

IMPORTANT NOTICE

THIS OFFERING IS AVAILABLE ONLY TO INVESTORS WHO ARE EITHER (1) BOTH QUALIFIED INSTITUTIONAL BUYERS UNDER RULE 144A AND QUALIFIED PURCHASERS AS DEFINED IN THE INVESTMENT COMPANY ACT OF 1940 OR (2) NON-U.S. PERSONS OUTSIDE OF THE UNITED STATES UNDER REGULATION S IN RELIANCE ON THE U.S. SECURITIES ACT OF 1933, AS AMENDED

IMPORTANT: You must read the following before continuing. The following applies to the offering memorandum following this page (the “**Offering Memorandum**”), and you are therefore advised to read this carefully before reading, accessing or making any other use of the Offering Memorandum. In accessing the Offering Memorandum, you agree to be bound by the following terms and conditions, including any modifications to them any time you receive any information from us as a result of such access.

NOTHING IN THIS ELECTRONIC TRANSMISSION CONSTITUTES AN OFFER OF SECURITIES FOR SALE IN THE UNITED STATES OR ANY OTHER JURISDICTION WHERE IT IS UNLAWFUL TO DO SO. THE SECURITIES HAVE NOT BEEN, AND WILL NOT BE, REGISTERED UNDER THE UNITED STATES SECURITIES ACT OF 1933, AS AMENDED (THE “**SECURITIES ACT**”), OR THE SECURITIES LAWS OF ANY STATE OF THE UNITED STATES OR OTHER JURISDICTION. THE SECURITIES MAY NOT BE OFFERED OR SOLD WITHIN THE UNITED STATES, OR TO, OR FOR THE ACCOUNT OR BENEFIT OF, U.S. PERSONS (AS DEFINED IN REGULATION S UNDER THE SECURITIES ACT (“**REGULATION S**”)) EXCEPT PURSUANT TO AN EXEMPTION FROM, OR IN A TRANSACTION NOT SUBJECT TO, THE REGISTRATION REQUIREMENTS OF THE SECURITIES ACT AND APPLICABLE STATE OR LOCAL SECURITIES LAWS.

THIS OFFERING MEMORANDUM MAY NOT BE FORWARDED OR DISTRIBUTED TO ANY OTHER PERSON AND MAY NOT BE REPRODUCED IN ANY MANNER WHATSOEVER, AND IN PARTICULAR, MAY NOT BE FORWARDED TO ANY ADDRESS IN THE UNITED STATES. ANY FORWARDING, DISTRIBUTION OR REPRODUCTION OF THIS DOCUMENT, IN WHOLE OR IN PART, IS UNAUTHORIZED. FAILURE TO COMPLY WITH THIS DIRECTIVE MAY RESULT IN A VIOLATION OF THE SECURITIES ACT OR THE APPLICABLE LAWS OF OTHER JURISDICTIONS.

Confirmation of your Representation: In order to be eligible to view the Offering Memorandum or make an investment decision with respect to the securities, investors must be either (1) both Qualified Institutional Buyers (“**QIBs**”) (within the meaning of Rule 144A under the Securities Act) and Qualified Purchasers (“**QPs**”) as defined in the United States Investment Company Act of 1940, as amended or (2) non-U.S. persons outside the United States in reliance on Regulation S under the Securities Act. The Offering Memorandum is being sent at your request and by accepting the e-mail and accessing the Offering Memorandum, you will be deemed to have represented to us that (1) you and any customers you represent are either (a) both QIBs and QPs or (b) non-U.S. persons outside of the United States and that the electronic mail address that you gave us and to which the Offering Memorandum has been delivered is not located in the United States and (2) you consent to delivery of the Offering Memorandum by electronic transmission.

IF ANY PERSON HOLDING AN INTEREST IN THE NOTES (AS DEFINED BELOW) IS NEITHER (1) A QIB WHO IS ALSO A QP AT THE TIME OF ACQUIRING THE NOTES NOR (2) A NON-U.S. PERSON OUTSIDE THE UNITED STATES, AS DEFINED IN REGULATION S UNDER THE SECURITIES ACT, THE ISSUER MAY REGARD THE TRANSACTION WITH SUCH PERSON AS NULL AND VOID AND OF NO EFFECT. IN SUCH CIRCUMSTANCES, SUCH PERSON MAY BE FORCED TO TRANSFER OR SELL SUCH NOTES TO A PERMITTED TRANSFEREE MEETING THE REQUIREMENTS SET FORTH UNDER THE CAPTION “TRANSFER RESTRICTIONS” IN THIS OFFERING MEMORANDUM.

MIFID II PRODUCT GOVERNANCE / TARGET MARKET: The Pricing Supplement in respect of any Notes may include a legend entitled “MiFID II Product Governance” which will outline the target market in respect of the Notes and which channels for distribution of the Notes are appropriate. Any person offering, selling or recommending the Notes (a “**distributor**”) should take into consideration such target market; however, a distributor subject to Directive 2014/65/EU (as amended, “**MiFID II**”) is for undertaking its own target market assessment in respect of the Notes and determining appropriate distribution channels.

A determination will be made in relation to each issue about whether, for the purpose of the MiFID Product Governance rules under EU Delegated Directive 2017/593 (the “**MiFID Product Governance Rules**”), any Dealer subscribing for any Notes is a manufacturer in respect of such Notes, but otherwise neither the Arranger (as defined below) nor the Dealers nor any of their respective affiliates will be a manufacturer for the purpose of the MiFID Product Governance Rules.

PROHIBITION OF SALES TO EEA RETAIL INVESTORS: If the Pricing Supplement in respect of any Notes includes a legend entitled “Prohibition of Sales to EEA Retail Investors”, such Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the European Economic Area (“**EEA**”). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client as defined in point (11) of Article 4(1) of MiFID II or (ii) a customer within the meaning of Directive (EC) 2016/97 (the “**Insurance Distribution Directive**”), where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or (iii) not a qualified investor as defined in Regulation (EU) 2017/1129 (the “**Prospectus Regulation**”). Consequently no key information document required by Regulation (EU) No 1286/2014 (as amended, the “**PRIIPs Regulation**”) for offering or selling the Notes or otherwise making them available to retail investors in the EEA will be prepared and therefore offering or selling the Notes or otherwise making them available to any retail investor in the EEA may be unlawful under the PRIIPs Regulation.

PRODUCT CLASSIFICATION PURSUANT TO SECTION 309B OF THE SECURITIES AND FUTURES ACT (CHAPTER 289 OF SINGAPORE) - The Pricing Supplement in respect of any Notes may include a legend entitled “Singapore Securities and Futures Act Product Classification” which will state the product classification of the Notes pursuant to section 309B(1) of the Securities and Futures Act (Chapter 289 of Singapore) (the “**SFA**”).

The Issuer will make a determination in relation to each issue about the classification of the Notes being offered for purposes of section 309B(1)(a). Any such legend included on the relevant Pricing Supplement will constitute notice to “relevant persons” for purposes of section 309B(1)(c) of the SFA. You are reminded that the Offering Memorandum has been delivered to you on the basis that you are a person into whose possession the Offering Memorandum may be lawfully delivered in accordance with the laws of the jurisdiction in which you are located and you may not, nor are you authorized to, deliver the Offering Memorandum to any other person.

To the fullest extent permitted by law, none of the Dealers or the Arranger accept any responsibility for the contents of the Offering Memorandum or for any other statements made or purported to be made by any Arranger or Dealer or on their behalf in connection with the Issuers or the Guarantor (each as defined in the Offering Memorandum) or the issue and offering of any securities. The materials relating to the offering of securities to which the Offering Memorandum relates do not constitute, and may not be used in connection with, an offer or solicitation in any place where offers or solicitations are not permitted by law. If a jurisdiction requires that the offering be made by a licensed broker or dealer and the underwriters or any affiliate of the underwriters is a licensed broker or dealer in that jurisdiction, the offering shall be deemed to be made by the underwriters or such affiliate on behalf of the relevant Issuer in such jurisdiction.

The Offering Memorandum has been sent to you in an electronic form. You are reminded that documents transmitted via this medium may be altered or changed during the process of electronic transmission and consequently none of the Issuers, the Guarantor, Standard Chartered Bank (the “**Arranger**”), any Dealer (as defined in the Offering Memorandum), any person who controls any Arranger or Dealer (as defined in the Offering Memorandum), any director, officer, employee or agent of the Issuers, the Guarantor or the Arranger or any Dealer, or affiliate of any such person accepts any liability or responsibility whatsoever in respect of any difference between the Offering Memorandum distributed to you in electronic format and the hard copy version available to you on request from the Arranger or the Dealers.

You are responsible for protecting against viruses and other destructive items. Your use of this e-mail is at your own risk and it is your responsibility to take precautions to ensure that it is free from viruses and other items of a destructive nature.

OFFERING MEMORANDUM



THAI OIL PUBLIC COMPANY LIMITED

(registered in the Kingdom of Thailand as a public company with limited liability)

THAIOIL TREASURY CENTER COMPANY LIMITED

(registered in the Kingdom of Thailand as a private company with limited liability)

US\$2,179,000,000 Global Medium Term Note Program

Under the US\$2,179,000,000 Global Medium Term Note Program described in this Offering Memorandum (the **"Program"**), each of Thai Oil Public Company Limited (the **"Company"**) and Thaioil Treasury Center Company Limited (the **"Treasury Center"**), subject to compliance with all relevant laws, regulations and directives, may from time to time issue medium term notes. Each Series (as defined in *"Summary of the Program"*) of notes shall be issued either by (i) the Company (in its capacity as issuer, an **"Issuer"**) (the **"Direct Issuance Notes"**); or (ii) the Treasury Center (in its capacity as issuer, an **"Issuer"**), and together with the Company in its capacity as issuer, the **"Issuers"**; in the case of (ii), the notes shall be unconditionally and irrevocably guaranteed by the Company (in its capacity as guarantor, the **"Guarantor"**) (the **"Guaranteed Notes"** and, together with the Direct Issuance Notes, the **"Notes"**).

Notes may only be issued in registered form. The aggregate nominal amount of Notes outstanding will not at any time exceed US\$2,179,000,000 (or its equivalent in other currencies, subject to any duly authorized increase). The Notes may be issued on a continuing basis to one or more of the Dealers specified under *"Summary of the Program"* or any additional Dealer appointed under the Program from time to time by the Company or the Treasury Center (each a **"Dealer"** and together the **"Dealers"**), which appointment may be for a specific issue or on an ongoing basis. References in this Offering Memorandum to the **"relevant Dealer"** shall, in the case of an issue of Notes being (or intended to be) purchased by more than one Dealer, be to all Dealers agreeing to purchase such Notes.

The guarantee of Guaranteed Notes (the **"Guarantee"**) constitutes a direct, unconditional, unsecured and unsubordinated obligation of the Guarantor, ranking at least *pari passu* with all other present and future unsecured and unsubordinated obligations of the Guarantor, save for such obligations as may be preferred by provisions of law that are both mandatory and of general application. In order to comply with applicable requirements of Thai law, the Indenture (as defined in *"Summary of the Program"*) will provide that the Guarantor's maximum liability under the Guarantee will be capped at an amount equal to 125% of the outstanding aggregate principal amount of the relevant Series of Guaranteed Notes (the **"Maximum Guaranteed Amount"**). See *"Risk Factors – Risks Relating to the Guarantee."*

Application has been made to the Singapore Exchange Securities Trading Limited (the **"SGX-ST"**) for permission to deal in and for the listing and quotation of any Notes that are agreed at or prior to the time of issue thereof to be so listed on the SGX-ST. Such permission will be granted when such Notes have been admitted to the Official List of the SGX-ST. Unlisted Series of Notes may also be issued pursuant to the Program. The relevant Pricing Supplement in respect of any Series of Notes will specify whether or not such Notes will be listed on the SGX-ST (or any other stock exchange). There is no assurance that an application to the SGX-ST for the listing of the Notes of any Series will be approved. Admission to the Official List of the SGX-ST and quotation of any Notes on the SGX-ST is not to be taken as an indication of the merits of the Issuers, the Guarantor, their respective subsidiary companies (if any), their respective associated companies (if any) or such Notes. The SGX-ST assumes no responsibility for the correctness of any of the statements made, opinions expressed or reports contained herein.

The Notes of each Series to be issued in registered form and which are sold in an **"offshore transaction"** within the meaning of Regulation S (**"Regulation S"**) under the United States Securities Act of 1933, as amended (the **"Securities Act"**) (**"Unrestricted Notes"**) will initially be represented by a registered global note certificate (each an **"Unrestricted Global Note Certificate"**) without interest coupons, which may be deposited on the relevant issue date (a) in the case of a Series intended to be cleared through Euroclear Bank S.A./N.V. (**"Euroclear"**) and/or Clearstream Banking, S.A. (**"Clearstream"**), with a common depository on behalf of Euroclear and Clearstream or (b) in the case of a Series intended to be cleared through The Depository Trust Company (**"DTC"**), registered in the name of Cede & Co. as nominee for DTC and (c) in the case of a Series intended to be cleared through a clearing system other than, or in addition to, Euroclear, Clearstream and/or DTC, or delivered outside a clearing system, as agreed among the relevant Issuer (in respect of each Series of Guaranteed Notes), the Guarantor and the relevant Dealer. Notes that are sold in the United States to investors who are both **"qualified institutional buyers"** (each, a **"QIB"**) within the meaning of Rule 144A (**"Rule 144A"**) under the Securities Act and **"qualified purchasers"** (each, a **"QP"**) as defined in the United States Investment Company Act of 1940, as amended (the **"U.S. Investment Company Act"**) (**"Restricted Notes"**) will initially be represented by a registered global note certificate (each a **"Restricted Global Note Certificate"**) and, together with the relevant Unrestricted Global Note Certificate, the **"Global Note Certificates"**), without interest coupons, which may be deposited on the relevant issue date with a custodian (the **"DTC Custodian"**) for, and registered in the name of Cede & Co. as nominee for, DTC or with a common depository on behalf of Euroclear and Clearstream. The provisions governing the exchange of interests in Global Notes for individual Note Certificates in registered form are described in *"Summary of Provisions Relating to the Notes while in Global Form."*

The Notes and the Guarantee have not been, and will not be, registered under the Securities Act or the securities laws of any other jurisdiction. Subject to certain exceptions, the Notes and the Guarantee may not be offered or sold within the United States or to, or for the account of benefit of, U.S. persons. Accordingly, the Notes and the Guarantee may be offered and sold (i) in the United States (as defined in Regulation S) in registered form only to persons who are both QIBs and QPs in reliance on the exemption from the registration requirements of the Securities Act provided by Rule 144A and the exemption from the registration requirements of the U.S. Investment Company Act provided by Section 3(c)(7) of that act, and/or (ii) outside the United States to non-U.S. persons in offshore transactions in reliance on Regulation S under the Securities Act. Any Series of Notes and the Guarantee may be subject to additional selling restrictions. The applicable Pricing Supplement in respect of such Series of Notes will specify any such restrictions. See *"Subscription and Sale"* and the applicable Pricing Supplement.

Notes issued under the Program may be rated or unrated. When an issue of Notes is rated, its rating will not necessarily be the same as the rating applicable to the Program. A rating is not a recommendation to buy, sell or hold securities and may be subject to suspension, reduction, revision or withdrawal at any time by the assigning rating agency.

Investing in Notes issued under the Program involves certain risks and may not be suitable for all investors. See *"Risk Factors"* beginning on page 10 for a discussion of factors that you should consider carefully before investing in the Notes.

Arranger

Standard Chartered Bank

Dealers

ANZ	BofA Merrill Lynch	Citigroup	Standard Chartered Bank	BNP PARIBAS	HSBC

The date of this Offering Memorandum is October 3, 2019.

NOTICE TO INVESTORS

This Offering Memorandum is being furnished by us on a confidential basis in connection with an offering exempt from the registration requirements under the Securities Act, solely for the purpose of enabling a prospective investor to consider the purchase of the Notes. The Notes may be offered in reliance upon the exemptions from registration under the Securities Act. **The Notes have not been and will not be registered under the U.S. Securities Act or any state securities laws in the United States. Neither the Issuer nor the Guarantor is registered, nor will they register, under the U.S. Investment Company Act, and investors will not be entitled to the benefits of the U.S. Investment Company Act. Subject to certain exceptions, the Notes may not be offered or sold within the United States or to any national, resident or citizen of the United States. Pursuant to this offering, the Notes may not be offered or sold in the United States or to, or for the account or benefit of, U.S. persons as defined in Regulation S under the U.S. Securities Act, except that the Notes may be offered or sold to (a) persons who are both (i) “qualified institutional buyers,” as defined in Rule 144A under the U.S. Securities Act and (ii) “qualified purchasers,” as defined in the U.S. Investment Company Act, in reliance on the exemption from the registration requirements of the U.S. Securities Act provided by Rule 144A and the exemption from the registration requirements of the U.S. Investment Company Act provided by Section 3(c)(7) of that act and (b) non-U.S. persons in offshore transactions in reliance on Regulation S. Prospective investors are hereby notified that sellers of the Notes may be relying on the exemption from the provisions of Section 5 of the Securities Act provided by Rule 144A.** Each purchaser of the Notes will be deemed to have made certain acknowledgments, representations and agreements regarding the Notes and the offer, sale, reoffer, pledge or other transfer of the Notes. See “*Transfer Restrictions.*”

Each Series (as defined herein) of Notes will be issued on the terms set out herein under “*Terms and Conditions of the Notes*” as amended and/or supplemented by the Pricing Supplement specific to such Series. This Offering Memorandum must be read and construed together with any amendments or supplements hereto and with any information incorporated by reference herein and, in relation to any Series of Notes, must be read and construed together with the relevant Pricing Supplement.

Distribution of this Offering Memorandum and any Pricing Supplement in whole or in part to any other person other than the prospective investor and any person retained to advise such prospective investor with respect to its purchase is unauthorized, and any disclosure of any of its contents, without our prior written consent, is prohibited. Each prospective investor, by accepting delivery of this Offering Memorandum and any Pricing Supplement, agrees to the foregoing and to make no photocopies of the whole or any part of this Offering Memorandum or any Pricing Supplement.

This Offering Memorandum and any Pricing Supplement do not constitute an offer to, and may not be used for the purpose of an offer to or a solicitation by, anyone in any jurisdiction or in any circumstances in which such an offer or solicitation is not authorized or is unlawful. No action has been or will be taken to permit a public offering of the Notes in any jurisdiction where action would be required for that purpose. The Notes may not be offered or sold, directly or indirectly, and neither this Offering Memorandum nor any Pricing Supplement may be distributed in any jurisdiction, except in accordance with the legal requirements applicable in such jurisdiction.

No person has been authorized to give any information or to make any representation other than those contained in this Offering Memorandum or any Pricing Supplement, and any information or representation not contained in this Offering Memorandum or any Pricing Supplement must not be relied upon as having been authorized by us, Standard Chartered Bank as the arranger (the “**Arranger**”) or the Dealers of the Program. Neither the delivery of this Offering Memorandum or any Pricing Supplement nor any sale of the Notes pursuant to the Program shall, under any circumstances, constitute a representation or create any implication that the information contained herein is correct as of any time subsequent to the date hereof or that there has been no change in the affairs of any party mentioned herein since that date.

No representation, warranty or undertaking, express or implied, is made by any of the Arranger, the Dealers, the Trustee or the Agents (in such capacity) (each as defined herein), and no responsibility or liability is accepted by any thereof, as to the accuracy, adequacy, reasonableness or completeness of the information contained in this Offering Memorandum or any other information provided by us in connection with the Issuers, the Guarantor or the Notes, their distribution or their future performance. The Arranger and the Dealers accordingly disclaim all and any liability whether arising in tort or contract or otherwise (save as referred to above) which they might otherwise have in respect of any such information.

Neither this Offering Memorandum, any Pricing Supplement nor any other information supplied in connection with the Notes should be considered as a recommendation by us, the Arranger, the Dealers, the Trustee

or the Agents (each as defined herein) that any recipient of this Offering Memorandum or any Pricing Supplement should purchase any of the Notes. Each investor contemplating purchasing any Notes should make its own independent investigation of our business, financial condition and affairs, and its own appraisal of our creditworthiness.

To the best of its knowledge, having made all reasonable enquiries, each of the Company and the Treasury Center confirms that (i) this Offering Memorandum (as may be supplemented from time to time) contains all information with respect to the Issuers, the Guarantor and the Notes which are material in the context of the offering of the Notes under the Program; (ii) the statements contained herein (as may be supplemented from time to time) relating to the Issuers, the Guarantor and the Notes are true and accurate in all material respects and not misleading; (iii) the opinions and intentions expressed in this Offering Memorandum (as may be supplemented from time to time) with regard to the Issuers and the Guarantor are honestly held, have been reached after considering all relevant circumstances and are based on reasonable assumptions; and (iv) there are no other facts in relation to the Issuers, the Guarantor or the Notes the omission of which would, in the context of the offering of the Notes under the Program, make any statement in this Offering Memorandum (as may be supplemented from time to time) misleading in any material respect.

THE NOTES HAVE NOT BEEN APPROVED OR DISAPPROVED BY THE UNITED STATES SECURITIES AND EXCHANGE COMMISSION (THE “SEC”), ANY STATE SECURITIES COMMISSION IN THE UNITED STATES OR ANY OTHER U.S. REGULATORY AUTHORITY, NOR HAVE ANY OF THE FOREGOING AUTHORITIES PASSED UPON OR ENDORSED THE MERITS OF THE OFFERING OF THE NOTES OR THE ACCURACY OR ADEQUACY OF THIS OFFERING MEMORANDUM. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE IN THE UNITED STATES.

In connection with the issue of any Series of Notes, the Dealer(s) (if any) named as the stabilizing manager(s) or persons acting on behalf of any Stabilizing Manager(s)) (the “**Stabilizing Manager(s)**”) may over-allot the Notes or effect transactions with a view to supporting the price of the Notes at a level higher than that which might otherwise prevail for a limited period after the issue date of the Notes. However, there is no obligation on such Stabilizing Manager(s) to do this. Such stabilizing, if commenced, may be discontinued at any time, and must be brought to an end after a limited period. Such stabilizing shall be in compliance with all applicable laws, regulations and rules.

DISCLOSURE OF INVESTORS IN COMPLIANCE WITH THAI SEC REQUIREMENTS

The Securities and Exchange Commission, Thailand, will require the Dealers to disclose the identity of investors in the Notes in accordance with applicable regulation.

NOTICE TO PROSPECTIVE INVESTORS IN THE UNITED KINGDOM

The Notes may not be offered or sold to any person in the United Kingdom, other than to persons whose ordinary activities involve them acquiring, holding, managing or disposing of investments (as principal or agent) for the purposes of their businesses or who it is reasonable to expect will acquire, hold, manage or dispose of investments (as principal or agent) for the purposes of their businesses or otherwise in circumstances which have not resulted and will not result in an offer to the public in the United Kingdom.

MIFID II PRODUCT GOVERNANCE / TARGET MARKET

The Pricing Supplement in respect of any Notes may include a legend entitled “MiFID II Product Governance” which will outline the target market in respect of the Notes and which channels for distribution of the Notes are appropriate. Any person offering, selling or recommending the Notes (a “distributor”) should take into consideration such target market; however, a distributor subject to Directive 2014/65/EU (as amended, “**MiFID II**”) is undertaking its own target market assessment in respect of the Notes and determining appropriate distribution channels.

A determination will be made in relation to each issue about whether, for the purpose of the MiFID Product Governance rules under EU Delegated Directive 2017/593 (the “**MiFID Product Governance Rules**”), any Dealer subscribing for any Notes is a manufacturer in respect of such Notes, but otherwise neither the Arranger nor the Dealers nor any of their respective affiliates will be a manufacturer for the purpose of the MIFID Product Governance Rules.

PRIIPs / IMPORTANT – EEA RETAIL INVESTORS

If the Pricing Supplement in respect of any Notes includes a legend entitled “Prohibition of Sales to EEA Retail Investors”, the Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the European Economic Area (“**EEA**”). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client as defined in point (11) of Article 4(1) of Directive 2016/97 (as amended, “**MiFID II**”) or (ii) a customer within the meaning of Directive (EU) 2016/97 (as amended, the “**Insurance Distribution Directive**”), where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or (iii) not a qualified investor as defined in Regulation (EU) 2017/1129 (as amended, the “**Prospectus Regulation**”). Consequently no key information document required by Regulation (EU) No 1286/2014 (as amended the “**PRIIPs Regulation**”) for offering or selling the Notes or otherwise making them available to retail investors in the EEA will be prepared and therefore offering or selling the Notes or otherwise making them available to any retail investor in the EEA may be unlawful under the PRIIPs Regulation.

PRODUCT CLASSIFICATION PURSUANT TO SECTION 309B OF THE SECURITIES AND FUTURES ACT (CHAPTER 289 OF SINGAPORE)

The Pricing Supplement in respect of any Notes may include a legend entitled “Singapore Securities and Futures Act Product Classification” which will state the product classification of the Notes pursuant to section 309B(1) of the Securities and Futures Act (Chapter 289 of Singapore) (the “**SFA**”).

The Issuer will make a determination in relation to each issue about the classification of the Notes being offered for purposes of section 309B(1)(a). Any such legend included on the relevant Pricing Supplement will constitute notice to “relevant persons” for purposes of section 309B(1)(c) of the SFA.

NOTICE TO RESIDENTS OF THAILAND

THE NOTES HAVE NOT BEEN, AND WILL NOT BE, REGISTERED WITH OR APPROVED BY THE THAI SEC. ANY OFFERING, SOLICITATIONS OR DISTRIBUTION, AS PRESCRIBED UNDER THAI LAWS AND REGULATIONS, OF THE NOTES IN THAILAND IS NOT LEGAL WITHOUT SUCH PRIOR REGISTRATION AND/OR APPROVAL. DOCUMENTS RELATING TO THE OFFERING OF THE NOTES, AS WELL AS INFORMATION CONTAINED THEREIN, MAY NOT BE DISTRIBUTED IN OR SENT TO THAILAND, AS THE OFFERING OF THE NOTES IS NOT AN OFFERING OF SECURITIES IN THAILAND, NOR MAY THEY BE USED IN CONNECTION WITH ANY OFFER FOR SUBSCRIPTION OR SALE OF THE NOTES IN THAILAND.

SERVICE OF PROCESS AND ENFORCEMENT OF CIVIL LIABILITIES

The Company is a limited liability public company and the Treasury Center is a private limited liability company, both organized under the laws of Thailand. Substantially all of our directors and officers (and our auditors) are residents of Thailand and a substantial portion of our assets and the assets of our officers and directors are located in Thailand. As a result, it may not be possible for investors to effect service of process upon us or such persons outside Thailand, or to enforce judgments against them obtained in courts outside Thailand predicated upon civil liabilities of ours or such directors and officers under laws other than Thailand, including any judgment predicated upon United States federal securities laws. We have been advised by Baker & McKenzie Ltd., our Thai counsel, that a judgment or order obtained in a court outside Thailand would not be enforced as such by the courts of Thailand, but such judgment or order in the discretion of the courts of Thailand may be

admitted as evidence of any obligation in new proceedings instituted in the courts of Thailand, which would consider the issue on the evidence before it.

CERTAIN DEFINED TERMS AND CONVENTIONS

As used in this Offering Memorandum, unless the context otherwise requires, the terms “we,” “us,” “our,” “Group,” and “Thai Oil” refer to Thai Oil Public Company Limited and its consolidated subsidiaries (including the Treasury Center). The terms “Company” and “Treasury Center” refer to each of Thai Oil Public Company Limited and Thail Oil Treasury Center Company Limited, respectively, on a standalone basis, unless the context requires otherwise.

In this Offering Memorandum, references to an “Issuer” or the “relevant Issuer” shall be either to the Company or the Treasury Center in their respective capacities as issuers under the Program, as the context requires, and references to the “Issuers” shall be to each Issuer collectively. References to the “Guarantor” shall be to the Company in its capacity as guarantor in respect of each Series of Guaranteed Notes.

The term “PTT” refers to PTT Public Company Limited and “PTT Group” refers to all the group companies under PTT, which include us. The terms “Thai Paraxylene” refers to Thai Paraxylene Company Limited, “Thai Lube Base” refers to Thail Lube Base Public Company Limited and “GPSC” refers to Global Power Synergy Public Company Limited.

In this Offering Memorandum, references to “US\$,” “\$” and “U.S. dollars” are to United States dollars, the legal currency of the United States, references to “THB,” “Baht” and “Thai Baht” are to the legal currency of the Kingdom of Thailand and references to “S\$” are to Singaporean dollars, the legal currency of Singapore. Unless otherwise specified or the context otherwise requires, all references to “Thai” or “Thailand” are references to the Kingdom of Thailand. All references to the “Government” or “Thai government” herein are references to the Government of the Kingdom of Thailand. All references to “United States” or “U.S.” herein are references to the United States of America. Certain terms used herein are defined in the “*Glossary of Technical Terms*” contained elsewhere in this Offering Memorandum.

PRESENTATION OF FINANCIAL AND OTHER INFORMATION

Exchange Rate Information

We publish our financial statements in Baht. Solely for convenience, this Offering Memorandum contains translations of certain Baht amounts into U.S. dollars at the exchange rate of THB30.74 = US\$1.00, which was the weighted-average interbank exchange rate announced by the Bank of Thailand (“**BOT**”) as of June 28, 2019. The weighted-average interbank exchange rate announced by the BOT as of September 30, 2019 was THB30.32 = US\$1.00. These translations should not be construed as representations that the Baht amounts represent such U.S. dollar amounts or could be, or could have been, converted into U.S. dollars at the rates indicated or at all. See “Exchange Rate Information” for further information regarding the rates of exchange between the Thai Baht and the U.S. dollar.

Presentation of Financial Information

This Offering Memorandum contains our audited financial statements as of and for the year ended December 31, 2017, including comparative information presented as corresponding figures as of and for the year ended December 31, 2016; our audited financial statements as of and for the year ended December 31, 2018, including comparative information presented as corresponding figures as of the for the year ended December 31, 2017; and our unaudited interim financial information as of and for the six months ended June 30, 2019, including comparative information presented as corresponding figures as of and for the six months ended June 30, 2018. These financial statements have been prepared in accordance with Thai Financial Reporting Standards (“**TFRS**”), which is aligned with, but not identical to, International Financial Reporting Standards (“**IFRS**”). See “*Summary of Principal Differences Between TFRS And IFRS.*”

Except as otherwise indicated or the context otherwise requires, financial information in this Offering Memorandum is presented on a consolidated basis.

Rounding

Rounding adjustments have been made in calculating some of the financial information included in this Offering Memorandum. As a result, numerical figures shown as totals in some tables may not be exact arithmetic aggregations of the figures that precede them.

Non-TFRS Financial Measures

This Offering Memorandum includes certain non-TFRS financial measures for Thai Oil, including EBITDA, EBITDA margins and other related ratios, and certain non-TFRS operating measures for Thai Oil, including, but not limited to, utilization rates, adjusted gross profit margin, gross integrated margin, product-to-feedstock margin and operating cash cost, which are supplemental measures of our performance and liquidity that are not required by, or presented in accordance with, TFRS or IFRS and should not be considered as an alternative to net income, operating income or any other performance measures derived in accordance with TFRS or IFRS or as an alternative to cash flow from operating activities or as a measure of liquidity. In addition, EBITDA, the EBITDA related ratios and the other operating measures are not standardized, hence a direct comparison between companies using such a term may not be possible.

Certain Operating Data

This Offering Memorandum contains certain operating data for Thai Oil, including distillation intake capacity, nameplate capacity and capacity utilization rates for our plants. The nameplate capacity with respect to other petrochemical products refers to the announced capacity of our plants based on technology licenses and/or production rates guaranteed by the construction contractor, as adjusted by upgrades or improvements. Capacity utilization rates refer to the actual total production expressed as a percentage of nameplate capacity during the relevant period.

AVAILABLE INFORMATION

While any Notes remain outstanding, we shall, during any period in which we are not subject to Section 13 or 15(d) of the U.S. Securities Exchange Act of 1934, as amended (the “**Exchange Act**”), or exempt from reporting pursuant to Rule 12g3-2(b) under the Exchange Act, make available to any qualified institutional buyer (as defined in Rule 144A) who is a holder and any prospective purchaser of a Note who is a qualified institutional buyer (as so defined) designated by such holder, upon the request of such holder or prospective purchasers, the information concerning us required to be provided to such holder or prospective purchaser by Rule 144A(d)(4) under the Securities Act.

FORWARD-LOOKING STATEMENTS

We have included statements in this Offering Memorandum which contain words or phrases such as “will,” “would,” “aim,” “is likely,” “expect,” “will continue,” “anticipate,” “estimate,” “intend,” “plan,” “contemplate,” “seek,” “target,” “propose,” “future,” “objective,” “goal,” “project,” “should,” “can,” “could,” “may” and similar expressions or variations of such expressions, that are “forward-looking statements.” Although our management believes that its expectations as reflected by such forward-looking statements are reasonable based on information currently available to it, actual results may differ materially from those suggested by the forward-looking statements due to certain risks or uncertainties associated with our expectations with respect to, but not limited to:

- fluctuations in prices of refinery and petrochemical products or feedstock;
- continued availability of capital and financing;
- interest rates and foreign exchange rates;
- value added tax and other taxes and duties;
- our fixed obligations;

- our competitive environment;
- the financial health of our principal offtake and other domestic refinery and petrochemical customers;
- the extension or renewal of our feedstock, offtake, utility and other contractual arrangements;
- general economic and business conditions and refined petroleum and petrochemical demand and supply in Thailand, Asia and the countries and regions in which we conduct our business;
- technical difficulties in the operation of our plants reducing expected levels of output and efficiency, including unplanned plant shutdowns;
- delays, cost overruns, shortages in materials or labor, defects in design or construction or other problems with construction of our proposed plant expansions;
- receipt of Government approvals and licenses for our other proposed plant expansions;
- our ability to successfully grow through strategic acquisitions and joint ventures;
- the cyclical and highly competitive nature of our business;
- significant capital expenditures required for plant maintenance;
- our ability to realize anticipated synergies and cost savings;
- our dependence on principal customers and feedstock suppliers, including PTT;
- unanticipated future regulatory restrictions in the refinery and/or petrochemical industry;
- liability for remedial actions under environmental regulations;
- political, economic and social developments in Thailand, Asia, the Middle East and the countries and regions in which we conduct our business;
- the cost and availability of adequate insurance coverage; and
- other factors beyond our control.

For a further discussion of the factors that could cause our actual results to differ, see the discussion under “*Risk Factors*.” The risks described in the “*Risk Factors*” section in this Offering Memorandum are not exhaustive. Other sections of this Offering Memorandum describe additional factors that could adversely affect our business, financial condition or results of operations. No assurances can be given that such expectations will prove to be correct. Moreover, we operate in a very competitive and rapidly changing environment. New risk factors emerge from time to time and it is not possible for us to predict all such risk factors, nor can we assess the impact of all such risk factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements. Given these risks and uncertainties, you should not place undue reliance on forward-looking statements as a prediction of actual results. We undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

HISTORICAL AND CURRENT MARKET AND INDUSTRY DATA

Historical and current market data used throughout this Offering Memorandum were obtained from internal company analyses, consultants’ reports and industry publications. In particular, information has been provided by Platts, a division of McGraw-Hill Financial (“**Platts**”), IHS, Inc. (“**IHS**”), the International Energy Agency (“**IEA**”), FACTS Global Energy (“**FGE**”), Argus Media Limited (“**Argus**”) and ICIS. Industry surveys and publications generally state that the information contained therein has been obtained from sources believed

to be reliable, but the accuracy and completeness of information contained in consultants' reports and industry publications is not guaranteed. Neither we nor the Arranger and Dealers have independently verified this market data. Similarly, internal company analyses, while believed by us to be reliable, have not been verified by any independent sources, and neither we nor any of the Arranger and Dealers make any representation as to the accuracy of such information. While we are not aware of any misstatements regarding any industry or similar data presented herein, such data involve risks and uncertainties and are subject to change based on various factors, including those discussed under the "*Risk Factors*" section in this Offering Memorandum. As a result, you should not place undue reliance on such information.

The IHS reports and information referenced herein (the "**IHS Materials**") are the copyrighted property of IHS and represent data, research, opinions or viewpoints published by IHS, and are not representations of fact. The IHS Materials speak as of the original publication date thereof (and not as of the date of this Offering Memorandum). The information and opinions expressed in the IHS Materials are subject to change without notice and IHS has no duty or responsibility to update the IHS Materials. Moreover, while the IHS Materials reproduced herein are from sources considered reliable, the accuracy and completeness thereof are not warranted, nor are the opinions and analyses which are based upon it. To the extent permitted by law, IHS shall not be liable for any errors or omissions or any loss, damage or expense incurred by reliance on the IHS Materials or any statement contained herein, or resulting from any omission.

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ICIS data is subject to the methodology described on ICIS's website (<https://s3-eu-west-1.amazonaws.com/cjp-rbi-icis-compliance/wp-content/uploads/2017/11/13120805/Base-Oils-Methodology-13-November-2017.pdf>), and ICIS accepts no liability for commercial decisions based on any such data.

DOCUMENTS INCORPORATED BY REFERENCE

This Offering Memorandum should be read and construed in conjunction with each relevant Pricing Supplement, the most recently published audited annual accounts and any interim accounts (whether audited or unaudited) published subsequently to our annual accounts from time to time (if any) and all amendments and supplements from time to time to this Offering Memorandum, which shall be deemed to be incorporated in, and to form part of, this Offering Memorandum and which shall be deemed to modify or supersede the contents of this Offering Memorandum to the extent that a statement contained in any such document is inconsistent with this Offering Memorandum. Copies of all such documents which are so deemed to be incorporated in, and to form part of, this Offering Memorandum will be available free of charge during usual business hours on any weekday (Saturdays and public holidays excepted) from the specified offices of the Paying Agent set out at the end of this Offering Memorandum.

TABLE OF CONTENTS

	Page
SUMMARY OF THE PROGRAM	1
SUMMARY CONSOLIDATED FINANCIAL AND OTHER INFORMATION.....	6
RISK FACTORS	10
USE OF PROCEEDS	33
EXCHANGE RATE INFORMATION	34
CAPITALIZATION AND INDEBTEDNESS.....	35
SELECTED CONSOLIDATED FINANCIAL AND OTHER DATA	36
MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS	40
INDUSTRY OVERVIEW	75
CORPORATE HISTORY AND CORPORATE STRUCTURE.....	87
DESCRIPTION OF THE TREASURY CENTER	95
BUSINESS.....	96
MANAGEMENT	131
PRINCIPAL SHAREHOLDERS	147
FORM OF THE NOTES.....	148
TERMS AND CONDITIONS OF THE NOTES	150
SUMMARY OF PROVISIONS RELATING TO THE NOTES WHILE IN GLOBAL FORM.....	188
FORM OF PRICING SUPPLEMENT	191
CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS	200
DESCRIPTION OF OTHER MATERIAL INDEBTEDNESS	203
TAXATION.....	207
SUBSCRIPTION AND SALE	216
TRANSFER RESTRICTIONS.....	222
ERISA CONSIDERATIONS.....	226
SUMMARY OF PRINCIPAL DIFFERENCES BETWEEN TFRS AND IFRS	230
LEGAL MATTERS	233
INDEPENDENT AUDITORS	234
GLOSSARY OF TECHNICAL TERMS	235
INDEX TO THE FINANCIAL STATEMENTS	F-1

SUMMARY OF THE PROGRAM

This summary must be read as an introduction to this Offering Memorandum and any decision to invest in the Notes should be based on a consideration of the Offering Memorandum as a whole, including any information incorporated by reference. Words and expressions defined in the “Terms and Conditions of the Notes” below or elsewhere in this Offering Memorandum have the same meanings in this summary.

Issuers	Thai Oil Public Company Limited (in respect of Direct Issuance Notes) and Thail Oil Treasury Center Company Limited (in respect of Guaranteed Notes).
Guarantor (in respect of Guaranteed Notes)	Thai Oil Public Company Limited.
Guarantee	The Guarantor will, in respect of a Series of Guaranteed Notes, fully, irrevocably and unconditionally guarantee the due and punctual payment of premium (if any) and interest in respect of or on, and all other amounts payable under, such Series of Guaranteed Notes (and any Additional Amounts), subject to the Maximum Guaranteed Amount and the amended and restated indenture dated October 3, 2019 (the “ Indenture ”), expressed to be payable by the Treasury Center. The Guarantor’s maximum liability under the Guarantee will be capped at the Maximum Guaranteed Amount.
Program Size	Up to US\$2,179,000,000 (or the equivalent in other currencies calculated as described in the Dealer Agreement (as defined in “ <i>Subscription and Sale</i> ”)) outstanding at any time. The Issuers and the Guarantor may increase the amount of the Program in accordance with the terms of the Dealer Agreement.
Arranger	Standard Chartered Bank.
Dealers	Australia and New Zealand Banking Group Limited, Citigroup Global Markets Inc., Merrill Lynch (Singapore) Pte. Ltd., Standard Chartered Bank, BNP Paribas, The Hongkong and Shanghai Banking Corporation Limited and any other Dealer appointed from time to time by the Issuers or the Guarantor (as the case may be) either generally in respect of the Program or in relation to a particular Series of Notes.
Principal Paying Agent and Paying Agent	Citibank, N.A., London Branch.
Registrar and Transfer Agent	Citibank, N.A., London Branch.
Exchange Agent	Citibank, N.A., London Branch.
Trustee	Citicorp International Limited.
Method of Issue	The Notes will be issued on a syndicated or non-syndicated basis. The Notes will be issued in series (each a “ Series ”) having one or more issue dates and on terms otherwise identical (or identical other than in respect of the first payment of interest and their issue price), and intended to be interchangeable with all other Notes of that Series. Each Series may be issued in tranches (each a “ Tranche ”) on the same or different issue dates. The specific terms of each Tranche (which will be completed, where necessary, with the relevant terms and conditions and, save in respect of the issue date, issue price, first payment date of interest and nominal amount of the Tranche, will be identical to the terms of other Tranches of the same Series) will be completed in the Pricing Supplement.

Clearing Systems	Euroclear, Clearstream and/or DTC and such other clearing system as shall be agreed between the relevant Issuer, (in respect of each Series of Guaranteed Notes) the Guarantor, the Trustee, the Agents and the relevant Dealer(s).
Form of the Notes	Notes may only be issued in registered form. Each Series of Notes, which are sold outside the United States in reliance on Regulation S, will, unless otherwise specified in the applicable Pricing Supplement, be represented by a Global Note Certificate (as defined in the “<i>Form of the Notes</i>”), which will be deposited on or about its issue date with a common depositary for, and registered in the name of a nominee of, Euroclear and Clearstream, or with a custodian for, and registered in the name of a nominee of, DTC for the accounts of Euroclear and Clearstream. With respect to all offers or sales by a Dealer of an unsold allotment or subscription, beneficial interests in a Global Note Certificate of such Series may be held only through Euroclear, Clearstream, DTC for the accounts of Euroclear and Clearstream. Regulation S Global Note Certificates will be exchangeable for Definitive Notes only upon the occurrence of an Exchange Event as described in “<i>Form of the Notes</i>.” Each Tranche of Notes sold to persons who are both QIBs and QPs in compliance with Rule 144A and subject to the restrictions described in “<i>Transfer Restrictions</i>” and “<i>Subscription and Sale</i>” and the applicable Pricing Supplement will, unless otherwise specified in the applicable Pricing Supplement, be represented by a Rule 144A Global Note Certificate, which will be deposited on or about its issue date with a custodian for, and registered in the name of a nominee of, DTC. Rule 144A Global Note Certificates will be exchangeable for Definitive Notes only upon the occurrence of an Exchange Event as described in “<i>Form of the Notes</i>.” Application will be made to have Global Note Certificates of any Series accepted for clearance and settlement through the facilities of DTC, Euroclear and/or Clearstream, as appropriate.
Currencies	Notes may be denominated in any currency or currencies, agreed between the relevant Issuer, (in respect of a Series of Guaranteed Notes) the Guarantor and the relevant Dealer(s) subject to compliance with all applicable legal and/or regulatory and/or central bank requirements. Payments in respect of Notes may, subject to such compliance, be made in and/or linked to, any currency or currencies other than the currency in which such Notes are denominated.
Denominations	Notes will be issued in such denominations as may be specified in the relevant Pricing Supplement, subject to compliance with all applicable legal and/or regulatory and/or central bank requirements.
Status of the Notes	The Notes will constitute direct, unconditional, unsubordinated and (subject to Condition 5(a) (<i>Certain Covenants—Limitation on Liens</i>)) unsecured obligations of the relevant Issuer which will at all times rank <i>pari passu</i> among themselves and at least <i>pari passu</i> with all other present and future unsecured and unsubordinated obligations of the relevant Issuer, save for such obligations as may be preferred by provisions of law that are both mandatory and of general application. See “<i>Terms and Conditions of the Notes—Status</i>.”
Status of the Guarantee.....	The Guarantee will constitute a direct, unconditional, unsubordinated and unsecured obligation of the Guarantor and will rank at least <i>pari passu</i> with all other present and future unsecured and unsubordinated

	obligations of the Guarantor, save for such obligations as may be preferred by provisions of law that are both mandatory and of general application. Notwithstanding anything to the contrary, the Guarantor's maximum liability under the Guarantee in respect of each Series of Guaranteed Notes will be capped at the Maximum Guaranteed Amount.
Issue Price	Notes may be issued at their nominal amount or at a discount or premium to their nominal amount. Partly Paid Notes may be issued, the issue price of which will be payable in two or more installments.
Maturities	Any maturity, subject, in relation to specific currencies, to compliance with all applicable legal and/or regulatory and/or central bank requirements. Where Notes have a maturity of less than one year and either (a) the issue proceeds are received by the relevant Issuer in the United Kingdom or (b) the activity of issuing the Notes is carried on from an establishment maintained by the relevant Issuer in the United Kingdom, such Notes must: (i) have a minimum redemption value of £100,000 (or its equivalent in other currencies) and be issued only to persons whose ordinary activities involve them in acquiring, holding, managing or disposing of investments (as principal or agent) for the purposes of their businesses or who it is reasonable to expect will acquire, hold, manage or dispose of investments (as principal or agent) for the purposes of their businesses; or (ii) be issued in other circumstances which do not constitute a contravention of section 19 of the Financial Services and Markets Act 2000 ("FSMA") by the Issuers or the Guarantor.
Redemption	Notes may be redeemable at par or at such other Redemption Amount (detailed in a formula, index or otherwise) as may be specified in the relevant Pricing Supplement. Notes may also be redeemable in two or more installments on such dates and in such manner as may be specified in the relevant Pricing Supplement.
Optional Redemption	If specified in the relevant Pricing Supplement, Notes may be redeemed before their stated maturity at the option of the relevant Issuer (either in whole or in part) as described in Condition 10(c) (<i>Redemption and Purchase—Optional Redemption</i>).
Tax Redemption	Except as described in " <i>Optional Redemption</i> " above, early redemption of Notes will only be permitted for tax reasons as described in Condition 10(b) (<i>Redemption and Purchase—Optional Tax Redemption</i>).
Interest.....	Notes may be interest-bearing or non-interest-bearing. Interest (if any) may accrue at a fixed rate or a floating rate or other variable rate or be index linked and the method of calculating interest may vary between the issue date and the maturity date of the relevant Series. All such information will be set out in the relevant Pricing Supplement.
Certain Covenants.....	Each of the Issuers and the Guarantor has covenanted in Condition 5 (<i>Certain Covenants</i>) with certain limitations and exceptions, not to incur certain liens or consolidate, merge or sell all or substantially all of its property or assets unless certain conditions are satisfied.
Maximum Guaranteed Amount	In order to comply with applicable requirements of Thai law, the Guarantor's maximum liability under the Guarantee will be capped at

	an amount equal to 125 % of the outstanding aggregate principal amount of the relevant Series of Guaranteed Notes.
Increase in Interest Rate Payable Upon the Occurrence of a Change of Control Triggering Event	The interest rate payable on the Notes will be subject to an increase of 1.25% upon the occurrence of a Change of Control Triggering Event.
Cross Default	The Notes will contain a cross default provision as further described in Condition 13 (<i>Events of Default</i>).
Withholding Tax	See Condition 10(b) (<i>Redemption and Purchase — Optional Tax Redemption</i>) and Condition 12 (<i>Additional Amounts</i>).
Listing and Trading	Application has been made to the SGX-ST for permission to deal in and for the listing and quotation of Notes that may be issued pursuant to the Program and which are agreed at or prior to the time of issue thereof to be so listed on the SGX-ST. The Notes may also be listed on such other or further stock exchange(s) as may be agreed between the relevant Issuer, (in respect of each Series of Guaranteed Notes) the Guarantor and the relevant Dealer in relation to each Series. Unlisted Series of Notes may also be issued pursuant to the Program. The relevant Pricing Supplement in respect of any Series of the Notes will specify whether or not such Notes will be listed and, if so, on which exchange(s) the Notes are to be listed. There is no assurance that an application to the Official List of the SGX-ST for the listing of the Notes of any Series will be approved. If approval in-principle is received from the SGX-ST in relation to the Notes of any Series to be listed on the SGX-ST, such Notes will be traded on the SGX-ST in a minimum board lot size of at least S\$200,000 (or its equivalent in foreign currencies) following listing, for so long as such Notes are listed on the Official List of the SGX-ST and the rules of the SGX-ST so require. For so long as any Notes are listed on the SGX-ST and the rules of the SGX-ST so require, the Issuers and the Guarantor shall appoint and maintain a paying agent in Singapore, where such Notes may be presented or surrendered for payment or redemption, in the event that the Global Notes representing such Notes are exchanged for Definitive Notes. In addition, in the event that the Global Notes are exchanged for Definitive Notes, an announcement of such exchange will be made by or on behalf of the relevant Issuer and the Guarantor through the SGX-ST and such announcement will include all material information with respect to the delivery of the definitive notes, including details of the paying agent in Singapore so long as the Notes are listed on the SGX-ST and the rules of the SGX-ST so require.
Governing Law	The Notes, the Guarantee and the Indenture will be governed by, and construed in accordance with, the laws of the State of New York.
Rating	Notes issued under the Program may be rated or unrated, as specified in the applicable Pricing Supplement. A rating is not a recommendation to buy, sell or hold securities and may be subject to suspension, reduction, revision or withdrawal at any time by the assigning rating agency.
Selling Restrictions	For a description of certain restrictions on offers, sales and deliveries of Notes and on the distribution of offering materials in the United States of America, the European Economic Area, the United Kingdom,

the PRC, Hong Kong, Japan, Singapore and Thailand, see “*Subscription and Sale*” below.

In connection with the offering and sale of a particular Series of Notes, additional restrictions may be imposed which will be set out in the applicable Pricing Supplement.

Transfer Restrictions..... There are restrictions on the transfer of Notes sold pursuant to Regulation S under the Securities Act prior to the expiration of the relevant distribution compliance period and on the transfer of Notes sold pursuant to Rule 144A under the Securities Act. See “*Transfer Restrictions*.” The Notes may not, either directly or indirectly, be resold, pledged or otherwise transferred in Thailand.

Initial Delivery of Notes On or before the issue date for each Series, the Global Note Certificate representing Notes may be deposited with a common depositary for Euroclear and Clearstream or registered in the name of a nominee of DTC and deposited on or about the issue date or any other clearing system or may be delivered outside any clearing system *provided that* the method of such delivery has been agreed in advance by the relevant Issuer, (in respect of each Series of Guaranteed Notes) the Guarantor, the Trustee, the Principal Paying Agent and the relevant Dealer(s). Notes that are to be credited to one or more clearing systems on issue will be registered in the name of, or in the name of a nominee or a sub-custodian for, such clearing systems.

SUMMARY CONSOLIDATED FINANCIAL AND OTHER INFORMATION

You should read the following summary consolidated financial information in conjunction with our consolidated financial statements, together with each of their related notes, “Presentation of Financial and Other Information,” “Selected Consolidated Financial and Other Data” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included elsewhere in this Offering Memorandum. Our consolidated financial statements have been prepared and presented in accordance with TFRS, which differs in certain respects from IFRS. See “Summary of Principal Differences Between TFRS and IFRS.”

Summary Consolidated Financial and Other Information

The following tables set forth our summary consolidated financial information as of and for the years ended December 31, 2016, 2017 and 2018, and as of and for the six months ended June 30, 2018 and 2019.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
Summary Consolidated Statement of Income (Loss) Information:							
Revenue from sale and services	274,738.9	337,387.7	389,343.5	12,665.7	188,172.2	183,587.6	5,972.3
Subsidy from oil fuel fund					1,256.6	765.6	24.9
Cost of sale of goods and services	(247,261.2)	(305,385.6)	(373,128.0)	(12,138.2)	(175,509.5)	(177,772.3)	(5,783.1)
Gross profit	27,477.8	32,002.1	16,215.5	527.5	13,919.2	6,580.9	214.1
Net derivative gain (loss) on hedging	(243.2)	(133.2)	(820.5)	(26.7)	171.7	(76.4)	(2.5)
Dividend Income	247.3	157.9	157.4	5.1	157.4	167.1	5.4
Net foreign exchange gain	446.1	3,181.6	626.7	20.4	311.6	1,245.6	40.5
Other income	1,118.8	1,190.1	1,718.9	55.9	708.2	1,337.1	43.5
Selling expenses	(451.3)	(491.8)	(424.0)	(13.8)	(224.6)	(218.3)	(7.1)
Administrative expenses	(2,182.1)	(2,969.4)	(2,357.8)	(76.7)	(1,059.2)	(1,128.6)	(36.7)
Share of profit of associates and joint ventures	929.7	1,196.7	1,192.9	38.8	671.9	702.5	22.9
Profit before finance costs and income tax expense....	27,343.1	34,133.8	16,309.2	530.6	14,656.2	8,609.9	280.1
Finance costs ⁽¹⁾	(3,460.7)	(3,285.1)	(3,941.9)	(128.2)	(1,827.4)	(2,410.4)	(78.4)
Profit before income tax expense	23,882.4	30,848.8	12,367.2	402.3	12,828.8	6,199.5	201.7
Income tax expense	(2,295.5)	(5,529.5)	(1,982.8)	(64.5)	(2,289.8)	(1,116.2)	(36.3)
Profit for the year / period .	21,586.9	25,319.3	10,384.4	337.8	10,538.9	5,083.3	165.4
Profit for the year / period attributable to:							
Owners of the Parent	21,221.9	24,856.2	10,149.0	330.2	10,402.6	4,975.2	161.8
Non-controlling interests	365.0	463.1	235.4	7.7	136.2	108.1	3.5
Profit for the year / period .	21,586.9	25,319.3	10,384.4	337.8	10,538.9	5,083.3	165.4
Basic earnings per share (Baht)	10.4	12.2	5.0	0.2	5.1	2.4	0.1

(1) Including finance costs from repurchase of debentures for the six months ended June 30, 2018.

	As of December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
Summary Consolidated Statement of Financial Position Information:							
Cash and cash equivalents	31,120.8	15,623.4	34,041.5	1,107.4	34,552.8	57,338.3	1,865.3
Total current assets	115,730.6	126,211.4	164,743.5	5,359.3	141,536.8	146,947.4	4,780.3
Total non-current assets	102,000.6	101,896.9	103,869.5	3,379.0	99,936.6	109,505.6	3,562.3
Total assets	217,731.2	228,108.3	268,613.0	8,738.2	241,473.4	256,453.0	8,342.6
Total current liabilities	34,145.8	33,348.0	38,020.1	1,236.8	38,641.5	29,885.0	972.2
Total non-current liabilities	71,988.1	67,612.0	104,120.5	3,387.1	73,041.3	101,414.3	3,299.1
Total liabilities	106,133.9	100,960.0	142,140.6	4,624.0	111,682.8	131,299.3	4,271.3
Total equity	111,597.3	127,148.2	126,472.4	4,114.3	129,790.6	125,153.7	4,071.4
Total liabilities and equity	217,731.2	228,108.3	268,613.0	8,738.2	241,473.4	256,453.0	8,342.6

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions) US\$	THB	THB	US\$
Summary Consolidated Statement of Cash Flow Information:							
Net cash provided by operating activities	23,181.6	34,417.2	18,313.0	595.7	11,184.3	8,647.0	281.3
Net cash (used in) provided by investing activities	(18,351.8)	(30,092.4)	(25,846.3)	(840.8)	9,604.3	26,265.6	854.4
Net cash (used in) provided by financing activities	(9,397.3)	(19,226.0)	25,565.6	831.7	(2,739.3)	(9,096.6)	(295.9)
Net increase (decrease) in cash and cash equivalents ..	(4,567.5)	(14,901.2)	18,032.4	586.6	18,049.3	25,816.0	839.8
Effect of exchange rate changes	(76.2)	(596.1)	385.7	12.5	880.1	(2,219.0)	(72.2)
Cash and cash equivalents at beginning of year / period	35,764.4	31,120.8	15,623.4	508.2	15,623.4	33,741.3	1,097.6
Cash and cash equivalents at end of year / period	31,120.8	15,623.4	34,041.5	1,107.4	34,552.8	57,338.3	1,865.3

Certain Other Financial and Operational Information

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
EBITDA Information:							
EBITDA ⁽¹⁾	32,674.8	36,924.7	20,238.5	658.4	16,503.9	8,960.9	291.5
EBITDA Margin ⁽²⁾	11.9%	10.9%	5.2%	5.2%	8.8%	4.9%	4.9%

Notes:

- (1) EBITDA means profit for the year excluding income tax expense, finance costs, depreciation and amortization, finance income, investment gain/loss and disposal of asset.
- (2) EBITDA margin means EBITDA divided by the sum of revenue from sale of goods and revenue from rendering of services.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
Certain Financial Information and Ratios:							
Total Debt ⁽¹⁾	76,301.0	66,468.0	107,059.9	3,482.8	75,412.9	99,596.9	3,240.0
Net Debt ⁽²⁾	15,526.5	(1,473.5)	(202.2)	(6.6)	(1,497.0)	5,738.7	186.7
Total Debt to EBITDA (times) ⁽³⁾	2.3	1.8	5.3	5.3	4.5	11.1	11.1
Net Debt to EBITDA (times) ⁽⁴⁾	0.5	(0.04)	0.0	0.0	(0.09)	0.6	0.6
EBITDA-to-interest coverage ratio (times) ⁽⁵⁾ ...	9.4	11.2	5.1	5.1	9.0	3.7	3.7
Net Debt to Equity (times) ⁽⁶⁾	0.1	(0.01)	0.0	0.0	(0.01)	0.0	0.0

Notes:

- (1) Total debt means the sum of short-term borrowings, the current portion of long-term borrowings, the current portion of debentures, the non-current portion of long-term borrowings and the non-current portion of debentures.
- (2) Net debt means total debt less (i) cash and cash equivalents and (ii) current investments.
- (3) Calculated from total debt divided by EBITDA.
- (4) Calculated from net debt divided by EBITDA.
- (5) Calculated from EBITDA divided by finance costs.
- (6) Calculated from net debt divided by equity.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
Certain Operational Information:							
Adjusted gross profit (loss)⁽¹⁾ from							
Oil refining	26,245.0	29,058.2	16,008.8	520.8	13,253.0	7,194.3	234
Petrochemical	6,452.5	6,302.0	6,218.4	202.3	2,663.4	2,674.2	87
Lube base oil	2,703.5	3,184.6	1,944.9	63.3	1,240.7	762.0	24.8
Integrated profit	35,401.0	38,544.9	24,172.1	786.3	17,157.1	10,630.5	345.8
Integrated intake (thousand bpd) ⁽²⁾	300.5	312.2	313.4	313.4	305.8	306.1	306.1
Average foreign exchange rate (THB/US\$) ⁽³⁾	35.5	34.1	32.5	32.5	31.9	31.8	31.8
Gross integrated margin (US\$ per barrel)⁽⁴⁾	9.1	9.9	6.5	6.5	9.7	6.0	6.0
Integrated cash cost (US\$ per barrel)⁽⁵⁾	2.3	2.1	2.4	2.4	2.2	2.7	2.7

Notes:

- (1) Adjusted gross profit (loss) is the sum of gross profit or loss under TFRS, non-feedstock related cost of goods sold and service rendered, depreciation and operating expenses, foreign currency exchange gains or losses, net realizable value adjustments and other income.
- (2) Integrated intake, measured in thousands of barrels per day, is calculated based on our oil refinery's crude oil and feedstock intake, our petrochemical plants' feedstock import and our lube base oil refinery's long residue import.
- (3) Average foreign exchange rate is calculated based on the daily average selling rate of foreign exchange published by the BOT.
- (4) Gross integrated margin was calculated by taking the integrated profit, as divided by the total integrated intake, and further adjusted to take into account the foreign exchange rates.
- (5) Integrated cash cost is a measure of operating expenses and includes plant operating expenses, selling expenses, administrative expenses and finance costs excluding non-recurring items. Our integrated cash cost comprised operating expenses of US\$1.8/bbl, US\$1.6/bbl, US\$1.9/bbl, US\$1.7/bbl and US\$2.1/bbl and finance costs of US\$0.6/bbl, US\$0.5/bbl, US\$0.5/bbl, US\$0.5/bbl and US\$0.6/bbl for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, respectively

See “*Management’s Discussion and Analysis of Financial Condition and Results of Operations—Key Metrics for our Group*” for further details in relation to calculation of the gross margin from production, gross integrated margin and integrated cash cost.

RISK FACTORS

Investing in the Notes issued under the Program involves a high degree of risk. You should carefully consider the risks and uncertainties described below, together with all of the other information set out in this Offering Memorandum, including the consolidated financial statements and the related notes included elsewhere in this Offering Memorandum, before deciding whether to invest in the Notes issued under the Program.

The risks and uncertainties described below are not the only ones that may affect us or the Notes issued under the Program. Additional risks and uncertainties that we are unaware of, or that we currently believe are not material, may also become important factors that adversely affect our business. In general, investing in securities of issuers in emerging market countries such as Thailand involves risks not typically associated with investing in the securities of companies in countries with more developed economies. To the extent any information below relates to the Thai government or Thai macroeconomic data, such information has been extracted from official Thai government publications or other third-party sources and has not been independently verified by us.

Risks Relating to Our Business

Cyclicalities in the refining and petrochemical industries may result in reduced volumes or operating margins, and volatile margins in the refining and petrochemical industries and uncertainty regarding the global economic recovery could have a material adverse effect on us in the future.

Our historical operating results reflect in part the volatile and cyclical nature of the refining and petrochemical industries. Historically, the refining and petrochemical industries have experienced alternating periods of tight supply, resulting in increased prices and profit margins, followed by periods of substantial capacity addition, resulting in oversupply and reduced prices and profit margins. Our financial results are primarily dependent on factors beyond our control which affect the margins between the prices of our refined petroleum, petrochemical and lube base oil products and the cost to acquire crude oil and other feedstock. Future volatility may negatively affect our results of operations, since the margin between products and feedstock prices may decrease below the amount needed for us to generate net cash flow sufficient for our needs. Specific factors that may affect our refining, petrochemical and lube base oil margins and financial performance include:

- aggregate demand for crude oil, refined petroleum products and petrochemical products, which is influenced by factors such as general economic conditions, weather patterns, government energy policy and market sentiment, which are each influenced by external factors beyond our control;
- accidents, interruptions in transportation, inclement weather or other events that cause unscheduled shutdowns or otherwise adversely affect our refinery, plants, machinery, pipelines or equipment, or those of our suppliers or customers;
- increases in the cost or availability to us of crude oil and other feedstock and related transportation costs without corresponding increases in the price of refined petroleum products or petrochemical products;
- aggregate refining capacity and utilization rate as well as petrochemical and lube base oil products production capacity in Thailand, the Asia-Pacific region and worldwide;
- unexpected changes in the refined petroleum product or petrochemical products pricing mechanism;
- unexpected changes in fuel specifications required by environmental laws and regulations, without being able to pass on the cost of complying with these specifications to our customers in the form of increases in the prices of refined petroleum products or petrochemical products;
- rulings, judgments or settlements in litigation and other legal matters, including unexpected environmental remediation or compliance costs at our facilities in excess of any reserves, and claims of personal injury;
- our ability to implement our planned capital projects or to realize the benefits expected from those projects;

- worldwide political conditions, including political conditions in oil producing regions, such as the Middle East and Asia, and the United States-China trade wars;
- price, availability and acceptance of substitute petroleum products or petrochemical products, such as biojet;
- adoption of or modifications to environmental, taxation and other laws and regulations in Thailand and abroad; and
- fluctuations in the value of the Baht against the U.S. dollar.

As a result of the foregoing factors, our gross refining margins and cash flows may be constrained and our ability to service our debt obligations may be adversely affected.

In addition, we are unable to predict with certainty future supply and demand balances, market conditions and other factors that may affect operating margins. We may reduce production at or leave idle a facility or a particular unit at a facility for an extended period of time, discontinue a product line because of an oversupply of a particular product and/or a lack of demand for that particular product, or high feedstock prices that make production uneconomical, which may have a material adverse effect on our results of operations.

Furthermore, we expect that challenging global economic conditions such as the continued uncertainty regarding the economic recovery in Europe and the slowdown in the Chinese economy will be a key factor that impacts the growth of the demand for refining and petrochemical products. For example, the slowdown in economic growth in China has partly contributed to instability in the prices for crude oil used in our refinery as well as our petroleum and petrochemical products. We expect that a weak economic outlook will continue to affect the overall demand for petroleum and petrochemical products, including in Thailand. If economic and market conditions domestically and globally in Europe, the United States, China and other key markets are uncertain or deteriorate, the demand for our products or operating margins for refined petroleum and petrochemical products could decline. Such a decline could have a material adverse effect on our business, operating results and financial condition.

Fluctuations in market prices of crude oil and other feedstock, as well as refined petroleum products or petrochemical products, may affect our results of operations.

The market prices of crude oil and other feedstock have been and are expected to continue to be volatile and are subject to a variety of factors that are beyond our control. These factors, among others, include:

- global and regional events and circumstances, as well as political developments and instability in petroleum producing regions, such as the Middle East and Asia;
- the ability of the Organization of Petroleum Exporting Countries (“OPEC”) and other petroleum-producing nations to set and maintain production levels and therefore influence market prices;
- market prices and supply and demand of crude oil, feedstock, natural gas, refined petroleum products and substitute energy sources;
- discoveries of low-cost feedstock in new geographical areas;
- change in product and process technologies;
- domestic and foreign government regulations with respect to oil and energy industries in general;
- significant events, including accidents, that affect our production capacity;
- the level and scope of activity of oil speculators;
- weather conditions and seasonality; and

- overall global, regional and domestic economic conditions, including the European sovereign debt crisis and the slowdown in China's economic growth.

Since we acquire our crude oil in the spot market or under long-term contracts that contain variable pricing provisions, we are subject to the day-to-day fluctuations in crude oil prices, as well as the demand and supply balance for refined petroleum products. Generally, an increase or decrease in the price of crude oil may result in a corresponding increase or decrease in the price of our refined petroleum products. However, there is an approximately one-month lag time from our purchase of crude oil and other feedstock to our sale of refined petroleum products produced from these feedstock. Price level changes during the period between purchasing our crude oil and other feedstock and our selling the refined petroleum products from such feedstock could have a material adverse effect on our profit margins and could have a significant effect on our business, financial condition and results of operations. In addition, there can be no assurance that the price of refined petroleum products will increase in the same proportion as the price of crude oil, or at all. Any inability to pass on increases in the market price of crude oil and other feedstock may have a material adverse effect on our financial condition and results of operations. World crude oil prices improved in 2019, with the price of Dubai crude oil fluctuating between US\$51.9 per barrel and US\$74.5, averaging at US\$64.1 per barrel, according to Platts. This was primarily attributable to several factors, including lower global crude supply due to the OPEC and alliance policy to cut output and the U.S. policy to sanction oil exports from Iran and Venezuela. Nevertheless, the output of U.S. crude oil rose gradually following an increase in the number of U.S. oil rigs, offsetting to a limited extent the cut in oil output. While it is impossible to predict the level of crude oil prices for the remainder of 2019, if crude oil prices decline, we may be required to record an inventory loss in 2019, which would have an adverse effect on our results of operations for the same period. We also maintain inventories of crude oil and refined products, as required under Thai law, and the value of such inventories are subject to fluctuations in market prices.

Any increase in the price of crude oil may increase our short-term financing or working capital needs. Although we have not recently experienced difficulties in securing trade financing for working capital requirements, any such difficulties in securing short-term financing on favorable terms may have a material adverse effect on our financial condition and results of operations.

We are heavily dependent on our relationship with PTT as our supplier, customer and major shareholder. Any changes in these relationships may materially and adversely affect us. The interests of PTT may also be in conflict with ours and yours as a holder of the Notes issued under the Program.

PTT, our major shareholder owning 48.03% of our shares as of June 30, 2019, is Thailand's largest integrated oil and gas company and is also engaged in the petrochemical production, petroleum refining, petrochemical trading and refined petroleum product retail marketing businesses in Thailand.

PTT is our principal feedstock supplier. For the year ended December 31, 2018, we sourced 53.3% and 100.0% of our crude oil and natural gas feedstock, respectively, under feedstock supply agreements with PTT. For the six months ended June 30, 2019, we sourced 52.3% and 100.0% of crude oil and natural gas feedstock, respectively, under feedstock supply agreements with PTT. Our principal feedstock supply agreement with PTT is a term contract, under which the price for purchases of crude oil and other feedstock are negotiated on an arm's length basis by reference to benchmark market prices, under which our feedstock costs may increase from time to time. See "*Business—Our Business Units and Products—Oil Refining.*" PTT also supplies natural gas to our refinery and power plants under gas sale contracts with similar market based terms. There can be no assurance that PTT will be able to procure crude oil, natural gas and other feedstock at the quantities we require and also at prices which we believe is reasonable, or at all.

We also enter into short and long term crude oil supply contracts with other major oil companies, such as Shell Thailand and Chevron, and procure feedstock from short-term suppliers and on the spot market. Our reliance on these short-term suppliers and spot market purchases increases during periods when PTT or other long-term suppliers experience interruptions or shutdowns which impact their ability to supply feedstock, or when our demand for feedstock exceeds historical norms. If, for any reason, any of these short-term suppliers declines to continue to supply us with feedstock on mutually agreeable terms and prices, or if PTT or other long-term suppliers fail to supply us with feedstock pursuant to the terms of the relevant agreements or we fail to negotiate an extension or renewal of such contracts on terms acceptable to us, or at all, we may be unable to procure feedstock and be required to purchase feedstock from other short term suppliers or increase our spot market purchases, either of which may be more costly.

PTT and PTTOR (PTT's subsidiary) are our largest customers by revenue from sale and services, together accounting for 45.4% and 46.4% of total sales revenue for the year ended December 31, 2018 and for the six months ended June 30, 2019. PTT and PTTOR accounted for 42.6%, and 15.2% of our total revenue from sales and service for our refined petroleum and lube base oil products, respectively, in the year ended December 31, 2018. PTT and PTTOR accounted for 44.2%, and 14.3% of our total revenue from sales and services for our refined petroleum and lube base oil products, respectively, in the six months ended June 30, 2019.

As a result, we will be affected by a reduction in or loss of sales to PTT or changes in its financial condition or operations. There can be no assurance that PTT will continue to purchase our products in quantities historically purchased, or at all. If PTT is unable to purchase our products, or otherwise ceases or suspends its purchases, and we cannot find other customers to offtake those quantities in bulk, our revenues, margins and cash flows may be adversely affected.

We generally make sales to PTT under long-term offtake agreements with minimum offtake commitments. Our inability to successfully negotiate renewals of such offtake agreements with PTT on terms that are mutually acceptable, or the failure of PTT to comply with the terms of the existing offtake agreements, could have a material adverse effect on our business, financial condition, results of operations and prospects. PTT sells certain of the products it purchases from us to other end-user customers and any changes in the demand for our products from end-user customers may affect future levels of offtake commitments by PTT and adversely affect our business and results of operations.

Circumstances may arise in which PTT's interests or the interests of its associated companies may be in conflict with our interests. Potential conflicts of interest could include matters relating to our feedstock supply or offtake agreements, potential competition in the areas in which we operate, approvals for significant corporate transactions or issuances or dispositions of securities. PTT holds interests in IRPC Public Company Limited ("IRPC"), PTT Global Chemical Company Limited ("PTTGC") and Star Petroleum Refining Public Company Limited ("SPRC"). Each of IRPC, PTTGC and SPRC competes with us for sales of refined petroleum, petrochemical and lube base oil products to PTT and other customers in the Thai domestic market and in the international markets. PTT's interests as our major shareholder and as a substantial or sole shareholder of IRPC, PTTGC and SPRC may conflict.

PTT could have the ability to control our management and administration, in particular, the nomination of directors to be appointed by the annual general meeting of shareholders and the nomination of certain executive officers to be appointed by the board of directors. At present, four of our non-independent directors are currently directors or executive officers of PTT or a PTT Group company. In addition, the Thai government, as a major shareholder of PTT, may influence us to pursue certain of its macroeconomic and social policies, which may not be in your or our best interest. We cannot assure you that conflicts of interest among the Thai government, PTT, ourselves, our respective associated companies and our directors and executive officers will always be resolved in a manner not adverse to your or our interests. Our directors and executive officers may face potential conflicts of interest in fulfilling their responsibilities as such individuals may also hold positions in PTT and our competitors.

There can be no assurance that we or PTT will be able to resolve any potential conflict, or that, if such conflicts were resolved, we would not receive a more favorable resolution if it were dealing with an unaffiliated party. We have adopted a Code of Conduct for our directors and executive officers that includes provisions designed to address such conflicts of interest. However, we cannot assure you that conflicts of interest among ourselves and our directors and executive officers, on the one hand, and the PTT Group and its directors and executive officers, on the other hand, will always be resolved in a manner not adverse to our interests or your interests as holders of the Notes issued under the Program.

We benefit from our relationship with PTT in a number of important respects. As the principal refiner of the PTT Group, we are able to benefit from PTT's market position, expertise and customer base. We believe that PTT's position as our principal feedstock supplier and principal offtake customer provides important stability to our business. Our membership within the PTT Group also provides us with significant economies of scale, competitive purchase terms and conditions, business opportunities and group synergies. Certain of our agreements contain termination or amendment clauses in the event PTT reduces its shareholding in our Company. Under a number of our outstanding loan agreements and Thai Baht debentures, an event of default is deemed to occur if PTT, directly and indirectly, owns less than 45.0% of our issued share capital.

We cannot assure you that PTT will continue its current level of shareholding in us, or at all, or that PTT will continue to provide support to us. If PTT reduces its shareholding in us or ceases to provide us with support,

or if any of our material feedstock or offtake agreements with PTT were terminated, our business, cash flow, financial condition, results of operations and prospects could be materially adversely affected.

We are dependent on foreign sources for our supply of crude oil and other feedstock, in particular from the Middle East, and any disruption in our supply of crude oil and other feedstock could reduce our margins and materially adversely affect our results of operations.

The main raw material used in our production process is crude oil and we are dependent on crude oil being readily available to satisfy substantially all of our production needs. We are capable of processing a wide range of crude oil, including crude oil from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand, although our choice of feedstock at any time depends on relative prices and yields. We consume crude oil from both foreign and domestic sources and acquire crude oil through a combination of long-term purchase contracts and spot market purchases. For the year ended December 31, 2018, crude oil from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand, accounted for, by volume, 75.2%, 8.4%, 8.5% and 7.9% of our total crude oil consumption, respectively. For six months ended June 30, 2019, crude oil from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand, accounted for, by volume, 74.0%, 6.2%, 14.1% and 5.7% of our total crude oil consumption, respectively. The supply of imported crude oil and other feedstock is subject to a variety of factors that are beyond our control, including the political developments and instability in petroleum producing regions, in particular in the Middle East, government regulations with respect to oil and energy industries in those regions, import tariffs and other restrictions, weather conditions and overall economic conditions in those regions. Although we have not experienced any significant difficulties in obtaining crude oil and other feedstock to satisfy our production requirements to date, there can be no assurance that we will continue to have an adequate supply of feedstock, primarily crude oil, available to our refinery to sustain our current level of refining operations at acceptable prices and on satisfactory terms. If we are unable to obtain an adequate supply of crude oil and other feedstock or are only able to obtain such volumes at unfavorable prices or terms, our margins and our results of operations would likely be materially adversely affected. See “*Business—Our Business Units and Products—Oil Refining.*”

A significant interruption in our operations, which may be caused by effects beyond our control, will reduce our production and materially and adversely affect our business.

The majority of our production facilities are located at the Sriracha Complex and substantially all of our revenues are derived from the sales of our products produced at such production facilities. Refining, transporting and storing crude oil and other feedstock, as well as other operational activities involving the refined petroleum products, petrochemical products and other products we produce involve many significant risks and hazards that could result in fires, explosions, leaks, spills, discharges or releases of hazardous substances or gases or other environmental risks, and other unexpected or dangerous conditions or accidents. Our operations are also subject to mechanical failures and equipment shutdowns. In such situations, undamaged refinery processing units or other production facilities may be dependent on or interact with damaged sections of our refinery or other facilities and, accordingly, are also subject to being shut down. If such events occur, our production capacity may be materially and adversely affected. If our refinery or other facilities are forced to shut down for a significant period of time, this would have a material adverse effect on our earnings, our other results of operations and our financial condition as a whole, particularly if such event was not adequately covered by our insurance. In addition, many of these operating and other risks may cause personal injury and loss of life, severe damage to or destruction of property and equipment and environmental damage, and may result in loss of permits or licenses, suspension of operations and the imposition of civil or criminal penalties.

Our business and operating results are vulnerable to interruption by events outside of our control that may affect our plants or facilities in Thailand or the facilities of our suppliers and customers. Possible disruptions include, among others: earthquakes, fire, tsunami, volcanic activity, flooding, power loss, telecommunications failures, political instability, military conflict and uncertainties arising from terrorist attacks, the economic consequences of military action or terrorist activities and associated political instability, and the effect of heightened security concerns on domestic and international travel and commerce. Floods and other events beyond our control can harm our business, financial condition and results of operation by causing, among other things, production stoppages, the incurrence of significant costs, including, but not limited to, supply chain shortages or reduced demand for our products due to the impact on our customers or supply chains.

While we try to ensure that our factories are well designed, safely operated and properly maintained, events outside of our control may significantly interrupt our operations, whether directly or indirectly, as a result

of industrial accidents, severe weather or other natural disasters, terrorist attacks or other causes. This could materially and adversely affect our business, financial condition and results of operations.

We depend on a small number of customers for a significant portion of our net sales.

We sell our refined petroleum products mainly in the domestic market to major oil companies, including PTT/PTTOR, Shell Thailand, Chevron and Bangchak Petroleum Public Company Limited (“**Bangchak**”), which accounted for, by total sales volume, 35.5%, 5.3%, 3.8% and 0.5%, respectively, of our revenue in the year ended December 31, 2018, by total sales volume 42.1%, 6.4%, 3.7% and 0.6%, respectively, of our revenue in the six months ended June 30, 2019. In particular, PTT and PTTOR accounted for, by volume, 43.2%, 40.2%, 40.9%, 46.6% and 42.4% of our revenue in 2016, 2017 and 2018 and in the six months ended June 30, 2018 and 2019, respectively. See “*Business—Our Business Units and Products—Oil Refining*.” As a result of our dependence on this small number of customers, we may be affected by changes in their financial condition or operations or their demand for our products. We have supported the growth of other independent offtake customers to capture the growing demand in Thailand and such offtake customers continue to be a growing portion of our sales. We also seek to expand our customer base both in the domestic and international markets, including traders and end users, to accommodate sales fluctuations to our major offtake customers.

We expect to continue to sell a substantial portion of our production to these major oil companies and maintain or expand our sales to other independent offtake customers, traders and users. We cannot assure you that any of our offtake customers will not encounter resale, marketing or financial difficulties or that they will be able to continue to purchase our refined petroleum products in quantities historically purchased, or at all.

Compliance with, and changes to, environmental, health and safety, tax and other laws and regulations may adversely affect our results of operations and our financial condition.

Environmental

Due to the nature of our business, we are subject to extensive and increasingly stringent environmental codes, rules, laws and regulations, both domestic and international. Some of these laws and regulations require our facilities to operate under permits, licenses, authorizations or certificates that are subject to renewal or modification. Any amendments or modifications to these laws and regulations and permits may require us to install pollution control equipment and to implement changes to our operations to limit the impact or potential impact on the environment, health and safety. A violation of these laws, codes, rules and regulations or permit conditions can result in substantial fines, criminal sanctions, permit revocations and facility shutdowns.

We have incurred, and expect to continue to incur, operating costs and capital expenditures to comply with the environmental laws and regulations to which we are subject. While we believe we are in compliance in all material respects with all applicable environmental laws and regulations, our operations may nevertheless give rise to liabilities and may require us to incur costs to remedy the damage caused. Environmental regulations in Thailand and other countries in which we operate have become increasingly stringent in recent years, and this trend is likely to continue. Changes to environmental laws and regulations, their interpretations or enforcement may require us to make additional capital expenditures or incur additional operating expenses in order to maintain our current operations, curtail our production activities or take other actions that could have a material adverse effect on our financial condition, results of operations and cash flow. See “*Business—Environment*.” In addition, we may be unable to sell any refined petroleum or other products if they fail to meet new specifications. If we fail to meet environmental requirements, we may also be subject to administrative, civil and criminal proceedings by governmental authorities, as well as civil proceedings by environmental groups and other individuals, which could result in substantial fines and penalties against us as well as orders that could limit or halt our operations. These changes could also limit the availability of our funds for other purposes, which could adversely affect our business, financial condition, results of operations and cash flows.

To date, we have not been subject to any litigation, investigations or any material fines and penalties with respect to environmental and related matters. However, there can be no assurance that we will not become involved in future litigation, investigation, claim, suit or other proceedings or be held responsible in any such future litigation or proceedings, whereby the costs could be material. Environmental clean-up and remediation costs of our sites and environmental litigation could pose reputational and other risks that could adversely affect our cash flow, results of operations and financial condition.

Health and Safety

Our business involves the handling, manufacture and use of substances and compounds that may be considered toxic or hazardous within the meaning of environmental, health and safety laws. As a result, we may face liability for alleged personal injury, property damage or product defects due to exposure to chemicals or other hazardous substances at our plants or chemicals that we manufacture, handle, own or sell. Although we have not experienced any claims of this nature to date, claims of this nature can be substantial and could in the future materially adversely affect our reputation, business, financial condition, profitability or cash flows.

We also incur and expect to continue to incur capital and operating costs to comply with health and safety laws and regulations in Thailand and other countries in which we operate. In addition, new laws and regulations, stricter enforcement of, or changes to, existing laws and regulations, the discovery of previously unknown health and safety hazards or the implementation of more stringent quality standards could in the future require us to incur costs, or affect our production or revenues, in ways that may have an adverse effect on our financial condition or results of operations. We cannot assure you that material capital expenditures, costs, or operating expenses beyond those currently anticipated will not be required under applicable health and safety laws and regulations, or that developments with respect to such laws and regulations will not adversely affect our production or revenues. See “*Business—Risk Management and Safety.*”

Legal and Business Environment

Our operations may also be impacted by changes in the legal and business environments in which we operate, as well as the outcome of government investigations, tax disputes and audits, tax assessments and legal proceedings. Also, as a result of new laws and regulations or other factors, we could be required to curtail or cease certain operations. Changes that impact the business environment include changes in electricity supply and tariffs, such as the tariffs applicable to end-user customers, product specification, pricing intervention, changes in accounting standards, changes in environmental laws, changes in tax laws or tax rates, changes in economic sanctions law, and changes affecting the rights, privileges and conditions under our Board of Investment of Thailand (“**BOI**”) investment promotion certificates, including any change to the interpretation and/or position of the BOI and/or the Thailand Revenue Department with regards to any tax privileges received under the BOI investment promotion certificate. See “*Business—Investment Promotion*” and “*Business—Environment.*” These changes could have a significant adverse financial impact on our future operations and the way we conduct, or if we conduct, business, particularly if such changes require significant capital investment, create additional liability or impose fines and penalties on us. There is no guarantee that we will be able to comply with these changes, make changes to our existing operations or services, develop new technologies, products or services, or otherwise react promptly to meet the demand of these changes in the legal and business environments in serving our customers. Failing to do so could have an adverse effect on our business, financial condition and results of operations.

Government intervention in our pricing decision and requirements in our production may adversely affect our results of operations and our financial condition. The Thai government may intervene, from time to time, to regulate the prices we charge for our products. Government intervention in our product pricing may result in losses incurred by us. The Thai government currently regulates the ex-refinery retail and wholesale prices of LPG. In order to cap the retail price of LPG, the Thai government requires all LPG producers, including us, to sell LPG to customers at an ex-refinery controlled price. Although the Thai government is required to subsidize LPG producers from the oil fuel fund to cover the difference between the controlled ex-refinery LPG price plus relevant taxes and the wholesale LPG price, and, to date, we have received payments from the oil fuel fund on a regular basis, the oil fuel fund is not subject to any requirements as to the timing of refund settlements. Any changes in the Thai government’s pricing policies may result in a material adverse effect on our business, financial condition and results of operations.

In respect of the prices of diesel, petrol and gasohol products, the Thai government may intervene to regulate the prices by subsidizing the price, or increasing the levies and/or the contribution rate to the oil fuel fund in order to stabilize domestic retail prices of such products and alleviate the effects of the rise of world market prices to encourage the use of alternative fuel, such as ethanol, and to mitigate the costs of living of consumers as well as the operating costs of business operators in Thailand. We cannot assure you that the Thai government will not intervene in our pricing decisions in the future, especially if crude oil prices in the market increase or fluctuate significantly. Such pricing intervention may materially and adversely affect our business, financial condition and results of operations.

The Thai government may from time to time increase oil reserves requirements as a percentage of a refiner's annual throughput. In November 2013, the Department of Energy Business (“DOEB”) increased the proportion of oil reserves required to be held by petroleum refiners such as ourselves from 5% of their annual throughput of crude oil to 6%, which resulted in an increase in our working capital costs and handling costs. The legal reserve requirement for the liquefied petroleum gas will also increase from 1% of its throughput to 2% in 2021. We cannot assure you that the DOEB or any other government body will not revise the regulatory requirements to increase the minimum ratio of oil and natural gas reserves and impose such requirements in the future.

Failure to obtain, renew or maintain the permits, approvals, licenses, authorizations or leases required to operate our businesses may have an adverse effect on our business, financial condition, results of operations and prospects.

We require permits, approvals, licenses, authorizations and leases to operate our business and/or to construct and operate our plants. For example, in the course of operating our business, we are frequently required to obtain environmental impact assessment approvals, and to comply with license requirements, rules, laws and regulations with respect to construction permit, fire prevention, safety and environmental protection. Health and environmental impact assessment approvals, if required, for any new projects are time-consuming, uncertain and may impact the feasibility of our planned projects. From time to time, we may be required to renew permits, approvals and leases or to obtain new permits, approvals and leases. There can be no assurance that the relevant authorities will issue any such permits, approvals and leases in the time frame anticipated by us, or at all. Failure to obtain such approvals, permits and leases may subject us to fines, suspensions, or disruption to our operations and construction, which may materially and adversely affect our business, results of operations and financial condition.

Our insurance coverage may not adequately protect us against possible risk of loss.

We carry physical loss or damage to our refinery and business interruption insurance which covers loss of gross profit as a consequence of fire, explosion, electrical damage, machinery breakdown, natural catastrophes, and fuel and/or power shortages. We also carry third-party liability insurance and marine open cargo insurance for all our commercial operating plants, as well as insurance coverage for our projects under construction, especially for the Clean Fuel Project (“CFP”). We carry constructional all-risk insurance, including delay in start-up, third-party liability insurance and project cargo insurance. As of June 30, 2019, the sum insured in respect of such physical loss or damage insurance, business interruption insurance, and third-party liability insurance was US\$ 8,556 million with limit of liability of US\$ 2,963 million per occurrence, the sum insured in respect of marine open cargo was US\$ 6,957 million with limit of liability of US\$ 330 million per shipment, the sum insured in respect of the CFP project was US\$ 5,719 million, and the sum insured in respect of CFP project cargo was US\$ 3,250 million with limit of liability of US\$ 100 million per shipment.

In addition, we carry insurance coverage for directors and officer's liability to protect our directors, officers, and senior managers against claims arising from their decisions and action taken, environmental liability insurance to protect the company against claims arising from pollution condition. We also carry policies for minor property, automobile, office equipment, electronic equipment such as computer and notebook insurance, and personal accident insurance for all of our employees.

While we believe that we maintain insurance coverage in amounts consistent with industry norms in Thailand, including deductibles and coverage amounts, if we suffer a material uninsured loss or any insured loss suffered by us significantly exceeds our insurance coverage, our business, financial condition and results of operations may be materially and adversely affected. In addition, our insurance policies do not cover any penalties or fines or other payments owed to the Thai government resulting from any of these risks. Although we believe that the Thai government does not have a history of levying material fines in the petroleum refining industry, we cannot assure you that the Thai government would not do so in the future. Furthermore, our insurance policies do not provide coverage for terrorist attacks and are subject to deductibles. Any terrorist attack that results in damage to our infrastructure or that of our customers could cause interruption to parts of our business and materially and adversely affect our financial condition and results of operations See “Business—Insurance.”

Our operations consume large amounts of electricity, industrial water, steam and other utilities, and shortages, supply disruptions or substantial increases in the price of such utilities could adversely affect our business.

The successful operation of our plants depends on an uninterrupted and timely supply of electricity, steam, industrial water and other utilities. Accordingly, we are at risk, in the event of a disruption, in the supply of any of these utilities. Prolonged blackouts or disruptions caused by accidents or natural disasters such as floods, droughts, earthquakes or tsunamis could also substantially disrupt our production, directly or indirectly. For example, we experienced a power disruption in March 2005, where a short circuit in one gas turbine triggered an unplanned shutdown in another gas turbine and a shutdown of our waste heat boilers. We also experienced a shortage of water supply during the water crisis in 2005. Future disruptions could materially and adversely affect our operating results and financial condition. Many factors, such as the supply and demand for electricity, general economic conditions, changes in government policies, political instability and global weather conditions, including natural disasters, may affect the availability and prices of these utilities. These risks may be exacerbated given the geographic concentration of our facilities. Additional prolonged substantial increases in the price of these utilities could have a material and adverse effect on the costs of operating our plants and would negatively affect our gross margins unless we are able to fully pass on the additional expense to our consumers.

Our business is capital intensive and our expansion plans have significant capital expenditures and financing requirements, which are subject to a number of risks and uncertainties. In addition, our planned expansion projects may not be completed as planned, or at all.

The refining and petrochemical industries are capital intensive. Our ability to maintain and increase our revenues and net profits is partially dependent upon continued capital spending, including investing in, constructing, upgrading and maintaining our facilities. In addition, we continuously monitor developments in the refining and petrochemical products markets in Thailand, Southeast Asia, East Asia and elsewhere for opportunities to expand into new businesses or invest in derivative uses of our refinery and petrochemical production. Any future expansion of our business, including our planned expansion projects, will require additional capital expenditures, which may be substantial.

The board of directors approves our capital expenditures on annual basis. The board of directors approved the incurrence of capital expenditures of up to THB148,597.2 million, for the next five years ending December 31, 2023. In particular, our board of directors on June 29, 2018 and our shareholders on August 27, 2018 approved the investment of approximately US\$4,825 million in the CFP Project, which constituted approximately 118.7% of our total assets as of June 30, 2019. The CFP Project involves the construction of new production units, with the aim of improving our production and energy efficiency, oil refinery capacity and refining capabilities, and reducing environmental impact. We expect to fund the significant investment in the CFP Project through our cash reserves, cash flow from our future business operations, long-term loans and debt instruments. See “Recent Developments—Clean Fuel Project.” Our actual capital expenditures may be significantly higher or lower than our planned amounts due to various factors, including, among others, unplanned cost overruns and additional capital expenditure which might be approved by the board of directors in the next fiscal years, our ability to generate sufficient cash flows from operations and our ability to obtain adequate external financing for our planned capital expenditures.

In addition, we cannot assure you whether, or at what cost, our capital expenditures that relate to planned or other possible expansion projects (including the CFP Project) will be completed as scheduled or at all, or that these projects will be successful if completed. The timing and cost of completion of these projects will depend on a number of factors, including the cost and availability of financing and changes in general economic conditions in Thailand and elsewhere, our intended significant export markets or changes in our expansion plans. The completion of these projects may also be adversely affected by uncertainties commonly associated with large construction and expansion projects, including shortages or changes in prices of equipment or materials, defects in design or construction, lack of environmental approvals, adverse weather conditions, natural disasters, accidents and unforeseen circumstances and problems. Any of these uncertainties may cause delays in completion of all or part of the planned projects and increases in related investment costs. Any or all of the above problems could materially harm our business and operating results.

Certain investments may be made either through newly established companies, through joint ventures or through associated companies. We sometimes find it necessary to provide financial support to such entities to alleviate difficulties such as weak financial condition in the startup stage or otherwise to ensure our strategic goals are met. In some cases, these entities may encounter a lack of liquidity from unexpected circumstances during the

course of operation and require financial support from shareholders. We cannot assure you that our associated companies will not have further financial difficulties that may require further financial assistance from us or result in us taking on impairment charges with respect to our investments in such companies, any of which could have an adverse effect on our financial condition and results of operations. Further, we cannot assure you that we will not provide financial assistance to certain associated companies by increasing our equity interests in such associated companies above 50.0% or otherwise acquire control or joint control of these associated companies, in which case we will be required, under TFRS to consolidate the financial accounts of such companies from the date of acquiring control, which may in turn have an adverse effect on our consolidated financial condition.

The additional funding we will need to raise in order to make our planned capital expenditures which, if met by way of additional debt financing, may place restrictions on us, may, among other things:

- increase our vulnerability to general adverse economic and industry conditions;
- limit our ability to pursue growth plans;
- limit our ability to raise additional debt financing;
- require us to dedicate a substantial portion of cash flow from operations to payments on our debt, thereby reducing the availability of our cash flow to fund capital expenditures, working capital requirements and other general corporate purposes; and/or
- limit our flexibility in planning for, or reacting to, changes in our business and its industry, either through the imposition of restrictive financial or operational covenants or otherwise.

We cannot assure you that we will be able to obtain additional financing when needed on commercially acceptable terms or at all. Any difficulties we face in accessing financing on acceptable terms and conditions could have a material adverse effect on our business, financial condition, results of operations and prospects.

The refining, petrochemical and lube base oil industries are highly competitive.

The refining industry is highly competitive with respect to the sale of refined petroleum products in the Thai domestic, regional and global markets. Our principal competitors include other major domestic petroleum refiners as well as other global refiners who export products into the regional and domestic markets in the refined petroleum products business. We compete for available supplies of crude oil and other feedstock and for outlets of our refined petroleum products. Domestic petroleum refiners, including us, increased refining capacity in the 1990s and the 2000s without a corresponding increase in demand for refined petroleum products, which has resulted in overcapacity for several major refined petroleum products. Currently, there is an excess supply in the Thai domestic market of certain refined petroleum products, such as gasoline, diesel, jet and fuel oil, petrochemical products, such as paraxylene and benzene, and lube base oil products. Continued imbalance in the supply and demand for certain refined petroleum, petrochemical and lube base oil products in the domestic market could cause pricing pressure in the domestic market and force suppliers, including us, to sell their excess production in the traditionally lower margin export markets, which may have a material adverse effect on our operating margins and results of operations. We do not have any retail business and therefore are dependent upon others to sell our refined petroleum, petrochemical and lube base oil products into the retail market. Three of our domestic competitors have both refining and marketing operations and may be better positioned to sell their products in the domestic market. Some of our competitors who sell into the markets to which we export may be able to drive down product prices if they have costs lower than ours and their export quantities are sufficiently large to influence market prices. Furthermore, some of our competitors may have greater financial, technological and other resources than ours, and may be in a better position to withstand changes in market conditions. Our competitors may also be able to respond more quickly to new or emerging technologies and changes in customer requirements than us.

Competition in the Thai domestic and international markets for refined petroleum products is based primarily on price, which is adjusted to account for product specifications and transportation costs. Furthermore, revenues from the refining business are subject to significant fluctuations as a result of global oil prices and other related factors that influence the price of refined petroleum products. As a result, we may not be able to pass on price increases to our customers. We may also face increased competition if our competitors increase their throughput or refining capacity in the future.

We face competition for the acquisition, development and production of refined petroleum and petrochemical products in Thailand and abroad, and for the capital to finance such activities, including from companies that may have greater financial and other resources. Our ability to enter into commercial arrangements with customers will be dependent upon the continuity of our close working relationships with them, as well as with our joint venture partners, the status of PTT as the primary purchaser of our products in Thailand under Product Offtake and Crude Oil Supply Agreement (“POCSA”), and our ability to consummate transactions in a highly competitive environment.

In addition, we compete with other industries that provide alternative means to satisfy the energy and fuel requirements of our offtake customers, such as natural gas, coal and renewable energy sources. If we are unable to compete effectively with these competitors, both within and outside our industry, our financial condition and results of operations, as well as our business prospects, could be materially and adversely affected. See “*Business—Competition.*”

Our power generation businesses rely on a single supplier for the supply of natural gas.

PTT is the only supplier and distributor of natural gas in Thailand. PTT delivers natural gas to Thailoil Power, TOP SPP and GPSC through its gas pipeline system under long-term gas sale agreements. Any disruption in the supply of natural gas to Thailoil Power, TOP SPP and GPSC by PTT could adversely affect the operating results of Thailoil Power, TOP SPP and GPSC, which could have a material and adverse effect on our business, financial condition and results of operations.

We may not be successful in developing new businesses, including our ethanol, starch, biogas and LAB businesses.

We have invested in developing new businesses and new production plants, including the ethanol, starch, biogas and LAB production businesses. The start-up and initial operations of new production plants are typically affected by adjustment and other operational challenges which can delay the commencement of full production, require production slowdown or shut downs, and result in higher than expected production costs. The risk that any of these circumstances may occur is higher where, as in our case, we have limited trained staff and management with experience in the ethanol, starch, biogas and LAB production businesses, whether on our own or together with joint venture partners. These production plants will use a design and production process that is different from our existing plants. There can also be no assurance that we would recover our investments or that these businesses would generate positive returns.

We may be exposed to interest rate fluctuations.

As of June 30, 2019, 13.9% of our short-term borrowings, or THB257.3 million (US\$8.4 million), and 9.8% of our long-term borrowings, or THB9,605.3 million (US\$312.5 million), were floating rate obligations. Interest rates have recently been at historically low levels, but we cannot assure you that interest rates will remain at such low levels. A significant increase in prevailing interest rates could substantially increase our borrowing costs with respect to our existing floating rate obligations or any new floating rate borrowings or any borrowings at higher fixed interest rates, which could materially and adversely affect our financial condition and results of operations. See “*Management’s Discussion and Analysis of Financial Condition and Results of Operations—Quantitative and Qualitative Disclosures Regarding Market Risks—Interest Rate Risk.*”

A substantial portion of our workforce is unionized and we may face labor disruptions that would interfere with our refinery operations.

As of June 30, 2019, we had approximately 1,539 full-time employees in our operations, approximately 31.8% of whom were members of the Thai Oil voluntary labor union. We believe our relationship with the union has been good and in the past 40 years we have never experienced a work stoppage as a result of labor disagreements. However, we cannot assure you that our good relationship with the union will continue. A labor disturbance at our refinery or plants could have a material adverse effect on our operations. See “*Business—Employees.*”

We depend on the expertise of our senior management and skilled personnel.

We are dependent on our senior management for setting our strategic direction and managing our business, which are crucial to our success. Furthermore, our continued success also depends upon our ability to attract and retain a large group of experienced professionals, including skilled engineers, technicians, and sales

and marketing personnel in our existing and future planned product lines. We have been successful in the past in attracting qualified managers and key personnel, and we have invested significant resources in training our personnel. However, our business could suffer if we lose the services of a number of key personnel and are not able to recruit quality replacements. Shortages of trained engineers, technicians and managers may make it more difficult or costly for us to hire adequate numbers of such personnel in the future. If we fail to attract and retain qualified personnel, our business and prospects may be materially and adversely affected.

We may be subject to legal, arbitral, government or regulatory proceedings, investigations, actions or suits that could be time consuming and costly, require significant amounts of management time and result in the diversion of significant operational resources.

We may be involved in lawsuits, arbitral, governmental or regulatory proceedings, investigations, actions, claims or suits, whether incidental to the ordinary course of our business or otherwise. These matters are inherently unpredictable. Any actual, pending, contemplated or threatened proceedings, investigations, actions, claims or suits against us, whether meritorious or not, could be time consuming and costly, require significant amounts of management time and result in the diversion of significant operational resources. The cost of defending any proceedings, investigations, actions, claims or suits against us or their ultimate resolution may harm our business, reputation and operating results. See “*Business—Legal Proceedings*.”

Trade disputes and geopolitical instability may adversely impact global economies, which could have an adverse impact on our operations.

Trade disputes and geopolitical instability may adversely impact global economies. In 2018, global growth weakened, trade tensions heightened, and several emerging markets experienced significant downturns as macroeconomic and geopolitical developments weighed on market sentiments. Governmental policies of developed economies, such as the U.S., have a substantial effect on emerging markets, and the consequences of a trade war among developed countries, like that between the U.S. and China, could further contribute to the adverse economic and political conditions of emerging and other developed economies and impact the price of crude oil. While it is difficult for us to predict the effect of such trade wars and heightened geopolitical and economic instability on our business, they could lead to currency devaluation, economic and political turmoil and market volatility, which could have a material adverse effect on our business, financial condition and results of operations.

The United Kingdom’s proposed withdrawal from the European Union may have a negative effect on global economic conditions, financial markets and our business.

Following a national referendum in which a majority of voters in the United Kingdom elected to withdraw from the European Union, the government of the United Kingdom formally initiated the process for withdrawal in March 2017. The terms of any withdrawal are subject to a complex and ongoing negotiation between the United Kingdom and the European Union whose result and timing remain unclear and which has created significant political and economic uncertainty about the future trading relationship between the United Kingdom and the European Union in the event of a withdrawal, particularly in light of the possibility that an immediate, so-called “no deal” withdrawal could occur without a negotiated agreement.

These developments, or the perception that any of them could occur, have had and may continue to have a material adverse effect on global economic conditions and the stability of global financial markets, and may significantly reduce global market liquidity, restrict the ability of key market participants to operate in certain financial markets or restrict our access to capital.

Risks Relating to the Treasury Center as an Issuer

The Treasury Center has limited assets and is dependent on intercompany loans from the Company and its subsidiaries.

The Treasury Center is a subsidiary of the Company and is its designated corporate treasury center. As an Issuer (in the case of Guaranteed Notes), it will on-lend the proceeds from the sale of any Guaranteed Notes issued under the Program to the Company or its subsidiaries. The Treasury Center will depend on payments from these inter-company loans and other similar loans to provide it with funds to meet its obligations under Guaranteed Notes issued under the Program, including payments of principal and interest thereon. The Treasury Center has limited assets and no subsidiaries. See “*Description of the Treasury Center*”. The Treasury Center’s material liabilities will be Guaranteed Notes issued under the Program and other securities. As such, it will be dependent upon payments under intercompany loans to make any payments due on Guaranteed Notes issued under the

Program. Should any of the companies to which the Treasury Center lends be unable to fund their payments under their respective loans, then the Treasury Center may be unable to meet its obligations under Guaranteed Notes issued under the Program.

Risks Relating to Thailand

Most of our assets and operations are located in Thailand and we are subject to economic, legal and regulatory uncertainties in Thailand.

Most of our assets and operations, including our headquarters, are located in Thailand. Consequently, we are subject to political, legal and regulatory conditions in Thailand that differ in certain significant respects from those prevailing in other countries with more developed economies. There is no assurance that the Thai economy will meet current projections or improve in the future. Any downturn in the Thai economy could have a material adverse effect on our business, financial condition, results of operations and prospects and the market price of the Notes issued under the Program. Furthermore, prior Thai governments have, in the past, intervened in the Thai economy and occasionally made significant changes in policy including, among other things, foreign exchange control, policies concerning wage and price controls (including price controls on LPG), capital controls and limits on imports, at times partially reversing such policies soon after the new policies were announced. See “—*Risks Relating to Our Business—Compliance with, and changes to environmental, health and safety and other laws and regulations may adversely affect our results of operations and our financial condition.*”

Our businesses and operations in Thailand are subject to the changing economic conditions prevailing from time to time in Thailand. From 1996 to 1998, Thailand’s Gross Domestic Product (“GDP”) growth slowed significantly in relation to historical levels and the country entered a recession. Since 1999, Thailand’s economy has been recovering, recording positive GDP growth each year until the global economy began to worsen in 2008. According to the National Economic and Social Development Board of Thailand (“NESDB”), Thailand’s GDP grew by 3.3% in 2016, 3.9% in 2017 and 4.1% in 2018. However, the continued prospects for the global and regional economy are uncertain. The demand for energy is generally correlated with GDP, and a contraction in Thailand’s GDP could lead to a reduction in the demand for energy, which could have a material adverse effect on our business, financial condition, results of operations and prospects. There is no assurance that the Thai economy will meet current projections or improve in the future. Any instability or economic downturn in Thailand could have a material adverse effect on our business, financial condition, results of operations and prospects and the market price of the Notes issued under the Program.

From 1996 to 1998, international credit rating agencies, including Moody’s, Fitch and Standard & Poor’s, lowered Thailand’s sovereign rating as well as various Thai corporate debt ratings. Although in the past, certain credit rating agencies have warned that Thailand’s credit rating may be downgraded due to political uncertainties and the weakening of the fiscal economic condition, with increased stability of the Thai economy in the previous year, there was corresponding improvement in rating outlooks given by certain credit rating agencies. As of July 31, 2017, Thailand’s sovereign foreign currency long-term debt was rated “Baa1” with a positive outlook by Moody’s, “BBB+” with a positive outlook by Fitch and “BBB+” with a stable outlook by Standard & Poor’s. However, there can be no assurance that there will be no further change to the Thailand’s credit rating in the future. Any lowering of the credit ratings for Thai sovereign debt may make it more expensive for us to obtain additional debt financing for our working capital and capital expenditures, which could have an adverse effect on our financial condition.

Additionally, prior Thai governments have, in the past, intervened in the Thai economy and occasionally made significant changes in policy. Policy changes made by the Thai government and the BOT have included the imposition (and subsequent reversal) of a one-year 30% unremunerated reserve requirement on foreign exchange inflows, under which any foreigner buying stock in Thailand had to place an extra non-interest-bearing deposit. There is no assurance that the Thai government will not in the future re-impose restrictive foreign exchange controls that may affect the outward remittance of funds, including interest or other payments payable on the Notes under the Program. Our business, financial condition, results of operations and prospects and the market price of the Notes issued under the Program may be adversely affected by future changes in Thai government policies.

Political conditions in Thailand will have a direct impact on our business and the market price of the Notes issued under the Program.

Our business, financial condition, results of operations and prospects may be influenced in part by the ongoing political situation in Thailand, which has been unstable from time to time. Following a military coup on

May 22, 2014, a general election was held on March 24, 2019 and the new coalition government was set up in July 2019. No assurances can be made regarding political disruptions in the future. Any change to the political situation may affect the legal and regulatory framework under which we operate. Any changes in the legal and regulatory environment in Thailand may materially and adversely affect our business, financial condition, results of operations and prospects.

Continued violence in southern Thailand could adversely affect our business, financial condition, results of operations and prospects.

Since 2004, there have been a large number of casualties and injuries arising from violence particularly in southern Thailand, including, recently, the fatal attacks in April and May 2015 in Phuket and Yala, respectively, and a series of bombings in August 2016 in Hua Hin, Surat Thani, Phuket and Trang. Continued violence could lead to widespread unrest in Thailand or a major terrorist incident in Thailand similar to those in other parts of Southeast Asia. If the security condition deteriorates and violence spreads to the northern provinces of Thailand, our business, financial condition, results of operations and prospects may be materially and adversely affected.

We may be adversely affected by terrorist attacks and international and regional instability.

Political events in the Middle East, including future terrorist attacks against targets in the Middle East, Southeast Asia or other regions, rumors or threats of terrorist attacks or war, actual conflicts involving the Middle East and trade disruptions, all of which may affect our suppliers or customers who are principally located in Thailand, may adversely affect our operations. In addition, there have been bombing incidents in Bangkok in recent years, and further bombings or other violent acts may occur in the future. For example, in August 2015, a bombing incident at the Erawan Shrine in Bangkok killed approximately 20 and injured many more. Similarly, the recent bombings in certain areas of Bangkok in August 2019 caused injuries and destruction to property. Violent acts arising from, and leading to, instability and unrest as well as political or economic developments related to these crises could adversely affect the Thai economy and the global economy and could have a material adverse effect on our business, financial condition, results of operations and prospects.

We face risks related to public health epidemics in Thailand or elsewhere.

Our business could be materially and adversely affected by the outbreak of public health epidemics, or the fear of such an outbreak, in Thailand or elsewhere. In April 2009, an outbreak of the H1N1 virus, commonly referred to as “swine flu,” occurred in Mexico and spread to other countries, including Thailand. In 2004, an outbreak of the H5N1 viruses, also known as “bird flu,” occurred in Southeast Asia and other regions, resulting in hundreds of deaths worldwide and significantly affecting Southeast Asia’s economy. Vietnam, a regional neighbor of Thailand, reported two human fatalities caused by bird flu in January 2012. In 2012, there was an outbreak of the viral hand, foot and mouth disease in Thailand and other neighboring countries, including several confirmed human cases and deaths, particularly among children. Also, since the beginning of 2019, there have been reports on the outbreak of dengue fever in many areas throughout Thailand. If the outbreak of any of these viruses or other severe viruses, including severe acute respiratory syndrome, or “SARS,” were to occur again and become widespread in Thailand or increase in severity, it could have an adverse effect on economic activity in Thailand, and could materially and adversely affect our business, financial condition and results of operations. Any future public health epidemics in Thailand or elsewhere could materially and adversely affect our business, financial condition, results of operations and prospects.

We may be adversely affected by the fluctuations in the value of the Baht against foreign currencies, particularly with the depreciation of the Baht against the U.S. dollar.

Substantially all of our revenues and crude oil and feedstock costs are denominated in U.S. dollars and translated into Baht for inclusion in our financial statements. As a result, fluctuations in the value of the Baht against the U.S. dollar may adversely affect our financial condition and results of operations.

Any depreciation of the Baht against foreign currencies, primarily the U.S. dollar, materially affects our results of operations because, among other things, it causes:

- an increase in the amount of Baht required by us to purchase crude oil and other raw materials and equipment and services, such as transportation from overseas sources, which are denominated primarily in U.S. dollars;

- increase in the amount of Baht required by us to make interest and principal payments on our foreign currency-denominated debt, which totaled an amount equivalent to approximately THB 61,816.2 million and accounted for approximately 63.0% of our total debt as of June 30, 2019; and
- foreign exchange translation losses on our foreign currency-denominated debt.

Adverse economic conditions in Thailand incidental to the depreciation of the value of the Baht could increase energy prices in Thailand, increase prices of crude oil and other feedstock used in our refining process and reduce overall demand for our products and those of our customers. The effects on us of any significant depreciation of the Baht are mitigated by our domestic sales that are directly linked to the U.S. dollar and our export sales that are denominated in U.S. dollars.

Any appreciation of the Baht against foreign currencies, primarily the U.S. dollar, may adversely affect our results of operations because, among other things, it causes an increase in our income taxes due to foreign exchange translation gains on our income.

From the beginning of 2017 to December 2018, the value of the Baht against the U.S. dollar fluctuated between a low of THB31.13 on March 27, 2018 to a high of THB35.89 on January 4, 2017, and from the beginning of 2019 to June 30, 2019, the value of Bath against the U.S. dollar fluctuated between a low of THB30.69 on June 25, 2019 to a high of THB32.35 on January 2, 2019. We cannot assure you that the value of the Baht will not decline or continue to fluctuate significantly against the U.S. dollar or other currencies in the future. Our export transactions accounted for approximately 13.2%, 14.5%, 14.2%, 14.2% and 12.2% of our net sales for the years ended December 31, 2016, 2017 and 2018, and in the six months ended June 30, 2018 and 2019, respectively. Although we have in the past been able to pass on to our customers a majority of the increases in raw material costs due to the depreciation of the Baht, there can be no assurance that we will be able to continue to do so in the future.

We have adopted a policy to minimize the effects of foreign currency fluctuations on our gross refining margins and product-to-feedstock margins with foreign currency borrowings so as to create a natural hedge. We also enter into short term forward contracts and currency swaps to manage exposure to fluctuations in foreign currencies on short term trade payables and receivables.

As of June 30, 2019, our total foreign currency-denominated indebtedness amounted to THB 61,816.2 million (US\$ 2,010.9 million), and it is possible that a substantial portion of our capital expenditures for future expansion programs may be incurred and/or financed in foreign currencies. Any depreciation in the Baht against the U.S. dollar would increase our finance costs, and there can be no assurance that we would be able to generate revenue increases sufficient to offset such increased finance costs. As a result, fluctuations in the value of the Baht against other foreign currencies may adversely affect our business, financial condition, results of operations and prospects.

Thailand is subject to potential sanctions from other countries which may impact its economy.

In April 2015, the EU gave a yellow card warning to Thailand for the failure to address illegal, unreported and unregulated fishing in compliance with the EU illegal, unreported and unregulated fishing regulation; the yellow card warning was lifted on January 18, 2019. On June 18, 2015, the ICAO “red flagged” Thailand for failing to solve significant safety concerns on applicable ICAO standards; the red flag status was lifted in October 2017. With regards to human trafficking, Thailand was placed in Tier 3 on the 2015 U.S. annual report on Trafficking in Persons issued by the State Department of the United States for the failure to fully comply with the minimum standards for the elimination of trafficking, and not making significant efforts to do so. This status was upgraded to the Tier 2 watchlist in 2016 and to Tier 2 in 2019. Such sanctions against Thailand or the failure to comply with such international standards may have a material adverse effect on the Thai economy, which may in turn have a material adverse effect on the Group’s business, financial condition, results of operations and prospects.

Risks Relating to the Structure of a Particular Issue of Notes

A wide range of Notes may be issued under the Program. A number of these Notes may have features which contain particular risks for potential investors. Set out below is a description of certain such features.

Notes subject to optional redemption by us.

An optional redemption feature is likely to limit the market value of Notes. During any period when we may elect to redeem Notes, the market value of those Notes generally will not rise substantially above the price at which they can be redeemed. This may also be true prior to any redemption period. We may be expected to redeem Notes when our cost of borrowing is lower than the interest rate on the Notes. At those times, an investor generally would not be able to reinvest the redemption proceeds at an effective interest rate as high as the interest rate on the Notes being redeemed and may only be able to do so at a lower rate. Potential investors should consider reinvestment risk in light of other investments available at that time.

Partly-Paid Notes.

We may issue Notes where the issue price is payable in more than one instalment. Failure to pay any subsequent instalment on a Partly-Paid Note could result in an investor losing all of its investment.

Variable Rate Notes with a multiplier or other leverage factor.

Notes with variable interest rates can be volatile investments. If they are structured to include multipliers or other leverage factors, or caps or floors, or any combination of those features or other similar related features, their market values may be even more volatile than those for securities that do not include those features.

Notes carrying an interest rate which may be converted from fixed to floating interest rates, and vice-versa.

Fixed/Floating Rate Notes may bear interest at a rate that we may elect to convert from a fixed rate to a floating rate, or from a floating rate to a fixed rate. Our ability to convert the interest rate will affect the secondary market and the market value of such Notes since we may be expected to convert the rate when it is likely to produce a lower overall cost of borrowing. If we convert from a fixed rate to a floating rate, the spread on the Fixed/Floating Rate Notes may be less favourable than then prevailing spreads on comparable Floating Rate Notes tied to the same reference rate. In addition, the new floating rate at any time may be lower than the rates on other Notes. If we convert from a floating rate to a fixed rate, the fixed rate may be lower than then prevailing rates on its Notes.

Notes with floating interest rates can be volatile investments. If they are structured to include multipliers or other leverage factors, or caps or floors, or any combination of those features or other similar related features, their market values may be even more volatile than those for securities that do not include those features.

The benchmark rate for any Floating Rate Notes may not be available

The regulation and reform of “benchmarks” may adversely affect the value of Notes linked to or referencing such “benchmarks”.

Interest rates and indices which are deemed to be “benchmarks”, (including the London interbank offered rate (“**LIBOR**”) and the euro interbank offered rate (“**EURIBOR**”)) are the subject of recent national and international regulatory guidance and proposals for reform. Some of these reforms are already effective whilst others are still to be implemented. These reforms may cause such benchmarks to perform differently than in the past, to disappear entirely, or have other consequences which cannot be predicted. Any such consequence could have a material adverse effect on any Notes referencing such a benchmark.

Regulation (EU) 2016/1011 (the “**Benchmarks Regulation**”) was published in the Official Journal of the EU on June 29, 2016 and mostly applies, subject to certain transitional provisions, from January 1, 2018. The Benchmarks Regulation applies to the provision of benchmarks, the contribution of input data to a benchmark and the use of a benchmark within the EU. Among other things, it (i) requires benchmark administrators to be authorised or registered (or, if non-EU-based, to be subject to an equivalent regime or otherwise recognised or endorsed) and (ii) prevents certain uses by EU supervised entities of benchmarks of administrators that are not authorised or registered (or, if non-EU based, not deemed equivalent or recognised or endorsed).

The Benchmarks Regulation could have a material impact on any Notes linked to or referencing a benchmark in particular, if the methodology or other terms of the benchmark are changed in order to comply with the requirements of the Benchmarks Regulation. Such changes could, among other things, have the effect of reducing, increasing or otherwise affecting the volatility of the published rate or level of the relevant benchmark.

More broadly, any of the international or national reforms, or the general increased regulatory scrutiny of benchmarks, could increase the costs and risks of administering or otherwise participating in the setting of a benchmark and complying with any such regulations or requirements. Specifically, the sustainability of LIBOR has been questioned as a result of the absence of relevant active underlying markets and possible disincentives (including possibly as a result of benchmark reforms) for market participants to continue contributing to such benchmarks. On July 27, 2017, and in a subsequent speech by its Chief Executive on July 12, 2018, the United Kingdom Financial Conduct Authority (the “**FCA**”) confirmed that it will no longer persuade or compel banks to submit rates for the calculation of the LIBOR benchmark after 2021 (the “**FCA Announcements**”). The FCA Announcements indicated that the continuation of LIBOR on the current basis cannot and will not be guaranteed after 2021. In addition, on November 29, 2017, the Bank of England and the FCA announced that, from January 2018, its Working Group on Sterling Risk-Free Rates has been mandated with implementing a broad based transition to the Sterling Overnight Index Average (“**SONIA**”) over the next four years across sterling bond, loan and derivative markets, so that SONIA is established as the primary sterling interest rate benchmark by the end of 2021.

Separate work streams are also underway in Europe to reform EURIBOR using a hybrid methodology and to provide a fallback by reference to a euro risk-free rate (based on a euro overnight risk-free rate as adjusted by a methodology to create a term rate). On September 13, 2018, the working group on euro risk-free rates recommended Euro Short-term Rate (“**ESTR**”) as the new risk free rate. ESTR is expected to be published by the ECB by October 2019. In addition, on January 21, 2019, the euro risk free-rate working group published a set of guiding principles for fallback provisions in new euro denominated cash products (including bonds). The guiding principles indicate, among other things, that continuing to reference EURIBOR in relevant contracts may increase the risk to the euro area financial system. It is not possible to predict with certainty whether, and to what extent, LIBOR and EURIBOR will continue to be supported going forwards. This may cause LIBOR and EURIBOR to perform differently than they have done in the past, and may have other consequences which cannot be predicted. Such factors may have (without limitation) the following effects on certain benchmarks: (i) discouraging market participants from continuing to administer or contribute to a benchmark; (ii) triggering changes in the rules or methodologies used in the benchmark and/or (iii) leading to the disappearance of the benchmark.

Any of the above changes or any other consequential changes as a result of international or national reforms or other initiatives or investigations, could have a material adverse effect on the value of and return on any Notes linked to, referencing, or otherwise dependent (in whole or in part) upon, a benchmark. Investors should be aware that, if LIBOR or EURIBOR were discontinued or otherwise unavailable, the rate of interest on Floating Rate Notes which reference LIBOR or EURIBOR will be determined for the relevant period by the fallback provisions applicable to such Notes. Depending on the manner in which LIBOR or EURIBOR is to be determined under the Terms and Conditions, this may in certain circumstances (i) be reliant upon the provision by reference banks of offered quotations for LIBOR or EURIBOR which, depending on market circumstances, may not be available at the relevant time or (ii) result in the effective application of a fixed rate for Floating Rate Notes based on the rate which was last observed on the Relevant Screen Page. Any of the foregoing could have an adverse effect on the value or liquidity of, and return on, any Floating Rate Notes which reference LIBOR or EURIBOR.

Notes issued at a substantial discount or premium.

The market values of securities issued at a substantial discount or premium to their nominal amount tend to fluctuate more in relation to general changes in interest rates than do prices for conventional interest-bearing securities. Generally, the longer the remaining term of the securities, the greater the price volatility as compared to conventional interest-bearing securities with comparable maturities.

Index Linked Notes.

We may issue Notes with principal or interest determined by reference to an index or formula, to changes in the prices of securities or commodities, to movements in currency exchange rates or other factors (each, a “**Relevant Factor**”). Each potential investor should be aware that:

- the market price of such Notes may be volatile and may be linked to factors other than our credit;
- they may receive no interest;
- payment of principal or interest may occur at a different time or in a different currency than expected;

- they may lose all or a substantial portion of their principal;
- a Relevant Factor may be subject to significant fluctuations that may not correlate with changes in interest rates, currencies or other indices;
- if a Relevant Factor is applied to Notes in conjunction with a multiplier greater than one or contains some other leverage factor, the effect of changes in the Relevant Factor on principal or interest payable likely will be magnified; and
- the timing of changes in a Relevant Factor may affect the actual yield to investors, even if the average level is consistent with their expectations.

In general, the earlier the change in the Relevant Factor, the greater the effect on yield. The historical experience of an index should not be viewed as an indication of the future performance of such index during the term of any Index Linked Notes. Accordingly, each potential investor should consult its own financial and legal advisers about the risk entailed by an investment in any Index Linked Notes and the suitability of such Notes in light of its particular circumstances.

Dual Currency Notes.

We may issue Notes with principal or interest payable in one or more currencies which may be different from the currency in which the Notes are denominated. Each potential investor should be aware that:

- the market price of such Notes may be volatile;
- they may receive no interest;
- payment of principal or interest may occur at a different time or in a different currency than expected; and
- the amount of principal payable at redemption may be less than the nominal amount of such Notes or even zero.

Notes payable in more than one instalment.

We may issue Notes where the issue price is payable in more than one instalment. Failure by a potential investor to pay a subsequent instalment of partly-paid Notes may result in it losing all of its investment.

Risks Relating to the Guarantee

Certain provisions under the Guarantee may not be enforceable against the Guarantor in a Thai court.

A judgment of a foreign court will not be enforced by a Thai court but may, at the sole discretion of the court, be admissible as evidence in an action in a Thai court. Therefore, even if the Trustee and the Holders have already obtained a judgment against the Guarantor in a foreign country, the Trustee and the Holders would still have to bring another action against the Guarantor in a Thai court. As the Guarantee is governed by New York law, in order for the Trustee and the Holders to enforce the Guarantee against the Guarantor in a Thai court, the Trustee and the Holders would be required to prove New York law to the satisfaction of the Thai court and such New York law must not be considered to be contrary to the public order or good morals of the people of Thailand. If the Thai court deems that the provisions of the Guarantee which the Trustee and the Holders are looking to enforce are contrary to the public order or good morals of the people of Thailand, such provisions will not be enforceable against the Guarantor. See “— *Thai guarantee law has imposed certain limitations and requirements which may adversely affect the Trustee and the Holders’ ability to enforce their rights under the Guarantee fully.*”

Thai guarantee law has imposed certain limitations and requirements which may adversely affect the Trustee and the Holders’ ability to enforce their rights under the Guarantee fully.

Even though the Trustee and the Holders may have certain rights as provided in the Guarantee, such rights may be limited under Thai guarantee law or not fully enforceable if certain procedure are not strictly followed. For instance, if an Event of Default (as defined under the “*Terms and Conditions of the Notes*”) shall

occur and be continuing, the Trustee and the Holders may declare, among other things, the principal amount of the Notes and accrued and unpaid interest due and payable. However, under Thai guarantee law, the Guarantor may (in its absolute sole discretion) determine either to (i) pay in full the principal amount, together with accrued and unpaid interest to the date of payment or (ii) pay any amount under the Guaranteed Notes in accordance with the original payment schedule as if the Event of Default and acceleration had not occurred. If the Guarantor opts to make the payment in accordance with the original payment schedule rather than making the full payment in one lump sum, payment under the Guaranteed Notes will not be accelerated. In such a scenario, the Maximum Guaranteed Amount might not be sufficient to service the interest payable for the remaining term of the Guaranteed Notes and principal repayment at maturity (see “— *The Trustee and the Holders may not be able to recover any debt in excess of the Maximum Guaranteed Amount*”).

Thai guarantee law does not allow parties to contract out of the right of recourse of the guarantor against the debtor for principal and interest discharged by the guarantor including for losses and damages suffered or incurred by the guarantor by reason of its guarantee upon making partial payment under the underlying obligations. Therefore, the Guarantor is able to take immediate recourse against the Issuer to the extent of any principal or interest discharged by it (whether in full or in part) and for losses and damages suffered or incurred by it by reason of its Guarantee.

Thai guarantee law mandatorily releases the Guarantor from its obligations under the Guarantee if the Trustee or the Holders has granted the Issuer an extension of time to perform its obligations without consent of the Guarantor. Any pre-consent by the Guarantor in any agreements to any an extension of time to perform the Issuer’s obligations granted by the Trustee or the Holders is unenforceable.

In order to enforce the Guarantee against the Guarantor, the Trustee and the Holders have to strictly comply with the requirements and procedures provided under the Thai guarantee law, some of which are still not definitively established. Failure to do so could limit the amounts recoverable under the Guarantee.

Thai guarantee law requires that a creditor must send a written notice to a guarantor within 60 days of the date of the debtor’s default, failing which the creditor shall not have the right to any interest or compensation that accrues after such 60-day period. Furthermore, the creditor shall not have the right to demand payment from the guarantor before such written notice reaches the guarantor. Therefore, if the Trustee or Holders gives a notice of default to the Guarantor later than 60 days from the date of the default, the Trustee and the Holders will not have the right to claim from the Guarantor interest, costs, damages or expenses payable following such 60-day period. In addition, Thai guarantee law uses the term “default” which has not been definitely established particularly whether it would include both monetary and a non-monetary breach of an agreement by the debtor, without it being required to constitute a typical “event of default” where usually a remedy period or grace period or a percentage voting requirement of creditors is accorded to. Therefore, it is easier for the Issuer to trigger monetary and non-monetary breaches of the Indenture than an occurrence of an Event of Default. If the Thai court takes the view that a default includes payment and non-payment default, and if the Trustee or Holders fails to give a notice of such default to the Guarantor within 60 days from the date of the default, the Trustee and the Holders will not be entitled to claim from the Guarantor interest, costs, damages or expenses payable following such 60-day period.

The Trustee and the Holders may not be able to recover any debt in excess of the Maximum Guaranteed Amount.

In accordance with the terms of the Guaranteed Notes under the Indenture, the Guarantor’s obligations are limited to a Maximum Guaranteed Amount in respect of each Series of Guaranteed Notes. Unpaid principal, premium (if any) or interest on the relevant Series of Guaranteed Notes may end up being greater than the Maximum Guaranteed Amount and, as a result, the Trustee or Holders may not be able to recover amounts in excess of the Maximum Guaranteed Amount from the Guarantor or the Issuer.

The obligations of the Guarantor under the Guarantee will be released and discharged upon the obligations of the Issuer under the Indenture and the Notes having been extinguished.

Under Thai guarantee law, following the extinguishment of the obligations of the Issuer under the Indenture and the Notes by any cause whatsoever, the Guarantor will be released from its obligations under the Guarantee, regardless of whether the obligations of the Issuer may have subsequently revived or been reinstated for whatever reasons. Although there are no precedents in interpreting this provision of law, if all amounts payable by the Issuer under the Indenture and the Notes have been fully satisfied by the Issuer, but the Trustee and/or the Holders are subsequently ordered by any competent authority to return all or portion of such sum to the Issuer or

its creditors for whatever reasons, it is likely that the Trustee and/or the Holders will no longer have any right of recourse against the Guarantor under the Guarantee for such returned amount because the obligations of the Guarantor under the Guarantee will have already been released and discharged when the obligations of the Issuer under the Indenture and the Notes have been fully satisfied.

In such event, the rights of the Trustee and the Holders to recover in full any amounts claimed against the Guarantor under the Guarantee may be materially and adversely affected.

Risks Relating to the Notes and the Guarantee Generally

The Notes and the Guarantee are unsecured obligations.

The Notes and the Guarantee are unsecured obligations of the Issuers and the Guarantor, respectively. The repayment of the Notes and payment under the Guarantee may be adversely affected if:

- the Issuers or the Guarantor enters into bankruptcy, liquidation, reorganisation or other winding-up proceedings;
- there is a default in payment under either of the Issuers' or the Guarantor's future secured indebtedness or other unsecured indebtedness; or
- there is an acceleration of any of the Issuers' or the Guarantor's indebtedness.

If any of these events were to occur, the Issuers' or the Guarantor's assets may not be sufficient to pay amounts due on the Notes or the Guarantee.

Outward remittance of payments under the Indenture.

The purchase and remittance of foreign currency by the Guarantor for the payment under the Guarantee is subject to applicable exchange control regulations. In principle, approval given by the BOT or an authorized agent of the BOT, which includes all commercial banks in Thailand, must be obtained immediately prior to each payment of a foreign currency out of Thailand. The authorized agent of the BOT has the discretion to deny or impose conditions on any approval or remittance and may require relevant documents and evidence to be filed with it in connection with any application made to it. There can be no assurance that the Bank of Thailand will not exercise further discretion nor impose any conditions or restrictions which may affect or delay the outward remittance of the proceeds from the Guarantee.

The Notes may not be a suitable investment for all investors.

Each potential investor in any Notes must determine the suitability of that investment in light of its own circumstances. In particular, each potential investor should:

- have sufficient knowledge and experience to make a meaningful evaluation of the relevant Notes, the merits and risks of investing in the relevant Notes and the information contained or incorporated by reference in this offering memorandum or any applicable supplement;
- have access to, and knowledge of, appropriate analytical tools to evaluate, in the context of its particular financial situation, an investment in the relevant Notes and the impact such investment will have on its overall investment portfolio;
- have sufficient financial resources and liquidity to bear all of the risks of an investment in the relevant Notes, including where principal or interest is payable in one or more currencies, or where the currency for principal or interest payments is different from the potential investor's currency;
- understand thoroughly the terms of the relevant Notes and be familiar with the behavior of any relevant indices and financial markets; and

- be able to evaluate (either alone or with the help of a financial advisor) possible scenarios for economic, interest rate and other factors that may affect its investment and its ability to bear the applicable risks.

Some Notes are complex financial instruments. Sophisticated institutional investors generally do not purchase complex financial instruments as stand-alone investments. They purchase complex financial instruments as a way to reduce risk or enhance yield with an understood, measured and appropriate addition of risk to their overall portfolios. A potential investor should not invest in Notes which are complex financial instruments unless it has the expertise (either alone or with the help of a financial advisor) to evaluate how the Notes will perform under changing conditions, the resulting effects on the value of such Notes and the impact this investment will have on the potential investor's overall investment portfolio. Investors may also be subject to investment laws that constrain their ability to invest in the Notes. Investors should consult their own legal advisors before making an investment in the Notes.

Notes issued under the Program have no current active trading market and may trade at a discount to their initial offering price and/or with limited liquidity.

Notes issued under the Program will be new securities which may not be widely distributed and for which there is currently no active trading market (unless in the case of any particular Tranche, such Tranche is to be consolidated with and form a single series with a Tranche of Notes which is already issued). If the Notes are traded after their initial issuance, they may trade at a discount to their initial offering price, depending upon prevailing interest rates, the market for similar securities, general economic conditions and our financial condition. If the Notes are trading at a discount, investors may not be able to receive a favourable price for their Notes, and in some circumstances investors may not be able to sell their Notes at all or at their fair market value. In addition, the market for investment grade and crossover grade debt has been subject to disruptions that have caused volatility in prices of securities similar to the Notes issued under the Program. Accordingly, we cannot assure you as to the development or liquidity of any trading market, or that disruptions will not occur, for any particular Tranche of Notes.

Foreign exchange rate risks and exchange controls may result in investors receiving less interest or principal than expected.

We will pay principal and interest on the Notes in the currency specified in the relevant Pricing Supplement (the “**Specified Currency**”). This presents certain risks relating to currency conversions if an investor's financial activities are denominated principally in a currency or currency unit (the “**Investor's Currency**”) other than the Specified Currency. These include the risk that exchange rates may significantly change (including changes due to devaluation of the Specified Currency or revaluation of the Investor's Currency) and the risk that authorities with jurisdiction over the Investor's Currency may impose or modify exchange controls. An appreciation in the value of the Investor's Currency relative to the Specified Currency would decrease (a) the Investor's Currency equivalent yield on the Notes, (b) the Investor's Currency equivalent value of the principal payable on the Notes and (c) the Investor's Currency equivalent market value of the Notes. Government and monetary authorities may impose (as some have done in the past) exchange controls that could adversely affect an applicable exchange rate. As a result, investors may receive less interest or principal than expected, or no interest or principal.

Changes in market interest rates may adversely affect the value of Fixed Rate Notes.

We expect that the trading price of Fixed Rate Notes will depend on a variety of factors, including, without limitation, the interest rate environment. Each of these factors may be volatile, and may or may not be within our control. If interest rates, or expected future interest rates, rise during the term of the Fixed Rate Notes, the trading price of the Fixed Rate Notes will likely decrease. Because interest rates and interest rate expectations are influenced by a wide variety of factors, many of which are beyond our control, we cannot assure you that changes in interest rates or interest rate expectations will not adversely affect the trading price of the Fixed Rate Notes.

The credit ratings assigned to the Notes may not reflect all risks and may be lowered or withdrawn.

One or more independent credit rating agencies may assign credit ratings to an issue of Notes and/or the Program. The ratings may not reflect the potential impact of all risks related to structure, market, additional factors discussed above and other factors that may affect the value of the Notes and/or the Program. Furthermore, we cannot assure you that a given credit rating will remain in effect for any period of time or that such rating will not

be lowered, suspended or withdrawn. A downgrade or potential downgrade in a rating may reduce the number of investors in the Notes and adversely affect the price and liquidity of the Notes. A credit rating is not a recommendation to buy, sell or hold securities and may be revised or withdrawn by the rating agency at any time.

The right to receive payments on the Notes is junior to certain tax and other liabilities preferred by law.

The Notes will be subordinated to certain liabilities preferred by law such as claims of the Government of Thailand on account of taxes, certain liabilities owed to employees and certain liabilities incurred in the ordinary course of our business. In particular, in the event of bankruptcy, liquidation or winding up, our assets will be available to pay obligations on the Notes only after all liabilities that rank senior to these Notes have been paid. In the event of a bankruptcy, liquidation or winding up, there may not be sufficient assets remaining, after paying amounts relating to such proceedings, to pay amounts due on the Notes.

The book-entry registration system of the Notes may reduce the liquidity of any secondary market for the Notes and may limit the receipt of payments by the beneficial owners of the Notes.

Because transfers of interests in the global notes to be issued in the offering can be effected only through book entries at DTC with respect to the global notes to be issued in reliance on Rule 144A and only through book entries at Clearstream, Euroclear in the case of the global notes to be issued in reliance on Regulation S, for the accounts of their respective participants, the liquidity of any secondary market for global notes may be reduced to the extent that some investors are unwilling to hold Notes in book-entry form in the name of a DTC, Clearstream or Euroclear. The ability to pledge interests in the global notes may be limited due to the lack of a physical certificate. Beneficial owners of global notes may, in certain cases, experience delay in the receipt of payments of principal and interest since such payments will be forwarded by the paying agent to DTC, Clearstream or Euroclear, as applicable, who will then forward payment to their respective participants, who (if not themselves the beneficial owners) will thereafter forward payments to the beneficial owners of the interests in the global notes. In the event of the insolvency of DTC, Clearstream, Euroclear or any of their respective participants in whose name interests in the global notes are recorded, the ability of beneficial owners to obtain timely or ultimate payment of principal and interest on global notes may be impaired.

The Notes are governed by the laws of the State of New York.

The Terms and Conditions of the Notes are governed by the laws of the State of New York. No assurance can be given as to the impact of any possible judicial decision or change the laws of the State of New York or administrative practice after the date of the issue of the Notes.

There are uncertainties in the enforcement of civil liabilities.

All or a substantial portion of our assets and the assets of our directors and officers are located outside the United States. As a result, it may not be possible for investors to enforce against us or such persons in the United States, the federal securities laws of the United States, or to enforce judgments obtained in the United States courts predicated upon the civil liability provisions of the federal securities laws of the United States, including the Securities Act and the Exchange Act. We have been advised by Baker & McKenzie Ltd., our Thai counsel, that Thailand is not a party to the Hague Convention on the Recognition and Enforcement of Foreign Judgments in Civil and Commercial Matters and it has no bilateral treaties with other countries for the reciprocal recognition and enforcement of judgments. Moreover, there is no statutory basis in Thai law to apply the principle of comity to judgments from foreign courts.

Under Thai law, judgments entered by a United States court or any other non-Thai court, including actions under the civil liability provisions of the U.S. securities laws, are not automatically enforceable in Thailand. In order to pursue a claim against us, an investor would have to bring a separate action or claim in Thailand within the prescribed period of time to bring such actions under Thai law. While a non-Thai judgment could be introduced as evidence in a court proceeding in Thailand, a Thai court would be free to examine new issues arising in the case. Thai counsel has advised that in a court proceeding in Thailand, a Thai court would base its judgment on New York law, the governing law of the Notes and Indenture, provided that evidence satisfactory to the court as to the relevant provisions of New York law is provided to the court and such provisions are not contrary to Thai public order or good morals. Thus, to the extent that investors succeed in bringing legal actions against us outside Thailand, their available remedies and any recovery in any Thai proceeding may be limited. To the extent investors are entitled to any recovery in a currency other than Baht with respect to the Notes in any Thai proceedings, recovery might be converted to payments in Baht.

The Notes are subject to transfer restrictions.

The Notes will not be registered under the Securities Act or any state securities laws and may not be offered or sold within the United States or to, or for the account or benefit of, U.S. persons, except (i) in reliance on the exemption provided by Rule 144A to persons who are both qualified institutional buyers as defined in Rule 144A and qualified purchasers as defined in the U.S. Investment Company Act, (ii) to certain persons in offshore transactions in reliance on Regulation S, or pursuant to another exemption from, or (iii) in another transaction not subject to, the registration requirements of the Securities Act and in accordance with applicable state securities laws. For a further discussion of the transfer restrictions applicable to the Notes, see “*Subscription and Sale*” and “*Transfer Restrictions*.”

Holders of the Notes will rely on DTC, Euroclear and Clearstream procedures.

Notes issued under the Program will be represented on issue by one or more Global Notes that may be deposited with a common depository for Euroclear and Clearstream or may be deposited with a nominee for DTC (each as defined under “*Form of the Notes*”). Except in the circumstances described in each Global Note, investors will not be entitled to receive Notes in definitive form. Each of DTC, Euroclear and Clearstream and their respective direct and indirect participants will maintain records of the beneficial interests in each Global Note held through it. While the Notes are represented by a Global Note, investors will be able to trade their beneficial interests only through the relevant clearing systems and their respective participants.

While the Notes are represented by Global Notes, we will discharge our payment obligation under the Notes by making payments through the relevant clearing systems for distribution to their accountholders. A holder of a beneficial interest in a Global Note must rely on the procedures of the relevant clearing system and its participants to receive payments under the Notes. We have no responsibility or liability for the records relating to, or payments made in respect of, beneficial interests in any Global Note.

Holders of beneficial interests in a Global Note will not have a direct right to vote in respect of the Notes so represented. Instead, such holders will be permitted to act only to the extent that they are enabled by the relevant clearing system and its participants to appoint appropriate proxies.

USE OF PROCEEDS

The net proceeds from an issue by the Company of a Tranche of Notes will be used by us for general corporate purposes.

The net proceeds from an issue by the Treasury Center of a Tranche of Notes will be applied by the Treasury Center for the repurchase and repayment of indebtedness and for general corporate purposes, including, but not limited to, on-lending to entities within the Group.

If, in respect of any particular issue, there is a particular identified use of proceeds, this will be stated in the applicable Pricing Supplement.

EXCHANGE RATE INFORMATION

The following table sets forth, for the periods indicated, the means of the average buying (transfer) rates and the average selling rates published by the Bank of Thailand. The average buying (transfer) rates and average selling rates are calculated by averaging the foreign exchange counter rates quoted by commercial banks registered in Thailand. No representation is made that the Baht or U.S. dollar amounts set forth herein and referred to elsewhere in this Offering Memorandum could have been, or could be, converted into U.S. dollars or Baht, as the case may be, at the rates indicated, at any particular rates, or at all.

	Exchange rates			Period end
	Low	High	Average ⁽¹⁾	
	(THB per US\$)			
2014	31.77	33.11	32.49	32.96
2015	32.35	36.59	34.29	36.08
2016	34.56	36.31	35.29	35.82
2017	32.49	35.89	33.93	32.66
2018	31.13	33.46	32.31	32.42
2019				
April	31.71	32.06	31.86	31.93
May.....	31.52	32.04	31.80	31.76
June.....	30.69	31.40	31.13	30.74
July	30.57	30.98	30.79	30.78
August	30.59	30.90	30.77	30.65
September	30.43	30.66	30.57	30.58

- (1) Annual averages were calculated by using the average of the exchange rates on the last day of each month during the relevant year. Monthly averages or average for a period are calculated by using mean of the average of the daily rates during the relevant month or period.

CAPITALIZATION AND INDEBTEDNESS

The following table sets forth as of June 30, 2019, our capitalization and indebtedness, which has been derived from and should be read in conjunction with our unaudited consolidated financial information for the six months period ended June 30, 2019 included elsewhere in this Offering Memorandum.

	As of June 30, 2019	
	(in millions)	
	THB	US\$
Long-term debt		
Long-term borrowings, excluding current portion	14,724.0	479.0
Debentures, excluding current portion	81,715.6	2,658.3
Total long-term debt, excluding current portion	96,439.6	3,137.3
Shareholders' equity		
Issued and paid-up share capital	20,400.3	663.6
Premium on ordinary shares	2,456.3	79.9
Premium on other shares.....	(2,823.3)	(91.8)
Retained earnings		
Appropriated		
Legal reserve	2,040.0	66.4
Other	244.5	8.0
Unappropriated	99,027.6	3,221.5
Surplus on business restructuring under common control	-	-
Other components of equity	(192.1)	(6.2)
Equity attributable to owners of the Company	121,153.2	3,941.2
Non-controlling interests.....	4,000.5	130.1
Total equity	125,153.7	4,071.4
Total capitalization⁽¹⁾	221,593.3	7,208.7

Note:

(1) Total capitalization is equal to the sum of total long-term debt, excluding current portion and total equity.

Since June 30, 2019 we have additional borrowings between Thailoil Power Company Limited (as borrower) and PTT Treasury Center Company Limited (as lender). As of September 26, 2019, such borrowings amounted to THB3,998.8 million.

SELECTED CONSOLIDATED FINANCIAL AND OTHER DATA

You should read the following selected consolidated financial data in conjunction with our consolidated financial statements, together with each of their related notes, “Presentation of Financial and Other Information,” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included elsewhere in this Offering Memorandum. Our consolidated financial statements have been prepared and presented in accordance with TFRS, which differs in certain respects from IFRS. See “Summary of Principal Differences Between TFRS and IFRS.”

Selected Consolidated Financial and Other Data

The following tables set forth our summary consolidated financial information as of and for the years ended December 31, 2016, 2017 and 2018 and as of and for the six months ended June 30, 2018 and 2019.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
Summary Consolidated Statement of Income (Loss) Information:							
Revenue from sale and services	274,738.9	337,387.7	389,343.5	12,665.7	188,172.2	183,587.6	5,972.3
Subsidy from oil fuel fund					1,256.6	765.6	24.9
Cost of sale of goods and services	(247,261.2)	(305,385.6)	(373,128.0)	(12,138.2)	(175,509.5)	(177,772.3)	(5,783.1)
Gross profit	27,477.8	32,002.1	16,215.5	527.5	13,919.2	6,580.9	214.1
Net derivative gain (loss) on hedging	(243.2)	(133.2)	(820.5)	(26.7)	171.7	(76.4)	(2.5)
Dividend Income	247.3	157.9	157.4	5.1	157.4	167.1	5.4
Net foreign exchange gain	446.1	3,181.6	626.7	20.4	311.6	1,245.6	40.5
Other income	1,118.8	1,190.1	1,718.9	55.9	708.2	1,337.1	43.5
Selling expenses	(451.3)	(491.8)	(424.0)	(13.8)	(224.6)	(218.3)	(7.1)
Administrative expenses	(2,182.1)	(2,969.4)	(2,357.8)	(76.7)	(1,059.2)	(1,128.6)	(36.7)
Share of profit of associates and joint ventures.....	929.7	1,196.7	1,192.9	38.8	671.9	702.5	22.9
Profit before finance costs and income tax expense .	27,343.1	34,133.8	16,309.2	530.6	14,656.2	8,609.9	280.1
Finance costs ⁽¹⁾	(3,460.7)	(3,285.1)	(3,941.9)	(128.2)	(1,827.4)	(2,410.4)	(78.4)
Profit before income tax expense	23,882.4	30,848.8	12,367.2	402.3	12,828.8	6,199.5	201.7
Income tax expense	(2,295.5)	(5,529.5)	(1,982.8)	(64.5)	(2,289.8)	(1,116.2)	(36.3)
Profit for the year / period .	21,586.9	25,319.3	10,384.4	337.8	10,538.9	5,083.3	165.4
Profit for the year / period attributable to:							
Owners of the Parent	21,221.9	24,856.2	10,149.0	330.2	10,402.6	4,975.2	161.8
Non-controlling interests	365.0	463.1	235.4	7.7	136.2	108.1	3.5
Profit for the year / period .	21,586.9	25,319.3	10,384.4	337.8	10,538.9	5,083.3	165.4
Basic earnings per share (Baht)	10.4	12.2	5.0	0.2	5.1	2.4	0.1

(1) Including finance costs from repurchase of debentures for the six months ended June 30, 2018.

	As of December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
Summary Consolidated Statement of Financial Position Information:							
Cash and cash equivalents	31,120.8	15,623.4	34,041.5	1,107.4	34,552.8	57,338.3	1,865.3
Total current assets	115,730.6	126,211.4	164,743.5	5,359.3	141,536.8	146,947.4	4,780.3
Total non-current assets	102,000.6	101,896.9	103,869.5	3,379.0	99,936.6	109,505.6	3,562.3
Total assets	217,731.2	228,108.3	268,613.0	8,738.2	241,473.4	256,453.0	8,342.6
Total current liabilities	34,145.8	33,348.0	38,020.1	1,236.8	38,641.5	29,885.0	972.2
Total non-current liabilities ...	71,988.1	67,612.0	104,120.5	3,387.1	73,041.3	101,414.3	3,299.1
Total liabilities	106,133.9	100,960.0	142,140.6	4,624.0	111,682.8	131,299.3	4,271.3

Total equity.....	111,597.3	127,148.2	126,472.4	4,114.3	129,790.6	125,153.7	4,071.4
Total liabilities and equity...	217,731.2	228,108.3	268,613.0	8,738.2	241,473.4	256,453.0	8,342.6

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions) US\$	THB	THB	US\$
Summary Consolidated Statement of Cash Flow Information:							
Net cash provided by operating activities	23,181.6	34,417.2	18,313.0	595.7	11,184.3	8,647.0	281.3
Net cash (used in) provided by investing activities	(18,351.8)	(30,092.4)	(25,846.3)	(840.8)	9,604.3	26,265.6	854.4
Net cash (used in) provided by financing activities	(9,397.3)	(19,226.0)	25,565.6	831.7	(2,739.3)	(9,096.6)	(295.9)
Net increase (decrease) in cash and cash equivalents	(4,567.5)	(14,901.2)	18,032.4	586.6	18,049.3	25,816.0	839.8
Effect of exchange rate changes	(76.2)	(596.1)	385.7	12.5	880.1	(2,219.0)	(72.2)
Cash and cash equivalents at beginning of year / period .	35,764.4	31,120.8	15,623.4	508.2	15,623.4	33,741.3	1,097.6
Cash and cash equivalents at end of year / period	31,120.8	15,623.4	34,041.5	1,107.4	34,552.8	57,338.3	1,865.3

Certain Other Financial and Operational Information

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
EBITDA Information:							
EBITDA ⁽¹⁾	32,674.8	36,924.7	20,238.5	658.4	16,503.9	8,960.9	291.5
EBITDA Margin ⁽²⁾	11.9%	10.9%	5.2%	5.2%	8.8%	4.9%	4.9%

Notes:

- (1) EBITDA means profit for the year excluding income tax expense, finance costs, depreciation and amortization, finance income, investment gain/loss and disposal of asset.
- (2) EBITDA margin means EBITDA divided by the sum of revenue from sale of goods and revenue from rendering of services.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	(in millions, except otherwise indicated) THB	US\$	THB	THB	US\$
Certain Financial Information and Ratios:							
Total Debt ⁽¹⁾	76,301.0	66,468.0	107,059.9	3,482.8	75,412.9	99,596.9	3,240.0
Net Debt ⁽²⁾	15,526.5	(1,473.5)	(202.2)	(6.6)	(1,497.0)	5,738.7	186.7
Total Debt to EBITDA (times) ⁽³⁾	2.3	1.8	5.3	5.3	4.5	11.1	11.1
Net Debt to EBITDA (times) ⁽⁴⁾	0.5	(0.04)	0.0	0.0	(0.09)	0.6	0.6
EBITDA-to-interest coverage ratio (times) ⁽⁵⁾	9.4	11.2	5.1	5.1	9.0	3.7	3.7
Net Debt to Equity (times) ⁽⁶⁾	0.1	(0.01)	0.0	0.0	(0.01)	0.0	0.0

Notes:

- (1) Total debt means the sum of short-term borrowings, the current portion of long-term borrowings, the current portion of debentures, the non-current portion of long-term borrowings and the non-current portion of debentures.
- (2) Net debt means total debt less (i) cash and cash equivalents and (ii) current investments.
- (3) Calculated from total debt divided by EBITDA.
- (4) Calculated from net debt divided by EBITDA.
- (5) Calculated from EBITDA divided by finance costs.
- (6) Calculated from net debt divided by equity.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	(in millions, except otherwise indicated)						
	THB	THB	THB	US\$	THB	THB	US\$
Certain Operational Information:							
Adjusted gross profit (loss)⁽¹⁾ from							
Oil refining	26,245.0	29,058.2	16,008.8	520.8	13,253.0	7,194.3	234
Petrochemical	6,452.5	6,302.0	6,218.4	202.3	2,663.4	2,674.2	87
Lube base oil	2,703.5	3,184.6	1,944.9	63.3	1,240.7	762.0	24.8
Integrated profit	35,401.0	38,544.9	24,172.1	786.3	17,157.1	10,630.5	345.8
Integrated intake (thousand bpd) ⁽²⁾	300.5	312.2	313.4	313.4	305.8	306.1	306.1
Average foreign exchange rate (THB/US\$) ⁽³⁾	35.5	34.1	32.5	32.5	31.9	31.8	31.8
Gross integrated margin (US\$ per barrel)⁽⁴⁾	9.1	9.9	6.5	6.5	9.7	6.0	6.0
Integrated cash cost (US\$ per barrel)⁽⁵⁾	2.3	2.1	2.4	2.4	2.2	2.7	2.7

Notes:

- (1) Adjusted gross profit (loss) is the sum of gross profit or loss under TFRS, non-feedstock related cost of goods sold and service rendered, depreciation and operating expenses, foreign currency exchange gains or losses, net realizable value adjustments and other income.
- (2) Integrated intake, measured in thousands of barrels per day, is calculated based on our oil refinery's crude oil and feedstock intake, our petrochemical plants' feedstock import and our lube base oil refinery's long residue import.
- (3) Average foreign exchange rate is calculated based on the daily average selling rate of foreign exchange published by the BOT.
- (4) Gross integrated margin was calculated by taking the integrated profit, as divided by the total integrated intake, and further adjusted to take into account the foreign exchange rates.
- (5) Integrated cash cost is a measure of operating expenses and includes plant operating expenses, selling expenses, administrative expenses and finance costs excluding non-recurring items. Our integrated cash cost comprised operating expenses of US\$1.8/bbl, US\$1.6/bbl, US\$1.9/bbl, US\$1.7/bbl and US\$2.1/bbl and finance costs of US\$0.6/bbl, US\$0.5/bbl, US\$0.5/bbl, US\$0.5/bbl and US\$0.6/bbl for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, respectively

See “*Management’s Discussion and Analysis of Financial Condition and Results of Operations—Key Metrics for our Group*” for further details in relation to calculation of the gross margin from production, gross integrated margin and integrated cash cost.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis are based upon the consolidated financial statements of Thai Oil and should be read in conjunction with the selected financial and operating data presented in "Selected Consolidated Financial and Other Data" and the consolidated financial statements of Thai Oil and the notes thereto as of and for the year ended December 31, 2017, including comparative information presented as corresponding figures as of and for the year ended December 31, 2016, the consolidated financial statements of Thai Oil and the notes thereto as of and for the year ended December 31, 2018, including comparative information presented as corresponding figures as of and for the year ended December 31, 2017, and the unaudited interim consolidated financial information of Thai Oil and the notes thereto as of and for the six months ended June 30, 2019, including comparative information presented as corresponding figures as of and for the six months ended June 30, 2018, included elsewhere in this Offering Memorandum. Investors are advised that any evaluation of Thai Oil's business should be made with reference to the information contained in this Offering Memorandum under the heading "Risk Factors." The financial statements presented in this Offering Memorandum are presented in accordance with TFRS, which differs in certain material respects from IFRS. For a description of certain differences between TFRS and IFRS, see "Summary of Principal Differences Between TFRS and IFRS."

Overview

We are one of the leading integrated publicly listed refining and petrochemical companies in Thailand. We currently own and operate the largest single-site complex refinery in Thailand measured by nameplate capacity and what we believe is one of the most complex refineries in the Asia-Pacific region, which is integrated with our petrochemicals and lube base oil platform. We derive the majority of our sales and operating revenue from the sale of refined petroleum products, petrochemical products and lube base oil products. We also derive revenue from the electricity generated by our power generation plants, from our solvent products, from our marine transportation services, from our sales of alternative energy products such as ethanol as well as services provided by our energy services business unit.

Our revenue from sale and services and net profit for the year ended December 31, 2016 amounted to THB274,738.9 million and THB21,221.9 million, respectively. Our revenue from sale and services and net profit for the year ended December 31, 2017 amounted to THB337,387.7 million and THB24,856.2 million, respectively. Our revenue from sale and services and net profit attributable to owners of the parent for the year ended December 31, 2018 amounted to THB389,343.5 million (US\$12,665.7 million) and THB10,149.04 million (US\$330.2 million), respectively. Our revenue from sale and services and net profit attributable to owners of the parent for the six months ended June 30, 2018 amounted to THB188,172.2 million and THB10,402.6 million, respectively. Our revenue from sale and services and net profit attributable to owners of the parent for the six months ended June 30, 2019 amounted to THB183,587.6 million (US\$5,972.3 million) and THB4,975.2 million (US\$161.8 million), respectively. Revenue from sale and services for each of our business units for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019 are set forth in the table below.

Business Unit	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	US\$ (in millions of)	THB	THB	US\$
Oil Refining	283,293.2	349,828.8	405,130.6	13,179.3	195,120.0	189,629.6	6,168.8
Lube Base Oil Refinery	13,535.7	18,662.4	20,959.0	681.8	10,010.73	9,531.0	310.1
Petrochemical	48,384.6	57,881.2	66,701.5	2,169.9	31,414.1	27,946.5	909.1
Power Generation	9,131.2	10,928.8	11,733.5	381.7	5,580.1	5,939.6	193.2
Marine Transportation							
Services	877.8	801.6	620.5	20.2	313.4	326.1	10.6
Solvent	7,629.8	9,181.5	9,991.8	325.0	4,791.4	4,434.5	144.3
Ethanol	1,538.1	1,619.8	1,477.2	48.1	743.9	739.1	24.0
Others	900.3	984.3	1,924.7	62.6	615.4	1,922.9	62.6
Eliminations ⁽¹⁾	(90,551.7)	(112,500.8)	(129,195.3)	(4,202.8)	(60,416.8)	(56,881.7)	(1,850.4)
Total revenue from sale and services	274,738.9	337,387.7	389,343.5	12,665.7	188,172.2	183,587.6	5,972.3

Note:

(1) Eliminations relate to intra-Group sales and services.

We are listed on the SET under the stock code “TOP” with a market capitalization of THB135,151.85 million (US\$4,396.6 million) as of December 31, 2018 and THB135,661.85 million (US\$4,413.2 million) as of June 30, 2019.

Key Factors Affecting Our Businesses

Our results of operations are driven by a combination of factors affecting the refining and petrochemical industries generally, including macroeconomic conditions, supply and demand in the petroleum refining, petrochemical and lube base oil industries, prices of feedstock, and foreign exchange rate fluctuations. Our results of operations are also impacted by company-specific structural and operational factors, such as production volumes and utilization at our refinery and plants and our product mix. Set forth below is an overview of the key drivers that have affected our historical results of operations, and are expected to continue to affect our future results of operations.

Macroeconomic Conditions

Our results of operations are directly affected by sales volume and sales prices of our products, which in turn are influenced by general macroeconomic conditions globally and in Thailand.

Spreads between petroleum product prices as measured against feedstock prices decreased in 2018 and in the six months ended June 30, 2019. The key driving factor for the declining spreads was surplus supply and low demand following the US-China trade war. Particularly, the spread between gasoline prices as measured against the price of Dubai crude oil decreased in 2018 and in the six months ended June 30, 2019 because of surplus supply, which resulted in an increase in the global inventory level after global refineries had ramped up their run rates in order to respond to heating oil demand during winter. Spreads between benzene prices as measured against the price of gasoline 95 decreased in 2018 and in the six months ended June 30, 2019, primarily because softened downstream demand for plastic production and styrene monomer as a consequence of the United States-China trade war and low crude oil prices. However, the spread between paraxylene as measured against the price of gasoline 95 increased in 2018 and in the six months ended June 30, 2019 primarily because of a considerable increase in crude oil prices, improved demand for paraxylene after China banned plastic waste imports and a shortage of paraxylene supply. The lube base oil spread as measured against the fuel oil also weakened in the six months ended December 31, 2019 due to the sluggish demand owing to the United States-China trade war.

In addition, as most of our assets and operations are located in Thailand, we are affected by macroeconomic conditions in Thailand. According to the NESDB, Thailand’s GDP grew by 3.3% in 2016, 3.9% in 2017 and 4.1% in 2018. If macro-management and planning to pre-empt and address these issues are not efficiently implemented by the Thai government, the future economic growth of Thailand and our business could be impacted.

See “Risk Factors—Risks Relating to Our Business—Cyclicality in the refining and petrochemical industries may result in reduced volumes or operating margins, and volatile margins in the refining and petrochemical industries and uncertainty regarding the global economic recovery could have a material adverse effect on us in the future” and “Risk Factors—Risks Relating to Thailand—Most of our assets and operations are located in Thailand and we are subject to economic, legal and regulatory uncertainties in Thailand.”

Supply and Demand in the Petroleum Refining, Petrochemical and Lube Base Oil Industries

Global supply and demand conditions influence the price of crude oil, which in turn influences the prices of our refined petroleum products. Typically as the supply for crude oil increases, the prices of crude oil feedstock and our refined petroleum products also decrease. Depending on the timing of our product sales and feedstock purchases, we may not however be able to pass on all these price fluctuations to our customers.

The prices of refined petroleum products increased as crude oil prices increased in 2017 and significantly increased further in 2018 by approximately 30.6% following the OPEC supply cut deal, rising global oil demand and a decline in oil production in Iran and Venezuela due to the sanctions imposed by the United States and the economic crisis in Venezuela, respectively. In the six months ended June 30, 2019, the prices of refined petroleum products decreased marginally compared to the six months ended June 30, 2018, primarily because of the sluggish demand following the United States-China trade war.

The spread of gasoline over Dubai oil crude prices remained at approximately the same level in 2016 and 2017 and decreased in 2018 primarily because of a supply surplus as global refineries had ramped up their run rates in order to respond to oil demands in winter. In the six months ended June 30, 2019 the spread of gasoline over Dubai declined significantly compared to the six months ended June 30, 2018 because of an increase in supply as two major refineries in China started operations. The spreads of jet and gas oil over Dubai crude oil prices continued to increase in 2017 and 2018 due to below average jet/kero and gas oil inventory. In the six months ended June 30, 2019 the spreads of jet and gas oil over Dubai decreased compared to the same period in the prior year because of low jet/kero and gas oil consumption in Europe which affected exports from Asia to the region. The spread of fuel oil over Dubai crude oil prices decreased marginally in 2018 owing to high supply and softened demand as Pakistan banned fuel oil imports. Meanwhile, fuel oil spread increased in the six months ended June 30, 2019 as the United States imposed sanctions on Venezuela which caused reductions in the supply of fuel oil.

Margins in the petrochemical and lube base oil industries are strongly influenced by capacity utilization. Generally, as demand for petrochemical and lube base oil products approaches available supply, utilization rates rise, and prices and margins typically increase. Historically, this relationship has been highly cyclical due to fluctuations in supply resulting from the timing of new investments in capacity by producers and general economic conditions affecting the relative strength or weakness of demand.

The global petrochemical market, especially aromatics, has been pressured by high capacity additions since 2014. The global nameplate capacity of paraxylene increased by 4.7 million tons in 2014 and around 78% located in Asia. The market faced excess supply and forced some uneconomic producers to shut down in 2015 as a consequence. The market started to recover in 2016 and continued to improve in 2018. The average spread between paraxylene price and unleaded gasoline 95 price increased from US\$276 per ton in 2017 to US\$388 per ton in 2018 mainly due to a considerable increase in crude oil prices, improved demand for paraxylene after China banned plastic waste imports for recycling in 2018 causing producers to use more paraxylene to substitute recycled plastic, and decrease in the supply of paraxylene as the new aromatics plants in the Middle East faced technical issues. Similarly, the average spread for paraxylene over unleaded gasoline 95 slightly increased from US\$286 in the six months ended June 30, 2018 to US\$391 in the six months ended June 30, 2019. The spread between benzene price and unleaded gasoline 95 price in 2018 decreased significantly to US\$141 per ton from US\$45 in 2017 mainly because of the United States-China trade wars leading to higher inventory levels in China causing a decrease in imports. Similarly, the spread between benzene price and unleaded gasoline 95 price in the six months ended June 30, 2019 decreased significantly to US\$3 per ton from US\$179 in the six months ended June 30, 2018 mainly because of low crude oil prices. The spread between toluene price and unleaded gasoline 95 price continued to decrease marginally in 2017, 2018 and in the six months ended June 30, 2019. See “—Key Metrics by which We Measure Our Key Business Units—Key Metrics for Our Petrochemical Business Unit—Product-to-Feedstock Market Price Spread.”

The lube base oil market in 2016 softened due to 2.5 million tons of additional lube base oil supply. The average lube base oil price (500SN) to high sulfur fuel oil (“**HSFO**”) price spread for 2016 was US\$412 per metric ton. In 2017, lube base oil market improved due to tight supply availability because a number of plants in Asia shut down for scheduled maintenance, leading to a decrease of 1.9 million tons in lube base oil supply. The average lube base oil price (500SN) to HSFO price spread for 2017 was US\$498 per metric ton. In 2018, there was an increase in supply of lube oil with the opening of new oil plants in Saudi Arabia and the resumption of oil plants that had shut operations for maintenance. Global demand for lube oil decreased in 2018 because of rising crude oil prices.

In the six months ended June 30, 2019 lube oil price (500SN) and its spread over HSFO decreased to US\$308 per metric ton from US\$497 per metric ton mainly because of sluggish demand from the prolonged United States-China trade war. With regards to bitumen, which is produced as a by-product in the refining of the more profitable lube base oil, its spread over HSFO in 2016 decreased significantly to negative US\$49 per metric ton. In 2017, the bitumen market was firmer on low bitumen supply conditions as producers switched mode to produce more HSFO instead of bitumen following the attractive strong margins of HSFO. The average bitumen to HSFO price spread for 2017 rose to negative US\$31.1 per metric ton. In 2018 bitumen to HSFO price spread decreased to negative US\$46 per metric ton primarily because of increase in crude oil prices and low supply in as refineries in Asia were gutted by a fire resulting in low bitumen production. In the six months ended June 30, 2019 the bitumen to HSFO price spread increased to a negative US\$22 per metric ton from a negative US\$61 per metric ton in the six months ended June 30, 2018 mainly because of rising regional demand from expedited road construction and repair before the rainy season. See “—Key Metrics by which We Measure Our Key Business Units—Key Metrics for Our Lube Base Oil Business Unit—Product-to-Feedstock Market Price Spread.”

Prices of Feedstock

Feedstock costs are significant components of the operating costs of our oil refinery, petrochemical and lube base oil businesses. Specifically, the production of refined petroleum products is dependent on the available supply of crude oil, while the costs of the feedstock required to produce petrochemical products (principally platformate) and lube base oil products (principally long residue) are generally driven by the price of oil. The prices of our feedstock, the majority of which we obtain under supply contracts which have pricing terms based on market prices, are generally subject to frequent and significant fluctuations and are affected by a variety of factors, including local market demand conditions and the level of operations of other refineries in Thailand and in the Asia-Pacific region, changes in global economic conditions, the political situation in major oil-producing countries, global inventory levels and the availability of crude oil and other feedstock and refined petroleum products, seasonal demand fluctuations, transportation costs of crude oil and other feedstock and refined petroleum products, predicted and actual weather conditions, the availability and suitability of similar or alternative fuels, the extent of government regulation, particularly as it relates to environmental policy (including product specifications) and exchange rate fluctuations, particularly fluctuations in the value of the Baht against the U.S. dollar.

World crude oil prices increased in 2018, with the price of Dubai crude oil fluctuating between US\$60 and US\$80 per barrel, averaging US\$53.1 per barrel, according to Platts. This was primarily attributable to several factors, including lower global production due to the OPEC and non-OPEC supply cut deal and decrease in crude oil production as a result of economic crisis in certain regions and imposition of United States sanctions. Nevertheless, the output of U.S. crude oil rose gradually following an increase in the number of U.S. oil rigs, which has caused Dubai crude oil prices to decrease. The average price of unleaded gasoline 95 (which we used as a benchmark for the price of platformate) was US\$56.1 per barrel in the year ended December 31, 2016 and subsequently increased to US\$68.0 per barrel in the year ended December 31, 2017 and further increased to US\$79.9 per barrel in the year ended December 31, 2018. The average price of HSFO (which we use as a benchmark for the price of long residue) was US\$36.3 per barrel in the year ended December 31, 2016 and subsequently increased to US\$50.8 per barrel in the year ended December 31, 2017 and further increased to US\$66.8 per barrel in the year ended December 31, 2018. Owing to the sluggish demand following the United States-China trade war, world crude oil prices marginally decreased in the six months ended June 30, 2019 to US\$65.4 per barrel from US\$68.0 in the six months ended June 30, 2018. Similarly, the average price of unleaded gasoline 95 decreased to US\$71.1 per barrel from US\$ 80.9 per barrel in the same period last year.

Fluctuations in feedstock prices also affect the gross refining margin of our refinery and our petrochemical and lube base oil product-to-feedstock margins, as there is a lag time between the time that we pay for crude oil and other feedstock and the time that we sell the resulting refined petroleum, petrochemical and lube base oil products. As a result, the gross refining margin of our refinery, our petrochemical product-to-feedstock margin and lube base oil products-to-feedstock margin are affected by changes in feedstock prices between the date that such feedstock is accounted for as inventory and the date of sale of the resulting refined petroleum, petrochemical and lube base oil products. See “—Key Metrics by which We Measure Our Business Units—Key Metrics for Our Refining Business Unit—Gross Refining Margin,” “—Key Metrics by which We Measure Our Business Units—Key Metrics for Our Petrochemical Business Unit—Product-to-Feedstock Margin” and “—Key Metrics by which We Measure Our Business Units—Key Metrics for Our Lube Base Oil Business Unit—Product-to-Feedstock Margin.”

Changes in feedstock prices also have a direct impact on our working capital needs. In general, increases in feedstock prices lead to an increase in our working capital needs, and vice versa.

To the extent we are unable to pass on to the customers the increases in the prices of our feedstock, our results of operations may be adversely impacted.

Product Mix

Our business, financial condition, results of operation and prospects are affected by our product mix, which is the mix of products we produce to meet the demand from our customers and optimize our sales and margins. Our product mix is driven by the types, quantities and market pricing of various refined petroleum, petrochemical, lube base oil and other products purchased by our customers. While we are able to make alterations to the mix of products that we produce, we cannot, however, solely refine or produce products with the highest selling prices or margins, as the refining and production process produces a variety of different product types in varying volumes. In formulating our product mix, we seek to maximize our overall gross profit margin while producing a mix of products that will match customer demand as closely as possible for any given period.

Our refinery's configuration allows us to process a variety of crude oil compared to less complex plants, while still producing high-value, clean fuels. Our current configuration is oriented towards maximizing middle distillates (hydrocracking) and routing platformate to produce petrochemical products, which typically have higher margin spreads compared to refined petroleum products such as unleaded gasoline 95 and gasohol, at our petrochemical complexes. Our feedstock flexibility allows us to manage our product mix for downstream products more effectively, as we are able to tailor our feedstock mix to produce the desired composition for our product mix more optimally.

Generally, we believe our feedstock slate is more flexible than those of our competitors that have less complex refineries and plants. Our refinery and production units are therefore able to take advantage of more cost-effective feedstock, as well as changes in market conditions, and we are able to benefit from optimization of our product mix and incremental gross margin opportunities for our refinery and production units.

Production Volume and Utilization

Our results of operations are materially influenced by the degree to which we utilize our assets in order to achieve maximum production volumes. The utilization rate of our production facilities affects our operating expenses on a per barrel or per metric ton basis. Higher utilization rates help spread our fixed operating expenses over a larger amount of products which reduces our unit cost of production. Generally, assuming that we are able to source appropriately priced feedstock, we believe that maximizing the utilization and capacity of our refinery allows us to maintain positive margins and cash flows, even during downturns in industry cycles or customer demand, more readily than some of our competitors who have higher production costs. The utilization rate of our petrochemical plants in turn depend on the utilization of our refinery, which supplies the platformate feedstock required by our petrochemical plants. The utilization of our refinery and production plants also depend on the margins which we can obtain for our various products, as we can alter our product mix to take advantage of fluctuating margins of our various products to maximize our profit as a group. We intend to achieve growth in production volume by improving utilization rates within the defined availability of our assets, improving availability of our assets by minimizing planned and unplanned facility shutdowns and improving the capacity of our assets through debottlenecking projects.

Our utilization rate is also impacted by the actual plant shutdown time for scheduled and unscheduled maintenance, including the time needed to gradually reduce production for the shutdowns and to resume full production following the shutdown.

The number and length of turnarounds (scheduled outages of a unit in order to perform necessary inspections and testing to comply with industry regulations and to permit us to carry out any maintenance activities that may be necessary) carried out in any given period can impact operating results. We routinely schedule major turnaround maintenance for each refinery and plant every three to six years for periods of approximately 21 to 30 days and on a staggered basis to minimize impact on our overall production. When possible, we seek to schedule the timing of turnarounds to coincide with periods of the scheduled shutdowns of suppliers and periods of relatively lower demand for the products of the relevant units.

For a discussion of the production volumes and the utilization rates of our various business units and the details of our plant shutdowns, see *"Business—Our Business Units and Products"* and *"Business—Refinery and Plant Maintenance,"* respectively.

Foreign Exchange Rate Fluctuations

Our results of operations may be affected by both the transaction effects and translation effects of foreign currency exchange rate fluctuations between the U.S. dollar and the Baht. Most of our production costs come from crude oil or raw material imports, which require payment in U.S. dollars. On the other hand, while we receive a large proportion of our revenues from our sales of petroleum and petrochemical products in Baht, the prices of such products are also closely linked to U.S. dollars. Therefore, substantially all of our revenues and expenses are directly linked to U.S. dollars and our revenues and expenses which are denominated in U.S. dollars are translated into Baht for inclusion in our financial statements. Variations in the value of the Baht can also affect profitability because of time differences for cost and sales transactions. Depreciation in the value of the Baht against the U.S. dollar tends to have a beneficial effect on our gross refining margins and product-to-feedstock margins. Conversely, appreciation in the value of the Baht against the U.S. dollar tends to have a detrimental effect on our gross refining margins and product-to-feedstock margins.

We engage in hedging activities, including forward contracts and currency swaps, to manage exposure to fluctuations in foreign currencies on our financial results. Our hedging activities are designed to reduce, but do not eliminate, the effects of foreign currency fluctuations. Factors that could affect the effectiveness of our hedging activities include accuracy of sales forecasts, volatility of currency markets and the availability of hedging instruments. We also incur U.S. dollar indebtedness to provide an indirect accounting hedge against the appreciation of the Baht against the U.S. dollar. For example, the gain resulting from the translation of our U.S. dollar indebtedness into Baht as the Baht appreciates against the U.S. dollar mitigates the impact on our gross refining margins and product-to-feedstock margins of an appreciation of the Baht.

Critical Accounting Estimates and Judgments

We have prepared our financial statements contained elsewhere in this Offering Memorandum in accordance with TFRS. Preparation of our financial statements requires our management to make estimates and judgments that affect the reported amount of our assets, liabilities, revenue and expenses, as well as the disclosure of our contingent assets and liabilities. Our management continually evaluates the estimates and judgments used in preparing the financial statements which are based on the management's historical experience and other factors, including the expectations of future events that are believed to be reasonable under the circumstances.

Our actual results may differ significantly under different assumptions or conditions. The accounting policies that we believe are the most critical to a full understanding and evaluation of our reported financial results are discussed below.

Inventories

Inventories are measured at the lower of cost and net realisable value.

Cost of inventories is calculated using the weighted average cost principle, and comprises all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition. In the case of manufactured inventories and work in progress, cost includes an appropriate share of production overheads based on normal operating capacity.

Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs to complete and to make the sale.

Impairment

The carrying amounts of the our assets are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, the assets' recoverable amounts are estimated. For goodwill and intangible assets that have indefinite useful lives or are not yet available for use, the recoverable amount is estimated each year at the same time.

An impairment loss is recognised if the carrying amount of an asset or its cash-generating unit exceeds its recoverable amount. The impairment loss is recognised in profit or loss.

When a decline in the fair value of an available-for-sale financial asset has been recognised directly in equity and there is objective evidence that the value of the asset is impaired, the cumulative loss that had been recognised directly in equity is recognised in profit or loss even though the financial asset has not been derecognised. The amount of the cumulative loss that is recognised in profit or loss is the difference between the acquisition cost and current fair value, less any impairment loss on that financial asset previously recognised in profit or loss.

Income Taxes

Income tax expense on the profit or loss for the year comprises current and deferred tax.

Current tax is the expected tax payable or receivable on the taxable income or loss for the year, using tax rates enacted or substantively enacted at the reporting date, and any adjustment to tax payable in respect of previous years.

Deferred tax is recognised in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognised for the following temporary differences: the initial recognition of goodwill; the initial recognition of

assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss; and differences relating to investments in subsidiaries and jointly-controlled entities to the extent that it is probable that they will not reverse in the foreseeable future.

Employee Benefits

We use assumptions and judgment when determining the obligations in respect of defined contribution plans, defined benefit plans and other long-term employee benefits.

Defined contribution plans

A defined contribution plan, provident fund, is a post-employment benefit plan under which an entity pays fixed contributions into a separate entity and will have no legal or constructive obligation to pay further amounts. Obligations for contributions to defined contribution pension plans are recognised as an employee benefit expense in profit or loss in the periods during which services are rendered by employees

Defined Benefit Plans

A defined benefit plan is a post-employment benefit plan other than a defined contribution plan. Our net obligation in respect of defined benefit plans is calculated separately for each plan by estimating the amount of future benefit that employees have earned in the current and prior periods, discounting that amount.

The calculation of defined benefit obligations is performed annually by a qualified actuary using the projected unit credit method. When the calculation results in a potential asset for us, the recognised asset is limited to the present value of economic benefits available in the form of any future refunds from the plan or reductions in future contributions to the plan. To calculate the present value of economic benefits, consideration is given to any application minimum funding requirements.

Remeasurements of the net defined benefit liability, actuarial gain or loss are recognised immediately in other comprehensive income. We determine the interest expense on the net defined benefit liability for the period by applying the discount rate used to measure the defined benefit obligation at the beginning of the annual period, taking into account any changes in the net defined benefit liability during the period as a result of contributions and benefit payments. Net interest expense and other expenses related to defined benefit plans are recognised in profit or loss.

When the benefits of a plan are changed or when a plan is curtailed, the resulting change in benefit that relates to past service or the gain or loss on curtailment is recognised immediately in profit or loss. We recognise gains and losses on the settlement of a defined benefit plan when the settlement occurs.

Other Long-Term Employee Benefits

Our net obligation in respect of long-term employee benefits is the amount of future benefit that employees have earned in return for their service in the current and prior periods. That benefit is discounted to determine its present value. Remeasurements are recognised in profit or loss in the period in which they arise.

Business Combinations

We apply the acquisition method for all business combinations when control is transferred to the Company other than those with entities under common control. We control an entity when it is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. The acquisition date is the date on which control is transferred to the acquirer. Judgment is applied in determining the acquisition date and determining whether control is transferred from one party to another.

Key Metrics by which We Measure Our Key Business Units

Key Metrics for Our Refining Business Unit

Capacity Utilization Rate

Our capacity utilization rate measures the utilization of our refinery and is the ratio of the crude oil feedstock input of our refinery against the refinery's total nameplate capacity of crude oil. Our capacity utilization rate is impacted by the potential incremental profitability of additional production and the availability of our production facilities. Our capacity utilization rate also takes into account shutdown time for scheduled and unscheduled maintenance, which includes the time necessary to gradually reduce production for the shutdowns and to recover to full production following the shutdowns. Our production is generally not subject to fluctuating demand and we generally seek to operate our refinery at its full capacity, as we are able to sell a large portion of our refined petroleum products from our refinery to PTT under long-term offtake agreements. For the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, 45.1%, 42.2%, 42.6%, 42.2% and 44.2% of our total sales revenue for our refinery products was derived from sales to PTT and PTTOR, respectively. Our capacity utilization rates vary mainly due to periods of maintenance shutdowns.

Our capacity utilization rate affects our operating expenses on a per barrel or per metric ton basis. Higher capacity utilization rates of our refinery reduce the unit cost of production as we are able to spread our fixed operating expenses over a larger amount of crude oil and other feedstock intake.

As of June 30, 2019, our refinery had a total nameplate capacity of approximately 275,000 barrels of crude oil per day. The capacity utilization rate of our refinery was 108.3%, 112.4%, 112.6%, 110.3% and 109.6% for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019, respectively. The marginal increase in our capacity utilization rate for the year ended December 31, 2018 compared to that for the year ended December 31, 2017 was due to increase in average selling prices as a result of increase in crude oil prices and an increase in total product sales volume. Our capacity utilization rate for the six months ended June 30, 2019 decreased compared to that of the six months ended June 30, 2018 mainly because of major turnarounds. See “—Gross Refining Margin.”

Gross Refining Margin

Similar to other oil refineries, we measure the financial performance of our refinery operations with reference to our refining margins, as revenues from, and costs of, our refining operations do not necessarily, when viewed individually, indicate our financial performance. Prices for crude oil and refined petroleum products are subject to frequent and significant fluctuations. As a result, a refinery's revenues and cost of goods sold can vary significantly from period to period, even when the volume of crude oil purchased and refined petroleum products sold remain relatively constant. A refinery's revenues depend on refined petroleum product prices, currency fluctuations and sales volume. The cyclical nature of refined petroleum product prices results in high volatility of revenues from refining operations. Consequently, revenues from refining operations, viewed alone, are not indicative of an oil refining company's financial performance. Earnings and cash flow from refining are largely driven by gross refining margin, and a successful refinery strives to maintain its profit margins from year to year, notwithstanding fluctuations in the prices of crude oil and refined petroleum products.

Similar to other oil refineries, we use gross refining margin, which is quoted in U.S. dollars and expressed on a per barrel basis, to assess the margin for refining and converting a barrel of crude oil or feedstock into refined petroleum products. The gross refining margin for a given period is (i) the difference between (a) the value of refined products produced for such period and (b) the landed cost of crude oil and other feedstock, including the costs of energy used in the refining process, (ii) divided by the total intake of our refinery feedstock for such period.

Our gross refining margin has been and will continue to be affected by numerous factors including those listed below, some of which are beyond our control.

- *Fluctuations in the price of crude oil and refined petroleum products.* The difference between the cost of our crude oil feedstock and the prevailing global prices for refined petroleum products is the primary factor that impacts our gross refining margins. Prices for crude oil are subject to frequent fluctuations depending on the prevailing global prices for crude oil. Further, while crude oil costs in general are a function of supply and demand, there are many types and grades of crude oil and their relative prices vary depending on various factors, including physical

properties and availability. Therefore, even if the volume of crude oil we have purchased remains constant, our costs of production may vary significantly from time to time. The prices for refined petroleum products are also subject to frequent and significant fluctuations. As a result, our revenue from refined petroleum products will vary over time even if our sale volume remains constant, resulting in corresponding variations in our gross refining margins. Prevailing global prices for crude oil may fluctuate in the same or different direction as the prevailing global prices for refined petroleum products.

- *Complexity and utilization of our refinery.* The complexity of the refinery's design and the utilization rate impact the gross refining margin. Thus, a complex refinery, such as ours, that can produce a higher percentage of the higher value light products and middle distillates from a barrel of crude oil will generally have a higher gross refining margin than a less complex facility. Higher capacity utilization rates reduce the unit cost of production and increase our gross refining margin. Our complex plant can process a variety of lighter/sweeter or heavier/sour crude oil. Fluctuations in the price of these feedstock may mean that at any time, it may be more profitable to process one particular type of feedstock. We can modify the proportion of feedstock we purchase (and process) to take advantage of such fluctuations to maximize our gross refining margin.
- *Source of feedstock and destination of products.* Gross refining margin is also affected by where the crude oil and other feedstock are sourced in addition to whether the refined petroleum products are ultimately sold domestically or abroad. For sourcing of crude oil and other feedstock, refineries located nearer the sources of their preferred crude oil and other feedstock would incur less cost for the transport of such feedstock. For product offtake, refineries located nearer the consumers generally incur less cost for product transportation and handling than those located further away. Transportation costs associated with the purchase of feedstock and sale of products have an impact on our gross refining margins.
- *Inventory accounting.* Our gross refining margins are affected by the way we account for the cost of our inventory. We maintain an inventory of crude oil and refined petroleum products, which we account for at the lower of cost and net realizable value. Net realizable value is the estimated selling price in the ordinary course of business less the estimated costs to complete and to make the sale.
- *Other factors.* Our gross refining margins are affected by other factors as well, including sales volumes which are influenced by factors such as demand for our products and utilization for our production facilities, fluctuations in foreign exchange rates, our ability to purchase the optimal blend of crude oil and other feedstock, utilities and energy costs, and our ability to produce products that match customer demand or to make special grade products for which the market is willing to pay a premium.

The average per barrel gross refining margins for our refinery were US\$6.8, US\$7.6, US\$4.4, US\$7.6 and US\$4.1 for the years ended December 31, 2017, 2018, 2019 and the six months ended June 30, 2018 and 2019, respectively. The increase in our gross refining margin for the year ended December 31, 2017 as compared to that for the year ended December 31, 2016 was largely attributable to higher product spreads, particularly the spread of gasoil price and fuel oil price over Dubai crude oil price. The decrease in our gross refining margin for the year ended December 31, 2018 as compared to that for the year ended December 31, 2017 was largely attributable to significant increase in crude oil price and crude premium together with the decrease in gasoline spread. The decrease in our gross refining margin for the six months ended June 30, 2019 as compared to that for six months ended June 30, 2018 was largely attributable to reductions in petroleum spreads, especially gasoline spread which fell due to surplus supply. See “—Product Spread” below.

The following table shows our gross refining margin and plant utilization rates for the years ended December 31, 2016, 2017, 2018 and for the six months ended June 30, 2018 and 2019:

	For the year ended December 31,			For the six months ended	
	2016	2017	2018	2018	2019
Gross Refining Margin (US\$ per barrel)	6.8	7.6	4.4	7.6	4.1
Capacity Utilization Rate	108.3%	112.4%	112.6%	110.3%	109.6%

Product Spread

We evaluate and monitor the profitability of our refined petroleum products by referring to the product spreads, which are the differences between average market benchmark prices of key refined petroleum products as measured against the market price of Dubai crude oil, and employing such data to determine and manage our product mix.

The table below sets forth certain refined petroleum product prices to Dubai crude oil price spreads for the years ended December 31, 2016, 2017, 2018 and for the six months ended June 30, 2018 and 2019 respectively.

	For the year ended December 31,			For the six months ended June 30,	
	2016	2017	2018	2018	2019
	(in US\$ per barrel)				
Product Spread⁽¹⁾					
LPG price ⁽²⁾ —Dubai crude oil price	(11.3)	(10.0)	(21.3)	(21.9)	(23.0)
Diesel price ⁽³⁾ —Dubai crude oil price	10.8	12.5	14.6	14.7	12.6
Jet price—Dubai crude oil price	11.6	12.1	15.4	15.7	12.6
Unleaded gasoline 95 price—Dubai crude oil price	14.9	14.9	10.5	12.9	5.6
Fuel oil price ⁽⁴⁾ —Dubai crude oil price	(5.0)	(2.3)	(2.6)	(4.7)	(0.9)

Sources: Saudi Aramco, Platts

Notes:

- (1) Calculated by subtracting the average monthly feedstock benchmark price for that period from the average monthly product market benchmark price for the year.
- (2) LPG prices represented are Saudi Aramco (Contract price). Our actual spreads for LPG are lower than the spreads presented above due to the fact that we are required to sell at Thai government imposed prices which are lower than what market prices for LPG would otherwise be.
- (3) Diesel prices represented are gasoil 0.05% sulfur grade prices.
- (4) Fuel oil prices represented are fuel oil 180 CST 3.5% sulfur grade prices. While the margin for fuel oil is negative when compared to crude oil prices, fuel oil is produced only as a by-product of our refining process, which is focused on producing the more profitable diesel, jet and gasoline.

Key Metrics for Our Petrochemical Business Unit

Capacity Utilization Rate

Our petrochemical plants are fully integrated with our refinery. As of June 30, 2019 our petrochemical plants had a production nameplate capacity of approximately 527,000 tons of paraxylene per year, approximately 259,000 tons of benzene per year and approximately 52,000 tons of mixed xylenes per year.

We measure the capacity utilization rate of our petrochemical plants based on our plants' combined realized output, divided by their nameplate capacity. Operational disruptions and shutdowns, both planned and unplanned, may result in a reduction in our capacity utilization rate.

As of June 30, 2019, our petrochemical plants had an aggregate nameplate capacity of approximately 838,000 tons of petrochemical products per year. The capacity utilization rate of our petrochemical units was 80.7%, 82.8%, 88.9%, 87.2% and 77.7% for the years ended December 31, 2016, 2017, 2018 and for the six months ended June 30, 2018 and 2019, respectively. The increase in our petrochemical plants capacity utilization rate for the year ended December 31, 2018 compared to that for the year ended December 31, 2017 and December 31, 2016 was attributable to an increase in feedstock volume. Our decrease in our petrochemical plants' capacity utilization rate for six months ended June 30, 2019 compared to six months ended June 30, 2018 was attributable to lower sales volume following the planned major turnaround.

Product-to-Feedstock Margin

As revenues from, and costs of, our petrochemical production operations do not necessarily, when viewed individually, indicate our financial performance, we assess the profitability of our petrochemical plants by their product-to-feedstock margin. The product-to-feedstock margin for a given period is (i) the difference between (a) the total revenue from the sale of petrochemical products and by-products for such period and (b) the total cost of our petrochemical feedstock, which includes costs of transportation of such feedstock, (ii) divided by the total volume of feedstock used for petrochemical products for such period.

The average per platformate ton product-to-feedstock margins for our petrochemical plants were US\$100.4, US\$98.7, US\$120.7, US\$99.2 and US\$112.6 for the years ended December 31, 2016, 2017, 2018 and for the six months ended June 30, 2018 and 2019, respectively. The decrease in our petrochemical product-to-feedstock margin for the year ended December 31, 2017 compared to that for the year ended December 31, 2016 was attributable to lower aromatics spreads compared to ULG95, particularly the spread of paraxylene price over ULG95 pressured an increase in additional supply more than an increase in demand growth. The increase in our petrochemical product-to-feedstock margin for the year ended December 31, 2017 compared to that for the year ended December 31, 2018 was attributable to tightened supply and strong demand from plastic and polyester production. Similarly, the increase in our petrochemical product-to-feedstock margin for the six months ended June 30, 2019 compared to the six months ended June 30, 2018 was attributable to strong demand and tighter supply. See “—Product-to-Feedstock Market Price Spread” below.

The following table shows our petrochemical unit’s average product-to-feedstock margin and plant utilization rates for the years ended December 31, 2016, 2017, 2018 and the six months ended June 30, 2018 and 2019 determined on a non-consolidated basis.

	For the year ended December 31,			For the six months ended June 30,	
	2016	2017	2018	2018	2019
Average Product-to-Feedstock Margin (US\$ per ton) ⁽¹⁾	100.4	98.7	120.7	99.2	112.6
Capacity Utilization Rate	80.7%	82.8%	89%	87.2%	77.7%

Note:

- (1) Calculated by dividing the difference between (a) the total revenue from the sale of petrochemical products and by-products for such period and (b) the total cost of our petrochemical feedstock, which includes costs of transportation of such feedstock, by the total volume of feedstock used to produce petrochemical products, for the year.

Product-to-Feedstock Market Price Spread

We evaluate and monitor the profitability of petrochemical products by referencing to the product-to-feedstock market price spreads, which are the differences between average market benchmark prices of key petrochemical products as measured against the market price of MOPS based unleaded gasoline 95, employing such data to determine and manage our product mix.

The table below sets forth the prices of certain petrochemical products to published benchmark gasoline price spreads for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

	For the year ended December 31,			For the six months ended June 30,	
	2016	2017	2018	2018	2019
Product-to-Feedstock Market Price Spread⁽¹⁾					
Paraxylene price (CFR Taiwan) — Unleaded gasoline 95	317.1	275.9	387.6	285.8	390.7
Benzene price (FOB Korea) — Unleaded gasoline 95	163.3	244.9	141.0	178.5	3.3
Toluene price (FOB Korea) — Unleaded gasoline 95	114.7	77.3	56.7	47.9	26.8

Source: Platts

Note:

- (1) Calculated by subtracting the average monthly feedstock benchmark price for that period from the average monthly product market benchmark price for the relevant year or year, as applicable.

Key Metrics for Our Lube Base Oil Business Unit

Capacity Utilization Rate

Our capacity utilization rate is the measure of our lube base oil plants’ utilization and is the ratio of our plants’ combined realized output of our products, including lube base oil, bitumen, TDAE, slack wax, extract and by product of gasoil blend, divided by their nameplate capacity. Our capacity utilization rate is impacted by the potential incremental profitability of additional production and the availability of our production facilities. Our capacity utilization rate also takes into account shutdown time for scheduled and unscheduled maintenance, which includes the time necessary to gradually reduce production for the shutdowns and to recover to full production following the shutdowns.

Our capacity utilization rate affects our operating expenses on a per metric ton basis. Higher capacity utilization rates of our lube base oil plants reduce the unit cost of production as we are able to spread our fixed operating expenses over a larger amount of our lube base oil product output. The main domestic customers for our lube base oil products include PTT, SFC Excellent and Bangchak.

As of June 30, 2019, our lube base oil plants have a nameplate capacity of approximately 267,015 tons per year of lube base oil, approximately 350,000 tons per year of bitumen and approximately 67,520 tons per year of TDAE. The capacity utilization rate of our lube base oil plants was 80.8%, 88.4%, 84.2%, 89.0% and 87.2% for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, respectively. The increase in our lube base oil plant's capacity utilization rate for the year ended December 31, 2017 from the year ended December 31, 2016 was due to higher intake volume. The decrease in our lube base oil plant's capacity utilization rate for the year ended December 31, 2018 from the year ended December 31, 2017 was due to an increase in sales prices tracking the crude oil prices. Similarly, the decrease in our lube base oil plant's capacity utilization rate for the six months ended June 30, 2019 from that of the six months ended June 30, 2018 was due to decrease in product selling prices and sales volumes.

Product-to-Feedstock Margin

As revenues from, and costs of, our lube base oil production operations do not necessarily, when viewed individually, indicate our financial performance, we assess the profitability of our lube base oil plants by their product-to-feedstock margin. The product-to-feedstock margin for a given period is (i) the difference between (a) the total revenue from the sale of lube base oil products and by-products for such period and (b) the total cost of our lube base oil feedstock, which includes costs of transportation of such feedstock, (ii) divided by the total volume of feedstock used for lube base oil products for such period.

The average per MOPS based HSFO ton product-to-feedstock margins for our lube base oil plants were US\$107.0, US\$112.2, US\$84.4, US\$101.2 and US\$76.6 for the years ended December 31, 2016, 2017, 2018 and the six months ended June 30, 2018 and 2019, respectively. The increase in our lube base oil product-to-feedstock margin for the year ended December 31, 2017 as compared to that for the year ended December 31, 2016 was largely attributable to higher product spreads supported by lowered supply of both lube base oil and bitumen. The decrease in our average lube base oil product-to-feedstock margin from the year ended December 31, 2018 compared to that for the year ended December 31, 2017 was largely attributable to weakened base oil and bitumen spreads following greater lube base oil supply and weaker bitumen demand and higher fuel oil price. Similarly, the decrease in our average lube base oil product-to-feedstock margin from the six months ended June 30, 2019 compared to that for the six months ended June 30, 2018 was largely attributable to weakened oil spread over fuel oil as there was additional supply from a new lube base oil plant. See “—Product-to-Feedstock Market Price Spread” below.

The following table shows our lube base oil product-to-feedstock margin and plant utilization rates for the years ended December 31, 2016, 2017 and 2019 and for the six months ended June 30, 2018 and 2019 determined on a non-consolidated basis.

	For the year ended December 31,			For the six months ended June 30,	
	2016	2017	2018	2018	2019
Average Product-to-Feedstock Margin (US\$ per ton) ⁽¹⁾	107.0	112.2	84.4	101.2	76.6
Capacity Utilization Rate.....	80.8%	88.4%	84.2%	89.0%	87.2%

Note:

- (1) Calculated by dividing the difference between (a) the total revenue from the sale of lube base oil products and by-products for such period and (b) the total cost of our lube base oil feedstock, which includes costs of transportation of such feedstock, by the total volume of feedstock used for lube base oil products, for the relevant year.

Product-to-Feedstock Market Price Spread

We evaluate and monitor the profitability of lube base oil products by reference to the product-to-feedstock market price spreads, which are the differences between average market benchmark prices of key lube base oil products as measured against the market price of MOPS based HSFO, employing such data to determine and manage our product mix.

The table below sets forth the prices of certain lube base oil products of various grades to MOPS based HSFO price spreads and the years ended December 31, 2016, 2017 and 2018, and the six months ended June 30, 2018 and 2019.

	For the year ended December 31,			For the six months ended	
	2016	2017	2018	June 30,	2019
	(in US\$ per ton)				
Product-to-Feedstock Market Price Spread ⁽¹⁾					
500SN (Ex-Tank Singapore)—HSFO ⁽²⁾	411.8	498.3	446.6	496.8	308.3
150SN (Ex-Tank Singapore)—HSFO ⁽²⁾	332.7	375.7	354.6	365.9	333.5
150BS (Ex-Tank Singapore)—HSFO ⁽²⁾	737.9	601.7	518.3	565.6	477.6
Bitumen (FOB Asia)—HSFO ⁽²⁾	(49.1)	(31.1)	(45.7)	(61.4)	(21.7)

Sources: ICIS, Argus, Platts

Notes:

- (1) Calculated by subtracting the average monthly feedstock benchmark price for that period from the average monthly product market benchmark price for the relevant year.
- (2) HSFO prices represented are fuel oil 180 CST 3.5% sulfur grade prices.

Key Metrics for our Group

Gross Integrated Margin

Our three core business units, oil refining, petrochemical production and lube base oil production are integrated, which allows us to achieve a higher profit margin on each barrel of feedstock processed. Therefore, we also use gross integrated margin, which is quoted in U.S. dollars and expressed on a per barrel of feedstock basis, to assess the margin for refining and converting a barrel of feedstock into our various products, including refined petroleum products, petrochemical products and lube base oil and related by-products. The gross integrated margin for a given period is (i) the difference between (a) the value of refined petroleum products, petrochemical products and lube base oil and related by-products produced for such period and (b) the landed cost of crude oil and other feedstock, including the costs of energy used in the refining and productions processes, (ii) divided by the total intake of our integrated feedstock for such period.

The following table shows (i) our adjusted gross profit or loss from our refinery, (ii) our adjusted gross profit or loss from our petrochemical unit, and (iii) our adjusted gross profit or loss from our lube base oil unit, as well as the gross integrated margin for our Group, which is calculated on the basis of the abovementioned gross margins, for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

	Year Ended December 31,				Six Months Ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	(in millions of)						
	THB	THB	THB	US\$	THB	THB	US\$
Adjusted gross profit (loss) ⁽¹⁾ from							
Oil refining	26,245.0	29,058.2	16,008.8	520.8	13,253.0	7,194.3	234.0
Petrochemical	6,452.5	6,302.0	6,218.4	202.3	2,663.4	2,674.2	87.0
Lube base oil	2,703.5	3,184.6	1,944.9	63.3	1,240.7	762.0	24.8
Integrated profit	35,401.0	38,544.9	24,172.1	786.3	17,157.1	10,630.5	345.8
Integrated intake (thousand bpd) ⁽²⁾	300.5	312.2	313.4	313.4	305.8	306.1	306.1
Average foreign exchange rate (THB/US\$) ⁽³⁾	35.5	34.1	32.5	32.5	31.9	31.8	31.8
Gross integrated margin (US\$ per barrel) ⁽⁴⁾	9.1	9.9	6.9	6.9	7.0	6.1	6.1

Notes:

- (1) Adjusted gross profit (loss) is the sum of gross profit or loss under TFRS, non-feedstock related cost of goods sold and service rendered, depreciation and operating expenses, foreign currency exchange gains or losses, net realizable value adjustments and other income. Integrated profit (loss) is calculated with no eliminated transaction.
- (2) Integrated intake, measured in thousands of barrels per day, is calculated based on our oil refinery's crude oil and feedstock intake, our petrochemical plants' feedstock import and our lube base oil refinery's long residue import.
- (3) Average foreign exchange rate is calculated based on the daily average selling rate of foreign exchange published by the BOT.
- (4) Gross integrated margin is calculated by taking the integrated profit, as divided by the total integrated intake, and further adjusted to take into account foreign exchange rates.

As a measure of our operating performance, we believe that the most directly comparable TFRS measure to adjusted gross profit is gross profit.

The following tables shows (i) our adjusted gross profit or loss from our refinery, (ii) our adjusted gross profit or loss from our petrochemical unit, and (iii) our adjusted gross profit or loss from our lube base oil unit, respectively, for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019 and reconciles our gross profit under TFRS to our abovementioned adjusted gross profit or loss for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

Oil refining

	For the year ended December 31,				Six Months Ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Revenue from sale and services.....	283,293.2	349,828.8	405,130.6	13,179.3	196,376.6	190,395.1	6,193.7
Cost of sales of goods and services.....	(265,517.8)	(328,442.1)	(398,208.4)	(12,954.1)	(186,753.2)	(187,416.9)	(6,096.8)
Gross profit.....	17,775.4	21,386.7	6,922.1	225.2	9,623.4	2,978.2	96.9
Depreciation ⁽¹⁾	3,454.0	3,215.3	3,007.7	97.8	1,505.3	1,449.2	47.1
Refinery operating expenses ⁽²⁾	4,989.9	4,592.6	5,151.4	167.6	2,230.9	2,837.6	92.3
Gain/(loss) from foreign exchange	290.2	783.6	521.8	17.0	(9.5)	586.5	19.1
Adjustments of feedstock and products to net realizable value.....	8.7	(754.5)	448.5	14.6	(96.9)	(696.5)	(22.7)
Non-feedstock related cost of goods sold and services rendered ⁽³⁾	(280.9)	(177.0)	(52.1)	(1.7)	(4.5)	37.4	1.2
Other income ⁽⁴⁾	7.7	11.4	9.4	0.3	4.3	1.9	0.1
Adjusted gross refining profit	26,245.0	29,058.2	16,008.8	520.8	13,253.0	7,194.3	234.0

Notes:

- (1) Depreciation of the oil refinery.
- (2) Including direct labour costs.
- (3) Including selling expenses such as freight costs and pipeline expenses.
- (4) Tax compensation for exported products.

Petrochemical

	For the year ended December 31,				Six Months Ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Revenue from sale and services	48,384.6	57,881.2	66,701.5	2,169.9	31,414.1	27,946.5	909.1
Cost of sales of goods and services	(44,416.5)	(54,237.9)	(62,775.8)	(2,042.2)	(30,076.4)	(26,741.7)	(869.9)
Gross profit	3,968.1	3,643.2	3,925.7	127.7	1,337.6	1,204.9	39.2
Depreciation ⁽¹⁾	1,571.6	1,644.3	1,596.0	51.9	790.1	793.8	25.8
Plant operating expenses ⁽²⁾	934.9	1,051.9	1,234.2	40.1	566.4	722.7	23.5
Non-feedstock related cost of goods sold and services rendered ⁽³⁾	(169.7)	(216.5)	(207.2)	(6.7)	(116.4)	(93.6)	(3.0)
Other income ⁽⁴⁾	13.0	41.4	(538.9)	(17.5)	(3.6)	(43.6)	(1.4)
Intra-Group sales of utilities to oil refinery ⁽⁵⁾	187.3	196.8	260.7	8.5	114.4	117.1	3.8
Adjusted gross profit (loss) from aromatics	6,505.3	6,361.1	6,270.5	204.0	2,688.5	2,701.3	87.9

Notes:

- (1) Depreciation of petrochemical plants.
- (2) Including direct labour costs.
- (3) Including selling expenses such as freight costs and surveyor's fees and storage fees.
- (4) Including tax compensation for exported products and derivatives gain/loss from commodity hedging.
- (5) Including sales of steam and condensate water.

Lube Base Oil Refinery

	For the year ended December 31,				Six Months Ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Revenue from sale and services	13,535.7	18,403.8	20,959.0	679.9	10,010.7	9,531.0	310.1
Cost of sales of goods and services	(11,869.8)	(16,051.6)	(19,532.9)	(633.5)	(9,009.6)	(9,002.7)	(292.9)
Gross profit	1,665.9	2,352.2	1,426.1	46.4	1,001.1	528.3	17.2
Depreciation ⁽¹⁾	424.2	426.5	104.3	3.4	51.8	54.6	1.8
Plant operating expenses ⁽²⁾	642.1	425.1	447.1	14.5	200.9	202.4	6.6
Non-feedstock related cost of goods sold and services rendered ⁽³⁾	(78.6)	(90.3)	(95.7)	(3.1)	(48.7)	(52.9)	(1.7)
Intra-Group sales of utilities to oil refinery ⁽⁴⁾	49.8	71.2	63.0	2.0	35.5	29.6	1.0
Adjusted gross profit from lube base oil	2,703.5	3,184.6	1,944.9	63.3	1,240.7	762.0	24.8

Notes:

- (1) Depreciation of the lube base oil plant.
- (2) Including direct labour costs.
- (3) Including selling expenses such as freight costs.
- (4) Including hot oil and condensate water.

Integrated Cash Cost

The integration of our three core business units also allows us to share our costs and lower our cost required to process each barrel of feedstock. Therefore, we also use our “integrated cash cost,” which is measured on a per barrel of feedstock basis, to assess the cost required to refine and convert a barrel of feedstock into our various products, including refined petroleum products, aromatic products and lube base oil and related by-products. Our integrated cash cost for a given period is the aggregate of our various operating costs, including plant operating expenses, selling expenses, administrative expenses and finance costs, divided by the total volume of integrated feedstock used in our operations for such period.

Our average integrated cash costs were US\$2.3/bbl, US\$2.1/bbl, US\$2.4/bbl, US\$2.2/bbl and US\$2.7/bbl comprising operating expenses of US\$1.8/bbl, US\$1.6/bbl, US\$1.9/bbl, US\$1.7/bbl and US\$2.1/bbl and finance costs of US\$0.5/bbl, US\$0.5/bbl, US\$0.5/bbl, US\$0.5/bbl and US\$0.6/bbl for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, respectively. Generally, non-recurring items are excluded from the calculation of integrated cash cost. We generally maintain our average integrated cash cost for the whole year at almost the same level each year. In 2016, our average integrated cash costs increased because TLB incurred planned major turnaround costs and LABIX commenced commercial production in February 2016. In 2017, our average integrated cash costs decreased because there were no major turnaround costs. In 2018, our average integrated cash costs increased because of a planned maintenance shutdown of a crude distillation unit. In the six months ended June 30, 2019, our average integrated cash costs increased because of a planned major turnaround at the Sriracha Complex.

Description of Certain Components of Our Results of Operations

Revenue from Sale and Services

Our revenue from sale and services comprises revenue from sales of our refined petroleum products such as LPG, unleaded gasoline, platformate, diesel, jet fuel and fuel oil from our refinery, sales of our petrochemical products comprising paraxylene and benzene, sales of our lube base oil products comprising lube base oil, bitumen, TDAE, slack wax and extract, sales of electricity generated by our power generation plants, sales of our solvent products, services provided by marine transportation units, sales of alternative energy products, including ethanol, starch and biogas and services provided by our energy services business unit.

Our sale prices for our refined petroleum products comprising revenue from sale of goods also include applicable excise and municipal taxes, oil fuel fund contribution and energy conservation fund contribution charges, which are pass-through items, and are paid to the relevant government authorities. Our service fees comprising our revenue from rendering of services exclude applicable taxes.

The following table sets out the revenue from sale and services of our various business units in the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

Business Unit	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Oil Refining	283,293.2	349,828.8	405,130.6	13,179.3	196,376.6	190,395.1	6,193.7
Lube Base Oil Refinery	13,535.7	18,662.4	20,959.0	681.8	10,010.7	9,531.0	310.1
Petrochemical	48,384.6	57,881.2	66,701.5	2,169.9	31,414.1	27,946.5	909.1
Power Generation	9,131.2	10,928.8	11,733.5	381.7	5,580.1	5,939.6	193.2
Marine Transportation							
Services	877.8	801.6	620.5	20.2	313.4	326.1	10.6
Solvent	7,629.8	9,181.5	9,991.8	325.0	4,791.4	4,434.5	144.3
Ethanol	1,538.1	1,619.8	1,477.2	48.1	743.9	739.1	24.0
Others	900.3	984.3	1,924.7	62.6	615.4	1,922.9	62.6
Eliminations ⁽¹⁾	(90,551.7)	(112,500.8)	(129,195.3)	(4,202.8)	(60,416.8)	(56,881.7)	(1,850.4)
Total revenue from sale and services	274,738.9	337,387.7	389,343.5	12,665.7	189,428.6	184,353.1	5,997.2

Note:

(1) Eliminations relate to intra-Group sales.

Cost of Sale of Goods and Services

Our cost of sale of goods and services principally comprises (i) the cost of our raw materials such as crude oil, natural gas and other feedstock, which includes excise and municipal taxes and oil fund contributions on domestic sales revenues for our refined petroleum products, (ii) production expenses, which include internally produced fuels, purchased energy and other production expenses, (iii) our operating costs in relation to our production support facilities such as our SBM and jetty services for plants in the Sriracha Complex as well as our operating costs in relation to the operation of our marine transportation units and our maintenance and engineering services and our safety, occupational health and environmental services. Our other expenses include depreciation of plant assets, utilities, direct labor costs and expenses in relation to shutdowns of our plants (other than major turnarounds). Expenses relating to major turnarounds of our refinery and plants are recorded as amortization expenses, which are also included in our cost of sale of goods and services.

The following table sets forth the cost of sale of goods and services for each business unit for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

Business Unit	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Oil Refining	265,517.8	328,442.1	398,208.4	12,954.1	186,753.2	187,416.9	6,096.9
Lube Base Oil, Refinery	11,869.8	16,310.3	19,532.9	635.4	9,009.6	9,002.7	292.9
Petrochemical	44,416.5	54,237.9	62,775.8	2,042.2	30,076.4	26,741.7	869.9
Power Generation	7,308.7	8,771.7	9,794.8	318.7	4,593.2	5,086.3	165.4
Marine Transportation							
Services	745.1	776.1	616.4	20.1	314.7	325.2	10.6
Solvent	6,572.5	8,183.4	9,192.7	299.0	4,340.2	4,018.0	130.7
Ethanol	1,297.7	1,213.1	1,381.2	44.9	678.9	699.2	22.7
Others	793.3	896.8	1,846.1	60.1	585.6	1,836.2	59.7
Eliminations ⁽¹⁾	(91,260.2)	(113,445.9)	(130,220.5)	(4,236.2)	(60,842.3)	(57,354.0)	(1,865.8)
Total cost of sale of goods and services	247,261.2	305,385.6	373,128.0	12,138.2	175,509.5	177,772.3	5,783.1

Note:

(1) Eliminations relate to intra-Group sales and services.

Dividend Income

Our dividend income represents dividend income from investments in our subsidiaries, associates, joint ventures and other related parties.

Net Derivative Gain (Loss) on Hedging

Our derivative gain comprises gains from our financial derivatives, which represents commodity forward contracts entered into for purposes of hedging our exposure to commodity price fluctuations.

Net Foreign Exchange Gain

Our net foreign exchange gain comprises both actual realized and unrealized gains from sales and purchases made in foreign currencies, costs and expenses paid in foreign currencies, and payments of interest in foreign currencies, as well as gains arising from the revaluation of our foreign currency assets and liabilities in line with fluctuations in exchange rates.

Other Income

Our other income primarily comprises interest income, income from land leases, service income, subsidies for the cost of power plant equipment change, proceeds from our insurance claims, reversal from impairment loss and others.

Selling Expenses

Our selling expenses include our distribution, promotional, marketing expenses and our sales and marketing personnel expenses, which includes commissions paid to sales and marketing personnel. These expenses are generally tied to our sale levels.

Administrative Expenses

Our administrative expenses include advisory and legal fees, our administrative and supporting personnel expenses, depreciation and amortization of intangible assets, such as licenses and software, which are not accounted for under cost of sale and services, impairment loss on asset, loss from investment sold, loss on assets sold or write-offs and others, including premium fees paid for our hedging activities. These expenses are relatively stable and are generally not tied to our sale levels.

Share of Profit of Associates and Joint Ventures

Our share of profit of associates and joint ventures comprises our share of profit from our associates and joint ventures in proportion to our shareholding in such associates or joint ventures. Our share of profit from associates and jointly ventures mainly derives from our investments in GPSC.

Finance Costs and Finance Cost from Repurchase of Debentures

Our finance costs include interest and other financing expenses incurred from borrowings from financial institutions and other credit facilities and our Baht and U.S. dollar denominated debentures and notes and repurchase of debentures. Our finance costs exclude interest during construction accrued in relation to the financing of certain qualifying assets, comprising primarily of our plants, as such interest is capitalized in accordance with TFRS.

Income Tax Benefit (expense)

Income tax benefit (expense) consist of current and deferred tax expenses and benefits. Current tax is the expected tax payable or receivable on the taxable income or loss for the period, using tax rates enacted at the tax reporting date. Current tax includes any adjustment to tax payable in respect of previous years. Deferred tax is recognized in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes.

Defined Benefit Plan Actuarial Gains/Losses

Our defined benefit plan actuarial calculations are performed by a qualified actuary using the projected unit credit method. Our net obligation in respect of a defined benefit pension plans is calculated separately for each plan by estimating the amount of future benefit that employees have earned in return for their service in the current and prior periods; that benefit is discounted to determine its present value.

Net Change in Fair Value of Available-for-Sale Investments

Our net change in fair value of available-for-sale investments represents the net change in the net asset value of our available-for-sale investments. Our net change in fair value of available-for-sale investments mainly derive from changes to the net asset value of the Core Flexible Fund and CIMB-PRINCIPAL EPIF. For further information, please see note 6 to our unaudited interim consolidated financial information for the six months ended June 30, 2019.

Exchange Difference on Translation

Our foreign currency translation differences represent the gains or losses resulting from the conversion of non-Baht currencies from our foreign operations into the Baht when the non-Baht currencies appreciate or depreciate.

Share of Other Comprehensive Income/Expense of Associate Accounted for using the Equity Method

Our share of other comprehensive income/expense of associate represents our share of our associates' items of income and expense not required to be recognized in the statement of income under TFRS.

Consolidated Results of Operations—Year to Year Comparison

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Revenues							
Revenue from sale and services	274,738.9	337,387.7	389,343.5	12,665.7	188,172.2	183,587.6	5,972.3
Subsidy from oil fuel fund.....	-	-	-	-	1,256.6	765.6	24.9
Dividend income	247.3	157.9	157.4	5.1	157.4	167.1	5.4
Net derivative gain (loss) on hedging instrument	(243.2)	(133.2)	(820.5)	(26.7)	171.7	(76.4)	(2.5)
Net foreign exchange gain.....	446.1	3,181.6	626.7	20.4	311.6	1,245.6	40.5
Other income.....	1,118.8	1,190.1	1,718.9	55.9	708.2	1,337.1	43.5
Total revenues	276,308.0	341,784.0	391,026.0	12,720.4	190,777.7	187,026.6	6,084.1
Expenses							
Cost of sale of goods and services	(247,261.2)	(305,385.6)	(373,128.0)	(12,138.2)	(175,509.5)	(177,772.3)	(5,783.1)
Selling expenses	(451.3)	(491.8)	(424.0)	(13.8)	(224.6)	(218.3)	(7.1)
Administrative expenses.....	(2,182.1)	(2,969.4)	(2,357.8)	(76.7)	(1,059.2)	(1,128.6)	(36.7)
Total expenses.....	(249,894.5)	(308,846.8)	(375,909.8)	(12,228.7)	(176,793.3)	(179,119.2)	(5,826.9)
Share of profit of associates and joint ventures.....	929.7	1,196.7	1,192.9	38.8	671.9	702.5	22.9
Profit before finance costs and income tax expense.....	27,343.1	34,133.8	16,309.2	530.6	14,656.2	8,609.9	280.1
Finance costs ⁽¹⁾	(3,460.7)	(3,285.1)	(3,941.9)	(128.2)	(1,827.4)	(2,410.4)	(78.4)
Profit before income tax expense	23,882.4	30,848.8	12,367.2	402.3	12,828.7	6,199.5	201.7
Income tax expense	(2,295.5)	(5,529.5)	(1,982.8)	(64.5)	(2,289.8)	(1,116.2)	(36.3)
Profit for the year / period	21,586.9	25,319.3	10,384.4	337.8	10,538.9	5,083.3	165.4
Profit for the year / period attributable to:							
Owners of the Parent	21,221.9	24,856.2	10,149.0	330.2	10,402.6	4,975.2	161.8
Non-controlling interest	365.0	463.1	235.4	7.7	136.2	108.1	3.5
Profit for the year / period	21,586.9	25,319.3	10,384.4	337.8	10,538.9	5,083.3	165.4
Basic earnings per share (Baht).....	10.4	12.2	5.0	0.2	5.1	2.4	0.1

Notes:

(1) Including finance costs from repurchase of debentures

Six Months Ended June 30, 2019 Compared to Six Months Ended June 30, 2018

Revenue from Sale and Services

Our revenue from sale and services for the six months ended June 30, 2019 was THB183,587.6 million (US\$5,972.3 million) compared to our revenue from sale and services for the six months ended June 30, 2018 of THB188,172.2 million, a decrease of THB4,584.6 million, or 2.4%. This decrease was primarily attributable to a decrease in revenue from our oil refinery, petrochemical and lube base oil refinery business units owing to low product sales and a decrease in average selling prices compared to the six months ended June 30, 2018.

Cost of Sale of Goods and Services

Our cost of sale of goods and services for the six months ended June 30, 2019 was THB177,772.3 million (US\$5,783.1 million) compared to our cost of sale of goods and services for the six months ended June 30, 2018 of THB175,509.5 million, an increase of THB2,262.8 million, or 1.3%. This increase was primarily attributable to an increase in feedstock prices tracking crude oil prices and crude premium, and low jet/keto, gas oil and fuel oil spreads.

Dividend Income

Our dividend income for the six months ended June 30, 2019 was THB167.1 million (US\$5.4 million), compared to our dividend income for the six months ended June 30, 2018 of THB157.4 million, an increase of THB9.7 million or 6.2%. This increase in dividend income was attributable to higher dividend received from Thai Petroleum Pipeline Co. in the six months ended June 30, 2019.

Net Derivative Gain (Loss) on Hedging Instrument

We had net derivative loss on hedging instrument for the six months ended June 30, 2019 of THB76.4 million (US\$2.5 million) compared to our net derivative gain on hedging instrument for the six months ended June 30, 2018 of THB171.7 million. The net derivative loss on hedging instrument represented losses realized from commodity derivatives we entered into to hedge against fluctuations in the spreads of our product prices over Dubai crude oil price.

Net Foreign Exchange Gain

We recognized a net foreign exchange gain of THB1,245.6 million (US\$40.5 million) for the six months ended June 30, 2019, as compared to net foreign exchange gain of THB311.6 million for the six months ended June 30, 2018. Our net foreign exchange gain was primarily attributable to the appreciation of the Baht against the U.S. dollar, which resulted in unrealized transaction gain of U.S. dollar-denominated debentures.

Other Income

Our other income for the six months ended June 30, 2019 was THB1,337.1 million (US\$43.5 million) compared to other income for the six months ended June 30, 2018 of THB708.2 million, an increase of THB628.9 million, or 88.8%. This increase was primarily due to an increase in interest income from higher amounts of current investments and available-for-sale investments.

Selling Expenses

Our selling expenses for the six months ended June 30, 2019 amounted to THB218.3 million (US\$7.1 million) compared to our selling expenses for the six months ended June 30, 2018 of THB224.6 million, a marginal decrease of THB6.3 million, or 2.8%.

Administrative Expenses

Our administrative expenses for the six months ended June 30, 2019 amounted to THB1,128.6 million (US\$36.7 million) compared to our administrative expenses for the six months ended June 30, 2018 of THB1,059.2 million, an increase of THB69.4 million, or 6.6%. The increase in administrative expenses was primarily due to a reclassification of Property, Plant and Equipments (“PPE”) to non-current assets held-for-sales.

Share of Profit of Associates and Joint Ventures

Our share of profit of associates and joint ventures for the six months ended June 30, 2019 was THB702.5 million (US\$22.9 million) compared to our share of profit of associates and joint ventures for the six months ended June 30, 2018 of THB671.9 million, an increase of THB30.6 million, or 4.6%. This increase was primarily attributable to the higher contributions from our associate companies.

Finance Costs and Finance Costs from Repurchase of Debentures

Our finance costs for the six months ended June 30, 2019 amounted to THB2,410.4 million (US\$78.4 million) compared to our finance costs for the six months ended June 30, 2018 of THB1,827.4 million, an increase of THB583.0 million, or 31.9%. The increase was primarily due to an increase in interest costs as a result of our issuance of senior unsecured notes by Thaioil Treasury Center Company Limited in late 2018.

Income Tax Expense

For the six months ended June 30, 2019, our income tax expense was THB1,116.2 million (US\$36.3 million) and the effective tax rate was 18.0%. For the six months ended June 30, 2018, our income tax expense was THB2,289.8 million, and the effective tax rate was 17.9%. The statutory tax rate for these periods was 20%.

Profit for the Period

As a result of the foregoing, our unaudited consolidated profit for the six months ended June 30, 2019 was THB5,083.3 million (US\$165.4 million) compared to our profit for the six months ended June 30, 2018 of THB10,538.9 million, a decrease of THB5,455.6 million, or 51.8%.

Our profit from our oil refining unit for the six months ended June 30, 2019 was THB2,527.3 million (US\$82.2 million), compared to our profit for the six months ended June 30, 2018 of THB7,121.6 million, a decrease of THB4,594.3 million. The decrease is attributable to low product sales and low average selling prices caused by reductions in petroleum product spreads, especially gasoline spread.

Our profit from our petrochemical unit for the six months ended June 30, 2019 was THB814.1 million (US\$26.5 million) compared to our profit from our petrochemical unit for the six months ended June 30, 2018 of THB946.5 million, a decrease of THB132.4 million. The decrease was primarily attributable to low sales volumes following a planned turnaround of the Thai Paraxylene plant.

Our profit from our lube base oil unit for the six months ended June 30, 2019 was THB377.7 million (US\$12.3 million) compared to THB776.5 million for the six months ended June 30, 2018, a decrease of THB398.8 million. The decrease was primarily attributable to a decrease in product selling prices and product sales volume. The product-to-feed margin decreased due to weakened base oil spread over fuel oil as there was surplus supply in the six months ended June 30, 2019.

Other Comprehensive Income – Net Change in Fair Value of Available-for-Sale Investments

Our net change in fair value of available-for-sale investments for the six months ended June 30, 2019 was a gain of THB43.2 million, primarily arising from an increase of the net asset value of our investments and an increase of our investment amounts. Our net change in fair value of available-for-sale investments for the six months ended June 30, 2018 was a loss of THB7.6 million.

Other Comprehensive Income – Exchange Difference on Translation

Our foreign currency translation differences for the six months ended June 30, 2019 were a loss of THB81.1 million (US\$2.6 million), compared to a gain of THB12.4 million for the six months ended June 30, 2018. Our loss from foreign currency translation difference in 2019 was primarily due to the appreciation of the average Thai Baht against the U.S. dollar in 2019 compared to the year 2018, which resulted in a negative foreign currency translation from TOP Solvent (Vietnam) LLC, our subsidiary in Vietnam and Thaioil Marine International Pte. Ltd, our subsidiary in Singapore.

Other Comprehensive Income (Expense) – Share of Other Comprehensive Income/Expense of Associate Accounted for Using the Equity Method

Our share of other comprehensive income (expense) of associate for the six months ended June 30, 2019 was a loss of THB26.0 million (US\$0.8 million), compared to an income of THB7.9 million for the six months ended June 30, 2018. Our loss from share of other comprehensive income was primarily due to the appreciation of the average Thai Baht against the U.S. dollar in 2019 compared to the year 2018 in which resulted in a negative foreign currency translation from investments in foreign countries of GPSC, our associate.

Total Comprehensive Income (Expense) for the Period

As a result of the foregoing, our total comprehensive income (expense) decreased from THB10,551.6 million for the six months ended June 30, 2018 to THB5,017.3 million (US\$163.2 million) for the year ended six months ended June 30, 2019.

Year ended December 31, 2018 Compared to Year ended December 31, 2017

Revenue from Sale and Services

Our revenue from sale and services for the year ended December 31, 2018 was THB389,343.5 million (US\$12,665.7 million) compared to our revenue from sale and services for the year ended December 31, 2017 of THB337,387.7 million, an increase of THB51,955.8 million, or 15.4%. This increase was primarily attributable to an increase in average product selling prices tracking the rise in crude oil prices.

Cost of Sale of Goods and Services

Our cost of sale of goods and services for the year ended December 31, 2018 was THB373,128.0 million (US\$12,138.2 million) compared to our cost of sale of goods and services for the year ended December 31, 2017 of THB305,385.6 million, an increase of THB67,742.4 million, or 22.2%. This increase was primarily attributable to an increase in feedstock prices tracking crude oil prices.

Dividend Income

Our dividend income for the year ended December 31, 2018 was THB157.4 million (US\$5.1 million), compared to our dividend income for the year ended December 31, 2017 of THB157.9 million, a decrease of THB0.5 million, or 0.3%. This represents the dividend income received from Thai Petroleum Pipeline Co., Ltd.

Net Derivative Gain (Loss) on Hedging Instrument

We had net derivative loss on hedging instrument for the year ended December 31, 2018 of THB820.5 million (US\$26.7 million) compared to our net derivative loss on hedging instrument for the year ended December 31, 2017 of THB133.2 million. The net derivative loss on hedging instrument represented losses realized from commodity derivatives we entered into to hedge against fluctuations in the spreads of our product prices over Dubai crude oil price.

Net Foreign Exchange Gain (Loss)

We recognized a net foreign exchange gain of THB626.7 million (US\$20.4 million) for the year ended December 31, 2018, as compared to a net foreign exchange gain of THB3,181.6 million for the year ended December 31, 2017. We recorded lower foreign exchange gain primarily because the Baht depreciated more slowly in 2018 compared to 2017.

Other Income

Our other income for the year ended December 31, 2018 was THB1,718.9 million (US\$55.9 million) compared to other income for the year ended December 31, 2017 of THB1,190.1 million, an increase of THB528.8 million, or 44.4%. This increase was primarily due to an increase in interest income from higher amounts of current investments and available for sale investments.

Selling Expenses

Our selling expenses for the year ended December 31, 2018 amounted to THB424.0 million (US\$13.8 million) compared to our selling expenses for the year ended December 31, 2017 of THB491.8 million, a decrease of THB67.8 million, or 13.8%. This decrease was primarily due to a decrease in sales volume throughout the year.

Administrative Expenses

Our administrative expenses for the year ended December 31, 2018 amounted to THB2,357.8 million (US\$76.7 million) compared to our administrative expenses for the year ended December 31, 2017 of THB2,969.4 million, a decrease of THB611.6 million, or 20.6%. The decrease in administrative expenses was primarily due to a loss from asset impairment booked in 2017.

Share of Profit/Loss of Associates and Joint Ventures

Our share of profit of associates and joint ventures for the year ended December 31, 2018 was THB1,192.9 million (US\$38.8 million) compared to our share of profit of associates and joint ventures for the year ended December 31, 2017 of THB1,196.7 million, a decrease of THB3.8 million, or 0.3%. This marginal decrease was primarily attributable to the decreased profit of our associates, UBE.

Finance Costs

Our finance costs for the year ended December 31, 2018 amounted to THB3,941.9 million (US\$128.2 million) compared to our finance costs for the year ended December 31, 2017 of THB3,285.1 million, an increase of THB656.8 million, or 20.0%. The increase was primarily due to a repurchase of debentures in 2018 as a part of our liability management ("LM") program.

Income Tax Expense

For the year ended December 31, 2018, our income tax expense was THB1,982.8 million (US\$64.5 million) and the effective tax rate was 16.0%. For the year ended December 31, 2017, our income tax expense was THB5,529.5 million, and the effective tax rate was 17.9%. The statutory tax rate for these periods was 20%. The lower effective tax rates were primarily due to an impairment loss booked in 2017 being utilized in 2018.

Profit for the Year

As a result of the foregoing, our consolidated profit for the year ended December 31, 2018 was THB10,384.4 million (US\$337.8 million) compared to our profit for the year ended December 31, 2017 of THB25,319.3 million, a decrease of THB14,934.9 million, or 59.0%.

Our profit from our oil refining unit for the year ended December 31, 2018 was THB3,982.6 million (US\$129.6 million), compared to our profit for the year ended December 31, 2017 of THB17,614.2 million, a decrease of THB13,631.6 million. The decrease was primarily attributable to a decrease in gross refining margin of US\$2.0 per barrel, because of a significant increase in crude oil price and crude premium, and an increase in net hedging loss.

Our profit from our petrochemical unit for the year ended December 31, 2018 was THB2,530.3 million (US\$82.3 million) compared to our profit from our petrochemical unit for the year ended December 31, 2017 of THB2,730.4 million, a decrease of THB200.1 million. The decreases were mainly due to lower spreads, a decrease in net hedging loss and higher finance costs.

Our profit from our lube base oil unit for the year ended December 31, 2018 was THB1,079.3 million (US\$35.1 million) compared to THB1,812.3 million for the year ended December 31, 2017, a decrease of THB733.0 million. The decrease was primarily attributable to a decrease in product-to-feed margin as a result of weakened base oil and bitumen spreads following an increase in lube supply, a decrease in bitumen demand and an increase in fuel oil price, which is feedstock. The decrease was also a result of an increase in electricity and fuel costs tracking higher natural gas prices.

Other Comprehensive Income – Net Change in Fair Value of Available-for-Sale Investments

Our net change in fair value of available-for-sale investments for the year ended December 31, 2018 was a loss of THB11.1 million, primarily arising from mark-to-market of our available for sale investments. Our net change in fair value of available-for-sale investments for the year ended December 31, 2017 was a gain of THB147.4 million.

Other Comprehensive Income – Exchange Difference on Translation

Our foreign currency translation differences for the year ended December 31, 2018 were a loss of THB30.8 million (US\$1.0 million), compared to a loss of THB120.8 million for the year ended December 31, 2017. Our loss from foreign currency translation difference in 2018 was primarily due to the appreciation of the average Thai Baht against the U.S. dollar in 2018 compared to the year 2017, which resulted in a negative foreign currency translation from TOP Solvent (Vietnam) LLC, our subsidiary in Vietnam and Thail Marine International Pte. Ltd, our subsidiary in Singapore.

Other Comprehensive Income – Share of Other Comprehensive Income/Expense of Associate Accounted for Using the Equity Method

Our share of other comprehensive income/loss of associate for the year ended December 31, 2018 was an income of THB5.4 million (US\$0.2 million), compared to a loss of THB16.2 million for the year ended December 31, 2017. Our income from share of other comprehensive income was primarily due currency translation differences in an associate company.

Total Comprehensive Income for the Period

As a result of the foregoing, our total comprehensive income decreased from THB25,006.3 million for the year ended December 31, 2017 to THB10,329.8 million (US\$336.0 million) for the year ended December 31, 2018.

Year ended December 31, 2017 Compared to Year ended December 31, 2016

Revenue from Sale and Services

Our revenue from sale and services for the year ended December 31, 2017 was THB337,387.7 million compared to our revenue from sale and services for the year ended December 31, 2016 of THB274,738.9 million, an increase of THB62,648.7 million, or 22.8%. This increase was primarily attributable to an increase in average selling prices and product sales volume.

Cost of Sale of Goods and Services

Our cost of sale of goods and services for the year ended December 31, 2017 was THB305,385.6 million compared to our cost of sale of goods and services for the year ended December 31, 2016 of THB247,261.2 million, an increase of THB58,124.4 million, or 23.5%. This increase was primarily attributable to an increase in feedstock prices tracking crude oil prices.

Dividend Income

Our dividend income for the year ended December 31, 2017 was THB157.9 million, compared to our dividend income for the year ended December 31, 2016 of THB247.3 million. This decrease in dividend income was attributable to lower dividend income from Thai Petroleum Pipeline Co., Ltd.

Net Derivative Gain (Loss) on Hedging

We had net derivative loss on hedging for the year ended December 31, 2017 of THB133.2 million compared to our net derivative loss on hedging for the year ended December 31, 2016 of THB243.2 million. The net derivative loss on hedging represented losses realized from commodity derivatives we entered into to hedge against fluctuations in the spreads of our product prices over Dubai crude oil price.

Net Foreign Exchange Gain (Loss)

We recognized a net foreign exchange gain of THB3,181.6 million for the year ended December 31, 2017, as compared to net foreign exchange gain of THB446.1 million for the year ended December 31, 2016. Our net foreign exchange gain was primarily attributable to the appreciation of the Baht against the U.S. dollar, which resulted in unrealized transaction gain of U.S. dollar-denominated debentures.

Other Income

Our other income for the year ended December 31, 2017 was THB1,190.1 million compared to other income for the year ended December 31, 2016 of THB1,118.8 million, an increase of THB71.3 million, or 6.4%. This increase was primarily due to an increase in interest income from higher amounts of current investments and available for sale investments.

Selling Expenses

Our selling expenses for the year ended December 31, 2017 amounted to THB491.8 million compared to our selling expenses for the year ended December 31, 2016 of THB451.3 million, an increase of THB40.5 million, or 9.0%. This increase was primarily due to an increase in sales volume of LABIX, as it ran full capacity throughout the year.

Administrative Expenses

Our administrative expenses for the year ended December 31, 2017 amounted to THB2,969.4 million compared to our administrative expenses for the year ended December 31, 2016 of THB2,182.1 million, an increase of THB787.4 million, or 36.1%. The increase in administrative expenses was primarily due to (1) an increase in our donations as part of our corporate social responsibility, (2) higher labour expenses and (3) a service fee for paraxylene loading from PTT's jetty.

Share of Profit/Loss of Associates and Joint Ventures

Our share of profit of associates and joint ventures for the year ended December 31, 2017 was THB1,196.7 million compared to our share of profit of associates and joint ventures for the year ended December 31, 2016 of THB929.7 million, an increase of THB267.0 million, or 28.7%. This increase was primarily attributable to the increased profit of our associates, GPSC, MCE, UBE and TOP-NS.

Finance Costs

Our finance costs for the year ended December 31, 2017 amounted to THB3,285.1 million compared to our finance costs for the year ended December 31, 2016 of THB3,460.7 million, a decrease of THB175.6 million, or 5.1%. The decrease was primarily due to a decrease in outstanding borrowings amounts along with the appreciation of the average Thai Baht against the U.S. dollar compared to the year 2016.

Income Tax Expense

For the year ended December 31, 2017, our income tax expense was THB5,529.5 million and the effective tax rate was 17.9%. For the year ended December 31, 2016, our income tax expense was THB2,295.5 million, and the effective tax rate was 9.6%. The statutory tax rate for these periods was 20.0%. The higher effective tax rates were primarily due to the amount of our profit being derived from activities for which concessionary tax rates apply increased from the year 2016 and BOI tax privileges from emission reduction and energy efficiency projects were fully utilized.

Profit (Loss) for the Year

As a result of the foregoing, our consolidated profit for the year ended December 31, 2017 was THB25,319.3 million compared to our profit for the year ended December 31, 2016 of THB21,586.9 million, an increase of THB3,723.3 million, or 17.3%.

Our profit from our oil refining unit for the year ended December 31, 2017 was THB17,614.2 million, compared to our profit for the year ended December 31, 2016 of THB14,027.9 million, an increase of THB3,586.3

million. The increase was primarily attributable to an increase in gross refining margin of US\$0.8 per barrel, and an increase in foreign exchange gain of THB2,735.4 million.

Our profit from our petrochemical unit for the year ended December 31, 2017 was THB2,730.4 million compared to our profit from our petrochemical unit for the year ended December 31, 2016 of THB3,087.2 million, a decrease of THB356.8 million. The decrease was primarily attributable to a slight decrease of product-to-feedstock spreads as a result of surplus in supply which pressured the aromatics market.

Our profit from our lube base oil unit for the year ended December 31, 2017 was THB1,812.3 million compared to THB1,261.1 million for the year ended December 31, 2016, an increase of THB551.2 million. The increase was primarily attributable to an increase in lube base oil and bitumen spreads over fuel oil due to tightened supply in the region after many lube base oil producers had shut down for maintenance.

Other Comprehensive Income – Net Change in Fair Value of Available-for-Sale Investments

Our net change in fair value of available-for-sale investments for the year ended December 31, 2017 was a gain of THB147.4 million, primarily arising from an increase of the net asset value of our investments and an increase of our investment amounts in 2017. Our net change in fair value of available-for-sale investments for the year ended December 31, 2016 was a gain of THB11.0 million.

Other Comprehensive Income – Exchange Difference on Translation

Our foreign currency translation differences for the year ended December 31, 2017 were a loss of THB120.8 million, compared to a loss of THB21.0 million for the year ended December 2016. Our loss from foreign currency translation difference in 2017 was primarily due to the appreciation of the average Thai Baht against the U.S. dollar in 2017 compared to the year 2016, which resulted in a negative foreign currency translation from TOP Solvent (Vietnam) LLC, our subsidiary in Vietnam and Thail Marine International Pte. Ltd, our subsidiary in Singapore.

Other Comprehensive Income – Share of Other Comprehensive Income/Expense of Associate Accounted for Using the Equity Method

Our share of other comprehensive income/loss of associate for the year ended December 31, 2017 was a loss of THB16.2 million, compared to an income of THB5.4 million for the year ended December 31, 2016. Our loss from share of other comprehensive income was primarily due to the appreciation of the average Thai Baht against the U.S. dollar in 2017 compared to the year 2016, which resulted in a negative foreign currency translation from investments in foreign countries of GPSC, our associate.

Total Comprehensive Income for the Period

As a result of the foregoing, our total comprehensive income increased from THB21,582.3 million for the year ended December 31, 2016 to THB25,006.3 million for the year ended December 31, 2017.

Liquidity and Capital Resources

Our primary sources of funding have historically been cash flows from operating activities, financing transactions with financial institutions and capital market debenture offerings. Our principal uses of funds have been working capital, repayments of principal and interest on borrowings, capital expenditures, and payment of dividends to our shareholders. We believe that our future cash flows from operations, borrowing capacity and funds raised from our debt offerings will be sufficient to fund our planned capital expenditures and investments, debt maturities and working capital requirements through 2019. However, our ability to obtain adequate financing to satisfy these demands on liquidity may be limited by our financial condition and results of operations and the liquidity of international and domestic financial markets.

We have certain financial guidelines to monitor our financial position. This monitoring includes keeping our net debt to total shareholders' equity ratio at equal to or less than 1.0, and our net debt to EBITDA ratio at equal to or less than 2.0. As of June 30, 2019, these ratios were 0.0 and 0.6, respectively. We also implement liquidity management guidelines under which we aim to maintain sufficient liquidity in cash or equivalents to meet our debt obligations. As of June 30, 2019, we had cash and cash equivalents and short-term investments of THB93,858.2 million (US\$3,053.29million). We invest any excess cash on hand in permitted short term investments with consideration to liquidity risk and return.

The following table sets forth a summary of our consolidated cash flows information for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Net cash provided by operating activities.....	23,181.6	34,417.2	18,313.0	595.7	11,184.3	8,647.0	281.3
Net cash (used in) provided by investing activities	(18,351.8)	(30,092.4)	(25,846.3)	(840.8)	9,604.3	26,265.6	854.4
Net cash (used in) provided by financing activities.....	(9,397.3)	(19,226.0)	25,565.6	831.7	(2,739.3)	(9,096.6)	(295.9)
Net increase (decrease) in cash and cash equivalents	(4,567.5)	(14,901.2)	18,032.4	586.6	18,049.3	25,816.0	839.8
Effect of exchange rate changes ...	(76.2)	(596.1)	385.7	12.5	880.1	(2,219.0)	(72.2)
Cash and cash equivalents at the beginning of year / period	35,764.4	31,120.8	15,623.4	508.2	15,623.4	33,741.3	1,097.6
Cash and cash equivalents at the end of year / period	31,120.8	15,623.4	34,041.5	1,107.4	34,552.8	57,338.3	1,865.3

Net Cash from Operating Activities

Our net cash flows from operating activities includes cash generated from the principal revenue-generating activities and other activities that are not investing or financing activities, which mainly include the sale of goods and services, costs of sales of goods and services, realized foreign exchange gains and losses, actual administrative and selling expenses such as employee expenses and professional fees, and income tax expense, whereby profit or loss is adjusted for the effects of transactions of a non-cash nature, deferrals or accruals of past or future operating cash receipts or payments, and items of income or expense associated with investing or financing cash flows.

Our net cash from operating activities for the six months ended June 30, 2019 amounted to THB8,647.0 million (US\$281.3 million) and was primarily attributable to our profit for the period of THB5,083.3 million (US\$165.4 million), as adjusted by the reconciliation of depreciation and amortization of THB3,574.6 million (US\$116.3 million), finance costs of THB2,410.4 million (US\$78.4 million) and income tax expense of THB1,116.2 million (US\$36.3 million). Changes in operating assets and liabilities also affected our operating cash flow and consisted primarily of a decrease in trade accounts receivable of THB5,640.9 million (US\$183.5 million) and other receivables of THB729.3 million (US\$23.7 million), which was partially offset by a decrease in trade accounts payable of THB4,559.9 million (US\$148.3 million) and a decrease in excise duty payable of THB1,493.9 million (US\$48.6 million).

Our net cash from operating activities for the year ended December 31, 2018 amounted to THB18,313.0 million (US\$595.7million) and was primarily attributable to our profit for the year of THB10,384.3 million (US\$337.8 million), as adjusted by the reconciliation of depreciation and amortization of THB7,263.8 million (US\$236.3 million), finance costs of THB3,941.9 million (US\$128.2 million), income tax expense of THB1,982.8 million (US\$64.5 million), partially offset by an unrealised loss on foreign exchange of THB428.2 million (US\$13.9 million), a share of profit of associates and joint ventures of THB1,192.9 million (US\$38.8 million), and a decrease in allowance for decline in value of inventories adjusted to net realizable value of THB1,350.4 million (US\$43.9 million). Changes in operating assets and liabilities also affected our operating cash flow and consisted primarily of a decrease of excise duty payable of THB29.9 million (US\$1.0 million) and an increase of inventories of THB2,752.0 million (US\$89.5 million), partially offset by an increase of trade accounts receivable of THB2,061.2 million (US\$67.1 million), an increase of other receivables of THB919.3 million (US\$29.9 million), and an increase in trade accounts payable of THB2,977.0 million (US\$96.8 million). These changes were mainly attributable to significant decreases in profit for the year 2018.

Our net cash from operating activities for the year ended December 31, 2017 amounted to THB34,417.2 million and was primarily attributable to our profit for the year of THB25,319.3 million, as adjusted by the reconciliation of depreciation and amortization of THB7,642.0 million, finance costs of THB3,285.1 million, income tax expense of THB5,529.5 million, partially offset by an unrealised gain on foreign exchange of THB2,335.1 million, a share of profit of associates and joint ventures of THB1,196.7 million, and a reversal of allowance for decline in value of inventories adjusted to net realizable value of THB93.1 million. Changes in operating assets and liabilities also affected our operating cash flow and consisted primarily of an increase of excise duty payable of THB3,335.3 million and an increase of inventories of THB441.0 million, partially offset by an increase of trade accounts receivable of THB2,791.7 million, an increase of other receivables of THB1,389.2

million, and a decrease in trade accounts payable of THB927.7 million. These changes were mainly attributable to significant increases in profit for the year 2017.

Our net cash from operating activities for the year ended December 31, 2016 amounted to THB23,181.6 million and was primarily attributable to our profit for the year of THB21,586.9 million, as adjusted by the reconciliation of depreciation and amortization of THB7,671.8 million, finance costs of THB3,460.7 million, income tax expense of THB2,295.5 million, partially offset by a reversal of allowance for decline in value of inventories adjusted to net realizable value of THB1,052.6 million. Changes in operating assets and liabilities also affected our operating cash flow and consisted primarily of an increase in inventories of THB13,237.3 million and an increase in trade accounts receivable of THB5,370.9 million, partially offset by an increase of trade accounts payable of THB7,846.9 million. These changes were mainly attributable to significant increases in crude oil price and product prices.

Net Cash from (used in) Investing Activities

Our net cash flows from/used in investing activities include interest and dividends received, sales and purchases of property, plant and equipment, equity investments and dispositions in businesses.

Our net cash from investing activities was THB26,265.6 million (US\$854.4 million) for the six months ended June 30, 2019, primarily consisting of proceeds from net disposal of short-term investments, net of THB 36,258.9 million (US\$1,179.5 million), dividend received of THB540.6 million (US\$17.6 million) and purchase of property, plant and equipment of THB10,377.2 million (US\$337.6 million).

Our net cash used in investing activities was THB25,846.3 million (US\$840.8 million) for the year ended December 31, 2018, primarily consisting of purchase of property plant and equipment of THB7,863.7 million (US\$255.8 million), purchase of current investments of THB21,597.1 million (US\$702.6 million) and purchase of intangible assets of THB130.8 million (US\$4.3 million).

Our net cash used in investing activities was THB30,092.4 million for the year ended December 31, 2017, primarily consisting of purchase of current investments of THB23,423.0 million, purchase of investments held as available-for-sale of THB3,016.0 million and purchase of property, plant and equipment of THB3,679.0 million.

Our net cash used in investing activities was THB18,351.8 million for the year ended December 31, 2016, primarily consisting of purchase of current investments of THB12,056.7 million and purchase of property, plant and equipment of THB6,393.1 million.

Net Cash from (used in) Financing Activities

Our net cash used in financing activities was THB9,096.6 million (US\$295.9 million) for the six months ended June 30, 2019, primarily attributable to dividends paid of THB2,512.9 million (US\$81.7 million), offset by repayment of long-term borrowings from third-parties of THB616.0 million (US\$20.0 million) and redemption of debentures of THB3,000.0 million (US\$97.6 million) and finance costs paid of THB2,482.0 million (US\$80.7 million), partially offset by proceeds from short-term borrowings from third-parties of THB3,929.0 million (US\$ 127.4 million).

Our net cash from financing activities was THB25,565.6 million (US\$831.7 million) for the year ended December 31, 2018, primarily attributable to proceeds from debentures of THB51,634.5 million (US\$1,679.7 million), proceeds from long-term borrowings of THB14,944.0 million (US\$486.1 million), proceeds from short-term borrowings of THB29,126.7 million (US\$947.5 million), partially offset by repayment of short-term borrowings of THB27,622.8 million (US\$898.6 million) and redemption of debentures of THB20,076.4 million (US\$653.1 million).

Our net cash used in financing activities was THB19,226.0 million for the year ended December 31, 2017, primarily attributable to dividends paid of THB9,455.3 million, finance costs paid of THB3,364.3 million, repayment of long-term borrowings of THB1,686.0 million and redemption of debenture of THB4,931.8 million, partially offset by proceeds from long-term borrowings from financial institutions of THB110.1 million and net proceeds from short-term borrowings of THB101.4 million.

Our net cash used in financing activities was THB9,397.3 million for the year ended December 31, 2016, primarily attributable to dividends paid of THB6,993.7million, finance costs paid of THB3,443.2 million and

repayment of long-term borrowings of THB1,381.6 million, partially offset by proceeds from long-term borrowings from financial institutions of THB1,967.2 million and proceeds from short-term borrowings of THB1,324.0 million.

We repaid existing borrowings and incurred new borrowings as we refinanced our indebtedness during the years ended December 31, 2016, 2017 and 2018, and in the six months ended June 30, 2019 to take advantage of better financing terms.

Dividends

It is the current policy of our board of directors to recommend to our shareholders a dividend of not less than 25.0% of net profit after tax after deduction of all specified reserves, subject to our investment plans, applicable laws, contingencies and other relevant considerations. The actual dividend payout ratio may vary above or below the level indicated in our dividend policy.

In April 2016, we paid dividends for the year ended December 31, 2015 of THB1.80 per share to our shareholders (excluding interim dividends of THB0.90 per share paid in September 2015), amounting to a total dividend payout of THB3,672.0 million. In September 2016, we paid interim dividends of THB1.50 per share totalling THB3,060.0 million.

In April 2017, we paid dividends for the year ended December 31, 2016 of THB3.00 per share to our shareholders (excluding interim dividends of THB1.50 per share paid in September 2016) amounting to a total dividend payout of THB6,120.1 million. In September 2017, we paid interim dividends of THB1.50 per share totalling THB3,060.0 million.

In April 2018, we paid dividends for the year ended December 31, 2017 of THB3.75 per share to our shareholders (excluding interim dividends of THB1.50 per share paid in September 2017) amounting to a total dividend payout of THB7,650.1 million. In September 2018, we paid interim dividends of THB1.50 per share totalling THB3,060.0million.

In April 2019 we paid dividends for the year ended December 31, 2018 of THB2.65 per share to our shareholders totalling THB5,406 million. After a deduction of the interim dividend of THB 1.50 per share which were paid to the shareholders in September 2018, the dividends remain for distribution were THB1.15 per share, totalling THB2,346 million.

Capital Expenditures and Investment

Our capital expenditures and investment for the year ended June 30, 2019 was THB10,377.2 million (US\$337.6 million), which comprises our capital expenditures on the purchase of property, plant and equipment and intangible assets. We have an investment policy under which we evaluate whether our capital expenditures and investment are suitable. We examine each project on the basis of a number of qualitative and quantitative criteria, including (i) whether the proposed project would be a strategic fit and be in line with our Group's vision and mission; (ii) the proposed project's economic attractiveness; and (iii) whether the proposed project would maintain or enhance existing business value.

The following table sets forth our capital expenditures for the years ended December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

Description of Capital Expenditures	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Purchase of property, plant and equipment.....	6,393.1	3,679.0	7,863.7	255.8	2,461.2	10,377.2	337.6
Purchase of intangible assets.....	625.8	920.6	130.8	4.3	29.2	146.5	4.8

For the years ended December 31, 2016 and 2017, the majority of our capital expenditures were related to the construction of lorry loading terminal expansion project, the front-end engineering and design (FEED) of CFP project, the construction of two small power plants of TOP SPP and the benzene derivatives-linear alkyl benzene production plant of LABIX.

For the years ended December 31, 2018, the majority of our capital expenditures were related to the construction of our refinery expansion project (the Clean Fuel Project or CFP).

For the six months ended June 30, 2019, the majority of our capital expenditures were related to the construction of the CFP.

We have estimated planned capital expenditures of THB147,828.7 million for 2019, 2020 and 2021. The board of directors has approved the incurrence of capital expenditures of up to THB148,597.2 million for the next five years ending December 31, 2023. We are committed to invest approximately THB18 billion baht into GPSC pursuant to its capital increase. See “Business – Recent Developments” for more information on this investment.

The following table sets forth our currently planned capital expenditures for 2019, 2020 and 2021. Actual future capital expenditures may differ materially from our planned capital expenditures and investment requirements set out below, and our board of directors may also approve additional capital expenditures and investment in future.

	For the year ended December 31,		
	2019	2020	2021
	(in millions of)		
	THB	THB	THB
Planned capital expenditures			
– Reliability, efficiency and flexibility improvement.....	1,537	522.6	61.5
– Jetty 7 & 8 project.....	1,998.1	153.7	-
– Office relocation & New crude tank	860.7	522.6	-
– Site office preparation for fire water & fire water improvement	65.5	491.8	-
– New Bangphra Raw Water Line	123.0	491.8	245.9
– Other investments	92.2	1,075.9	153.7
– CFP Project.....	39,347.2	54,963.1	26,897.5
– GPSC Capital Injection.....	17,644.8	-	-
Total planned capital investments and investment requirements ⁽¹⁾	62,248.5	58,221.6	27,358.6

Notes:

(1) Excluding approximately US\$40 million for annual maintenance.

We plan to meet our capital expenditures requirements primarily from cash flow from operations and the net proceeds of existing debt facilities. We may also raise additional capital through the offering of equity, debt and other securities in the future. We may make additional capital investments as opportunities or needs arise. In addition, we may increase, reduce or suspend our planned capital expenditures for 2019 through 2021 or change the timing and use of our capital expenditures from what is currently planned in response to market conditions or for other reasons. We may be able to obtain tax credits from the BOI for capital expenditures which are related to environmental projects. See “Business—Investment Promotion.”

Financing Arrangements and Other Contractual Obligations

Indebtedness

The following table shows the outstanding amounts of our total consolidated short-term borrowings, long-term borrowings from financial institutions and debentures as of December 31, 2016, 2017 and 2018 and for the six months ended June 30, 2018 and 2019.

	As of December 31,				As of June 30,		
	2016	2017	2018	2018	2018	2019	2019
	(in millions of)						
	THB	THB	THB	US\$	THB	THB	US\$
Short-term borrowings	867.4	968.8	2,391.7	77.8	1,318.5	1,856.5	60.4
Long-term borrowings from financial institutions.....	11,580.5	9,660.6	16,602.9	540.1	17,494.0	16,024.8	521.3
Debentures	63,853.0	55,838.6	88,065.2	2,864.8	56,600.4	81,715.6	2,658.3

We have a conservative internal treasury policy that targets to maintain our indebtedness at levels such that our net debt (defined as total debt less cash and cash equivalents and short-term investment, where total debt means the sum of short-term borrowings, the current portion of long-term borrowings from financial institutions, the current portion of debentures, the non-current portion of long-term borrowings from financial institutions and the non-current portion of debentures) to equity ratio is less than 1.0 times and our net debt to EBITDA ratio is less than 2.0 times.

As of June 30, 2019, THB15,464.7 million (US\$503.1 million) of our total indebtedness of THB99,596.9 million (US\$3,240.0 million) was secured indebtedness. As of June 30, 2019, our total Baht-denominated indebtedness amounted to THB37,780.7 million (US\$1,229.0 million) and our total foreign currency-denominated indebtedness amounted to THB61,816.2 million (US\$2,010.9 million). As of June 30, 2019, our total fixed rate indebtedness amounted to THB89,734.3 million (US\$2,919.1 million) and our total floating rate indebtedness amounted to THB9,862.6 million (US\$320.8 million).

As of December 31, 2018, THB15,815.7 million (US\$512.5 million) of our total indebtedness of THB107,059.9 million (US\$3,482.8 million) was secured indebtedness. As of December 31, 2018, our total Baht-denominated indebtedness amounted to THB41,918.6 million (US\$1,363.7 million) and our total foreign currency-denominated indebtedness amounted to THB65,141.3 million (US\$2,119.1 million). As of December 31, 2018, our total fixed rate indebtedness amounted to THB96,700.8 million (US\$3,145.8 million) and our total floating rate indebtedness amounted to THB10,359.1 million (US\$337 million).

As of December 31, 2017, THB7,942.3 million (US\$243.2 million) of our total indebtedness of THB66,468.0 million (US\$2,035.1 million) was secured indebtedness. As of December 31, 2017, our total Baht-denominated indebtedness amounted to THB30,548.5 million (US\$935.3 million) and our total foreign currency-denominated indebtedness amounted to THB35,919.5 million (US\$1,099.8 million) (which included our cross currency swaps of THB3,581.0 million (US\$109.6 million) to hedge our Thai Baht indebtedness against foreign exchange and interest rate exposure). As of December 31, 2017, our total fixed rate indebtedness amounted to THB59,881.5 million (US\$1,833.5 million) and our total floating rate indebtedness amounted to THB6,586.5 million (US\$201.7 million).

As of December 31, 2016, THB9,425.8 million (US\$263.1 million) of our total indebtedness of THB76,301.0 million (US\$2,130.1 million) was secured indebtedness. As of December 31, 2016, our total Baht-denominated indebtedness amounted to THB33,417.2 million (US\$932.9 million) and our total foreign currency-denominated indebtedness amounted to THB42,883.8 million (US\$1,197.2 million) (which included our cross currency swaps of THB7,462.5 million (US\$208.3 million) to hedge our Thai Baht indebtedness against foreign exchange and interest rate exposure). As of December 31, 2016, our total fixed rate indebtedness amounted to THB68,622.3 million (US\$1,915.7 million) and our total floating rate indebtedness amounted to THB7,678.7 million (US\$214.4 million).

Contractual Obligations

The following table provides a maturity analysis of our material contractual obligations as of June 30, 2019.

	Expected cash payments due by period				
	Total	Less than 1	1 – 3 years	3 – 5 years	More than 5
		year	(in millions of)		years
	THB	THB	THB	THB	THB
Contractual Obligations					
Short-term borrowings from financial institutions.....	1,856.5	1,856.5	-	-	-
Long-term borrowings from financial institutions.....	16,024.8	1,300.8	2,637.1	2,428.8	9,658.1
Debentures	81,715.6	-	6,000.0	22,416.0	53,299.5
Non-cancellable operating lease commitments.....	19,419.8	245.9	491.8	768.5	17,913.5

Off Balance Sheet Arrangements and Contingent Liabilities

Except as disclosed in note 13 to our unaudited interim consolidated financial information for the six months period ended June 30, 2019 included elsewhere in this Offering Memorandum, we do not have any off-balance sheet arrangements or contingent liabilities that we believe have or are reasonably likely to have a current or future material effect on our financial condition, change in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources.

Taxation

The prevailing corporate rate of income tax applicable to Thai companies generally is 20%. We enjoy certain investment promotion privileges from the BOI, which include certain tax privileges and exemptions. See “*Business—Investment Promotion*” for more details on our investment promotion privileges, including our tax privileges and exemptions.

Our effective tax expense rates for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019 were 9.6%, 17.9%, 16.0%, 17.9% and 18.0% respectively.

Inflation

According to the BOT, Thailand's annual overall inflation rates for the years ended December 31, 2016, 2017 and 2018 were negative 0.2%, 0.7% and 0.7%, respectively. We do not believe that inflation will have a material effect on our financial condition or results of operations.

Quantitative and Qualitative Disclosures Regarding Market Risks

Our primary market risk exposures are to fluctuations in foreign exchange rates, the prices of commodities and interest rates.

Foreign Currency Risk

We are exposed to foreign currency risk relating to purchases of raw materials and long-term borrowings which are denominated in foreign currencies. However, we enter into short-term currency hedging contracts for short term foreign currency exposures when appropriate.

Substantially all of our revenues and feedstock costs are denominated in U.S. dollars or are pegged to U.S. dollars, while our fixed costs and administrative expenses are denominated in Baht. While the matching of revenue from our products and our feedstock costs in U.S. dollars or U.S. dollar-linked currencies provides a partial natural hedge, we are exposed to changes in the value of the U.S. dollar against the Baht. Depreciation in the value of the Baht against the U.S. dollar tends to have a beneficial effect on our gross refining margins and product-to-feedstock margins. Conversely, appreciation in the value of the Baht against the U.S. dollar tends to have a detrimental effect on our gross refining margins and product-to-feedstock margins. We also have outstanding foreign currency debt, and may incur and/or finance a substantial portion of our capital expenditures for future expansion programs in foreign currencies. Any depreciation in the Baht against the U.S. dollar would increase our finance costs.

We engage in hedging activities, including forward contracts and currency swaps, to manage exposure to fluctuations in foreign currencies on our financial results. We also incur U.S. dollar indebtedness to provide an indirect accounting hedge against the appreciation of the Baht against the U.S. dollar. The gain resulting from the translation of our U.S. dollar indebtedness into the Baht as the Baht appreciates against the U.S. dollar mitigates the impact on our gross refining margins and product-to-feedstock margins of an appreciation of the Baht. Our hedging activities are designed to reduce, but do not eliminate, the effects of foreign currency fluctuations. Factors that could affect the effectiveness of our hedging activities include accuracy of sales forecasts, volatility of currency markets and the availability of hedging instruments.

See *“Risk Factors—Risks Relating to Thailand—We may be adversely impacted by fluctuations in the value of the Baht against foreign currencies, particularly the depreciation of the Baht against the U.S. dollar.”*

Commodity Price Risk

We also attempt to manage our exposure to commodity price fluctuations by selling a diversified portfolio of refined petroleum and petrochemical products. We have a high degree of integration in our operations which also assists us in managing the effect of such fluctuations.

We are exposed to fluctuations in the prices of crude oil and other feedstock as well as refined petroleum and petrochemical products. These fluctuations directly impact our net sales and costs of goods sold. However, the movement in crude oil prices does not necessarily have a direct long-term relationship to our net profit. The effect of changes in crude oil prices on our operating results is determined more by the rate at which the prices of refined petroleum and petrochemical products adjust to reflect such changes. Our sale prices for refined petroleum and petrochemical products are influenced by the prices of crude oil. Generally, an increase or decrease in the price of crude oil may result in a corresponding increase or decrease in the price of refined petroleum and petrochemical products. The timing of the relative movement of the prices of crude oil and refined petroleum and petrochemical products, however, as well as the overall change in the prices of refined petroleum or petrochemical products, can affect our gross refining margins and could have significant impact on our refining operations and our earnings and cash flows.

We are exposed to seasonal fluctuations in the consumption of particular types of refined products. For example, the unit prices for some of our refined petroleum products, such as gasoline, are higher during the summer months because more gasoline is consumed in the United States during the summer driving season. The unit price for diesel also increases during the winter months as diesel is used as heating oil in the United States, Europe and North Asia. The demand in Thailand, in terms of sales volume, for diesel and gasoline is normally lower during the monsoon season in the third quarter each year.

We also maintain inventories of crude oil and refined petroleum and petrochemical products, the values of which are subject to fluctuations in market prices. Due to our legal reserve of stock, as of June 30, 2019, we hold approximately nine million barrels of crude oil, feedstock and oil product inventories. Consequently, our financial results are impacted by the effects of fluctuations in the market prices for crude oil and other feedstock and refined petroleum and petrochemical products. To the extent that crude oil and refined petroleum or petrochemical product prices rise in tandem, our gross profit would generally be positively affected, because we compute the gross profit as the excess of net sales (determined at the time of sale at the higher refined product prices) over the cost of sales (determined at the earlier time the crude oil is purchased at lower prices). Thus, a portion of the gross profit that we earn during a period of rising prices may be significantly attributable to the stock gain or the increase in prices during the period after we buy the crude oil and other feedstock and prior to the time we sell the refined petroleum or petrochemical products produced from such crude oil and other feedstock. However, during periods of rising crude oil and refined petroleum or petrochemical product prices, the cost of replenishing our crude oil inventories and, thus, our working capital requirements, are similarly rising. We generally experience the increased working capital requirements from higher crude oil prices sooner, and to a greater degree, than the benefits to our gross refining margin that may arise from selling refined petroleum or petrochemical products at higher prices. Moreover, depending on the rate and the duration of the increase of crude oil prices, and the degree to which crude oil prices increase compared to the increase in refined petroleum or petrochemical product prices, our gross refining margins may actually decline during periods of rising crude oil prices. During periods of declining crude oil prices, we generally experience the opposite effects. See “Risk Factors—Risks Relating to Our Business—Fluctuations in market prices of crude oil and other feedstock, as well as refined petroleum products or petrochemical products, may affect our results of operations.”

Interest Rate Risk

We are exposed to interest rate risk resulting from fluctuations in interest rates on our short-term and long-term borrowings. See “Risk Factors—Risks Relating to Our Business—We may be exposed to interest rate fluctuations.” Upward fluctuations in interest rates increase the cost of new borrowings and the interest cost of our outstanding floating rate borrowings. As of June 30, 2019, our floating rate exposure on long-term borrowings was 9.8% of our total long-term borrowings. As of June 30, 2019, a 1% change in interest rates on our floating rate borrowings, which totaled THB9,605.3 million (US\$312.5 million), would result in a change of approximately THB96.1 million of annualized interest expense, provided that the impact on our interest expense may decrease under our hedging contracts.

INDUSTRY OVERVIEW

Certain information and statistics presented in this Industry Overview have been taken from independent market consulting firms including IHS, FGE, IEA and other sources in the public domain. We do not have any confirmation that the information provided by these sources is inaccurate in any material respect. Neither us, any of our respective affiliates, advisors, nor have any of the Arranger and Dealers independently verified the information included in this section. The information may not be consistent with other information available within or outside Thailand.

Oil Refining

Global Overview

The oil refining industry includes the refining of crude oil and the selling and distribution of products derived from crude oil. Key products include motor gasoline, diesel oil, LPG, jet fuel and fuel oil, among others. A refinery's financial performance is largely determined by its refining margins. Refining margins are significantly affected by international and regional supply and demand conditions. Globally, gross refining margins, although showing a strong recovery since 2009 as a result of cheaper feedstock supply and growing demand, still remain vulnerable to overcapacity of refined products. Significant additions of new capacity are expected over the next five years, with a majority of the additions occurring in Asia-Pacific and the Middle East. Although the current environment with cheap feedstock and continued growth in demand is beneficial for global refiners, refineries in Japan and Europe will likely be pressured by a slowdown in demand growth and high competition from mega refineries from China and the Middle East.

Demand for refined products has been partly driven by GDP growth. The table below shows the year-on-year actual real GDP growth and forecast since 2019 for selected countries and regions.

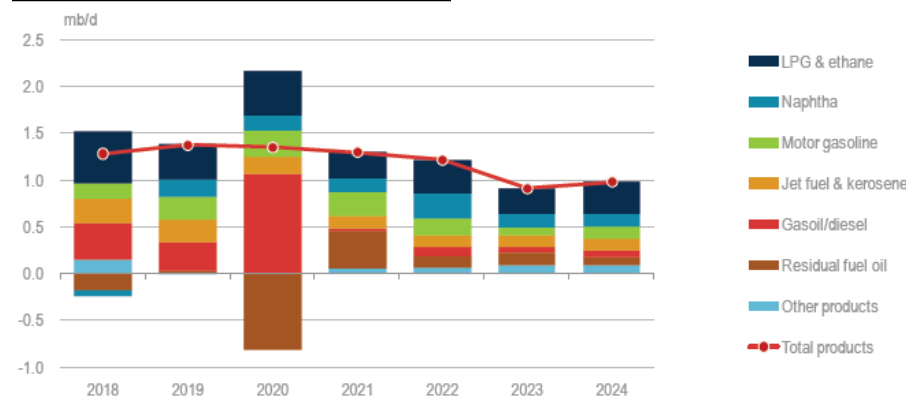
Real GDP % Year-on-Year Growth

Country	2013	2014	2015	2016	2017	2018	2019F	2020F	2021F	2022F	2023F	2024F
World	3.49%	3.58%	3.44%	3.37%	3.79%	3.60%	3.33%	3.61%	3.63%	3.61%	3.64%	3.65%
US	1.84%	2.45%	2.88%	1.57%	2.22%	2.86%	2.33%	1.87%	1.77%	1.64%	1.62%	1.57%
Euro Area	-0.24%	1.40%	2.10%	1.95%	2.38%	1.83%	1.28%	1.55%	1.48%	1.44%	1.39%	1.36%
Japan	2.00%	0.38%	1.22%	0.61%	1.93%	0.81%	0.98%	0.45%	0.54%	0.51%	0.53%	0.52%
China	7.80%	7.30%	6.90%	6.73%	6.76%	6.57%	6.27%	6.12%	6.00%	5.75%	5.60%	5.50%
India	6.39%	7.41%	8.00%	8.17%	7.17%	7.05%	7.26%	7.49%	7.74%	7.73%	7.74%	7.74%
Thailand	2.70%	1.00%	3.10%	3.40%	4.00%	4.10%	3.50%	3.50%	3.50%	3.50%	3.60%	3.60%

Source: International Monetary Fund, World Economic Outlook Database, April 2019

The IMF expects the global economy to grow at an average of 3.6% from 2020 to 2024. Potential growth in emerging market economies is likely to increase slightly from current rates. On the other hand, the advanced economies will likely see a slight decline in the medium term because of aging population, weaker investment and lower productivity. Oil product demand is expected to grow at a CAGR of 1.1% or 1.1 million bpd per year from 2020 to 2024. Over the next five years, the dominance of non-OECD is clearly visible with non-OECD demand forecast to reach 58.5 million bpd and OECD demand to fall to 47.9 million bpd in 2024. However, demand growth momentum is limited by enhanced vehicle fuel efficiency and higher electric vehicle penetration. In terms of fuel mix, petrochemical and aviation sectors were forecasted by the IEA to dominate the global oil demand growth. The 2020 IMO marine fuel regulation change will trigger deep changes in the structure of products demand. IEA expected demand growth in transportation, heating and industrial sectors will slow down in 2020 to 2024 while power sector demand will temporarily boost.

Global oil demand addition (by products)

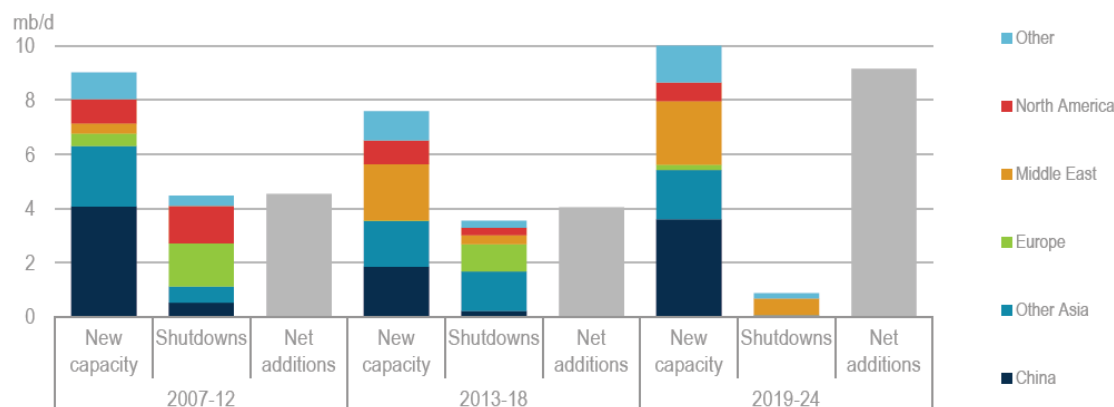


Source: Medium-Term Oil Market Report © OECD/IEA 2019

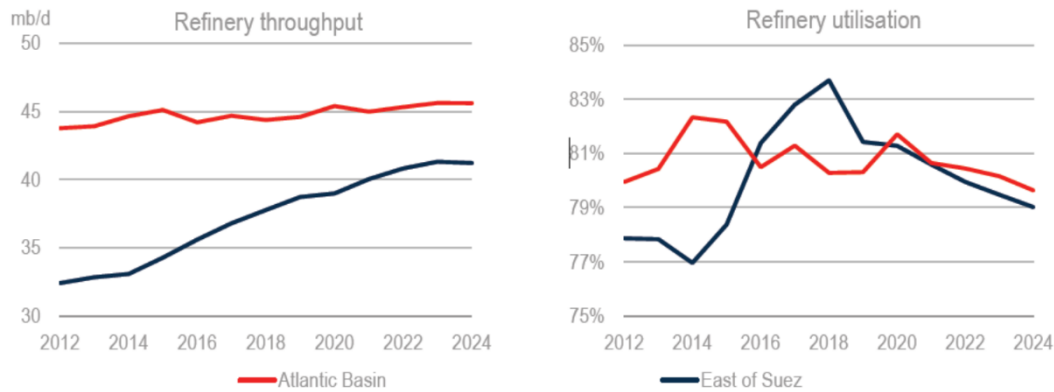
The global refining industry continues to reinvent itself in terms of restructuring and capacity additions. According to the IEA, refinery capacity is expected to rise by 9.0 million bpd to 109.4 million bpd from 2019 to 2024. Most of the capacity growth is expected to take place in the east of Suez, led by emerging countries in Asia (including China), followed by the Middle East. China is expected to experience major changes and to once again lead the capacity-building with almost 3.6 mb/d, while the Middle East capacity is projected to contribute around 2.3 mb/d led by Saudi Arabia and Kuwait.

With the huge refinery capacity addition, IEA expects global refinery throughput to rise only by 4.7 mb/d from 2019 to 2024. During the same period, total oil demand is expected to grow only by 6.5 mb/d, implying that oil demand growth will outpace incremental product supply. As a result, global refinery margins are likely to find support from the tight product supply. In the Atlantic Basin, the refinery utilization is steady over the period, while East of Suez refining utilization continues to increase to catch up with the strong demand growth in Asia Pacific and Middle East. The major increase in East of Suez refining runs comes from China where there are several mega-projects to start up especially in the Zhejiang and Fujian provinces.

Global refinery crude distillation capacity additions



Global refinery throughput (Atlantic Basin vs East of Suez)



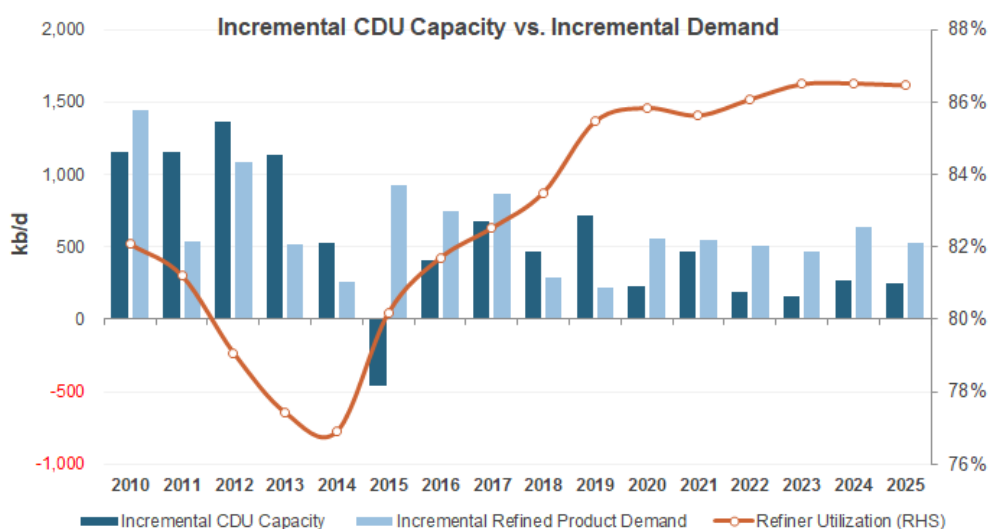
Source: Medium-Term Oil Market Report © OECD/IEA 2019

Asia-Pacific and Middle East Overview

According to Medium Term Oil Outlook 2019 by the IEA, oil product demand growth in Asia Pacific and Middle East is expected to reach 4.3 million bpd during 2019-2024 while 3.4 million bpd of refinery throughput will be added during the same period. Refinery throughput in Asia-Pacific and Middle East has observed consistent growth since 2014, which is expected to increase from 37.8 million bpd in 2019 to 41.2 million bpd by 2024. China and Middle East are the largest contributors with the largest increase of 3.0 million bpd, which accounts for 88% of the global increment from 2019 to 2024.

Prices of refined products in Asia-Pacific region are benchmarked against Singapore refined product prices. Refining margins can vary depending on the type of crude oil used, the product slate and the fixed and variable costs of the refinery. Refineries typically process various crude slates with different prices, yields and product mixes. In Asia-Pacific, the Singapore's Refining Margin is used as a proxy for the region because of Singapore's established trading platform. The Singapore's Refining Margin provides the benchmark used by Asian refineries to evaluate their refining margins and does not indicate the margin for any specific refinery.

CDU Capacity against Demand Growth (thousand bpd)



Source: FGE (Sep 2019)

(Above "Incremental CDU capacity vs. Incremental Demand" chart seems to conflict with those presented on the similar capacity addition and utilisation rate charts in the earlier section. To select the most appropriate data.)

Increasing utilization rates, sustainable demand growth and rationalization of supply have resulted in higher refining margins since 2004, with the exception of 2009-2010. However, the refining margins came under pressure in 2014 due to excess capacity and in 2015 refining margins bounced back due to lower oil prices. In 2020-2024, demand is expected to outpace additional capacity following economic growth.

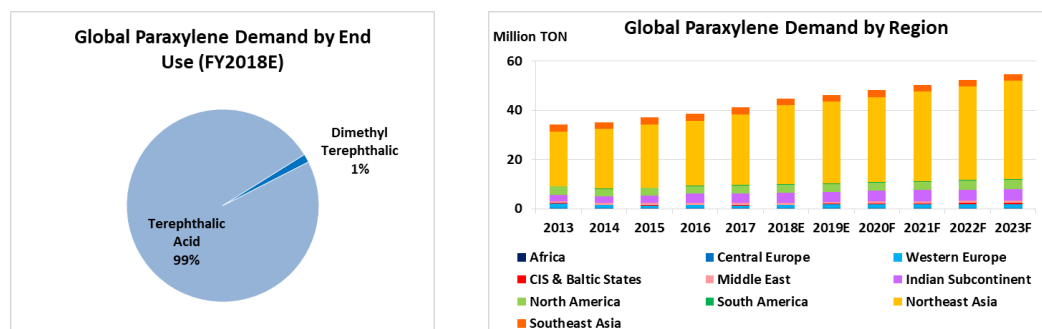
The Paraxylene Industry

Demand

Paraxylene is used primarily as a feedstock for the manufacture of purified terephthalic acid (“**PTA**”), an important feedstock used in the production of polyester fiber and plastic bottles (“**PET bottle**”). According to IHS, the demand for paraxylene 44.8 million metric tons in 2018E and is expected to grow at a 2018E-23F CAGR of 4.1%.

Majority of the growth is expected to be in Asia, especially from China, which accounted for 59% of global demand in 2018E and with growing demand at a 2018E-23F CAGR of 5.5%. China is expected to grow, to account for 63.2% of global demand by 2023F, according to IHS. Northeast Asia demand will continue to account for roughly two-thirds of global paraxylene demand, driven by strong growth in China’s polyester production along with an increase of PTA capacity addition. China is the world’s largest polyester producer and has been on an expansion drive over the past five years as it seeks to reduce its reliance on imports.

Demand in India is expected to grow with expanding fiber production while exports from the Middle East, primarily to Europe and Asia, are expected to grow. Paraxylene demand in North America is forecasted to increase 3.3% CAGR from period of 2018E-2023F, due to PTA capacity addition in US. Europe will exhibit slower growth in paraxylene demand as no plans for additional PTA capacity in Europe to boost paraxylene demand. Europe’s paraxylene demand has been impacted by the closure of several PTA and DMT plants over the last five years. Demand for PTA in Europe is now heavily satisfied by imports from Asia.

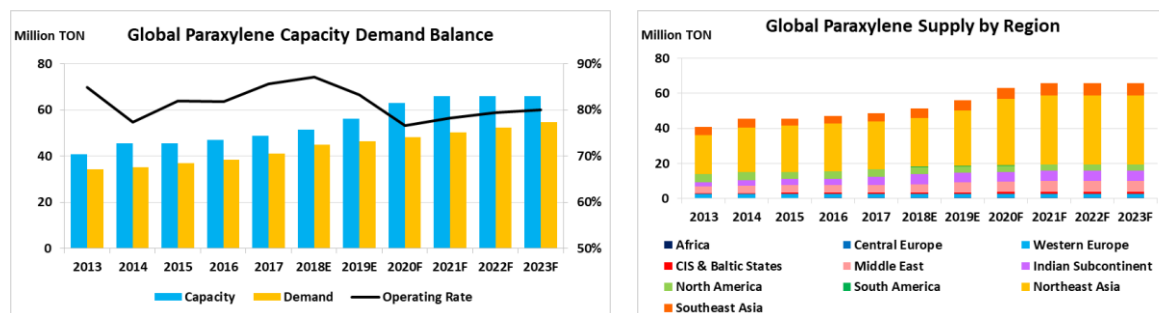


Source: IHS Spring 2019 (2018E: Estimated up to Dec 2018; F=Forecast)

Supply

According to IHS, global paraxylene production 44.8 million metric tons in 2018E, and is expected to grow at a 2018E-23F CAGR 4.0%.

According to IHS, China accounted for over 24% of the global paraxylene production in 2018E, a level that is expected to increase to 36% by 2023F as China tries to be more self-dependent. New plants in China come in Mega-capacity size with new technology such as crude-to-chemical, which can maximize chemical yield from crude oil. Supply from the Middle East is expected to increase continuously due to capacity expansion in order to serve domestic consumption and export needs. The region are expected to increase their capacity by 36% respectively by the end of 2023F.



Source: IHS Spring 2019 (2018E: Estimated up to Dec 2018; F=Forecast)

The Benzene Industry

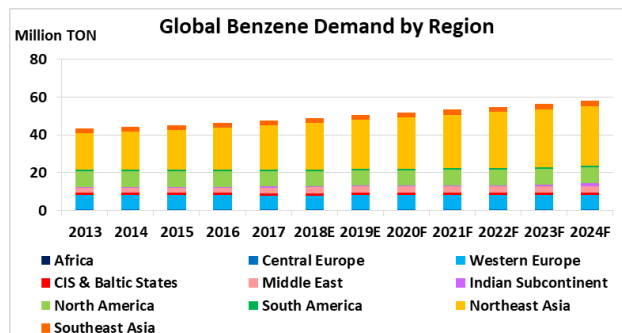
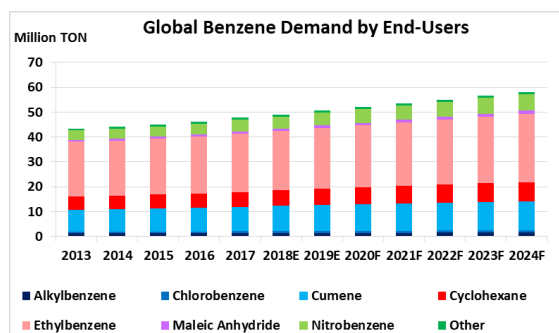
Demand

Benzene is mainly used in the production of polymers such as polystyrene, expandable polystyrene, acrylonitrile butadiene styrene (“ABS”) and polycarbonate. These products are then used in a variety of applications such as packaging, insulation for houses, engineering resins, casings for computers and various car components.

According to IHS, global demand for benzene reached 50.6 million metric tons in 2019F and is forecasted to grow at a 2019F-23F CAGR of 2.8%, reaching 58.0million metric tons by 2024F. This growth is driven by growth rates in the following key benzene derivatives over the same period:

- Nitrobenzene/aniline, 5.1%
- Cumene/phenol, 2.3%
- Ethylbenzene/styrene, 2.4%
- Cyclohexane/nylon, 3.1%

These derivatives account for more than 90% of benzene consumed globally. Northeast Asia has been the largest regional consumer of benzene for many years and, by 2024F the region is expected to account for 54% of global demand, according to IHS. Between 2019F and 2024F, demand in Northeast Asia is expected to grow from 25.7 million metric tons to 31.4 million metric tons at a CAGR 4.1%, according to IHS. The majority of the benzene in this region is used to make ethylbenzene which is converted into styrene. The other two major consuming regions are North America and Europe with market shares of approximately 16% each in 2019F. The Middle East, Africa and Southeast Asia have growing needs for benzene and they collectively account for over 12% of the global benzene demand in 2019F.

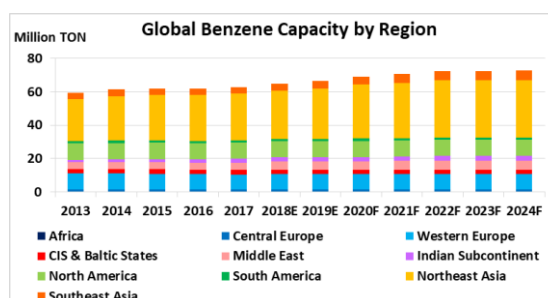
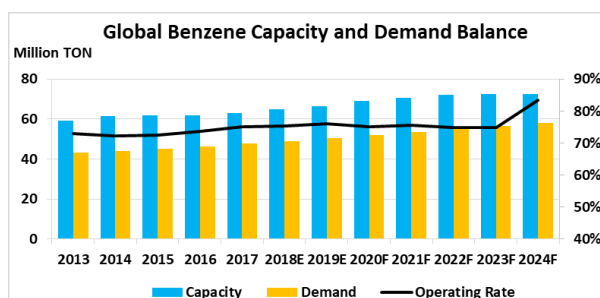


Source: IHS Spring 2019 (2018E: Estimated up to Dec 2018; F=Forecast)

Supply

According to IHS, global benzene capacity was 66.5 million metric tons in 2019F, and is expected to grow at a 2019F-24F CAGR 1.8%, which is in line with the growth in global demand. During 2019F-2024F, capacity addition is lower than demand growth, so operating rate is expected to rise from 76.0% in 2019F to 83.5% in 2024F.

According to IHS, China accounted for over 24% of the global benzene production in 2019F, a level that is expected to climb up to 28% in 2024F. New mega capacities have started up in 2019-2020 along with paraxylene production, mainly with crude-to-chemical technology. The outlook for benzene producer remains positive as demand growth is expected to keep rising due to demand especially from China.



Source: IHS Spring 2019 (2018E: Estimated up to Dec 2018; F=Forecast)

Lube Base Oil

Overview of the Lube Base Oil Industry

Lubricant products are used to reduce friction and wear, remove heat and prevent contamination. Lubricants are classified into two categories—automotive and industrial. Automotive lubricants include engine oils, gear oils and transmission oils and assist in the smooth operation of different types of vehicles. Industrial lubricants include turbine oils, bearing oils and hydraulic oils for industrial applications.

The global lubricants market has undergone significant changes in the past decade, mainly due to industry consolidation. Global consumption has been led by the automotive sector that brought sharp shifts in consumption from heavy-grade to light-grade base oils and also raised the international standard for base oil and lubricant.

Production technology in this field does not usually evolve at a rapid pace, but improvements in existing technologies have occurred recently in response to tighter quality specifications set by automakers.

The lube base oil industry provides the major feedstock for the manufacture of all types of lubricants. The manufacture of lube base oil consists of a series of steps to physically remove undesirable components and chemically modify other components to make them suitable for finished lubricants. Lube base oil is extracted after refining crude oil but requires further performance-enhancing chemical additives to improve the characteristics of the resultant mixture.

During the refining process, by-products that are high in aromatics content are extracted. These by-products can be mixed with carbon black and other non-lube applications. Bitumen, extract and slack wax, are some of the by-products produced in the manufacturing process.

Lube base oils vary widely in molecular composition and physical and chemical properties depending on the sources of crude oil and the processing steps used in manufacturing them. These differences in base stock composition can impact the end use, performance of, and therefore the demand for, finished lubricants.

The American Petroleum Institute has established a base oil classification system to help compare engine oils with base oils from different manufacturing sources. The system classifies the lube base oil into five categories, from Group I to Group V, based on sulfur content, saturates and viscosity.

The table below sets out the basestock categories established by the American Petroleum Institute:

American Petroleum Institute Basestock Categories

Requirements				
API	Sulfur, Wt. %		% Saturates	Viscosity Index
I.....	>0.03	and/or and and	<90	80-120
II	<0.03		≥90	80-120
III.....	<0.03		≥90	>120
IV.....	All Polyalphaolefins			
V	All Stocks Not Included in Groups I-IV			

Source: American Petroleum Institute

Group III base oil offers a higher viscosity index than base oil in Group I and Group II, and historically has marketed at a higher price. In recent years, the increasing demand for higher-quality lubricants is expected to lead to decreasing Group I production and raising Group II and III production.

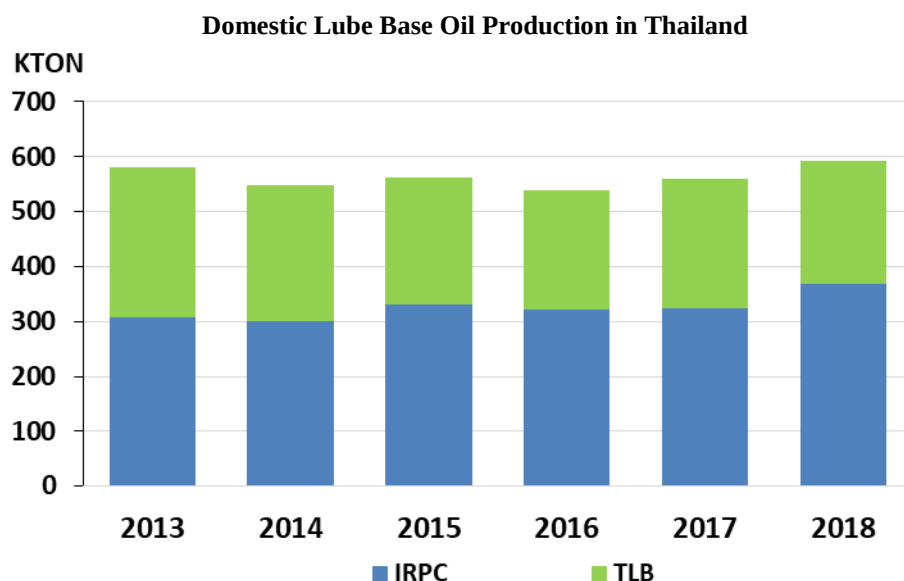
Asia Lube Base Oil Demand

Asia is a significant importer of lube base oils, especially because China has experienced rising demands for finished lubricants year by year. Asian capacity has exceeded demand in total with a shortage in the supply of Group I base oil and a surplus in the capacity of Groups II and III, although demand growth has increased plant utilization in recent years. Demand in Asia for higher-grade base oils has emerged, led by China along with the growing capacity of higher-grade base oils like Group II in China and Group III in South Korea.

Thailand's Lube Base Oil Industry

There are two base oil producers in Thailand: IRPC and Thai Lube Base. While both companies' plants have been under-utilized since 1999, capacity utilization has improved since 2003 and is continuing to improve.

The following chart sets out the volume of lube base oil production in Thailand from 2013-2018.



Remarks: IRPC Oil included since 2017

Source: Department of Energy Business, Thailand

Bitumen

Bitumen constitutes a significant portion of by-product from the manufacturing process of Group I base oils. Bitumen is nearly, if not completely, solid, either brown or black and has a distinctive odor. It melts upon heating and contains impurities such as nitrogen, oxygen and sulfur. The main application of Bitumen is in road construction and roofing materials.

The chart below sets out the domestic supply and demand for bitumen in the six years from 2013 to 2018:

Bitumen Domestic Supply/Demand Balance

(Tons)	2013	2014	2015	2016	2017	2018
Supply						
Production	1,197,558	1,177,440	1,438,461	1,386,187	1,364,071	1,377,415
Import	126,552	149,592	298,194	317,123	325,091	264,929
Total supply	1,324,080	1,327,032	1,736,655	1,703,310	1,689,162	1,642,344
Growth (%).....	0.6%	0.2%	30.9%	(1.9%)	(0.8%)	(2.8%)
Demand						
Domestic Consumption	754,894	766,518	1,008,224	1,129,564	1,061,034	941,464
Export	445,066	449,349	437,382	308,496	292,322	349,357
Total demand	1,199,960	1,215,867	1,445,606	1,438,060	1,353,356	1,290,821
Growth (%).....	(1.4%)	1.3%	18.9%	(0.5%)	(5.9%)	(4.6%)

Source: Department of Energy Business, Ministry of Energy and Thai Custom, Thailand

Asia is the largest market in the world for bitumen, driven by growth in China, the largest Asian market, and other infrastructure projects in Southeast Asia. Although capacity in China has been increasing, it is still not enough to meet domestic demand. As a result, China imports large volumes from the region, mostly from Singapore, South Korea and Malaysia.

The Thai Electricity Industry

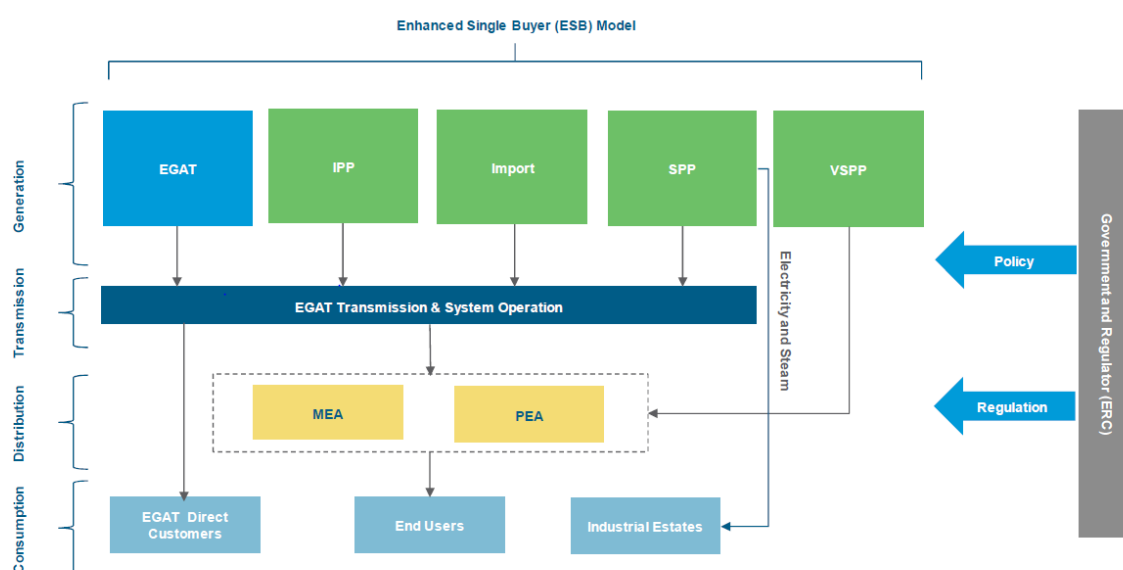
Power Generation, Transmission and Distribution

The electricity industry in Thailand is divided into three main functions: power generation, transmission and distribution, a substantial portion of which remains state-controlled.

Electricity Generating Authority of Thailand (“**EGAT**”) is the leading owner/operator of installed generation capacity in Thailand while the Provincial Electricity Authority (“**PEA**”) and Metropolitan Electricity Authority (“**MEA**”) are responsible for the distribution in provincial areas and metropolitan areas, respectively.

As a result of the Thai government’s power generation privatization program, the private sector is now engaged in power generation through companies participating in EGAT’s Small Power Producer (“**SPP**”) program or in EGAT’s Independent Power Producer (“**IPP**”) program. The private sector has also entered the market via acquisitions of power plants formerly owned by EGAT, such as Electricity Generating Public Company Limited and Ratchaburi Holding Public Company Limited.

In the Enhanced Single Buyer (ESB) model, EGAT is the key buyer for all electricity generating entities, including foreign ones. EGAT purchases electricity from private operators under long-term Power Purchase Agreements (PPAs). Currently, SPPs are required to sell part of their electrical generation to EGAT and are allowed to sell the rest to industrial users, whereas IPPs and other producers must sell 100% of their electricity generation to EGAT. In addition to the electricity generated from power plants in Thailand, EGAT has entered into agreements to purchase electricity from producers in the neighboring countries of Malaysia and Laos.



Source: EGAT, Ministry of Energy

EGAT owns the majority of the country’s transmission lines, with a portion held by the Metropolitan Electricity Authority (“**MEA**”) and the Provincial Electricity Authority (“**PEA**”). EGAT is the sole operator of the national network and is responsible for operating, maintaining and managing the national transmission system. Load dispatch as well as operations of generation and transmission facilities is managed by EGAT’s national control center and five regional control centers.

EGAT’s national transmission system of high voltage transmission lines and substations carry electricity from EGAT and private power plants to the MEA and PEA, the country’s two main distributors, for distribution to their customers. The MEA has the exclusive right to sell and distribute power in Bangkok and Nonthaburi and Samutprakarn provinces. The PEA has the exclusive right to sell and distribute power to other provinces not serviced by the MEA. Outside of EGAT’s transmission system, some distribution of the electricity of SPPs is made directly to industrial users.

EGAT is the largest state-owned enterprise in the power industry with total assets of over THB 1,021bn (as of 2018), followed by PEA (over THB 398bn, as of 2017) and MEA (over THB 201bn, as of 2017).

Private Sector Participation in the Power Sector

Private sector participation in power generation has been allowed since early 1990s – Thailand’s government liberalized the sector by introducing open bidding for power projects in 1994 under the Independent Power Producer (IPP) scheme in order to reduce EGAT’s investment burden and to cater to growing demand in the domestic market.

The IPP program

In response to the Thai government policy to encourage state enterprise privatization, EGAT launched a competitive bid for the IPP program in 1994 to allow the private sector to construct and operate large-scale power projects and sell electricity exclusively to EGAT under long-term power purchase agreements (“**PPAs**”) for terms of 20 to 25 years. The bidding process was re-opened in 2007 and 2010 with a total installed capacity of 16 GW across all three rounds. A substantial portion of this capacity is currently operational already.

As of August 2019, there were 13 operating IPPs with an aggregate generating capacity of 14,948.5 MW. In addition, there are a number of IPP projects scheduled for commercial completion in 2024, which are estimated to produce a total aggregated power supply of 5,000.0 MW once operational.

In addition to IPPs, smaller-scale privately-owned power plants operate under Small Power Producer (“**SPP**”) – mostly 90 MW contracted capacity projects and Very Small Power Producer (“**VSPP**”) schemes.

The SPP program

EGAT launched the SPP program in 1992 to promote the use of indigenous by-product energy sources and non-conventional energy for power generation, such as wind, solar, waste and residues from agriculture. The program also encourages the private sector to participate in power generation by allowing the private sector to generate and sell electricity and by-product energy sources to nearby industrial users, as well as to sell excessive electricity back to the power grid. The SPP program serves to reduce the financial burden of government investment in electricity generation and distribution. The SPP scheme was designed to allow developers to propose projects with capacity sales of up to 90 MW to EGAT. Any additional capacity can either be used internally or sold to industrial customers.

As of end of 2018, EGAT has signed power purchase agreement with 146 SPP projects with an installed capacity of 8,957.8 MW. In addition, c.1,032 MW of SPP projects are scheduled for commercial completion in 2025, comprising of 987 MW of cogeneration projects and 45 MW of renewable energy projects.

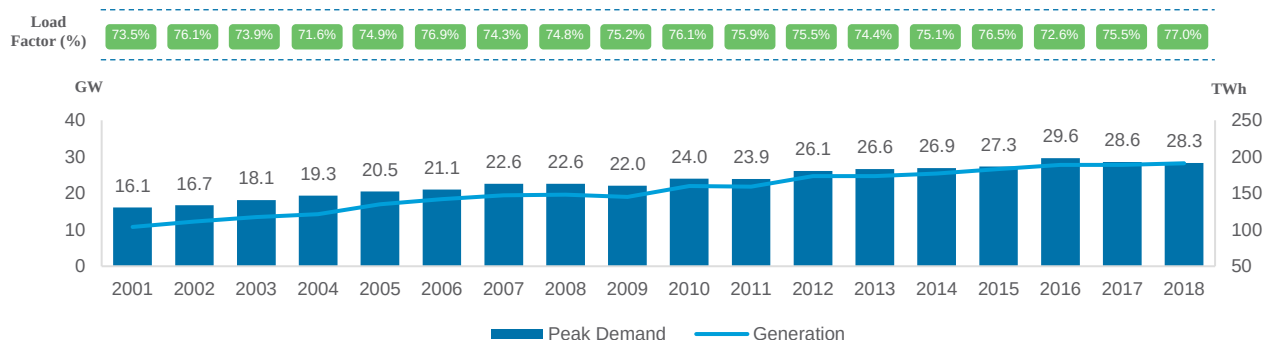
The VSPP program

The VSPP scheme was launched in 2002 which allows small-scale renewable energy projects of up to 10MW to connect to the grid and sell electricity directly to MEA and PEA. The cap was initially set at 1MW and was increased to 10MW in 2006. As of end of 2018, 937 VSPP projects with a contracted capacity of c.3.8 GW (using biomass, solar, wind, biogas and waste as fuel) have been awarded PPAs.

Demand-Supply Dynamics

Thailand's power demand growth has remained relatively inelastic to external shockstransitions, showing a consistent growth trend.

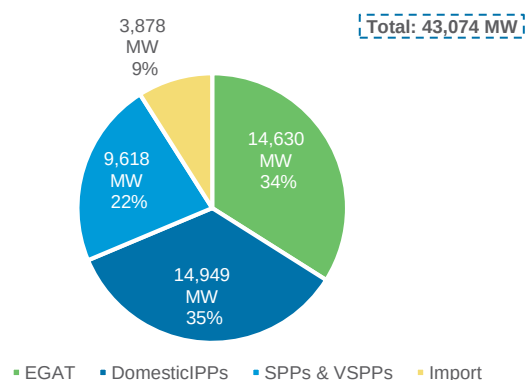
Peak Demand, Electricity Generation and System Load



Source: EPPO Thailand, EGAT

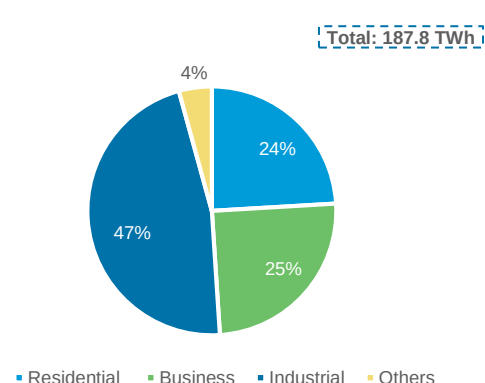
EGAT is the largest contributor in terms of installed generating capacity with c.14.6 GW under operation (34% of total) while c.3.9 GW is sourced through imports (mainly from Laos and Malaysia). The rest of the capacity is supplied by IPPs, SPPs and VSPPs.

Installed generating capacity (MW, as of Aug-19)



SOURCE: EPPO THAILAND, EGAT

Electricity consumption (By sector, 2018)



As of August 2019, Thailand's total generation capacity reached 43,074 MW, which consisted of 39,196.4 MW from domestic production and 3,877.6 MW from neighboring countries. IPP held the largest share of Thailand's installed capacity. The installed capacity operated by private producers and EGAT stood at 66% and 34%, respectively. In terms of fuel type, natural gas contributes the largest share of installed capacity, followed by coal and renewable.

Currently, the industrial sector is the largest consumer of electricity in Thailand, accounting for c.47% of the total consumption in 2018. This is due to the heavy reliance of Thailand's economy on manufacturing and petrochemicals. Residential and business consumption accounted for c.24% and 25%, respectively, while agriculture, government use and public lighting accounted for the rest.

Regulatory Framework

Thailand's power sector is regulated by the government via the National Energy Policy Council ("NEPC") which has the authority to determine policies on the energy industry while the Energy Regulatory Commission ("ERC") (established under the Energy Industry Act 2007) has the authority and duty to regulate energy industry operations in accordance with the policy framework of the government.

The ERC is empowered to issue regulations, rules, announcements or criteria, procedures and conditions as prescribed by law:

- Licensing
- Regulation of tariff setting
- Establishment of energy service provision standards
- Safety standards of the energy industry
- Protection of energy consumer rights and dispute settlement
- Promotion of renewable energy and efficient usage of energy

Thailand's Ministry of Energy ("MoE") is involved in energy policy making by setting policies, including electric power and renewable energy policies. It also oversees a number of agencies responsible for implementing energy policies and programmes including:

- Energy Policy and Planning Office ("EPPO"): Involved in developing energy policies, measures, and plans for the oil, natural gas and power sectors
- Department of Mineral Fuels ("DMF"): Regulates upstream sector of Thailand's hydrocarbons and responsible for promoting oil and gas exploration and development
- Department of Energy Business ("DOEB"): Monitors and supervises trade, quality, industrial safety, environmental concerns and security of fuels
- Department of Alternative Energy Development and Efficiency ("DEDE"): Implements energy efficiency
- and renewable energy programmes including energy conservation and development of alternative energy

The Power Development Plan ("**PDP**") is a long-term plan serving as an investment framework for EGAT for its investment in the expansion of electricity generation and transmission systems. The latest official PDP, PDP 2018, encompasses the period from 2018 to 2037. The following assumptions and frameworks were used in formulating PDP 2018:

- Ensuring power system reliability of subsystem areas in terms of generation, transmission and distribution;
- Considering that the power plant is at optimized levels to support emergency case and increasing grid flexibility
- Promoting electricity production with low investment costs to reduce consumer expenses and support economic and community long term development
- Preparing readiness of power system to be more competitive in electricity production to increase efficiency of domestic electricity production
- Reducing environmental impact
- Promoting renewable energy and increasing efficiency in power production and consumption
- Developing Smart grid to support "Prosumer"

CORPORATE HISTORY AND CORPORATE STRUCTURE

Corporate History

The following table sets forth the key corporate milestones in our operating history.

Year	Event
1961.....	We were incorporated under a 20-year build-operate-transfer concession with the Thai government through the Ministry of Industry (the “ Concession ”) to construct and operate an oil refinery in Sriracha.
1964.....	We commenced our oil refining operations following the completion of the first refining complex (“ TOC-1 ”) with a crude oil distillation capacity of 35,000 bpd with a fluidized catalytic cracking unit (“ FCCU ”).
1970.....	Our refining capacity expanded to 65,000 bpd due to the completion of the second refinery complex (“ TOC-2 ”) with a thermal cracking unit (“ TCU ”).
1981.....	Upon the expiration of the Concession, we transferred and leased back the land and the refinery assets from the Ministry of Industry.
1989.....	We increased our refining capacity from 65,000 bpd to 90,000 bpd after the installation of the first hydrocracking complex and other processing units.
1992.....	We purchased the leased refinery assets from the Ministry of Industry and entered into a long-term land lease agreement with the Treasury Department of the Ministry of Finance with a 30-year term, which expires on September 10, 2022.
1993.....	We expanded our refining capacity to 190,000 bpd with the installment of additional units, including the CCRs, TCU and the FCCU.
1994 — 1997	We entered into the petrochemical and the lube base oil businesses by making initial investments in Thai Paraxylene and Thai Lube Base, respectively. Our refining capacity increased to 220,000 bpd due to the installation of the second hydrocracking unit and other processing units. IPT became the first IPP to enter into a PPA with EGAT; separately, Thairoil Power was the first SPP to be constructed in Thailand under the SPP program.
2004.....	We converted into a public company and changed our name to Thai Oil Public Company Limited. Our shares were publicly listed for trading on the SET. We acquired additional shares in Thai Paraxylene and Thai Lube Base from the other shareholders, and Thai Paraxylene and Thai Lube Base became our wholly-owned subsidiaries.
2007.....	We increased the refining capacity of our third CDU by 50,000 bpd. As a result, our total crude refining capacity was increased to 275,000 bpd.
2008.....	We became the first refiner in Thailand with middle distillate refining capabilities to comply with the sulfur content requirements of Euro IV, ahead of the Thai government’s required timeframe of January 1, 2012. Thai Paraxylene expanded its production capacity to 489,000 tons of paraxylene per year, 177,000 tons of benzene per year, 144,000 tons of toluene per year and 90,000 tons of mixed xylene per year, yielding 900,000 tons of petrochemical products capacity in total. We entered into the solvent business, including both manufacturing and trading operations in Thailand and trading operations in Vietnam.

Year	Event
2010.....	Through Thairoil Ethanol, we acquired a 50% equity interest in Sapthip, which focuses on the cassava-based ethanol production business.
2011.....	Thai Lube Base completed the construction and commenced commercial operation of its TDAE, which produces 50,000 tons of TDAE per year. Through Thairoil Ethanol, we acquired a 21.28% equity interest in UBE, which focuses on the cassava-based and molasses-based ethanol business. Through Thairoil Marine, we acquired our first VLCC under a joint venture agreement. We were the first refiner in the Asia-Pacific region to manufacture diesel and unleaded gasoline in compliance with the sulfur and benzene petrochemical content requirements of the Euro IV standard.
2012.....	Thai Paraxylene completed the construction of the paraxylene maximizer unit, which converts toluene into paraxylene and benzene. As of December 31, 2016, we had a nameplate capacity of approximately 527,000 tons of paraxylene per year, approximately 259,000 tons of benzene per year and approximately 52,000 tons of mixed xylene per year, yielding approximately 838,000 tons of petrochemical products capacity in total. We acquired a 19.0% equity interest in Thairoil Power from J-Power Holding (Thailand) Company Limited. As a result, we had a 73.99% shareholding in Thairoil Power.
2013.....	We formed GPSC through the amalgamation between IPT and PTT Utility Co., Ltd. (“PTTUT”). GPSC is engaged in the power business to develop power generation projects and had a total capacity of 1,039MW of electricity and 1,340 tons of steam per hour in 2013. As of December 31, 2016, GPSC had a total capacity of 1,922MW of electricity and 1,582 tons of steam per hour. We currently have a 24.29% effective interest in GPSC. We issued a US\$1.0 billion dual-tranche senior unsecured fixed rate notes in accordance with Rule 144A and Regulation S. The notes were rated BBB and Baa1 by S&P and Moody’s, respectively. Thai Paraxylene formed a joint venture with Mitsui & Co., Ltd. (“Mitsui”) to set up LABIX Co., Ltd. (“LABIX”) to produce LAB, a core feedstock for detergents. As of June 30, 2019, Thai Paraxylene and Mitsui & Co., Ltd. owned 75.0% and 25.0%, respectively, of LABIX. Thairoil Marine formed a joint venture with Nathalin Co., Ltd. (“Nathalin”) TOP-NTL Shipping Trust (“TOP-NTL”) to set up TOP Nautical Star Co., Ltd. to acquire large vessels for crude, feedstock and petroleum product storage and transportation. We formed a wholly owned subsidiary, TOP SPP, to operate two small power plants.
2014.....	We issued THB15 billion domestic, unsecured, unsubordinated debentures in four tranches of 3, 5, 7 and 10-year tenors to institutional and high net worth investors. The debentures were rated AA-(tha) by Fitch Ratings (Thailand) Ltd. Sak Chaisidhi Co., Ltd (“Sak Chaisidhi”) expanded its hydrocarbon solvent nameplate capacity from approximately 76,000 to approximately 141,000 tons per year. Our third CDU and other core production units and underwent major turnaround. During the shutdown, we implemented energy efficiency improvement measures. We completed an emission improvement project for our refinery, which improved the quality of waste gas from our refinery by converting gaseous hydrosulfide into sulfur.

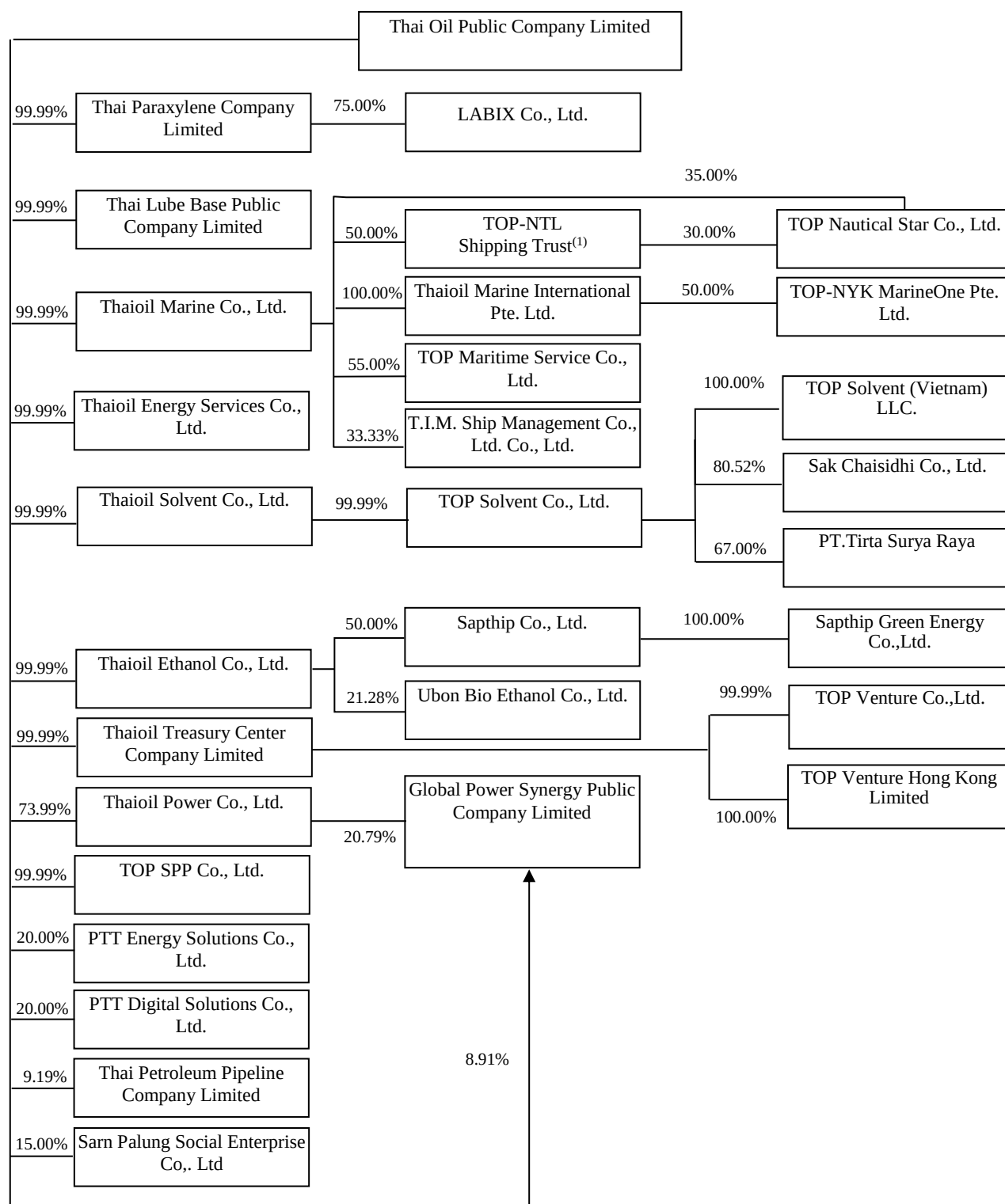
Year	Event
	Sulfur dioxide gas emissions from our refinery improved to a level lower than 250 ppm, which was significantly below 500 ppm as required by Thai law. We completed the HVU-2 debottlenecking project, which improved our ability to produce light products, such as jet and diesel. Through TOP SPP, we began constructing two small power plants with an aggregate capacity of 239MW of electricity and 498 tons of steam per hour (taking into account the gas turbine generator with a capacity of 38MW of electricity and the heat recovery steam generator with a capacity of 76 tons of steam per hour which we plan to sell to TOP SPP). The small power plants have strengthened our power generation capacity. We and PTT approved the joint investment in a transport and logistics system development project, which comprises two sub-projects. The first project aims to improve the distribution of jet fuel and paraxylene by modifying the existing pipeline system. The project of paraxylene distribution to the Sriracha Petroleum Terminal was completed in January 2017 and jet fuel distribution to the Chonburi Terminal is scheduled to be completed in the second quarter of 2018 respectively. The second project is a lorry expansion project for our product distribution system, which started commercial operation in March 2017.
2015.....	Our associate company, GPSC, completed its initial public offering on the SET in May 2015, raising approximately THB10.0 billion (US\$278.1 million). After its initial public offering, we currently hold a 24.29% effective interest in GPSC. We completed the energy efficiency improvement programs at our CDU-3 and propane deasphalting unit. This generated greater volumes of gasoline, TDAE, treated residual aromatic extract (“TRAE”) and MES and helped to streamline inventory management. Thaioil Marine, our subsidiary, acquired three additional crew boats for offshore work, bringing our total number of crew boats up to 14. We established and inaugurated a Research and Development Center at the Thailand Science Park in Pathum Thani to support research work in furtherance of our business operations and strategies.
2016.....	Our associate company, LABIX Co., Ltd., commenced commercial operations of its 120,000 tons/year LAB facility at Sriracha on February 25, 2016. TOP SPP Co., Ltd., our subsidiary, successfully constructed and commenced the operation of two small power plants with an aggregate installed capacity of 239 MW of electricity and 498 tons/hour of steam. The project is divided into two phases: phase 1 of 124 MW electricity capacity and phase 2 of 115 MW. The commercial operation dates for phase 1 and phase 2 are April 1, 2016 and June 1, 2016, respectively. We established one chemical tanker for solvent and LAB products procurement for market expansion.
2017.....	We commenced operating our improved paraxylene line to the Sriracha Petroleum Terminal in December 2016. The project has increased Thaioil’s paraxylene distribution to its fully utilized rate of 25,000 tons per month by modifying the existing pipeline system. Our lorry expansion project started commercial operation in March 2017. The project is a part of Thaioil’s product distribution system development and has increased petroleum products distribution by 5 million litres per day from 10 million litres per day to 15 million litres per day.

Year	Event
	Infrastructure improvement projects are being executed as planned. Jetty expansion is under construction and is expected to start commercial operation in 2019. We expect the new office buildings in Sriracha to be ready for use in 2020. Infrastructure improvement projects are in progress. Jetty extension, office relocation and TOP crude oil tank projects are being executed as planned. We expect the projects to start commercial operations by early 2019.
2018.....	On June 29, 2018, our board of directors approved the investment of approximately US\$4,825 million in the Clean Fuel Project (the “CFP Project”). The CFP Project was subsequently approved at extraordinary shareholders’ meeting on August 27, 2018. The CFP Project involves the construction of new production units, with the aim of improving our production and energy efficiency, oil refining capacity and refining capabilities, and reducing environmental impact. As part of the project, we plan to construct distillation units with a higher refining capacity to replace the current distillation units, which will result in an increase in our refining capacity from 275,000 barrels to 400,000 barrels per day and will improve the average complexity of our refinery from 9.8 to 12.0, based on our internal estimates using the methodology of the Nelson Complexity Index. We expect the CFP Project to COD in Q1/2023. On August 21, 2018, we signed a renewal 30-year land lease agreement (2022-2052) with the Treasure Department. Parts of Thailoil Sriracha Buildings Project completed construction. We moved in to our Engineering Centre Building (ECB), a new workshop and new warehouse, in September 2018. TOP Solvent (Vietnam) Liability Limited Company completed the construction of a new solvent distribution center in Haiphong, Vietnam in October 2018. This project successfully expanded the company’s market share in Northern Vietnam.
2019.....	TOP crude oil tanks started accommodating the fuel reserves in January 2019. The project is part of an infrastructure improvement project to increase flexibility in refining management for business continuity and to accommodate the reserves. A new laboratory building, another building in Thailoil Sriracha Buildings Project, was ready for use in January 2019. On April 10, 2019, Thailoil’s shareholders approved the disposal of assets to transfer ownership in Energy Recovery Unit (the “ERU Project”), which is a part of CFP, and the execution of the Relevant Agreements. Later on May 10, 2019, TOP and GPSC had signed the Asset Sales and Purchase Agreement. The ERU Project will be completed and transferred to GPSC in 2023. On May 31, 2019, the board of directors of TOP Solvent Company Limited (TS) approved TS to purchase the shares for investment in PT. Tirta Surya Raya (TSR) for the amount of up to 1.5 M.USD or equivalent to shareholding of 67%. TS and TSR’s shareholders had entered into the Share Purchase Agreement and completed the share transfer in September 2019. This investment is to strengthen the business structure and is in line with the company’s strategy to address market demand and trends, and also enhance the company’s competitiveness. On June 25, 2019, the board of directors of Thailoil Treasure Center Company Limited (TTC) resolved to established TOP Ventures Company Limited and TOP Ventures Hong Kong Limited for Corporate Venture Capital (CVC) transactions by investment in Venture Capital (VC) Fund and/or Startup Business. We commenced operating our Infrastructure Development at Existing Site Office Area for Future Projects (IDEA) in June 2019. We executed the project to improve our basic

Year	Event
	infrastructure on the former office building site, to reorganize and optimize the use of space on the refinery premises and to ensure enough space for the future projects. On July 26, 2019, our board of directors affirmed the provision of support to Global Power Synergy Public Company Limited (GPSC) in the plan to increase its registered capital. The company and Thaipower Power Company Limited (TP) hold 8.91% and 20.79%, respectively, in GPSC and have subscribed such shares in proportion of their shareholding under the rules and conditions of GPSC to support its investment such as the GLOW acquisition and other future growth projects.

Corporate Structure

The following diagram summarizes our corporate structure as of the date of this Offering Memorandum:



Note:

(1) TOP-NTL Shipping Trust, which is registered in Singapore, is managed by its trustee manager, TOP-NTL Pte. Ltd.

Consolidated Subsidiaries and Jointly-Controlled Associates

The following table sets forth our consolidated subsidiaries and jointly-controlled associates and their respective businesses as of the date of this Offering Memorandum.

Name of Entity	Principal Activities	Country of Incorporation	Effective Equity Interest (%)
<i>Direct subsidiaries</i>			
Thai Paraxylene Co., Ltd.	Petrochemical manufacturing and distribution	Thailand	99.99
Thai Lube Base Public Company Limited	Lube base oil manufacturing and distribution	Thailand	99.99
Thaioil Marine Co., Ltd.	Providing marine transportation services for petroleum and liquid chemical products	Thailand	99.99
Thaioil Energy Services Co., Ltd.	Providing management and general services	Thailand	99.99
Thaioil Solvent Co., Ltd.	Investment in solvent and petrochemical businesses	Thailand	99.99
Thaioil Ethanol Co., Ltd.	Investment in ethanol business and alternative energy products	Thailand	99.99
Thaioil Power Co., Ltd.	Power and steam generation	Thailand	73.99
TOP SPP Co., Ltd.	Power and steam generation	Thailand	99.99
Thaioil Treasury Center Company Limited	Treasury Center for the Group's business	Thailand	99.99
<i>Indirect subsidiaries</i>			
TOP Solvent Co., Ltd.	Distribution of solvent and petrochemical products	Thailand	99.99
Sak Chaisidhi Co., Ltd.	Hydrocarbon solvent manufacturing and distribution	Thailand	80.52
TOP Solvent (Vietnam) LLC.	Distribution of solvent and petrochemical products in Vietnam	Vietnam	100.00
Sapthip Co., Ltd.	Cassava-based ethanol products manufacturing and distribution	Thailand	50.00
Thaioil Marine International Pte. Ltd.	Investment in marine transportation for crude oil and petroleum product business	Singapore	100.00
TOP Maritime Service Co., Ltd.	Providing marine transportation services for crew and utilities in Gulf of Thailand	Thailand	55.00
LABIX Co., Ltd.	Linear Alkyl Benzene manufacturing and distribution	Thailand	75.00
TOP Venture Co.,Ltd.	Investment in Venture Capital (VC) Fund and/or Startup Business	Thailand	99.99
TOP Venture Hong Kong Limited.	Investment in Venture Capital (VC) Fund and/or Startup Business	Hong Kong	100.00
PT.Tirta Surya Raya	Distribution of solvent and petrochemical products in Indonesia	Indonesia	67.00
<i>Associates</i>			
Global Power Synergy Public Company Limited	Power generation	Thailand	24.29

Name of Entity	Principal Activities	Country of Incorporation	Effective Equity Interest (%)
PTT Digital Solutions Co., Ltd <i>(formerly PTT ICT Solutions Co., Ltd.)</i>	Information technology and communication services	Thailand	20.00
PTT Energy Solutions Co., Ltd.	Providing engineering technical consulting and other services	Thailand	20.00
Ubon Bio Ethanol Public Co., Ltd.	Ethanol production from cassava and sugar cane	Thailand	21.28
T.I.M. Ship Management Co., Ltd. <i>(formerly Thome Ship Management (Thailand) Co. Ltd.)</i>	Providing ship management service, consulting service and training in crew development, ship operation, technique and quality control	Thailand	33.33
Joint Ventures			
TOP-NYK MarineOne Pte. Ltd.	Providing marine transportation of crude oil products	Singapore	50.00
TOP-NTL Shipping Trust	Providing marine transportation of crude oil products	Singapore	50.00
TOP-NTL Pte. Ltd.	A trustee manager of TOP-NTL Shipping Trust	Singapore	50.00
TOP Nautical Star Co., Ltd.	Providing large vessels for storage and marine transportation of crude oil and petroleum products	Thailand	50.00
Other Related Party			
Thai Petroleum Pipeline Co., Ltd.	Pipeline transportation of petroleum products	Thailand	9.19
Sam Palung Social Enterprise Co., Ltd.	Support execution of social enterprise	Thailand	15.00

DESCRIPTION OF THE TREASURY CENTER

The Treasury Center was incorporated on October 3, 2017 as a limited liability company in Thailand with a registered and paid-up capital of THB10,000,000. Its registered office is at 555/1 Energy Complex, Building A, 11th Floor Vibhavadi-Rangsit Road Chatuchak, Chatuchak, Bangkok, Thailand. The Treasury Center is a direct wholly-owned subsidiary of the Company and its financial statements will be consolidated with the Company. No part of the equity securities of Treasury Center is listed or dealt in on any stock exchange and no listing or permission to deal in such securities is being or is proposed to be sought.

On November 21, 2017, the Treasury Center received a Treasury Center License (“**TC License**”) from the MOF allowing it to operate corporate treasury center business under the supervision of the MOF and Bank of Thailand. On February 5, 2018, the Treasury Center also qualified as an “international headquarters” for the Company and received the International Headquarters License (“**IHQ License**”) from the Revenue Department of Thailand.

On June 1, 2019, the Treasury Center replaced its IHQ license with an International Business Center License (“**IBC License**”), pursuant to regulatory changes from the Revenue Department of Thailand in order to avoid *potential adverse tax consequences*. The IHQ License brings additional tax benefits for taxes relating to an overseas capital gain which has no negative impact on the Treasury Center.

On June 6, 2019, the Extraordinary Board of Directors of The Treasury Center approved the company capital increase of THB946,200,000 with an initial paid-up capital 25%, amount THB 236,550,000. The Treasury Center currently has a registered capital of THB956,200,000 and paid-up capital of THB246,550,000.

On June 25, 2019, the Extraordinary Board of Directors of The Treasury Center resolved to establish TOP Ventures Company Limited and TOP Ventures Hong Kong Limited to engage in certain Corporate Venture Capital (CVC) transactions. The objective of this initiative is to provide a platform for Thai Oil to invest in new businesses in which we have the expertise to support change. TOP Ventures Company Limited and TOP Ventures Hong Kong Limited are 100% owned by the Treasury Center with a registered share capital of THB35 Million and 1 Hong Kong Dollar, respectively.

As a corporate treasury center, the Treasury Center performs the cash and liquidity management and foreign exchange risk management activities for the Company and its subsidiaries. As the “international business center” of the Company, the Treasury Center’s functions include providing financial management services and managerial and support services to the Company.

The Treasury Center’s Articles of Association provide that the board of directors is to be elected by shareholders. The Treasury Center’s Board of Directors is comprised of six members and, together with our senior management team, is responsible for the management of the Treasury Center’s business.

Name	Position
Ms. Pattaralada Sa-NGasang	Director
Ms. Torsang Chaipravat	Director
Ms. Rungtip Maneesarachun	Director
Mr. Pongpun Amornvivat	Director
Mr. Viroj Meenaphant	Director
Mr. Chatchai Siriwit	Director

BUSINESS

Overview

We are one of the leading integrated publicly listed refining and petrochemical companies in Thailand. We currently own and operate the largest single-site complex refinery in Thailand measured by nameplate capacity, which is integrated with our petrochemical platform. As of June 30, 2019, we had a refining nameplate capacity of approximately 275,000 bpd of crude oil and other feedstock, representing approximately 22.3% of the total refining nameplate capacity in Thailand, according to the EPPO. For the year ended December 31, 2018 and the six months ended June 30, 2019, our refinery processed crude oil and other feedstock representing approximately 25.1% and 24.4% of the total processed feedstock in Thailand for the period, according to the DOEB. As of June 30, 2019, we also had a petrochemical production nameplate capacity of approximately 838,000 tons per year, a hydrocarbon solvent production nameplate capacity of approximately 141,000 tons per year, a LAB production nameplate capacity of approximately 120,000 tons per year and a lube base oil nameplate capacity of approximately 267,015 tons per year. We are the principal refiner for the PTT Group. We believe we have a strong relationship with PTT, who is our major shareholder as well as the principal offtake customer for our refined petroleum and petrochemical products and our principal feedstock supplier. We also sell our refining and petrochemical products to other customers, both in Thailand and internationally.

We are organized into eight core business units: oil refinery, lube base oil refinery, petrochemical, power generation, marine transportation services, solvent, ethanol and other businesses. Our refinery, petrochemical and lube base oil business units are highly integrated, which allow us to achieve an overall higher margin for our business. See *“Management’s Discussion and Analysis of Financial Condition and Results of Operation—Key Metrics for Our Group—Gross Integrated Margin.”*

Our refined petroleum products include light products consisting of LPG, unleaded gasoline, gasohol and naphtha, middle distillates consisting of diesel and jet fuel, and heavy products in the form of fuel oil. The principal petrochemical products that we produce include paraxylene, benzene and LAB. Our lube base oil products include group 1 lube base oil, bitumen, slack wax and extract.

Our refinery, the Sriracha Complex, is located near the Laem Chabang deep sea port in Sriracha, Choburi Province, approximately 124 kilometers southeast of Bangkok, the capital city of Thailand. The strategic location of the Sriracha Complex provides our offtake customers access to a convenient product delivery network. This network allows our offtake customers to take delivery of our refined petroleum products efficiently and in a cost-effective manner via the connecting multi-product pipeline owned and operated by our related party, Thappline, as well as via ground transportation and coastal vessels.

We believe that our refinery is one of the most complex and efficient in the Asia-Pacific region. The Sriracha Complex currently has three CDUs, two CCRs, an ISOM, two HCU, a FCCU, a TCU, three HDTs, two HDSs, three HVUs and various supporting units that allow us to produce refined petroleum products that meet our customers’ requirements. Our various conversion units enable us to vary the output of our refinery and produce the blend of products which maximizes our gross refining margin, and provides us with significant flexibility in the use of feedstock. We are also capable of processing a wide range of crude oil, including crude oil from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand, although our choice of feedstock at any time depends on relative prices and yields. Our gasohol, gasoline and diesel products are compliant with the sulfur content requirements of the Euro IV standard and we believe we were the first refinery in Thailand to achieve this standard.

The feedstock for our refinery primarily comprises crude oil imported by PTT and other suppliers from the Middle East and other regions and sold to us through a combination of long-term purchase contracts and spot market purchases to allow us flexibility in obtaining crude oil. PTT has agreed to supply and we have agreed to purchase at prevailing market prices crude oil and other feedstock required to produce refined petroleum products representing at least 49.99% of our refining nameplate capacity, subject to certain conditions. PTT also has a priority right to supply to us at prevailing market prices crude oil and other feedstock in an amount up to 100% of our refining nameplate capacity, subject to certain conditions. Our SBM facilities allows us to receive crude oil and other feedstock directly from VLCC, thereby reducing our crude freight cost and increasing our feedstock offloading efficiency. We consumed approximately 105.1 million barrels, 107.7 million, 107.0 million barrels, 52.2 million barrels, and 50.6 million barrels for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019 respectively. In 2016, crude oil originally sourced from the Middle East, Asia (excluding Thailand), other foreign sources and locally accounted for, by volume, 79.0%, 9.8%, 3.2% and 8.0% of our total crude oil consumption, respectively. For the year ended December 31, 2017, crude oil

originally sourced from the Middle East, Asia (excluding Thailand), other foreign sources and locally accounted for, by volume, 74.6%, 7.5%, 10.1% and 7.8% of our total crude oil consumption, respectively. For the year ended December 31, 2018, crude oil originally sourced from the Middle East, Asia (excluding Thailand), other foreign sources and locally accounted for, by volume, 75.2%, 8.4%, 8.5% and 7.9% of our total crude oil consumption, respectively. For the six months ended June 30, 2018, crude oil originally sourced from the Middle East, Asia (excluding Thailand), other foreign sources and locally accounted for, by volume, 77.7%, 8.5%, 6.4% and 7.4% of our total crude oil consumption, respectively. For the six months ended June 30, 2019, crude oil originally sourced from the Middle East, Asia (excluding Thailand), other foreign sources and locally accounted for, by volume, 74.0%, 6.2%, 14.1% and 5.7% of our total crude oil consumption, respectively.

Our petrochemical business is carried out through our wholly-owned subsidiary, Thai Paraxylene and our 75.0%-owned joint venture company, LABIX Co., Ltd. (“**LABIX**”), while our lube base oil business is carried out through our wholly-owned subsidiary, Thai Lube Base. We also engage in the power generation business through our 73.99%-owned subsidiary, Thailoil Power, our wholly-owned subsidiary, TOP SPP Co., Ltd. (“**TOP SPP**”) and our associate company, GPSC, in which we currently hold an effective interest of 24.29%. See “—Our Business Units and Products—Power Generation—GPSC” and “—Our Business Units and Products—Power Generation—TOP SPP Company Limited.” Our solvent business is carried out through our wholly-owned subsidiary, Thailoil Solvent. Our marine transportation services business is carried out through our wholly-owned subsidiary, Thailoil Marine. We have also entered into the alternative energy business through our wholly-owned subsidiary, Thailoil Ethanol, through which we hold interests in various businesses producing cassava-based ethanol, molasses-based ethanol, starch and electricity from biogas. In the year ended December 31, 2016, our refining business, lube base oil business, petrochemical business, power generation business, marine transportation services business, solvent business, ethanol business and other businesses contributed 64.6%, 6.1%, 17.6%, 7.3%, 0.8%, 2.4%, 0.9% and 0.3% of our EBITDA (before eliminating intra-Group sales), respectively, in the year ended December 31, 2017, 66.3%, 7.3%, 15.0%, 7.7%, 0.4%, 1.9%, 1.3% and 0.2% of our EBITDA (before eliminating intra-Group sales), respectively, in the year ended December 30, 2018, 49.4%, 7.1%, 27.0%, 13.0%, 0.4%, 2.1%, 0.7% and 0.2% of our EBITDA (before eliminating intra-Group sales), respectively, in the six months ended June 30, 2018, 69.4%, 6.1%, 13.9%, 8.0%, 0.3%, 1.7%, 0.5% and 0.1% of our EBITDA (before eliminating intra-Group sales), respectively, and in the six months ended June 30, 2019, 51.9%, 5.9%, 24.0%, 13.4%, 0.5%, 2.6%, 0.8% and 0.8% of our EBITDA (before eliminating intra-Group sales), respectively.

The following table sets out the EBITDA of our various business units in the years ended December 31, 2016, 2017, and 2018 and the six months ended June 30, 2018 and 2019.

	For the year ended December 31,				For the six months ended June 30,		
	2016	2017	2018	2018	2018	2019	2019
	THB	THB	THB	(in millions of) US\$	THB	THB	US\$
Business Unit							
Oil Refining	21,139.8	24,507.9	10,049.9	326.9	11,614.5	4,704.6	153.0
Lube Base Oil	2,004.2	2,694.5	1,447.4	47.1	1,017.0	532.5	17.3
Petrochemical	5,748.9	5,527.5	5,486.4	178.5	2,319.9	2,178.4	70.9
Power Generation	2,388.4	2,831.8	2,652.7	86.3	1,342.4	1,212.5	39.4
Marine Transportation Services	263.9	152.6	78.4	2.6	52.2	46.5	1.5
Solvent	792.7	689.8	436.5	14.2	277.3	236.7	7.7
Ethanol	296.4	468.4	143.1	4.7	83.4	76.8	2.5
Others	86.5	65.1	40.2	1.3	20.9	72.0	2.3
Eliminations ⁽¹⁾	(46.1)	(12.9)	(96.2)	(3.1)	(31.1)	(99.3)	(3.2)
Total EBITDA ⁽²⁾	32,674.8	36,924.7	20,238.5	658.4	16,696.3	8,960.9	291.5

Notes:

(1) Eliminations relate to intra-Group sales.

(2) EBITDA means earnings for the period excluding income tax expense, finance costs and depreciation and amortization.

Competitive Strengths

We believe that we have the following competitive strengths:

Thailand’s Largest and One of the Region’s Most Advanced and Competitive Refineries

We currently own and operate the Sriracha Complex, the largest single-site complex refinery in terms of nameplate capacity in Thailand with a refining nameplate capacity of approximately 275,000 bpd of crude oil and

other feedstock as of June 30, 2019, representing approximately 22.3% of the total refining nameplate capacity according to the DOEB.

We believe our refinery, which is integrated with our petrochemical platform, is one of the most complex refineries in the Asia-Pacific region, with an average complexity of 9.8 based on our internal estimates using the methodology of the Nelson Complexity Index as of June 30, 2019. The Nelson Complexity Index measures a refinery's upgrading capability, with the ratio representing the complexity of barrels divided by crude distillation nameplate capacity.

Our plants have the ability to process a variety of crude and feedstock, reducing our dependence on any given type of feedstock. This allows us to achieve efficient production, thus minimizing both logistics costs and product wastage throughout the production chain. We also benefit from our ability to produce higher value-added petrochemical products instead of selling those products in their intermediate stage at lower margins to the market. For example, we have been able to utilize the platformate generated in our oil refinery to produce petrochemical products, including paraxylene and benzene during periods where the market prices for such products yielded higher margins than other products.

We believe our technologically superior plant enables us to produce a more favorable products slate, with a focus on the more profitable middle distillates and less on heavy oils which have lower profit margins. We believe we also enjoy a high upgrading to refining capacity ratio, as demonstrated by our internally estimated Nelson Complexity Index rating of 9.8 as of June 30, 2019, and are able to efficiently produce quality petroleum products to meet changing demands in the domestic and export markets.

While our various units and plants are integrated with each other, they can also operate independently, allowing us the ability to adjust our production proportions according to market conditions, as well as to more efficiently manage our maintenance schedules to minimize the impact to our operations. We have three CDUs, which allow us to co-ordinate the maintenance of the CDUs without needing to halt our refining process. Therefore, our plants have been able to maintain higher utilization rates than other plants in the market. For example, the capacity utilization rate of our refinery was 108.3%, 112.4%, 112.6% for the years ended December 31, 2016, 2017 and 2018, respectively, and 110.3% and 109.5% for the six months ended June 30, 2018 and 2019.

We believe that as a result of our operational strength, we are able to maintain our position as Thailand's principal petroleum refiner. According to DOEB, for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, we supplied 29.1% and 29.1%, 28.9%, 28.4% and 28.0%, respectively, of Thailand's domestic demand for refined petroleum products, excluding LPG.

Diversified Earnings through Integration with, and Stable Contribution from, our Subsidiaries

In order to diversify our business beyond oil petroleum refining, which is heavily affected by commodity pricing, we have expanded our operations to a broad range of downstream products including petrochemical products, lube base oil and its by-products, solvent products, surfactants and ethanol, and related derivative products which in many cases enjoy higher profit margins. We benefit from our diversified portfolio of businesses and products. We believe this diversification enables us to reduce our dependence on any one product. This allows us to reduce earnings volatility and increase operating margins. In addition, we have also invested in support businesses, including marine and pipeline transportation, power production and energy services. We believe that the ability to produce or provide many of the services required for our businesses further allows us to reduce the volatility of the price at which we can procure these, thus improving our operating margins.

Strategic Relationship and Operational Integration with PTT as PTT Group's Principal Refiner

PTT, a Thai state-owned entity and Thailand's national oil company, is a long-term shareholder with a 48.03% interest in our Company. According to DOEB, approximately 41.8% and 45.1% of the total refined petroleum products sold in Thailand for 2017 and 2018, respectively, and approximately 41.9% of the total refined petroleum products sold in Thailand for the six months ended June 30, 2019, was sold by PTT. PTT purchases a substantial portion of its requirements at prevailing market prices from us. For the years ended December 31, 2017 and 2018, and for the six months ended June 30, 2019, PTT purchased approximately 144,062.0 bpd, 148,447.1 bpd and 154,084.7 bpd of retail refined petroleum products from us, respectively. As the domestic demand for refined petroleum products grows, PTT's requirements are also expected to increase. See “—Our Business Units and Products—Oil Refining—Oil Refining—Sales.”

We are the PTT Group's principal refiner. We believe that PTT's dual role as our major shareholder and key business partner has resulted in a mutually beneficial business partnership covering, amongst others, crude oil production and product offtake. We also enjoy operational synergies as part of the PTT Group, including the reduction of freight costs in the purchase of larger quantities of crude oil and other feedstock and the transfer of knowledge and shared services. This includes our joint investment in PTES and PTT DIGITAL, which were established by the PTT Group to provide engineering technical consultation and IT and communication services to the PTT Group and to develop expertise to serve external clients, and through close management collaboration and the secondment of trained staff between PTT and us. We are also able to take advantage of PTT's expertise and contacts. For example, we have been able to obtain crude oil that is originally derived from sources which would otherwise not be available to us.

Strategic Location of Our Plants with Competitive Advantages in Access to Key Markets

Our plants are located within the Sriracha Complex. Our SBM provides direct access to deep water ports, and the ability to receive crude oil and other feedstock directly from VLCC, thereby enabling us to reduce freight costs and increase feedstock offloading efficiency. This strategic location provides us with key competitive advantages as it puts us in close proximity with the key domestic markets such as Bangkok, and a number of our key suppliers and customers in other parts of Thailand. We also enjoy available connections to delivery networks such as multi-product pipelines, including Thapline, a major pipeline operator, which transports a substantial portion of our products. This allows us to minimize feedstock and product transportation costs, enabling us to receive feedstock from our suppliers and deliver end-products to our customers in a timely and cost-effective manner.

Industry with High Natural Barriers to Entry and Strong Market Positioning

Although there are no regulatory barriers preventing new entrants from entering the Thai refining market, the significant investments required in the construction of a new refinery, as well as the long lead times which would be required before the new refinery becomes operational, means that the oil refinery industry is one with high natural barriers to entry. Furthermore, we distribute our products to various long term customers under long term contracts, including PTT, with whom we have guaranteed offtake arrangements. We believe our long-term customers and offtake relationships place us in an advantageous position compared with any new competitors.

Technological Superiority, Logistical Advantages and Cost Leadership

We believe that we benefit from our technological superiority, logistical advantages and cost leadership. We actively partner with industry leaders and pursue our own research and development initiatives to improve our technologies. Since May 2008, we have signed three memoranda of understanding to collaborate with the Petroleum and Petrochemical College ("PPC") and Chulalongkorn University to establish a 275-square meter research and development center located in the PPC. Our research and development initiatives have helped us improve our operations. For example, we successfully improved the preheat train mechanism for our CDU-3 based on results from our research and development projects. To date, the know-how and experience made available to us has allowed us to develop and operate a complex refinery without large expenditures on research and development. In July 30, 2014, we also entered into an agreement with the National Science and Technology Development Agency to establish a research and development center, which will focus on research relating to products development and operations. See "*Technological Support*."

We also enjoy logistical advantages provided by our wholly-owned subsidiary, Thail Marine. As of June 30, 2019, through Thail Marine, we own four chemical tankers and one LPG tanker with a combined capacity of 22,777 deadweight tons. We also operate other oil and petrochemical transportation units, crew and utility boat services and ship management services through our other subsidiaries, associates and joint ventures, such as TOP Maritime Service Co., Ltd., Thail Marine International Pte. Ltd., TOP Nautical Star Co., Ltd., TOP-NTL Shipping Trust and T.I.M. Ship Management Co., Ltd. We aim to become a fleet leader for PTT Group and in Asia to support the growing petroleum and petrochemical market by expanding our fleet size. We believe our expansion plans will provide us with logistical advantages over our competitors.

In addition, we believe our feedstock slate is more flexible than those of our competitors' that have less complex refineries and plants. Our refinery and production units are therefore able to take advantage of more cost-effective feedstock, as well as changes in market conditions, and we are able to benefit from optimization of our product mix and incremental gross margin opportunities for our refinery and production units. As our core business units become more integrated, we are able to share our costs and lower our cost required to process each barrel of feedstock. Our average integrated cash costs were US\$2.4/bbl, US\$2.1/bbl, and US\$2.4/bbl for the years

ended December 31, 2016, 2017 and 2018, respectively, and US\$2.2/bbl and US\$2.7/bbl for the six months ended June 30, 2018 and 2019, respectively.

Highly Experienced Management Team

Our senior management team is highly experienced and has a proven track record in the refining and petrochemical related industries. The most senior members of our executive management as of June 30, 2019, Mr. Atikom Terbsiri, Mr. Bandhit Thamprajamchit, Mr. Chatapong Wungtanagorn, Ms. Pattaralada Sa-Ngasang, Mr. Surachai Saengsamran and Mr. Viroj Meenaphant, have an average of over 30 years of experience in the Thai refinery and petrochemical related industries and within the PTT Group.

Strong Financial Profile

Our liquidity is supported by solid cash flow generation and good access to capital markets and banks. We generated EBITDA of THB32,674.8 million, THB36,924.7 million, THB20,238.5 million (US\$658.4 million), THB16,696.3 million and THB8,960.9 million (US\$291.5 million) for the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019 respectively. As of June 30, 2019, 82.0% of our total debt was in the form of debentures with an outstanding principal amount of THB81,715.6 million (US\$2,658.3 million) while 16.1% was in the form of long-term borrowings with an outstanding principal amount of THB16,024.8 million (US\$521.3 million).

Short-term borrowings of THB1,856.5 million (US\$60.4 million) accounted for 1.9% of our total debt, while about 63.2%, or THB62,957.6 million (US\$2,048.1 million) had a maturity beyond five years as of June 30, 2019. We held cash and cash equivalents and short-term investments of THB93,858.2 million (US\$3,053.3 million) as of June 30, 2019 compared with THB3,157.3 million (US\$102.7 million) of debt maturing by June 30, 2020.

Our EBITDA interest coverage ratio, where interest coverage is equal to EBITDA for any period divided by finance costs during such period, stood at 9.4 times, 11.2 times, 5.1 times, 9.1 times and 3.7 times as of December 31, 2016, 2017, and 2018, and as of June 30, 2018 and 2019, respectively. We adopt a conservative treasury policy of capping net debt divided by EBITDA at under 2.0 times and net debt divided by equity at under 1.0 times. Net debt, or total interest bearing debt net of cash and cash equivalents and current investments, divided by EBITDA stood at 0.5 times, (0.04) times, (0.01) times, (0.09) times and 0.6 times as of December 31, 2016, 2017, 2018, June 30, 2018, and June 30, 2019, respectively. Net debt divided by equity stood at 0.1 times, (0.01) times, (0.00) times, (0.01) times and 0.04 times as of December 31, 2016, 2017, and 2018, and as of June 30, 2018 and 2019, respectively. See “*Selected Consolidated Financial and Other Data.*”

Strategy

Our vision is to become a leading fully integrated refining and petrochemical company in the Asia-Pacific region. We intend to accomplish this goal by executing the following strategies:

Enhance Competitiveness of Existing Core Businesses through Operational Synergies and Operational Efficiencies

To enhance the benefits we enjoy from the integration of our refining, petrochemical and lube base oil units, we have developed initiatives to increase our performance and capabilities in order to further enhance our reliability, efficiency and flexibility. We have budgeted for investments in certain projects which will increase our cracking capacity, plant reliability and efficiency, emission enhancement as well as projects targeted at reducing energy use. For example, in 2015, we completed the energy efficiency improvement programs at our CDU-3 and propane deasphalting unit. This generated greater volumes of gasoline, TDAE, TRAE and MES and helped to streamline inventory management.

Given the nature of these projects, which are mainly related to the upgrading of our existing facilities, we believe that these investments permit us to achieve our operational objectives in a manner that is more cost-efficient than undertaking new constructions, hence providing better relative return. In addition, we are undertaking a number of other projects to enhance our performance and capabilities. For example, we are installing a real-time optimization system in our utility units to optimize efficiency in our steam and electricity production units, which we expect will lower our energy consumption. We believe that with these projects, we would be able to improve the competitiveness of our refinery, including in terms of availability of refining capacity, utilization, non-energy cash cost.

In addition, we continue to pursue the hydrocarbon management review program (the “**HMR Program**”), which focuses on identifying opportunities to maximize our gross refining margin through better feedstock selection, improved operation of process units, enhanced use of hydrocarbon streams, improved supply and planning processes, and the exploration of new product specifications and new markets in order to improve our gross profit. The HMR Program will help us further enhance our profitability.

Upgrade of Refineries and Production Plants to Capitalize on Higher Margin Products

In order to better capture market demand and increase our margins, we have also been focusing on shifting the capacity of our refinery, petrochemical and lube base oil plants towards the production of specialty products and other downstream products. Our lube base oil unit has also produced a special grade rubber oil which has been exported to the tire market in Europe since 2011. In 2012, we completed the construction of the PXMax unit at our petrochemical plant, enabling us to increase the output of paraxylene and benzene products, which generally enjoyed higher profit margins, by further converting the lower value product toluene. The major turnaround of our CDU-3 in 2014 allowed us to increase our production of the more profitable middle distillates. At present, we have a number of projects under studies focusing on, among others, the upgrading of refineries and production plants in order to produce higher value products from low-value fuel oil, as well as the expansion of our solvent nameplate capacity.

Enhance Growth through Geographic Expansion to Develop New Markets and Collaboration with Our Customers

One of our key strategies is to expand our business into new geographical locations. We believe that there are significant opportunities to expand our businesses to take advantage of the strong growth prospects in Southeast Asia, whether through the marketing of our products or by seeking opportunities to enhance, upgrade or co-invest in refining, petrochemical or lube base oil related projects with strategic partners. In particular, we are investigating investment opportunities in Indonesia, Vietnam and Myanmar, which generally have high energy demand. We also believe that the implementation of the ASEAN Economic Community will help provide opportunities for us to competitively access the demand for petrochemical products in Southeast Asia more broadly by eliminating import tariffs for trade amongst the ASEAN countries. We also intend to expand the sales of our products into Indochina where we believe our geographical location provides us with an advantage over other exporters in the region, and into China and other developing markets to capture the high demand for lube base oil and solvent products. We will also seek to co-operate with PTT and our other customers to work with their plans to expand retail markets activity into these new geographical areas.

Develop and Promote New Product Offerings to Diversify and Ensure Sustainable Growth

We actively seek to expand our product offerings across our various business units, to capture new product areas which we anticipate growth in demand, to diversify our operations from petroleum refining which is heavily affected by commodity pricing, as well as to introduce new products with higher margins into our product mix. We believe this will enhance our competitiveness by improving our ability to adapt to future developments in product demand, as well as further integrating our refinery and petrochemical units, while potentially providing us with higher returns from new attractive products. Examples of such prospective products include cleaner petroleum oil products that comply with the Euro IV standards, higher-quality lube base oil, specialty lube base by-products, green solvent and ethanol derivatives. Within our lube base oil business unit, we are focusing on developing new specialty products with a higher value including paraffin wax, modified asphalt, premixed / colored asphalt and TDAE, which occupy niche markets and we expect to see growth in demand due to their use in new applications. We also intend to expand our solvent products to include water-based solvent and monomers, and also to co-operate with the PTT Group to develop specialty solvent products to capture the rapid growth in demand for such products in Asia. We have expanded into alternative energy through our ethanol productions, to take advantage of governmental regulations encouraging the development of alternative energy sources, investing in MCE in 2006, Sapthip in 2010 and UBE in 2011. In 2013, through our wholly-owned subsidiary, Thai Paraxylene, we and Mitsui jointly established LABIX. As of June 30, 2019, Thai Paraxylene and Mitsui owned 75.0% and 25.0%, respectively, of LABIX. LABIX is a pioneer producer of a type of benzene derivatives called linear alkyl benzene (“**LAB**”) in Thailand. LAB is a key ingredient used in the detergent business. We believe that LABIX’s production of LAB in Thailand will reduce LAB imports and allow the export of LAB from Thailand to Southeast Asian markets. LABIX completed construction of the first fully integrated LAB plant in Southeast Asia and commercial production of LAB was commenced on February 25, 2016. We also diversify our operations by developing our business operations that are less susceptible to commodity prices, such as power generation. For example, TOP SPP’s two small power plants which had commenced commercial

operations on April 1, 2016 and June 1, 2016, respectively. The small power plants have strengthened our power generation capacity. TOP SPP has sales arrangements with EGAT in relation to electricity to be produced from its small power plants. Under a power purchase agreement between TOP SPP and EGAT, 180MW of electricity will be sold to EGAT (90MW from each of the two small power plants). We also hold interest in our associate company, GPSC, a power generation company in Thailand. Our share of profit from GPSC amounted to THB655.8 million in 2016, THB771.1 million in 2017, THB815.9 million in 2018, THB479.4 million in the six months ended June 30, 2018 and THB491.5 million in the six months ended June 30, 2019.

We are internationally recognized for our performance towards sustainability. For seven consecutive years, 2013 to 2019, we were recognized as a member of the Dow Jones Sustainability Indices (“**DJSI**”). In addition, RobecoSAM, DJSI’s assessor, awarded us with the silver class level of the Robeco SAM Sustainability Award in 2018.

Recent Developments

Sriracha Transport and Logistics System Development Project

In August 2014, we and PTT launched the joint investment in a transport and logistics system development project, which comprises of two sub-projects.

The first project is jet fuel and paraxylene distribution system enhancement. The project aims to increase the distribution channel of jet fuel to the Chonburi Terminal and paraxylene to the Sriracha Petroleum Terminal for offloading to 10,000 ton cargo ships, and to reduce shipment cost by modifying the existing pipeline system. The project of paraxylene distribution to the Sriracha Petroleum Terminal was completed in January 2017. The modification of the existing pipeline system increased our paraxylene distribution to the fully utilized rate of 25,000 tons per month.

The second project is lorry loading capacity expansion. The project started commercial operation in March 2017 and has increased our petroleum product distribution (delivery by truck) from 10 million liters per day to 15 million liters per day to meet market demands and has increased the efficiency and flexibility of the distribution of our petroleum products.

In addition, we have another distribution system development project, which is the extension of the jetty. The project is expected to improve product distribution flexibility and reliability in order to support our new products and our future growth. Both projects were completed in early 2019.

New Crude Tank Project for Refinery Stability

Our Board of Directors has approved the study for the potential acquisition of new crude tanks for storing legal reserve, the amount of which had been changed in line with the revised Fuel Trade Act, and for enhancing the stability in refining to ensure constant production and strong competitiveness. As a result, we plan to build five crude tanks. New crude tanks in this project have been commissioned since early 2019.

Sriracha Office Relocation Project

In order to maximize the efficiency and utilization of the Sriracha site, enhance production safety and security and accommodate future business expansion, we are preparing for the relocation of our office, the product testing laboratory and the engineering and warehouse building. The new office buildings are divided into three building groups, namely, group 1 consisting of office and product testing laboratory; group 2 consisting of the engineering and warehouse building; and group 3 consisting of entrance control and the security office. The project is currently at the stage of construction and is expected to complete in 2019.

Solvent Distribution Center in Vietnam

On December 6, 2017, the Board of Directors of TOP Solvent (Vietnam) LLC approved the establishment of a new solvent distribution center in Haiphong, Vietnam. We expect the project to expand our market reach and to better serve customers in Northern Vietnam. The project commenced operations in early 2019.

New Solvent Subsidiary in Indonesia

On May 31, 2019, the board of directors' meeting of TOP Solvent Company Limited, an indirect subsidiary of the Company, resolved to approve TOP Solvent to purchase 67% shares of PT. Tirta Surya Raya (TSR), domiciled in Indonesia, for an amount of up to US\$1.5 Million. The share purchase was completed in September 2019. We expect the project to expand TS's solvent distribution in Indonesia.

Clean Fuel Project

On June 29, 2018, our board of directors approved the investment of approximately US\$4,825 million in the Clean Fuel Project (the "**CFP**"). CFP was subsequently approved at extraordinary shareholders' meeting on August 27, 2018. CFP involves the construction of new production units, with the aim of improving our production and energy efficiency, oil refining capacity and refining capabilities, and reducing environmental impact. As part of the project, we plan to construct distillation units with a higher refining capacity to replace the current distillation units, which will result in an increase in our refining capacity from 275,000 barrels to 400,000 barrels per day and will improve the average complexity of our refinery from 9.8 to 12.0, based on our internal estimates using the methodology of the Nelson Complexity Index. We expect the higher refining capacity to increase our economies of scale and enable our refineries to handle more types and greater quantities of crude oil. By improving the performance of our production process, we expect to increase our capacity to refine heavy crude oil, which is normally cheaper than light crude oil that we currently refine, thereby reducing our raw material cost. CFP will also increase our capacity to produce lighter distillates that tend to have higher margins, such as LPG, naphtha and gasoline. Light distillates currently constitute approximately 28% of our petroleum products and are expected to comprise approximately 50% of our petroleum products after CFP is completed.

The scope of CFP is comprised of the construction of six groups of production units as follows:

Group 1: Hydrocracking Unit (HCU-3) and Residue Hydrocracking Unit (RHCU), which are distillation units that add value to our products by converting fuel oil to middle distillates, such as jet, gasoline and diesel, in accordance with the Euro 5 Standard. As compared to fuel oils, middle distillates are lighter oils with lower sulfur content, are of higher quality and are more environmentally friendly.

Group 2: Crude Distillation Unit (CDU-4), which has a higher refining capacity of 220,000 barrels per day and will replace CDU-1 and CDU-2, and the High Vacuum Unit (HVV), which distills crude oil and long residues from the residues of crude oil distillation columns and processes it with fractional distillation prior to feeding it to other units.

Group 3: Hydrogen Manufacturing Unit (HMU-3 / PSA-4), which produces hydrogen for use in other production units.

Group 4: Hydro Treating Unit (HDT-4) and Hydro De-sulfurization Unit (HDS-4), which extract sulfur content from gasoline and diesel, respectively.

Group 5: Sulphur Recovery Unit (SRU), which extracts sulfur from various types of oil, which can be distributed in the form of liquid sulfur or converted into solids for export purposes.

Group 6: Energy Recovery Unit (ERU), which extracts the residual products from the RHCU for use as fuel for generating electricity, all of which will be used in the production units of CFP. The ERU will have an installed capacity of 250 MW.

In addition to the construction of the foregoing production units, we will build necessary utility units, such as wastewater treatment systems, raw water ponds, crude oil and products storage tanks, and pipelines for transportation of crude oils and products.

In May 2018, we entered into a memorandum of understanding with PTT for the sale to PTT of our increased production as a result of CFP. The products to be sold to PTT will include liquefied petroleum gas, unleaded gasoline, base gasoline, jet fuel, diesel, fuel oil and bitumen. We will sell these products to PTT at market prices on an arm's length basis. Pursuant to the memorandum of understanding, PTT will nominate the types and quantities of our refined petroleum products that it requires, representing at least 49.99% of our refining nameplate capacity.

CFP will be constructed on the same plots of land as our existing oil refinery, and we leased the land from the Ministry of Finance of Thailand under a 30-year lease expiring in September 2022. In August 2018, we extended the lease term for an additional 30 years from September 2022 to September 2052.

We engaged an EPC contractor for CFP in October 2018. Construction has commenced in November 2018 and we expect it to be completed by the first quarter of 2023.

The 2019 Annual General Meeting of Shareholders held on April 10, 2019, the shareholders resolved to approve the disposal of assets to transfer ownership in the Energy Recovery Unit (ERU) which is a part of the CFP and the execution of the Relevant Agreements including the asset sale and purchase agreement, fuel and utilities supply agreement, power purchase agreement, operation and maintenance services agreement and land sub-lease agreement as well as the novation agreement with Global Power Synergy Public Company Limited (GPSC) or wholly owned subsidiary of GPSC (ERU Project). The ERU Project has significant aims to reduce investment costs of the CFP, enhance liquidity and efficiently support future investment; furthermore, the transaction will boost the return on investment of the CFP while the Company can continue to manage and oversee the implementation of the CFP and ERU during the construction phase and the operation phase in respect of the safety, reliability and plant optimization of the projects as originally planned. We believe that CFP will be highly beneficial to our competitiveness in the oil refinery industry and to Thailand's energy security. The new refineries to be constructed will be equipped with advanced technologies that are more energy efficient and consume more renewable energy. We expect to increase the capacity to refine heavy crude oil, which can help reduce the cost of oil refining and help enable us to accept supplies of crude oil from more varied sources, reducing our dependency on certain suppliers.

Under the CFP Project, we will expand our production of gasoline, diesel, jet and naphtha. Having the capability to convert fuel oil into jet, gasoline and diesel may help increase our revenue, as these environmentally-friendly oil products typically yield higher prices, and it will also help us respond to the expected decline in the use of fuel oil in the shipping industry from 2020 onwards. In addition, the CFP Project will help enable us to produce more light and heavy naphtha, which are raw materials used in the petrochemical industry. The improvement in our production capacity and the range of our oil products, will help reduce Thailand's dependency on imported products, especially jet and gasoline, in line with the government's policies regarding the consumption of domestic crude oil. We will produce less gasoil and fuel oil, which tend to be oversupplied in Thailand.

Capital increases in GPSC

In July 2019, Board of Directors passed a resolution on the provision of support to Global Power Synergy Public Company Limited ("**GPSC**") for its plan to increase its registered capital. The Company holds, directly and indirectly, an ownership stake of 24.29% in GPSC. The Company directly holds an 8.91% stake in GPSC, and Thailoil Power Company Limited ("**TP**"), a 73.99% owned subsidiary of the Company holds a 20.79% stake in GPSC. Each of the Company and TP will subscribe such shares in proportion of their shareholding under the rules and conditions of GPSC on the subscription of the capital increase. This resolution for subscription is one of the strategic moves for the power business portfolio of Thailoil and Subsidiaries.

Our Business Units and Products

We are organized into eight core business units: oil refining, lube base oil, petrochemical, power generation, marine transportation services, solvent, ethanol and other businesses.

Oil Refining

Our oil refining business unit is the most important business unit of our Group. We generated revenues of THB283,293.2 million, THB349,828.8 million, THB405,130.6 million (US\$13,179.3 million), THB195,120 million and THB189,630 million (US\$ 6,168.8 million) from our refining business unit (before eliminating intra-Group sales) in the years ended December 31, 2016, 2017, and 2018 and for the six months ended June 30, 2018 and 2019, respectively. For the year ended December 31, 2018, revenues from this business unit (before eliminating intra-Group sales) accounted for 78.1% of our Group's revenues. Our revenues from our oil refining business unit are generated principally from the sale of our refined petroleum products, in particular diesel and gasoline, which represented 45.5% and 20.7%, respectively, of our revenue from this business unit for the year ended December 31, 2016, 44.0% and 20.7%, respectively, of our revenue from this business for the year ended December 31, 2017, 44.0% and 18.4%, respectively, of our revenue from this business for the year ended December 31, 2018, 45.0% and 18.4%, respectively, of our revenue from this business for the six months ended

June 30, 2018, and 47.2% and 18.7%, respectively, of our revenue from this business for the six months ended June 30, 2019.

We own and operate an advanced refinery in the Sriracha Complex. This is the most important asset of our Group. We believe that our refinery is one of the most complex refineries in the Asia-Pacific region, with an average Nelson Complexity Index rating of 9.8 based on our internal estimates as of June 30, 2019. Our refinery's configuration allows us to process a variety of crude oil, while still producing high-value, clean fuels. The configuration is oriented towards maximizing middle distillates (through hydrocracking) and re-directing reformat to produce petrochemical products at our petrochemical facilities. We also believe that we were the first refiner in Southeast Asia to produce fuels which are compliant with the sulfur content requirements of the Euro IV standard. Generally, as the feedstock slate is more complex and flexible, the refinery is better positioned to take advantage of the more cost effective crude oils, resulting in incremental gross margin opportunities for the refinery. We seek to maximize revenue from gasoil products by adjusting production to capture the domestic price premium of the various products. See "*Oil Refining—Pricing*." We also maximize platformate production, which our wholly-owned subsidiary Thai Paraxylene uses to produce paraxylene, in order to capture the higher margin downstream petrochemical products.

We are the principal refiner of the PTT Group. For the years ended December 31, 2016, 2017, and 2018, and for the six months ended June 30, 2018 and 2019, PTT and PTTOR purchased 43.2%, 40.2%, and 40.9% and 40.0% and 42.4%, respectively, in terms of sales volume, of our refined petroleum products. Our products constituted approximately 50.0%, 48.9%, 45.4%, and 44.8% and 46.4% of PTT's refined petroleum product requirements for the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 20, 2018 and 2019, respectively.

Our refinery produces a wide range of refined petroleum products. Our products include light distillates consisting of LPG, unleaded gasoline, gasohol and naphtha; middle distillates consisting of diesel and jet fuel; and heavy distillates in the form of fuel oil and long residue. For the years ended December 31, 2016, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, light distillates accounted for 32.6%, 32.5%, and 33.6%, and 34.3% 32.8% of our sales volume, respectively, and middle distillates accounted for approximately 56.5%, 56.2%, and 53.8%, and 53.1% and 54.4% of our sales volume, respectively. For the same periods, heavy distillates, which are our lowest margin products, accounted for approximately 10.8%, 11.3%, and 12.6%, and 12.5% and 12.9% of our sales volume, respectively.

Oil Refining—Intake Capacity and Capacity Utilization Rates

Our refinery is capable of refining crude oil into various intermediate and downstream products, including feedstock for captive consumption by our other business units. Our refinery had a total refining nameplate capacity of approximately 275,000 barrels of crude oil feed per day as of June 30, 2019, which accounted for approximately 22.3% of Thailand's total refining nameplate capacity according to the EPPO, making us the largest refiner in Thailand. For the year ended December 31, 2018, and the six months ended June 30, 2019, we processed crude oil and other feedstock representing approximately 25.1% and 24.4% of the total processed feedstock in Thailand for the period, according to the DOEB.

We measure the capacity utilization rate of our refinery, or crude distillation rate, based on the refinery's crude input divided by its nameplate capacity. In any given year, our capacity utilization rate may exceed 100% as a result of efficiency and operational improvements, while operational disruptions and shutdowns, both planned and unplanned, may result in a reduction in the rate.

For the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, our refinery's capacity utilization rate was 108.3%, 112.4% 112.6%, 110.3% and 109.5%, respectively. The increase from 2016 to 2017 was due to an increase in feedstock volume to capture the high spreads of petroleum products. The increase in our capacity utilization rate for the year ended December 31, 2018 compared to that for the year ended December 31, 2017 was due to an increase in the average selling price as a result of an increase in crude oil prices sales volumes. Our capacity utilization rate for the six months ended June 30, 2018 decreased from the utilization rate in the six months ended June 30, 2019 mainly because of a decrease in sales revenue owing to lower sales volumes and lower average selling prices.

Oil Refining—Feedstock

The main raw material used in our refinery is crude oil. We are capable of processing a wide range of crude oil, including crude oil from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand,

and our choice of feedstock at any time depends on relative prices and yields. The feedstock for our refinery primarily comprises crude oil imported by our suppliers and sold to us through a combination of long-term purchase contracts and spot market purchases to allow us flexibility in obtaining crude oil. We take delivery of foreign sourced crude oil via waterborne delivery and domestically sourced crude oil via railway and waterborne delivery. Our SBM facilities allow us to receive crude oil and other feedstock directly from VLCC, thereby increasing our feedstock offloading efficiency.

We consumed approximately 52.4 million barrels and 50.6 million barrels of crude oil for the six months ended June 30, 2018 and 2019, respectively, and 107.1 million barrels and 107.7 million barrels of crude oil for the years ended December 31, 2018 and 2017, respectively. For the six months ended June 30, 2019, we consumed crude oil originating from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand, which accounted for, by volume, 74.0%, 6.2%, 14.1% and 5.7% of our total crude oil purchases, respectively. For the six months ended June 30, 2018, we consumed crude oil originating from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand, which accounted for, by volume, 77.7%, 8.5%, 6.4% and 7.4% of our total crude oil purchases, respectively. In the year ended December 31, 2018, we consumed crude oil originating from the Middle East, Asia (excluding Thailand), other foreign sources and Thailand, which accounted for, by volume, 75.2%, 8.4%, 8.5% and 7.9% of our total crude oil purchases, respectively. See “*Risk Factors—Risks Relating to Our Business—We are dependent on foreign sources for our supply of crude oil and other feedstock, in particular from the Middle East, and any disruption in our supply of crude oil and other feedstock could reduce our margins and materially adversely affect our results of operations*”.

Depending on the crude oil market outlook, including market prices and the availability of crude oil, we generally procure approximately 50% of our crude oil from PTT pursuant to the product offtake and crude oil supply agreement (the “**POCSA**”) and the remaining 50% from various other suppliers such as BP Singapore Pte. Ltd. (“**BP**”), Shell or Exxon using term contracts or spot purchases. A majority of imported crude oil is purchased under a 30-day open account basis (from bill of lading date), which is the market practice. We also procure Thai crude oil and condensate from PTT on a 30 days open account basis.

We have entered into the POCSA with PTT through which we purchase from PTT foreign or domestic crude oil and other feedstock which they have sourced. Pursuant to the POCSA, PTT has agreed to supply and we have agreed to purchase at prevailing market prices crude oil and other feedstock required to produce refined petroleum products representing at least 49.99% of our refining nameplate capacity, subject to the terms and conditions set forth in the POCSA. PTT also has a priority right to supply crude oil and other feedstock required to produce refined petroleum products in an amount up to 100% of our refining nameplate capacity, subject to certain conditions in the POCSA. Prices for crude oil and other feedstock are negotiated on an arm’s length basis by reference to benchmark market prices. We generally obtain standard open account 30-day payment terms from PTT unless a different payment term is requested by us and agreed by PTT under the POCSA. The POCSA does not contain a termination date but may be terminated after July 2024, in addition to other causes, by either party with 12 months prior written notice of termination to the other party. In addition, we maintain an oil processing arrangement with PTT whereby PTT may, if requested by us, procure crude oil and other feedstock designated by us for processing at our refinery.

We enter into supply contracts on a yearly basis with other suppliers from time to time depending on whether we are able to obtain favorable terms with the suppliers. In 2017, we purchased 46% of our crude oil requirements from PTT, by volume, pursuant to supply contracts, and did not have a supply contract with BP. In 2018, we purchased 52.3% of our crude oil requirement from PTT, pursuant to supply contracts. In the six months ended June 30, 2019, we purchased 50.6% of our crude oil requirement from PTT, pursuant to supply contracts.

The following table sets forth the volume of crude oil and other feedstock we consume by region of origin.

	For the year ended December 31,						For the six months ended June 30,			
	2016		2017		2018		2018		2019	
	(in millions of, except percentages)									
	Barrels	%	Barrels	%	Barrels	%	Barrels	%	Barrels	%
Middle East	83.0	79.0	80.2	74.6	80.5	75.2	40.7	77.7	37.4	74.0
Thailand	8.4	8.0	8.4	7.8	8.5	7.9	3.9	7.4	2.9	5.7
Asia (excluding										
Thailand)	10.3	9.8	8.1	7.5	9.0	8.4	4.5	8.5	3.1	6.2
Other foreign sources	3.4	3.2	10.9	10.1	9.1	8.5	3.4	6.4	7.1	14.1
Total	105.1	100.0	107.7	100.0	107.1	100.0	52.4	100.0	50.6	100.0

Oil Refining—Sales

The majority of our refined petroleum products are sold domestically to PTT. We also sell our refined petroleum products domestically to other major oil companies, including Bangchak, Shell Thailand and Chevron, as well as other independent oil wholesalers and offtake customers and domestic jobbers (including independent wholesalers and petrol stations). In 2016, we sold, by volume, 86.8% of our refined petroleum products in the Thai domestic market, which is approximately 31.1% of the market share in Thailand according to DOEB and Company data, including 38.8% to PTT, 1.0% to Bangchak, 3.1% to Shell Thailand, 3.3% to Chevron, 28.7% to other independent offtake customers and domestic jobbers and 11.9% to Thai Paraxylene, while the remaining 13.2% of our products was exported. In 2017, we sold, by volume, 85.5% of our refined petroleum products in the Thai domestic market, which is approximately 30.0% of the market share in Thailand according to DOEB and Company data, including 36.1% to PTT, 0.7% to Bangchak, 4.0% to Shell Thailand, 3.9% to Chevron, 29.2% to other independent offtake customers and domestic jobbers and 11.6% to Thai Paraxylene, while the remaining 14.5% of our products was exported. In 2018, we sold, by volume, 85.8% of our refined petroleum products in the Thai domestic market, which is approximately 32.1% of the market share in Thailand according to DOEB and Company data, including 35.5% to PTT, 0.5% to Bangchak, 5.3% to Shell Thailand, 3.9% to Chevron, 29.4% to other independent offtake customers and domestic jobbers and 11.2% to Thai Paraxylene, while the remaining 14.2% of our products was exported. In the six months ended June 30, 2018, we sold, by volume, 85.8% of our refined petroleum products in the Thai domestic market, which is approximately 31.5% of the market share in Thailand according to DOEB and Company data, including 35.4% to PTT, 0.6% to Bangchak, 5.2% to Shell Thailand, 4.1% to Chevron, 29.4% to other independent offtake customers and domestic jobbers and 11.1% to Thai Paraxylene, while the remaining 14.2% of our products was exported. In the six months ended June 30, 2019, we sold, by volume, 87.8% of our refined petroleum products in the Thai domestic market, which is approximately 31.6% of the market share in Thailand according to DOEB and Company data, including 37.0% to PTT, 0.5% to Bangchak, 5.7% to Shell Thailand, 3.2% to Chevron, 31.2% to other independent offtake customers and domestic jobbers and 10.2% to Thai Paraxylene, while the remaining 12.2% of our products was exported. PTT is our largest shareholder and also our largest customer. According to DOEB, PTT sold approximately 39.2%, 41.8%, 40.7%, and 41.1% and 41.3% of the total refined petroleum products sold in Thailand for 2016, 2017, and 2018 and in the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, PTT purchased approximately 147,506.1 bpd, 143,547.9 bpd, 148,477.4 bpd, 72,147.5 bpd and 76,454.1 bpd, respectively of retail refined petroleum products from us. In order to ensure its supply of refined petroleum products, PTT purchases, at prevailing market prices, a substantial portion of its requirements from us. As the domestic demand for refined petroleum products grows, PTT's requirement is also expected to increase.

We sell refined petroleum products to PTT group under the POCSA. Pursuant to the POCSA, PTT has agreed to purchase and we have agreed to sell at prevailing market prices our refined petroleum products, subject to the nomination procedure and other terms and conditions set forth in the POCSA. According to the nomination procedure, PTT is required to nominate the types and quantities of our refined petroleum products that it requires for domestic and/or export markets, which must be at least 49.99% of our refining nameplate capacity of approximately 275,000 bpd. We are required to inform PTT of the availability of such products for delivery to PTT within an agreed time period and PTT shall offtake such products that meet its conditions. PTT also has a priority right to purchase at prevailing market prices our refined petroleum products up to 100% of our refining nameplate capacity, subject to certain conditions in the POCSA. PTT is required to maximize its offtake of our products for domestic sales to the extent it is reasonably, commercially and technically possible and we are required to satisfy PTT's requirements for our products as closely as reasonably, commercially and technically possible. The terms and conditions for sale and purchase of our refined petroleum products for export sales are made pursuant to a mutual agreement of both parties on a case by case basis at the time of offtake.

We also sell refined petroleum products to Shell Thailand, Chevron and other independent offtake customers, such as Bangchak, PTG Energy Public Company Limited and Susco Public Company Limited, to satisfy their retail networks and to our wholly-owned subsidiary, Thai Paraxylene. We sell refined petroleum products to Shell Thailand and Chevron pursuant to sale and purchase agreements that contain pricing terms based on published benchmark prices and also guaranteed offtake and supply amounts. The offtake contracts for our refined petroleum products are in the form of monthly, yearly and longer-term contracts. These contracts are periodically negotiated from time to time with our customers on arm's length terms. In addition, we sell refined petroleum products to independent offtake customers and domestic jobbers at market prices.

Surplus products that are not taken up by domestic customers are exported either through PTT or other oil traders. The portion of export, adjusted for production increases, has declined over time as the domestic demand for refined petroleum products has increased.

The following table details the type and sales volume of refined petroleum products sold by us, as well as the percentage of sales volume for each product, for the years ended December 31, 2016, 2017, and 2018, and for the six months ended June 30, 2018 and 2019.

Product	For the year ended December 31,						For the six months ended June 30,			
	2016		2017		2018		2018		2019	
	(in millions of, except percentages)									
	Barrels	%	Barrels	%	Barrels	%	Barrels	%	Barrels	%
LPG.....	860.3	4.7	876.6	4.8	5.7	5.0	2.8	4.9	2.4	4.3
Platformate.....	2,336.9	12.7	2,413.8	13.1	14.7	12.8	7.2	12.6	6.6	11.5
Gasoline.....	3,090.9	16.7	3,341.4	18.2	19.3	16.8	9.6	16.8	9.7	17.0
Jet.....	4,302.1	23.3	3,645.0	19.9	23.3	20.3	11.5	20.3	11.1	19.3
Diesel.....	6,597.9	35.8	6,905.9	37.6	42.3	36.8	21.5	36.9	22.7	39.7
Fuel Oil.....	1,267.3	6.8	1,179.5	6.4	9.7	8.3	4.4	8.5	4.6	8.2
Total.....	18,455.4	100.0	18,362.2	100.0	115.0	100.0	57.0	100.0	57.1	100

The following table sets forth our gross revenue breakdown of refined petroleum products as well as the percentage of revenue for each product (before eliminating intra-Group sales), for the years ended December 31, 2016, 2017, and 2018, and for the six months ended June 30, 2018 and 2019.

	For the year ended December 31,						For the six months ended June 30,					
	2016		2017		2018		2018		2019			
	(in millions of, except percentages)											
	THB	%	THB	%	THB	US\$	%	THB	%	THB	US\$	%
LPG	7,324.8	2.8	7,560.6	2.4	8,365.1	272.1	2.3	3,907.5	2.2	3,678.4	119.7	2.1
Platformate ..	30,961.6	11.7	36,779.5	11.5	40,203.2	1,307.8	11.0	19,412.2	11.0	15,807.1	514.2	9.2
Gasoline	54,629.9	20.7	66,584.8	20.7	67,056.5	2,181.4	18.4	32,563.5	18.4	32,203.3	1,047.6	18.7
Jet	40,497.4	15.3	54,157.6	16.9	67,496.1	2,195.7	18.5	32,354.4	18.3	29,498.8	959.6	17.2
Diesel	120,292.3	45.5	141,353.4	44.0	160,588.7	5,224.1	44.0	79,457.1	45.0	81,096.8	2,638.2	47.2
Fuel Oil	10,703.6	4.0	14,781.6	4.6	21,163.9	688.5	5.8	9,005.6	5.1	9,652.9	314.0	5.6
Total	264,409.6	100.0	321,217.5	100.0	364,873.5	11,869.6	100.0	176,700.3	100.0	171,937.3	5,593.3	100.0

Oil Refining—Pricing

Pricing of refined petroleum products in Thailand is based on the Singapore spot market price for the relevant product, which is a benchmark for the Thai ex-refinery price. The Singapore spot market price reflects the demand and supply balance in the region as well as the level of crude oil prices and is quoted in U.S. dollars on a daily basis. We sell refined petroleum products in the domestic market at a price based on import parity and those exported based on export parity.

Domestic sales of refined petroleum products are generally priced on an import parity basis, which means that the ex-refinery price of the refined petroleum product for sale in Thailand is derived from the Singapore spot market price for the relevant product quoted on MOPS, plus the logistics costs of transporting such product from Singapore to Thailand, including insurance, freight, import duties, ocean losses and handling. A quality premium or discount may be added or deducted for certain products to account for the differences in the product quality specifications between the two locations. Generally, the product quality specifications, such as MTBE, sulfur, aromatic and benzene content in Thailand are more stringent than the standard product quality specifications quoted by Singapore refineries. The ex-refinery prices for our refined petroleum products, which are quoted in U.S. dollars per barrel except fuel oil, which is quoted in U.S. dollars per ton, are converted into Baht per liter for invoicing purposes using the applicable current Baht/U.S. dollar exchange rate. We invoice our customers at the ex-refinery price, which is based on MOPS plus relevant excise and municipal taxes, the oil fuel fund contributions and the energy conservation fund contributions imposed by the Thai government, and value added taxes. Taxes and fund contributions are collected as pass-through items by Thai refineries, including us, and such taxes and fund contributions are forwarded to the applicable Thai government authorities. For independent wholesalers, we generally require a bank-issued letter of guarantee, bill of exchange guaranteed by a bank, or pledge of oil products stored at our tank farm to secure payment. The payment is generally due within 19 days from the date of delivery.

Export sales of refined petroleum products are priced on an export parity basis, which is derived from the Singapore spot market price for the relevant product quoted on MOPS, plus or minus a premium or discount that is subject to the market conditions and negotiations with potential purchasers. For each export cargo, the price of the refined petroleum product is quoted in U.S. dollars per barrel except fuel oil, which is quoted in U.S. dollars

per ton and is determined through bidding or negotiations. We generally try to minimize our export sales of refined petroleum products since export prices of our refined petroleum products are usually lower than domestic prices because domestic prices are based on import parity basis. Export sales of refined petroleum products are generally made on an FOB basis to traders for sale to various customers, primarily in Singapore, Vietnam, Malaysia and other countries in Asia. Payment for such export sales is mostly settled by a bank-issued letter of credit. The payment is generally due within 30 days from the date of delivery. See “—Government Regulation—Regulation Relating to Refineries—Pricing of Refined Petroleum Products and Price Stabilization.”

Oil Refining—Delivery

We sell our refined petroleum products to our customers at gate, or on an “FOB” basis. We also deliver on a “FIP” (free into pipe) basis in the case of pipeline deliveries to specific customers. The strategic location of our refinery near the Laem Chabang deep sea port provides our offtake customers access to a convenient product delivery network that allows them to take delivery of our refined petroleum products in a cost-effective manner via the connecting multi-product pipeline owned and operated by our related party, Thappline, as well as ground transportation and coastal vessels. Our refinery is connected to a multi-product pipeline and a depot located north of Bangkok. For the year ended December 31, 2018, approximately 45% of the refined petroleum products sold by us was delivered by our offtake customers to their customers via the multi-product pipeline and a pipeline linked between PTT and us, approximately 28% was delivered via coastal vessels chartered by our offtake customers and the remaining 27% was delivered via ground transportation. For the six months ended June 30, 2019, 44% of the refined petroleum products sold by us was delivered by our offtake customers to their customers via the multi-product pipeline and a pipeline linked between PTT and us, approximately 25% was delivered via coastal vessels chartered by our offtake customers and the remaining 31% was delivered via ground transportation. We believe the strategic location of our refinery gives us an advantage, because our domestic customers can purchase our products under various modes of transportation closer to their locations and distribute such products at a relatively low cost to Thailand’s main demand clusters for refined petroleum products, which include Bangkok and other regional centers around Thailand.

Lube Base Oil

We own and operate through our wholly-owned subsidiary, Thai Lube Base, a lube base oil refinery with a nameplate capacity of approximately 267,015 tons per year of lube base oil using long residue as a feedstock as of June 30, 2019. Thai Lube Base’s lube base oil plant also produced bitumen and TDAE in the amounts of approximately 434,729.6 tons per year and approximately 88,650.4 tons per year for the year ended December 31, 2018 respectively, and 206,054.6 tons per year and approximately 43,991.4 tons per year for the six months ended June 30, 2019 respectively. Thai Lube Base’s facilities are located near the Sriracha Complex. We also send our gasoil by-products from the lube base oil refinery back to our refinery for further refining.

We have integrated our wholly-owned subsidiary, Thai Lube Base, with our refining and petrochemical businesses. We have constructed a product pipeline between Thai Lube Base’s facilities and our refinery to support integrated operations, including supplying feedstock from our refinery to Thai Lube Base’s facilities.

We generated revenues of THB13,535.7 million, THB18,662.4 million, THB20,959.0 million (US\$681.8 million), THB10,010.7 million and THB9,531.0 million (US\$310.1 million) from our lube base oil business unit (before eliminating intra-Group sales) in the years ended December 31, 2016, 2017 and 2018, and in the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2017 and 2018, revenues from our lube base oil business unit (before eliminating intra-Group sales) accounted for 4.1% and 4.0% of our Group’s revenues, respectively. For the six months ended June 30, 2018 and 2019, revenues from our lube base oil business unit (before eliminating intra-Group sales) accounted for 4.0% and 4.0% of our Group’s revenues, respectively. Our revenues from our lube base oil business unit are generated principally from the sales of our lube base oil, specialty products such as TDAE and related by products, in particular bitumen.

Lube Base Oil—Production Nameplate Capacity and Capacity Utilization Rates

As of June 30, 2019, Thai Lube Base had a nameplate capacity of approximately 267,015 tons per year of lube base oil, approximately 350,000 tons per year of bitumen and approximately 67,520 tons per year of TDAE.

We measure the utilization of our lube base oil plant based on the refinery’s realized output, divided by its nameplate capacity. For the year ended December 31, 2018, our capacity utilization rate for our lube base oil plant was 84%, compared with 88.4% for the year ended December 31, 2017. The lower capacity utilization rate

of our lube base oil plant was due to our group company production optimization as lube base oil price decreased in 2018 compare to 2017. For the six months ended June 30, 2019, our capacity utilization rate for our lube base oil plant was 87% compared with 89% for the six months ended June 30, 2018. The lower capacity utilization rate of our lube base oil plant was due to low selling price and low product sales volume.

Lube Base Oil—Feedstock

The principal feedstock used in our lube base oil plant is long residue. For the years ended December 31, 2017 and 2018, Thai Lube Base purchased 1.1 million tons and 1.1 million tons of long residue, respectively, from our oil refinery, IRPC and international refineries. For the six months ended June 30, 2018 and 2019, Thai Lube Base purchased 0.6 million tons and 0.6 million tons of long residue, respectively, from our oil refinery, IRPC and international refineries.

We purchase long residue from traders under spot contracts which contain pricing terms based on a negotiated formula that takes into account published benchmark prices, such as MOPS HSFO, as well as the amounts of long residue to be supplied.

Lube Base Oil—Sales

For the years ended December 31, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, we sold approximately 55.0%, 53.8%, 56.8% and 47.7%, respectively, of our lube base oil products domestically. During the same periods, we exported the remaining lube base oil products to a number of countries, including Singapore, Malaysia, China, Bangladesh, Taiwan, Vietnam, Philippines, Indonesia and Australia.

Our main domestic customers for our lube base oil products include PTT, SFC Excellent and Bangchak. The products sold for export are generally sold directly to end users.

Our lube base oil and by-products are delivered to our customers by a combination of marine transportation, via our jetty at our Sriracha Complex, ground transportation or through pipelines.

Petrochemical

We own and operate primarily through our wholly-owned subsidiary, Thai Paraxylene, a petrochemical plant producing petrochemical products including paraxylene and benzene. We generated revenues of THB48,384.6 million, THB57,881.2 million, THB66,701.5 million, THB31,414.1 million (US\$102.2 million), THB27,946.5 million (US\$909.1 million) from our petrochemical business unit (before eliminating intra-Group sales) in the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2017 and 2018, revenues from our petrochemical business unit (before eliminating intra-Group sales) accounted for 12.9% and 12.9% of our Group's revenues, respectively. For the six months ended June 30, 2018 and 2019, revenues from our petrochemical business unit (before eliminating intra-Group sales) accounted for 12.6% and 11.6% of our Group's revenues, respectively. Our revenues from our petrochemical business unit are generated principally from the sale of our petrochemical products, in particular paraxylene and benzene and related by-products.

Our petrochemical production facilities are located near the Sriracha Complex and have connecting facilities with our refinery for platformate supply and by-product return streams. Our petrochemical products are used in various downstream petrochemical applications, including the production of automotive parts, furniture, toys, household appliances, textiles, PET bottles, adhesives, laminate, pipe, paints, insecticides and glue. We also send certain of our gasoline by-products back to our refinery for further refining.

In July 2013, through our wholly-owned subsidiary, Thai Paraxylene, we and Mitsui jointly established LABIX. As of June 30, 2019, Thai Paraxylene and Mitsui owned 75.0% and 25.0%, respectively, of LABIX. We established LABIX with the intention of pioneering in the production of LAB in Thailand with a capacity of 120,000 tons per annum. LAB is an intermediate and the core feedstock for detergents. The production process would be linked to our production structure, with benzene and kerosene from our petrochemical and refinery production facilities as the main raw materials. As there is only one other LAB plant in Southeast Asia which operated in the absence of a refinery link, LABIX's production of LAB in Thailand will reduce LAB import and will allow export of LAB to Southeast Asian markets. This will enhance Thailand's potential as the hub for production and export of detergents feedstock in Southeast Asia. Commercial production commenced on February 25, 2016.

Petrochemical—Production Nameplate Capacity and Capacity Utilization Rates

Our petrochemical plant is integrated with our refinery. As of June 30, 2019, we had a petrochemical production nameplate capacity of approximately 527,000 tons of paraxylene per year, approximately 259,000 tons of benzene per year and approximately 52,000 tons of mixed-xylenes per year. This has expanded from its original production capacity due to improvements allowing for the further upgrading of toluene to paraxylene and benzene, which offers higher profit margins than toluene.

We measure the utilization of our petrochemical plants based on our plants' combined realized output, divided by their nameplate capacity. Operational disruptions and shutdowns, both planned and unplanned, may result in a reduction in our capacity utilization rate. For the year ended December 31, 2018, our utilization rate for Thai Paraxylene's plants was 89.2%, compared with 82.8% for the year ended December 31, 2017. This was due to our internal optimization processes. For the six months ended June 30, 2019, our utilization rate for Thai Paraxylene's plants was 77.7%, compared with 87.2% for the six months ended June 30, 2018. This was due to planned major turnarounds in mid 2019.

Petrochemical —Feedstock

The principal feedstock used in our petrochemical plants is platformate, which is sourced internally from our refinery. For the years ended December 31, 2017 and 2018, and for the six months ended June 30, 2018 and 2019, approximately 1.9 million tons, 1.9 million tons, 0.9 million tons and 0.8 million tons, respectively, of platformate were sourced internally from our refinery. The platformate produced by our refinery is only sufficient to meet approximately 99% of our petrochemical plants' needs, and therefore, subject to demand and market prices, we may also elect to purchase the remaining approximately 1% of the feedstock for our petrochemical plants, including mixed xylenes and toluene, from the local or international markets.

Petrochemical—Sales

For the year ended December 31, 2018, we sold approximately 20.4% of our petrochemical products directly to domestic end-users and exported the remaining 79.6% of our petrochemical products to other Asian countries, including China. For the six months ended June 30, 2019, we sold approximately 17.7% of our petrochemical products directly to domestic end-users and exported the remaining 82.3% of our petrochemical products to other Asian countries, including China.

We enter into yearly contracts with petrochemical traders through which we sell approximately 84.4% of our petrochemical products. These contracts contain pricing terms based on published benchmark prices. We sell the remaining approximately 15.6% of our petrochemical products on the spot market.

All of our petrochemical products are delivered to our customers by marine transportation, via the jetty at our Sriracha Complex.

Power Generation

As of June 30, 2019, our power generation business had a total capacity of 357 MW of electricity and 714 tons of steam per hour, all of which were attributable to Thailoil Power and TOP SPP. In addition, we also have a power generation capacity for internal consumption in our refinery and plants. TOP SPP has completed and commenced commercial operations of two small power plants on April 1, 2016 and on June 1, 2016. We generated revenues of THB9,131.2 million, THB10,928.8 million, THB11,733.5 million (US\$381.7 million), THB5,580.1 million and THB5,939.6 million (US\$193.2 million) from our power generation business unit (before eliminating intra-Group sales) in the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, revenues from our power generation business unit (before eliminating intra-Group sales) accounted for 2.5%, 2.4%, 2.3%, 2.2% and 2.5% of our revenues, respectively. Our revenues from our power generation business unit are generated principally from the sale of the electricity generated by our power plants. In addition, we also engage in our power generation business through GPSC, our associate company.

Thailoil Power

Thailoil Power, our 73.99%-owned subsidiary, owns and operates a natural gas-fired combined cycle co-generation power plant with capacity to produce 118 MW of electricity and 216 tons per hour of steam as of June 30, 2019. It sells electricity to EGAT and sells electricity and steam to us. For the year ended December 31, 2018,

and the six months ended June 30, 2018 and 2019, Thaioil Power earned 80.8%, 81.3% and 79.4% of its net sales from the sale of electricity and steam to us under certain long-term power and steam purchase agreements, respectively. Thaioil Power's remaining net sales are derived from the sale of electricity to EGAT pursuant to a 25-year power purchase agreement, which expires in 2023. The sales revenue of Thaioil Power is secured by take-or-pay obligations of its customers, including an average of 70% minimum take obligations for electricity and an average of 85% minimum take obligations for steam. Under the power purchase agreement, EGAT has agreed to pay Thaioil Power capacity payments at the agreed amounts that are sufficient to cover fixed costs and debt service obligations, plus returns. In addition, EGAT has agreed to make energy payments to Thaioil Power according to the formula specified in the power purchase agreement. Thaioil Power's net sales in 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, were THB4,263.7 million, THB4,150.2 million, THB4,408.9 million (US\$143.4 million), THB2,062.7 million and THB2,258.2 million (US\$73.5 million), respectively.

TOP SPP

TOP SPP, our wholly-owned subsidiary, was established in December 26, 2013. The first small power plant commenced commercial operations on April 1, 2016 and the second small power plant commenced commercial operations and sales on June 1, 2016. TOP SPP has an aggregated generation capacity of 239 MW of electricity and 498 tons of steam per hour. For the year ended December 31, 2018, and the six months ended June 30, 2018 and 2019, TOP SPP earned 45.5%, 44.7% and 46.0% of its net sales from the sale of electricity and steam to us under long-term power and steam purchase agreements, respectively. TOP SPP's remaining net sales are derived from the sale of electricity to EGAT pursuant to a 25-year power purchase agreement, which expires in 2041. The sales revenue of TOP SPP is secured by take-or-pay obligations of its customers, including an average of 70% minimum take obligations for electricity and an average of 85% minimum take obligations for steam. Under the power purchase agreement, EGAT has agreed to pay TOP SPP capacity payments at agreed amounts that are sufficient to cover fixed costs and debt service obligations, plus an additional amount of return. In addition, EGAT has agreed to make energy payments to TOP SPP according to the formula specified in the power purchase agreement. TOP SPP's net sales in 2018 and in the six months ended June 30, 2018 and 2019 were THB7,324.6 million (US\$238.3 million), THB3,517.4 million and THB3,681.3 million (US\$119.8 million), respectively.

GPSC

The amalgamation between our former subsidiary IPT and PTTUT, a company jointly owned by PTTGC and PTT, was completed on January 10, 2013, forming a new company named Global Power Synergy Company Limited. In late 2014, Global Power Synergy Company Limited was transformed into a public company and renamed to "Global Power Synergy Public Company Limited" to prepare for its initial public offering, which was completed in May 2015. We currently directly own 8.91%, and via Thaioil Power, indirectly own 20.79% interest in GPSC, giving us an effective interest of 24.29%.

GPSC owns a portfolio of power plants with a total capacity of 5,026 MW of electricity and 2,876 tons per hour of steam as of June 30, 2019. GPSC supplies electricity generated from its power plants to EGAT under long-term power purchase agreements and to local industrial users. GPSC has invested in a number of power generation projects both in Thailand and overseas, ranging from natural gas fired power plants to solar farms and hydropower plants. As of June 30, 2019, GPSC had an attributed installed capacity of 5,026 MW, of which operating projects accounted for 4,748 MW, and projects under construction accounted for 278 MW.

Marine Transportation Services

We engage in the transportation of petroleum oil products and chemical products using marine vessels on international and domestic waterways through our wholly-owned subsidiary, Thaioil Marine. As of June 30, 2019, we owned 4 chemical tankers and 1 LPG tanker with a combined capacity of 22,777 deadweight tons. We also owned 14 crew and utility boats of 120 deadweight tons each through an indirect wholly owned subsidiary, TOP Maritime Service Co., Ltd. ("**TOP Maritime**"), to enable transportation between shore and oil and gas platforms or for other marine transport. We also have an indirect 33.3% interest in T.I.M. Ship Management Co., Ltd., which provides ship management services. Through our indirect wholly owned subsidiary Thaioil Marine International Pte. Ltd., we have a 50.0% interest in TOP-NYK MarineOne Pte. Ltd, which holds a VLCC with a capacity of 281,050 deadweight tons as of June 30, 2019. In addition, through TOP-NTL Shipping Trust, which is registered in Singapore, we hold a bareboat charter of 2 VLCCs with a combined capacity of 600,000 deadweight tons as of June 30, 2019, to import crude oil for our refinery. TOP-NTL Shipping Trust is managed by TOP-NTL Pte. Ltd., a trustee-manager in which we have an effective 50.0% effective interest. Furthermore, through TOP Nautical Star, we have a 50.0% interest in 2 Aframaxs for crude, feedstock and product storage and

transportation services with a combined capacity of 200,000 deadweight tons as of June 30, 2019. We mainly serve customers in the Thai domestic market and within the Asia-Pacific region. Customers include PTT, other companies within the PTT Group and other international traders.

We generated THB877.8 million, THB801.6 million, THB620.5 million (US\$20.2 million), THB313.4 million and THB326.1 million (US\$10.6 million) from our marine transportation business unit (before eliminating intra-Group sales and services) in the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2016, 2017 and 2018, revenues from our marine transportation business unit (before eliminating intra-Group sales and services) accounted for 0.2%, 0.2% and 0.1% of our Group's revenues, respectively. For the six months ended June 30, 2018 and 2019, revenues from our marine transportation business unit (before eliminating intra-Group sales and services) accounted for 0.1% and 0.1% of our Group's revenues, respectively. Our revenues from our marine transportation business unit are generated principally from transportation services rendered by our fleet.

Solvent

We engage in the production and distribution of hydrocarbon solvents, chemical solvents and other chemicals mainly in Thailand, Vietnam and other overseas markets through our wholly-owned subsidiary, Thailoil Solvent, which directly owns 99.99% interest in TOP Solvent Co., Ltd., indirectly owns 80.52% interest in Sak Chaisidhi, and indirectly owns 100% interest in TOP Solvent (Vietnam) Limited Liability Company. Established in October 2008, TOP Solvent Co., Ltd. engages in the hydrocarbon solvent manufacturing business through Sak Chaisidhi. It also engages in the solvent trading business in Thailand directly and, through TOP Solvent (Vietnam) Limited Liability Company, in Vietnam. Sak Chaisidhi produces hydrocarbon solvent such as paraffin, aliphatic, SBPs, mineral spirits and aromatics which are used in various industries. Our products are also used in the manufacturing of industrial products such as coating, paints, automotive, tires, ink, adhesives, vegetable oils, foams, plastics, petrochemicals and the mining of copper. TOP Solvent (Vietnam) Limited Liability Company is a distributor for solvent and chemicals such as aromatics, alcohol, ketone, ester, glycol ethers, ethylene glycols and monomer to Thailand and Vietnam, as well as to other Asia-Pacific countries. In July 2014, Sak Chaisidhi completed the expansion of its production plant which increased its hydrocarbon solvent nameplate capacity from approximately 76,000 tons per year to approximately 141,000 tons per year to meet the rising domestic and regional demand for hydrocarbon solvent. In 2015, Sak Chaisidhi completed the construction of a new lorry loading and new export pipeline to a terminal.

We generated THB7,629.8 million, THB9,181.5 million, THB9,991.8 million (US\$325.0 million), THB4,791.4 million and THB4,434.5 million (US\$144.3 million) from our solvent business unit (before eliminating intra-Group sales and services) in the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2017 and 2018, revenues from our solvent business unit (before eliminating intra-Group sales and services) accounted for 2.0% and 1.9% of our Group's revenues, respectively. For the six months ended June 30, 2018 and 2019, revenues from our solvent business unit (before eliminating intra-Group sales and services) accounted for 1.9% and 1.8% of our Group's revenues, respectively. Our revenues from our solvent business unit are generated principally from the sales of our solvents.

Solvent—Production Nameplate Capacity and Capacity Utilization Rates

Our hydrocarbon solvent products are produced by the plants of Sak Chaisidhi, which had nameplate capacity of approximately 141,000 tons per year as of June 30, 2019.

We measure the utilization of our solvent plants based on our plants' combined realized output, divided by their nameplate capacity. Operational disruptions and shutdowns, both planned and unplanned, may result in a reduction in our nameplate capacity utilization rate. For the six months ended June 30, 2019, our utilization rate for our solvent plants was 116.8%, compared with 115.6% for the six months ended June 30, 2018. For the year ended December 31, 2018, our utilization rate for our solvent plants was 112.3%, compared with 122.5% for the year ended December 31, 2017. The decrease in capacity the utilization rate of our solvent plants during this period was mainly attributable to our production plan to minimize by-product production volume.

Solvent—Feedstock

The principal feedstock used by our solvent plants is light virgin naphtha, which is sourced from domestic refineries. For the years ended December 31, 2017 and 2018, and the six months ended June 30, 2018 and 2019,

our solvent plants processed 132,931.9 tons, 118,685.4 tons, 60,510.3 tons and 65,449.1 tons of light virgin naphtha, respectively.

Solvent—Sales

For the year ended December 31, 2018, we sold approximately 72.1% of our solvent products domestically to end-users, and exported the remaining 27.9% of our solvent products to countries in the Asia-Pacific, Middle East, Africa and Europe. For the six months ended June 30, 2019, we sold approximately 71.0% of our solvent products domestically to end-users, and exported the remaining 29.0% of our solvent products to countries in the Asia-Pacific, Middle East, Africa and Europe.

We deliver our solvent products to our domestic customers via ground transportation and to our export customers by marine transportation.

Ethanol

We expanded into alternative energy in 2006 by establishing our joint venture, MCE, a sugarcane-based ethanol producer. In 2008, we established our wholly-owned subsidiary Thailoil Ethanol and transferred all of our shares in MCE to Thailoil Ethanol. However, we sold all of our shares in MCE to one of its major shareholders, MP Energy Co., Ltd., on February 16, 2017 and received total proceeds of THB50.6 million. This transaction is part of our business improvement strategy.

In 2010, Thailoil Ethanol acquired a 50.0% interest in Sapthip Co., Ltd. (“**SAPTHIP**”), a cassava-based ethanol producer with a production nameplate capacity of approximately 200,000 liters per day as of June 30, 2019.

SAPTHIP initially invested in biogas power plant with capacity of 2.4 MW electricity and 16.7 ton per hour steam generation through its wholly owned company, Sapthip Green Energy Co., Ltd. (“**SGE**”) which is currently under construction and expected to be completed in Q4/2019.

In 2011, Thailoil Ethanol acquired a 21.28% stake in Ubon Bio Ethanol Public Co., Ltd. (“**UBE**”), which has a cassava and molasses-to-ethanol production plant with a production nameplate capacity of approximately 400,000 liters per day as of June 30, 2019. UBE initially invested in the production of starch powder from cassava through its wholly-owned company, Ubon Agricultural Energy Co., Ltd. (“**UAE**”), with a production nameplate capacity of approximately 600 metric tons per day as of June 30, 2019, and also invested in the biogas business from waste water from cassava starch production through Ubon Biogas Co., Ltd. (“**UBG**”), which had a nameplate capacity of approximately 35,910 cubic meters of biogas per day of as June 30, 2019. Approximately half of the biogas from UBG is used as fuel for starch production and the other half is used to produce approximately 1.9 MW of electricity, which is sold to the grid. In 2011, UBE also founded NP Bio Energy Co., Ltd. (“**NPE**”) to produce biogas from wet cassava pulp, which is a residue from UBE’s ethanol production and from UAE’s cassava starch production. NPE’s a biogas production nameplate capacity was 70,000 cubic meters as of June 30, 2019. Commercial operations of the project commenced in the fourth quarter of 2015.

The Thai government has targeted to increase ethanol usage to 6.6 million liters per day by the year 2037. In order to meet this target, we expect that a substantial volume of refined products from our refinery would have to be substituted by ethanol. We have therefore invested in the ethanol business to participate in the potential growth in this industry, as well as to hedge against any decrease in demand for traditional energy sources.

We generated THB1,538.1 million, THB1,619.8 million, THB1,477.2 million (US\$48.1 million), THB743.9 million and THB739.1 million (US\$24.0 million) from our ethanol business unit (before eliminating intra-Group sales) for the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2017 and 2018, revenues from our ethanol business unit (before eliminating intra-Group sales) accounted for 0.4% and 0.3% of our Group’s revenues, respectively. For the six months ended June 30, 2018 and 2019, revenues from our ethanol business unit (before eliminating intra-Group sales) accounted for 0.3% and 0.3% of our Group’s revenues, respectively. Our revenues from our ethanol business unit are generated principally from ethanol sales and may be affected by ethanol demand from gasoline blending for gasohol production, as well as prices of ethanol, which are impacted by the oil market and by governmental incentive programs that promote ethanol consumption.

Others

Our wholly-owned subsidiary Thail Energy Services (“TES”) provides manpower supply services to us, and our wholly-owned subsidiary Thail Treasury Center (“TTC”) manages foreign currency funds for the Company and its subsidiaries. We generated revenues of THB900.3 million, THB984.3 million THB1,924.7 million (US\$62.6 million), THB615.4 million and THB1,922.9 million (US\$62.6 million) from these business units (before eliminating intra-Group sales and services) in the years ended December 31, 2016, 2017, and 2018, and the six months ended June 30, 2018 and 2019, respectively. For the years ended December 31, 2017 and 2018, revenues from this business unit (before eliminating intra-Group sales and services) accounted for 0.2% and 0.4% of our revenues. For the six months ended June 30, 2018 and 2019, revenues from this business unit (before eliminating intra-Group sales and services) accounted for 0.2% and 0.8% of our revenues. Our revenues are principally from the provision of consulting services by our energy services business, and information technology and communication services.

We also hold 20.0% of each of PTES and PTT DIGITAL, which were established by the PTT Group to provide engineering, technical consultation, information technology and communication services respectively to the PTT Group and to develop expertise to serve external clients.

Production Facilities

General

The Sriracha Complex is located near the Laem Chabang deep-sea port in Sriracha, Choburi Province, approximately 124 kilometers southeast of Bangkok.

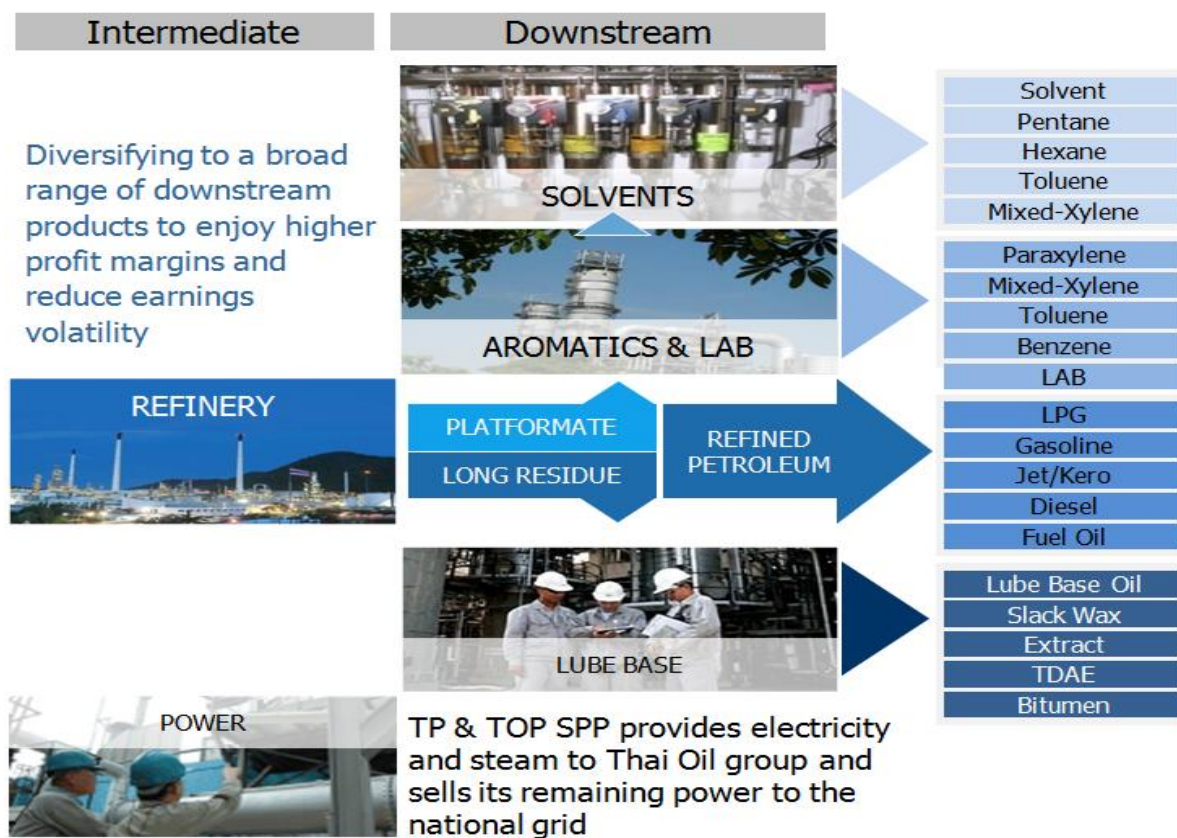
The following table sets out the various units and its combined nameplate capacity as of June 30, 2019 at the Sriracha Complex that allow us to produce refined petroleum products that meet our customers’ requirements.

Process Unit	Number	Combined Nameplate Capacity (bpd, except where indicated)
CDU and intermediate feedstock processing facilities	3	275,000
CCRs	2	50,000
ISOM	1	20,000
Mixed-xylenes unit	1	40,000
HCU	2	50,000
FCCU	1	10,400
TCU	1	19,000
HDT	3	85,000
HDS	2	75,000
HVU	3	95,000
Paraxylene unit	1	53,900
PXMax	1	750 tons per day
Sulfolane unit	1	1,632 tons per day
Vacuum distillation unit	1	3,650 tons per day
Propane deasphalting unit	1	1,300 tons per day
MP refining unit	1	1,650 tons per day

Our various conversion units enable us to maximize our middle distillate production, which represents the majority of the Thai market’s demand, and provides us with significant flexibility in the use of feedstock. Our gasoline, gasoline and diesel products are compliant with the sulfur content requirements of the Euro IV standard, and we believe we were the first refiner in Thailand to achieve this standard.

Production Process

The following flowchart illustrates the production process of our business units, including the principal feedstock inputs we purchase, the products we produce and the integration of production and exchange stream across our business units.



Refinery and Plant Maintenance

As with all refineries and petrochemical plants, our refinery and plants are shut down periodically for scheduled turnaround maintenance and unscheduled corrective or emergency maintenance. Scheduled maintenance shutdowns reduce our utilization rates but increases refinery and plant safety and efficiency and reduces the possibility of future unscheduled refinery and plant shutdowns and extend refinery and plant life.

The number and length of turnarounds carried out in any given period can impact operating results. We typically schedule major turnaround maintenance for each refinery and plant every three to six years for periods of approximately 21 to 30 days and on a staggered basis to minimize impact on our overall production. When possible, we seek to schedule the timing of turnarounds to coincide with the scheduled shutdowns of feedstock providers and periods of relatively lower demand for the products of the relevant units. In between major scheduled turnaround maintenance events, we also plan minor scheduled maintenance periodically, during which our plants are partially or entirely shut down. We coordinate the major turnarounds for units in the Sriracha Complex to minimize the effects of the turnarounds and to optimize the Group's operations with a view to avoiding any disruption in products supply to customers during major turnarounds.

In 2014, certain of our major processing units, including CDU-3, HCU-1, CCR-1 and HVU-3, underwent major turnarounds aimed to enhance our processing capabilities and competitiveness by optimizing the efficiency and production of these processing units. As part of the major turnarounds, we improved the energy efficiency of CDU-3 by modifying the crude oil pre-heating train, incorporating high efficiency plate heat exchangers with updated configurations and installing a convection bank with higher efficiency in the CDU-3 furnace. After the completion of the major turnarounds, we were able to realize more than 10% of energy saving from the crude-fired heater, which would allow us to save up to 15MW to 20MW of fuel per year and reduce carbon dioxide emissions by 33,000 tons per year. In 2015, we completed the energy efficiency improvement programs at CDU-3 and the propane deasphalting unit. These major turnarounds have enhanced our competitiveness by lowering our operating costs, thereby enhancing our operational excellence and promoting our environmental sustainability.

In 2016, 2017 and 2018 all of major turnaround units were completed within shortened timeframes. Energy efficiency was significantly improved by the clean up of the heat exchanger and the replacement of catalysts during the major turnaround. Distillation performance improved, and as a result, we are able to produce higher value products. Our maintenance and engineering services are managed by our own staff.

Utilities and Catalysts

As part of the production process, we consume a variety of utilities, including steam, industrial water, gas and electricity. We are able to meet some of these needs through production within the Group. To the extent our internal production of these utilities is insufficient, we purchase such utilities from third parties.

Water

We use two main types of water in our refinery, raw water and seawater. Raw water used in our refinery is primarily sourced from nearby reservoirs, such as the Bang-Phra Reservoir and the Nong-Kor Reservoirs. As of June 30, 2019, the rate of water supply from the reservoirs was approximately 515 m³ per hour. We have also entered into a raw water supply agreement with Eastern Water Resources Development and Management PCL ("**East Water**"), under which East Water has agreed to provide us with raw water. Raw water accounts for approximately 66% of our refinery's water requirements.

We own seawater desalination facilities that can provide approximately 34% of our refinery's water requirements. The desalination plants supply almost all the water required for steam generation in our refinery. As of June 30, 2019, our desalination plants had a rate of water supply of approximately 270 m³ per hour and a spare water supply capacity of 80 m³ per hour for use in the event of a shortage of raw water.

To ensure a stable supply of water for our refinery, we cooperate with the Royal Irrigation Department of Thailand and East Water to closely monitor the sources of raw water supply and the pipeline system in Chonburi Province and Rayong Province, formulate water management plans for the ordinary course of our operations and prepare backup plans in the event of a shortage of raw water.

Electricity and Steam

We purchase approximately 52% and 12% of our electricity and steam requirements, respectively, from Thaipower. The balance is generated within our refinery from refinery fuel. Thaipower maintains a link with EGAT as a backup supply in case Thaipower cannot deliver sufficient amount of electricity to us. We produce steam from our gas turbine generators, fire-tube boiler and other processing units. When necessary, we can increase our steam production by utilizing the idle capacity of our spare fire-tube boilers. In addition, TOP SPP completed and commenced operations of its two small power plant on April 1, 2016 and June 1, 2016, respectively. A portion of the electricity and steam, which are approximately 30% and 52% of our electricity and steam requirements, respectively, produced from the small power plants is used in our refinery and affiliated companies once the plants commence commercial operations. We believe the reliability of our power supply is greatly enhanced by maintaining different sources for our electricity and steam requirements.

We experienced a power disruption in March 2005, where a short circuit in one gas turbine triggered a an unplanned shutdown in another gas turbine and a shutdown of our waste heat boilers. With our backup power generation systems and spared steam reserve, the processing units in our refinery was able to resume operations within a few hours, and the incident had minimal impact on our overall operations. Since the incident, we have implemented a number of initiatives aimed at preventing similar incidents, such as a debottlenecking project to build a larger power transformer connected to EGAT and the improvement of our power protective system. As a result of our initiatives, we have not experienced any power disruption since March 2005.

Natural Gas

PTT is the sole supplier of natural gas in Thailand. PTT supplies natural gas to Thaipower, TOP SPP and GPSC for power generation and to us for our refining production pursuant to a long term contract which was negotiated on an arm's length basis, with pricing determined by a specified formula.

In addition to natural gas, we have the flexibility to use other alternative fuels, such as fuel oil and liquefied petroleum gas. We believe this would minimize our risk exposure in the event of a shortage of natural gas supply.

Catalysts

Various types of catalysts are used in our production process such as hydrocrackers, naphtha hydrotreaters, diesel hydrodesulfurisation, reformers, fluidized catalytic cracker, sulfur recovery units and tail gas treating units. We evaluate and select catalysts based on their performance and prices.

Storage

Our plants have storage tanks and facilities which enable us to store our products before delivery and to store feedstock before use. We believe our storage facilities have sufficient capacity to accommodate normal operations, including foreseeable circumstances where we or one or more of our customers or feedstock suppliers may experience an unplanned plant shutdown for a limited period of time. Our inventory of products may increase from time to time, reflecting unscheduled shutdowns or other problems at our customers' plants that prevent or delay their taking delivery, as well as our inventory planning in advance of our scheduled shutdowns and our customers' inventory planning for planned production. Pursuant to the regulations of the Energy Business Department of the Ministry of Energy, each Thai refinery, including ours, is required to hold as legal reserve an equivalent of 6% of its annual throughput of crude oil and certain other feedstock for producing domestic refined petroleum products. As of June 30, 2019, our oil legal reserves were approximately 7.0 million barrels of crude oil, feedstock and oil product inventories.

Competition

We face significant competition in the refining and petrochemical markets. Given that most refinery products are commodities, we believe the main competitive criteria are pricing (which in turn depends principally on the price and availability of crude oil and other feedstock and refinery efficiency), service and lead time to product delivery. A key competitive factor is the ability to manage costs successfully, which requires management focus on reducing unit costs and improving efficiency. The main drivers in this respect include technology, scale, feedstock access, asset utilization, refined petroleum product mix, logistics, level of integration, geographical location of feedstock, plants and customers, which affect product distribution and transportation costs, and the ability to execute capital projects efficiently.

We compete in both the domestic market in Thailand and the international markets. We consider Thailand to be our principal market, not only because we are a Thai company, but because of the strength of our strategic business relationship with PTT with respect to feedstock supply and offtake arrangements and also the fact that the majority of our products are sold within Thailand. In the international markets, we compete with a number of international refineries and petrochemical companies. In these markets, proximity to our customers is an important cost-driver as delivery and freight costs affect our pricing, and therefore our price competitiveness. For this reason, our international customers are mostly located in Asia, including China, Singapore, Vietnam, Indonesia, Malaysia, Taiwan, the Philippines, Laos, Cambodia and Myanmar. However, due to our geographical proximity, we plan to further expand our sales into other parts of Asia, especially ASEAN, as well as increase our sales efforts in China, in accordance with our investment plans. See "*—Strategies.*"

There are currently seven major refining companies in Thailand, with a combined refining nameplate capacity of approximately 1,234,500 bpd as of June 30, 2019, according to the Ministry of Energy of Thailand. These include us, Bangchak, Esso (Thailand) Public Company Limited ("**ESSO**"), IRPC, PTTGC, FANG and SPRC. Our refinery competes primarily with these domestic refineries and, to a lesser degree, with regional refineries in Asia. See "*Industry Overview—Oil Refining.*"

We compete with other companies for supplies of feedstock and for outlets for our refined petroleum products. Many of our competitors produce their own feedstock and have extensive retail outlets. We do not produce any of our own feedstock for our refining operations and do not own any retail outlets. The stable supply of feedstock and ready market and distribution channels of such competitors place us at a competitive disadvantage in periods of feedstock shortages, high feedstock prices, low refined petroleum product prices or unfavorable distribution conditions. In addition, competitors with their own production or retail outlets may be better able to withstand such periods of depressed refining margins or feedstock shortages because they can offset refining losses with profits from their retail operations.

As the products from our refinery and petrochemical business units are largely commodity products, we do not expend significant resources in the marketing of our products. For the year ended December 31, 2018, and the six months ended June 30, 2019, our total selling expenses (including distribution, promotional, marketing

and marketing-related personnel costs) amounted to THB 72.9 million (US\$ 2.4 million) and THB 33.2 million (US\$ 1.1million), respectively.

Our industry is subject to extensive environmental regulations. These regulations may have a significant impact on the refining industry and may require capital outlays by us and our competitors in order to upgrade our facilities to comply with any new standards. Competitors who have more modern plants than we do may not need to spend as much to comply with these regulations and may be better able to afford the upgrade costs. For further information on environmental compliance, see “—Environment.” See also “Risk Factors—Risks Relating to Our Business— The refining, petrochemical and lube base oil industries are highly competitive.”

We aim to continuously improve production of our petrochemical and lube base oil products to ensure that we are able to most effectively use available feedstock to ensure lowest possible costs to allow us to compete effectively in the petrochemical and lube base oil markets. We believe we are able to achieve this through the use of leading production technologies, ensuring feedstock flexibility and strategically locating ourselves in the Sriracha Complex, where a large number of our customers are also located, to ensure timely and less costly delivery.

In the domestic petrochemical market, our key competitors are ESSO and PTTGC (an affiliate of ours and a member of the PTT Group).

In the domestic lube base oil market, IRPC (an affiliate of ours and a member of the PTT Group) is the other main supplier of lube base oil and related products. Our main customers are PTT and other domestic users, while IRPC’s main customers are large scale international oil companies such as Shell and Chevron. Our remaining lube base oil products which are sold internationally face competition from, in particular, other exporters from South Korea, Taiwan, Indonesia and Singapore.

Marketing

We have a sales and marketing team in Bangkok that is responsible for sales and marketing activities related to our customers worldwide. The team is focused on meeting our customers, including PTT, to understand their requirements and maintain good relationships, as well as provide customer service. We are focused on relationship management to ensure that our customers’ expectations are met.

We generally sell our products directly to our customers or through distributors.

We have a sales and marketing team in Bangkok that is responsible for sales and marketing activities related to our customers worldwide. The team is focused on meeting our customers, including PTT and PTTOR, to understand their requirements and maintain good relationships, as well as provide customer service. We are focused on relationship management to ensure that our customers’ expectations are met.

Plants and Properties

The Sriracha Complex occupies approximately 900 acres of sea front land. We currently lease approximately 60.5%, or 545 acres, of the land from the Treasury Department of the Ministry of Finance under a long-term lease, which will expire on September 10, 2022. On August 21, 2018, we signed a new long-term lease with the Treasury Department, extending the lease term of the Sriracha Complex to 2052. We own the remaining 39.5%, or 355 acres, of land. We sublease approximately 8.4% and lease approximately 12.1% of the land to our investee companies under long-term arrangements. The annual rent we pay is subject to an escalation adjustment at the rate of 15% every five years. As of June 30, 2019, our annual rental fee comprised lease fees of approximately THB 230.7 million (US\$7.5 million) and additional fee for land sublease to others of approximately THB21.4 million (US\$0.7 million).

The majority of our material plants and properties are located in the Sriracha Complex in Sriracha, Choburi Province, Thailand. Our material plants and properties, including their approximate nameplate capacities as of June 30, 2019, are set forth in the table below.

Plant/Property	Location	Usage or principal products manufactured	Unit	Approximate Nameplate capacity
Oil Refinery				
Refinery	Sriracha Complex	LPG, platformate, gasoline, get, diesel and fuel oil	Barrels/day	275,000
Lube Base Oil Refinery				
Lube Base Oil refinery	Sriracha Complex	Lube base oil, bitumen, TDAE, slack wax, extract and by-products	Metric tons/year	Lube base oil — 267,015 Bitumen — 350,000 TDAE — 67,520
Petrochemical				
Petrochemical Complex	Sriracha Complex	Paraxylene, benzene, toluene and mixed xylenes	Metric tons/year	Paraxylene — 527,000 Benzene — 259,000 Mixed Xylene — 52,000
Power Generation				
Thaioil Power co-generation power plant	Sriracha Complex	Electricity	MW	118
		Steam	Tons per hour	216
TOP SPP co-generation power plant				
	Sriracha Complex	Electricity	MW	239
		Steam	Tons per hour	498
Solvent				
Sak Chaisidhi	Rayong	Hydrocarbon solvent	Metric tons/year	141,000
Ethanol				
MCE—sugar based ethanol plant ⁽¹⁾	Tak	Ethanol	Liters/day	230,000
Sapthip—cassava based ethanol plant	Lopburi	Ethanol	Liters/day	200,000
UBE—cassava-based and molasses-based ethanol plant	Ubon Ratchathani	Ethanol	Liters/day	400,000
UAE—starch plant	Ubon Ratchathani	Starch	Metric tons/day	600
UBG—biogas plant	Ubon Ratchathani	Biogas	Cubic meters/day	35,910
NPE—biogas plant	Ubon Ratchathani	Biogas	Cubic meters/day	70,000

We also had interests in the following ships as of June 30, 2019:

Ship	Usage or principal products transported	Interest	Approximate Capacity (deadweight tons)
Chemical tanker	Petrochemical	100.0% beneficial ownership	7,000
Chemical tanker	Petrochemical	100.0% beneficial ownership	7,000
Chemical tanker	Petrochemical	100.0% beneficial ownership	2,600

Ship	Usage or principal products transported	Interest	Approximate Capacity (deadweight tons)
Chemical tanker	Petrochemical	100.0% beneficial ownership	3,500
LPG tanker	Polybutadiene	100.0% beneficial ownership	2,677
VLCC	Crude oil	50.0% beneficial ownership	281,050
VLCC	Crude oil	Bareboat charter	300,000
VLCC	Crude oil	Bareboat charter	300,000
Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
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Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
Crew and utilities boat	Crew and utilities	55.0% beneficial ownership	120
Aframax	Crude, feedstock, product storage and transportation services	50.0% beneficial ownership	100,000
Aframax	Crude, feedstock, product storage and transportation services	50.0% beneficial ownership	100,000

Investment Promotion

We have obtained investment promotion privileges from the BOI pursuant to the Investment Promotion Act B.E. 2520 (1977) (the “**Investment Promotion Act**”). Under the Investment Promotion Act, a company looking to make an investment in Thailand in certain industries or business activities that meet the criteria of the BOI may apply to the BOI for investment incentives provided by the Government, including tax privileges, relaxation of restrictions on foreign participation, business protection, land ownership rights, and customs duties reduction/exemption. The BOI grants investment promotion on a project-by-project basis and the company whose project has been granted investment promotion by the BOI must comply with general conditions as well as project-specific conditions the BOI may impose on the project.

We hold investment promotion privileges granted by the BOI with respect to our plants, industrial zones, and investment projects for our production of refining and petrochemical products and our power plants. These rights and privileges granted to us by the BOI under these investment promotion certificates include, among others:

- permission to bring into Thailand foreign technicians who are skilled workers, experts, and their spouses and dependents;
- foreign nationals who are skilled workers or experts and who are permitted to stay in Thailand shall be granted a work permit for a specific position approved by the BOI for the period of permitted stay;
- reduction or exemption of import duty on machinery approved by the BOI imported within the period specified in each investment promotion certificate;
- exemption of import duty on raw materials, things or other materials that need to be imported in order to manufacture our products for export or things that need to be imported and then exported, for one year;

- exemption of income tax for certain operations and dividends for three to eight years, subject to each project's criteria, from the date on which income is first derived from such operations. In certain emission improvement projects, corporate income tax exemption is applicable up to the total investment amount. The value of corporate income tax exempted is also limited to a certain amount, as specified in each particular investment promotion certificate, and is subject to adjustment according to the actual investment capital on the date of commencement of operation under the promoted project; and
- permission to take out or remit abroad money in foreign currency.

We are required to comply with a number of conditions set forth in each investment promotion certificate, or otherwise, risk losing the investment promotion privileges. These conditions include, among others, restrictions as to the areas where the project can be located, registered capital requirements, various reporting obligations and requirements to install and implement environmental protection systems.

Environment

Our operations are subject to significant environmental laws and regulations, including the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), and the Factory Act B.E. 2535 (1992). In 1992, Thailand strengthened its environmental laws and regulations in an effort to promote sustainable development and to better protect the natural environment.

Environmental laws and regulations that primarily relate to air emissions, water discharged and industrial waste from our facilities and, to a lesser extent, to our construction and maintenance programs affect all aspects of our business, including oil refining and construction of our new facilities. We are required by environmental laws to conduct studies of the environmental impact of a potential facility and take into consideration the environmental philosophy in the design phase of a project prior to construction or installation to assess the likely effect of our activities on the surrounding environment, to conduct mitigation and monitoring programs and to ensure that our new facilities will operate with minimal impact on the environment, the local community and biodiversity. Environmental laws also require us to maintain the emissions of our various facilities within certain limits. The primary governmental bodies which supervise our operations are the Office of Natural Resources and Environmental Policy and Planning and the Pollution Control Department, both of which are under the Ministry of Natural Resources and Environment.

The principal objectives of our environmental policy are to comply with all relevant legislation, to minimize the adverse effects that our existing and potential oil refining activities may have on the environment and local communities, and to ensure that we operate with a high degree of social responsibility. We view the safe and environmentally responsible conduct of our oil refining activities as an important aspect of our business. To achieve this, we employ a variety of pollution control and other environmental impact mitigation efforts, including the application of advanced technology to improve and reduce environmental impact such as VOCs treating by biotechnology, Sulphur treating unit- SRU, TGTU, and also emission dispersion enhancement by stack with 140 meter height. We also run a continuous emission monitoring system in the refinery stacks and a mobile air quality monitoring system in 2002. Our effluent water treatment plant applies denitrification—nitrification biotreating technology to ensure that treated waste water quality meets the environmental regulations before discharging it to the sea. We also monitor on a regular basis the emissions of our facilities and the effect that these emissions and effluents have on the surrounding air quality, water quality and terrestrial and aquatic environments, as required by environmental laws and regulations. To support our environmental protection measures, we have coordinated, cooperated with and supported governmental studies of environmental monitoring models near our refinery. We are one of the founding members of the Oil Industry Environmental Safety Group Association, which is a voluntary group comprised of oil companies in Thailand that are committed to providing mutual aid for clean-up activities in the event of oil spills.

We have adopted international codes, standards and recommended practices from the International Organization for Standardization ("ISO"), American Petroleum Institute and Process Safety Management for process safety management. We have received both ISO 14001 and OSHAS 18001 certifications. We have also received TIS 18001 certification (Thai Industrial Standard 18001 for Safety and Occupational Health Management), which have the same requirements as OSHAS 18001. While we believe we are in compliance in all material respects with applicable environmental laws and regulations, the discharge of oil or other pollutants into the air, soil or water may nevertheless give rise to liabilities to the government or third parties and may require us to incur costs to remedy the damage caused by such discharges. Furthermore, environmental laws may change

in the future, resulting in curtailment of production activities requiring additional capital expenditures or otherwise adversely affecting our operations and financial condition. See *“Risk Factors—Risks Relating to Our Business—Compliance with, and changes to, environmental, health and safety, tax and other laws and regulations may adversely affect our results of operations and our financial condition.”*

Our environmental program continues to focus on compliance and our social projects are aimed at contribution to the local community and society. We have progressively improved and adjusted our operations to conform with ISO 26000—in order to ensure that our business operates in a socially responsible manner, and in order to strengthen our corporate sustainability.

To gain long-term business value and competitiveness, we aspire to develop genuine business integration for sustainability. To achieve this, we studied all stakeholder expectations in all aspects to identify risks and opportunities to strengthen environmental management. We have initiated a five-year Environmental Master Plan (2017-2021) to proactively ensure compliance and to use as a framework for improvement of environmental sustainability efforts, addressing key components such as governance structure, technical procedure, climate strategy, water management, eco-efficiency performance, biodiversity, supplier and contractor programs, environmental audits and also management information systems. We plan to review the environment master plan at the end of the year.

Government Regulation

General

The energy industry in Thailand is under the supervision of four main government authorities: the Ministry of Energy (the **“MOE”**), the National Energy Policy Council (the **“NEPC”**), the Energy Policy and Planning Office (the **“EPPO”**) and the Energy Regulatory Commission (the **“ERC”**).

The Ministry of Energy

The Ministry of Energy oversees the country’s energy policy and energy industry. The policy includes management of the country’s indigenous resources by granting concessions for natural gas exploration and production in the Gulf of Thailand. It is also responsible for an oversight of PTT and EGAT. The Ministry of Energy also exercises its powers and duties through the DOE in the supervision of refineries to ensure safety compliance in oil and gas business operations and the supervision of oil domestic trading and oil product quality and legal reserve.

The NEPC

The NEPC is the government body established under the National Energy Policy Council Act B.E. 2535 (1992), as amended (the **“NEPC Act”**). The NEPC functions its duties by giving recommendations on the country’s energy policies and energy management and development plans to the Thai cabinet. Its powers and duties as set out in the NEPC Act include establishing rules and conditions for the determination of energy prices in conjunction with the abovementioned plans, supervising and monitoring operation of all committees relating to energy sector and constituencies, including government agencies, state enterprises and private sectors as well as performing any duties as assigned by the Prime Minister or the cabinet.

Under the NEPC, the Energy Policy Management Board (**“EPMB”**) was established by virtue of the NEPC Act to function as a screening and supporting body for the NEPC by making recommendations and/or providing comments with regard to energy management and development. In addition, the EPMB is empowered by the Prime Minister of Thailand by virtue of the Royal Decrees on Remedy and Prevention of Shortage of Fuel Oils B.E. 2516 (1973), as amended, to prescribe regulations in relation to price calculation and fuel oil pricing and to formulate policies as to the oil fuel fund contribution rates and subsidies. The EPMB has a key role in determining the policies relating to the oil fuel fund.

The EPPO

The EPPO was formerly known as the National Energy Policy Office (the **“NEPO”**) and was originally established as the secretariat to the NEPC. After the enactment of the Act on the Administrative Organization of State Affairs (No. 5) B.E. 2545 (2002) and the Act on Organizing Ministries, Sub-ministries and Departments B.E. 2545 (2002), the supervision of NEPO was transferred to the Ministry of Energy. Accordingly, NEPO’s name was changed to the Energy Policy and Planning Office.

Among the EPPO's powers and duties set out in the NEPC Act, one of its primary responsibilities is to study and analyze the country's energy policy and national management and development plan to be presented to the NEPC. Its functions and duties include monitoring, evaluating, and acting as a coordinating and supporting center for the foregoing policy and plan, collecting data, monitoring the changing energy situation, analyzing trends and making forecasts. The EPPO is also in charge of disseminating energy statistics and must perform any other duties as assigned by the Prime Minister or NEPC. In addition to the powers and duties given in the NEPC Act, the EPPO's powers and duties are given in the Emergency Decree on Remedy and Prevention of Shortage of Fuel Oils B.E. 2516 (1973) and the Energy Conservation Promotion Act B.E. 2535 (1992). As the PTT Group's principal refiner, we are required to cooperate with the EPPO on the implementation of such policies.

The ERC

The ERC was established by Energy Industry Act B.E. 2550 (2007), as amended (the “**Energy Industry Act**”) and has become the key regulatory body of energy industry in power, natural gas and the energy network system sectors. ERC's main authorities and duties are to regulate an operation of power and natural gas businesses and to ensure compliance with objectives of the Energy Industry Act under the policy approved by the Cabinet, serving as the center for submission of applications for issuance of key license required for the operation of electricity and natural gas businesses under the Energy Industry Act and other laws regarding energy business operation as well as acting as the deciding authority in relation to disputes between licensees and energy consumers, or between licensees.

Regulation Relating to Refineries

Pricing of Refined Petroleum Products and Price Stabilization

Pricing of refined petroleum products in Thailand is based on the Singapore spot market price for the relevant refined petroleum products. See “—Our Business Units and Products—Oil Refining—Oil Refining—Sales.”

Through the adjustment of oil fuel fund collection policies and petroleum tax, the Thai Government can maintain the stability of the prices of retail petroleum products. Therefore, refineries in Thailand can sell their products to their off takers at market price—the government uses the oil fuel fund and petroleum tax policy to manipulate the retail price and domestic demand pattern according to their energy policy.

The wholesale and importation of LPG, which is largely used by households as cooking gas, is no longer regulated since August 2017. Due to the resolutions of NEPC in July 2017 approving the liberalization of the LPG business, as previously contemplated by the EPMB in late 2016, the Thai Government has lifted the price control from all supply sources and allowing free import and wholesale of LPG based on global market price. According to the resolutions of the EPMB as of July 18, 2018, the benchmark price for quoting the ex-refinery price of LPG is a global LPG market price (LPG Cargo) calculated from an average of Platts' Propane Cargo price and Butane Cargo (FOB Arab Gulf) price plus importation costs. While the retail price of LPG is still controlled via the mechanism of the oil fuel fund and retail sale is still under the supervision of the Department of Internal Trade in order to ensure that there will be no unfair pricing (marking-up excessive profits from the benchmark price) by LPG retailers.

Limitation on LPG Exports

Despite the liberalization of the wholesale and importation of LPG, the export of LPG still remains regulated by the DOEB in order to prevent domestic shortages of LPG. However, it will be subject to a somewhat more relaxed regulatory framework, whereby a permission from DOEB must be obtained for LPG export and the exporter will be required to make contribution to the oil fuel fund at the rate of 0.7 Baht per kilogram of the exported LPG.

Legal Reserve Requirement

Pursuant to the regulation of the DOEB, each Thai refiner is required to hold an equivalent of 6% of its annual throughput of crude oil and an equivalent of 6% of its annual throughput of certain types of refined petroleum products (other than jet fuel oil) as legal reserve. A legal reserve for jet fuel oil varies from 6%, 10% and 20% of its annual throughput depending on the type of jet fuel oil. Subject to prior approval of the DOEB, oil refiners may reserve the requisite volume of its refined petroleum products as substitute for reserves of crude oil or other types of refined petroleum products in accordance with the criteria set out in the regulation.

Each Thai refiner is also required to hold an equivalent of 1.0% of its liquefied petroleum gas and 0.5% of its natural gas as legal reserve. From January 1, 2021 onwards, the amount of legal reserve for liquefied petroleum gas will increase to 2% while the legal reserve for natural gas will remain unchanged.

Domestic Oil Fuel Fund and Energy Conservation Promotion Fund

With effect from 24 September 2019, the operation and function of the oil fuel fund will become subject to the framework of the newly enacted Oil Fuel Fund Act B.E. 2562 (2019) (the “**Oil Fuel Fund Act**”) which are, by and large, based on the same concept under the Order of the Prime Minister of Thailand issued under the Royal Decrees on Remedy and Prevention of Shortage of Fuel Oils B.E. 2516 (1973) that first set up the oil fuel fund in 2004, but with certain modifications in the organization of supervisory agencies and operational requirements which aim to provide more efficiency, neutrality and transparency of the oil fuel fund. The Oil Fuel Fund Management Committee, a committee specifically established by the Oil Fuel Fund Act will assume the management role for the oil fuel fund which were main duties that the EPMB previously had over the oil fuel fund in place of the EPMB.

The oil fuel fund was set up to stabilize the domestic retail price of oil fuel resulting from the increase of price in the world market to minimize any adverse effect on the Thai economy. The operators of oil fuel production and distribution are obligated to make contributions to the fund in accordance with the volume produced or distributed at the rate levied by the EPMB, as adjusted from time to time. Remittance to the fund is made under the supervision of the Excise Department, the Customs Department and the Energy Fund Administration Institute. The EPMB sets the oil fuel fund contribution rates and compensation rates for various types of fuel oils produced from domestic refineries, including imported fuel oil for domestic use, which may be amended from time to time.

The energy conservation promotion fund was created to meet the requirement for working capital and expenditures and to support or promote activities relating to energy conservation. The operators of oil fuel production and distribution are obligated to make contributions to the fund at the rate as prescribed by the NEPC. The Excise Department, the Customs Department and the Department of Mineral Fuels are in charge of collecting the contributions to the fund.

Product Specification

The Thai government has imposed stringent environmental compliance regulations on petroleum products. The regulations prescribe specifications and quality of refined petroleum products, including, among others, the reduction of lead content in ULG and diesel. The Thai government has also imposed significant regulatory changes in relation to the quality of refined petroleum products, including the reduction of lead content in ULG and diesel.

The Thai Cabinet Resolution of May 17, 2005 approved a new strategy to attempt to solve Thailand’s energy shortages by promoting the use of renewable energy sources, including natural gas for vehicles, gasohol and biodiesel, in place of oil. The foregoing Cabinet resolution also set a goal for phasing out the use of 95-octane unleaded gasoline by January 1, 2007. However, this complete phase-out has not yet occurred and 95-octane unleaded gasoline was, as of the date hereof, still sold in Thailand but is becoming less common over time. In addition, the Thai Cabinet Resolutions of December 27, 2011 and of October 9, 2012 approved the resolutions of the NEPC to call for a phase-out of 91-octane unleaded gasoline by January 1, 2013, which has been completed. As a substitute for unleaded gasoline, the Thai government intends to encourage the use of gasohol containing ethanol content in the volume pursuant to the applicable statutory minimum imposed for each type of gasohol. The minimum volume of ethanol in gasohol is variable depending on the type of gasohol. From 2010, regulations of the DOEB which are issued from time to time, by virtue of the Fuel Oil Trading Act B.E. 2543 (2000), include a requirement that gasohol sold in Thailand, unless otherwise exempt pursuant to certain conditions set out in the regulations, must consist of denatured ethanol within a range of percentage of volume as specified in the regulations.

Product specifications may vary from product to product and may depend on purposes of using such product. For example, refined petroleum products for export purposes may be exempt from compliance with the stringent specification and quality control in Thailand upon prior approval from the Director General of the DOEB.

Air Emission Standards

The scope of regulatory emission standards have set emission source standards and ambient standards, thus covering operational control and operational impact of emissions. Thus, as part of our emissions management,

we focus on both the internal operations of the emission source and the external impact following the ambient standard.

In respect of the emission source standards for air emissions from refineries, the Thai government has adopted notifications prescribing the controlled standards of other emissions, including the notification of the Ministry of Industry in 2010 and the notifications of the Ministry of Natural Resources and Environment in 2011, which set out the controlled standards for the emission of particulate matter, sulfur dioxide, carbon monoxide, hydrogen sulfide, mercury, lead and oxides of nitrogen emitted from petroleum refinery plants; as well as the notification of the Ministry of Natural Resources and Environment in 2010 setting controlled standards for Total Volatile Organic Compounds (VOCs) from fuel storage facilities and the notification of the Ministry of Industry in 2012 setting controlled standards for leak emission of Volatile Organic Compounds from petroleum refinery plants and petrochemical plants. Apart from emission source standards, there ambient standard on emissions on an area basis (e.g. sulphur oxide, nitrogen oxide, VOCs, benzene, etc.). The Pollution Control Department monitors ambient standards.

To ensure all emissions are within the standards, the CEMs monitoring system installed connect directly online to Department of Industrial Works (DIW) and the sampling monitoring period in the EIA plan has been conducted on both an operational level and ambient level to ensure that emissions from the refinery and its affiliate will not impact on area basis. See *“Risk Factors—Risks Relating to Our Business—Compliance with, and changes to, environmental, health and safety, tax and other laws and regulations may adversely affect our results of operations and our financial condition.”*

Regulation Relating to Electricity

Governance and regulation of energy businesses in Thailand is enforced under the Energy Industry Act which came into effect on December 11 2007. The law aims to restructure the energy industry and increase efficiency by separating policy-making, regulatory and operational functions and allowing for greater participation in the power industry by the private sector, the local community, and the public. Moreover, the Energy Industry Act provides for the establishment of ERC to supervise and regulate both the power industry and the natural gas industry, including the granting, suspension or termination of licenses for energy sector operations. It is tasked with ensuring the separation of the activities of policy making, regulation and operations in Thailand’s energy industry. One mandate of the ERC is to prevent abusive use of monopoly power and protect energy consumers and other segments of society that may be adversely affected by activities of the energy industry in part through a licensing regime.

Under the Energy Industry Act, any operation in the power business, either with or without remuneration, is required to obtain a license from the ERC, unless otherwise exempted by the Royal Decree dated June 1, 2009 prescribing the types, capacity and characteristics of energy business exempted from the license requirement. A power plant which has a generator with capacity greater than 200 kilo-volt-ampere is also required to obtain another license from the ERC under the Energy Development and Promotion Act B.E. 2535 (1992). Moreover, in accordance with the Electricity Generation Authority of Thailand Act B.E. 2511 (1968), any operator of a power plant with a capacity greater than 20 megawatt for supplying to its facilities or greater than six megawatt for selling to the public is required to obtain permission from EGAT on any connection with the electric system of EGAT, the MEA or the PEA. EGAT may impose any conditions concerning the quality, engineering technique and safety of such connection.

The Power Development Plan 2015-2036 (“**PDP 2015**”) was replaced by the Power Development Plan 2018-2037 (“**PDP 2018**”) by the approval of the NEPC in January 2018 and the Thai Cabinet in April 2018 respectively in order to adjust the Power Development Plan to be more consistent with the direction of national economic and social development plan. The PDP 2018 embraces three major principles:

- *Security of national power system.* The security of the country’s power system is reflected through its generation, transmission and distribution systems designed to respond to the national economic and social development plan and encourage fuel diversification with an aim to reduce the country’s over dependence in a particular type of fuel, including an expansion of power plant numbers for energy security in case of energy crisis;
- *Economy.* Supporting low-cost electricity generation to reduce end-user’s burden as well as effective cost management of power generation; and

- *Ecology.* Reducing environmental impact, promoting renewable energy, and enhance efficiency in the power generation and consumption by development of a smart grid power network system.

PDP 2018, provides for reliability in the power system of subsystem areas in terms of generation, transmission and distribution, promoting electricity production with low investment costs to reduce customer expenses and support economic and community long-term development and preparing readiness of the power system to be more competitive in electricity production.

See “*Risk Factors—Risks Relating to Our Business—Compliance with, and changes to, environmental, health and safety, tax and other laws and regulations may adversely affect our results of operations and our financial condition.*”

Employees

As of June 30, 2019, we had approximately 1,539 full-time employees in our operations, as well as approximately 625 contractors.

Our remuneration package includes salary, overtime, bonus, allowances, welfare benefits and gratuity. Employees are also entitled to receive certain company subsidies relating to housing, medical care, children’s education and other miscellaneous benefits, such as annual leave and special leave for military service, maternity and funerals. As part of the remuneration, we contribute 5% to 15% of an individual employee’s salary monthly to the registered applicable provident fund while the employees may choose to contribute 5% to 15% of their salaries to the fund.

We believe that we have well-trained and experienced employees. As of June 30, 2019, there were 881 employees holding a bachelor’s degree or higher (Bachelor’s 528, Master’s 344, Doctoral 9). 54.1% (833/1,539) of our employees have been employed by us for more than 10 years. We have invested significant efforts and resources in our employee development program.

Our employees are classified into four major groups:

- junior staff, consisting of technicians, operative and clerical staff;
- supervisory staff, consisting of team leaders, assistant engineers and semi-professionals;
- senior staff, consisting of section heads, engineers, senior engineers and professionals; and
- management.

Historically, we believe we have enjoyed good labor relations and we are committed to maintaining these strong relationships. As of June 30, 2019, approximately 31.8% (490/1,539) of our of our employees were members of the Thaioil voluntary labor union. A committee made up of management and union member reports to the national state enterprise employees union representative on a regular basis. We have not been subject to any strikes or other labor disturbances that have interrupted our operations.

Insurance

Our insurance policies cover the following:

- physical loss or damage and business interruption;
- third party liability;
- all risks for properties other than our plants, such as office buildings, office appliances and petrol stations;
- construction all risks;
- marine cargo; and

- directors and officers liability.

We believe our policies are in accordance with customary industry practices, including deductibles and coverage amounts. We have a physical loss or damage and business interruption insurance policy, which includes coverage for fire, flood, earthquakes, severe storms, vehicular damage, damage to oil and material stocks and real property owned or held under custody by us and against business interruption, subject to certain limitations. In addition, we have a third party liability and marine open cargo insurance policy. We also take out an all risks insurance policy for other properties not relating to the refining process. Such insurance policies are renewed on an annual basis. Our insurance covers liability arising out of operations at the refinery and the power plants, including premises, products and operations risks within Sriracha, Choburi Province, within Thailand and worldwide, but excludes, for certain insurance policies, the United States and Canada. Our insurance does not cover sabotage, certain risks arising from war and terrorism or environmental pollution liability. Furthermore, our insurance policies are subject to deductibles and are renewed annually. See *“Risk Factors—Risks Relating to Our Business—Our insurance coverage may not adequately protect us against possible risk of loss.”*

Legal Proceedings

As is the case with many companies in the refining and petrochemical industry, we are and may from time to time become a party to claims and lawsuits incidental to the ordinary course of our business.

We currently are not involved in any litigation or legal proceeding which we believe will have a material adverse effect on our business, financial condition or results of operations.

Technological Support

We initiated our own oil research and development in 2012. Before this, we have had access to advanced technological, operative and engineering know-how through a long-standing non-exclusive technical services agreement (the **“SGSI Technical Services Agreement”**) with Shell Global Solutions International (**“SGSI”**) since our inception.

Previously, we obtained the necessary know-how and experience and the latest developments in petroleum refining and products from SGSI through the SGSI Technical Services Agreement. We terminated the SGSI Technical Services Agreement in September 2011 and entered into a new technical services agreement with PTTES and SGSI (the **“PTTES-SGSI Technical Services Agreement”**) with regards to technical services from both PTTES and SGSI.

SGSI currently provides technical services to refineries worldwide, and our refinery is part of this extensive technical data bank. The PTTES-SGSI Technical Services Agreement allows us to be constantly updated regarding all technological, operational and engineering aspects of oil refining as well as crude oil and product quality matters. Of particular value to us are SGSI’s process/engineering trouble shooting and technical development training courses, technical publications, technical conferences, computer network systems, engineering systems, and information on standards and developments on safety. Through the PTTES-SGSI Technical Services Agreement, we are able to benefit from the research and development efforts of this industry leader. In addition, in July 30, 2014, we entered into an agreement with the National Science and Technology Development Agency to establish a research and development center, which will focus on researching relating to products development and operations. Since May 2008, we have also signed three memoranda of understanding to collaborate with the PCC and Chulalongkorn University to establish a 275-square meter research and development center located in the PPC. Our research and development initiatives have helped us improve our operations. For example, we successfully improved the preheat train mechanism for our CDU-3 based on results from our research and development projects. To date, the know-how and experience made available to us has allowed us to develop and operate a complex refinery without large expenditures on research and development.

As of June 30, 2019, our technology department comprised 60 persons, of which 48 persons were chemical engineers. The team’s main responsibilities consist of the following:

- technological support to each refining/petrochemical area;
- project development;
- project execution;

- refining process control for basic and advanced controllers; and
- technical audit.

Together with the commercial department and other related departments, the technology department is involved in decision-making to optimize our throughput, feedstock selection, refinery operations and scheduled turnaround.

Risk Management and Safety

Our risk management, loss prevention and safety management processes, ranging from operational procedures, process hazard analysis, asset integrity and reliability, compliance with standards, work practices, safety functions to change of management, contractor management, emergency management and employee training, are in line with international standards and include quality assurance, occupational health, safety and environmental procedures. We carry out a risk-based approach to our inspection activities and our technical and non-technical functions. We use a computerized maintenance management system by SAP for planning and recording of inspection and maintenance activities. We also use SAP for human resource management, financial accounting and controlling, purchasing and inventory systems.

We emphasize a culture of safety through line responsibility training of our employees and contractors, area inspection activities and involvement of line management. We believe we have a strong culture and personal safety record, with lost time frequency rates for staff and contractors due to accidents decreasing over the past few years. We record all reportable accidents and conduct regular technical safety audits.

We are subject to various Thai health and safety laws, which impose certain general duties and procedures in relation to health and safety in the workplace. In accordance with these laws, we have implemented safety procedures to help protect the health and safety of our workers, assets and the environment.

We have implemented a special software tool, Thail Information Portal System, to provide a well-structured documentation system. We have also implemented a plant information software system, which is a data recording and information tool that will improve plant monitoring and our operational technology. The plant information software system will maintain data for thousands of process variables, such as track throughput rates and heater tube skin temperatures, from which trends can be produced to, among others, trouble-shoot process problems.

We have adopted a proximity card access system to verify the access of eligible persons and movement-activated closed circuit television monitor for our refinery. Our refinery site has been classified into three zones based on security and plant hazard areas to control access of personnel and vehicles.

Our operational structure is customized to suit our environment. Teams of personnel from our technology, operations and engineering departments from area production units manage four individual operational areas. They have joint performance targets and work together to achieve safe and economic operation of their unit.

Since 1996, we have adopted the ISO System as a basis for managing product quality control, testing calibration, environment, occupational health and safety. In 2009, we made progress with the Integrated Management System, unifying all three internal standard systems to improve the efficiency of the overall management system and to better respond to needs and expectations from stakeholders. These three systems are Quality Management Systems (ISO 9001:2015), Environmental Management Systems (ISO 14001:2015) and Occupational Health & Safety Management Systems (TIS 18001:2554 & BS OHSAS 18001:2007). In 2012, we integrated the Operational Management System (OEMS) to enhance process safety management (PSM) and help prevent major incidents. In 2010 and 2012, these systems underwent reassessment for Thai Lube Base and Thai Paraxylene, and we achieved certification of Energy Management Systems (ISO 50001:2011) surveillance for CDU-3 and all refining units of Thai Lube Base. In 2016 TP achieved ISO 9001:2008 and reassessed as ISO 9001:2015 in 2017. Furthermore, in 2017 TOPSPP and LABIX also achieved three systems which are ISO 9001:2015, ISO 14001:2015, TIS 18001:2554 & BS OHSAS 18001:2007 and IMS System. In addition, we focus on product quality control and require testing and calibration laboratories to meet our requirement of competence in order to comply with the requirements of the agreements and sales contracts with our customers.

In 2011, we obtained a certification of Information Security Management System (ISO/IEC 27001) for Advanced Process Control Network to protect data from threats and other risks. We also obtained the ISO/IEC

27001 certification for our Instrument control system and our data center in 2012 and 2013 respectively. In 2015, we obtained recertification for our “integration 3” scopes and the upgrading of the Information Security Management System (ISO/IEC27001).

MANAGEMENT

Board of Directors

Our board of directors has ultimate responsibility for the administration of our Company's affairs. Our Articles of Association provide for a board of directors of at least five but not more than 15 directors. As of the date of this Offering Memorandum, our board of directors consists of 15 members, 14 of whom are Non-Executive Directors. Out of the 14 Non-Executive Directors, 6 are Independent Directors. Our Articles of Association require the board of directors to hold a meeting at least once every three months.

The following table sets out our current directors, their position(s) on the board of directors and board committees, their age and the date of their appointment to the board.

Name	Position	Age	Date Appointed
Prof. Dr. Thosaporn Sirisumphand	Director; Chairman of the Board	59	Re-elected: April 11, 2018
Mr. Kanit Si	Independent Director; Chairman of the Audit Committee	69	Re-elected: April 10, 2019
Ms. Chularat Suteethorn	Director; Member of the Risk Management Committee	65	Re-elected: April 11, 2018
Associate Prof. Dr. Pasu Decharin	Independent Director; Member of the Audit Committee; Member of the Nomination and Remuneration Committee;	51	April 11, 2018
ACM Suttipong Inseeyong	Independent Director; Chairman of the Nomination and Remuneration Committee	62	Re-elected: April 7, 2017
Mr. Auttapol Rerkpiboon	Director; Chairman of the Risk Management Committee; Member of the Nomination and Remuneration Committee	54	Re-elected: April 10, 2019
Pol. Gen. Aek Angsanantont	Independent Director; Chairman of the Corporate Governance Committee	64	April 7, 2017
Mr. Yongyut Jantararotai	Director; Member of the Corporate Governance Committee	60	Re-elected: April 7, 2017
Gen. Kukiat Srinaka	Independent Director; Member of the Corporate Governance Committee	59	Re-elected: April 10, 2019
Mr. Praphon Wongtharua	Director;	58	Re-elected: April 10, 2019
Ms. Phannalin Mahawongtikul	Director; Member of the Risk Management Committee	55	September 28, 2018
Mr. Praphaisith Tankeyura	Independent Director; Member of the Audit Committee	64	August 30, 2019
Mr. Preecha Pocatanawat	Director	58	April 10, 2019
Ms. Duangporn Thiengwatanatham	Director	58	Re-elected: April 10, 2019
Mr. Wirat Uanarumit	Director; Member of the Risk Management Committee; Chief Executive Officer and President; Secretary to the Board	57	June 21, 2019

Professor Dr. Thosaporn Sirisumphand has been serving as Independent Non-Executive Director since May 25, 2012 and serving as Non-Executive Director since August 23, 2018 according to the Company's regulations that the Company's Independent Directors. He was elected as the Chairman of the Board since April 7, 2017. He currently serves as Secretary General of the National Economic and Social Development Council; Director and Chairman of Corporate Governance Committee of the Bank of Thailand; Director and Chairman of the Board of Tourism Authority of Thailand; Member of Chulalongkorn University's Council; Director of Creative Economy Agency (Public Organization); Member of Council of State, and President of Chulalongkorn University Preparatory School Alumni Association Under His Royal Patronage. Professor Dr. Sirisumphand previously served as Secretary General of the Public Sector Development Commission, the Office of the Higher Education Commission and the Office of the Public Sector Development Commission, as well as Advisor of the Prime Minister's Office. He received a Ph.D. in Policy Analysis, Public Administration and Comparative Politics and a Master's degree in Public Administration from Northern Illinois University, U.S.A. and a Bachelor's degree in Public Administration from Chulalongkorn University, Thailand.

Mr. Kanit Si was appointed as Independent, Non-Executive Director on January 26, 2018. He was elected as the Chairman of the Audit Committee on September 20, 2019. He currently serves as Senior Executive Vice President of Bangkok Bank PCL., Director of TPT Petrochemicals PCL; Director of Indorama Polyester Industries PCL; and Independent Director and Member of the Nomination, Compensation and Corporate Governance Committee as well as the Sustainability and the Risk Management Committee of Indorama Ventures PCL. He received a Master's degree in Business Administration (Finance and Quantitative Method), University of New Orleans, U.S.A. and a Bachelor's degree in Engineering from Chulalongkorn University, Thailand.

Ms. Chularat Suteethorn has been serving as Independent Non-Executive Director since September 20, 2013 and serving as Non-Executive Director since September 20, 2019 according to the Company's regulations that the Company's Independent Directors. She is also a Member of the Risk Management Committee. She currently serves as the Chairman of the Board of Neighbouring Countries Economic Development Cooperation Agency (Public Organization); Member of the Insurance Commission by Expertise (Economics); and Director of MFC Asset Management PCL. Ms. Suteethorn previously served in several positions in the Ministry of Finance – Vice Minister, Director General of the Public Debt Management Office, and Inspector General. Ms. Suteethorn received a Master's degree of Development Studies in Economic Policy and Planning from the Institute of Social Studies, Rotterdam Erasmus University, the Netherlands and a Bachelor's degree in Economics in Banking and Finance from Kasetsart University, Thailand.

Associate Prof. Dr. Pasu Decharin was appointed as Independent, Non-Executive Director on April 11, 2018. He is also Member of the Audit Committee as well as Member of the Nomination and Remuneration Committee. He currently serves as the Independent Director and Member of the Audit Committee of Siam Commercial Bank PCL; Independent Director, Member of the Audit Committee and Member of the Governance and Nomination Committee, Siam Cement PCL; Independent Director of Aksorn Education PCL; and Independent Director and Chairman of the Board, Warrix Sports Co., Ltd. He is also serving as Lecturer of Faculty of Commerce and Accountancy, Chulalongkorn University; and Director of AUA Language Centre. Associate Prof. Dr. Decharin received a Doctorate Degree of Philosophy in Management of Technology from Asian Institute of Technology; a Master's degree in Business Administration (General Management) from University of Colorado (Boulder), U.S.A. and a Bachelor's degree in Business Administration (Management) from Chulalongkorn University, Thailand.

ACM Suttipong Inseeyong has been serving as Independent, Non-Executive Director since January 22, 2016. He was elected as the Chairman of the Nomination and Remuneration Committee on May 17, 2017. He currently serves as Supreme Court Judge. ACM Inseeyong previously served as Deputy Chief of Defence Forces of Thai Armed Forces; a Member of the National Legislative Assembly; and served in several positions in Royal Thai Air Force – Assistant Commander-in-Chief, Commander of Directorate of Air Operation Control, Deputy Chief of the Air Staff for Operations, Assistant Chief of the Air Staff for Operations, and Director of Operations. ACM Inseeyong obtained a Bachelor's degree in Political Science Program in International Relations and Comparative Government and Politics from Sukhothai Thammathirat Open University, and a Bachelor's degree of Science in Aeronautical Engineering from The Royal Thai Air Force Academy, Thailand.

Mr. Auttapol Rerkpiboon has been serving as Non-Executive Director since April 11, 2018. He was elected as the Chairman of the Risk Management Committee on June 11, 2019 and Member of the Nomination and Remuneration Committee on May 31, 2019. He currently serves as Chief Operating Officer at Downstream Petroleum Business Group, PTT PCL; Director and Chairman of the Board at PTT Oil and Retail Business PCL; and Director and Chairman of the Board at PTT Tank Terminal Co., Ltd. He is also serving as Member of Payment

Systems Committee at Bank of Thailand. Mr. Rerkpiboon received his Diploma of Petroleum Management from Oxford University, United Kingdom; a Master's degree in Economics Program from the National Institute of Development Administration and a Bachelor's degree in Engineering (Civil Engineering) from Chulalongkorn University, Thailand.

Pol. Gen. Aek Angsananont was appointed as Independent, Non-Executive Director on April 7, 2017. He was elected as the Chairman of the Corporate Governance Committee on June 21, 2017. He currently serves as Independent Director and Chairman of the Board of Big C Supercenter PCL; Director and Chairman of the Nomination and Remuneration Committee, Glow Energy PCL; Director and Member of the Audit Committee, Royal Orchid Hotel (Thailand) PCL; Member of Ramkhamhaeng University Council; and a Member of Committee of Property Management Office at Thai Red Cross Society. Pol. Gen. Angsananont previously served as Permanent Secretary, Office of the Permanent Secretary of The Prime Minister's Office and Deputy Commissioner General of Royal Thai Police. He received a Master's degree in Law from Chulalongkorn University, a Bachelor's degree in Law from Ramkhamhaeng University, a Barrister-at-Law from The Institute of Legal Education at Thai Bar Association, as well as Certificate of Senior Police Command, Police College Bramshill, United Kingdom.

Mr. Yongyut Jantararotai has been serving as Non-Executive Director since April 2, 2014. He is also a Member of the Corporate Governance Committee. He currently serves as Director General of Department of Alternative Energy Development and Efficiency, Ministry of Energy. Mr. Jantararotai previously served in several positions in Ministry of Energy – Deputy Permanent Secretary, Inspector General, the Deputy Director General of the Department of Alternative Energy Development and Efficiency, Assistant of Permanent Secretary, as well as Director of the Office of the Minister. He received a Bachelor's degree in Civil Engineering from Kasetsart University, Thailand.

Gen. Kukiat Srinaka has been serving as Independent, Non-Executive Director since November 23, 2018. He is also a Member of the Corporate Governance Committee. He currently serves as Deputy Permanent Secretary for Defence, Ministry of Defence. Gen. Srinaka previously served in several positions in Royal Thai Army – Assistant Commander-in-Chief, Commanding General of 1st Army Area, Commanding General of 1st Corps, Deputy Commanding General of 1st Army Area, and Commanding General of 2nd Infantry Division, Queen's Guard. He received a Master's degree in Public Administration from Burapha University and a Bachelor's degree in Science from Chulachomklao Royal Military Academy, Thailand.

Mr. Praphon Wongtharua has been serving as Non-Executive Director since February 15, 2019. He currently serves as Inspector General of Ministry of Energy. Mr. Wongtharua previously served in several positions in Ministry of Energy – Director General of the Department of Alternative Energy Development and Efficiency, Deputy Permanent Secretary, Deputy Director General, as well as Director of Bureau of Biofuel Development. He received his Master's degree and Bachelor's degree in Mechanical Engineering from Chulalongkorn University and King Mongkut's University of Technology North Bangkok, Thailand, respectively.

Ms. Phannalin Mahawongtikul was appointed as Non-Executive Director on September 28, 2018. She is also a Member of the Risk Management Committee. She currently serves as Chief Financial Officer of PTT PCL. Ms. Mahawongtikul previously served as Executive Vice President-Corporate Finance and Vice President-Finance Strategy and Policy at PTT PCL, and secondment to PTT Exploration and Production PCL as Senior Executive Vice President, Finance and Accounting Group. She received a Master's degree in Business Administration (M.B.A.) and a Bachelor's degree of Science in Accounting (B.B.A.) from Thammasat University, Thailand.

Mr Praphaisith Tankeyura was appointed as Independent, Non-Executive Director on August 30, 2019. He is also a Member of the Audit Committee. He currently serves as Managing Director of Boathouse Hua Hin Co., Ltd.; Chairman of Advisory Board, JWS Construction Co., Ltd.; Independent Director, Chairman of the Audit Committee, Corporate Governance and Corporate Social Responsibilities, and Member of Nomination and Remuneration Committee, Krungthai Card PCL; Governor Performance Evaluation Subcommittee, Islamic Bank Asset Management Co., Ltd.; Director and Executive Chairman, Maboonyong Real Estate Co., Ltd.; and Director and Executive Director, Small and Medium Enterprise Development Bank of Thailand. He received a Master's degree in of Business Administration (Finance) from Florida State University, U.S.A. and a Bachelor's degree of Science in Statistics (Applied Statistics for Business) from Chulalongkorn University, Thailand.

Mr Preecha Pocatanaawat was appointed as Non-Executive Director on April 10, 2019. He currently serves as Senior Executive Vice President-Organization Management and Sustainability, PTT PCL. Mr. Pocatanaawat previously served as Executive Vice President-Corporate Human Resources at PTT PCL and Vice President-

Finance, Account and Corporate Support at HMC Polymers Co., Ltd. He received Bachelor's degree in Laws and Business Administration from Ramkhamhaeng University, as well as a Barrister-at-Law from The Institute of Legal Education at Thai Bar Association.

Ms. Duangporn Thiengwatanatham has been serving as Non-Executive Director since September 28, 2018. She currently serves as Senior Executive Vice President-Downstream Business Group Alignment at PTT PCL. Ms. Thiengwatanatham previously served in several positions in PTT PCL – Executive Vice President-Innovation Institute, Executive Vice President at PTT Research and Technology Institute, Executive Vice President-Downstream Business Group Collaboration, Executive Vice President, Downstream Business Group Planning, and Executive Vice President-Subsidiary Planning & Management Petrochemical & Refining Business Unit. She received a Master's degree in Business Management from Sasin Graduate Institute of Business Administration of Chulalongkorn University and Master's degree in Chemical Engineering from The University of British Columbia, Canada, as well as a Bachelor's degree in Chemical Engineering from Chulalongkorn University, Thailand.

Mr. Wirat Unarumit was appointed as Executive Director on June 21, 2019. He is also appointed as Chief Executive Officer and President; Secretary to the Board and Member of the Risk Management Committee on September 1, 2019. He currently serves as Chief Operating Officer at PTT PCL; Director and Member of the Risk Management Committee at Global Power Synergy PCL, Director at Thai Lube Base PCL, Thai Paraxylene Co., Ltd. and Thailoil Power Co., Ltd.; Director and Chairman of the Board at Thailoil Marine Co., Ltd. and TOP SPP Co., Ltd.; Chairman of the Board at Thailand - Malaysia Business Council; and Director and Member of the Audit Committee, Thailand Management Association. Mr. Unarumit received a Master's degree in Business Administration (Financial Management) from Pennsylvania State University, U.S.A. and a Bachelor's degree in Electrical Engineering from Chulalongkorn University, Thailand.

The business address of all our directors is our registered office.

Under our Articles of Association, directors serve a maximum term of three years. At every annual general meeting, one-third of the directors must retire from office. The directors to retire during the first and second years after our incorporation are to be drawn by lots. In subsequent years, directors who have been in office for the longest period will retire. However, a director whose term in the office expires can be re-elected.

Board Committees

Our board of directors has four board committees: the Audit Committee, the Nomination and Remuneration Committee, the Corporate Governance Committee and the Risk Management Committee. All board committees report directly to our board of directors. Members of these board committees are appointed by the board of directors from time to time.

Audit Committee

The Audit Committee shall consist of fully qualified members against SEC and SET requirements. A minimum of three members must be Independent Directors, at least one of whom must be an accounting graduate with adequately qualified and experienced in reviewing the credibility of financial statements. The Committee reviews Thailoil's performance outcomes, financial reports, internal control system, and consider related-party transactions, the appropriateness of accounting (external) auditors, including the selection and appointment process.

The current members of the Audit Committee (each, an Independent Director) are:

Name	Position
Mr. Kanit Si.....	Chairman of the Audit Committee, with sufficient expertise and experience to review creditability of financial statements
Associate Prof. Dr. Pasu Decharin	Member of the Audit Committee
Mr. Praphaisith Tankeyura	Member of the Audit Committee, with sufficient expertise and experience to review creditability of financial statements

Ms. Prapin Thongnium, Vice President-Corporate Internal Audit, serves as Secretary to the Audit Committee.

Each Committee member is in accordance with the Board of Directors' term. In the case of any Audit Committee member vacating the position, resulting in the insufficient number of the committee members, the Board shall appoint another director, who is fully qualified, to replace the resigning member not later than three months from the date of incomplete composition of the Audit Committee. Members of the Audit Committee shall immediately be terminated from the position by death, resignation, vacating the position, the Board of Directors' resolution to vacate the position, or lack of qualifications of the Audit Committee member.

The Audit Committee has the responsibilities set out below.

1. Reviews the efficiency and effectiveness of the good corporate governance, risk management, and internal control processes.
2. Reviews the Company's financial reporting process to ensure its accuracy, credibility, and sufficient information disclosure by coordinating with the external auditors. The responsible executive is required to prepare quarterly and annually financial reports to comply with the Thai Financial Accounting Standards and to promote the development of accounting systems to be comparable to the International Financial Accounting Standards.
3. Reviews the Company's compliance with laws governing securities and stock exchange, or requirements of the Stock Exchange of Thailand, and other policies, rules, regulations, charters, and laws applicable to the Company's business.
4. Reviews the Connected Transactions or the transactions that may lead to conflicts of interests and consider the information disclosure to ensure that they are in compliance with the laws and the Stock Exchange of Thailand's regulations.
5. Considers to select, nominate, re-elect, and terminate the Company's external auditors and to propose the auditors' remuneration to the Board of Directors before tabling to the shareholder's meeting for approval respectively. The Audit Committee, also, is to meet with the external auditor without executives at least once a year.
6. Reviews the anti - corruption self - assessment for certification process and sign by The Chairman of the Audit Committee.
7. Finds facts and track progress of complaints that may imply fraud that the Audit Committee has received through the whistle blowing channels to ensure duly action.
8. Reviews and provides opinion on internal audit plan and system to meet internationally - accepted methods and standards.
9. Considers the independence of the Internal Systems Audit Section including the adequacy of the budget and workforce of the Internal Systems Audit Section, and considers to approve the appointment and relocation of, and evaluates the annual performance of the Head of the Internal Systems Audit Section.
10. The Audit Committee may seek independent opinions from professional advisors or specialists in other fields when needed under the Company's expense with the approval from the Board of Directors. The employment of advisors or specialists must comply with the Company's regulations.
11. Chairman or members of the Audit Committee shall attend the shareholders' annual general meeting in order to clarify issues associated with the Audit Committee or appointment of the external auditors.
12. Approves the disclosure of quarterly financial statements to the Stock Exchange of Thailand.
13. Reports the operating results of the Internal Audit to the Board of Directors annually. Such report must includes the Audit Committee's opinion on internal audit, opinions on financial reports, adequacy of internal control systems, and other applicable topics to the Board of Directors as deemed appropriate.

14. Approves the Audit Committee Charter before presenting to the Board of Directors for approval. The Committee shall review its charter at least once a year.
15. Prepares the Audit Committee's report signed by the Chairman of the Audit Committee. The report is to be disclosed in the Company's annual report in accordance with the requirement of the Stock Exchange of Thailand, and shall consist of at least the following information:
 - (a) Opinion(s) on the accuracy and credibility of the Company's financial report;
 - (b) Opinion(s) on the adequacy of the Company's internal control system;
 - (c) Opinion(s) on the compliance with the law on the Securities and Exchange Commission, the Stock Exchange of Thailand's regulations, or laws applicable to the Company's business;
 - (d) Opinion(s) on the suitability of the external auditors;
 - (e) Opinion(s) on the transactions that may lead to conflicts of interests;
 - (f) The number of the Audit Committee's meetings and the attendance of such meetings of each committee member;
 - (g) Opinion(s) or overview comment gained from the Audit Committee's its performance or duties in accordance with the Committee Charter; and
 - (h) Other reports which should be known to the shareholders and general investors under the roles and responsibilities as assigned by the Company's Board of Directors.
16. After the Audit Committee receives from the auditors the information on any suspicious circumstances that the director, manager or any person responsible for the Company's operation commits an offence under the Securities and Exchange Act, the Audit Committee is required to report the preliminary inspection to the Company's Board of Directors prior to reporting the Securities and Exchange Commission and the Company's auditors within 30 days from the date of the auditor's notification is received.
17. For the Audit Committee's duty, if it is found or suspected that there is any transaction or action that may materially affect the Company's financial condition and operating results, the Committee shall promptly report it to the Board of Directors for rectification in a timely manner.
 - (a) A transaction which causes a conflict of interest;
 - (b) Any fraud, irregularity, or material defect in the internal control system;
 - (c) An infringement of laws or the Stock Exchange of Thailand's regulations, and any laws applicable relating to the Company's business.

If the Audit Committee reports to the Board of Directors on suspicious actions and discusses with the Board and executives on the rectification of such issue, when it is due time, as agree by all involved. If the Audit Committee finds that the Board or executives fail to make corrective actions without a justifiable reason, any member of the Audit Committee may report such transaction or action directly to the Securities and Exchange Commission or the Stock Exchange of Thailand.

18. Performs other duties as assigned by the Company's Board of Directors, with the approval of the Audit Committee.

Under its scope of duties and responsibilities, the Audit Committee is authorized to invite the executives, or any concerned persons to give suggestions, to attend the meeting, or to deliver necessary information.

In its performance of duties, the Audit Committee must be directly responsible to the Company's Board of Directors, while the Company's Board of Directors shall remain responsible to third parties for the operations of the Company.

Financial Reports and External Audit

The Audit Committee oversees our financial reporting and external audit. In this role, the Audit Committee has the responsibilities set out below:

- reviewing the accuracy, creditability, and sufficient disclosure of our financial reports and ensuring our compliance with the Thai Financial Reporting Standard (TFRS), International Financial Reporting Standard (IFRS), laws, and relevant standards;
- considering and selecting the external auditor, and recommending remuneration for the external auditor for approval by the board of directors; and
- encouraging independence and providing an opinion on the suitability of the external auditor to the board of directors.

Internal Controls

The Audit Committee oversees our internal controls. In this role, the Audit Committee has the responsibilities set out below:

- reviewing the adequacy and effectiveness of our internal control system;
- reviewing the appropriateness of our risk management system and risk measurement procedures; and
- reviewing our internal whistleblowing procedures concerning incident reports and complaints.

Internal Audit

The Audit Committee oversees our internal audit functions. In this role, the Audit Committee has the responsibilities set out below:

- reviewing the adequacy and effectiveness of our internal audit system and ensuring compliance with the internal audit standards of the Internal Audit Department.
- overseeing the independence of the Internal Audit Department;
- reviewing the appointment and replacement, and evaluating the performance of, the head of the Internal Audit Department;
- reviewing and approving the charter of the Internal Audit Department;
- approving and evaluating annual internal audit plans to ensure consistency with our types and levels of risks;
- jointly reviewing and examining audit results with the Internal Audit Department;
- developing understanding among the Audit Committee, our management, the Internal Audit Department and our external auditors in order to ensure coordination; and
- reviewing the scope of the audit with our external auditors to ensure consistency and coordination.

Compliance with the Law and Related Regulations

The Audit Committee oversees our compliance with applicable laws and regulations. In this role, the Audit Committee has the responsibilities set out below:

- reviewing our activities to ensure compliance with the laws of the Securities and Exchange Act B.E. 2535 (1992) of Thailand, as amended (the “Thai Securities and Exchange Act”) and the requirements of the Thai SEC, the Capital Market Supervisory Board and the SET, and any other laws relevant to our businesses; and
- reviewing connected transactions or transactions that may lead to conflicts of interest to ensure that they conform to the law and regulations of the Thai SEC, the Capital Market Supervisory Board, and the SET, and that they are reasonable and to our best interests.

Reporting

The Audit Committee oversees our audit reporting. In this role, the Audit Committee has the responsibilities set out below:

- preparing the Audit Committee’s report, which is signed by the Chairman of the Audit Committee, for inclusion in the annual report, with information as required by the SET; and
- reporting its performance to the board of directors.

In performing its duties, if any transaction or incident potentially affecting our financial condition and performance is found or suspected, the Audit Committee must report the concern to the board of directors for rectification within the period the Audit Committee considers appropriate. Those transactions and incidents include:

- any connected transactions;
- any transaction which causes conflicts of interest;
- any fraud, irregularity, or significant defect in the internal control system; and
- any violation of the rules and regulations of the Thai SEC, the Capital Market Supervisory Board, and the SET, and any other laws relating to our business.

If the board of directors or the executives fail to rectify a transaction or incident within an appropriate period, the Audit Committee may report the transaction or incident to the Office of the Thai SEC or the SET, as applicable.

Other Duties

Other duties of the Audit Committee include procuring advice from external independent advisers where necessary, reviewing the charter of the Audit Committee and proposing any revisions of such charter to the board of directors for approval, and performing other Board-assigned duties.

The Audit Committee is required to hold a non-management meeting with the external auditor at least once a year.

Nomination and Remuneration Committee

The Committee consists of at least three Directors, most of whom must be Independent Directors and must not be the Chairman of the Board nor the CEO/President. All of the members fully qualified as Directors in accordance with the Nomination and Remuneration Committee Charter. The Committee considers and sets criteria and nomination process of qualified candidates to be appointed as directors and Chief Executive Officer of the Company. The Committee also selects directors to take position in the board-committees; considers remuneration form and criteria; and presents the candidate(s) carefully selected with the nomination process to the Board of Directors (the Board) for consideration or to the Shareholders’ Meeting for approval as required by law.

The current members of the Nomination and Remuneration Committee are:

Name	Position
ACM Suttipong Inseeyong	Chairman of the Nomination and Remuneration Committee
Associate Prof. Dr. Pasu Decharin	Member of the Nomination and Remuneration Committee
Mr. Auttapol Rerkpiboon	Member of the Nomination and Remuneration Committee

Mr. Viroj Meenaphant, Executive Vice President-Corporate Governance and Affairs and Company Secretary, serves as the secretary to the Nomination and Remuneration Committee.

Each Committee member is in accordance with the Board of Directors' term. In the case of any Nomination and Remuneration Committee member vacating the position, resulting in the insufficient number of the committee members, the Board shall appoint another director, who is fully qualified, to replace the resigning member not later than three months from the date of incomplete composition of the Nomination and Remuneration Committee. Members of the Nomination and Remuneration Committee shall immediately be terminated from the position by death, resignation, vacating the position, the Board of Directors' resolution to vacate the position, or Lack of Qualifications of the Nomination and Remuneration Committee member.

The Nomination and Remuneration Committee has the responsibilities set out below:

1. Nomination

- (i) Considers the Board of Directors' composition and qualifications of both the Board and individual Director to suit the size, type, and complexity of the business focusing on education, knowledge, expertise, skills, experience, and specialization that associate with the Company's; business as well as their independency in accordance to the Company's criteria.
- (ii) Considers the qualifications of the Chief Executive Officer and President to suit the Company's business management in order to achieve the Company's objectives, covering education, experience, knowledge, and expertise; as well as take the essential and relevant business environment such as economic and industry trends and business competitiveness into consideration.
- (iii) Defines nomination process and criteria in accordance with the composition and qualifications stated in 1.1 and 1.2. in compliance with good corporate governance principles.
- (iv) Supervises to ensure that the Company arranges orientation programs and provide welcoming package that is beneficial to the newly appointed Director(s) to perform the roles and responsibilities.
- (v) Develops and review the succession plan for Chief Executive Officer and President as continuous preparation plan for readiness and successor to ensure the Company's continuity of business management and operation.
- (vi) Encourages the Company to provide opportunity for minor shareholders to propose candidate to be nominated as the Company's Director.
- (vii) Selects qualified Director(s) to take position in the Board-Committees and table the name(s) to the Board for consideration and approval in the case of vacancy.

2. Remuneration

- (i) Reviews and proposes remuneration form and criteria to suit the responsibilities of the Board of Directors; taking into consideration the Company's overall performance to motivate and retain Directors with competency, quality, and potentiality. The Board of Directors is to consider such matter prior to presenting it to the shareholders in the Annual General Meeting of Shareholders for approval.

- (ii) Conducts the performance evaluation and consider to adjust the appropriate remuneration rate for the Company's Chief Executive Officer and President before proposing to the Board of Directors for approval.
3. Reviews the Nomination and Remuneration Committee Charter regularly.
4. Responsible for other tasks assigned by the Board of Directors.

Reporting

1. The Nomination and Remuneration Committee must report to the Board of Directors on the result from nomination and remuneration process, the resolution of the meeting, or related matters as deemed necessary in the following Board of Directors meeting.
2. The Chairman of the Nomination and Remuneration Committee must report to the shareholders via the Company's annual report and the Disclosure Report concerning additional information (Form 56-1) on the performance of the Committee.

Corporate Governance Committee

The Corporate Governance Committee consists of at least three Non-Executive Directors, most of whom must be Independent Directors. All of the members are fully qualified as Directors in accordance with the Corporate Governance Committee Charter. The Committee supports the performance of the Board of Directors in determining corporate governance policies and guidelines for compliance in the Company in accordance with the internationally-accepted good corporate governance principles for listed companies. The Committee is committed to promote and support all employees to adhere and comply with the corporate governance principles and business ethics to ensure the Company's sustainable growth with integrity, efficiency, transparency, openness to audit and social and environmental responsibility. When this becomes the corporate culture, it will enhance the Company's confidence and credibility to all shareholders, investors, stakeholders, and all concerned parties.

The current members of the Corporate Governance Committee are:

Name	Position
Pol. Gen. Aek Angsanant	Chairman of the Corporate Governance Committee
Gen. Kukiat Srinaka	Member of the Corporate Governance Committee
Mr. Yongyut Jantararotai	Member of the Corporate Governance Committee

Mr. Viroj Meenaphant, Executive Vice President-Corporate Governance and Affairs and Company Secretary, serves as Secretary to the Corporate Governance Committee.

Each Committee member is in accordance with the Board of Directors' term. In the case of any Corporate Governance Committee member vacating the position, resulting in the insufficient number of the committee members, the Board shall appoint another director, who is fully qualified, to replace the resigning member not later than three months from the date of incomplete composition of the Corporate Governance Committee. Members of the Corporate Governance Committee shall immediately be terminated from the position by death, resignation, vacating the position, the Board of Directors' resolution to vacate the position, or Lack of Qualifications of the Corporate Governance Committee member.

The Corporate Governance Committee has the responsibilities set out below:

1. Defines corporate governance policies, practices, and related operations including sustainability management and corporate social responsibility aspects to conform with principles, standards, and requirements as stipulated by the Stock Exchange of Thailand, the Securities and Exchange Commission, and other recognized institutions domestically and internationally. The aim is to promote corporate strategies and goals, as well as to regularly review such policies and practices.
2. Defines guidelines, as well as supervise and monitor process, to ensure that the Company's operations are in compliance with established policies and practices in order to continuously develop and enhance corporate governance of the Company.

3. Promotes corporate governance culture among all executives and employees for clear understanding and actual implementation within Thaioil and Subsidiaries.
4. Promotes and provides advice for the Company on participating in the corporate governance-related assessment or rating to continuously develop and enhance the Company's corporate governance standard.
5. Considers and approve the Board's performance evaluation form, including approving the overall evaluation results and give consent before proposing to the Board.
6. Reviews the Corporate Governance Committee Charter regularly.
7. Responsible for other tasks assigned by the Board of Directors.

Reporting

1. The Corporate Governance Committee must report to the Board of Directors on the resolution of the meeting or related matters as deemed necessary in the following Board of Directors meeting.
2. The Chairman of the Corporate Governance Committee must report to the shareholders via the Company's annual report or the Disclosure Report concerning additional information (Form 56-1) on the compliance with good corporate governance principles.

Risk Management Committee

The Risk Management Committee consists of a minimum of three Directors, with the CEO/President serving as one of the members. All of the members are fully qualified as Directors in accordance with the Risk Management Committee Charter. The Committee determines risk management policy covering the entire organization, and to supervise to ensure there is a system or process risk management to reduce the impact to the Company's business. The Board determines the Committee composition and scope of duties and responsibilities in order for the Committee to effectively perform their roles as assigned by the Board.

The current members of the Risk Management Committee are:

Name	Position
Mr. Auttapol Rerkpiboon	Chairman of the Risk Management Committee
Ms. Chularat Suteethorn	Member of the Risk Management Committee
Ms. Phannalin Mahawongtikul	Member of the Risk Management Committee
Mr. Wirat Unarumit	Member of the Risk Management Committee

Mr. Pongpun Amornvivat, Executive Vice President-Strategy, serves as Secretary to the Risk Management Committee.

Each Committee member is in accordance with the Board of Directors' term. In the case of any Risk Management Committee member vacating the position, resulting in the insufficient number of the committee members, the Board shall appoint another director, who is fully qualified, to replace the resigning member not later than three months from the date of incomplete composition of the Risk Management Committee. Members of the Risk Management Committee shall immediately be terminated from the position by death, resignation, vacating the position, the Board of Directors' resolution to vacate the position, or Lack of Qualifications of the Risk Management Committee member.

The Risk Management Committee has the responsibilities set out below:

1. Defines and reviews risk management framework, Risk Management Committee Charter, risk management policies and process including suitably and effectively suggest the guidelines to risk management relating to the Company's business to correspond with business strategies, business plans, and volatile circumstances.

2. Continuously and effectively promotes and develops risk management and risk management tools in all levels across the organization, as well as encourage the development of risk management culture in the organization.
3. Supervises, monitors, and reviews key risk management plan and report including give necessary advice to ensure effective risk management at an acceptable level corresponding with risk management policy.
4. Report significant risk management performance to the Board of Directors; in case there are factors or events that might have significant impact on the Company, the Committee shall notify the Board of Directors in a timely manner.
5. Responsible for other tasks assigned by the Board of Directors.

In performing its duties, the Risk Management Committee may request an opinion from independent counsel when deemed necessary and appropriate. The Company shall cover all relevant expenses.

Reporting

1. The Risk Management Committee must report to the Board of Directors on the resolution of the meeting, matters needed to be improved or resolved, or any other related matters as deemed necessary in the following Board of Directors meeting.
2. The Chairman of the Risk Management Committee must report to the shareholders via the Company's annual report or the Disclosure Report concerning additional information (Form 56-1) on the performance relating to risk management.

Chief Executive Officer

The Chief Executive Officer conducts the Company business under the approved plans and budgets with rigor and integrity, while protecting the best interests of the Company and its shareholders, the Chief Executive Officer must not be engaged in any conflicts of interest with Thaioil and Subsidiaries.

The Management

The Company is principally managed by certain executives that comprise the management team responsible for determining strategy and reviewing policies of the Company. The management team is also responsible for managing the affairs of the Company in accordance with the policies established by the board of directors.

Our executive officers are appointed from time to time by a majority vote of our board of directors.

The following table sets out our current executive officers, most of whom have served the Company for over 30 years and their position(s), age and date of appointment, as of the date of this Offering Memorandum.

Name	Position	Age	Date of appointment to current position
Mr. Wirat Uanarumit	Chief Executive Officer and President	57	September 1, 2019
Mr. Bandhit Thamprajamchit	Senior Executive Vice President-Refinery and Petrochemical	49	January 1, 2017
	Executive Vice President-Operation Excellence (Act.)		October 22, 2018
Mr. Jeerawat Pattanasomsit	Executive Vice President-Manufacturing	46	October 22, 2018
Mr. Chatapong Wungtanagorn	Executive Vice President-Corporate Commercial	54	October 1, 2015
Mr. Pongpun Amornvivat	Executive Vice President-Strategy	48	July 1, 2017
	Executive Vice President-Innovation and Digitalization (Act.)		October 1, 2018

Name	Position	Age	Date of appointment to current position
Ms. Pattaralada Sa-Ngasang	Executive Vice President-Finance and Accounting	52	October 1, 2015
Mr. Viroj Wongsathirayakhun	Executive Vice President-Organization Effectiveness	55	October 1, 2018
Mr. Viroj Meenaphant	Executive Vice President-Corporate Governance and Affairs	56	January 1, 2019
Mr. Surachai Saengsamran	Executive Vice President-CFP Project Sponsor	54	October 22, 2018
Mr. Charlee Balmongkol	Executive Vice President-CFP Project Director	49	October 22, 2018

Mr. Wirat Uanarumit has served as our Chief Executive Officer and President since September 1, 2019. He currently serves as Chief Operating Officer of PTT PCL; Director and Member of the Risk Management Committee at Global Power Synergy PCL; Chairman of the Board at Thailand - Malaysia Business Council; and Director and Member of the Audit Committee, Thailand Management Association. He also serves as Directors positions in many organizations – Thai Lube Base PCL, Thailoil Marine Co; Ltd., TOP SPP Co; Ltd., Thai Paraxylene Co; Ltd. and Thailoil Power Co; Ltd.. Mr. Uanarumit previously served in several positions in PTT PCL as Chief Operating Officer-Upstream Petroleum and Gas Business Group, Chief Financial Officer, and Executive Vice President-Corporate Finance. Mr. Uanarumit received a Master’s degree in Business Administration (Financial Management) from Pennsylvania State University, U.S.A. and a Bachelor’s degree in Electrical Engineering from Chulalongkorn University, Thailand.

Mr. Bandhit Thamprajamchit was appointed as Senior Executive Vice President-Refinery and Petrochemical on January 1, 2017 and is currently serving as Executive Vice President-Operation Excellence. He currently also serves as Director and Member of the Corporate Governance Committee, Global Power Synergy PCL; as well as Director of Thai Lube Base PCL, Thai Paraxylene Co., Ltd., Thailoil Power Co., Ltd., Thailoil Ethanol Co., Ltd., Sapthip Co., Ltd.; and Chairman of the Board of Thailoil Energy Services Co., Ltd. Mr. Thamprajamchit previously served as Executive Vice President-Manufacturing and Senior Vice President-Refinery. He obtained two Master’s degrees: Executive MBA from Sasin Graduate Institute of Business Administration of Chulalongkorn University, Thailand and Advanced Chemical Engineering from Imperial College University of London, UK. He received a Bachelor’s degree in Chemical Engineering from Chulalongkorn University, Thailand. He has 28 years of experience in the energy sector.

Mr. Jeerawat Pattanasomsit was appointed as Executive Vice President-Manufacturing on October 22, 2018 and is currently serving as Vice President-Refinery. He currently also serves as Director of Thailoil Power Co., Ltd., Sak Chaisidhi Co., Ltd. Mr. Pattanasomsit previously served as Vice president-Petrochemical and Lube Base and Managing Director of Thai Lube Base PCL, Thai Paraxylene Co., Ltd. and Sak Chaisidhi Co., Ltd. He received a Master’s degree of Science in Petrochemical Technology from The Petroleum and Petrochemical College, Chulalongkorn University, and a Bachelor’s degree in Chemical Engineering from Kasetsart University, Thailand. He has 23 years of experience in the energy sector.

Mr. Chatapong Wungtanagorn was appointed as Executive Vice President-Corporate Commercial on October 1, 2015. He currently serves as Chairman of the Board of Thailoil Ethanol Co., Ltd. and Sak Chaisidhi Co., Ltd.; as well as Director of Thai Lube Base PCL, Thailoil Marine Co., Ltd., TOP Solvent Co., Ltd., and Thailoil Energy Services Co., Ltd. Mr. Wungtanagorn previously served as Senior Vice President-Supply Chain Optimization and Senior Vice President-Commercial. He received two Master’s degrees: Master of Advanced Chemical Engineering from the Imperial College of Science, Technology and Medicine, London, UK and Master of Management from College of Management, Mahidol University, Thailand. He obtained a Bachelor’s degree in Chemical Engineering from King Mongkut’s University of Technology Thonburi, Thailand. He has 32 years of experience in the energy sector.

Mr. Pongpun Amornvivat was appointed as Executive Vice President-Strategy on July 1, 2017 and Executive Vice President-Innovation and Digitalization on October 1, 2018. He currently serves as Director of TOP Solvent Co., Ltd., Sak Chaisidhi Co., Ltd., Thailoil Ethanol Co., Ltd., Sapthip Co., Ltd., Ubon Bio Ethanol PCL, Thailoil Marine International Private Limited, TOP Maritime Service Co., Ltd., Thailoil Treasury Center Co., Ltd., PTT Digital Solutions Co., Ltd. and Thai Petroleum Pipeline Co., Ltd. He previously served as Senior Vice President-Business Development and Senior Vice President-Corporate Project Development. Mr. Amornvivat

received three Master's degrees: Master of Civil and Environmental Engineering and Master of Business Administration from Massachusetts Institute of Technology, U.S.A., and Master of Arts Program in Economic Law from Chulalongkorn University, Thailand, as well as obtained a Bachelor's degree in Civil Engineering from Carnegie Mellon University, U.S.A.

Ms. Pattaralada Sa-Ngasang was appointed as Executive Vice President-Finance and Accounting on October 1, 2015. She currently also serves as Director of LABIX Co., Ltd., Thailoil Ethanol Co., Ltd., Ubon Bio Ethanol PCL., Saphip Co., Ltd., Thailoil Marine Company Limited, as well as Chairman of the Board of TOP Maritime Service Co., Ltd. and Thailoil Treasury Center Co., Ltd. Ms. Sa-Ngasang previously served as Senior Vice President-Financial Planning and Vice President of Strategic Planning. She received a Mini MBA from National Institute of Development Administration, and MBA and a Bachelor's degree in Accounting from Thammasat University, Thailand.

Mr. Viroj Wongsathirayakhun was appointed as Executive Vice President-Organization Effectiveness on October 1, 2018 and is currently serving as Vice President-People and Organization Management and assigned as Managing Director of Thailoil Energy Services Co., Ltd. He currently serves as Director of Thailoil Energy Services Co., Ltd. Mr. Wongsathirayakhun received a Master's degree in Public Administration Program from National Institute of Development Administration, and a Bachelor's degree in Chemical Science from Silpakorn University, Thailand.

Mr. Viroj Meenaphant was appointed as Executive Vice President-Corporate Governance and Affairs on January 1, 2019 and is currently serving as Vice President-Corporate Affairs and Company Secretary. He currently also serves as Director of Thailoil Power Co., Ltd., TOP Solvent Co., Ltd., Thailoil Marine Co., Ltd., TOP Maritime Service Co., Ltd., Thailoil Treasury Center Co., Ltd., Thailoil Energy Services Co., Ltd. and Sarn Palung Social Enterprise Co., Ltd. Mr. Meenaphant previously served as Assistant Executive Vice President-Corporate Governance. He received a Bachelor's degree in Chemical Engineering from Chulalongkorn University, Thailand. He has 32 years of experience in the energy sector.

Mr. Surachai Saengsamran was appointed as Executive Vice President-CFP Project Sponsor on October 22, 2018. He currently also serves as Director of Thailoil Energy Services Co., Ltd., Sak Chaisidhi Co., Ltd., and PTT Energy Solutions Co., Ltd. Mr. Saengsamran previously served as Executive Vice President-Operation Excellence and Senior Vice President-Engineering. He obtained a Bachelor's degree in Mechanical Engineering from Chulalongkorn University, Thailand. He has 30 years of experience in the energy sector.

Mr. Charlee Balmongkol was appointed as Executive Vice President-CFP Project Director on October 22, 2018. He previously served as Vice President-Engineering, Managing Director of Thailoil Power Co., Ltd. and TOP SPP Co., Ltd. Mr. Balmongkol received a Master of Advanced Mechanical Engineering from Imperial College University of London, UK and a Bachelor's degree in Mechanical Engineering from Chulalongkorn University, Thailand. He has 26 years of experience in the energy sector.

Corporate Governance and Management Practices

Corporate Governance

We review our corporate governance principles and practices and implement new principles and practices to improve our corporate governance from time to time. We have corporate governance principles that apply to our directors and employees. Our principles of good corporate governance are generally based on the principles of good corporate governance established by the SET and the Thai SEC and address a wide range of matters, including establishing procedures and requirements relating to the following:

- duties, responsibilities, qualifications and ethics with respect to the board of directors;
- responsibilities to shareholders, employees, society and the environment;
- relationships with customers, trading partners, and competitors;
- codes of conduct for executives and employees;
- internal controls and risk management; and

- information disclosure and transparency.

Our principles of good corporate governance also set out our policies and guidelines on matters relating to marketing communications, intellectual property, health, safety and environment, human rights, anti-corruption and bribery, internal controls, conflict of interests, confidentiality, connected transactions, use of our information technology system and good procurement practices.

Management Practices

We have adopted a management code of conduct which outlines certain management practices, focusing on good management and responsibility to our shareholders. We have systems to implement our management practices and committees at the operational level to implement and review these systems.

We have also implemented an employee's code of conduct which outlines our various policies, systems and committees to fulfill our responsibilities to different stakeholder groups, namely, our shareholders, business partners, competitors and creditors, employees, society and the environment and the Government and associated organizations.

Awards and Recognitions

Our 2019 performance was widely recognized both nationally and internationally with recognitions and awards in various fields. For the seventh consecutive years, we were selected as a member of Dow Jones Sustainability Indices (DJSI), maintaining the top score, and recognized as Oil & Gas Refining and Marketing Industry Leader. We also received Thailand Top Company Awards 2019 and NACC Awards at 8th NACC Integrity Awards event. Finally, we also garnered the "Excellence" award for Asia's Best CEO, Asia's Best CFO and the Best Investor Relations by Company at the Asian Excellence Awards 2019 event.

Share Ownership and Compensation

Our directors and executive officers named above held in aggregate 0.01% of our share capital as of September 13, 2019. The total remuneration (salaries, discretionary bonuses and directors' fees) expenses to our directors as a group was THB 68.52 million (US\$ 2.2 million) for the year ended 2018.

The tables below set forth the shareholdings of our directors and executive officers as of September 20, 2019.

Shareholdings of Directors

Name	Position	No. of shares
Prof. Dr. Thosaporn Sirisumphand	Director;	-
	Chairman of the Board	
Mr. Kanit Si	Independent Director;	20,000
	Chairman of the Audit Committee	(By spouse)
Ms. Chularat Suteethorn	Director;	10,000
	Member of the Risk Management Committee	
Associate Prof. Dr. Pasu Decharin	Independent Director;	-
	Member of the Audit Committee;	
	Member of the Nomination and Remuneration Committee;	
ACM Suttipong Inseepong	Independent Director;	-
	Chairman of the Nomination and Remuneration Committee	
Mr. Auttapol Rerkpiboon	Director;	-
	Chairman of the Risk Management Committee;	
	Member of the Nomination and Remuneration Committee	
Pol. Gen. Aek Angsanant	Independent Director;	-
	Chairman of the Corporate Governance Committee	
Mr. Yongyut Jantararotai	Director;	-

Name	Position	No. of shares
Gen. Kukiatt Srinaka	Member of the Corporate Governance Committee Independent Director;	-
Mr. Praphon Wongtharua	Member of the Corporate Governance Committee Director;	-
Ms. Phannalin Mahawongtikul	Director;	-
Mr. Praphaisith Tankeyura	Member of the Risk Management Committee Independent Director;	-
Mr. Preecha Pocatanawat	Member of the Audit Committee Director	-
Ms. Duangporn Thiengwatanatham	Director	600
Mr. Wirat Unarumit	Director;	-
	Member of the Risk Management Committee; Secretary to the Board	

Shareholdings of Executive Officers

Name	Position	No. of shares
Mr. Wirat Unarumit	Chief Executive Officer and President;	-
Mr. Bandhit Thamprajamchit	Senior Executive Vice President-Refinery and Petrochemical Executive Vice President-Operation Excellence (Act.)	7,200
Mr. Jeerawat Pattanasomsit	Executive Vice President-Manufacturing	-
Mr. Chatapong Wungtanagorn	Executive Vice President-Corporate Commercial	97,400
Mr. Pongpun Amornvivat	Executive Vice President-Strategy Executive Vice President-Innovation and Digitalization (Act.)	17,100
Ms. Pattaralada Sa-Ngasang	Executive Vice President-Finance and Accounting	-
Mr. Viroj Wongsathirayakhun	Executive Vice President-Organization Effectiveness	21,600
Mr. Viroj Meenaphant	Executive Vice President-Corporate Governance and Affairs	-
Mr. Surachai Saengsamran	Executive Vice President-CFP Project Sponsor	98,500
Mr. Charlee Balmongkol	Executive Vice President-CFP Project Director	-

PRINCIPAL SHAREHOLDERS

The following table sets forth certain information about our Principal Shareholders, defined as shareholders who own more than 1% of our outstanding common shares, and information about common shares as of June 30, 2019. To the best of our knowledge, no shareholder owns more than 1% of our outstanding common shares except as indicated in the table below.

Principal Shareholders ⁽¹⁾	Number of common shares	Percentage⁽¹⁾
PTT Public Company Limited ⁽²⁾	979,765,183	48.03%
State Street Europe Limited.....	70,959,650	3.48%
South East Asia UK (Type C) Nominees Limited.....	59,187,140	2.90%
Social Security Office.....	33,528,000	1.64%
The Bank of New York (Nominees) Limited	25,802,342	1.26%
Total shareholdings of Principal Shareholders	1,169,242,315	57.32%
Total number of common shares outstanding	2,040,027,873	100.00%

Notes:

- (1) The table excludes Thai NVDR Co., Ltd., a subsidiary of the Stock Exchange of Thailand with the objective of promoting investor's investment, particularly of foreign investors, in the common stock of listed companies in Thailand, without being restricted by the foreign shareholding. Investments through Thai NVDR Co., Ltd. are not entitled to the right to vote at shareholders' meetings of listed companies.
- (2) As a major shareholder, PTT participates in formulating the Company's management and operational policies via directors nominated to our Board of Directors. As of June 30, 2019, five directors from a total of 15 directors were nominated by PTT. These five directors are Mr. Attapol Rerkpiboon, Ms. Phannalin Mahawongtikul, Ms. Duangporn Thiengwatanatham, Mr. Preecha Pocatanaawat, and Mr. Wirat Unanarumit, who also hold positions either as a director of PTT or as a member of PTT management. See "Management—Board of Directors" for further information.

As of June 30, 2019, our directors and executive officers collectively held in aggregate approximately 0.01% of our total common shares.

FORM OF THE NOTES

Notes may only be issued in registered form.

Each Tranche of Notes in registered form (“**Notes**”) will be represented by either:

- (i) individual Note Certificates in registered form (“**Individual Note Certificates**”); or
- (ii) one or more unrestricted global note certificates (“**Unrestricted Global Note Certificate(s)**”) in the case of Notes sold outside the United States to non-U.S. persons in reliance on Regulation S (“**Unrestricted Notes**”) and/or one or more restricted global note certificates (“**Restricted Global Note Certificate(s)**”) in the case of Notes sold to persons who are both QIBs and QPs in reliance on Rule 144A (“**Restricted Notes**”),

in each case as specified in the relevant Pricing Supplement, and references in this Offering Memorandum to “Global Note Certificates” shall be construed as a reference to Unrestricted Global Note Certificates and/or Restricted Global Note Certificates.

Each Note represented by a Restricted Global Note Certificate will be registered in the name of Cede & Co. (or such other entity as is specified in the applicable Pricing Supplement) as nominee for DTC or, as the case may be, in the name of the common depositary (or its nominee) for Euroclear and/or Clearstream and the relevant Restricted Global Note Certificate will be deposited on or about the issue date with the custodian for DTC (the “**DTC Custodian**”) or a depositary of the common depositary for Euroclear and/or Clearstream. Beneficial interests in Notes represented by a Restricted Global Note Certificate may be held through DTC or, as the case may be, Euroclear and/or Clearstream at any time.

Each Note represented by an Unrestricted Global Note Certificate will be registered in the name of a common depositary (or its nominee) for Euroclear and/or Clearstream and/or any other relevant clearing system or in the name of Cede & Co. as nominee for DTC, and the relevant Unrestricted Global Note Certificate will be deposited on or about the issue date with the common depositary or the DTC Custodian.

If the relevant Pricing Supplement specifies the form of Notes as being “Individual Note Certificates,” then the Notes will at all times be represented by Individual Note Certificates issued to each Noteholder in respect of their respective holdings.

Global Note Certificate exchangeable for Individual Note Certificates

If the relevant Pricing Supplement specifies the form of Notes as being “Global Note Certificate exchangeable for Individual Note Certificates,” then the Notes will initially be represented by one or more Global Note Certificates, each of which will be exchangeable in whole, but not in part, for Individual Note Certificates:

- (i) on the expiry of such period of notice as may be specified in the relevant Pricing Supplement; or
- (ii) if the relevant Pricing Supplement specifies “in the limited circumstances described in the Global Note Certificate,” then:
 - (a) in the case of any Global Note Certificate held by or on behalf of DTC, if DTC notifies the relevant Issuer that it is no longer willing or able to discharge properly its responsibilities as depositary with respect to any Global Note Certificate or DTC ceases to be a “clearing agency” registered under the Exchange Act or if at any time DTC is no longer eligible to act as such, and the relevant Issuer is unable to locate a qualified successor within 90 days of receiving notice or becoming aware of such ineligibility on the part of DTC;
 - (b) in the case of any Unrestricted Global Note Certificate held by or on behalf of, Euroclear and/or Clearstream and/or any other clearing system (other than DTC), if Euroclear, Clearstream or any other relevant clearing system is closed for business for a continuous period of 14 days (other than by reason of legal holidays) or announces an intention permanently to cease business; and

- (c) in any case, if any of the circumstances described in Condition 13 (*Events of Default*) occurs in respect of any Note of the relevant Tranche.

Whenever a Global Note Certificate is to be exchanged for Individual Note Certificates, each person having an interest in a Global Note Certificate must provide the Registrar (through the relevant clearing system) with such information as the relevant Issuer and the Registrar may require to complete and deliver Individual Note Certificates (including the name and address of each person in which the Notes represented by the Individual Note Certificates are to be registered and the principal amount of each such person's holding). In addition, whenever a Restricted Global Note Certificate is to be exchanged for Individual Note Certificates, each person having an interest in the Restricted Global Note Certificate must provide the Registrar (through the relevant clearing system) with a certificate given by or on behalf of the holder of each beneficial interest in the Restricted Global Note Certificate stating either (i) that such holder is not transferring its interest at the time of such exchange or (ii) that the transfer or exchange of such interest has been made in compliance with the transfer restrictions applicable to the Notes and that the person transferring such interest reasonably believes that the person acquiring such interest is both a QIB and a QP, is obtaining such beneficial interest in a transaction meeting the requirements of Rule 144A. Individual Note Certificates issued in exchange for interests in the Restricted Global Note Certificate will bear the legends and be subject to the transfer restrictions set out under "*Transfer Restrictions*."

Whenever a Global Note Certificate is to be exchanged for Individual Note Certificates, the relevant Issuer shall procure that Individual Note Certificates will be issued in an aggregate principal amount equal to the principal amount of the Global Note Certificate within five business days of the delivery, by or on behalf of the registered holder of the Global Note Certificate to the Registrar of such information as is required to complete and deliver such Individual Note Certificates against the surrender of the Global Note Certificate at the specified office of the Registrar.

Such exchange will be effected in accordance with the provisions of the Indenture and the regulations concerning the transfer and registration of Notes and, in particular, shall be effected without charge to any holder, but against such indemnity as the Registrar may require in respect of any tax or other duty of whatsoever nature which may be levied or imposed in connection with such exchange.

Terms and Conditions applicable to the Notes

The terms and conditions applicable to any Individual Note Certificate will be endorsed on that Individual Note Certificate and will consist of the terms and conditions set out under "*Terms and Conditions of the Notes*" below and the provisions of the relevant Pricing Supplement which supplement, amend and/or replace those terms and conditions.

The terms and conditions applicable to any Global Note Certificate will differ from those terms and conditions which would apply to the Note were it in definitive form to the extent described under "*Summary of Provisions Relating to the Notes while in Global Form*" below.]

TERMS AND CONDITIONS OF THE NOTES

The following is the text of the terms and conditions which, as supplemented, amended and/or replaced by the relevant Pricing Supplement, will be endorsed on each Note in definitive form issued under the Program. The terms and conditions applicable to any Note in global form will differ from those terms and conditions which would apply to the Note were it in definitive form to the extent described under “Summary of Provisions Relating to the Notes while in Global Form” below.

1. Introduction

- (a) **Program:** Thai Oil Public Company Limited (the “**Company**”) and Thailoil Treasury Center Company Limited (“**Treasury Center**”) have established a Global Medium Term Note Program (the “**Program**”) for the issuance of up to U.S.\$2,179,000,000 in aggregate principal amount of notes (the “**Notes**”). Each Series (as defined below) of Notes shall be issued either by (i) the Company (in its capacity as issuer, an “**Issuer**”); or (ii) Treasury Center (in its capacity as issuer, an “**Issuer**”, and together with the Company in its capacity as issuer, the “**Issuers**”); in the case of (ii), the Notes shall be unconditionally and irrevocably guaranteed by the Company (in its capacity as guarantor, the “**Guarantor**”) in accordance with Condition 1(d). References to “the Issuer” in these Conditions shall be construed as to the Issuer specified in the relevant Pricing Supplement.
- (b) **Pricing Supplement:** Notes issued under the Program are issued in series (each, a “**Series**”) and each Series may comprise one or more tranches (each, a “**Tranche**”) of Notes. The terms and conditions applicable to any particular Series or Tranche of Notes are set out in the relevant pricing supplement (the “**Pricing Supplement**”) which supplements, amends and/or replaces these terms and conditions (the “**Conditions**”). In the event of any inconsistency between these Conditions and the relevant Pricing Supplement, the relevant Pricing Supplement shall prevail.
- (c) **Indenture:** The Notes are subject to, and have the benefit of, an amended and restated indenture dated October 3, 2019 (as amended and/or supplemented from time to time, the “**Indenture**”) between the Issuers, the Guarantor and Citicorp International Limited as trustee (the “**Trustee**”, which expression includes all persons for the time being trustee or trustees appointed under the Indenture). Noteholders (as defined below) are deemed to have accepted the appointment of the Trustee.
- (d) **Guarantee:** The Guarantor has, in accordance with the terms of the Indenture, unconditionally and irrevocably guaranteed the due and punctual payment of all sums from time to time payable in respect of Notes issued by Treasury Center in its capacity as Issuer (the “**Guarantee**”). The Guarantor’s maximum liability under the Guarantee in respect of each Series of Guaranteed Notes (as defined below) will be capped at an amount equal to 125 per cent. of the outstanding aggregate principal amount of the relevant Series of Guaranteed Notes. The Guarantee will be released in respect of a Series of Notes upon the later of (i) the date falling ten years after the maturity date of the relevant Series of Notes or (ii) the date on which all sums expressed to be payable by Treasury Center under the Indenture and the relevant Series of Guaranteed Notes have been unconditionally and irrevocably paid and discharged in full; or, alternatively, upon a defeasance or discharge as provided in Article 13 of the Indenture, *provided that*, in each case, any rights of the Holders and any liability of the Guarantor that have arisen or accrued under the Guarantee prior to any such release will continue to be in full force and effect after any such release and will survive any such release.
- (e) **Agents:** Pursuant to a paying and transfer agent and registrar appointment letter dated October 3, 2019 (as amended and/or supplemented from time to time, the “**Paying and Transfer Agent and Registrar Appointment Letter**”), Citibank, N.A., London Branch is appointed as principal paying agent (the “**Principal Paying Agent**”, which expression includes any successor principal paying agent appointed from time to time in connection with the Notes), Citibank, N.A., London Branch as exchange agent (the “**Exchange Agent**”, which expression includes any successor exchange agent appointed from time to time in connection with the Notes) and Citibank, N.A., London

Branch as registrar (the “**Registrar**”, which expression includes any successor registrar appointed from time to time in connection with the Notes). In addition, the paying agents named therein (together with the Principal Paying Agent, the “**Paying Agents**”, which expression includes any successor or additional paying agents appointed from time to time in connection with the Notes) and the transfer agents named therein (together with the Registrar, the “**Transfer Agents**”, which expression includes any successor or additional transfer agents appointed from time to time in connection with the Notes) are appointed subject to these Conditions, the Indenture and the Paying and Transfer Agent and Registrar Appointment Letter. In these Conditions references to the “**Agents**” are to the Paying Agents, the Exchange Agent and the Transfer Agents and any reference to an “**Agent**” is to any one of them.

- (f) **The Notes:** The Notes may only be issued in registered form. All subsequent references in these Conditions to “**Notes**” are to the Notes which are the subject of the relevant Pricing Supplement. Copies of the relevant Pricing Supplement are available for viewing and copies may be obtained from the Specified Office of each of the Paying Agents and Transfer Agents.
- (g) **Summaries:** Certain provisions of these Conditions are summaries of the Indenture and are subject to their detailed provisions. Noteholders are bound by, and are deemed to have notice of, all the provisions of the Indenture applicable to them. Copies of the Indenture are available for inspection by Noteholders during normal business hours with reasonable prior written notification at the Specified Offices of the Paying Agents.

2. Interpretation

- (a) **Definitions:** In these Conditions the following expressions have the following meanings:

“**Accrual Yield**” has the meaning given in the relevant Pricing Supplement;

“**Additional Business Centre(s)**” means the city or cities specified as such in the relevant Pricing Supplement;

“**Additional Financial Centre(s)**” means the city or cities specified as such in the relevant Pricing Supplement;

“**Applicable Premium**” means, with respect to any Note on any date fixed for redemption, as determined by the Issuer, the greater of:

- (a) 1.0 per cent. of the principal amount of the Note; or
- (b) the excess of:
 - (i) the present value at the date fixed for redemption of (i) the principal amount of the Note *plus* (ii) all required interest payments due on the Note through the Maturity Date (excluding accrued but unpaid interest to the date fixed for redemption), computed using a discount rate equal to the Treasury Rate as of such redemption date *plus* 35 basis points; over
 - (ii) the principal amount of the Note.

“**Authorized Officer**” means, with respect to any Person, a director or officer of such Person duly authorized to perform the acts required under these Conditions or the Indenture;

“**Business Day**”, means any day (other than a Saturday or a Sunday) on which commercial banks and foreign exchange markets are open for business in Bangkok, London, Hong Kong and New York and, other than in Condition 3(e) (*Registration and delivery of Note Certificates*) and Condition 13 (*Events of Default*):

- (a) in relation to any sum payable in euro, a TARGET Settlement Day and a day on which commercial banks and foreign exchange markets settle payments generally in each (if any) Additional Business Centre;
- (b) in relation to any sum payable in a currency other than euro and Renminbi, a day on which commercial banks and foreign exchange markets settle payments generally, in the Principal Financial Centre of the relevant currency and in each (if any) Additional Business Centre; and
- (c) for the purposes of Notes denominated in Renminbi only, any day (other than a Sunday or a Saturday) on which commercial banks and foreign exchange markets are open for business and settle Renminbi payments in Hong Kong and are not authorized or obligated by law or executive order to be closed;

“Business Day Convention”, in relation to any particular date, has the meaning given in the relevant Pricing Supplement and, if so specified in the relevant Pricing Supplement, may have different meanings in relation to different dates and, in this context, the following expressions shall have the following meanings:

- (a) **“Following Business Day Convention”** means that the relevant date shall be postponed to the first following day that is a Business Day;
- (b) **“Modified Following Business Day Convention”** or **“Modified Business Day Convention”** means that the relevant date shall be postponed to the first following day that is a Business Day unless that day falls in the next calendar month in which case that date will be the first preceding day that is a Business Day;
- (c) **“Preceding Business Day Convention”** means that the relevant date shall be brought forward to the first preceding day that is a Business Day;
- (d) **“FRN Convention”, “Floating Rate Convention”** or **“Eurodollar Convention”** means that each relevant date shall be the date which numerically corresponds to the preceding such date in the calendar month which is the number of months specified in the relevant Pricing Supplement as the Specified Period after the calendar month in which the preceding such date occurred *provided, however, that*:
 - (i) if there is no such numerically corresponding day in the calendar month in which any such date should occur, then such date will be the last day which is a Business Day in that calendar month;
 - (ii) if any such date would otherwise fall on a day which is not a Business Day, then such date will be the first following day which is a Business Day unless that day falls in the next calendar month, in which case it will be the first preceding day which is a Business Day; and
 - (iii) if the preceding such date occurred on the last day in a calendar month which was a Business Day, then all subsequent such dates will be the last day which is a Business Day in the calendar month which is the specified number of months after the calendar month in which the preceding such date occurred; and
- (e) **“No Adjustment”** means that the relevant date shall not be adjusted in accordance with any Business Day Convention;

“Calculation Agent” means the Principal Paying Agent or such other Person, in each case as specified in the relevant Pricing Supplement as the party responsible for calculating the Rate(s) of Interest and Interest Amount(s) and/or such other amount(s) as may be specified in the relevant Pricing Supplement;

“Calculation Amount” has the meaning given in the relevant Pricing Supplement;

“Change of Control” means (i) PTT Public Company Limited ceasing to own and control, directly or indirectly, at least 40 per cent. of the Company’s issued and outstanding capital stock or (ii) any Person or Persons, acting together, becoming the owner, directly or indirectly, of a greater number of the Company’s issued and outstanding capital stock than that owned and controlled, directly or indirectly, by PTT Public Company Limited or (iii) in the case of Guaranteed Notes, the Guarantor ceasing to own and control, directly or indirectly, 99 per cent. of Treasury Center’s issued and outstanding capital stock;

“Change of Control Triggering Event” means the occurrence of both a Change of Control and a Ratings Decline;

“Code” means the US Internal Revenue Code of 1986;

“Consolidated Net Tangible Assets” means the total amount of the assets of the Company and its consolidated Subsidiaries, including investments in unconsolidated Subsidiaries and associated companies, after deducting therefrom (i) all current liabilities (excluding any current liabilities constituting Long-term Debt by reason of their being renewable or extendible at the option of the Company or its consolidated Subsidiaries), and (ii) all goodwill, trade names, trademarks, patents, unamortized debt discount and expense and other like intangible assets, all as set forth on the most recent statement of financial position of the Company and its consolidated Subsidiaries and computed in accordance with TFRS;

“Day Count Fraction” means, in respect of the calculation of an amount for any period of time (the **“Calculation Period”**), such day count fraction as may be specified in these Conditions or the relevant Pricing Supplement and:

- (a) if **“Actual/Actual (ICMA)”** is so specified, means:
 - (i) where the Calculation Period is equal to or shorter than the Regular Period during which it falls, the actual number of days in the Calculation Period divided by the product of (1) the actual number of days in such Regular Period and (2) the number of Regular Periods in any year; and
 - (ii) where the Calculation Period is longer than one Regular Period, the sum of:
 - (A) the actual number of days in such Calculation Period falling in the Regular Period in which it begins divided by the product of (a) the actual number of days in such Regular Period and (b) the number of Regular Periods in any year; and
 - (B) the actual number of days in such Calculation Period falling in the next Regular Period divided by the product of (a) the actual number of days in such Regular Period and (b) the number of Regular Periods in any year;
- (b) if **“Actual/365”** or **“Actual/Actual (ISDA)”** is so specified, means the actual number of days in the Calculation Period divided by 365 (or, if any portion of the Calculation Period falls in a leap year, the sum of (A) the actual number of days in that portion of the Calculation Period falling in a leap year divided by 366 and (B) the actual number of days in that portion of the Calculation Period falling in a non-leap year divided by 365);
- (c) if **“Actual/365 (Fixed)”** is so specified, means the actual number of days in the Calculation Period divided by 365;

- (d) if “**Actual/360**” is so specified, means the actual number of days in the Calculation Period divided by 360;
- (e) if “**30/360**” is so specified, the number of days in the Calculation Period divided by 360, calculated on a formula basis as follows:

$$\text{Day Count Fraction} = \frac{[360x(Y_2 - Y_1)] + [30x(M_2 - M_1)] + (D_2 - D_1)}{360}$$

where:

“**Y1**” is the year, expressed as a number, in which the first day of the Calculation Period falls;

“**Y2**” is the year, expressed as a number, in which the day immediately following the last day included in the Calculation Period falls;

“**M1**” is the calendar month, expressed as a number, in which the first day of the Calculation Period falls;

“**M2**” is the calendar month, expressed as number, in which the day immediately following the last day included in the Calculation Period falls;

“**D1**” is the first calendar day, expressed as a number, of the Calculation Period, unless such number would be 31, in which case **D1** will be 30; and
“**D2**” is the calendar day, expressed as a number, immediately following the last day included in the Calculation Period, unless such number would be 31 and **D1** is greater than 29, in which case **D2** will be 30;

- (f) if “**30E/360**” or “**Eurobond Basis**” is so specified, the number of days in the Calculation Period divided by 360, calculated on a formula basis as follows:

$$\text{Day Count Fraction} = \frac{[360x(Y_2 - Y_1)] + [30x(M_2 - M_1)] + (D_2 - D_1)}{360}$$

where:

“**Y1**” is the year, expressed as a number, in which the first day of the Calculation Period falls;

“**Y2**” is the year, expressed as a number, in which the day immediately following the last day included in the Calculation Period falls;

“**M1**” is the calendar month, expressed as a number, in which the first day of the Calculation Period falls;

“**M2**” is the calendar month, expressed as a number, in which the day immediately following the last day included in the Calculation Period falls;

“**D1**” is the first calendar day, expressed as a number, of the Calculation Period, unless such number would be 31, in which case **D1** will be 30; and
“**D2**” is the calendar day, expressed as a number, immediately following the last day included in the Calculation Period, unless such number would be 31, in which case **D2** will be 30; and

- (g) if “**30E/360 (ISDA)**” is so specified, the number of days in the Calculation Period divided by 360, calculated on a formula basis as follows:

$$\text{Day Count Fraction} = \frac{[360x(Y_2 - Y_1)] + [30x(M_2 - M_1)] + (D_2 - D_1)}{360}$$

where:

“**Y1**” is the year, expressed as a number, in which the first day of the Calculation Period falls;

“**Y2**” is the year, expressed as a number, in which the day immediately following the last day included in the Calculation Period falls;

“**M1**” is the calendar month, expressed as a number, in which the first day of the Calculation Period falls;

“**M2**” is the calendar month, expressed as a number, in which the day immediately following the last day included in the Calculation Period falls;

“**D1**” is the first calendar day, expressed as a number, of the Calculation Period, unless (i) that day is the last day of February or (ii) such number would be 31, in which case D1 will be 30; and

“**D2**” is the calendar day, expressed as a number, immediately following the last day included in the Calculation Period, unless (i) that day is the last day of February but not the Maturity Date or (ii) such number would be 31, in which case D2 will be 30,

provided, however, that in each such case the number of days in the Calculation Period is calculated from and including the first day of the Calculation Period to but excluding the last day of the Calculation Period;

“**Default**” means an occurrence of any event or condition which constitutes or which, after notice or passage of time or both, would become, an Event of Default;

“**Early Redemption Amount (Tax)**” means, in respect of any Note, its principal amount or such other amount as may be specified in (which shall in no event be less than its initial issue price), or determined in accordance with, the relevant Pricing Supplement;

“**Early Termination Amount**” means, in respect of any Note, its principal amount or such other amount as may be specified in, or determined in accordance with, these Conditions or the relevant Pricing Supplement;

“**Exchange Act**” means the U.S. Securities Exchange Act of 1934, as amended, and any rules or regulations promulgated thereunder;

“**Final Redemption Amount**” means, in respect of any Note, its principal amount or such other amount as may be specified in, or determined in accordance with, the relevant Pricing Supplement;

“**First Interest Payment Date**” means the date specified in the relevant Pricing Supplement;

“**Fixed Coupon Amount**” has the meaning given in the relevant Pricing Supplement;

“**Group**” means the Company and its Subsidiaries, taken as a whole;

“**Guaranteed Notes**” means Notes issued by Treasury Center as Issuer and guaranteed by the Guarantor;

“**Holder**” has the meaning given in Condition 3(b) (*Title*);

“**Hong Kong**” means the Hong Kong Special Administrative Region of the PRC;

“Indebtedness” means any obligation for the payment or repayment of money borrowed;

“Interest Amount” means, in relation to a Note and an Interest Period, the amount of interest payable in respect of that Note for that Interest Period;

“Interest Commencement Date” means the Issue Date of the Notes or such other date as may be specified as the Interest Commencement Date in the relevant Pricing Supplement;

“Interest Determination Date” has the meaning given in the relevant Pricing Supplement;

“Interest Payment Date” means the First Interest Payment Date and any date or dates specified as such in, or determined in accordance with the provisions of, the relevant Pricing Supplement and, if a Business Day Convention is specified in the relevant Pricing Supplement:

- (a) as the same may be adjusted in accordance with the relevant Business Day Convention; or
- (b) if the Business Day Convention is the FRN Convention, Floating Rate Convention or Eurodollar Convention and an interval of a number of calendar months is specified in the relevant Pricing Supplement as being the Specified Period, each of such dates as may occur in accordance with the FRN Convention, Floating Rate Convention or Eurodollar Convention at such Specified Period of calendar months following the Interest Commencement Date (in the case of the first Interest Payment Date) or the previous Interest Payment Date (in any other case);

“Interest Period” means each period beginning on (and including) the Interest Commencement Date or any Interest Payment Date and ending on (but excluding) the next Interest Payment Date;

“ISDA Definitions” means the 2006 ISDA Definitions (as amended and updated as at the date of issue of the first Tranche of the Notes of the relevant Series (as specified in the relevant Pricing Supplement) as published by the International Swaps and Derivatives Association, Inc.) unless otherwise specified in the relevant Pricing Supplement;

“Issue Date” has the meaning given in the relevant Pricing Supplement;

“Long-term Debt” means any note, bond, debenture or other Indebtedness having a maturity of more than one year from the date such Indebtedness was incurred or having a maturity of less than one year but by its terms being renewable or extendible, at the option of the Company or the borrower, beyond one year from the date such evidence of Indebtedness was incurred;

“Margin” has the meaning given in the relevant Pricing Supplement;

“Maturity Date” has the meaning given in the relevant Pricing Supplement;

“Maximum Redemption Amount” has the meaning given in the relevant Pricing Supplement;

“Minimum Redemption Amount” has the meaning given in the relevant Pricing Supplement;

“Moody’s” means Moody’s Investors Service, Inc. and its successors;

“Noteholder” has the meaning given in Condition 3(b) (*Title*);

“Officer’s Certificate” means a certificate signed by an Authorized Officer of the Issuer or the Guarantor (as applicable) and delivered to the Trustee;

“Opinion of Counsel” means an opinion in writing signed by legal counsel who may be an employee of, or counsel to, the Issuer or the Guarantor (as applicable) or who may be other counsel satisfactory to the Trustee;

“Optional Redemption Amount (Call)” means, in respect of any Note, its principal amount *plus* the Applicable Premium;

“Optional Redemption Amount (Put)” means, in respect of any Note, its principal amount or such other amount as may be specified in, or determined in accordance with, the relevant Pricing Supplement;

“Optional Redemption Date (Call)” has the meaning given in the relevant Pricing Supplement;

“Optional Redemption Date (Put)” has the meaning given in the relevant Pricing Supplement;

“Payment Business Day” means:

- (a) if the currency of payment is euro, any day which is:
 - (i) a day on which (a) banks in the relevant place of presentation are open for presentation and payment of debt securities and for dealings in foreign currencies; and (b) a day on which commercial banks are open for general business (including dealings in foreign currencies) in the city where the Principal Paying Agent or, as the case may be, the Paying Agent has its Specified Office; and
 - (ii) in the case of payment by transfer to an account, (a) a TARGET Settlement Day and (b) a day on which dealings in foreign currencies may be carried on in each (if any) Additional Financial Centre; or
- (b) if the currency of payment is not euro, any day which is:
 - (i) a day on which (a) banks in the relevant place of presentation are open for presentation and payment of debt securities and for dealings in foreign currencies and (b) a day on which commercial banks are open for general business (including dealings in foreign currencies) in the city where the Principal Paying Agent or, as the case may be, the Paying Agent has its Specified Office; and
 - (ii) in the case of payment by transfer to an account, a day on which dealings in foreign currencies (including, in the case of Notes denominated in Renminbi, settlement of Renminbi payments) may be carried on in the Principal Financial Centre of the currency of payment and in each (if any) Additional Financial Centre;

“Person” means any individual, corporation, partnership, joint venture, association, joint- stock company, trust, unincorporated organization, limited liability company, state-owned enterprise, government or any agency or political subdivision thereof or any other entity;

“PRC” means, for the purpose of these Conditions, the People’s Republic of China excluding Hong Kong, Macau and Taiwan;

“Principal Financial Centre” means, in relation to any currency, the principal financial centre for that currency *provided, however, that:*

- (a) in relation to euro, it means the principal financial centre of such Member State of the European Communities as is selected (in the case of a payment) by the payee or (in the case of a calculation) by the Calculation Agent;
- (b) in relation to Australian dollars, it means Sydney and in relation to New Zealand dollars, it means Auckland, in each case as is selected (in the case of a payment) by the payee or (in the case of a calculation) by the Calculation Agent or, in each case, the principal financial centre as is specified in the applicable Pricing Supplement; and
- (c) in relation to Renminbi, it means Hong Kong or the principal financial centre as is specified in the applicable Pricing Supplement;

“Rate of Interest” means the rate or rates (expressed as a percentage per annum) of interest payable in respect of the Notes specified in the relevant Pricing Supplement or calculated or determined in accordance with the provisions of these Conditions and/or the relevant Pricing Supplement;

“Rating Agency” means any of (i) S&P and (ii) Moody’s *provided that* (A) if either of S&P or Moody’s, but not both, will not make a rating of the Notes publicly available, one other “nationally recognized statistical rating organization” that is registered as such pursuant to Section 15E of the Exchange Act and Rule 17g thereunder selected by the Issuer as a replacement agency will be substituted for S&P or Moody’s, as the case may be; and (B) if both S&P and Moody’s will not make a rating of the Notes publicly available, two other “nationally recognized statistical rating organizations” that are registered as such pursuant to Section 15E of the Exchange Act and Rule 17g thereunder selected by the Issuer as replacement agencies;

“Rating Category” means (1) with respect to S&P, any of the following categories: “AAA,” “AA,” “A,” “BBB,” “BB,” “B,” “CCC,” “CC,” “C” and “D” (or equivalent successor categories); (2) with respect to Moody’s, any of the following categories: “Aaa,” “Aa,” “A,” “Baa,” “Ba,” “B,” “Caa,” “Ca,” and “C” (or equivalent successor categories); and (3) the equivalent of any such category of S&P or Moody’s used by another Rating Agency. In determining whether the rating of the Notes has decreased by one or more gradations, gradations within Rating Categories (“+” and “-” for S&P; “1,” “2” and “3” for Moody’s; or the equivalent gradations for another Rating Agency) shall be taken into account (e.g., with respect to S&P, a decline in a rating from “BB+” to “BB,” as well as from “B+” to “B-,” will constitute a decrease of one gradation);

“Ratings Decline” means, in connection with a Change of Control Triggering Event, the occurrence on, or within 90 days after, the earlier of the date, or public notice of the occurrence, of a Change of Control or the intention by PTT Public Company Limited to effect a Change of Control (which period will be extended so long as the rating of the Notes is under publicly announced consideration for possible downgrade by any of the Rating Agencies), the public announcement by either Rating Agency of a decrease in the rating of the Notes by one or more gradations (including gradations within Rating Categories as well as between Rating Categories);

“Redemption Amount” means, as appropriate, the Final Redemption Amount, the Early Redemption Amount (Tax), the Optional Redemption Amount (Call), the Optional Redemption Amount (Put), the Early Termination Amount or such other amount in the nature of a redemption amount as may be specified in, or determined in accordance with the provisions of, the relevant Pricing Supplement;

“Reference Banks” has the meaning given in the relevant Pricing Supplement or, if none, four major banks selected by the Issuer in the market that is most closely connected with the Reference Rate and notified in writing to the Trustee and the Calculation Agent;

“Reference Price” has the meaning given in the relevant Pricing Supplement;

“Reference Rate” has the meaning given in the relevant Pricing Supplement;

“Regular Period” means:

- (a) in the case of Notes where interest is scheduled to be paid only by means of regular payments, each period from and including the Interest Commencement Date to but excluding the first Interest Payment Date and each successive period from and including one Interest Payment Date to but excluding the next Interest Payment Date;
- (b) in the case of Notes where, apart from the first Interest Period, interest is scheduled to be paid only by means of regular payments, each period from and including a Regular Date falling in any year to but excluding the next Regular Date, where **“Regular Date”** means the day and month (but not the year) on which any Interest Payment Date falls; and
- (c) in the case of Notes where, apart from one Interest Period other than the first Interest Period, interest is scheduled to be paid only by means of regular payments, each period from and including a Regular Date falling in any year to but excluding the next Regular Date, where **“Regular Date”** means the day and month (but not the year) on which any Interest Payment Date falls other than the Interest Payment Date falling at the end of the irregular Interest Period.

“Relevant Date” means, in relation to any payment, whichever is the later of (a) the date on which the payment in question first becomes due and (b) if the full amount payable has not been received in the Principal Financial Centre of the currency of payment by the Principal Paying Agent or the Trustee on or prior to such due date, the date on which (the full amount having been so received) notice to that effect has been given to the Noteholders;

“Relevant Financial Centre” has the meaning given in the relevant Pricing Supplement;

“Relevant Indebtedness” of any Person means, at any date, Indebtedness (i) that has a final maturity date of one year or more from the date of incurrence or issuance of such Indebtedness and (ii) is in the form of, is represented or embodied by, bonds, notes, debentures or other securities which are, or are intended to be, commonly quoted, listed or dealt in or traded on any stock exchange or over-the-counter securities market;

“Relevant Screen Page” means the page, section or other part of a particular information service (including, without limitation, Reuters) specified as the Relevant Screen Page in the relevant Pricing Supplement, or such other page, section or other part as may replace it on that information service or such other information service, in each case, as may be nominated by the Person providing or sponsoring the information appearing there for the purpose of displaying rates or prices comparable to the Reference Rate;

“Relevant Time” has the meaning given in the relevant Pricing Supplement;

“Reset Interest Rate” has the meaning given in Condition 6(e);

“Security Interest” means any mortgage, pledge, lien, fixed or floating charge or other encumbrance;

“SGX-ST” means the Singapore Exchange Securities Trading Limited;

“Specified Currency” has the meaning given in the relevant Pricing Supplement;

“Specified Denomination(s)” has the meaning given in the relevant Pricing Supplement;

“**Specified Office**” has the meaning given in the Indenture;

“**Specified Period**” has the meaning given in the relevant Pricing Supplement;

“**Subsidiary**” means any corporation or other entity of which more than 50 per cent. of the total voting power of shares, securities or other ownership interests entitled to vote in the election of the board of directors or other persons performing similar functions is at the time directly or indirectly owned by the Company;

“**S&P**” means Standard & Poor’s Rating Services, a part of McGraw-Hill Financial (NYSE:MHFI) and its successors;

“**TARGET Settlement Day**” means any day on which TARGET2 is open for the settlement of payments in euro;

“**TARGET2**” means the Trans-European Automated Real-Time Gross Settlement Express Transfer payment system which utilizes a single shared platform and which was launched on November 19, 2007;

“**Treasury Rate**” means, as of any redemption date, the yield to maturity as of such redemption date of United States Treasury securities with a constant maturity (as compiled and published in the most recent Federal Reserve Statistical Release H.15 (519) that has become publicly available at least two business days prior to the redemption date (or, if such Statistical Release is no longer published, any publicly available source of similar market data)) most nearly equal to the period from the redemption date to the Maturity Date; *provided, however, that* if the period from the redemption date to the Maturity Date, is less than one year, the weekly average yield on actually traded United States Treasury securities adjusted to a constant maturity of one year will be used;

“**TRFS**” means Thai Financial Reporting Standards; and

“**Zero Coupon Note**” means a Note specified as such in the relevant Pricing Supplement.

(b) **Interpretation:**

In these Conditions:

- (i) any reference to principal shall be deemed to include the Redemption Amount, any Additional Amounts (as defined in Condition 12 (*Additional Amounts*)), any premium payable in respect of a Note and any other amount in the nature of principal payable pursuant to these Conditions or the Indenture;
- (ii) any reference to interest shall be deemed to include any Additional Amounts and any other amount in the nature of interest payable pursuant to these Conditions or the Indenture;
- (iii) references to Notes being “**outstanding**” shall be construed in accordance with the Indenture;
- (iv) if an expression is stated in Condition 2(a) (*Interpretation — Definitions*) to have the meaning given in the relevant Pricing Supplement, but the relevant Pricing Supplement gives no such meaning or specifies that such expression is “**not applicable**” then such expression is not applicable to the Notes; and
- (v) any reference to the Indenture shall be construed as a reference to the Indenture as amended and/or supplemented up to and including the Issue Date of the Notes.

3. Form, Denomination, Title and Transfer

(a) **Notes**

Notes are in the Specified Denomination(s), which may include a minimum denomination specified in the relevant Pricing Supplement and higher integral multiples of a smaller amount specified in the relevant Pricing Supplement.

(b) **Title**

The Registrar will maintain a register outside the United Kingdom in accordance with the provisions of the Indenture. A certificate (each, a “**Note Certificate**”) will be issued to each Holder of Notes in respect of its registered holding. Each Note Certificate will be numbered serially with an identifying number which will be recorded in the register (the “**Register**”). “**Holder**” means the person in whose name such Note is for the time being registered in the Register (or, in the case of a joint holding, the first named thereof) and “**Noteholder**” shall be construed accordingly.

(c) **Ownership**

The Holder of any Note shall (except as otherwise required by law) be treated as its absolute owner for all purposes (whether or not it is overdue and regardless of any notice of ownership, trust or any other interest therein, any writing on the Note Certificate relating thereto (other than the endorsed form of transfer) or any notice of any previous loss or theft thereof) and no Person shall be liable for so treating such Holder.

(d) **Transfers of Notes**

Subject to paragraphs (g) and (h) below, a Note may be transferred upon surrender of the relevant Note Certificate, with the endorsed form of transfer duly completed, at the Specified Office of the Registrar or any Transfer Agent, together with such evidence as such Registrar or (as the case may be) such Transfer Agent may reasonably require to prove the title of the transferor and the authority of the individuals who have executed the form of transfer; provided, however, that a Note may not be transferred unless the principal amount of Notes transferred and (where not all of the Notes held by a Holder are being transferred) the principal amount of the balance of Notes not transferred are Specified Denominations. Where not all the Notes represented by the surrendered Note Certificate are the subject of the transfer, a new Note Certificate in respect of the balance of the Notes will be issued to the transferor.

(e) **Registration and delivery of Note Certificates**

Within five business days of the surrender of a Note Certificate in accordance with paragraph (d) above, the Registrar will register the transfer in question and deliver a new Note Certificate of a like principal amount to the Notes transferred to each relevant Holder at its Specified Office or (as the case may be) the Specified Office of any Transfer Agent or (at the request and risk of any such relevant Holder) by uninsured first class mail (airmail if overseas) to the address specified for the purpose by such relevant Holder. In this paragraph, “business day” means a day on which commercial banks are open for general business (including dealings in foreign currencies) in the city where the Registrar or (as the case may be) the relevant Transfer Agent has its Specified Office.

(f) **No charge**

The transfer of a Note will be effected without charge by or on behalf of the Issuer, the Guarantor (if applicable) or the Registrar or any Transfer Agent but against such indemnity by the transferor as such Registrar or (as the case may be) such Transfer Agent may require in respect of any tax or other duty of whatsoever nature which may be levied or imposed in connection with such transfer.

(g) ***Closed periods***

Noteholders may not require transfers to be registered:

- (i) during the period of 15 days ending on the due date for any payment of principal or interest in respect of the Notes; and
- (ii) during the period of 15 days ending on any date on which Notes may be called for redemption by the Issuer at its option pursuant to Condition 10(b) (*Optional Tax Redemption*) or Condition 10(c) (*Optional Redemption*) below.

(h) ***Regulations concerning transfers and registration***

All transfers of Notes and entries on the Register are subject to the detailed regulations concerning the transfer of Notes scheduled to the program manual relating to the Program. The regulations may be changed by the Issuer with the prior written approval of the Registrar. A copy of the current regulations will be mailed by the Registrar to any Noteholder (at the cost and expense of such Noteholder) who requests in writing a copy of such regulations.

4. Status

- (a) The Notes constitute direct, unconditional, unsubordinated and (subject to Condition 5(a) (*Limitation on Liens*)) unsecured obligations of the Issuer which will at all times rank *pari passu* among themselves and at least *pari passu* with all other present and future unsecured and unsubordinated obligations of the Issuer, save for such obligations as may be preferred by provisions of law that are both mandatory and of general application.
- (b) The Guarantor's obligations under the Guarantee constitute direct, unconditional, unsubordinated and (subject to Condition 5(a) (*Limitation on Liens*)) unsecured obligations of the Guarantor which will at all times rank *pari passu* among themselves and at least *pari passu* with all other present and future unsecured and unsubordinated obligations of the Guarantor, save for such obligations as may be preferred by provisions of law that are both mandatory and of general application.

5. Certain Covenants

(a) ***Limitation on Liens***

So long as any Note remains outstanding, the Company will not, and the Company will not permit any of its Subsidiaries to, create, incur, issue or assume or guarantee any Relevant Indebtedness secured by any Security Interest on any property or assets owned by it or any Subsidiary without in any such case effectively providing that the Notes (together with, if the Company shall so determine, any other Indebtedness of the Company or the Company's Subsidiaries then existing or thereafter created which is not subordinated to the Notes) will be secured at least equally and ratably with or prior to such secured Relevant Indebtedness unless, after giving effect thereto, the aggregate principal amount of all such secured Relevant Indebtedness would not exceed 10 per cent. of the Company's Consolidated Net Tangible Assets.

The foregoing restrictions will not apply to Relevant Indebtedness secured by:

- (i) any Security Interest existing on the Issue Date of the Notes;
- (ii) any Security Interest existing on any property or assets prior to the acquisition thereof by the Company or any of its Subsidiaries or arising after such acquisition pursuant to contractual commitments entered into prior to, and not in contemplation of, such acquisition;

- (iii) any Security Interest securing Relevant Indebtedness incurred or assumed for the purpose of financing the purchase price of any property or assets or the cost of construction, improvement or repair of all or any part thereof, provided that such Security Interest attaches to such property or assets concurrently with or within 12 months after the acquisition thereof or the completion of construction, improvement or repair thereof;
- (iv) any Security Interest existing on any property or assets of any Subsidiary prior to the time such Subsidiary becomes a Subsidiary of the Company or arising after such time pursuant to contractual commitments entered into prior to, and not in contemplation of, such Subsidiary becoming a Subsidiary of the Company; or
- (v) any Security Interest arising out of the refinancing, extension, renewal or refunding of any Relevant Indebtedness secured by any Security Interest permitted by any of the foregoing clauses, to the extent of the amount of such Relevant Indebtedness; *provided that* such Relevant Indebtedness is not secured by any additional property or assets.

(b) ***Consolidation, Merger and Sale of Assets***

Neither the Issuer nor (while there are any Guaranteed Notes outstanding) the Guarantor (if applicable) will consolidate with or merge with or into any other Person in a transaction in which the Issuer or the Guarantor (if applicable) is not the surviving entity, or sell, transfer or lease or otherwise dispose of all or substantially all of its property or assets (computed on a consolidated basis) to any Person, unless:

- (i) any Person formed by such consolidation or into which the Issuer or the Guarantor (if applicable) is merged or to whom the Issuer or the Guarantor (if applicable) has sold, transferred, leased or otherwise disposed of substantially all of its properties or assets (a “**Successor Issuer**” or a “Successor Guarantor”, as applicable) is a corporation organized and validly existing under the laws of the Kingdom of Thailand, and expressly assumes by a supplemental agreement all obligations of the Issuer or the Guarantor (if applicable) under the Notes, the Indenture and the Paying and Transfer Agent and Registrar Appointment Letter;
- (ii) immediately after giving effect to such transaction, no Default or Event of Default shall have occurred and be continuing;
- (iii) if, as a result of the transaction, any property or asset of the Company or any of the Company’s Subsidiaries would become subject to a Security Interest that would not be permitted under Condition 5(a) above, the Company or such successor Person takes such steps as shall be necessary to secure the Notes at least equally and ratably with the Relevant Indebtedness secured by such Security Interest or by such other Security Interest as shall have been approved by Holders of the Notes pursuant to the Indenture; and
- (iv) the Issuer or the Guarantor (if applicable) delivers to the Trustee an Officer’s Certificate and an Opinion of Counsel, in each case stating that such consolidation, merger or transfer and the relevant supplemental agreement complies with this provision and that all conditions precedent provided for in the Indenture and the Paying and Transfer Agent and Registrar Appointment Letter relating to such transaction have been complied with and that the relevant supplemental agreement is enforceable.

References to the Issuer and the Guarantor in these Conditions shall be deemed to include any Successor Issuer or Successor Guarantor.

(c) ***Reports and Notices of Default***

So long as any of the Notes remain outstanding, the Issuer shall file with the Trustee and, upon request, furnish to the Holders of the Notes, as soon as they are available but in any event not more than 10 calendar days after any financial statements of the Company are filed with the Stock Exchange of Thailand (the “SET”) or any other recognized exchange on which the Company’s common shares are at any time listed for trading, true and correct copies of any financial statements filed with such exchange if such financial statements are in the English language;

provided that, if such financial statements are not in the English language, or at any time the common stock of the Company ceases to be listed for trading on SET or any other recognized exchange, the Issuer shall file with the Trustee and, upon request, furnish to the Holders of the Notes:

- (i) as soon as they are available, but in any event within 90 calendar days after the end of each fiscal year of the Company, copies of the Company’s financial statements (on a consolidated basis) in respect of such fiscal year (including a statement of income, balance sheet and cash flow statement) audited by a member firm of independent accountants;
- (ii) as soon as they are available, but in any event within 45 calendar days after the end of the first three fiscal quarters of the Company, copies of the Company’s unaudited financial statements (on a consolidated basis) in respect of such fiscal quarter (including a statement of income, balance sheet and cash flow statement) prepared on a basis consistent with the audited financial statements of the Company, together with a certificate signed by the person then authorized to sign financial statements on behalf of the Company, to the effect that such financial statements are true in all material respects and present fairly the financial position of the Company, as at the end of, and the results of its operations for, the relevant fiscal quarter; and

provided further that, if reports other than financial statements filed with the SET or any other recognized exchange on which the Company’s common shares are at any time listed for trading are not in the English language, the Issuer shall file with the Trustee and, upon request, furnish to the Holders of the Notes, as soon as practicable after the issue or publication of such reports, English copies of such reports.

The Trustee shall have no obligation whatsoever to determine whether or not such information, documents or reports have been filed with the exchange.

So long as any of the Notes remain outstanding, the Issuer and the Guarantor (if applicable) shall provide to the Trustee promptly after the Issuer or the Guarantor (if applicable) becomes aware of the occurrence of a Default, an Officer’s Certificate setting forth the details of the Default, and the action which the Issuer or the Guarantor (if applicable) proposes to take with respect thereto.

6. Fixed Rate Note Provisions

(a) Application

This Condition 6 is applicable to the Notes only if the Fixed Rate Note Provisions are specified in the relevant Pricing Supplement as being applicable.

(b) Accrual of interest

The Notes bear interest from the Interest Commencement Date at the Rate of Interest payable in arrear on each Interest Payment Date up to and including the Maturity Date, subject as provided in Condition 11 (*Payments*) below. Each Note will cease to bear interest from the due date for final redemption unless, upon due presentation, payment of the Redemption Amount is improperly withheld or refused, in which case it will continue to bear interest in accordance with this Condition 6 (as well after as before judgment) until whichever is the earlier of (i) the day on which all sums due in respect

of such Note up to that day are received by or on behalf of the relevant Noteholder and (ii) the day which is seven days after the Principal Paying Agent or the Trustee has notified the Noteholders of receipt of all sums due in respect of the Notes up to such seventh day (except to the extent that there is any subsequent default in payment).

(c) ***Fixed Coupon Amount***

Unless specified in the relevant Pricing Supplement, the amount of interest payable in respect of each Note for any Interest Period shall be the relevant Fixed Coupon Amount and, if the Notes are in more than one Specified Denomination, shall be the relevant Fixed Coupon Amount in respect of the relevant Specified Denomination.

(d) ***Calculation of interest amount***

The amount of interest payable in respect of each Note for any period for which a Fixed Coupon Amount is not specified shall be calculated by applying the Rate of Interest to the Calculation Amount, multiplying the product by the relevant Day Count Fraction, rounding the resulting figure to the nearest sub-unit of the Specified Currency (half a sub-unit being rounded upwards) and multiplying such rounded figure by a fraction equal to the Specified Denomination of such Note divided by the Calculation Amount. For this purpose a “**sub-unit**” means, in the case of any currency other than euro, the lowest amount of such currency that is available as legal tender in the country of such currency and, in the case of euro, means one cent.

(e) ***Step-up upon a Change of Control Triggering Event***

The Rate of Interest payable on the Notes will be subject to an increase of 1.25 per cent. upon the occurrence of a Change of Control Triggering Event (the Rate of Interest subject to such increase, the “**Reset Interest Rate**”). The Reset Interest Rate will have effect from and including the first interest payment date following the date of the occurrence of such Change of Control Triggering Event and shall apply to all subsequent interest payment dates regardless of any future increase in the ratings of the Notes.

7. Floating Rate Note and Index-Linked Interest Note Provisions

(a) ***Application***

This Condition 7 is applicable to the Notes only if the Floating Rate Note Provisions or the Index- Linked Interest Note Provisions are specified in the relevant Pricing Supplement as being applicable.

(b) ***Accrual of interest***

The Notes bear interest from the Interest Commencement Date at the Rate of Interest payable in arrear on each Interest Payment Date, subject as provided in Condition 11 (*Payments*) below. Each Note will cease to bear interest from the due date for final redemption unless, upon due presentation, payment of the Redemption Amount is improperly withheld or refused, in which case it will continue to bear interest in accordance with this Condition (as well after as before judgment) until whichever is the earlier of (i) the day on which all sums due in respect of such Note up to that day are received by or on behalf of the relevant Noteholder and (ii) the day which is seven days after the Principal Paying Agent or the Trustee has notified the Noteholders of receipt of all sums due in respect of the Notes up to such seventh day (except to the extent that there is any subsequent default in payment).

(c) ***Screen Rate Determination***

If Screen Rate Determination is specified in the relevant Pricing Supplement as the manner in which the Rate(s) of Interest is/are to be determined, the Rate of Interest

applicable to the Notes for each Interest Period will be determined by the Calculation Agent on the following basis:

- (i) if the Reference Rate is a composite quotation or customarily supplied by one entity, the Calculation Agent will determine the Reference Rate which appears on the Relevant Screen Page as of the Relevant Time on the relevant Interest Determination Date;
- (ii) if Linear Interpolation is specified as applicable in respect of an Interest Period in the applicable Pricing Supplement, the Rate of Interest for such Interest Period shall be calculated by the Calculation Agent by straight-line linear interpolation by reference to two rates which appear on the Relevant Screen Page as of the Relevant Time on the relevant Interest Determination Date, where:
 - (A) one rate shall be determined as if the Relevant Period were the period of time for which rates are available next shorter than the length of the relevant Interest Period; and
 - (B) the other rate shall be determined as if the Relevant Period were the period of time for which rates are available next longer than the length of the relevant Interest Period;

provided, however, that if no rate is available for a period of time next shorter or, as the case may be, next longer than the length of the relevant Interest Period, then the Calculation Agent shall, upon seeking advice from the Reference Banks (at the cost of the Issuer (failing which, the Guarantor (if applicable))) or taking instructions from the Issuer, determine such rate at such time and by reference to such sources as it determines appropriate;

- (iii) in any other case, the Calculation Agent will determine the arithmetic mean of the Reference Rates which appear on the Relevant Screen Page as of the Relevant Time on the relevant Interest Determination Date;
- (iv) if, in the case of (i) above, such rate does not appear on that page or, in the case of (ii) above, fewer than two such rates appear on that page or if, in either case, the Relevant Screen Page is unavailable, the Calculation Agent will:
 - (A) request the principal Relevant Financial Centre office of each of the Reference Banks to provide a quotation of the Reference Rate at approximately the Relevant Time on the Interest Determination Date to prime banks in the Relevant Financial Centre interbank market in an amount that is representative for a single transaction in that market at that time; and
 - (B) determine the arithmetic mean of such quotations; and
- (v) if fewer than two such quotations are provided as requested in accordance with (iv) above, the Calculation Agent will determine the arithmetic mean of the rates (being the nearest to the Reference Rate, as determined by the Calculation Agent) quoted by major banks in the Principal Financial Centre of the Specified Currency, selected by the Issuer, at approximately 11.00 a.m. (local time in the Principal Financial Centre of the Specified Currency) on the first day of the relevant Interest Period for loans in the Specified Currency for a period equal to the relevant Interest Period and in an amount that is representative for a single transaction in that market at that time, and the Rate of Interest for such Interest Period shall be the sum of the Margin and the rate or (as the case may be) the arithmetic mean so determined; provided, however, that if the Calculation Agent is unable to determine a rate or (as the case may be) an arithmetic mean in accordance with the above provisions in relation to any Interest Period, the Rate of Interest applicable to the Notes

during such Interest Period will be the sum of the Margin and the rate or (as the case may be) the arithmetic mean last determined in relation to the Notes in respect of a preceding Interest Period.

(vi) notwithstanding the foregoing, if the Reference Rate from time to time in respect of Floating Rate Notes is specified hereon as CNH HIBOR:

(A) the Rate of Interest for each Interest Period will, subject as provided below, be either:

(1) the offered quotation; or

(2) the arithmetic mean of the offered quotations,

(expressed as a percentage rate per annum) for the Reference Rate which appears on the Relevant Screen Page as at 11.15 a.m. (Hong Kong time) or if, at or around that time it is notified that the fixing will be published at 2.30 p.m. (Hong Kong time), then 2.30 p.m. (Hong Kong time) on the Interest Determination Date in question as determined by the Calculation Agent;

(B) if the Relevant Screen Page is not available or, if sub-paragraph (vi)(A)(1) above applies and no such offered quotation appears on the Relevant Screen Page, or, if subparagraph (vi)(A)(2) above applies and fewer than three such offered quotations appear on the Relevant Screen Page, in each case as at the time specified above, subject as provided below, the Calculation Agent shall request the principal Hong Kong office of each of the Reference Banks to provide the Calculation Agent with its offered quotation (expressed as a percentage rate per annum) for the Reference Rate at approximately 11.15 a.m. (Hong Kong time) on the Interest Determination Date in question. If two or more of the Reference Banks provide the Calculation Agent with such offered quotations, the Rate of Interest for such Interest Period shall be the arithmetic mean of such offered quotations as determined by the Calculation Agent. If all four Reference Banks provide the Calculation Agent with such offered quotations, the highest (or, if there is more than one such highest quotation, one only of such quotations) and the lowest (or, if there is more than one such lowest quotation, one only of such quotations) shall be disregarded by the Calculation Agent for the purpose of determining the arithmetic mean of such offered quotations;

(C) if subparagraph (vi)(B) above applies and the Calculation Agent determines that fewer than two Reference Banks are providing offered quotations, subject as provided below, the Rate of Interest shall be the arithmetic mean of the rates per annum (expressed as a percentage) as communicated to (and at the request of) the Calculation Agent by the Reference Banks or any two or more of them, at which such banks were offered at approximately 11.15 a.m. (Hong Kong time) on the relevant Interest Determination Date, deposits in CNH for a period equal to that which would have been used for the Reference Rate by leading banks in the Hong Kong inter-bank market. If fewer than two of the Reference Banks provide the Calculation Agent with such offered rates, the Rate of Interest shall be (i) the offered rate for deposits in CNH for a period equal to that which would have been used for the Reference Rate by a bank, or (ii) the arithmetic mean of the offered rates for deposits in CNH for a period equal to that which would have been used for the Reference Rate by two or more banks, in each case as informed to the Calculation Agent by such bank or banks (which shall be such

bank or banks being in the opinion of the Issuer suitable for such purpose) as being quoted by each such bank at approximately 11.15 a.m. (Hong Kong time) on the relevant Interest Determination Date to leading banks in the Hong Kong inter-bank market, *provided that*, if the Rate of Interest cannot be determined in accordance with the foregoing provisions of this paragraph, the Rate of Interest shall be determined as at the last preceding Interest Determination Date (though substituting, where a different Margin or Maximum or Minimum Rate of Interest is to be applied to the relevant Interest Period from that which applied to the last preceding Interest Period, the Margin or Maximum or Minimum Rate of Interest relating to the relevant Interest Period, in place of the Margin or Maximum or Minimum Rate of Interest relating to that last preceding Interest Period); and

- (D) in no event shall the Rate of Interest be less than zero per cent. per annum.

(d) **ISDA Determination**

If ISDA Determination is specified in the relevant Pricing Supplement as the manner in which the Rate(s) of Interest is/are to be determined, the Rate of Interest applicable to the Notes for each Interest Period will be the sum of the Margin and the relevant ISDA Rate where “**ISDA Rate**” in relation to any Interest Period means a rate equal to the Floating Rate (as defined in the ISDA Definitions) that would be determined by the Calculation Agent under an interest rate swap transaction if the Calculation Agent were acting as Calculation Agent for that interest rate swap transaction under the terms of an agreement incorporating the ISDA Definitions and under which:

- (i) the Floating Rate Option (as defined in the ISDA Definitions) is as specified in the relevant Pricing Supplement;
- (ii) the Designated Maturity (as defined in the ISDA Definitions) is a period specified in the relevant Pricing Supplement;
- (iii) the relevant Reset Date (as defined in the ISDA Definitions) is either (A) if the relevant Floating Rate Option is based on (x) the London inter-bank offered rate (LIBOR), (y) the Eurozone inter-bank offered rate (EURIBOR) or (z) the Hong Kong inter-bank offered rate (HIBOR) for a currency, the first day of that Interest Period or (B) in any other case, as specified in the relevant Pricing Supplement; and
- (iv) if Linear Interpolation is specified as applicable in respect of an Interest Period in the applicable Pricing Supplement, the Rate of Interest for such Interest Period shall be calculated by the Calculation Agent by straight-line linear interpolation by reference to two rates based on the relevant Floating Rate Option, where:
 - (A) one rate shall be determined as if the Designated Maturity were the period of time for which rates are available next shorter than the length of the relevant Interest Period; and
 - (B) the other rate shall be determined as if the Designated Maturity were the period of time for which rates are available next longer than the length of the relevant Interest Period

provided, however, that if there is no rate available for a period of time next shorter than the length of the relevant Interest Period or, as the case may be, next longer than the length of the relevant Interest Period, then the Calculation Agent shall determine such rate at such time and by reference to such sources as it determines appropriate.

(e) ***Index-Linked Interest***

If the Index-Linked Interest Note Provisions are specified in the relevant Pricing Supplement as being applicable, the Rate(s) of Interest applicable to the Notes for each Interest Period will be determined in the manner specified in the relevant Pricing Supplement.

(f) ***Maximum or Minimum Rate of Interest***

If any Maximum Rate of Interest or Minimum Rate of Interest is specified in the relevant Pricing Supplement, then the Rate of Interest shall in no event be greater than the maximum or be less than the minimum so specified. If the relevant Pricing Supplement does not specify any Minimum Rate of Interest and the Rate of Interest as determined by the Calculation Agent according to this Condition is a negative value, the Rate of Interest shall be zero per cent. per annum.

(g) ***Step-up upon a Change of Control Triggering Event***

The Rate of Interest payable on the Notes will be subject to an increase of 1.25 per cent. upon the occurrence of a Change of Control Triggering Event (the Rate of Interest subject to such increase, the Reset Interest Rate). The Reset Interest Rate will have effect from and including the first interest payment date following the date of the occurrence of such Change of Control Triggering Event and shall apply to all subsequent interest payment dates regardless of any future increase in the ratings of the Notes.

(h) ***Calculation of Interest Amount***

The Calculation Agent will, as soon as practicable after the time at which the Rate of Interest is to be determined in relation to each Interest Period, calculate the Interest Amount payable in respect of each Note for such Interest Period. The Interest Amount will be calculated by applying the Rate of Interest for such Interest Period to the Calculation Amount, multiplying the product by the relevant Day Count Fraction, rounding the resulting figure to the nearest sub-unit of the Specified Currency (half a sub-unit being rounded upwards) and multiplying such rounded figure by a fraction equal to the Specified Denomination of the relevant Note divided by the Calculation Amount. For this purpose a “sub-unit” means, in the case of any currency other than euro, the lowest amount of such currency that is available as legal tender in the country of such currency and, in the case of euro, means one cent.

(i) ***Calculation of other amounts***

If the relevant Pricing Supplement specifies that any other amount is to be calculated by the Calculation Agent, the Calculation Agent will, as soon as practicable after the time or times at which any such amount is to be determined, calculate the relevant amount. The relevant amount will be calculated by the Calculation Agent in the manner specified in the relevant Pricing Supplement.

(j) ***Publication***

The Calculation Agent will cause each Rate of Interest and Interest Amount determined by it, together with the relevant Interest Payment Date, and any other amount(s) required to be determined by it together with any relevant payment date(s) to be notified to the Issuer, the Guarantor (if applicable), the Paying Agents, and the Trustee as soon as practicable after such determination but (in the case of each Rate of Interest, Interest Amount and Interest Payment Date) in any event not later than the first day of the relevant Interest Period. Notice thereof shall also promptly be given by the Issuer to the Noteholders and each competent authority, stock exchange and/or quotation system (if any) by which the Notes have then been admitted to listing, trading and/or quotation. The Calculation Agent will be entitled to recalculate any Interest Amount (on the basis of the foregoing provisions) without notice in the event of an extension or shortening

of the relevant Interest Period. If the Calculation Amount is less than the minimum Specified Denomination the Calculation Agent shall not be obliged to publish each Interest Amount but instead may publish only the Calculation Amount and the Interest Amount in respect of a Note having the minimum Specified Denomination.

(k) ***Notifications etc***

All notifications, opinions, determinations, certificates, calculations, quotations and decisions given, expressed, made or obtained for the purposes of this Condition by the Calculation Agent will (in the absence of manifest error) be binding on the Issuer, the Guarantor (if applicable), the Trustee, the Paying Agents, the Noteholders and (subject as aforesaid) no liability to any such Person will attach to the Calculation Agent in connection with the exercise or non-exercise by it of its powers, duties and discretions for such purposes.

(l) ***Benchmark Discontinuation***

If a Benchmark Event occurs in relation to the Reference Rate when the Rate of Interest (or any component part thereof) for any Interest Period remains to be determined by reference to such Reference Rate, then the Issuer shall use its reasonable endeavours to appoint an Independent Adviser, as soon as reasonably practicable, to determine a Successor Rate, failing which an Alternative Rate (in accordance with Condition 7(l)) and, in either case, an Adjustment Spread, if any (in accordance with Condition 7(l)(iii)) and any Benchmark Amendments (in accordance with Condition 7(l)(iv)).

In the absence of bad faith or fraud, the Independent Adviser shall have no liability whatsoever to the Issuer, the Guarantor, the Trustee, Agents or the Noteholders for any determination made by it pursuant to this Condition 7(l) and the Trustee and Agents will not be liable for any loss, liability, cost, charge or expense which may arise as a result thereof.

- (i) If (A) the Issuer is unable to appoint an Independent Adviser or (B) the Independent Adviser appointed by it fails to determine a Successor Rate or, failing which, an Alternative Rate in accordance with this Condition 7(l) prior to the relevant Interest Determination Date, the Reference Rate applicable to the immediate following Interest Period shall be the Reference Rate applicable as at the last preceding Interest Determination Date. If there has not been a first Interest Payment Date, the Reference Rate shall be the Reference Rate applicable to the first Interest Period. For the avoidance of doubt, any adjustment pursuant to this final paragraph of Condition 7(l) shall apply to the immediately following Interest Period only. Any subsequent Interest Period may be subject to the subsequent operation of this Condition 7(l).
- (ii) If the Independent Adviser determines in its discretion that:
 - (A) there is a Successor Rate, then such Successor Rate shall (subject to adjustment as provided in Condition 7(l)(iii)) subsequently be used in place of the Reference Rate to determine the Rate of Interest for the immediately following Interest Period and all following Interest Periods, subject to the subsequent operation of this Condition 7(l); or
 - (B) there is no Successor Rate but that there is an Alternative Rate, then such Alternative Rate shall (subject to adjustment as provided in Condition 7(i)(cc)) subsequently be used in place of the Reference Rate to determine the Rate of Interest for the immediately following Interest Period and all following Interest Periods, subject to the subsequent operation of this Condition 7(l).

- (iii) If the Independent Adviser determines in its discretion (A) that an Adjustment Spread is required to be applied to the Successor Rate or the Alternative Rate (as the case may be) and (B) the quantum of, or a formula or methodology for determining, such Adjustment Spread, then such Adjustment Spread shall apply to the Successor Rate or the Alternative Rate (as the case may be).
- (iv) If any relevant Successor Rate, Alternative Rate or Adjustment Spread is determined in accordance with this Condition 7(l) and the Independent Adviser determines in its discretion (i) that amendments to these Conditions are necessary to ensure the proper operation of such Successor Rate, Alternative Rate and/or Adjustment Spread (such amendments, the “Benchmark Amendments”) and (ii) the terms of the Benchmark Amendments, then the Issuer shall, subject to giving notice thereof in accordance with Condition 7(l)(v), without any requirement for the consent or approval of relevant Noteholders, vary these Conditions to give effect to such Benchmark Amendments with effect from the date specified in such notice (and for the avoidance of doubt, the Trustee shall, at the direction and expense of the Issuer, consent to and effect such consequential amendments to the Trust Deed and these Conditions as may be required in order to give effect to this Condition 7(l)).
- (v) Any Successor Rate, Alternative Rate, Adjustment Spread and the specific terms of any Benchmark Amendments, determined under this Condition 7(l) will be notified promptly by the Issuer to the Trustee, the Calculation Agent, the Paying Agents and, in accordance with Condition 22 (Notices), the Noteholders. Such notice shall be irrevocable and shall specify the effective date of the Benchmark Amendments, if any.
- (vi) No later than notifying the Trustee of the same, the Issuer shall deliver to the Trustee a certificate signed by two authorised signatories of the Issuer:
 - (A) confirming (x) that a Benchmark Event has occurred, (y) the relevant Successor Rate, or, as the case may be, the relevant Alternative Rate and, (z) where applicable, any relevant Adjustment Spread and/or the specific terms of any relevant Benchmark Amendments, in each case as determined in accordance with the provisions of this Condition 7(l); and
 - (B) certifying that the relevant Benchmark Amendments are necessary to ensure the proper operation of such relevant Successor Rate, Alternative Rate and/or Adjustment Spread.
- (vii) The Successor Rate or Alternative Rate and the Adjustment Spread (if any) and the Benchmark Amendments (if any) specified in such certificate will (in the absence of manifest error or bad faith in the determination of such Successor Rate or Alternative Rate and such Adjustment Spread (if any) and such Benchmark Amendments (if any)) be binding on the Issuer, the Trustee and Principal Paying Agent, the Calculation Agent, the other Paying Agents and the Noteholders.

As used in this Condition 7(l):

“**Adjustment Spread**” means either a spread (which may be positive or negative), or the formula or methodology for calculating a spread, in either case, which the Independent Adviser determines is required to be applied to the relevant Successor Rate or the relevant Alternative Rate (as the case may be) to reduce or eliminate, to the extent reasonably practicable in the circumstances, any economic prejudice or benefit (as the case may be) to Noteholders as a result of the replacement of the Reference Rate with the Successor Rate or the Alternative Rate (as the case may be) and is the spread, formula or methodology which:

- (i) in the case of a Successor Rate, is formally recommended, or formally provided as an option for parties to adopt, in relation to the replacement of the Reference Rate with the Successor Rate by any Relevant Nominating Body; or
- (ii) (if no such recommendation has been made, or in the case of an Alternative Rate), the Independent Adviser, determines is customarily applied to the relevant Successor Rate or Alternative Rate (as the case may be) in international debt capital markets transactions to produce an industry-accepted replacement rate for the Reference Rate; or
- (iii) (if no such recommendation has been made, or in the case of an Alternative Rate) the Independent Adviser determines, is recognised or acknowledged as being the industry standard for over-the-counter derivative transactions which reference the Reference Rate, where such rate has been replaced by the Successor Rate or the Alternative Rate (as the case may be); or
- (iv) (if the Independent Adviser determines that no such industry standard is recognised or acknowledged) the Independent Adviser determines to be appropriate.

“Alternative Rate” means an alternative benchmark or screen rate which the Independent Adviser determines in accordance with Condition 7(l)(ii) is customary in market usage in the international debt capital markets for the purposes of determining floating rates of interest (or the relevant component part thereof) in the Specified Currency.

“Benchmark Event” means :

- (i) the relevant Reference Rate has ceased to be published on the Relevant Screen Page as a result of such benchmark ceasing to be calculated or administered; or
- (ii) a public statement by the administrator of the relevant Reference Rate that it has ceased, or will, by a specified date within the following six months, cease, publishing such Reference Rate permanently or indefinitely (in circumstances where no successor administrator has been appointed that will continue publication of such Reference Rate); or
- (iii) a public statement by the supervisor of the administrator of the relevant Reference Rate that such Reference Rate has been or will, by a specified date within the following six months, be permanently or indefinitely discontinued; or
- (iv) a public statement by the supervisor of the administrator of the relevant Reference Rate that means that such Reference Rate will, by a specified date within the following six months, be prohibited from being used or that its use will be subject to restrictions or adverse consequences, either generally or in respect of the Notes; or
- (v) a public statement by the supervisor of the administrator of the relevant Reference Rate (as applicable) that, in the view of such supervisor, (i) such Reference Rate is no longer representative of an underlying market or (ii) the methodology to calculate such Reference Rate has materially changed ; or
- (vi) it has or will, by a specified date within the following six months, become unlawful for the Calculation Agent to calculate any payments due to be made to any Noteholder using the relevant Reference Rate (as applicable) (including, without limitation, under the Benchmarks Regulation (EU) 2016/1011, if applicable).

“**Benchmark Amendments**” has the meaning given to it in Condition 7(l)(i).

“**Independent Adviser**” means an independent financial institution of international repute or other independent financial adviser experienced in the international capital markets, in each case appointed by the Issuer at its own expense under Condition 7(l)(i).

“**Relevant Nominating Body**” means, in respect of a benchmark or screen rate (as applicable):

- (i) the central bank for the currency to which the benchmark or screen rate (as applicable) relates, or any central bank or other supervisory authority which is responsible for supervising the administrator of the benchmark or screen rate (as applicable); or
- (ii) any working group or committee sponsored by, chaired or co-chaired by or constituted at the request of (a) the central bank for the currency to which the benchmark or screen rate (as applicable) relates, (b) any central bank or other supervisory authority which is responsible for supervising the administrator of the benchmark or screen rate (as applicable), (c) a group of the aforementioned central banks or other supervisory authorities or (d) the Financial Stability Board or any part thereof.

“**Successor Rate**” means a successor to or replacement of the Reference Rate which is formally recommended by any Relevant Nominating Body.

8. Zero Coupon Note Provisions

(a) Application

This Condition 8 is applicable to the Notes only if the Zero Coupon Note Provisions are specified in the relevant Pricing Supplement as being applicable.

(b) Late payment on Zero Coupon Notes

If the Redemption Amount payable in respect of any Zero Coupon Note is improperly withheld or refused, the Redemption Amount shall thereafter be an amount equal to the sum of:

- (i) the Reference Price; and
- (ii) the product of the Accrual Yield (compounded annually) being applied to the Reference Price on the basis of the relevant Day Count Fraction from (and including) the Issue Date to (but excluding) whichever is the earlier of (A) the day on which all sums due in respect of such Note up to that day are received by or on behalf of the relevant Noteholder and (B) the day which is seven days after the Principal Paying Agent or the Trustee has notified the Noteholders of receipt of all sums due in respect of the Notes up to such seventh day (except to the extent that there is any subsequent default in payment).

9. Dual Currency Note Provisions

(a) Application

This Condition 9 is applicable to the Notes only if the Dual Currency Note Provisions are specified in the relevant Pricing Supplement as being applicable.

(b) ***Rate of Interest***

If the rate or amount of interest falls to be determined by reference to an exchange rate, the rate or amount of interest payable shall be determined in the manner specified in the relevant Pricing Supplement.

10. Redemption and Purchase

(a) ***Scheduled redemption***

Unless previously redeemed, or purchased and cancelled, each Note will be redeemed at its Final Redemption Amount on the Maturity Date, subject as provided in Condition 11 (*Payments*).

(b) ***Optional Tax Redemption***

The Notes may be redeemed at the option of the Issuer in whole, but not in part, at the relevant Early Redemption Amount (Tax), upon not less than 30 nor more than 60 days' written notice:

- (i) at any time (if neither the Floating Rate Note Provisions nor the Index-Linked Interest Note Provisions are specified in the relevant Pricing Supplement as being applicable); or
- (ii) on any Interest Payment Date (if the Floating Rate Note Provisions or the Index-Linked Interest Note Provisions are specified in the relevant Pricing Supplement as being applicable),

if, as a result of any change in, or amendment to, the tax laws of a Taxing Jurisdiction (as defined in Condition 12 (*Additional Amounts*)) or any regulations or ruling promulgated thereunder or any change in the official interpretation or official application of such laws, regulations or rulings, which change or amendment is publicly announced and becomes effective on or after the Issue Date of the Notes (or in the case of a jurisdiction that becomes a Taxing Jurisdiction at a later date, after such date):

- (A) the Issuer is, or would be, obligated on the next succeeding due date for a payment with respect to the Notes to pay Additional Amounts (as defined in Condition 12 (*Additional Amounts*)) and such obligation cannot be avoided by the use of reasonable measures available to the Issuer; or
- (B) the Guarantor (if applicable) is, or would be (if a demand was made under the Guarantee), obligated on the next succeeding due date for a payment with respect to the Notes to pay Additional Amounts (as defined in Condition 12 (*Additional Amounts*)) under the Guarantee and such obligation cannot be avoided by the use of reasonable measures available to the Guarantor (if applicable);

in each case *provided that* changing the jurisdiction of the Issuer or the Guarantor (as applicable) is not a reasonable measure, but changing the jurisdiction of the Paying Agent may be a reasonable measure, for purposes of this Condition; *provided further that* where any such requirement to pay Additional Amounts is due to taxes of the Kingdom of Thailand (or any political subdivision or taxing authority thereof or therein), the Issuer shall be permitted to redeem the Notes in accordance with the provisions above only if the rate of withholding or deduction in respect of which Additional Amounts are required is in excess of 15 per cent; and *provided further that* (i) no such written notice of redemption may be given earlier than 60 days prior to the earliest date on which the Issuer or the Guarantor (as applicable) would be obligated to pay such Additional Amounts if a payment in respect of the Notes

were then due or (as the case may be) a demand under the Guarantee were then made, and (ii) at the time such written notice of redemption is given, such obligation to pay such Additional Amounts remains in effect.

Prior to any redemption of any Notes, the Issuer will deliver to the Trustee, to be made available for inspection by Noteholders, (a) an Opinion of Counsel of recognized standing with respect to tax matters in the relevant Taxing Jurisdiction that the requirement to pay such Additional Amounts results from such change or amendment in law occurring on or after the Issue Date (or such later date specified above) of the Notes and (b) an Officer's Certificate stating that the Issuer is entitled to effect such redemption and setting forth a statement of facts showing that the conditions precedent to the right of redemption have occurred including that the Issuer's or the Guarantor's (if applicable) obligation to pay Additional Amounts giving rise to the right of redemption cannot be avoided by the use of reasonable measures available to the Issuer or the Guarantor (if applicable).

The Trustee shall, without further enquiry, accept and rely upon such Opinion of Counsel and Officer's Certificate as sufficient evidence of the satisfaction of the circumstances set out above and they shall be conclusive and binding on the Noteholders.

(c) ***Optional Redemption***

If the Call Option is specified in the relevant Pricing Supplement as being applicable, the Notes may be redeemed at the option of the Issuer in whole or, if so specified in the relevant Pricing Supplement, in part on any Optional Redemption Date (Call) at the relevant Optional Redemption Amount (Call) on the Issuer's giving not less than 30 nor more than 60 days' notice to the Noteholders (which notice shall be irrevocable and shall oblige the Issuer to redeem the Notes or, as the case may be, the Notes specified in such notice on the relevant Optional Redemption Date (Call) at the Optional Redemption Amount (Call) *plus* accrued and unpaid interest (if any) to such date).

(d) ***Partial redemption***

If the Notes are to be redeemed in part only on any date in accordance with Condition 10(c) (*Optional Redemption*) above, each Note shall be redeemed in part in the proportion which the aggregate principal amount of the outstanding Notes to be redeemed on the relevant Optional Redemption Date (Call) bears to the aggregate principal amount of outstanding Notes on such date. If any Maximum Redemption Amount or Minimum Redemption Amount is specified in the relevant Pricing Supplement, then the Optional Redemption Amount (Call) shall in no event be greater than the maximum or be less than the minimum so specified.

(e) ***No other redemption***

The Issuer shall not be entitled to redeem the Notes otherwise than as provided in Conditions 10(a) to 10(d) above.

(f) ***Early redemption of Zero Coupon Notes***

Unless otherwise specified in the relevant Pricing Supplement, the Redemption Amount payable on redemption of a Zero Coupon Note at any time before the Maturity Date shall be an amount equal to the sum of:

- (i) the Reference Price; and
- (ii) the product of the Accrual Yield (compounded annually) being applied to the Reference Price from (and including) the Issue Date to (but excluding) the date fixed for redemption or (as the case may be) the date upon which the Note becomes due and payable.

Where such calculation is to be made for a period which is not a whole number of years, the calculation in respect of the period of less than a full year shall be made on the basis of such Day Count Fraction as may be specified in the Pricing Supplement for the purposes of this Condition 10(f)(f) or, if none is so specified, a Day Count Fraction of 30E/360 (ISDA).

(g) ***Repurchase***

The Company and any of its Subsidiaries (including Treasury Center) may, in accordance with all applicable laws and regulations, at any time purchase Notes in the open market or otherwise at any price. If purchases are made by tender, such tender must be made available to all Holders of the Notes alike. Any Notes the Company or any of its Subsidiaries (including Treasury Center) repurchase may be held, cancelled or sold.

(h) ***Calculations***

Neither the Trustee nor any of the Agents (other than the Calculation Agent and solely in respect of its functions as an appointed Calculation Agent of the Issuer and the Guarantor (if applicable)) shall be responsible for calculating or verifying the calculations of any amount payable under any notice of redemption and shall not be liable to the Noteholders or any other person for not doing so.

11. Payments

(a) ***Principal***

Payments of principal and premium shall be made (i) in the case of a currency other than Renminbi, by cheque drawn in the currency in which the payment is due drawn on, or, upon application by a Holder of a Note to the Specified Office of the Principal Paying Agent not later than the fifteenth day before the due date for any such payment, by transfer to an account denominated in that currency (or, if that currency is euro, any other account to which euro may be credited or transferred) and maintained by the payee with, a bank in the Principal Financial Centre of that currency (in the case of a sterling cheque, a town clearing branch of a bank in the City of London), and (ii) in the case of Renminbi, by transfer to an account denominated in that currency and maintained by the payee with a bank in the Principal Financial Centre of that currency, and (in the case of redemption) upon surrender (or, in the case of part payment only, endorsement) of the relevant Note Certificates at the Specified Office of any Paying Agent.

(b) ***Interest***

Payments of interest shall be made (i) in the case of a currency other than Renminbi, by cheque drawn in the currency in which the payment is due drawn on, or, upon application by a Holder of a Note to the Specified Office of the Principal Paying Agent not later than the fifteenth day before the due date for any such payment, by transfer to an account denominated in that currency (or, if that currency is euro, any other account to which euro may be credited or transferred) and maintained by the payee with, a bank in the Principal Financial Centre of that currency (in the case of a sterling cheque, a town clearing branch of a bank in the City of London), and (ii) in the case of Renminbi, by transfer to an account denominated in that currency and maintained by the payee with a bank in the Principal Financial Centre of that currency, and (in the case of interest payable on redemption) upon surrender (or, in the case of part payment only, endorsement) of the relevant Note Certificates at the Specified Office of any Paying Agent.

(c) ***Payments subject to fiscal laws***

All payments in respect of the Notes are subject in all cases to (i) any applicable fiscal or other laws and regulations in the place of payment, but (except as described in (ii)

below) subject to Condition 12 (*Additional Amounts*), and (ii) any withholding or deduction required pursuant to an agreement described in Section 1471(b) of the Code or otherwise imposed pursuant to Sections 1471 through 1474 of the Code, as of the issue date (or any amended or successor version of such sections) any regulations or agreements thereunder, any official interpretations thereof, or any similar law implementing any intergovernmental agreement between a non-U.S. jurisdiction and the United States with respect to the foregoing. No commissions or expenses shall be charged to the Noteholders in respect of such payments.

(d) ***Payments on business days***

Where payment is to be made by transfer to an account, payment instructions (for value the due date, or, if the due date is not Payment Business Day, for value the next succeeding Payment Business Day) will be initiated and, where payment is to be made by cheque, the cheque will be mailed (i) (in the case of payments of principal, premium and interest payable on redemption) on the later of the due date for payment and the day on which the relevant Note Certificate is surrendered (or, in the case of part payment only, endorsed) at the Specified Office of a Paying Agent and (ii) (in the case of payments of interest payable other than on redemption) on the due date for payment. A Holder of a Note shall not be entitled to any interest or other payment in respect of any delay in payment resulting from (A) the due date for a payment not being a Payment Business Day or (B) a cheque mailed in accordance with this Condition 11 arriving after the due date for payment or being lost in the mail.

(e) ***Partial payments***

If a Paying Agent makes a partial payment in respect of any Note, the Issuer shall procure that the amount and date of such payment are noted on the Register and, in the case of partial payment upon presentation of a Note Certificate, that a statement indicating the amount and the date of such payment is endorsed on the relevant Note Certificate.

(f) ***Record date***

Each payment in respect of a Note will be made to the person shown as the Holder in the Register at the opening of business in the place of the Registrar's Specified Office on the fifth (in the case of Renminbi) and fifteenth (in the case of a currency other than Renminbi) day before the due date for such payment (the "**Record Date**"). Where payment in respect of a Note is to be made by cheque, the cheque will be mailed to the address shown as the address of the Holder in the Register at the opening of business on the relevant Record Date.

*So long as the Global Note Certificate is held on behalf of Euroclear Bank S.A./N.V. ("**Euroclear**") and/or Clearstream Banking, S.A. ("**Clearstream**", The Depository Trust Company ("**DTC**") or any other clearing system, each payment in respect of the Global Note Certificate will be made to the person shown as the holder in the Register at the close of business of the relevant clearing system on the Clearing System Business Day before the due date for such payments, where "Clearing System Business Day" means a weekday (Monday to Friday, inclusive) except 25 December and 1 January.*

12. Additional Amounts

All payments, including, without limitation, payments of principal, redemption price, purchase price, premium and interest in respect of the Notes or under the Guarantee (if applicable) by or on behalf of the Issuer or (with respect to the Guaranteed Notes) the Guarantor shall be made free and clear of, and without withholding or deduction for present or future taxes, duties, assessments, fees or other governmental charges imposed by the Kingdom of Thailand or any other jurisdiction in which the Issuer or the Guarantor (if applicable) is tax resident (or of any political subdivision or taxing authority thereof or therein) or any jurisdiction through which the Issuer, the Guarantor (if applicable) or its Agent makes payment (each such jurisdiction a "**Taxing Jurisdiction**"), unless such withholding or deduction is required by law or by

regulation or any governmental policy having the force of law. In the event that any such withholding or deduction is so required, the Issuer (failing which, with respect to Guaranteed Notes, the Guarantor) will pay additional amounts (“**Additional Amounts**”) as necessary to ensure that the Holder will receive the same amount as would have been received without any such withholding or deduction.

However, no Additional Amounts will be payable by the Issuer, the Guarantor (if applicable) or its Agent to the extent that such Additional Amounts are required to be paid because:

- (i) a Holder or beneficial owner (or, if the holder or beneficial owner is a trust, partnership, limited liability company or a corporation, its beneficiaries, partners, members or shareholders) was or is connected with a Taxing Jurisdiction (including, without limitation, being a citizen or resident or national of, or carrying on a business or maintaining a permanent establishment in, or being physically present in, a Taxing Jurisdiction) other than by merely owning the Note, enforcing the Note or the Guarantee or receiving income or payments on the Note or the Guarantee;
- (ii) a Holder or beneficial owner failed, after a timely request by the Issuer, the Guarantor (if applicable) or a relevant taxing authority, to (a) provide information concerning its nationality, residence or identity or connection with a Taxing Jurisdiction or (b) make any declaration or other similar claim or satisfy any information or reporting requirement which is required or imposed by a statute, treaty, regulation or administrative practice of the relevant Taxing Jurisdiction as a precondition to exemption from, or reduction in the rate of deduction or withholding of, taxes, in each case to the extent legally able to do so;
- (iii) a Holder failed to present a Note or the Guarantee for payment within 30 days of when the payment is due (when presentation is required), except that, the relevant payor will pay Additional Amounts to the extent the holder would have been entitled to such amounts had the holder presented the Note or the Guarantee for payment on the last day of the 30-day period;
- (iv) a Holder would have been able to avoid the withholding or deduction by the presentation (where presentation is required) of the relevant Note or the Guarantee to, or otherwise accepting payment from, another paying agent, but failed to do so;
- (v) any withholding or deduction is required pursuant to an agreement described in Section 1471(b) of the Code, or otherwise imposed pursuant to Sections 1471 through 1474 of the Code, as of the issue date (or any amended or successor version of such sections), any regulations or agreements thereunder, any official interpretations thereof, or any similar law implementing an intergovernmental agreement between a non-U.S. jurisdiction and the United States with respect to the foregoing; or
- (vi) any withholding or deduction that is required as a result of any combination of the above.

Neither the Issuer, the Guarantor (if applicable) nor any of their agents will pay any Additional Amounts for taxes on the Notes or the Guarantee except for taxes payable through deduction or withholding from payments of principal, premium (if any) or interest on the Notes. Examples of the types of taxes for which no Additional Amounts will be paid include the following: estate or inheritance taxes, gift taxes, sales or transfer taxes, personal property or related taxes, assessments or other governmental charges. The Issuer (failing which, the Guarantor (if applicable)) will pay stamp or other similar taxes that may be imposed by any Taxing Jurisdiction as a result of entering into, registering or enforcing the Indenture or may be payable in connection with the issuance of the Notes or any other document or instrument referred to therein, or the receipt of any payments with respect thereto (limited, solely in the case of taxes attributable to the receipt of any payments with respect thereto, to any such taxes which are not excluded under clauses (i) through (vi) above or any combination thereof).

In addition, with respect to any payment of the principal of, or premium (if any) or interest on, a Note, if the Holder of a Note is a fiduciary, partnership, limited liability company or person

other than the sole beneficial owner of any payment, neither the Issuer nor the Guarantor (if applicable) shall be required to pay any Additional Amounts with respect to taxes imposed by a Taxing Jurisdiction to the extent that such payment would be required to be included in the income under the laws of a Taxing Jurisdiction of a beneficiary or settlor, with respect to the fiduciary, or a member of that partnership or limited liability company or a beneficial owner who would not have been entitled to such Additional Amounts had that beneficiary, settlor, partner or member, or beneficial owner been the Holder of such Note.

If the Issuer or the Guarantor (if applicable), as the case may be, becomes aware that it will be obligated to pay Additional Amounts with respect to any payment under or with respect to the notes or the Guarantee, the Issuer or the Guarantor (if applicable), as the case may be, will deliver to the trustee on a date at least 30 days prior to the date of payment (unless the obligation to pay Additional Amounts arises after the 30th day prior to that payment date, in which case the Issuer or the Guarantor (if applicable) shall notify the trustee promptly thereafter) an officers' certificate stating the fact that Additional Amounts will be payable and the amount estimated to be so payable. The officers' certificate must also set forth any other information reasonably necessary to enable the paying agent to pay Additional Amounts on the relevant payment date. The trustee shall be entitled to rely solely on such officers' certificate as conclusive proof that such payments are necessary. The Issuer or the Guarantor (if applicable) will provide the trustee with documentation reasonably satisfactory to the trustee evidencing the payment of Additional Amounts.

The Issuer or the Guarantor (if applicable) will make all withholdings and deductions required by law and will remit the full amount deducted or withheld to the relevant tax authority in accordance with applicable law. The Issuer or the Guarantor (if applicable) will use its reasonable efforts to obtain tax receipts from each tax authority evidencing the payment of any taxes so deducted or withheld. The Issuer or the Guarantor (if applicable) will furnish to the holders, within 60 days after the date the payment of any taxes so deducted or withheld is made, certified copies of tax receipts evidencing payment by the Issuer or the Guarantor (if applicable), as the case may be, or if, notwithstanding such entity's efforts to obtain receipts, receipts are not obtained, other evidence of payments by such entity.

References to principal, premium (if any) or interest in respect of the Notes will be deemed also to refer to any Additional Amounts which may be payable as set forth in the Notes and the Indenture.

The above obligation will survive any termination, defeasance or discharge of the Indenture, any transfer by a holder or beneficial owner of its Notes, and will apply, mutatis mutandis, to any jurisdiction in which any successor Person to the Issuer or the Guarantor (if applicable) is then incorporated, organized, engaged in business or resident for tax purposes or any jurisdiction from or through which such person makes any payment on the notes (or the Guarantee) and any political subdivision or taxing authority or agency thereof or therein having the power to tax.

13. Events of Default

The occurrence and continuance of the following events will constitute events of default ("**Events of Default**"):

- (a) failure to pay interest (including premium, if any) on the Notes as and when the same will become due and payable, and continuance of such default for a period of 14 days;
- (b) failure to pay principal on the Notes when due, and continuance of such default for a period of 7 days, whether at Maturity Date, upon redemption or otherwise;
- (c) failure by the Issuer or the Guarantor (if applicable) to comply with its obligations under the covenant described under Condition 5(b) (*Certain Covenants—Consolidation, Merger and Sale of Assets*);
- (d) failure on the part of the Issuer or the Guarantor (if applicable) to duly observe or perform any of the other covenants or agreements on the part of the Issuer or the Guarantor (if applicable), as the case may be, contained in the Notes or in the Indenture

relating to the Notes or the Guarantee that continues for 60 days after the date on which written notice specifying such failure, stating that such notice is a “Notice of Default” under the Notes and demanding that the Issuer or the Guarantor (if applicable) remedy the same, shall have been given by registered or certified mail, return receipt requested, to the Issuer or the Guarantor (if applicable) by the Trustee, or to the Issuer or the Guarantor (if applicable) at the office of the Trustee by the holders of at least 25 per cent. in aggregate principal amount of the outstanding Notes;

- (e) any of the Issuer’s or (while there are any Guaranteed Notes outstanding) the Guarantor’s Indebtedness of an amount equal to or greater than US\$25,000,000 either (a) becoming due and payable prior to the due date for payment thereof by reason of acceleration following a default by the Issuer or the Guarantor (if applicable), or (b) not being repaid by the Issuer or the Guarantor (if applicable) at, and remaining unpaid after, maturity (as extended by the grace period, if any), or any guarantee given by the Issuer or (while there are any Guaranteed Notes outstanding) the Guarantor in respect of any Indebtedness of any other Person of an amount equal to or greater than US\$25,000,000 not being honored and remaining dishonored after becoming due and called;
- (f) a court or administrative or other governmental agency or body having jurisdiction in the premises shall enter a decree or order for relief in respect of the Issuer or (while there are any Guaranteed Notes outstanding) the Guarantor in an involuntary case under any applicable bankruptcy, insolvency, reorganization, compulsory composition or other similar law now or hereafter in effect, or appointing a receiver, liquidator, assignee, custodian, trustee, sequestrator (or similar official) of the Issuer or (while there are any Guaranteed Notes outstanding) the Guarantor or for any substantial part of its property or ordering the winding up, dissolution or liquidation of its affairs, or shall otherwise adjudicate or find the Issuer or (while there are any Guaranteed Notes outstanding) the Guarantor to be bankrupt or insolvent, and such decree or order shall remain unstayed and in effect for a period of 60 consecutive days;
- (g) the Issuer or (while there are any Guaranteed Notes outstanding) the Guarantor shall commence a voluntary case under any applicable bankruptcy, insolvency, reorganization, compulsory composition or other similar law now or hereafter in effect, or consent to the entry of an order for relief in an involuntary case under any such law, or consent to the appointment or taking possession by a receiver, liquidator, assignee, custodian, trustee, sequestrator or similar official of the Issuer or (while there are any Guaranteed Notes outstanding) the Guarantor or for any substantial part of any of its property, or the Issuer or (while there are any Guaranteed Notes outstanding) the Guarantor ceases to carry on the whole or substantially the whole of its business or make any general assignment for the benefit of creditors, or enter into any composition with any of its respective creditors, or take corporate action in furtherance of any such action; or
- (h) (while there are any Guaranteed Notes outstanding) the Guarantee is not (or is claimed by the Guarantor not to be) in full force and effect.

If an Event of Default (other than an Event of Default described in clauses (f) or (g) above) with respect to the Notes shall occur and be continuing, either the Trustee or the Holders of at least 25 per cent. in aggregate principal amount of the Notes then outstanding by written notice to the Issuer and (while there are any Guaranteed Notes outstanding) the Guarantor (and to the Trustee if given to the Holders) may declare the principal amount of the Notes and any accrued and unpaid interest thereon to be due and payable immediately. If an Event of Default in clause (f) or (g) above with respect to the Notes shall occur, the unpaid principal amount of all the Notes and any accrued and unpaid interest thereon will automatically, and without any action by the Trustee or any Holder of Notes, become immediately due and payable. After any such acceleration but before a judgment or decree based on acceleration has been obtained, the Holders of at least a majority in aggregate principal amount of the Notes then outstanding may, under certain circumstances, rescind and annul such acceleration if all Events of Default, other

than the non-payment of accelerated principal, have been cured or waived as provided in the Indenture.

In the event of a declaration of acceleration of the Notes because of an Event of Default described in clause (e) has occurred and is continuing, the declaration of acceleration of the Notes will be automatically annulled if the acceleration described in clause (e)(a) above, the failure to pay described in clause (e)(b) above, or the failure to honor a guarantee described in clause (e), as the case may be, constituting such Event of Default pursuant to clause (e) is rescinded and annulled or cured, as the case may be, by the Issuer or the Guarantor (if applicable) or waived by the holder of such Indebtedness within 20 days after such declaration of acceleration of the Notes, *provided that* (1) the annulment of the acceleration of the Notes would not conflict with any judgment or decree of a court of competent jurisdiction and (2) all existing Events of Default, except with respect to the payment of principal of, premium (if any), Additional Amounts or interest on any Notes that became due solely because of the acceleration of the Notes, have been cured or waived.

Subject to the provisions of the Indenture relating to the duties of the Trustee, in case an Event of Default shall occur and be continuing, the Trustee will be under no obligation to exercise any of its rights or powers under the Indenture at the request or direction of any of the Holders of Notes unless such Holders shall have offered to the Trustee security and/or indemnity satisfactory to the Trustee. Subject to certain provisions, including those requiring security and/or indemnification of the Trustee, the Holders of a majority in aggregate principal amount of the Notes then outstanding will have the right to direct the time, method and place of conducting any proceeding for any remedy available to the Trustee or exercising any trust or power conferred on the Trustee with respect to the Notes. No Holder will have any right to institute any proceeding, judicial or otherwise, with respect to the Indenture, or for the appointment of a receiver or a trustee, or for any other remedy thereunder unless (i) such Holder has previously given to the Trustee written notice of a continuing Event of Default with respect to the Notes, (ii) the Holders of at least 25 per cent. in aggregate principal amount of the Notes then outstanding have made written request, and such Holder or Holders have offered to the Trustee security and/or indemnity satisfactory to the Trustee, to institute such proceeding as trustee and (iii) the Trustee has failed to institute such proceeding, and has not received from the Holders of a majority in aggregate principal amount of the Notes then outstanding a direction inconsistent with such request, within 60 days after such written notice, request and offer. However, such limitations do not apply to a suit instituted by a Holder of a Note for the enforcement of the right to receive payment of the principal of or interest on such Note on or after the applicable due date specified in such Note.

14. Prescription

Any moneys deposited with or paid to the Trustee or any Paying Agent of the Notes, or then held by the Issuer or the Guarantor (if applicable), in trust, for the payment of the principal of, premium (if any) or interest on (or any Additional Amount payable in respect of) any Note or the Guarantee (if applicable) and not applied but remaining unclaimed for two years after the date upon which such principal, premium (if any) or interest shall have become due and payable, shall, upon the written request of the Issuer or the Guarantor (if applicable) be repaid to the Issuer or the Guarantor (if applicable) by the Trustee or such Paying Agent or (if then held by the Issuer or the Guarantor (if applicable)) be discharged from such trust unless otherwise required by mandatory provisions of applicable escheat or abandoned or unclaimed property law, and the Holder shall, unless otherwise required by mandatory provisions of applicable escheat or abandoned or unclaimed property laws, thereafter look only to the Issuer or the Guarantor (if applicable) for any payment which such Holder may be entitled to collect, and all liability of the Trustee or any Paying Agent of the Notes with respect to such moneys shall thereupon cease.

Under New York law, any legal action upon the Notes must be commenced within six years after the payment thereof is due. Thereafter, the Notes will generally become unenforceable.

15. Replacement of Notes

If any Note or Note Certificate is lost, stolen, mutilated, defaced or destroyed, it may be replaced at the Specified Office of the Registrar (and, if the Notes are then admitted to listing, trading and/or quotation by any competent authority, stock exchange and/or quotation system which requires the appointment of a Paying Agent or Transfer Agent in any particular place, the Paying Agent or Transfer Agent having its Specified Office in the place required by such competent authority, stock exchange and/or quotation system), subject to all applicable laws and competent authority, stock exchange and/or quotation system requirements, upon payment by the claimant of the expenses incurred in connection with such replacement and on such terms as to evidence, security, indemnity and otherwise as the Issuer may reasonably require. Mutilated or defaced Notes or Note Certificates must be surrendered before replacements will be issued.

16. Modification and Waiver

(a) *Modification with consent of Holders*

With the consent of the Holders of more than 50 per cent. in aggregate principal amount of the outstanding Notes, the Issuer or the Guarantor (if applicable) may execute supplemental indentures or modify, amend or supplement the Conditions or the Paying and Transfer Agent and Registrar Appointment Letter with the Trustee and Agents, as the case may be, to add provisions or change or eliminate any provision of the Indenture, any supplemental indenture, the Paying and Transfer Agent and Registrar Appointment Letter or the Conditions to modify, amend or supplement the rights of the Holders of the Notes. Without the consent of the Holders of all the outstanding Notes, however, no such supplemental indenture or modification, amendment or supplementation will, with respect to the Notes or the Guarantee:

- (i) change their stated maturity;
- (ii) reduce the principal amount payable, reduce the stated rate of (including the Reset Interest Rate), or extend the stated time for payment of, interest on any Note;
- (iii) change the obligation of the Issuer or (with respect to Guaranteed Notes) the Guarantor to pay Additional Amounts;
- (iv) change the terms of the Guarantee;
- (v) change the place or currency in which they are payable;
- (vi) impair the right to institute suit for their enforcement;
- (vii) waive a Default in the payment of principal of, premium (if any) or interest on the Notes;
- (viii) reduce the percentage in principal amount of the outstanding Notes, the consent of the holders of which is required for any such supplemental indenture or for any modification to the provisions relating to modification and waiver; or
- (ix) reduce the premium payable upon the redemption or repurchase of any Note or change the time at which any Note may be redeemed or repurchased as described above under Condition 10(b) (*Optional Tax Redemption*) or Condition 10(c) (*Optional Redemption*).

The Holders of more than 50 per cent. in aggregate principal amount of the outstanding Notes may:

- (a) waive compliance by the Issuer and Guarantor (if applicable) with certain provisions of the Indenture, the Conditions, the Guarantee or

the Paying and Transfer Agent and Registrar Appointment Letter;
and

- (b) waive any past Default (except Defaults relating to payment of principal of, premium (if any) or interest on any Note).

(b) ***Modification without consent of Holders***

Notwithstanding the foregoing, the Issuer, the Guarantor (if applicable), the Trustee and the Agents may, without notice to or the consent or vote of any Holder of the Notes, amend or supplement the Indenture, the Notes or the Guarantee (if applicable) or modify, amend or supplement the Conditions or the Paying and Transfer Agent and Registrar Appointment Letter, in each case, for one or more of the following purposes (it being understood that such modification, amendment or supplement shall not materially and adversely affect the rights of the Holders of the Notes):

- (i) to cure any ambiguity, omission, defect or inconsistency (including, without limitation, any inconsistency between the text of the Indenture, the Paying and Transfer Agent and Registrar Appointment Letter, the Guarantee or the Notes and the description of the Indenture, the Paying and Transfer Agent and Registrar Appointment Letter, the Guarantee or the Notes contained in the Offering Memorandum);
- (ii) to comply with the covenant described under Condition 5(b) (*Certain Covenants— Consolidation, Merger and Sale of Assets*);
- (iii) to evidence and provide for the appointment of a successor Trustee or Agent;
- (iv) to add guarantors or guarantees with respect to such Notes;
- (v) to add to the covenants of the Issuer and the Guarantor (if applicable) for the benefit of Holders of such Notes;
- (vi) to surrender any right conferred by the relevant Indenture upon the Issuer or the Guarantor (if applicable);
- (vii) to enter into a supplemental indenture, in any case where a supplemental indenture is required or permitted to be entered into pursuant to the provisions of the Indenture without the consent of any Holder;
- (viii) to effect any changes to the Indenture, the Conditions or the Paying and Transfer Agent and Registrar Appointment Letter in a manner necessary to comply with the procedures of DTC, Euroclear or Clearstream or any other clearing system;
- (ix) to provide for the issuance of additional Notes in accordance with the limitations set forth in the Indenture and the Conditions;
- (x) to provide for Global Note Certificates in addition to or in place of Note Certificates;
- (xi) to provide collateral to secure the Notes; or
- (xii) to make any other change that does not materially and adversely affect the rights of any Holder.

17. Concerning the Trustee

The Holders of more than 50 per cent. in aggregate principal amount of all outstanding Notes shall have the right to direct the time, method and place of conducting any proceeding for exercising any remedy or power available to the Trustee with respect to the Notes. However,

the direction must not conflict with any rule of law or with the Indenture. In case of an Event of Default, the Trustee shall be required to exercise its powers with the degree of care and skill of a prudent person in the conduct of his own affairs. The Trustee is, however, under no obligation to exercise any of its rights or powers under the Indenture at the request of any of the Holders, unless they have offered to the Trustee security or indemnity satisfactory to the Trustee against the costs, expenses and liabilities that might be incurred by it in compliance with such request or direction in its sole discretion.

Under the Indenture, the Trustee is entitled to be indemnified and/or provided with security to its satisfaction, as well as relieved from responsibility in certain circumstances and to be paid its fees, costs and expenses in priority to the claims of the Noteholders. In addition, the Trustee is entitled to enter into business transactions with Treasury Center or the Company and any entity relating to Treasury Center or the Company without accounting for any profit.

In connection with the exercise by it of any of its trusts, powers, authorities and discretions (including, without limitation, any modification, waiver, authorization or determination), the Trustee shall have regard to the general interests of the Noteholders as a class (but shall not have regard to any interests arising from circumstances particular to individual Noteholders whatever their number) and, in particular but without limitation, shall not have regard to the consequences of any such exercise for individual Holders (whatever their number) resulting from their being for any purpose domiciled or resident in, or otherwise connected with, or subject to the jurisdiction of, any particular territory or any political sub-division thereof and the Trustee shall not be entitled to require, nor shall any Noteholder be entitled to claim, from the Issuer, the Guarantor (if applicable), the Trustee or any other person any indemnification or payment in respect of any tax consequences of any such exercise upon individual Noteholders except to the extent already provided for under Condition 12 (*Additional Amounts*) and/or any undertaking or covenant given in addition to, or in substitution for, Condition 12 (*Additional Amounts*) pursuant to the Indenture.

The Trustee may rely without liability to Noteholders on a report, confirmation or certificate or any advice of any lawyers, accountants, financial advisors, financial institution or any other expert, whether or not addressed to it and whether their liability in relation thereto is limited (by its terms or by any engagement letter relating thereto or in any other manner) by reference to a monetary cap, methodology or otherwise. The Trustee may accept and shall be entitled to rely on any such report, confirmation or certificate or advice and such report, confirmation or certificate or advice shall be binding on the Issuer, the Guarantor (if applicable), the Trustee and the Noteholders.

18. The Agents

In acting under the Indenture and the Paying and Transfer Agent and Registrar Appointment Letter and in connection with the Notes, the Agents act solely as agents of the Issuer, the Guarantor (if applicable) and (to the extent provided therein) the Trustee and do not assume any obligations towards or relationship of agency or trust for or with any of the Noteholders.

The initial Calculation Agent (if any) is specified in the relevant Pricing Supplement. The Issuer and the Guarantor (if applicable) reserve the right (with the prior approval of the Trustee) at any time to vary or terminate the appointment of any Agent and to appoint a successor principal paying agent or registrar or Calculation Agent and additional or successor paying agents; *provided, however, that:*

- (a) the Issuer and the Guarantor (if applicable) shall at all times maintain a principal paying agent and a registrar; and
- (b) if a Calculation Agent is specified in the relevant Pricing Supplement, the Issuer and the Guarantor (if applicable) shall at all times maintain a Calculation Agent; and
- (c) for so long as the Notes are listed on the SGX-ST and the rules of the SGX-ST so require, the Issuer and the Guarantor (if applicable) shall maintain a Paying Agent in Singapore, where the Notes may be presented or surrendered for payment or redemption, in the event that global notes are exchanged for definitive notes; and

- (d) if and for so long as the Notes are admitted to listing, trading and/or quotation by any competent authority, stock exchange and/or quotation system which requires the appointment of a Paying Agent and/or a Transfer Agent in any particular place, the Issuer and the Guarantor (if applicable) shall maintain a Paying Agent and/or a Transfer Agent having its Specified Office in the place required by such competent authority, stock exchange and/or quotation system.

Notice of any change in any of the Agents or in their Specified Offices shall promptly be given to the Noteholders.

19. Further Issuance

The Issuer may from time to time, without notice to or the consent of the Noteholders, create and issue further debt securities ranking *pari passu* with the Notes in all respects (or in all respects except for the payment of interest accruing prior to the issue date of the debt securities or except for the first payment of interest following the issue date of the debt securities). The Issuer may consolidate such further debt securities with the outstanding Notes to form a single Series; *provided that*, if any further debt securities issued are not fungible for U.S. federal income tax purposes with any Notes previously issued, such further debt securities shall trade separately from such previously issued Notes under different CUSIP, ISIN and common codes from those assigned to the Notes but shall otherwise be treated as a single Series with all other Notes issued under the Indenture.

20. Payment for consent

Neither the Company nor any of its Subsidiaries will, directly or indirectly, pay or cause to be paid any consideration, whether by way of interest, fee or otherwise, to any Holder for or as an inducement to any consent, waiver or amendment of any of the terms or provisions of the Indenture or the Notes unless such consideration is offered to be paid or agreed to be paid to all Holders that consent, waive or agree to amend in the time frame set forth in the solicitation documents relating to such consent, waiver or agreement.

21. Defeasance and Discharge

The Issuer and the Guarantor (if applicable) shall not be required to comply with certain restrictive covenants of the Indenture (including the limitations on liens) with respect to the Notes or the Guarantee, if:

- (a) the Issuer deposits with the Trustee, in trust, money or U.S. Government Obligations (or a combination thereof) sufficient to pay the principal of, and interest on, the Notes when due;
- (b) there is no Default under the Indenture;
- (c) the Issuer delivers to the Trustee an Opinion of Counsel of recognized standing with respect to U.S. federal income tax matters to the effect that the deposit will not cause the beneficial owners of the Notes to recognize income, gain or loss for U.S. federal income tax purposes and the beneficial owners of the Notes will be subject to U.S. federal income tax on the same amounts, in the same manner and at the same times as if the deposit was not made; and
- (d) the Issuer delivers to the Trustee an Officer's Certificate and Opinion of Counsel stating that all conditions for the defeasance have been complied with.

In addition, if the conditions described in paragraphs (a) and (c) above are complied with, the Issuer and the Guarantor (if applicable) will be discharged from all of its obligations under the Notes (except for certain obligations to exchange or register the transfer of the Notes, replace stolen, lost or mutilated notes, maintain paying agents and pay Additional Amounts) (“**Legal Defeasance**”) (a) if the Issuer delivers to the Trustee all the Notes for cancellation, together with an Opinion of Counsel and an Officer's Certificate stating that all conditions for the discharge have been complied with, and pays all other amounts payable under the Indenture, or (b) if all

Notes not delivered to the Trustee for cancellation have become due and payable, will become due and payable within one year or are to be called for redemption within one year, and the Issuer has irrevocably deposited with the Trustee, in trust, money or U.S. Government Obligations (or a combination thereof) sufficient to pay the principal of, and interest on, the Notes when due, together with an Opinion of Counsel and an Officer's Certificate stating that all conditions for discharge have been complied with, and pays all other amounts payable under the Indenture, *provided that*, under the circumstances outlined in (a) or (b) above, the Opinion of Counsel described in paragraph (c) above also confirms that (x) the Issuer has received from, or there has been published by, the U.S. Internal Revenue Service a ruling or (y) since the Issue Date, there has been a change in the applicable U.S. federal income tax law, in either case to the effect that, and based thereon such Opinion of Counsel will confirm that, the beneficial owners of the Notes will not recognize income, gain or loss for U.S. federal income tax purposes as a result of such Legal Defeasance and will be subject to U.S. federal income tax on the same amounts, in the same manner and at the same times as would have been the case if such Legal Defeasance had not occurred.

"U.S. Government Obligations" means direct obligations (or certificates representing an ownership interest in such obligations) of the United States of America (including any agency or instrumentality thereof) for the payment of which the full faith and credit of the United States of America is pledged and which are not callable at the Issuer's option.

22. Notices

Notices to the Holders of Notes shall be sent to them (or the first named of joint holders) by first class mail (or its equivalent) or (if posted to an overseas address) by airmail at their respective addresses on the Register. Any such notice shall be deemed to have been given on the fourth day after the date of mailing.

So long as the Notes are represented by a Global Note Certificate and such Global Note Certificate is held on behalf of Euroclear and/or Clearstream, DTC or any other clearing system, notices to the Holders of Notes of that Series may be given by delivery of the relevant notice to that clearing system for communication by it to entitled accountholders in substitution for publication as required by the Indenture.

23. Indemnification for Judgment Currency Fluctuations

To the fullest extent permitted by law, the obligations of the Issuer and the Guarantor (if applicable) to any Noteholder under the Indenture, the Guarantee or the Notes, as the case may be, shall, notwithstanding any judgment in a currency (the **"Judgment Currency"**) other the currency of the particular Series or Tranche of Notes (the **"Agreement Currency"**), be discharged only to the extent that on the day following receipt by such Noteholder or the Trustee, as the case may be, of any amount in the Judgment Currency, such Noteholder or the Trustee, as the case may be, may in accordance with normal banking procedures purchase the Agreement Currency with the Judgment Currency. If the amount of the Agreement Currency so purchased is less than the amount originally to be paid to such Noteholder or the Trustee, as the case may be, in the Agreement Currency, the Issuer and the Guarantor (if applicable) agree, as a separate obligation and notwithstanding such judgment, to pay the difference and if the amount of the Agreement Currency so purchased exceeds the amount originally to be paid to such Noteholder, such Noteholder or the Trustee, as the case may be, agrees to pay to or for the account of the Issuer or the Guarantor (if applicable), as the case may be, such excess; *provided that* such Noteholder or the Trustee, as the case may be, shall not have any obligation to pay any such excess as long as a Default has occurred and is continuing, in which case such excess may be applied by such Noteholder or the Trustee, as the case may be, to such obligations.

24. Rounding

For the purposes of any calculations referred to in these Conditions or the Indenture (unless otherwise specified in these Conditions or the relevant Pricing Supplement), (a) all percentages resulting from such calculations will be rounded, if necessary, to the nearest one hundred-thousandth of a percentage point (with 0.000005 per cent. being rounded up to 0.00001 per cent.), (b) all United States dollar amounts used in or resulting from such calculations will be

rounded to the nearest cent (with one half cent being rounded up), (c) all Japanese Yen amounts used in or resulting from such calculations will be rounded downwards to the next lower whole Japanese Yen amount, and (d) all amounts denominated in any other currency used in or resulting from such calculations will be rounded to the nearest two decimal places in such currency, with 0.005 being rounded upwards.

25. Governing Law; Consent to Jurisdiction and Waiver of Immunity

- (a) The Indenture and the Notes shall be governed by, and construed in accordance with, the laws of the State of New York.
- (b) The Issuer and the Guarantor (if applicable) shall irrevocably submit to the non-exclusive jurisdiction of any New York state or United States federal court located in the Borough of Manhattan, The City of New York, New York (each a “**New York Court**”) in any suit, action or proceeding arising out of or relating to the Indenture, the Notes or any transaction contemplated thereby, and will irrevocably waive, to the fullest extent permitted by applicable law, any objection to the venue of any such suit, action or proceeding in any such New York Court and any claim of any inconvenient forum. The Issuer and the Guarantor (if applicable) has appointed Corporation Service Company as agent for service of process with respect of any such suit, action or proceeding.
- (c) To the extent that the Issuer or the Guarantor (if applicable) has or hereafter may acquire any immunity (sovereign or otherwise) from any legal action, suit or proceeding, from jurisdiction of any court or from set-off or any legal process (including any immunity from non-exclusive jurisdiction or from service of process or from any execution to satisfy a final judgment or from attachment or in aid of such execution or otherwise) with respect to itself or any of its assets or properties, the Issuer and the Guarantor (if applicable) irrevocably waives, to the fullest extent permitted under applicable law, any such right or immunity or claim thereto which may now or hereafter exist, and agrees not to assert any such right or claim in any action or proceeding against it arising out of or based on the Notes or the Indenture.

26. No Personal Liability of Directors, Officers, Employees and Stockholders

No director, officer, employee, incorporator or stockholder of the Issuer or the Guarantor (if applicable) shall have any personal liability for any obligations of the Issuer or the Guarantor (if applicable) under the Notes, the Guarantee, the Indenture, or for any claim based on, in respect of, or by reason of, such obligations or their creation. Each Holder by accepting a Note waives and releases all such liability. The waiver and release are part of the consideration for issuance of the Notes. The waiver may not be effective to waive liabilities under federal securities laws.

SUMMARY OF PROVISIONS RELATING TO THE NOTES WHILE IN GLOBAL FORM

Clearing System Accountholders

In relation to any Series of Notes represented by one or more Global Note Certificates, references in the Conditions of the Notes to “Noteholder” are references to the person in whose name the relevant Global Note Certificate is for the time being registered in the Register which (a) in the case of a Restricted Global Note Certificate held by or on behalf of DTC will be Cede & Co. (or such other entity as is specified in the applicable Pricing Supplement) as nominee for DTC and (b) in the case of any Unrestricted Global Note Certificate which is held by or on behalf of a depositary or a common depositary for Euroclear and/or Clearstream and/or any other relevant clearing system, will be that depositary or common depositary or a nominee for that depositary or common depositary.

Each of the persons shown in the records of DTC, Euroclear, Clearstream and/or any other relevant clearing system as being entitled to an interest in a Global Note Certificate (each an “**Accountholder**”) must look solely to DTC, Euroclear, Clearstream and/or such other relevant clearing system (as the case may be) for such Accountholder’s share of each payment made by the relevant Issuer (failing which, in the case of Guaranteed Notes, the Guarantor) to the holder of such Global Note Certificate and in relation to all other rights arising under such Global Note Certificate. The extent to which, and the manner in which, Accountholders may exercise any rights arising under a Global Note Certificate will be determined by the respective rules and procedures of DTC, Euroclear and Clearstream and any other relevant clearing system from time to time. For so long as the relevant Notes are represented by a Global Note Certificate, Accountholders shall have no claim directly against the relevant Issuer or (in respect of each Series of Guaranteed Notes) the Guarantor in respect of payments due under the Notes and such obligations of the relevant Issuer or (in respect of each Series of Guaranteed Notes) the Guarantor will be discharged by payment to the holder of such Global Note Certificate.

Transfers of Interests in Global Note Certificates

Transfers of interests in Global Note Certificates within DTC, Euroclear and Clearstream or any other relevant clearing system will be in accordance with their respective rules and operating procedures. None of the Issuers, the Guarantor, the Registrar, the Dealers or the Agents will have any responsibility or liability for any aspect of the records of any DTC, Euroclear and Clearstream or any other relevant clearing system or any of their respective participants relating to payments made on account of beneficial ownership interests in a Global Note Certificate or for maintaining, supervising or reviewing any of the records of DTC, Euroclear and Clearstream or any other relevant clearing system or the records of their respective participants relating to such beneficial ownership interests.

The laws of some states of the United States require that certain persons receive individual certificates in respect of their holdings of Notes. Consequently, the ability to transfer interests in a Global Note Certificate to such persons will be limited. Because clearing systems only act on behalf of participants, who in turn act on behalf of indirect participants, the ability of a person having an interest in a Global Note Certificate to pledge such interest to persons or entities which do not participate in the relevant clearing systems, or otherwise take actions in respect of such interest, may be affected by the lack of an Individual Note Certificate representing such interest.

Subject to compliance with the transfer restrictions applicable to the Notes described under “*Transfer Restrictions*,” transfers between DTC participants, on the one hand, and Euroclear or Clearstream accountholders, on the other will be effected by the relevant clearing systems in accordance with their respective rules and through action taken by the DTC Custodian, the Registrar and the Principal Paying Agent.

On or after the issue date for any Series, transfers of Notes of such Series between accountholders in Euroclear and/or Clearstream and transfers of Notes of such Series between participants in DTC will generally have a settlement date three business days after the trade date (T+3). The customary arrangements for delivery versus payment will apply to such transfers.

Transfers between DTC participants, on the one hand, and Euroclear or Clearstream accountholders, on the other will need to have an agreed settlement date between the parties to such transfer. Because there is no direct link between DTC, on the one hand, and Euroclear and Clearstream, on the other, transfers of interests in the relevant Global Note Certificates will be effected through the Principal Paying Agent, the DTC Custodian, the relevant Registrar and any applicable Transfer Agent receiving instructions (and where appropriate certification) from the transferor and arranging for delivery of the interests being transferred to the credit of the designated account for the transferee. Transfers will be effected on the later of (i) three business days after the trade date for

the disposal of the interest in the relevant Global Note Certificate resulting in such transfer and (ii) two business days after receipt by the Principal Paying Agent or the Registrar, as the case may be, of the necessary certification or information to effect such transfer. In the case of cross-market transfers, settlement between Euroclear or Clearstream accountholders and DTC participants cannot be made on a delivery versus payment basis. The securities will be delivered on a free delivery basis and arrangements for payment must be made separately. The customary arrangements for delivery versus payment between Euroclear and Clearstream accountholders or between DTC participants are not affected.

For a further description of restrictions on the transfer of Notes, see “*Subscription and Sale*” and “*Transfer Restrictions*.”

Upon the issue of a Restricted Global Note Certificate to be held by or on behalf of DTC, DTC or the DTC Custodian will credit the respective nominal amounts of the individual beneficial interests represented by such Global Note Certificate to the account of DTC participants. Ownership of beneficial interests in such Global Note Certificate will be held through participants of DTC, including the respective depositaries of Euroclear and Clearstream. Ownership of beneficial interests in such Global Note Certificate will be shown on, and the transfer of such ownership will be effected only through, records maintained by DTC or its nominee. DTC has advised the Issuers that it will take any action permitted to be taken by a holder of the Notes represented by a Global Note Certificate held by or on behalf of DTC (including, without limitation, the presentation of such Global Note Certificates for exchange as described above) only at the direction of one or more participants in whose account with DTC interests in such Global Note Certificate are credited, and only in respect of such portion of the aggregate nominal amount of such Global Note Certificate as to which such participant or participants has or have given such direction. However, in certain circumstances, DTC will exchange the relevant Global Note Certificate for Individual Note Certificates (which will bear the relevant legends set out in “*Transfer Restrictions*”).

Although DTC, Euroclear and Clearstream have agreed to the foregoing procedures in order to facilitate transfers of interests in the Global Note Certificates among participants and account holders of DTC, Euroclear and Clearstream, they are under no obligation to perform or continue to perform such procedures, and such procedures may be discontinued at any time. None of the Issuers, the Guarantor, the Registrar, the Dealers, the Trustee or the Agents will have any responsibility for the performance by DTC, Euroclear or Clearstream or their respective direct or indirect participants or account holders of their respective obligations under the rules and procedures governing their respective operations.

While a Global Note Certificate is lodged with DTC, Euroclear, Clearstream or any relevant clearing system, Individual Note Certificates for the relevant Series of Notes will not be eligible for clearing and settlement through such clearing systems.

Conditions applicable to Global Note Certificates

Each Global Note Certificate will contain provisions which modify the Conditions of the Notes as they apply to the Global Note Certificate. The following is a summary of certain of those provisions:

Payments: All payments in respect of the Global Note Certificate which, according to the Conditions of the Notes, require presentation and/or surrender of a Note or Global Note Certificate will be made against presentation and (in the case of payment of principal in full with all interest accrued thereon) surrender of the Global Note Certificate to or to the order of any Paying Agent and will be effective to satisfy and discharge the corresponding liabilities of the relevant Issuer (failing which, in the case of Guaranteed Notes, the Guarantor) in respect of the Notes. On each occasion on which a payment of principal or interest is made in respect of the Global Note Certificate, the relevant Issuer shall procure that the payment is noted in a schedule thereto.

Payment Business Day: in the case of a Global Note Certificate, shall be: if the currency of payment is euro, any day which is a TARGET Settlement Day and a day on which dealings in foreign currencies may be carried on in each (if any) Additional Financial Centre; or, if the currency of payment is not euro, any day which is a day on which dealings in foreign currencies may be carried on in the Principal Financial Centre of the currency of payment and in each (if any) Additional Financial Centre.

Payment Record Date: Each payment in respect of a Global Note Certificate will be made to the person shown as the Holder in the Register at the close of business (in the relevant clearing system) on the Clearing System Business Day before the due date for such payment (the “**Record Date**”) where “Clearing System Business Day” means a day on which each clearing system for which the Global Note Certificate is being held is open for business.

Partial exercise of call option: In connection with an exercise of the option contained in Condition 10(c) (*Redemption and Purchase—Optional Redemption*) in relation to some only of the Notes or Global Note Certificate may be redeemed in part in the principal amount specified by the relevant Issuer in accordance with the Conditions and the Notes to be redeemed will not be selected as provided in the Conditions but in accordance with the rules and procedures of DTC, Euroclear and/or Clearstream (to be reflected in the records of DTC, Euroclear and/or Clearstream as either a pool factor or a reduction in principal amount, at their discretion).

Notices: Notwithstanding Condition 22 (*Notices*), while all the Notes are represented by a Global Note Certificate and the Global Note Certificate is registered in the name of DTC's nominee or deposited with a depositary or a common depositary for Euroclear and/or Clearstream and/or any other relevant clearing system, notices to Noteholders may be given by delivery of the relevant notice to DTC and/or Euroclear and/or Clearstream and/or any other relevant clearing system and, in any case, such notices shall be deemed to have been given to the Noteholders in accordance with Condition 22 (*Notices*) on the date of delivery to DTC and/or Euroclear and/or Clearstream and/or any other relevant clearing system.

FORM OF PRICING SUPPLEMENT

The Pricing Supplement in respect of each Series of Notes will be substantially in the following form, duly supplemented (if necessary), amended (if necessary) and completed to reflect the particular terms of the relevant Notes and their issue.

MiFID II product governance / target market – [appropriate target market legend to be included]

Option 1: Legend for issuances involving one or more MiFID Firm manufacturers

[MiFID II product governance / Professional investors and ECPs only target market – Solely for the purposes of [the/each] manufacturer's product approval process, the target market assessment in respect of the Notes has led to the conclusion that: (i) the target market for the Notes is eligible counterparties and professional clients only, each as defined in [Directive 2014/65/EU (as amended, "**MiFID II**")][MiFID II]; and (ii) all channels for distribution of the Notes to eligible counterparties and professional clients are appropriate. Any person subsequently offering, selling or recommending the Notes (a "**distributor**") should take into consideration the manufacturer['s/s'] target market assessment; however, a distributor subject to MiFID II is responsible for undertaking its own target market assessment in respect of the Notes (by either adopting or refining the manufacturer['s/s'] target market assessment) and determining appropriate distribution channels.]

Option 2: Legend for issuances where there are no MiFID Firm manufacturers

[MiFID II product governance / Professional investors and ECPs only target market – For the purposes of Directive EU 2014/65/EU (as amended, "**MiFID II**"), the target market in respect of the Notes is expected to be eligible counterparties and professional clients only, each as defined in MiFID II. Any person offering, selling or recommending the Notes (a "**distributor**") should take into consideration such target market; however, a distributor subject to MiFID II is responsible for undertaking its own target market assessment in respect of the Notes and determining appropriate distribution channels.]

Option 3: Legend for issuances where there is a sole manager that is a MiFID Firm manufacturer (i.e. no syndicate) (and assuming that none of the Issuer, the Guarantor or other credit provider is a MiFID regulated entity)

[MiFID II product governance / Professional investors and ECPs only target market – Solely for the purposes of the manufacturer's product approval process, the target market assessment in respect of the Notes has led to the conclusion that: (i) the target market for the Notes is eligible counterparties and professional clients only, each as defined in [Directive 2014/65/EU (as amended, "**MiFID II**")][MiFID II]; and (ii) all channels for distribution of the Notes to eligible counterparties and professional clients are appropriate. Any person subsequently offering, selling or recommending the Notes (a "**distributor**") should take into consideration the manufacturer's target market assessment; however, a distributor subject to MiFID II is responsible for undertaking its own target market assessment in respect of the Notes (by either adopting or refining the manufacturer's target market assessment) and determining appropriate distribution channels.]

[PROHIBITION OF SALES TO EEA RETAIL INVESTORS – The Notes are not intended to be offered, sold or otherwise made available to and should not be offered, sold or otherwise made available to any retail investor in the European Economic Area ("**EEA**"). For these purposes, a retail investor means a person who is one (or more) of: (i) a retail client as defined in point (11) of Article 4(1) of MiFID II; (ii) a customer within the meaning of Directive (EU) 2016/97 (the "**Insurance Distribution Directive**"), where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or (iii) not a qualified investor as defined in Regulation (EU) 2017/1129 (the "**Prospectus Regulation**"). Consequently no key information document required by Regulation (EU) No 1286/2014 (as amended, the "**PRIIPs Regulation**") for offering or selling the Notes or otherwise making them available to retail investors in the EEA has been prepared and therefore offering or selling the Notes or otherwise making them available to any retail investor in the EEA may be unlawful under the PRIIPs Regulation.]

[Singapore Securities and Futures Act Product Classification – Solely for the purposes of its obligations pursuant to sections 309B(1)(a) and 309B(1)(c) of the Securities and Futures Act (Chapter 289 of Singapore) (the "**SFA**"), the Issuer has determined, and hereby notifies all relevant persons (as defined in Section 309A of the SFA) that the Notes are ["prescribed capital markets products"]/[capital markets products other than "prescribed capital markets products"] (as defined in the Securities and Futures (Capital Markets Products) Regulations 2018).

Pricing Supplement dated [●]

[Thai Oil Public Company Limited] [Thaioil Treasury Center Company Limited]

Issue of [Aggregate Nominal Amount of Series] [Guaranteed] [Title of Notes] [Guaranteed by Thai Oil Public Company Limited subject to the Maximum Guaranteed Amount] under the US\$2,179,000,000 Global Medium Term Note Program

The document constitutes the Pricing Supplement relating to the issue of Notes described herein.

Terms used herein shall be deemed to be defined as such for the purposes of the Conditions (the “**Conditions**”) set forth in the Offering Memorandum dated October 3, 2019. This Pricing Supplement contains the final terms of the Notes and must be read in conjunction with such Offering Memorandum [and the supplemental Offering Memorandum dated [date]].

[Include whichever of the following apply or specify as “Not Applicable” (N/A). Note that the numbering should remain as set out below, even if “Not Applicable” is indicated for individual paragraphs or sub-paragraphs. Italics denote guidance for completing the Pricing Supplement.]

1.	Issuer:	[Thai Oil Public Company Limited.] / [Thaioil Treasury Center Company Limited]
2.	Guarantor:	[Thai Oil Public Company Limited] / [Not Applicable] ¹
3.	[(i) Series Number:]	[●]
	[(ii) Tranche Number:]	[●]
	<i>(If fungible with an existing Series, details of that Series, including the date on which the Notes become fungible).]</i>	
4.	Specified Currency or Currencies:	[●] <i>(If Notes are being cleared through DTC with interest and or principal payable in a currency other than U.S. dollars, check whether DTC will accept payments in such currency)</i>
5.	Aggregate Nominal Amount:	[●]
	[(i)] [Series]:	[●]
	[(ii) Tranche:	[●]
	(i) Issue Price:	[●]% of the Aggregate Nominal Amount [plus accrued interest from [insert date] (in the case of fungible issues only, if applicable)]
	(ii) Net Proceeds	[●] [(Required only for listed issues)]
6.	(i) Specified Denominations ^{2, 3, 4} :	[●]
	(ii) Calculation Amount:	[●]

¹ Guarantor to be included for every Series of Notes where Thaioil Treasury Center Company Limited is Issuer.

² Notes (including Notes denominated in sterling) in respect of which the issue proceeds are to be accepted by the Issuer in the United Kingdom or whose issue otherwise constitutes a contravention of section 19 of the FSMA and which have a maturity of less than one year and must have a minimum redemption value of £100,000 (or its equivalent in other currencies).

³ If the specified denomination is expressed to be €100,000 or its equivalent and multiples of a lower principal amount (for example €1,000), insert the additional wording as follows: €100,000 and integral multiples of [€1,000] in excess thereof up to and including [€99,000]/[€199,000]. No notes in definitive form will be issued with a denomination above [€99,000]/[€199,000].

⁴ Notes to be listed on the Singapore Exchange Securities Trading Limited (the “SGX-ST”) are required to be traded with board lot size of at least S\$200,000 (or equivalent in other countries)

7. (i) Issue Date: [●]
- (ii) Interest Commencement Date: [Specify/Issue Date/Not Applicable]
8. Maturity Date: [Specify date or (for Floating Rate Notes) Interest Payment Date falling in or nearest to the relevant month and year]⁵
- [If the Maturity Date is less than one year from the Issue Date and either (a) the issue proceeds are received by the Issuer in the United Kingdom, or (b) the activity of issuing the Notes is carried on from an establishment maintained by the Issuer in the United Kingdom, (i) the Notes must have a minimum redemption value of £100,000 (or its equivalent in other currencies) and be sold only to “professional investors” or (ii) another applicable exemption from section 19 of the FSMA must be available.]
9. Interest Basis: [[●]% Fixed Rate]
- [[Specify reference rate] +/- [●]% Floating Rate]
- [Zero Coupon]
- [Index Linked Interest]
- [Other (Specify)]
- (further particulars specified below)
10. Redemption/Payment Basis: [Redemption at par]
- [Index Linked Redemption]
- [Dual Currency]
- [Partly Paid]
- [Installment]
- [Other (Specify)]
11. Change of Interest or Redemption/ Payment Basis: [Specify details of any provision for convertibility of Notes into another interest or redemption/payment basis]
12. Call Options:
- [Issuer Call]
- [(further particulars specified below)]
13. Listing: [Singapore Exchange Securities Trading Limited/Other (specify)/None]
14. Method of distribution: [Syndicated/Non-syndicated]

PROVISIONS RELATING TO INTEREST (IF ANY) PAYABLE

15. **Fixed Rate Note Provisions** [Applicable/Not Applicable]
- (If not applicable, delete the remaining sub- paragraphs of this paragraph)
- (i) Rate[(s)] of Interest: [●]% per annum [payable [annually/ semi-annually/quarterly/monthly/ other (specify)] in arrear]
- (ii) Interest Payment Date(s): [●] in each year [adjusted in accordance with [specify Business Day Convention and any applicable Business

⁵ Note that for Renminbi or Hong Kong dollar denominated Fixed Rate Notes where Interest Payment Dates are subject to modification it will be necessary to use the second option here.

		Centre(s) for the definition of “Business Day”]/not adjusted]
(iii)	Fixed Coupon Amount[(s)]:	[●] per Calculation Amount ⁶
(iv)	Broken Amount(s):	[●] per Calculation Amount, payable on the Interest Payment Date falling [in/on] [●]
(v)	Day Count Fraction:	[30/360/Actual/Actual (ICMA/ISDA)// other]
(vi)	Other terms relating to the method of calculating interest for Fixed Rate Notes:	[Not Applicable/give details]
16.	Floating Rate Note Provisions	[Applicable/Not Applicable] <i>(If not applicable, delete the remaining sub-paragraphs of this paragraph)</i>
(i)	Interest Period(s):	[●]
(ii)	Specified Period:	[●] <i>(Specified Period and Specified Interest Payment Dates are alternatives. A Specified Period, rather than Specified Interest Payment Dates, will only be relevant if the Business Day Convention is the FRN Convention, Floating Rate Convention or Eurodollar Convention. Otherwise, insert “Not Applicable”)</i>
(iii)	Specified Interest Payment Dates:	[●] <i>(Specified Period and Specified Interest Payment Dates are alternatives. If the Business Day Convention is the FRN Convention, Floating Rate Convention or Eurodollar Convention, insert “Not Applicable”)</i>
(iv)	First Interest Payment Date:	[●]
(v)	Business Day Convention:	[Floating Rate Convention/Following Business Day Convention/Modified Following Business Day Convention/Preceding Business Day Convention/other (give details)]
(vi)	Additional Business Centre(s):	[Not Applicable/give details]
(vii)	Manner in which the Rate(s) of Interest is/are to be determined:	[Screen Rate Determination/ISDA Determination/other (give details)]
(viii)	Party responsible for calculating the Rate(s) of Interest and/or Interest Amount(s) (if not the [Principal Paying Agent]):	[[Name] shall be the Calculation Agent (no need to specify if the Principal Paying Agent is to perform this function)]
(ix)	Screen Rate Determination:	
	Reference Bank:	[●]
	Reference Rate:	[For example, LIBOR or EURIBOR]
	Interest Determination Date(s):	[●]
	Relevant Screen Page:	[For example, Reuters LIBOR 01/EURIBOR 01]
	Relevant Time:	[For example, 11.00 a.m. London time/Brussels time]

⁵ For Renminbi or Hong Kong dollar denominated Fixed Rate Notes where the Interest Payment Dates are subject to modification the following alternative wording is appropriate: “Each Fixed Coupon Amount shall be calculated by multiplying the product of the Rate of Interest and the Calculation Amount by the Day Count Fraction and rounding the resultant figure to the nearest RMB0.01, RMB0.005 for the case of Renminbi-denominated Fixed Rate Notes and to the nearest HK\$0.01, HK\$0.005 for the case of Hong Kong dollar denominated Fixed Rate Notes, being rounded upwards.

	Relevant Financial Centre:	[For example, London/Euro-zone (where Euro-zone means the region comprised of the countries whose lawful currency is the euro)]
(x)	ISDA Determination:	
	Floating Rate Option:	[•]
	Designated Maturity:	[•]
	Reset Date:	[•]
(xi)	Margin(s):	[+/-][•]% per annum
(xii)	Minimum Rate of Interest:	[•]% per annum
(xiii)	Maximum Rate of Interest:	[•]% per annum
(xiv)	Linear Interpolation:	[Applicable/Not Applicable]
(xv)	Day Count Fraction:	[•]
(xvi)	Fall back provisions, rounding provisions, denominator and any other terms relating to the method of calculating interest on Floating Rate Notes, if different from those set out in the Conditions:	[•]
17.	Zero Coupon Note Provisions	[Applicable/Not Applicable] <i>(If not applicable, delete the remaining sub-paragraphs of this paragraph)</i>
	(i) Accrual Yield:	[•]% per annum
	(ii) Reference Price:	[•]
	(iii) Any other formula/basis of determining amount payable:	[•]
18.	Index-Linked Interest Note/other variable-linked interest Note Provisions	[Applicable/Not Applicable] <i>(If not applicable, delete the remaining sub-paragraphs of this paragraph)</i>
	(i) Index/Formula/other variable:	<i>[give or annex details]</i>
	(ii) Calculation Agent responsible for calculating the interest due:	[•]
	(iii) Provisions for determining Coupon where calculated by reference to Index and/or Formula and/or other variable:	[•]
	(iv) Interest Determination Date(s):	[•]
	(v) Provisions for determining Coupon where calculation by reference to Index and/or Formula and/or other variable is impossible or impracticable or otherwise disrupted:	[•]
	(vi) Interest or calculation period(s):	[•]
	(vii) Specified Period:	[•] <i>(Specified Period and Specified Interest Payment Dates are alternatives. A Specified Period, rather than Specified Interest Payment Dates, will only be relevant if the Business Day Convention is the FRN Convention, Floating Rate Convention or Eurodollar Convention. Otherwise, insert "Not Applicable")</i>

	(viii)	Specified Interest Payment Dates:	[●]	
				<i>(Specified Period and Specified Interest Payment Dates are alternatives. If the Business Day Convention is the FRN Convention, Floating Rate Convention or Eurodollar Convention, insert "Not Applicable")</i>
	(ix)	Business Day Convention:	[●]	[Floating Rate Convention/Following Business Day Convention/Modified Following Business Day Convention/Preceding Business Day Convention/other (give details)]
	(x)	Additional Business Centre(s):	[●]	
	(xi)	Minimum Rate/Amount of Interest:	[●]	% per annum
	(xii)	Maximum Rate/Amount of Interest:	[●]	% per annum
	(xiii)	Day Count Fraction:	[●]	
19.		Dual Currency Note Provisions	[Applicable/Not Applicable]	<i>(If not applicable, delete the remaining sub-paragraphs of this paragraph)</i>
	(i)	Rate of Exchange/method of calculating Rate of Exchange:	[●]	<i>(give details)</i>
	(ii)	Calculation Agent, if any, responsible for calculating the principal and/or interest due:	[●]	
	(iii)	Provisions applicable where calculation by reference to Rate of Exchange impossible or impracticable:	[●]	
	(iv)	Person at whose option Specified Currency(ies) is/are payable:	[●]	
PROVISIONS RELATING TO REDEMPTION				
20.		Call Option	[Applicable/Not Applicable]	<i>(If not applicable, delete the remaining sub-paragraphs of this paragraph)</i>
	(i)	Optional Redemption Date(s) (Call):	[●]	
	(ii)	Optional Redemption Amount(s) (Call) of each Note and method, if any, of calculation of such amount(s):	[●]	per Calculation Amount
	(iii)	If redeemable in part:		
	(a)	Minimum Redemption Amount:	[●]	per Calculation Amount
	(b)	Maximum Redemption Amount	[●]	per Calculation Amount
	(iv)	Notice period:	[●]	
21.		Put Option	[Applicable/Not Applicable]	<i>(If not applicable, delete the remaining sub-paragraphs of this paragraph)</i>
	(i)	Optional Redemption Date(s) (Put):	[●]	

(ii)	Optional Redemption Amount(s) (Put) of each Note and method, if any, of calculation of such amount(s):	[●] per Calculation Amount
(iii)	Notice period:	[●]
22.	Final Redemption Amount of each Note In cases where the Final Redemption Amount is Index-Linked or other variable-linked:	[●] per Calculation Amount
(i)	Index/Formula/variable:	[give or annex details]
(ii)	Calculation Agent responsible for calculating the Final Redemption Amount:	[●]
(iii)	Provisions for determining Final Redemption Amount where calculated by reference to Index and/or Formula and/or other variable:	[●]
(iv)	Date for determining Final Redemption Amount where calculation by reference to Index and/or Formula and/or other variable:	[●]
(v)	Provisions for determining Final Redemption Amount where calculation by reference to Index and/or Formula and/or other variable is impossible or impracticable or otherwise disrupted:	[●]
(vi)	[Payment Date]:	[●]
(vii)	Minimum Final Redemption Amount:	[●] per Calculation Amount
(viii)	Maximum Final Redemption Amount:	[●] per Calculation Amount
23.	Early Redemption Amount Early Redemption Amount(s) per Calculation Amount payable on redemption for taxation reasons, on change of control or on event of default or other early redemption and/or the method of calculating the same (if required or if different from that set out in the Conditions):	[Not Applicable] <i>(If each of the Early Redemption Amount (Tax) and the Early Termination Amount are the principal amount of the Notes/specify the Early Redemption Amount (Tax) and/or the Early Termination Amount if different from the principal amount of the Notes)]</i>

GENERAL PROVISIONS APPLICABLE TO THE NOTES

24. Form of Notes:

[Unrestricted Global Certificate exchangeable for unrestricted Individual Note Certificates on [●] days' notice in the limited circumstances described in the Unrestricted Global Certificate]⁷
[and]
[Restricted Global Certificate exchangeable for Restricted Individual Note Certificates on [●] days']

⁷ If the Specified Denominations of the Notes in paragraph 6 includes language substantially to the following effect: "[€50,000]/[€100,000] and integral multiples of [€1,000] in excess thereof up to and including [€99,000]/[€199,000]," the Unrestricted Global Certificate shall not be exchangeable on [●] days' notice or at any time.

		notice in the limited circumstances described in the Restricted Global Certificate] ⁸
25.	Additional Financial Centre(s) or other special provisions relating to payment dates:	[Not Applicable/give details.] <i>Note that this paragraph relates to the date and place of payment, and not interest period end dates, to which sub paragraphs 16(vi) and 18(x) relate]</i>
26.	Details relating to Partly Paid Notes: amount of each payment comprising the Issue Price and date on which each payment is to be made [and consequences (if any) of failure to pay, including any right of the Issuer to forfeit the Notes and interest due on late payment]:	[Not Applicable/give details]
27.	Details relating to Installment Notes: amount of each installment, date on which each payment is to be made:	[Not Applicable/give details]
28.	Redenomination, renominialization and reconventioning provisions:	[Not Applicable/The provisions annexed to this Pricing Supplement apply]
29.	Consolidation provisions:	The provisions in Condition [20] (<i>Further Issues</i>) [annexed to this Pricing Supplement] apply]
30.	Any applicable currency disruption/ fallback provisions:	[Not Applicable/give details]
31.	Maximum Guaranteed Amount	[Not Applicable/as further described in the Offering Memorandum]
32.	Other terms or special conditions:	[Not Applicable/give details]
DISTRIBUTION		
33.	(i) If syndicated, names of Managers:	[Not Applicable/give names]
	(ii) Stabilizing Manager(s) (if any):	[Not Applicable/give name]
34.	If non-syndicated, name and address of Dealer:	[Not Applicable/give name and address]
35.	Total commission and concession:	[•]% of the Aggregate Nominal Amount
36.	U.S. Selling Restrictions:	[Reg. S Category [1/2]]/[Rule 144A]; [Rule 144A Eligible/Not Rule 144A Eligible]
37.	Additional selling restrictions:	[Not Applicable/give details]
38.	Prohibition of Sales to EEA Retail Investors:	[Applicable/Not Applicable]

(If the Notes clearly do not constitute “packaged” products, “Not Applicable” should be specified. If the offer of the Notes may constitute “packaged” products and no KID will be prepared, “Applicable” should be specified.)

OPERATIONAL INFORMATION

39.	ISIN Code:	[•]

⁸ If the Specified Denominations of the Notes in paragraph 6 includes language substantially to the following effect: “[€50,000]/[€100,000] and integral multiples of [€1,000] in excess thereof up to and including [€99,000]/[€199,000],” the Restricted Global Certificate shall not be exchangeable on [•] days’ notice or at any time.

40. Common Code: [●]
41. [FISN: [●]]
42. [CFI Code: [●]]
43. CUSIP: [●]
44. Any clearing system(s) other than Euroclear/Clearstream, DTC Service and the relevant identification number(s): [Not Applicable/give name(s) and number(s)]
45. Delivery: Delivery [against/free of] payment
46. Additional Paying Agent(s) (if any): [●]

GENERAL

47. The aggregate principal amount of Notes issued has been translated into United States dollars at the rate of [●], producing a sum of (for Notes not denominated in United States dollars): [Not Applicable/US\$]
48. [Ratings: The Notes to be issued have been rated:
[[●]: [●]]; [[●]: [●]]; [and]
(each a “**Rating Agency**”).
If any Rating Agency shall not make a rating of the Notes publicly available, the Issuer shall select and substitute them with [●] or [●] and its successors.]

[USE OF PROCEEDS

Give details if different from the “Use of Proceeds” section in the Offering Memorandum.]

STABILIZING

In connection with the issue of the Notes, [name(s) of Stabilizing Manager(s)] (or persons acting on behalf of [name(s) of Stabilizing Manager(s)]) (the “**Stabilizing Manager[s]**”) may over-allot Notes or effect transactions with a view to supporting the price of the Notes at a level higher than that which might otherwise prevail for a limited period after the Issue Date. However, there is no obligation on such Stabilizing Manager[s] to do this. Such stabilizing, if commenced, may be discontinued at any time, and must be brought to an end after a limited period. Such stabilizing shall be in compliance with all applicable laws, regulations and rules.

PURPOSE OF PRICING SUPPLEMENT

This Pricing Supplement comprises the final terms required for issue and admission to trading on the SGX-ST of the Notes described herein pursuant to the US\$2,179,000,000 Guaranteed Global Medium Term Note Program of the Issuer [and the Guarantor].

RESPONSIBILITY

The Issuer accepts responsibility for the information contained in this Pricing Supplement.

Signed on behalf of [Thai Oil Public Company Limited] [Thaioil Treasury Center Company Limited]

By:
Name:
Title:

CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

The following is a summary of certain of our material related party transactions for the year ended December 31, 2018 and for the six months ended June 30, 2019. For the purposes herein, parties are considered to be related parties if we have the ability, directly or indirectly, to control or jointly control the party or exercise significant influence over the party in making financial and operating decisions, or *vice versa*, or where we and the party are subject to common control or common significant influence. Related parties may be individuals or other entities. We believe each of these arrangements as described below have been entered into on arm's length terms or on terms that have been at least as favorable to us as similar transactions with non-related parties. For further information about our related party transactions, please see note 5 to our audited consolidated financial statements for the year ended December 31, 2018.

Transactions

The table below sets forth the amounts involved in our related party transactions for the year ended December 31, 2018 and for the six months ended June 30, 2019 by type of transaction:

Transactions	For the year ended December 31, 2018		For the six months ended June 30, 2019	
	THB	US\$ (in millions)	THB	US\$
Purchase of crude oil and feedstock from related parties	155,687.0	5,010.4	71,830.2	2,336.7
Revenue from sales of goods and rendering of services to related parties	185,118.6	6,022.1	89,365.7	2,907.1
Directors' remuneration	78.7	2.6	47.9	1.6
Others ⁽¹⁾	2,303.2	74.9	1,573.1	51.2
Total	343,187.5	11,110.0	162,816.9	5,296.6

Note:

(1) See "—Others" below.

Purchases of Crude Oil and Feedstock from Related Parties

The Company has entered into a long-term agreement with PTT for the supply of crude oil. See "Business—Our Business Units and Products—Oil Refining" for further information.

The Company, together with certain of its subsidiaries, has entered into natural gas supply agreements with PTT at quantities and prices as stipulated in such agreements. These agreements are generally for terms of 10 to 25 years expiring between 2022 and 2041.

The Company, together with certain of its subsidiaries, has entered into power purchase agreements with Thaioil Power and TOP SPP at quantities and prices as stipulated in such agreements. These agreements are generally for terms of 24 and 25 years, expiring in 2023, 2027 and 2040.

The Company, together with certain of its subsidiaries, has entered into steam purchase agreements at quantities and prices as stipulated in such agreements. These agreements are generally for terms of 20 and 25 years, expiring in 2023, 2027 and 2040.

The Company has entered into a by-product purchase agreement with Thai Lube Base, with purchase volumes and prices of the by-product as specified in the agreement. The agreement is for a period of 16 years expiring in September 2020.

Sak Chaisidhi has entered into raw materials and petrochemical products purchase and sale agreements with related companies, including PTT, IRPC and PTTGC, at quantities and prices as stipulated in the agreements. These agreements range from one year to 15 years expiring during 2019 and 2025.

The Company has entered into a raw materials purchase agreement with Thai Paraxylene, with purchase volumes and raw material prices as specified in the agreement. This agreement is evergreen unless terminated by either party with at least 6 months' notice in writing.

The Company has entered into an ethanol products purchase agreement with UBE, with purchase volumes and prices of the ethanol products as specified in the agreement. The agreement shall be automatically renewed every year unless terminated by either party in writing.

Sales of Goods and Rendering of Services to Related Parties

The Company has entered into a long-term agreement with PTT and PTTOR, whereby PTT and PTTOR agrees to purchase a certain quantity of our refined petroleum products at prevailing market prices. See “Business—Our Business Units and Products—Oil Refining” for further information.

We have entered into purchase and sale agreements with related parties with respect to the purchase and sale of various products, including refined petroleum and related by-products and ethanol. These related parties include Thai Lube Base, Thai Paraxylene and UBE. These agreements have terms of at least 16 years and some are evergreen.

The Company has entered into time charter agreements with TOP-NYK MarineOne Pte. Ltd. and TOP-NTL Pte. Ltd. and its jointly controlled entities to provide us with VLCCs and tankers for transportation of oil and petrochemical products.

TOP Maritime has charter of crew boat agreements with PTT Exploration and Production Public Company Limited, for a service fee as specified in the agreement.

Thai Paraxylene and LABIX have entered into a services agreement for Thai Paraxylene to provide LABIX the use of its facilities, including lab and laboratory consumables, for a service fee as specified in the agreement.

Borrowings

We have uncommitted unsecured short term inter-company borrowing and lending agreements with PTT to manage liquidity. None of the borrowing credit lines and lending credit lines exceeds THB 2,000 million. The credit lines bear interest at floating rates calculated with reference to either Bangkok Interbank Offered Rate or LIBOR. These agreements are for terms of one year and are automatically extended at the end of each term.

Directors’ Remuneration

Our transactions with directors consist of directors’ compensation items, such as directors’ fees and variable bonuses which must be approved by the Annual General Meeting of Shareholders.

Others

We have entered into crack spread swap agreements with PTT to hedge our exposure to crude oil fluctuations and their effect on our oil refinery’s margins. Under the agreements, the floating or the actual value of the crack spread (the difference between product price and feedstock price) is swapped for the fixed or hedged value of the crack spread each month for a specified quantity. As of June 30, 2019, we have not entered into any hedging arrangements under our crack spread swap agreements with PTT.

We, as lessor, have lease and sublease agreements regarding certain parcels of land in the Sriracha Complex which we in turn either own or lease from the Treasury Department, Ministry of Finance. These lease and sublease agreements are with Thai Paraxylene, Thai Lube Base, Thailoil Power, TOP SPP, GPSC and LABIX. We also have a land lease agreement under which we lease land from PTT, which expires in August 2026.

We have entered into cost reimbursement agreements with Thailoil Power and GPSC covering the reimbursement of construction costs of natural gas pipeline facilities and the use of the pipeline facilities, raw water pipeline and the use of land for the construction of a transmission line connecting the subsidiaries to EGAT. Under the terms of the agreements, Thailoil Power and GPSC agree to share the cost of investments with the Company. These agreements are effective for a period of 25 years, or until the termination of the power purchase agreement entered into by Thailoil Power and GPSC with EGAT, whichever is sooner.

We have entered into an Asset Sale and Purchase Agreement for the ERU with a related company to support energy and utilities for CFP, whereby the purchase price is specified in the agreement. The Company will transfer ownership in the ERU to the purchaser upon satisfaction of all the conditions precedent set out in the agreement. Such conditions precedent include the Company’s countersigning of the Provisional Acceptance Certificate (PAC) to the contractor, which we expect to occur in 2023, and the purchaser and seller receiving all necessary certifications from the relevant authorities.

We also have entered into a Fuel and Utilities Supply Agreement, Power Purchase Agreement and Operation and Maintenance Services Agreement with ERU to support energy for CFP, utilities and supply, services of operation and maintenance of the ERU. The term of the agreement is 25 years from the from the closing date of the agreement and the parties may agree to extend the term for another 5 years.

We and our related parties have entered into various service, supply and throughput agreements in relation to various amenities, technical and support services such as consultancy, time charter and affreightment, office rentals, technology and communication services support, usage of buoy mooring facilities, throughput operating, repair and maintenance, waste water treatment, financial, accounting and human resource services, information technology, administration, procurement, ship management and crude oil storage tank services and fuel transmission. These contracts are entered into on an arm's length basis.

Accounts Balances

The balances due to and from our related parties as of June 30, 2019 are as follows:

	As of June 30, 2019	
	(in millions of)	
Accounts⁽¹⁾	THB	US\$
Trade and other accounts receivable	8,583.0	279.2
Trade and other accounts payable	9,564.6	311.1

Notes:

(1) For further information, please see notes 5, 8 and 20 to our consolidated financial statements for the year ended June 30, 2019.

DESCRIPTION OF OTHER MATERIAL INDEBTEDNESS

To finance working capital requirements and to fund investment projects, we have entered into financing arrangements with various financial institutions. In addition, we issue debentures from time to time which are offered to institutional investors and/or the public. As of June 30, 2019, our total outstanding borrowings, including debentures issued, totaled THB 99,596.9 million (US\$3,240.0 million), of which THB15,437.7 million (US\$502.2 million) were secured. Of our total outstanding borrowings, foreign currency denominated indebtedness amounted to THB61,816.2 million (US\$2,010.9 million), Thai Baht denominated debentures amounted to THB20,500.0 million (US\$666.9 million) and Thai Baht denominated borrowings amounted to THB17,280.7 million (US\$562.2 million).

We set forth below a summary of the material terms and conditions of these borrowings, debentures and other material indebtedness. This summary does not purport to be complete. Please refer to the financial statements of the Company and the notes thereto included elsewhere in this Offering Memorandum for additional information with respect to such indebtedness. Each of the Issuers is not restricted from incurring any new indebtedness, save for financial covenants set out in any agreement to which the relevant Issuer is a party.

Bank borrowings

We have entered into loan agreements with various banks and financial institutions. These borrowings are typically unsecured and secured borrowings to finance our investment projects and working capital and to refinance our borrowings and other indebtedness. Our subsidiaries, Sapthip, UBE, TOP Maritime, TOPSPP and LABIX have unsecured and secured borrowings with various banks and financial institutions with terms up to 18 years.

As of June 30, 2019, the aggregate outstanding amount under these borrowings from financial institutions totaled approximately THB17,881.3 million (US\$581.7 million), of which THB1,856.5 million (US\$60.4 million) were short-term obligations. Out of the long-term obligations, THB1,300.8 million (US\$42.3 million) would be due within one year, THB2,637.1 million (US\$85.8 million) would be due between one and three years, THB2,428.8 million (US\$79.0 million) would be due between three and five years and THB9,658.1 million (US\$314.2 million) would be due in more than five years.

Interest

The principal amounts outstanding under the bank borrowings generally bear interest at floating rates calculated with reference to benchmarks, such as fixed deposit rates (“**FDR**”), minimum loan rates (“**MLR**”), the Money Market Rate (“**MMR**”) and the Thai Baht floating-rate fix (“**THBFIX**”). FDR, MLR and MMR are interest rates which are calculated and announced by the respective commercial banks, while THBFIX rate is calculated by third parties. Interest payments are payable either monthly, quarterly, semi-annually or as specified in each promissory note, and payments must be made on each interest payment date as provided in the respective loan agreements. As of June 30, 2019, the interest rates on our long-term borrowings ranged from approximately 3.3% to 6.4% per annum, subject to applicable reference rates.

Covenants

Under the bank borrowings, we have agreed, among other things, not to take the following actions without the prior written consent from the relevant lender or group of lenders to whom we owe more than two-thirds of the total principal amount (in case of a syndicated borrowings):

- making any disposals of all or any material portion of our assets save for certain conditions prescribed in the bank loan agreements, such as disposals in the ordinary course of business and on arm’s length commercial terms or disposal of obsolete or redundant vehicles, plants, machinery or equipment;
- creating or permitting to subsist any encumbrance on our current or future assets or revenues other than permitted encumbrance as prescribed in the bank loan agreements;
- materially changing the nature of our business; and

- amending, or granting any release or waiver with respect to, technical services agreements in a manner or to an extent that would have a material adverse effect on, among others, our business condition (financial or otherwise), operations, performance or assets.

Events of Default

The bank loan agreements contain certain customary events of default, such as failure to pay, cross-acceleration of repayment obligations under other borrowings or financing documents in excess of US\$15.0 million in aggregate, the occurrence of certain bankruptcy, reorganization, and liquidation-related events and government intervention. Moreover, events of default under the bank borrowings typically include PTT ceasing to directly or indirectly own at least 45.0% of our issued share capital. Upon the occurrence of any event of default, the lenders are entitled to terminate their respective commitments and/or demand immediate repayment of the borrowings and any accrued interest.

Thai Baht Debentures

From time to time, we issue and offer debentures to investors by way of public offering and private placement in Thailand. These debentures are denominated in Baht and are unsecured and unsubordinated. The proceeds from these debentures have been used to finance our investment projects and working capital and to refinance our borrowings and other indebtedness. Other than with respect to specific pricing terms of each tranche, the terms and conditions of the Thai Baht debentures are substantially similar to each other. The terms of the Thai Baht debentures range from three to 15 years from their respective issue date. As of June 30, 2019, the outstanding amount under these debentures totaled approximately THB20,500.0 million (US\$666.9 million), of which THB6,000.0 million (US\$195.2 million) would be due between one and three years, THB7,000.0 million (US\$227.7 million) would be due between three and five years, and THB7,500.0 million (US\$244.0 million) would be due in more than five years.

Interest

The Thai Baht debentures generally bear interest at fixed rates. Interest payments are payable semi-annually. As of June 30, 2019, the interest rates on our Thai Baht debentures ranged from 4.6% to 5.1% per annum based on the duration of the particular debentures.

Covenants

Under the terms and conditions of the Thai Baht debentures, we have agreed, among other things, not to take the following actions, unless certain conditions are met:

- creating a security interest or any other encumbrance on our assets or assets of our principal subsidiaries to secure the performance under Thai Baht-denominated, long-term and negotiable debt instruments which are or are capable of being listed on any security market in Thailand or guarantees, indemnity agreements, or similar obligations of or relating to any such debt instruments, unless we have obtained a prior consent from a meeting of the holders of the Thai Baht debentures. For the purpose of the covenant, a principal subsidiary means (i) Thai Paraxylene for so long as we, directly or indirectly, hold more than 50% of the total shares in Thai Paraxylene or (ii) any other company, in which Thai Paraxylene (for so long as it is a principal subsidiary pursuant to item (i)), directly or indirectly, hold more than 50% of the total shares of such company; and
- selling or disposing of our assets, unless certain conditions prescribed in the terms and conditions of the Thai Baht debentures are met, such as where the sale or disposition of assets does not have a material adverse effect on our ability to repay the Thai Baht debentures or which is carried out for the purpose of amalgamating, merging or reorganizing our business in accordance with details approved by a meeting of the holders of the Thai Baht debentures.

Events of Default

The terms and conditions of the Thai Baht debentures contain certain customary events of default, such as failure to pay the amount payable on the due date, failure to comply with other terms of the Thai Baht debentures, acceleration of repayment obligations under other borrowings or financing documents totaling

US\$15.0 million or more, failure to comply with a court order to repay any indebtedness which would have a material adverse effect on our ability to repay the Thai Baht debentures, our assets being subject to foreclosure which would have a material adverse effect on our ability to repay the Thai Baht debentures, bankruptcy, liquidation and illegality of the Thai Baht debentures. Moreover, if PTT, directly or indirectly, holds less than 45.0% of our total issued shares, an event of default will also be deemed to have occurred under the Thai Baht debentures. The holders of the Thai Baht debentures are entitled to demand immediate repayment of the Thai Baht debentures and any accrued interest upon the occurrence of an event of default.

U.S. Dollar Notes

On January 23, 2013, we issued notes in a principal amount of US\$500.0 million at an interest rate of 3.625% per annum (the “**2023 USD Notes**”) and notes in a principal amount of US\$500.0 million at an interest rate of 4.875% per annum (the “**2043 USD Notes**”).

On April 10, 2018, by way of tender offers, we repurchased US\$283.6 million in principal amount of 2023 USD Notes and US\$327.6 million in principal amount of 2043 USD Notes from existing holders of such notes. Concurrently with such repurchase, Treasury Center issued US\$283.6 million in principal amount of senior unsecured notes due 2023 (the “**TC 2023 Notes**”) and US\$327.6 million in principal amount of senior unsecured notes due 2043 (the “**TC 2043 Notes**”). The Company acted as guarantor of the TC 2023 Notes and TC 2043 Notes, which have substantially identical terms as the 2023 USD Notes and the 2043 USD Notes, respectively.

On November 20, 2018, Treasury Center issued notes in a principal amount of US\$400.0 million at an interest rate of 4.625% per annum due 2028 (the “**TC 2028 Notes**”) and notes in a principal amount of US\$600.0 million at an interest rate of 5.375% per annum due 2048 (the “**TC 2048 Notes**”). The Company acted as guarantor of the TC 2028 Notes and TC 2048 Notes, which have substantially identical terms as the TC 2023 Notes and the TC 2043 Notes, respectively.

As of June 30, 2019, the outstanding amounts under the 2023 USD Notes, the 2043 USD Notes, the TC 2023 Notes, the TC 2043 Notes, the TC 2028 Notes and the TC 2048 Notes were US\$216.4 million, US\$172.4 million, US\$283.6 million, US\$327.6 million, US\$400.0 million and US\$600.0 million, respectively.

Interest

The 2023 USD Notes and the TC 2023 Notes bear interest on their outstanding principal amounts at the rate of 3.625% per annum, payable semi-annually in arrears. The 2043 USD Notes and the TC 2043 Notes bear interest on their outstanding principal amounts at the rate of 4.875% per annum, payable semi-annually in arrears. The TC 2028 Notes bear interest on their outstanding principal amount at the rate of 4.625% per annum, payable semi-annually in arrears. The TC 2048 Notes bear interest on their outstanding principal amount at the rate of 5.375% per annum, payable semi-annually in arrears.

Covenants

Under the terms and conditions of the 2023 USD Notes, 2043 USD Notes, TC 2023 Notes, TC 2043 Notes, TC 2028 Notes and TC 2048 Notes, we are subject to covenants that restrict us and certain of our subsidiaries from creating any security interest over our present or future business, undertaking, assets or revenues to secure certain indebtedness unless we ensure, among others, that all amounts payable under the 2023 USD Notes, 2043 USD Notes, TC 2023 Notes, TC 2043 Notes, TC 2028 Notes and TC 2048 Notes are secured by an equal and rateable security interest.

Events of Default

The terms and conditions of the 2023 USD Notes, 2043 USD Notes, TC 2023 Notes, TC 2043 Notes, TC 2028 Notes and TC 2048 Notes contain certain customary events of default, including default in the payment of any principal or interest due in respect of the such notes, and other events of default such as liquidation and insolvency. Subject to certain exceptions, an event default is also deemed to have occurred when, among other things, our debts of an amount equal to or greater than US\$25 million either (a) become due and payable by reason of acceleration or (b) we fail to pay our debts as they fall due.

Increase in Interest Rate Payable Upon the Occurrence of a Change of Control Triggering Event

The interest rate payable on the 2023 USD Notes, 2043 USD Notes, TC 2023 Notes, TC 2043 Notes, TC 2028 Notes, TC 2048 Notes will be subject to an increase of 1.25% if (i) PTT ceases to own or control, directly or indirectly, at least 40% of our issued and outstanding share capital or any person owns (directly or indirectly) more shares of our issued and outstanding share capital than PTT, and (ii) within 90 days of the occurrence or public notice of such change of control, either S&P or Moody's publicly announces a decrease in the rating of such notes by one or more gradations.

Maturity, Purchase and Redemption

The maturity dates of the 2023 USD Notes, 2043 USD Notes, TC 2023 Notes, TC 2043 Notes, TC 2028 Notes and TC 2048 Notes are January 23, 2023, January 23 2043, January 23, 2023, January 23, 2043, November 20, 2028 and November 20, 2048, respectively.

At any time, the Company may on any one or more occasions redeem all or a part of such notes, upon not less than 30 nor more than 60 days' written notice, at a redemption price equal to 100% of the principal amount of such notes redeemed, plus the applicable premium as of, and accrued and unpaid interest, if any, to the date of redemption, subject to the rights of holders of such notes on the relevant record date to receive interest due on the relevant interest payment date.

For taxation reasons, these notes may be redeemed, in whole but not in part, at the Company's option, upon not less than 30 nor more than 60 days' written notice, at any time at a redemption price equal to:

- 100% of the aggregate principal amount of the notes to be redeemed, plus;
- accrued interest to the date fixed for redemption.

Any such notes redeemed or repurchased by us shall be cancelled and may not be reissued or resold.

TAXATION

Thai Taxation

*The following is a summary of the principal Thai tax consequences of the purchase, ownership and disposition of the Notes by individual and corporate investors who are not resident in Thailand for tax purposes (referred to as “**non-resident individual holders**” and “**non-resident corporate holders**,” respectively, and together as “**non-resident holders**”) based on Thai tax laws and their implementing regulations in force as of the date of this Offering Memorandum. The summary does not address any laws other than the tax laws of Thailand. It does not purport to be a comprehensive description of all of the tax considerations that may be relevant to a decision to purchase the Notes. Prospective investors in all jurisdictions are advised to consult their own tax advisors as to other tax consequences of the purchase, ownership and disposition of the Notes, including the consequences under Thai laws, the laws of the country of which they are resident and any double taxation agreement between Thailand and their country of residence for tax purposes.*

Income Tax

Non-resident Individual Holders

A non-resident individual holder is an individual owner of Notes that has not resided in Thailand at one or more times for a period or periods equal in the aggregate to 180 days or more in any calendar year, regardless of the nationality of the individual holders.

Interest

Unless the terms and conditions of applicable double taxation agreement entered into between Thailand and the resident country of the non-resident individual holders provide otherwise, interest paid or deemed to be paid on the Notes from or within Thailand to a non-resident individual holder is subject to 15% withholding tax.

Capital Gains

Capital gains (being the amount received in excess of the cost of acquisition of the Notes) received by a non-resident individual holder from the sale or other disposition of Notes outside Thailand in connection with which payment is made neither from nor within Thailand are not subject to Thai withholding tax.

Unless the terms and conditions of applicable double taxation agreement entered into between Thailand and the resident country of the non-resident individual holders provide otherwise, capital gain received by a non-resident individual holder from a sale or other disposition of Notes in which payment is made or deemed to be made from or within Thailand is subject to 15% withholding tax. The transferee or the payer of the gain has a duty to withhold tax at such rate and remit the withholding tax to the Thai Revenue Department.

Premium

Unless the terms and conditions of applicable double taxation agreement entered into between Thailand and the resident country of the non-resident individual holders provide otherwise, any premium (being the amount received in excess of the interest and the principal amount paid upon a redemption of the Notes) paid or deemed to be paid on the Notes from or within Thailand to a non-resident individual holder is subject to 15% withholding tax.

Non-resident Corporate Holders

A non-resident corporate holder is an owner of Notes that is a company, a registered partnership or any entity established pursuant to a foreign law that is not doing business in Thailand or deemed to be doing business in Thailand or does not have a permanent establishment, employees, agents or representatives in Thailand but receiving from or within Thailand interest on the Notes or capital gains arising from the transfer of the Notes.

Interest

Interest paid on the Notes by the Issuer to a non-resident corporate holder that is a company or limited partnership established under a foreign law (a “**Qualified Non-resident Corporate Holder**”) are exempted from Thai corporate income tax, to the extent that the Issuer remains qualified as a treasury centre that has the

international business centre status pursuant to the rules and regulations of the Revenue Department of Thailand and all other conditions for a Thai corporate income tax exemption with respect to the interest made by the Issuer in accordance with the Royal Decree issued pursuant to the Revenue Code on Reduction and Exemption of Taxes are fully satisfied.

If any of the qualifications or conditions for a Qualified Non-resident Corporate Holder's Thai corporate income tax exemption referred to in the paragraph above are no longer met, interest paid on the Notes by the Issuer to a Qualified Non-resident Corporate Holder will be subject to a withholding tax at the rate of 15% of the gross amount of the interest payment, unless the terms and conditions of applicable double taxation agreement between Thailand and the resident country of such non-resident corporate holder provide otherwise.

Interest paid on the Notes by the Issuer to a non-resident corporate holder that is not a Qualified Non-resident Corporate holder will, in any case, be subject to a withholding tax at the rate of 15% of the gross amount of the interest payment, unless the terms and conditions of applicable double taxation agreement between Thailand and the resident country of such non-resident corporate holder provide otherwise.

Capital Gains

Capital gains (being the amount received in excess of the cost of acquisition of the Notes) received by a non-resident corporate holder from the sale or other disposition of Notes outside Thailand in connection with which payment is made neither from nor within Thailand are not subject to Thai withholding income tax.

Unless the terms and conditions of applicable double taxation agreement entered into between Thailand and the resident country of the non-resident corporate holder provide otherwise, a capital gain received by a non-resident corporate holder from a sale or other disposition of Notes in which payment is made or deemed to be paid from or within Thailand is subject to a 15% withholding tax.

Premium

Unless the terms and conditions of applicable double taxation agreement entered into between Thailand and the resident country of the non-resident corporate holders provide otherwise, any premium (being the amount received in excess of the interest and the principal amount paid upon a redemption of the Notes) paid or deemed to be paid on the Notes from or within Thailand to a non-resident corporate holder is subject to 15% withholding tax.

Income Tax in connection with a Guarantee Payment by the Guarantor

Thai taxation with respect to any payment made to the holders of the Notes by the Guarantor pursuant to its obligations under the Guarantee, if part of the guaranteed payment is considered by the Thai authorities as payment of interest and/or premium (as described below) from or in Thailand, is as set out below.

Non-resident Individual Holders

Interest

Interest paid on the Notes to a non-resident individual holder will be subject to a withholding tax at the rate of 15% of the gross amount of the interest payment, unless the terms and conditions of applicable double taxation agreement between Thailand and the resident country of such non-resident individual holder provide otherwise.

Premium

Any premium (being the amount received in excess of the interest and the principal amount paid in accordance with the terms of the Guarantee) paid to a non-resident individual holder will be subject to Thai withholding tax at the rate of 15% of the gross amount of the premium, unless the terms and conditions of applicable double taxation agreement between Thailand and the resident country of such non-resident individual holder provide otherwise.

Non-resident Corporate Holders

Interest

Interest paid on the Notes to a non-resident corporate holder (including a Qualified Non-resident Corporate Holder) will be subject to a withholding tax at the rate of 15% of the gross amount of the interest payment, unless the terms and conditions of applicable double taxation agreement between Thailand and the resident country of such non-resident corporate holder provide otherwise.

Premium

Any premium (being the amount received in excess of the interest and the principal amount paid in accordance with the terms of the Guarantee) paid to a non-resident corporate holder (including a Qualified Non-resident Corporate Holder) will be subject to Thai withholding tax at the rate of 15% of the gross amount of the premium, unless the terms and conditions of applicable double taxation agreement between Thailand and the resident country of such non-resident corporate holder provide otherwise.

Double Taxation Agreement

Presently, Thailand concluded double taxation agreements with more than 60 countries. The rate of withholding tax applicable to individual and corporate holders of the Notes, who are regarded as tax residents of the countries which are parties to the double taxation agreements and receive interest payments in respect of the Notes that are subject to withholding tax, may be reduced or exempted depending on the terms and conditions of the particular tax agreement.

Corporate and individual holders of the Notes resident in such a country for tax purposes who are not regarded as tax residents in Thailand, may be entitled to an exemption or reduction from Thai capital gains tax for the capital gain received from or within Thailand depending on the terms and conditions of the particular tax treaty.

Value Added Tax

Interest on the Notes and capital gains derived from the transfer of the Notes are not subject to value added tax in Thailand.

Specific Business Tax

Interest on the Notes and capital gains derived from the transfer of the Notes are not subject to specific business tax in Thailand. However, Thai specific business tax would apply at a rate which varies depending on the type of business and income if a person who receives the interest on the Notes and capital gains derived from the transfer of the Notes is a person carrying on a banking business, finance business, securities business or business similar to a commercial bank in Thailand.

Stamp Duty

Each Note certificate will be subject to a stamp duty of THB5.0 in Thailand. Stamp duty will be triggered when Note certificate is issued in Thailand, or is brought into Thailand if issued outside Thailand. An instrument of transfer of the Notes is exempted from stamp duty.

The Guarantee will be subject to a stamp duty of THB 10 in Thailand. Stamp duty will be triggered when the Guarantee is executed in Thailand or is brought into Thailand if executed outside Thailand.

United States Federal Income Taxation

The following discussion is a summary of certain U.S. federal income tax consequences of the purchase, ownership and disposition of the Notes by a U.S. holder (defined below), but does not purport to be a complete analysis of all potential tax effects.

This summary is based upon the U.S. Internal Revenue Code of 1986, as amended (the “**Code**”), Treasury regulations issued thereunder and judicial and administrative interpretations thereof, each as of the date hereof, and all of which are subject to change, possibly with retroactive effect. There can be no assurance that the United

States Internal Revenue Service (the “**IRS**”) will not take a different position concerning the tax consequences of the purchase, ownership or disposition of the Notes or that any such position would not be sustained. This discussion does not address state, local, foreign or tax laws other than U.S. Federal income tax law. This discussion does not address all of the U.S. federal income tax consequences that may be relevant to a U.S. holder in light of such U.S. holder’s particular circumstances or to U.S. holders subject to special rules, such as banks, insurance companies and other financial institutions, certain U.S. expatriates or former long-term residents of the United States, dealers in securities, traders in securities that elect mark-to-market tax accounting, partnerships or other pass-through entities or persons holding the Notes through such entities, U.S. holders whose functional currency is not the U.S. dollar, tax-exempt organizations, regulated investment companies, real estate investment trusts, persons subject to alternative minimum tax or Medicare tax on net investment income, persons subject to special tax accounting rules as a result of any item of gross income with respect to the Notes being taken into account in an applicable financial statement, persons holding the Notes as part of a “straddle,” “hedge,” “conversion transaction” or other integrated transaction and persons deemed to sell Notes under the “constructive sale” provisions of the Code. In addition, this discussion is limited to U.S. holders (except that the discussion below regarding Foreign Account Tax Compliance applies to all holders) who purchase the Notes for cash at the price set forth in the applicable Pricing Supplement and who hold the Notes as capital assets (generally, property held for investment) for U.S. federal income tax purposes.

The following discussion only addresses Notes that (i) are denominated in U.S. dollars, (ii) provide for a fixed rate of interest, (iii) have a term to maturity exceeding one year but not more than 30 years, and (iv) are issued without (1) bond premium or (2) pre-issuance accrued interest, each as defined for U.S. federal income tax purposes. If we issue Notes that do not meet all of these conditions, the applicable Pricing Supplement will describe the U.S. federal income tax consequences relating to such Notes to the extent they differ from the consequences described below. Additionally, in certain circumstances, U.S. federal income tax consequences not discussed below may apply if the issue price of the Notes is payable in more than one instalment.

THIS SUMMARY IS NOT INTENDED TO CONSTITUTE A COMPLETE ANALYSIS OF ALL TAX CONSEQUENCES RELATING TO THE OWNERSHIP OF THE NOTES. PROSPECTIVE PURCHASERS OF THE NOTES SHOULD CONSULT THEIR OWN TAX ADVISORS CONCERNING THE TAX CONSEQUENCES OF THEIR PARTICULAR SITUATIONS.

For purposes of this discussion, a “U.S. holder” is a beneficial owner of a Note that is for U.S. federal income tax purposes: (i) an individual who is a citizen or resident of the United States; (ii) a corporation or any entity taxable as a corporation created or organized in or under the laws of the United States, any state thereof or the District of Columbia; (iii) an estate the income of which is subject to U.S. federal income taxation regardless of its source; or (iv) a trust if (A) a court within the United States is able to exercise primary supervision over the administration of the trust and one or more U.S. persons have the authority to control all substantial decisions of the trust or (B) it has made a valid election to be treated as a domestic trust.

If an entity that is classified as a partnership for U.S. federal income tax purposes holds Notes, the tax treatment of a partner in the partnership will generally depend upon the status of the partner and the activities of the partnership. Such partnerships and their partners should consult their tax advisors regarding the tax consequences of their particular situations.

Characterization of the Notes

The Direct Issuance Notes, when issued, are generally expected to be characterized as debt for U.S. tax purposes. By comparison, the characterization of the Guaranteed Notes as debt or equity for U.S. federal income tax purposes is not entirely clear. The Treasury Center, the Issuer of the Guaranteed Notes, owns only limited assets and no subsidiaries. Furthermore, in accordance with the terms of the Guaranteed Notes under the Indenture, the Guarantor’s obligations are limited to a Maximum Guaranteed Amount in respect of each Series of Guaranteed Notes. We intend to treat the Guaranteed Notes as debt for U.S. federal income tax purposes, and the following discussion assumes such treatment. However, there can be no assurance that the IRS or the courts would agree with such treatment. If the Guaranteed Notes were treated as equity, they could be treated as equity interests in a passive foreign investment company, which may result in adverse U.S. tax consequences to U.S. holders of the Guaranteed Notes.

In addition, with respect to both the Guaranteed Notes and the Direct Issuance Notes, we are required to pay additional amounts with respect to Thai taxes withheld on interest payments, subject to certain exceptions and limitations. In addition, under certain circumstances, we may be obligated to pay amounts in excess of the principal and interest on the Notes. The following discussion assumes that the additional amounts we are required

to pay will remain constant throughout the term of the Notes and that there is only a remote possibility that we will be required to pay different amounts. Based on such assumption, we believe that it is unlikely that the Notes will be treated as contingent payment debt instruments. However the IRS may not agree and may treat the Notes as contingent payment debt instruments. In such case, U.S. holders may be required to accrue interest at a rate higher than the yield to maturity and recognize ordinary income rather than capital gain upon a sale, exchange or redemption of the Notes. U.S. holders should consult their tax advisors regarding the potential application of the contingent payment debt instrument rules to the Notes and the tax consequences thereof.

Stated Interest and Original Issue Discount

Payments of stated interest on the Notes that constitutes “qualified stated interest” generally will be taxable to a U.S. holder as ordinary income at the time that such payments are received or accrued, in accordance with such U.S. holder’s method of accounting for U.S. federal income tax purposes. Stated interest payments on a Note that are unconditionally payable in cash at least annually at a single fixed rate would generally constitute “qualified stated interest.”

A Note will be treated as issued with OID if the excess of the Note’s “stated redemption price at maturity” over its issue price is greater than or equal to a *de minimis* amount (0.25% of the Note’s stated redemption price at maturity multiplied by the number of complete years to its maturity or, in the case of an installment obligation, the weighted average maturity date of the Note, as defined in the applicable Treasury Regulations). Generally, the issue price of a Note will be the first price at which a substantial amount of Notes included in the issue of which the Note is a part is sold for money to persons other than bond houses, brokers, or similar persons or organizations acting in the capacity of underwriters, placement agents, or wholesalers. The stated redemption price at maturity of a Note is the total of all payments provided by the Note that are not payments of qualified stated interest.

If the Notes are treated as issued with OID, U.S. holders must include OID in income as it accrues, using a constant-yield method generally before the receipt of cash attributable to the income, and generally will have to include in income increasingly greater amounts of OID over the life of the Notes. The amount of OID includible in income by a U.S. holder of a Note is the sum of the daily portions of OID with respect to the Note for each day during the taxable year or portion of the taxable year on which the U.S. holder holds the Note. The daily portion is determined by allocating to each day in any “accrual period” a pro rata portion of the OID allocable to that accrual period. Accrual periods with respect to a Note may be of any length and may vary in length over the term of the Note as long as (i) no accrual period is longer than one year and (ii) each scheduled payment of interest or principal on the Note occurs on either the final or first day of an accrual period. The amount of OID allocable to an accrual period equals the excess of (a) the product of the Note’s adjusted issue price at the beginning of the accrual period and the Note’s yield to maturity (determined on the basis of compounding at the close of each accrual period and properly adjusted for the length of the accrual period) over (b) the sum of the payments of qualified stated interest on the Note allocable to the accrual period. The “adjusted issue price” of a Note at the beginning of any accrual period is the issue price of the Note increased by (x) the amount of accrued OID for each prior accrual period and decreased by (y) the amount of any payments previously made on the Note that were not qualified stated interest payments.

It is expected that interest payments will be subject to Thai withholding taxes (see “—*Thai Taxation—Income Tax*”). Such Thai withholding taxes and any other non-U.S. tax withheld together with the gross amount of any additional amounts paid to a U.S. holder will also be included in such holder’s income at the time such amount is received or accrued in accordance with such holder’s method of accounting for U.S. federal income tax purposes. Any non-U.S. tax withheld on interest paid to a U.S. holder (taking into account any applicable income tax treaty) will, subject to limitations and conditions, be treated as foreign income tax eligible for credit against such holder’s U.S. federal income tax liability or, at such holder’s election, eligible for deduction in computing such holder’s U.S. federal taxable income. To the extent the amount of such non-U.S. withholding tax is based on a withholding rate in excess of the rate otherwise applicable to a U.S. holder (taking into account any applicable income tax treaty), such excess amount may not be eligible as foreign income tax eligible for credit or deduction in computing such holder’s U.S. federal income tax liability.

Interest income on a Note as well as any additional amounts and OID generally will constitute foreign source income and generally will be considered “passive category” income in computing the foreign tax credit allowable to U.S. holders under U.S. federal income tax laws. The rules relating to the treatment of non-U.S. taxes imposed on a U.S. holder and foreign tax credits are complex, and U.S. holders should consult their tax advisors about the impact of these rules in their particular situations.

Sale, Exchange and Redemption of Notes

Generally, upon the sale, exchange or redemption of a Note, a U.S. holder will recognize taxable gain or loss equal to the difference between the amount realized on the sale, exchange or redemption (less any amount attributable to accrued but unpaid qualified stated interest, which will be taxable as interest as described above) and such U.S. holder's tax basis in the Note. A U.S. holder's tax basis in a Note will generally equal the cost of the Note to such U.S. holder, increased by the amount of any OID included in the U.S. holder's income with respect to the Note and reduced by the amount of any payments that are not qualified stated interest payments. Such gain or loss generally will be capital gain or loss and will be long-term capital gain or loss if at the time of sale, exchange or redemption the Note has been held by such U.S. holder for more than one year. Such gain or loss will generally be U.S. source, subject to the potential applicability of the sourcing rules in the income tax treaty between the United States and Thailand. The deductibility of capital losses is subject to limitations. As described in "*—Thai Taxation*," gain from the sale of a Note may be subject to Thai tax in certain circumstances. U.S. holders should consult their tax advisors regarding the creditability of any such tax.

Information Reporting and Backup Withholding

Information returns may be filed with the IRS in connection with payments on, and accrued OID on, the Notes and the proceeds from a sale or other disposition of a Note. A U.S. holder may be subject to U.S. backup withholding on these payments and accruals of OID if it fails to provide its tax identification number to the paying agent and comply with certain certification procedures or otherwise establish an exemption from backup withholding. The amount of any backup withholding from a payment to a U.S. holder will be allowed as a credit against the holder's U.S. federal income tax liability and may entitle the holder to a refund, provided that the required information is timely furnished to the IRS.

Individuals who own "specified foreign financial assets" with an aggregate value in excess of specified thresholds are generally required to file an information report with respect to such assets with their tax returns. "Specified foreign financial assets" include any financial accounts maintained by foreign financial institutions, as well as securities issued by non-U.S. persons (e.g., the Notes), but only if they are not held in accounts maintained by certain financial institutions. Individuals required to file U.S. federal income tax returns are urged to consult their tax advisors regarding the application of this rule to their ownership of the Notes.

Foreign Account Tax Compliance

Pursuant to Section 1471 through 1474 of the Code (provisions commonly known as "**FATCA**"), a "foreign financial institution" may be required to withhold U.S. tax on certain "foreign passthru payments" to the extent such payments are treated as attributable to certain U.S.-source payments. Currently, the term "foreign passthru payment" is not defined and it is unclear whether or to what extent payments on the Notes would be considered foreign passthru payments, assuming the Company were treated as a foreign financial institution. Debt obligations issued on or prior to the date that is six months after the date on which applicable final Treasury Regulations defining "foreign passthru payment" are filed with the Federal Register generally would be "grandfathered" (and therefore not subject to withholding under FATCA) unless such obligations are materially modified after such date. If the Issuer or the Guarantor is treated as a foreign financial institution, FATCA is expected to apply to payments on the Notes only if there is a significant modification of the Notes for U.S. federal income tax purposes after the expiration of the grandfathering period.

Under proposed regulations, any FATCA withholding on foreign passthru payments on debt instruments that are not otherwise grandfathered would only apply to foreign passthru payments made on or after the date that is two years after the date on which final regulations are published in the Federal Register defining foreign passthru payments. Taxpayers generally may rely on these proposed regulations until final regulations are issued. In the event any FATCA withholding is imposed with respect to any payments on the Notes, there will be no Additional Amounts payable to compensate for the withheld amount.

Certain non-U.S. governments (including Thailand) have entered into intergovernmental agreements with the United States to implement FATCA in a manner that may alter the rules described herein. Under such intergovernmental agreements, the Company may be required to report certain information regarding investors to non-U.S. tax authorities, which information may be shared with taxing authorities in the United States. Holders should consult their tax advisors on any applicable intergovernmental agreements and how these rules may apply to their investment in the Notes.

CLEARANCE AND SETTLEMENT

The information set out below is subject to any change in or reinterpretation of the rules, regulations and procedures of DTC, Euroclear or Clearstream (together, the “**Clearing Systems**”) currently in effect. The information in this section concerning the Clearing Systems has been obtained from sources that the Issuers and the Guarantor believe to be reliable, but none of the Issuers, the Guarantors or any Dealer takes any responsibility for the accuracy thereof. Investors wishing to use the facilities of any of the Clearing Systems are advised to confirm the continued applicability of the rules, regulations and procedures of the relevant Clearing System. The Issuers will not have any responsibility or liability for any aspect of the records relating to, or payments made on account of, beneficial ownership interests in the Notes held through the facilities of any Clearing System or for maintaining, supervising or reviewing any records relating to such beneficial ownership interests.

The Clearing Systems

DTC

DTC has advised us that it is a limited purpose trust company organized under the New York Banking Law, a “banking organization” within the meaning of the New York Banking Law, a “clearing corporation” within the meaning of the New York Uniform Commercial Code and a “clearing agency” registered pursuant to Section 17A of the Exchange Act. DTC holds securities that its participants (“**Participants**”) deposit with DTC. DTC also facilitates the clearance and settlement among Participants of securities transactions, such as transfers and pledges, in deposited securities through electronic computerized book-entry changes in Participants’ accounts, thereby eliminating the need for physical movement of securities certificates. DTC is owned by a number of its direct participants (“**Direct Participants**”), which include securities brokers and dealers, banks, trust companies, clearing corporations and certain other organizations. Access to the DTC System is also available to others such as securities brokers and dealer, banks and trust companies that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly (“**Indirect Participants**”).

Under the rules, regulations and procedures creating and affecting DTC and its operations (the “**Rules**”), DTC makes book-entry transfers of Notes among Direct Participants on whose behalf it acts with respect to Notes accepted into DTC’s book-entry settlement system (“**DTC Notes**”) as described below and receives and transmits distributions of principal and interest on DTC Notes. The Rules are on file with the U.S. Securities and Exchange Commission. Direct Participants and Indirect Participants with which beneficial owners of DTC Notes (“**Owners**”) have accounts with respect to the DTC Notes similarly are required to make book-entry transfers and receive and transmit such payments on behalf of their respective Owners. Accordingly, although Owners who hold DTC Notes through Direct Participants or Indirect Participants will not possess Notes, the Rules, by virtue of the requirements described above, provide a mechanism by which Direct Participants will receive payments and will be able to transfer their interest in respect of the DTC Notes.

Purchases of DTC Notes under the DTC system must be made by or through Direct Participants, which will receive a credit for the DTC Notes on DTC’s records. The ownership interest of each actual purchaser of each DTC Note (“**Beneficial Owner**”) is in turn to be recorded on the Direct and Indirect Participant’s records. Beneficial Owners will not receive written confirmation from DTC of their purchase, but Beneficial Owners are expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the DTC Notes are to be accomplished by entries made on the books of Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in DTC Notes, except in the event that use of the book-entry system for the DTC Notes is discontinued.

To facilitate subsequent transfers, all DTC Notes deposited by Participants with DTC are registered in the name of DTC’s partnership nominee, Cede & Co. The deposit of DTC Notes with DTC and their registration in the name of Cede & Co. effect no change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the DTC Notes; DTC’s records reflect only the identity of the Direct Participants to whose accounts such DTC Notes are credited, which may or may not be the Beneficial Owners. The Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time.

Redemption notices shall be sent to Cede & Co. If less than all of the DTC Notes within an issue are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such issue to be redeemed.

Neither DTC nor Cede & Co. will consent or vote with respect to DTC Notes. Under its usual procedures, DTC mails an Omnibus Proxy to the relevant Issuer as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the DTC Notes are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal and interest payments on the DTC Notes will be made to DTC. DTC's practice is to credit Direct Participants' accounts on the due date for payment in accordance with their respective holdings shown on DTC's records unless DTC has a reason to believe that it will not receive payment on the due date. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities registered in "street name," and will be the responsibility of such Participant and not of DTC, the Issuers, or the Guarantor subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of principal and interest to DTC is the responsibility of the relevant Issuer (failing which, in the case of Guaranteed Notes, the Guarantor), disbursement of such payments to Direct Participants is the responsibility of DTC, and disbursement of such payments to the Beneficial Owners is the responsibility of Direct and Indirect Participants.

Under certain circumstances, including if there is an Event of Default under the Notes, DTC will exchange the DTC Notes for definitive Notes, which it will distribute to its Participants in accordance with their proportionate entitlements and which, if representing interests in a Rule 144A Global Certificate, will be legended as set forth under "*Transfer Restrictions*."

Since DTC may only act on behalf of Direct Participants, who in turn act on behalf of Indirect Participants, any Owner desiring to pledge DTC Notes to persons or entities that do not participate in DTC, or otherwise take actions with respect to such DTC Notes, will be required to withdraw its Notes from DTC as described below.

Euroclear and Clearstream

Euroclear and Clearstream each hold securities for its customers and facilitate the clearance and settlement of securities transactions by electronic book-entry transfer between their respective account holders. Euroclear and Clearstream provide various services including safekeeping, administration, clearance and settlement of internationally traded securities and securities lending and borrowing. Euroclear and Clearstream also deal with domestic securities markets in several countries through established depository and custodial relationships. Euroclear and Clearstream have established an electronic bridge between their two systems across which their respective participants may settle trades with each other.

Euroclear and Clearstream customers are world-wide financial institutions, including underwriters, securities brokers and dealers, banks, trust companies and clearing corporations. Indirect access to Euroclear and Clearstream is available to other institutions that clear through or maintain a custodial relationship with an account holder of either system.

Book-entry Ownership of and Payments in respect of DTC Notes

The relevant Issuer may apply to DTC in order to have any Series of Notes represented by a Global Note Certificate accepted in its book-entry settlement system. Upon the issue of any such Global Note Certificate, DTC or its custodian will credit, on its internal book-entry system, the respective nominal amounts of the individual beneficial interests represented by such Global Note Certificate to the accounts of persons who have accounts with DTC. Such accounts initially will be designated by or on behalf of the relevant Dealer. Ownership of beneficial interests in such a Global Note Certificate will be limited to Direct Participants or Indirect Participants, including, in the case of any Regulation S Global Note, the respective depositories of Euroclear and Clearstream. Ownership of beneficial interests in a Global Note Certificate accepted by DTC will be shown on, and the transfer of such ownership will be effected only through, records maintained by DTC or its nominee (with respect to the interests of Direct Participants) and the records of Direct Participants (with respect to interests of Indirect Participants).

Payments in U.S. dollars of principal and interest in respect of a Global Note Certificate accepted by DTC will be made to the order of DTC or its nominee as the registered holder of such Note. In the case of any

payment in a currency other than U.S. dollars, payment will be made to the Exchange Agent on behalf of DTC or its nominee and the Exchange Agent will (in accordance with instructions received by it) remit all or a portion of such payment for credit directly to the beneficial holders of interests in the Global Note Certificate in the currency in which such payment was made and/or cause all or a portion of such payment to be converted into U.S. dollars and credited to the applicable Participants' account.

The Issuers expect DTC to credit accounts of Direct Participants on the applicable payment date in accordance with their respective holdings as shown in the records of DTC unless DTC has reason to believe that it will not receive payment on such payment date. The Issuers also expect that payments by Participants to beneficial owners of Notes will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers, and will be the responsibility of such Participant and not the responsibility of DTC, the Principal Paying Agent, the Registrar, the Issuers or the Guarantor. Payment of principal, premium, if any, and interest, if any, on Notes to DTC is the responsibility of the relevant Issuer (failing which, in the case of Guaranteed Notes, the Guarantor).

Transfers of Notes Represented by Global Notes Certificate

Transfers of any interests in Notes represented by a Global Note Certificate within DTC, Euroclear and Clearstream will be effected in accordance with the customary rules and operating procedures of the relevant clearing system. The laws in some States within the United States require that certain persons take physical delivery of securities in definitive form. Consequently, the ability to transfer Notes represented by a Global Note Certificate to such persons may depend upon the ability to exchange such Notes for Notes in definitive form. Similarly, because DTC can only act on behalf of Direct Participants in the DTC system who in turn act on behalf of Indirect Participants, the ability of a person having an interest in Notes represented by a Global Note Certificate accepted by DTC to pledge such Notes to persons or entities that do not participate in the DTC system or otherwise to take action in respect of such Notes may depend upon the ability to exchange such Notes for Notes in definitive form. The ability of any holder of Notes represented by a Global Note Certificate accepted by DTC to resell, pledge or otherwise transfer such Notes may be impaired if the proposed transferee of such Notes is not eligible to hold such Notes through a direct or indirect participant in the DTC system.

Subject to compliance with the transfer restrictions applicable to the Notes described under “*Transfer Restrictions*,” cross-market transfers between DTC, on the one hand, and directly or indirectly through Clearstream or Euroclear accountholders, on the other, will be effected by the relevant clearing system in accordance with its rules and through action taken by the Registrar, the Paying Agent and the DTC Custodian with whom the relevant Notes have been deposited.

On or after the Issue Date for any Series, transfers of Notes of such Series between accountholders in Clearstream and Euroclear and transfers of Notes of such Series between Participants in DTC will generally have a settlement date three business days after the trade date (T+3). The customary arrangements for delivery versus payment will apply to such transfers.

Cross-market transfers between accountholders in Clearstream or Euroclear and DTC participants will need to have an agreed settlement date between the parties to such transfer. Because there is no direct link between DTC, on the one hand, and Clearstream and Euroclear, on the other, transfers of interests in the relevant Registered Global Notes will be effected through the Registrar, the Paying Agent and the DTC Custodian receiving instructions (and, where appropriate, certification) from the transferor and arranging for delivery of the interests being transferred to the credit of the designated account for the transferee. In the case of cross-market transfers, settlement between Euroclear or Clearstream accountholders and DTC participants cannot be made on a delivery versus payment basis. The securities will be delivered on a free delivery basis and arrangements for payment must be made separately.

DTC, Clearstream and Euroclear have each published rules and operating procedures designed to facilitate transfers of beneficial interests in Notes among participants and accountholders of DTC, Clearstream and Euroclear. However, they are under no obligation to perform or continue to perform such procedures, and such procedures may be discontinued or changed at any time. None of the Issuers, the Guarantor, the Agents or any Dealer will be responsible for any performance by DTC, Clearstream or Euroclear or their respective direct or indirect participants or accountholders of their respective obligations under the rules and procedures governing their operations and none of them will have any liability for any aspect of the records relating to or payments made on account of beneficial interests in the Notes represented by Global Notes Certificate or for maintaining, supervising or reviewing any records relating to such beneficial interests.

SUBSCRIPTION AND SALE

Summary of Dealer Agreement

The Dealers have, in an amended and restated dealer agreement dated October 3, 2019 (the “**Dealer Agreement**”), agreed with the Issuers and the Guarantor a basis upon which they or any of them may from time to time agree to severally, and not jointly, purchase Notes. Any such agreement will extend to those matters stated under “*Form of the Notes*” and “*Terms and Conditions of the Notes*.” The relevant Issuer will pay each relevant Dealer a commission as agreed between them in respect of Notes purchased by it. Where the relevant Issuer agrees to sell to the Dealer(s), who agree to purchase and pay for, or to procure purchasers to purchase and pay for, Notes at an issue price (the “**Issue Price**”), any subsequent offering of those Notes to investors may be at a price different from such Issue Price. The Issuers are responsible for the payment of certain of the expenses incurred in connection with the establishment, and maintenance of the Program and certain other activities in connection with the Program. The commissions in respect of an issue of Notes on a syndicated basis may be stated in the relevant Pricing Supplement.

The Issuers and the Guarantor have agreed to indemnify the Dealers against certain liabilities in connection with the offer and sale of the Notes. The Dealer Agreement entitles the Dealers to terminate any agreement that they make to purchase Notes in certain circumstances prior to payment for such Notes being made to the Issuer.

In connection with the issue of any Series of Notes, the Stabilizing Manager may over-allot Notes or effect transactions with a view to supporting the price of the Notes at a level higher than that which might otherwise prevail for a limited period after the issue date of the Notes. However, there is no obligation on such Stabilizing Manager(s) to do this. Such stabilizing, if commenced, may be discontinued at any time, and must be brought to an end after a limited period. Such stabilizing shall be in compliance with all applicable laws, regulations and rules.

In connection with each Series of Notes issued under the Program, the Dealers or certain of their affiliates may purchase Notes and be allocated Notes for asset management and/or proprietary purposes but not with a view to distribution. Further, the Dealers or their respective affiliates may purchase Notes for its or their own account and enter into transactions, including credit derivatives, such as asset swaps, repackaging and credit default swaps relating to such Notes and/or other securities of the Issuers, the Guarantor or their respective subsidiaries or affiliates at the same time as the offer and sale of each Series of Notes or in secondary market transactions. Such transactions would be carried out as bilateral trades with selected counterparties and separately from any existing sale or resale of the Series of Notes to which a particular Pricing Supplement relates (notwithstanding that such selected counterparties may also be purchasers of such Series of Notes).

The Dealers and their affiliates are full service financial institutions engaged in various activities which may include securities trading, commercial and investment banking, financial advice, investment management, principal investment, hedging, financing and brokerage activities. Each of the Dealers may have engaged in, and may in the future engage in, investment banking and other commercial dealings in the ordinary course of business with the Issuers, the Guarantor or their subsidiaries, joint ventures or associated companies from time to time. In the ordinary course of their various business activities, the Dealers and their affiliates may make or hold (on their own account, on behalf of clients or in their capacity of investment advisers) a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments and enter into other transactions, including credit derivatives (such as asset swaps, repackaging and credit default swaps) in relation thereto. Such transactions, investments and securities activities may involve securities and instruments of the Issuers, the Guarantor or their subsidiaries, joint ventures or associated companies, including Notes issued under the Program, may be entered into at the same time or proximate to offers and sales of Notes or at other times in the secondary market and be carried out with counterparties that are also purchasers, holders or sellers of Notes. Notes issued under the Program may be purchased by or be allocated to any Dealer or an affiliate for asset management and/or proprietary purposes but not with a view to distribution.

If a jurisdiction requires that the offering be made by a licensed broker or dealer and a Dealer or any affiliate of that Dealer is a licensed broker or dealer in that jurisdiction, the offering shall be deemed to be made by that Dealer or such affiliate on behalf of the relevant Issuer (as defined in this Offering Memorandum) in such jurisdiction.

Selling Restrictions

United States of America

The Notes have not been and will not be registered under the Securities Act and may not be offered or sold within the United States or to, or for the account or benefit of, U.S. persons (as defined in Regulation S) except pursuant to an exemption from, or in a transaction not subject to, the registration requirements of the Securities Act.

Compliance with United States securities laws

(a) *Offers/sales only in accordance with Regulation S:* In relation to each Tranche of Notes issued in reliance on Regulation S under the Securities Act:

(i) the Notes and the Guarantee have been offered and sold, and will be offered and sold:

(A) as part of their distribution, at any time; and

(B) *otherwise*, until 40 days after the issue date in respect of the relevant Notes (the period described herein as “**distribution compliance period**”);

only in accordance with Rule 903 of Regulation S under the Securities Act and, accordingly, that

(A) neither it nor any of its affiliates (including any person acting on behalf of a Dealer or any of its affiliates) has engaged or will engage in any directed selling efforts with respect to the Notes and the Guarantee; and

(B) it and its affiliates have complied and will comply with Regulation S under the Securities Act; and

(ii) *Prescribed form of confirmation:* At or prior to confirmation of sale, each distributor, dealer or person receiving a selling concession, fee or other remuneration which purchases Notes from a Dealer during the distribution compliance period will receive a confirmation or notice in substantially the following form:

“The Securities covered hereby have not been and will not be registered under the United States Securities Act of 1933, as amended, (the “**Securities Act**”) and may not be offered or sold within the United States or to, or for the account or benefit of, U.S. persons (as defined in Regulation S), (a) as part of their distribution at any time or (b) otherwise until 40 days after the completion of the distribution of the Tranche of Notes of which such Notes are a part, as determined by [Name of Dealer or Dealers, as the case may be], except in either case pursuant to a valid exemption from registration in accordance with Regulation S or Rule 144A under the Securities Act.”;

(iii) *Completion of distribution:* Each Dealer, which has purchased Notes of such Tranche in accordance with the related subscription agreement, shall determine and certify to the Principal Paying Agent or the Issuer the completion of the distribution of the Notes of such Tranche purchased by it. In the case of a subscription agreement between the relevant Issuer, (in respect of each Series of Guaranteed Notes) the Guarantor and more than one Dealer, the Principal Paying Agent, the relevant Issuer or (in respect of each Series of Guaranteed Notes) the Guarantor shall notify each relevant Dealer when all relevant Dealers have certified as provided in this paragraph. In order to facilitate compliance by each Dealer with the foregoing, the Issuers and (in respect of each Series of Guaranteed Notes) the Guarantor undertake that, prior to such certification with respect to such Tranche, it will notify each Dealer in writing of each acceptance by the relevant Issuer of an offer to purchase and of any issuance of, Notes or other debt obligations of the relevant Issuer which are denominated in the same currency or composite currency and which have substantially the same interest rate and maturity date as the Notes of such Tranche;

- (b) In relation to each Tranche of Notes issued in reliance on Rule 144A under the Securities Act:
- (i) each Dealer may directly or through their respective affiliates arrange for the placing of Restricted Notes in the United States to qualified institutional buyers (as *defined* in Rule 144A under the Securities Act) pursuant to Rule 144A under the Securities Act and in accordance with the provisions of the Dealer Agreement, provided that each person to whom Restricted Notes are offered or sold is, or such Dealer reasonably believes each such person to be a qualified institutional buyer as defined under Rule 144A and a qualified purchaser as defined under the U.S. Investment Company Act purchasing for its own account or for the account of a qualified institutional buyer as defined under Rule 144A and a qualified purchaser as defined under the U.S. Investment Company Act and provided further that the aggregate principal amount of Restricted Notes sold by such Dealer to each qualified institutional buyer and qualified purchaser pursuant to this paragraph is not less than US\$200,000 (or its equivalent in other currencies). In addition, the affiliate through which the mandated Dealer arranges for the placing of Restricted Notes in the United States or (as the case may be) such other Dealer or its affiliate shall be a U.S. broker-dealer that is registered under the Exchange Act;
 - (ii) neither the Issuer nor the Guarantor have been, and they will not be, registered under the U.S. Investment Company Act, and investors will not be entitled to the benefits of the U.S. Investment Company Act. The Issuer is relying on the exemption from the registration requirements of the U.S. Investment Company Act provided by Section 3(c)(7) of that Act, and as a result the Notes may only be purchased within the United States by persons who are both qualified institutional buyers as defined in Rule 144A and qualified purchasers as defined in the U.S. Investment Company Act; and
 - (iii) no Dealer nor any of its affiliates (including any person acting on behalf of such Dealer or any of its affiliates) has solicited or will solicit any offer to buy or offer to sell the Notes by any form of general solicitation or general advertising (as those terms are used in Rule 502(c) under the Securities Act) in the United States.

Interpretation

Terms used in the paragraph “*Compliance with United States securities laws*” have the meanings given to them by Regulation S under the Securities Act.

Index-, commodity- or currency-linked Notes

Each issuance of index-, commodity- or currency-linked Notes shall be subject to additional U.S. selling restrictions.

European Economic Area

Unless the Pricing Supplement in respect of any Notes specifies the “Prohibition of Sales to EEA Retail Investors” as “Not Applicable”, each Dealer has represented and agreed, and each further Dealer appointed under the Program will be required to represent and agree, that it will not have offered, sold or otherwise made available and will not offer, sell or otherwise make available any Notes which are the subject of the offering contemplated by the Offering Memorandum as completed by the Pricing Supplement in relation thereto to any retail investor in the European Economic Area. For the purposes of this provision:

- (a) the expression “**retail investor**” means a person who is one (or more) of the following:
 - (i) a retail client as defined in point (11) of Article 4(1) of Directive 2014/65/EU (as amended, “**MiFID II**”); or
 - (ii) a customer within the meaning of the Insurance Distribution Directive, where that customer would not qualify as a professional client as defined in point (10) of Article 4(1) of MiFID II; or
 - (iii) not a qualified investor as defined in the Prospectus Regulation; and

- (b) the expression an “**offer**” includes the communication in any form and by any means of sufficient information on the terms of the offer and the Notes to be offered so as to enable an investor to decide to purchase or subscribe the Notes.

If the Pricing Supplement in respect of any Notes specifies “Prohibition of Sales to EEA Retail Investors” as “Not Applicable”, in relation to each Member State of the European Economic Area (each an “EEA State”), each Dealer has represented and agreed, and each further Dealer appointed under the Programme will be required to represent and agree, that it has not made and will not make an offer of Notes which are the subject of an offering contemplated by this Offering Memorandum as completed by the Pricing Supplement in relation thereto to the public in that EEA State except that it may be made to the public in that EEA State:

- (a) *Approved prospectus*: If the Pricing Supplement in relation to the Notes specify that an offer of those Notes may be made other than pursuant to Article 1(4) of the Prospectus Regulation in that EEA State (a “**Non-exempt Offer**”), following the date of publication of a prospectus in relation to such Notes which has been approved by the competent authority in that EEA State or, where appropriate, approved in another EEA State and notified to the competent authority in that EEA State, provided that any such prospectus has subsequently been completed by the Pricing Supplement contemplating such Non-exempt Offer, in accordance with the Prospectus Regulation, in the period beginning and ending on the dates specified in such prospectus or Pricing Supplement, as applicable and the Issuer has consented in writing to its use for the purpose of that Non-exempt Offer;
- (b) *Qualified Investors*: At any time to any legal entity which is a qualified investor as defined in the Prospectus Regulation;
- (c) *Fewer than 150 offerees*: At any time to fewer than 150, natural or legal persons (other than qualified investors as defined in the Prospectus Regulation) subject to obtaining the prior consent of the relevant Dealer or Dealers nominated by the Issuer for any such offer; or
- (d) *Other exempt offers*: At any time in any other circumstances falling within Article 1(4) of the Prospectus Regulation.

provided that no such offer of Notes referred to in (b) to (d) above shall require the Issuer or any Dealer to publish a prospectus pursuant to Article 3 of the Prospectus Regulation or supplement a prospectus pursuant to Article 23 of the Prospectus Regulation.

United Kingdom

- (a) *No deposit-taking*: in relation to any Notes having a maturity of less than one year:
 - (i) each Dealer shall be a person whose ordinary activities involve it in acquiring, holding, managing or disposing of investments (as principal or agent) for the purposes of its business; and
 - (ii) Notes may only be sold to persons:
 - (A) whose ordinary activities involve them in acquiring, holding, managing or disposing of investments (as principal or agent) for the purposes of their businesses; or
 - (B) who it is reasonable to expect will acquire, hold, manage or dispose of investments (as principal or agent) for the purposes of their businesses, where the issue of the Notes would otherwise constitute a contravention of Section 19 of the FSMA by the Issuers or the Guarantor.
- (b) *Financial promotion*: No communication or invitation or inducement to engage in investment activity (within the meaning of section 21 of the FSMA) in connection with the issue or sale of any Notes will be made in circumstances in which section 21(1) of the FSMA does not apply to the Issuers or the Guarantor.
- (c) *General compliance*: all applicable provisions of the FSMA with respect to anything done by it in relation to any Notes in, from or otherwise involving the United Kingdom shall be complied with.

PRC

No Notes may be offered or sold in the PRC (excluding Hong Kong, Macau and Taiwan) as part of the initial distribution of the Notes.

Hong Kong

In relation to each Series of Notes to be issued by an Issuer under the Program:

- (a) no Notes may be offered or sold in Hong Kong, by means of any document, except for Notes which are a “structured product” as defined in the Securities and Futures Ordinance (Cap. 571) of Hong Kong (the “SFO”), other than (i) to “professional investors” as defined in the SFO and any rules made under the SFO; or (ii) in other circumstances which do not result in the document being a “prospectus” as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32 of the Laws of Hong Kong) (the “**Companies Ordinance**”) or which do not constitute an offer to the public within the meaning of the Companies Ordinance; and
- (b) no person may have in its possession for the purposes of issue, whether in Hong Kong or elsewhere, any advertisement, invitation or document relating to the Notes, which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to Notes which are or are intended to be disposed of only to persons outside Hong Kong or only to “professional investors” as defined in the SFO and any rules made under the SFO.

Japan

The Notes have not been and will not be registered under the Financial Instruments and Exchange Act of Japan (Act no. 25 of 1948, as amended) (the “**Financial Instruments and Exchange Act**”). Accordingly, no Notes to be issued by an Issuer under this Program will, directly or indirectly, be offered or sold in Japan or to, or for the benefit of, any resident of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan) or to others for re-offering or re-sale, directly or indirectly, in Japan or to, or for the benefit of, any resident of Japan except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Act and any other relevant laws and regulations of Japan.

Singapore

Each Dealer has acknowledged and each further Dealer appointed under the Program will be required to acknowledge that this Offering Memorandum has not been and will not be registered as a prospectus with the Monetary Authority of Singapore. Accordingly, each Dealer has represented, warranted and agreed that, and each further Dealer appointed under the Program will be required to represent, warrant and agree that it has not offered or sold any Notes or caused the Notes to be made the subject of an invitation for subscription or purchase and will not offer or sell any Notes or cause the Notes to be made the subject of an invitation for subscription or purchase and has not circulated or distributed, nor will it circulate or distribute, this Offering Memorandum and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the Notes, whether directly or indirectly, to any person in Singapore other than (i) to an institutional investor (as defined in Section 4A of the Securities and Futures Act (Chapter 289 of Singapore) (the “SFA”)) pursuant to Section 274 of the SFA, (ii) to a relevant person (as defined in Section 275(2) of the SFA) pursuant to Section 275(1) of the SFA, or any person pursuant to Section 275(1A) of the SFA, and in accordance with the conditions specified in Section 275 of the SFA and (in the case of an accredited investor) Regulation 3 of the Securities and Futures (Classes of Investors) Regulations 2018, or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the Notes are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

- (a) a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or

- (b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

securities or securities-based derivatives contracts (each term as defined in Section 2(1) of the SFA) of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired the Notes pursuant to an offer made under Section 275 of the SFA except:

- (i) to an institutional investor or to a relevant person defined in the SFA, or to any person arising from an offer referred to in Section 275(1A) or Section 276(4)(i)(B) of the SFA;
- (ii) where no consideration is or will be given for the transfer;
- (iii) where the transfer is by operation of law;
- (iv) as specified in Section 276(7) of the SFA; or
- (v) as specified in Regulation 37A of the Securities and Futures (Offers of Investments) (Securities and Securities-based Derivatives Contracts) Regulations 2018 of Singapore.

Thailand

(i) No Notes may be offered or sold, whether directly or indirectly, in Thailand; (ii) no person will make, whether directly or indirectly, any invitation in Thailand to subscribe for the Notes; and (iii) no person will circulate or distribute this Offering Memorandum or any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of Notes, whether directly or indirectly, in Thailand.

General

These selling restrictions may be modified by the agreement of each of the Issuers, the Guarantor and the Dealers following a change in a relevant law, regulation or directive. Any such modification will be set out in the relevant Pricing Supplement issued in respect of the issue of the Notes to which it relates or in a supplement to this Offering Memorandum.

TRANSFER RESTRICTIONS

Thailand

By accepting delivery of this Offering Memorandum and the Notes, the holders of the Notes will be deemed to have agreed for the benefit of the Issuers and the Guarantor that the Notes may not, either directly or indirectly, be resold, pledged, transferred or otherwise in Thailand.

United States

The Notes may not be offered or sold within the United States or to, or for the account or benefit of, U.S. persons (as defined in Regulation S) except (i) in reliance on Rule 144A to persons who are both qualified institutional buyers and qualified purchasers and (ii) outside the United States to non-U.S. persons in offshore transactions in reliance on Regulation S. Regulation S Notes

Each purchaser of or Unrestricted Notes outside the United States pursuant to Regulation S and each subsequent purchaser of such Notes in resales prior to the expiration of the distribution compliance period, by accepting delivery of this Offering Memorandum and the Notes, will be deemed to have represented, agreed and acknowledged that:

- (i) it is, or at the time Notes are purchased will be, the beneficial owner of such Notes and:
 - (a) it is not a U.S. person and it is located outside the United States (within the meaning of Regulation S); andit is not an affiliate of the Issuers, the Guarantor or a person acting on behalf of such an affiliate;
- (ii) it understands that such Notes have not been and will not be registered under the Securities Act and that, prior to the expiration of the distribution compliance period (as defined in Regulation S) it will not offer, sell, pledge or otherwise transfer such Notes except:
 - (a) in an offshore transaction in accordance with Rule 903 or Rule 904 of Regulation S; or
 - (b) to the Issuers or the Guarantor; or,
 - (c) in the case of Unrestricted Notes only, in accordance with Rule 144A to a person that it and any person acting on its behalf reasonably believe is a both a QIB and a QP purchasing for its own account or the account of a person that is both a QIB and a QP,in each case in accordance with any applicable securities laws of any state of the United States;
- (iii) it understands that the Issuers, the Guarantor, the Principal Paying Agent, the Registrar, the Dealers and their affiliates, and others will rely upon the truth and accuracy of the foregoing acknowledgements, representations and agreements.

On or prior to the fortieth day after the relevant issue date, Notes represented by an interest in an Unrestricted Global Note Certificate may be transferred to a person who wishes to hold such Notes in the form of an interest in a Restricted Global Note Certificate only upon receipt by the Registrar of a written certification from the transferor to the effect that such transfer is being made to a person whom the transferor reasonably believes is both a QIB and a QP, in a transaction meeting the requirements of Rule 144A and in accordance with any applicable securities laws of any state of the United States. After such fortieth day, such certification requirements will no longer apply to such transfers, but such transfers will continue to be subject to the transfer restrictions contained in the legend appearing on the face of such Global Note Certificate, as described above under “*Form of the Notes*.”

Notes represented by an interest in a Restricted Global Note Certificate may also be transferred to a person who wishes to hold such Notes in the form of an interest in an Unrestricted Global Note Certificate, but only upon receipt by the Registrar of a written certification from the transferor to the effect that such transfer is being made in accordance with Regulation S or Rule 144 (if available) under the Securities Act.

Any interest in a Note represented by an Unrestricted Global Note Certificate that is transferred to a person who takes delivery in the form of an interest in a Note represented by a Restricted Global Note Certificate will, upon transfer, cease to be an interest in a Note represented by an Unrestricted Global Note Certificate and become an interest in a Note represented by a Restricted Global Note Certificate and, accordingly, will thereafter be subject to all transfer restrictions and other procedures applicable to Notes represented by a Restricted Global Note Certificate.

Rule 144A Notes

Each purchaser of Restricted Notes in reliance on Rule 144A, by accepting delivery of this Offering Memorandum, will be deemed to have represented, agreed and acknowledged as follows (terms used in the following paragraphs that are defined in Rule 144A have the respective meanings given to them in Rule 144A):

- (i) the purchaser is both (a) a QIB and a QP, (b) acquiring the Notes for its own account or for the account of one or more persons who are both a QIB and a QP, (c) not formed for the purpose of investing in the Notes or the relevant Issuer and (d) is aware, and each beneficial owner of such Notes has been advised that the sale of the Notes to it is being made in reliance on Rule 144A;
- (ii) the purchaser understands that (1) the Notes have not been and will not be registered under the Securities Act and may not be offered, sold, pledged or otherwise transferred except (a) in accordance with Rule 144A to a person that it, and any person acting on its behalf, reasonably believes is both a QIB and a QP purchasing for its own account or for the account of one or more persons who are both a QIBs and a QP, (b) in an offshore transaction in accordance with Rule 903 or Rule 904 of Regulation S under the Securities Act, (c) pursuant to an exemption from registration under the Securities Act provided by Rule 144 thereunder (if available), (d) pursuant to an effective registration statement under the Securities Act or (e) to the Issuers, the Guarantor or any of their affiliates, in each case in accordance with any applicable securities laws of any State of the United States and (2) it will, and each subsequent holder of the Restricted Notes is required to, notify any purchaser of the Restricted Notes from it of the resale restrictions applicable to the Restricted Notes;
- (iii) the purchaser understands that the Restricted Global Note Certificate and any restricted Individual Note Certificate (a “**Restricted Individual Note Certificate**”) will bear a legend to the following effect, unless the relevant Issuer determines otherwise in accordance with applicable law:

THE NOTES REPRESENTED HEREBY HAVE NOT BEEN AND WILL NOT BE REGISTERED UNDER THE UNITED STATES SECURITIES ACT OF 1933, AS AMENDED (THE “**SECURITIES ACT**”) OR ANY SECURITIES LAW OF ANY STATE OF THE UNITED STATES. THE HOLDER HEREOF, BY PURCHASING THE NOTES REPRESENTED HEREBY, AGREES FOR THE BENEFIT OF THE ISSUER [AND THE GUARANTOR] THAT THE NOTES REPRESENTED HEREBY MAY BE REOFFERED, RESOLD, PLEDGED OR OTHERWISE TRANSFERRED ONLY IN COMPLIANCE WITH THE SECURITIES ACT AND OTHER APPLICABLE LAWS. AND ONLY (1) PURSUANT TO RULE 144A UNDER THE SECURITIES ACT TO A PERSON THAT THE HOLDER REASONABLY BELIEVES IS BOTH A QUALIFIED INSTITUTIONAL BUYER WITHIN THE MEANING OF RULE 144A AND A “QUALIFIED PURCHASER” (AS DEFINED IN SECTION 2(A)(51) OF THE U.S. INVESTMENT COMPANY ACT OF 1940, AS AMENDED) PURCHASING FOR ITS OWN ACCOUNT OR A PERSON PURCHASING FOR THE ACCOUNT OF A QUALIFIED INSTITUTIONAL BUYER WHOM THE HOLDER HAS INFORMED, IN EACH CASE, THAT THE REOFFER, RESALE, PLEDGE OR OTHER TRANSFER IS BEING MADE IN RELIANCE ON RULE 144A, (2) IN AN OFFSHORE TRANSACTION IN ACCORDANCE WITH RULE 903 OR 904 OF REGULATION S UNDER THE SECURITIES ACT OR (3) TO THE ISSUER, [THE GUARANTOR] OR [ITS/THEIR] AFFILIATES.

- (iv) if it is acquiring any Notes for the account of one or more persons who are both a QIB and a QP, the purchaser represents that it has sole investment discretion with respect to each such account and that it has full power to make the foregoing acknowledgements, representations and agreements on behalf of each such account; and

- (v) the purchaser understands that the Issuers, the Guarantor, the Principal Paying Agent, the Registrar, the Dealers and their affiliates, and others will rely upon the truth and accuracy of the foregoing acknowledgements, representations and agreements.

By purchasing or accepting a subsequent transfer of Notes (or a beneficial interest therein), you will be deemed to have made the following acknowledgements, representations to and agreements with the Company:

- (i) if you are a U.S. person (as defined in Regulation S), you represent that:
 - (A) you are not a broker-dealer who owns and invests on a discretionary basis less than U.S.\$25,000,000 in securities of unaffiliated issuers;
 - (B) you are not a participant-directed employee plan, such as a 401(k) plan, or a trust holding the assets of such a plan;
 - (C) you were not formed, reformed or recapitalized for the specific purpose of investing in the Notes and/or other securities of the Issuer, unless all of the beneficial owners of your securities are both QIBs and QPs;
 - (D) if you are an investment company excepted from the U.S. Investment Company Act pursuant to Section 3(c)(1) or Section 3(c)(7) thereof and were formed on or before April 30, 1996, you have received the consent of your beneficial owners who acquired their interests on or before April 30, 1996, with respect to your treatment as a qualified purchaser in the manner required by Section 2(a)(51)(C) of the U.S. Investment Company Act and the rules promulgated thereunder;
 - (E) you are not a partnership; common trust fund; or corporation, special trust, pension fund or retirement plan, or other entity, in which the partners, beneficiaries, beneficial owners, participants, shareholders or other equity owners, as the case may be, may designate the particular investment to be made, or the allocation thereof, unless all such partners, beneficiaries, beneficial owners, participants, shareholders or other equity owners are both QIBs and QPs; and
 - (F) you have not invested more than 40% of your assets in the Notes (or beneficial interests therein) and/or other securities of the Issuer after giving effect to the purchase of the Notes (or beneficial interests therein) (unless all of the beneficial owners of your securities are both QIBs and QPs).
- (ii) you understand and acknowledge that the Notes (or any interest therein) may be purchased, sold, pledged or otherwise transferred only in minimum principal amounts of U.S.\$200,000 and integral multiples of U.S.\$1,000 in excess thereof; and
- (iii) you understand and acknowledge that if your purchase of the Notes, or any sale or transfer of the Notes (or a beneficial interest therein) to any other person, does not comply with the requirements set forth in these "Transfer Restrictions," such transaction may, at the discretion of the Issuer, be considered void and of no effect. The Issuer may compel you or such other person to sell or transfer, as applicable, such Notes (or such beneficial interest), within 30 days after notice of the sale requirement is given, to a person acceptable to the Issuer who is able to, and who does make, all of the representations and agreements set forth herein. If you fail to effect the sale or transfer, as applicable, within such 30-day period, the Issuer has the right, without further notice to you, to compel you to sell or transfer, as applicable, such Notes (or such beneficial interest) to a purchaser selected by the Issuer who meets the requirements set forth hereunder on such terms as the Issuer may choose. The Issuer may select the purchaser by soliciting one or more bids from one or more brokers or other market professionals that regularly deal in securities similar to the Notes, and selling such Notes to the highest such bidder. However, the Issuer may select a purchaser by any other means determined by the Issuer in its sole discretion.

Upon the transfer, exchange or replacement of a Restricted Global Note Certificate or a Restricted Individual Note Certificate, or upon specific request for removal of the legend, the relevant Issuer will deliver only a Restricted Global Note Certificate or one or more Restricted Individual Note Certificates that bear such

legend or will refuse to remove such legend, unless there is delivered to the relevant Issuer, (in respect of each Series of Guaranteed Notes) the Guarantor, and the Registrar such satisfactory evidence (which may include a legal opinion) as may reasonably be required by the relevant Issuer or (in respect of each Series of Guaranteed Notes) the Guarantor, that neither the legend nor the restrictions on transfer set forth therein are required to ensure compliance with the provisions of the Securities Act.

Any interest in a Restricted Global Note Certificate that is transferred to a person who takes delivery in the form of an interest in an Unrestricted Global Note Certificate will, upon transfer, cease to be an interest in a Restricted Global Note Certificate and become an interest in an Unrestricted Global Note Certificate and, accordingly, will thereafter be subject to all transfer restrictions and other procedures applicable to an interest in an Unrestricted Global Note Certificate.

Prospective purchasers are hereby notified that sellers of the Restricted Notes may be relying on the exemption from the provisions of Section 5 of the Securities Act provided by Rule 144A.

ERISA CONSIDERATIONS

The following is a summary of certain considerations associated with the purchase and holding of the Direct Issuance Notes by employee benefit plans that are subject to Title I of the Employee Retirement Income Security Act of 1974, as amended (“**ERISA**”), plans, individual retirement accounts (“**IRAs**”) and other arrangements that are subject to Section 4975 of the Code or provisions under any federal, state, local, non-U.S. or other laws or regulations that are similar to such provisions of ERISA or the Code (collectively, “**Similar Laws**”), and entities whose underlying assets are considered to include “plan assets” (within the meaning of 29 C.F.R. 2510.3-101, as modified by Section 3(42) of ERISA, and any Similar Laws) of such plans, accounts and arrangements (each, a “**Plan**”).

General fiduciary matters

ERISA and the Code impose certain duties on persons who are fiduciaries of a Plan subject to Title I of ERISA or Section 4975 of the Code (an “**ERISA Plan**”) and prohibit certain transactions involving the assets of an ERISA Plan and its fiduciaries or other interested parties. Under ERISA and the Code, any person who exercises any discretionary authority or control over the administration of an ERISA Plan or the management or disposition of the assets of an ERISA Plan, or who renders investment advice to an ERISA Plan for a fee or other compensation (an “**investment advice fiduciary**”), is generally considered to be a fiduciary of the ERISA Plan.

When considering an investment in the Direct Issuance Notes of the assets of any Plan, a fiduciary should determine whether the investment is in accordance with the documents and instruments governing the Plan and the applicable provisions of ERISA, the Code or any Similar Laws relating to a fiduciary’s duties to the Plan including, without limitation, the prudence, diversification, delegation of control and prohibited transaction provisions of ERISA, the Code and any applicable Similar Laws.

Each ERISA Plan, including IRAs and other arrangements that are subject to Section 4975 of the Code, should consider the fact that none of the Issuers, the Guarantor or the Dealers or any of their respective affiliates (collectively, the “**Transaction Parties**”) is acting, or will act, as a fiduciary to any ERISA Plan with respect to the decision to purchase or hold the Direct Issuance Notes, and that the Transaction Parties have financial interests in the ERISA Plan’s purchase and holding of the Direct Issuance Notes, which interests may conflict with the interest of the ERISA Plan. The Transaction Parties are not undertaking to provide impartial investment advice or advice based on any particular investment need, or to give advice in a fiduciary capacity, with respect to the decision to purchase or hold the Direct Issuance Notes. All communications, correspondence and materials from the Transaction Parties with respect to the Direct Issuance Notes are intended to be general in nature and are not directed at any specific purchaser of the Direct Issuance Notes, and do not constitute advice regarding the advisability of investment in the Direct Issuance Notes for any specific purchaser. The decision to purchase and hold the Direct Issuance Notes must be made solely by each prospective ERISA Plan purchaser on an arm’s length basis.

Prohibited transaction issues

Section 406 of ERISA and Section 4975 of the Code prohibit ERISA Plans from engaging in specified transactions involving plan assets with persons or entities who are “parties in interest,” within the meaning of ERISA, or “disqualified persons,” within the meaning of Section 4975 of the Code, unless an exemption is available. A party in interest or disqualified person, including a fiduciary, of an ERISA Plan who engages in a non-exempt prohibited transaction may be subject to excise taxes and other penalties and liabilities under ERISA and the Code.

The acquisition and/or holding of Direct Issuance Notes by an ERISA Plan with respect to which a Transaction Party is considered a party in interest or a disqualified person may constitute or result in a direct or indirect prohibited transaction under Section 406 of ERISA and/or Section 4975 of the Code, unless the investment is acquired and is held in accordance with an applicable statutory, class or individual prohibited transaction exemption. Included among these statutory exemptions are Section 408(b)(17) of ERISA and Section 4975(d)(20) of the Code, which exempt certain transactions (including, without limitation, a sale and purchase of securities) between a Plan and a party in interest so long as (i) such party in interest is treated as such solely by reason of providing services to the Plan, (ii) such party in interest is not a fiduciary which renders investment advice, or has or exercises discretionary authority or control, with respect to the plan assets involved in such transaction, or an affiliate of any such person and (iii) the Plan neither receives less than nor pays more than “adequate consideration” (as defined in such Sections) in connection with such transaction. In addition, the U.S. Department of Labor has issued prohibited transaction class exemptions (“**PTCEs**”) that may apply to the

acquisition and holding of the Direct Issuance Notes. These class exemptions include, without limitation, PTCE 84-14 respecting transactions determined by independent qualified professional asset managers, PTCE 90-1 respecting insurance company pooled separate accounts, PTCE 91-38 respecting bank collective investment funds, PTCE 95-60 respecting life insurance company general accounts and PTCE 96-23 respecting transactions determined by in-house asset managers. Furthermore, newly-issued class exemptions, such as the “Best Interests Contract Exemption” (PTCE 2016-01) and the “Principal Transaction Exemption” (PTCE 2016-02) may provide relief for certain transactions involving investment advice fiduciaries. There can be no assurance that all of the conditions of any such exemptions will be satisfied.

Because of the foregoing, the Direct Issuance Notes may not be purchased or held by any person investing “plan assets” of any Plan, unless such purchase and holding will not constitute a non-exempt prohibited transaction under ERISA and the Code or violate any applicable Similar Laws.

The foregoing discussion is general in nature and is not intended to be all inclusive. Due to the complexity of these rules and the penalties that may be imposed upon persons involved in non-exempt prohibited transactions, it is particularly important that fiduciaries or other persons considering investing in the Direct Issuance Notes on behalf of, or with the assets of, any Plan, consult with their counsel regarding the potential applicability of ERISA, Section 4975 of the Code and any Similar Laws to such transactions and whether an exemption would be applicable.

Representation

Accordingly, by its acceptance of a Direct Issuance Note, each purchaser and subsequent transferee will be deemed to have represented and warranted that either (1) no portion of the assets used by such purchaser or transferee to acquire or hold the Direct Issuance Notes constitutes assets of any Plan or (2) the purchase and holding of the Direct Issuance Notes by such purchaser or transferee will not constitute or result in a non-exempt prohibited transaction under Section 406 of ERISA or Section 4975 of the Code or a violation under any applicable Similar Laws.

Further, if the purchaser or subsequent transferee is an ERISA Plan, such purchaser or subsequent transferee will be deemed to have represented and warranted that (1) none of the Transaction Parties has acted as the ERISA Plan’s fiduciary (within the meaning of ERISA or the Code), or has been relied upon for any advice, with respect to the purchaser or transferee’s decision to acquire and hold the Direct Issuance Notes, and none of the Transaction Parties shall at any time be relied upon as the ERISA Plan’s fiduciary with respect to any decision to acquire, continue to hold or transfer the Direct Issuance Notes, and (2) the decision to purchase the Direct Issuance Notes has been made by a duly authorized fiduciary of the ERISA Plan that (i) is independent (as that term is used in 29 C.F.R. 2510.3-21(c)(1)) of the Transaction Parties and there is no financial interest, ownership interest, or other relationship, agreement or understanding or otherwise that would limit its ability to carry out its fiduciary responsibility to the ERISA Plan; (ii) is a bank, insurance carrier, registered investment adviser, a registered broker-dealer, or an independent fiduciary that holds, or has under management or control, total assets of at least \$50 million (in each case, as specified in 29 C.F.R. 2510.3-21(c)(1)(i)(A)-(E)); (iii) is capable of evaluating investment risks independently, both in general and with regard to particular transactions and investment strategies (including, without limitation, with respect to the decision to invest in the Direct Issuance Notes); (iv) has been fairly informed that the Transaction Parties have not and will not undertake to provide impartial investment advice, or to give advice in a fiduciary capacity, in connection with the purchase and holding of the Direct Issuance Notes; (v) has been fairly informed that the Transaction Parties have financial interests in the ERISA Plan’s purchase and holding of the Direct Issuance Notes, which interests may conflict with the interest of the ERISA Plan; (vi) is a fiduciary under ERISA or the Code, or both, with respect to the decision to purchase and hold the Direct Issuance Notes and is responsible for exercising (and has exercised) independent judgment in evaluating whether to invest the assets of such ERISA Plan in the Direct Issuance Notes; and (vii) is not paying any Transaction Party, any fee or other compensation directly for the provision of investment advice (as opposed to other services) in connection with the ERISA Plan’s purchase and holding of the Direct Issuance Notes.

Certain ERISA Considerations With Respect to Guaranteed Notes

Guaranteed Notes are not permitted to be acquired or held by ERISA Plans. Subject to certain restrictions described below, Guaranteed Notes are permitted to be acquired and held by governmental plans, non-electing church plans and other arrangements that are not subject to ERISA or Section 4975 of the Code and are not ERISA Plans (collectively, “**Non-ERISA Plans**”).

ERISA imposes fiduciary standards and certain other requirements on ERISA Plans and on those persons who are fiduciaries with respect to ERISA Plans. Non-ERISA Plans are subject to applicable state, local or federal law, as well as the restrictions of duties of common law, and may also be subject to prohibited transaction provisions that operate similarly to those under ERISA.

Under the regulations issued by the US Department of Labor (“**DOL**”), as modified by Section 3(42) of ERISA (the “**Plan Asset Regulations**”), unless certain exceptions apply, if an ERISA Plan invests in an “equity interest” of an entity, that is neither a “publicly offered security” nor a security issued by an investment company registered under the Investment Company Act, the ERISA Plan’s assets include both the equity interest and an undivided interest in each of the entity’s underlying assets. This “look through” rule will only apply where ERISA Plans own 25 percent or more of the value of any class of equity interest in the entity. For purposes of this 25 percent determination, the value of equity interests held by persons (other than ERISA Plans) that have discretionary authority or control with respect to the assets of the entity or that provide investment advice for a fee (direct or indirect) with respect to such assets (or any affiliate of such person) is disregarded. An equity interest does not include debt (as determined by applicable local law) which does not have substantial equity features.

If the underlying assets of an entity are deemed to be plan assets, those with discretionary authority or control over the entity would be fiduciaries with respect to the entity’s assets. The assets of the entity would also be subject to the prohibited transaction rules of ERISA and Section 4975 of the Code, as well as other rules applicable to plan assets.

The Issuer believes that the proper characterization of the Guaranteed Notes for U.S. federal income tax purposes is uncertain. The DOL may view the Guaranteed Notes as having substantial equity features. Further, the Issuer will not be able to monitor the noteholders’ status as ERISA Plans. Accordingly, the Guaranteed Notes are not permitted to be acquired or held by any ERISA Plan.

Non-ERISA Plans are permitted to acquire and hold the Guaranteed Notes, subject to certain restrictions described below. Each Non-ERISA Plan acquiring and holding the Guaranteed Notes will be deemed to have represented and warranted that the acquisition, holding and disposition of the Guaranteed Notes do not and will not violate any statute, regulation, administrative decision, policy or other legal authority applicable to the Non-ERISA Plan and the acquisition, holding and disposition of the Guaranteed Notes or any interest therein do not and will not result in the assets of the Issuer being considered plan assets of such Non-ERISA Plan. Non-ERISA Plans are generally not subject to ERISA nor do the prohibited transaction provisions of ERISA or Section 4975 of the Code apply to these types of plans. However, governmental plans (as described in Section 3(32) of ERISA), are subject to prohibitions on related-party transactions under Section 503 of the Code, which prohibitions operate similarly to the prohibited transaction rules under ERISA or Section 4975 of the Code, and other Non-ERISA Plans may be subject to similar prohibitions. Accordingly, the fiduciary of a Non-ERISA Plan must consider applicable state or local laws, if any, imposed upon such plan before purchasing and holding a Guaranteed Note or any interest therein.

BY ITS PURCHASE AND HOLDING OF A GUARANTEED NOTE OR ANY INTEREST THEREIN, THE PURCHASER AND/OR HOLDER THEREOF AND EACH TRANSFEREE WILL BE DEEMED TO HAVE REPRESENTED AND WARRANTED AT THE TIME OF ITS PURCHASE AND THROUGHOUT THE PERIOD THAT IT HOLDS SUCH GUARANTEED NOTE OR INTEREST THEREIN, THAT (1) IT IS NOT AND WILL NOT BE AN ERISA PLAN, (2) IF IT IS A GOVERNMENTAL PLAN, AS DEFINED IN SECTION 3(32) OF ERISA, OR OTHER PLAN OR ARRANGEMENT THAT IS NOT SUBJECT TO TITLE I OF ERISA OR SECTION 4975 OF THE CODE, THE ACQUISITION, HOLDING AND DISPOSITION OF THE GUARANTEED NOTES OR ANY INTEREST THEREIN DO NOT AND WILL NOT VIOLATE ANY STATUTE, REGULATION, ADMINISTRATIVE DECISION, POLICY OR ANY OTHER LEGAL AUTHORITY APPLICABLE TO SUCH GOVERNMENTAL PLAN OR OTHER PLAN OR ARRANGEMENT THAT IS NOT SUBJECT TO TITLE I OF ERISA OR SECTION 4975 OF THE CODE, AND THE ACQUISITION, HOLDING AND DISPOSITION OF THIS GUARANTEED NOTE OR ANY INTEREST HEREIN DO NOT AND WILL NOT RESULT IN THE ASSETS OF THE ISSUER OF THE GUARANTEED NOTES BEING CONSIDERED PLAN ASSETS OF SUCH GOVERNMENTAL PLAN OR OTHER PLAN NOT SUBJECT TO TITLE I OF ERISA OR SECTION 4975 OF THE CODE, AND (3) IT WILL NOT SELL OR OTHERWISE TRANSFER ANY GUARANTEED NOTE OR INTEREST THEREIN TO ANY PERSON WITHOUT FIRST OBTAINING THE SAME FOREGOING REPRESENTATIONS, WARRANTIES AND COVENANTS FROM THAT PERSON.

The foregoing is not intended to be exhaustive and the law governing investments by ERISA Plans and Non-ERISA Plans is subject to extensive administrative and judicial interpretations. The foregoing discussion should not be construed as legal advice. Any potential purchaser or holder of Guaranteed Notes should consult counsel with respect to issues arising under ERISA, the Code and other applicable laws and make their own independent decisions.

SUMMARY OF PRINCIPAL DIFFERENCES BETWEEN TFRS AND IFRS

The following is a general summary of certain principal differences between TFRS and IFRS as applicable to us.

For the purpose of this Offering Memorandum, we have prepared the audited consolidated financial statements for the years ended December 31, 2016, 2017 and 2018, which comprise the consolidated financial statements of Thai Oil and its subsidiaries (the “**consolidated financial statements**”) and the separate financial statements of Thai Oil and the unaudited interim consolidated financial information as of and for the six-month period ended June, 2019 in accordance with Thai Generally Accepted Accounting Principles under the Accounting Act B.E. 2543, being those TFRS issued under the Accounting Profession Act B.E. 2547.

A summary of certain significant differences between TFRS and IFRS which are relevant to our financial statements is provided below. The differences identified below are limited to those significant differences that are appropriate to our financial statements for the years ended December 31, 2016, 2017 and 2018 and to our financial information for the six-month ended June 30, 2019. However, they should not be construed as being exhaustive. The International Accounting Standard Board (“**IASB**”) and the Federation of Accounting Professions (“**FAP**”) in Thailand have issued new pronouncements that may impact subsequent periods and have on-going projects that could significantly affect the summary of differences between TFRS and IFRS described below. Accordingly, no attempt has been made to identify differences between TFRS and IFRS as a result of prescribed changes in accounting standards in the future or to identify all future differences that may affect our financial statements as a result of transactions or events that may occur in the future. Furthermore, no attempt has been made in this summary to identify disclosures, presentation, or classification differences that would affect the manners in which transaction and events are reflected in the financial statements or the respective note thereto.

TFRS and accounting interpretations are issued by the FAP and endorsed by the Supervisory Board on Audit Profession of the Business Development Department, the Ministry of Commerce of Thailand. These standards and interpretations are endorsed by the Government gazette and supplemented by the requirements of the SET and the Thai SEC, as well as the announcements of the FAP.

In making an investment decision, investors must rely on their own examination of our business, financial condition and results of operations, the terms of the relevant offering and our financial information. Potential investors should consult their own professional advisers for an understanding of the differences between TFRS and IFRS and how these differences might affect the financial information in this Offering Memorandum.

Financial Instruments: Recognition and Measurement

Currently, there is no specific guidance for the recognition and measurements of derivatives under TFRSs. We did not recognize derivatives on the balance sheet at fair value. We only disclosed details of outstanding derivatives and its fair value in the notes to financial statements.

While there is no one single TAS covering accounting for all types of financial instruments similar to IFRS, there are a number of TAS standards which provide guidance on accounting for financial instruments such as TAS 105 Accounting for Investment in Debt and Equity Securities and TAS 101 Doubtful Accounts and Bad Debts.

IFRS 9 *Financial Instruments* provides extensive guidance on the recognition and measurement of financial instruments, including the classification of financial assets and liabilities, accounting for derivatives, hedging activities and impairment.

Significant differences between TFRS and IFRS 9 as applicable to us for the years ended December 31, 2016, 2017, 2018 and to our financial information for the six-month ended June 30, 2019 are as follows:

Classification of Financial Assets and Liabilities

Under TAS 105, investments are classified into the following four categories: (1) held-for-trade investments; (2) held-to-maturity investments; (3) available-for-sale investments; and (4) general investments. The classification is dependent on the purpose for which the investments were acquired. Investment in a marketable equity security is classified as an available-for-sale investment if it is not held for trading purposes. An available-for-sale investment is carried at fair value through other comprehensive income while held-to-

maturity investments are carried at amortized cost. An investment in non-marketable equity security is classified as general investment and is carried at cost less impairment loss.

IFRS 9 contains three principal classification categories for financial assets – i.e. measured at: amortised cost, fair value through other comprehensive income and fair value through profit or loss. The classification depends on the type of the instruments and objective of the business model within which the financial asset is held. Financial liabilities are either classified into financial liabilities at fair value through profit or loss applying fair value option or financial liabilities carried at amortized cost. Subsequent measurement depends on their respective categories.

On recognition of a financial asset for debt instrument, IFRS 9 requires an assessment of its underlying terms to establish if these constitute solely payments of principal and interest, the “SPPI test”. If the financial asset does not pass this test it is mandatorily classified at fair value through profit or loss. No such assessment is required under TFRS.

Derivative Financial Instruments and Hedge Accounting

We enter into derivative contracts to manage our exposure from fluctuation of interest rate, foreign exchange rate and commodity price. There is no specific guidance under TFRS for accounting for derivatives or embedded derivatives. We do not recognize derivatives on the balance sheet at fair value. We recognize realized derivative gain or loss upon settlement.

No assessment of embedded derivative is made by us. Under IFRS 9, any embedded derivatives identified in financial assets would need to be considered in the context of the SPPI test referred to under the classification section above. In the case of liabilities, any embedded derivatives would need to be either (a) bifurcated from the host contract and recognized separately at fair value through profit or loss, or (b) not bifurcated, but with the whole financial liability being recorded at fair value through profit or loss. Under IFRS, derivative financial instruments are required to be recognised at fair value. Changes to fair value are recognized through profit and loss. If hedge accounting is elected and the specific criteria of IFRS 9 are met, volatility in profit and loss is minimized. If a hedge is designated as a fair value hedge, changes in the derivative’s fair value are recorded in profit and loss and the hedged item is adjusted for changes in fair value associated with the hedged risk. If designated as a cash flow hedge, the effective portion of the hedge is recorded in equity as a component of other comprehensive income, and released from other comprehensive income into earnings as the hedged item affects earnings. All ineffectiveness in the hedging relationship, as well as derivative instruments not qualifying for hedge accounting, is reflected in the statement of income immediately.

Effective Interest Method and Impairment

Currently, we recognize loans initially based on the proceeds received. Interest expenses are recognized based on contractual interest rate. IFRS 9 requires loans to be initially recognized at fair value net of transaction costs. Unless designated as at fair value through profit or loss, where the fair value option is not applied, the loans are subsequently carried at amortized cost using the effective interest method.

IFRS 9 requires that financial assets that are not measured at fair value through profit and loss, including loans, lease and trade receivables and debt securities are considered for impairment based on an “expected credit loss” model. The model uses a dual measurement approach, under which the loss allowance is measured as either the twelve month expected credit losses or the lifetime expected credit losses. The measurement basis generally depends on whether there has been a significant increase in credit risk since initial recognition. The impairment assessment as required by current TFRS is not as prescriptive.

Financial Instruments: Presentation and Disclosure

TFRS requires disclosing significant transactions related to financial instruments but not extensive as those required by IFRS 7 *Financial Instruments: Disclosures*. IFRS 7 requires that the entity disclose qualitative and quantitative information about exposure to risks arising from financial instruments, including specified minimum disclosures about credit risk, liquidity risk and market risk. The qualitative disclosures describe management’s objectives, policies and processes for managing those risks. The quantitative disclosures provide information about the extent to which the entity is exposed to risk, based on information provided internally to the entity’s key management personnel. Together, these disclosures provide an overview of the entity’s use of financial instruments and the exposures to risks they create.

Lease

Significant differences between IFRS 16 and TAS 17 as applicable to us for the years ended December 31, 2016, 2017, 2018 and to our financial information for the six-month ended June 30, 2019 are as follows:

IFRS 16 introduces a single lessee accounting model for lessees. A lessee recognises a right-of-use asset and a lease liability. There are recognition exemptions for short-term leases and leases of low-value items.

Under TAS 17, the Group recognises payments made under operating leases in profit or loss on a straight line basis over the term of the lease, and recognised assets and liabilities only to the extent that there was a timing difference between actual lease payments and the expense recognised. Under IFRS 16, the Group will recognize right-of-use assets and lease liabilities for all leases except short-term lease and lease of low value which the Company is a lessee. As a result, the nature of expenses related to those leases will now change because the Group will recognise depreciation of right-of-use assets and interest expense on lease.

LEGAL MATTERS

Certain matters in connection with this offering as to New York law and U.S. federal law will be passed upon for the Company by Latham & Watkins, and for the Arranger and Dealers by Clifford Chance. Certain matters in connection with this offering as to Thai law will be passed upon for the Company by Baker & McKenzie Ltd., and for the Arranger and Dealers by Allen & Overy (Thailand) Co., Ltd.

INDEPENDENT AUDITORS

The unaudited interim consolidated and separate financial information of Thai Oil Public Company Limited as of and for the six months ended June 30, 2019, including comparative information presented as corresponding figures as of and for the six months ended June 30, 2018, included in this Offering Memorandum have been reviewed by PricewaterhouseCoopers ABAS Ltd., independent auditors, as stated in their report appearing herein.

The consolidated and separate financial statements of Thai Oil Public Company Limited as of and for the year ended December 31, 2018, including comparative information presented as corresponding figures as of and for the year ended December 31, 2017, included in this Offering Memorandum have been audited by KPMG Phoomchai Audit Limited, independent auditors, as stated in their report appearing herein.

The consolidated and separate financial statements of Thai Oil Public Company Limited as of and for the year ended December 31, 2017, including comparative information presented as corresponding figures as of and for the year ended December 31, 2016, included in this Offering Memorandum have been audited by KPMG Phoomchai Audit Limited, independent auditors, as stated in their report appearing herein.

GLOSSARY OF TECHNICAL TERMS

aframax.....	An aframax is a medium-sized crude tanker with a dead weight tonnage typically ranging between 80,000 and 120,000
aromatics	A group of unsaturated cyclic hydrocarbons containing one or more benzene rings of six carbon atoms. They are highly reactive and chemically versatile. The group name is derived from the strong and not unpleasant odor characteristic of most chemicals in this family.
attributed installed capacity.....	The power generation capacity attributable to an entity based on the entity's equity ownership in a power generation plant.
bbl or bbls.....	Barrels (1 Bbl = 158.984 liters).
benzene.....	An aromatic hydrocarbon in the form of a colorless, flammable liquid. It is created by catalytically reforming naphtha, in the thermal cracking process, and is used in the production of other chemicals such as styrene, cumene, cyclohexane, aniline and chlorobenzene.
biodiesel	Vegetable oil or animal fat-based diesel fuel.
bitumen.....	Heavy oil product normally used for road pavement and construction.
bpd.....	Barrels per day.
capacity utilization rate	Capacity utilization rate refers to total production expressed as a percentage of nameplate capacity during the relevant year or period.
cassava-based ethanol.....	Ethanol produced from cassava, a root vegetable
cost and freight ("CFR")	A trade term requiring the seller to arrange for the carriage of goods by sea to a port of destination, and provide the buyer with the documents necessary to obtain the goods from the carrier.
complex refinery	A refinery that has manufacturing processes (conversion units or upgrading units) to upgrade lower value hydrocarbon products to higher value products. The type of processing facilities indicates the degree of complexity of the refinery.
condensate	Liquid that is formed when a vapor cools.
continuous catalyst regeneration platformers ("CCR").....	Refinery units that change the molecular structure of lower octane gasoline components to higher octane in the presence of catalyst.
conversion unit	Manufacturing units that chemically transform structure of low value hydrocarbon molecule to higher value hydrocarbon molecule. Light hydrocarbon conversion units are catalytic reforming and ISOMs. Heavy hydrocarbon conversion units are thermal cracking, hydrocracking and catalytic cracking units.
cracking ("CCU").....	A process of breaking down larger molecules of heavy oil into smaller ones by the action of heat, with the aid of catalyst.

crude distillation unit (“CDU”)	A refinery unit that separates crude oil into fractions, by the aid of heat, based on the difference in boiling point of hydrocarbons. The lightest fraction includes refinery fuel gas, LPG and gasoline. The middle fraction includes kerosene and diesel. The heaviest fraction (bottom stream) is mainly fuel oil, which has the lowest value. Fuel oil can be further processed in the conversion unit to produce more valuable products.
crude oil.....	Crude oil is a mixture of hydrocarbon which is used as the principal feedstock in the refinery for the production of petroleum products.
diesel	A general term of fuel used in diesel (compression ignition) engines.
distillates	Distillates may refer to any refined oil products.
export parity	Refers to how export sales of refined petroleum products are priced, which is derived from the Singapore spot market price for the relevant product quoted on MOPS plus or minus a premium or discount that is subject to the market conditions and negotiation with potential purchasers. Also premium or discount is adjusted in accordance with the freight rate from Thailand to Singapore.
fatty acid	Fatty acid is an oleochemical derived from vegetable feedstock, such as coconut and palm-kernel oils. During the production process, vegetable oils are first converted into an intermediary chemical, such as methyl ester, which is then fractionated to produce fatty alcohols.
feedstock	Hydrocarbon compounds, such as crude oil, natural gas liquid and imported residue that are fed into processing units and/or blended into refined products.
fluidized catalytic cracking unit (“FCCU”).....	A refinery process unit that uses catalyst to convert low value, heavy components to higher value, lighter components such as high octane gasoline and other products.
free on board (“FOB”).....	A trade term under which the price invoiced or quoted by a seller includes all charges up to the port of shipment, plus loading costs.
fractionation	Process of separating crude oil into different compounds or fractions, each with its own boiling range, by heating the crude oil to a certain temperature and sending it to the fractionation tower.
fuel oil	Oil generally used as furnace fuel. It is also widely used as a main source of energy for electricity generators and bunkering.
gasohol	A fuel consisting of a blend of ethanol and unleaded gasoline.
gas separation	Gas separation is the separation of natural gas.
gas treating unit (“ADIP Unit”).....	A refinery unit that removes undesirable components, such as hydrogen sulfide, from gaseous and LPG streams with Di-IsoPropanol-Amine (DIPA or ADIP) liquid. Used ADIP liquid can be re-used by a regeneration process. Gaseous product from the regeneration process is called acid gas.

gross refining margin (“GRM”)	Value of production (“ VOP ”) minus cost of intake (“ COI ”) and cost of purchased utilities. VOP is calculated based on the quantity of products from the refinery during a certain period multiplied by the prices of each product type. This VOP is automatically reduced by used fuel and loss in the processing system. COI is calculated based on the quantity of crude oil and other feedstock used in the refinery process during a certain period multiplied by cost of crude based on a LIFO basis, insurance and freight price of each crude type.
group I lube base oil	Group I base oils are classified as less than 90% saturates, greater than 0.03% sulfur and with a viscosity-index range of 80 to 120. The temperature range for these oils is from 32 to 150 degrees Fahrenheit. Group I base oils are solvent-refined, which is a simpler refining process. They are generally the least costly group of lube base oil.
group II lube base oil.....	Group II base oils are defined as being more than 90% saturates, less than 0.03% sulfur and with a viscosity index of 80 to 120. They are often manufactured by hydrocracking, which is a more complex process than what is used for Group I base oils. Since all the hydrocarbon molecules of these oils are saturated, Group II base oils have better antioxidation properties. They also have a clearer color and cost more in comparison to Group I base oils.
group III lube base oil	Group III base oils are greater than 90% saturates, less than 0.03% sulfur and have a viscosity index above 120. These oils are refined even more than Group II base oils and generally are severely hydrocracked through higher pressure and in greater heat. This longer process is designed to achieve a purer base oil.
heavy products.....	Fuel oil, long residue and bitumen.
high vacuum unit (“HVU”).....	A refinery unit that further fractionates the black fuel oil fraction produced by the CDU, which is also known as long residue, to produce a light fuel oil fraction (light vacuum gasoil and heavy vacuum gasoil) and a heavy fuel oil fraction (short residue). In the HVU, separation occurs in the fractionation column at a high temperature and under vacuum conditions to prevent a cracking reaction.
hydrocracker unit (“HCU”).....	A refinery process unit using catalyst and hydrogen that converts low value, heavy components to higher value, lighter components such as high cetane diesel and other products.
hydrocarbons	Hydrocarbons is used to describe all compounds that consist of hydrogen and carbon. These include crude oil, natural gas, aromatics, olefins and their derivatives.
hydrocracking.....	A process of breaking down larger molecules of heavy oil into smaller ones with the aid of catalyst under hydrogen pressure.
hydrodesulfurization unit (“HDS”)	A refinery process unit using catalyst and hydrogen that removes sulfur from components to produce low sulfur diesel.

hydrogen manufacturing unit (“HMU”)	A refinery unit that produces hydrogen gas from light hydrocarbons and steam under the presence of catalyst and the aid of heat.
hydrotreating unit (“HDT”).....	A refinery process unit that removes contaminants such as sulfur, nitrogen from naphtha and lighter components.
import parity	Refers to how domestic sales of refined petroleum products are priced, which is derived from the Singapore spot market price for the relevant product quoted on MOPS, plus the logistics costs of transporting such product from Singapore to Thailand, such as insurance, freight, ocean losses, deemed import duty and deemed legal reserve.
isomerate	A main product, which is produced from an isomerization unit. It is used as a gasoline blending component to improve the octane rating and to reduce petrochemical of automotive gasoline.
isomerization unit (“ISOM”).....	A refinery unit that processes light naphtha (low octane gasoline component) and converts it to high-octane gasoline by using a catalyst and hydrogen. Also known as a penex/molex unit.
jet fuel.....	A refined product used for both commercial aviation and military aircraft. There are several jet fuel specifications. It is also known as turbine fuel. The primary source of jet fuel blending stocks is kerosene from CDU and hydrocracking unit.
jetty.....	A breakwater constructed to protect or defend a harbor, stretch of coast, or riverbank.
kerosene.....	A refined middle-distillate petroleum product that is used for jet fuel, cooking, heating, lighting, solvent and for blending into diesel and fuel oil.
light products.....	LPG, unleaded gasoline, reformat and isomerate.
linear alkyl benzene (“LAB”).....	A family of organic compound commonly used as a raw material in the manufacture of biodegradable household detergents.
long residue	The black fuel oil fraction produced by the CDU, which is usually sold as fuel oil for simple refineries. For complex refineries, long residue is further processed through the conversion process to produce higher value oil products.
LPG	Liquefied petroleum gas. Consists primarily of propane and butane and is produced for use for cooking, home heating and as an intermediate material in the manufacture of petrochemicals.
lube base oil.....	The main component of finished lubricants derived from heavy crude oil fraction in vacuum distillation.
Mean of Platts Singapore (“MOPS”)	The arithmetic average of the high and low price published by Platts Asia-Pacific on each day for the relevant grade of fuel.
mild extract solvate (“MES”)	A mildly refined paraffinic base oil that can be used as substitute for distillate aromatic extract in the production of synthetic rubber.
Methyl Tertiary Butyl Ether	An oxygenate to enhance the octane number in ULG.

middle distillates	Diesel (or automotive gasoil and industrial gasoil) and jet fuel.
mixed xylenes.....	Mixed-xylenes are highly volatile, colorless petroleum-based industrial chemicals used in the production of many products, such as plastics, fabrics, solvent, cleaning agents, adhesives, dyes, and paints. Mixed-xylenes are also used as a high octane blending component in gasoline. As the name “mixed” suggests, there are actually four different chemicals in mixed-xylenes: orthoxylene, metaxylene, paraxylene and ethylbenzene. The greatest demand is for paraxylene (used for Polyester production).
molasses-based ethanol	Ethanol produced from malasses, a viscous by-product of the refining of sugarcane or sugar beets into sugar.
mono-ethylene glycol	An organic chemical compound derived from the oxidation of ethylene.
monomer	A feedstock material for the manufacture of polymers and derivative products.
MW	Megawatt (million watts), unit of power measurement.
naphtha	A general term used for low boiling range (and low octane rating) hydrocarbon fractions that are a product of crude oil or condensate refining. Naphtha is generally used as feedstock for catalytic reforming unit and ethylene plant. It is also used as gasoline blending component.
natural gas	A colorless, highly flammable gaseous hydrocarbon, which occurs naturally with crude oil, consisting primarily of methane and small amounts of heavier gaseous hydrocarbon compounds such as propane.
octane number	A number indicates the relative antiknock (self-ignition) characteristics of Gasoline. The higher Octane number, the higher the anti-knock quality of Gasoline. Gasoline component produced from CDU has a relatively low Octane number and is of little value for Gasoline blending.
Official Selling Price (“OSP”).....	Price of crude oil sold during a particular month, set by the owner of the crude and can be quoted at a fixed price or benchmarked to other crude with a premium or discount.
paraxylene	An aromatic hydrocarbon in the form of a colorless, flammable liquid that is recovered from mixed xylenes streams by adsorption and by isomerization of aromatics.
petrochemicals.....	Chemicals derived from petroleum or natural gas, of which there are almost 200 that can be so described. Certain products from oil refining are used as petrochemical feedstock in the production of plastics, synthetic fibers, synthetic rubbers and other products.
plant utilization rate.....	A measurement of fraction of the capacity of manufacturing unit used for processing. It is expressed as the ratio of actual intake (or production) to refining capacity over specified period.
ppm.....	Parts per million.
propane.....	A gaseous hydrocarbon in its natural state but can be easily liquefied. Its major end uses are as a fuel and as a feedstock for petrochemicals.

refining	The conversion of crude oil into useful products, such as naphtha, the most important feedstock for the petrochemical industry. The general refinery process begins with the separation of crude oil into different fractions by distillation. The fractions are further treated to convert them into mixtures of more useful products by various methods such as cracking, reforming, alkylation, polymerization and isomerization. These mixtures of new compounds are then separated using methods such as fractionation and solvent extraction.
refining capacity	Designed capacity of a refinery per stream day, assuming a specific slate of crude. A refinery may operate in excess of its designed capacity if there is an optimization of its operating conditions, a change in the slate of crude from that which its designed capacity is based on, or a continuous improvement in its production facilities.
reformate, or platformate.....	A reformed naphtha, which is upgraded in octane by means of catalytic reforming.
selective toluene dis-proportionation ("STDP").....	A conversion process that produces paraxylene-rich mixed xylenes along with high purity benzene streams from toluene. STDP produces a higher purity stream of paraxylene (i.e., greater than 80%) and benzene as opposed to conventional TDP which produces an equilibrium mixture of xylenes (i.e., approximately 20% paraxylene) together with benzene.
single buoy mooring ("SBM")	Used for discharging oil into storage tanks in the open sea, the principle being that the vessel can moor to discharge oil whatever the direction of wind or current and swing at the mooring to present least resistance to the prevailing conditions.
slack wax.....	A minimally refined oil product derived from lubricating oil and is used in the production of candles, shoes polish, wax, cosmetics and binding materials.
solvent	A substance used to dissolve solids and keep them in liquid form.
special boiling points ("SBPs")	A group of solvents with narrow boiling ranges typically used in the adhesives, rubber, cleaning products, pharmaceuticals and surface coating industries.
thermal cracking unit ("TCU").....	A refinery unit that breaks up heavy oil molecules into lighter, more valuable fractions (e.g. gasoline, kerosene) by the use of high temperature without the aid of catalysts.
toluene	An aromatic hydrocarbon used as an octane enhancer in gasoline, as a chemical intermediate in the production of benzene, paraxylene, TDI and as a solvent in paints.
treated distillate aromatics extract ("TDAE") ..	A low aromatics content-extract oil which is a refined oil product derived from the production of lube base oil and is used in the production of synthetic rubber.
treating.....	The process of removing contaminants, such as nitrogen and sulfur compounds from the oil fractions and also to improve their physical properties, such as thermal and color stability. In most cases, a catalytic reaction is required for this purification process.

turnaround	The temporary shutdown of a refinery or petrochemical production facility for required maintenance.
unleaded gasoline (“ULG”).....	Automotive gasoline where lead compounds have not been added to enhance octane rating.
very large crude carriers (“VLCC”)	A supertanker with a capacity between 160,000 and 320,000 deadweight tons. Deadweight tonnage (“ DWT ”) is the amount of cargo, fuel, water, stores and crew that a tanker can carry when fully loaded.

INDEX TO THE FINANCIAL STATEMENTS

Unaudited interim financial statements of the Company as of and for the three-month and six-month periods ended June 30, 2019, including comparative information presented as corresponding figures as of and for the six months ended June 30, 2018

Auditor's Report on the Review of the Interim Financial Information	F-2
Statements of Financial Position	F-3
Statements of Income (Three-month period ended June 30)	F-6
Statements of Comprehensive Income (Three-month period ended June 30)	F-7
Statements of Income (Six-month period ended June 30)	F-8
Statements of Comprehensive Income (Six-month period ended June 30)	F-9
Statements of Changes in Equity	F-10
Statements of Cash Flows	F-12
Condensed Notes to the Interim Financial Statements (Unaudited)	F-15

Annual financial statements of the Company as of and for the year ended December 31, 2018, including comparative information presented as corresponding figures as of and for the year ended December 31, 2017

Independent Auditors' Report	F-29
Statements of Financial Position	F-34
Statements of Income	F-36
Statements of Comprehensive Income	F-37
Statements of Changes in Equity	F-38
Statements of Cash Flows	F-40
Notes to the Financial Statements	F-43

Annual financial statements of the Company as of and for the year ended December 31, 2017, including comparative information presented as corresponding figures as of and for the year ended December 31, 2016

Independent Auditors' Report	F-122
Statements of Financial Position	F-127
Statements of Income	F-129
Statements of Comprehensive Income	F-130
Statements of Changes in Equity	F-131
Statements of Cash Flows	F-133
Notes to the Financial Statements	F-135

AUDITOR'S REPORT ON THE REVIEW OF THE INTERIM FINANCIAL INFORMATION

To the Board of Directors of Thai Oil Public Company Limited

I have reviewed the interim consolidated financial information of Thai Oil Public Company Limited and its subsidiaries, and the interim separate financial information of Thai Oil Public Company Limited. These comprise the consolidated and separate statements of financial position as at 30 June 2019, the related consolidated and separate statements of income, and comprehensive income for the three-month and six-month periods then ended, and the related consolidated and separate statements of changes in equity and cash flows for the six-month period then ended, and the condensed notes to the interim financial information. Management is responsible for the preparation and presentation of this interim consolidated and separate financial information in accordance with Thai Accounting Standard No. 34, "Interim Financial Reporting". My responsibility is to express a conclusion on this interim consolidated and separate financial information based on my review.

Scope of review

I conducted my review in accordance with the Thai Standard on Review Engagements 2410, "Review of interim financial information performed by the independent auditor of the entity". A review of interim financial information consists of making inquiries, primarily of persons responsible for financial and accounting matters, and applying analytical and other review procedures. A review is substantially less in scope than an audit conducted in accordance with Thai Standards on Auditing and consequently does not enable me to obtain assurance that I would become aware of all significant matters that might be identified in an audit. Accordingly, I do not express an audit opinion.

Conclusion

Based on my review, nothing has come to my attention that causes me to believe that the accompanying interim consolidated and separate financial information is not prepared, in all material respects, in accordance with Thai Accounting Standard No. 34, "Interim Financial Reporting".

PricewaterhouseCoopers ABAS Ltd.

Boonrueng Lerdwiseswit
Certified Public Accountant (Thailand) No. 6552
Bangkok
9 August 2019

Thai Oil Public Company Limited
Statement of Financial Position
As at 30 June 2019

	Notes	Consolidated financial information		Separate financial information	
		Unaudited 30 June 2019	Audited 31 December 2018	Unaudited 30 June 2019	Audited 31 December 2018
		Thousand Baht	Thousand Baht	Thousand Baht	Thousand Baht
Assets					
Current assets					
Cash and cash equivalents		57,338,268	33,741,253	54,336,157	29,868,078
Deposits at a financial institution used as collaterals		319,755	300,218	-	-
Short-term investments		36,519,934	73,220,568	36,519,933	73,027,317
Trade accounts receivable, net	7	18,704,898	24,359,025	18,272,481	25,193,926
Other receivables		1,057,648	1,381,634	967,208	1,443,681
Short-term loans		-	45,000	3,620,517	4,274,000
Inventories, net		30,657,538	28,738,502	26,433,423	24,423,642
Prepaid corporate income tax		966,885	937,574	865,251	860,135
Value added tax receivables		603,513	630,752	115,665	36,760
Receivables from oil fuel fund		721,113	1,388,932	721,113	1,388,932
Non-current assets classified as held-for-sale	8	57,843	-	-	-
Total current assets		146,947,395	164,743,458	141,851,748	160,516,471
Non-current assets					
Available-for-sale investments		397,056	360,516	397,056	360,516
Investments in subsidiaries		-	-	14,555,419	14,555,419
Investments in joint ventures	9	660,886	624,895	-	-
Investments in associates	9	10,732,255	14,315,601	1,260,605	1,260,605
Other long-term investments		814,713	779,872	814,713	779,872
Long-term loan to a related party	14	-	-	400,000	400,000
Investment properties, net		102,520	102,520	1,100,443	1,100,443
Property, plant and equipment, net	10	88,991,654	79,929,022	49,536,280	39,989,649
Goodwill		553,842	584,727	-	-
Intangible assets, net		2,513,104	2,460,315	624,171	529,009
Deferred tax assets		784,935	629,339	638,638	515,759
Other non-current assets		3,954,596	4,082,688	3,819,648	3,837,325
Total non-current assets		109,505,561	103,869,495	73,146,973	63,328,597
Total assets		256,452,956	268,612,953	214,998,721	223,845,068

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Thai Oil Public Company Limited
Statement of Financial Position
As at 30 June 2019

	Notes	Consolidated financial information		Separate financial information	
		Unaudited	Audited	Unaudited	Audited
		30 June	31 December	30 June	31 December
		2019	2018	2019	2018
		Thousand Baht	Thousand Baht	Thousand Baht	Thousand Baht
Liabilities and equity					
Current liabilities					
Short-term borrowings		1,856,483	2,391,675	-	-
Trade accounts payable	11	17,266,344	21,844,263	17,784,451	23,516,750
Other payables		5,029,830	3,871,804	5,064,568	3,575,377
Short-term borrowings from related parties	14	-	-	1,026,502	1,506,552
Current portion of long-term borrowings		1,300,822	1,548,627	-	-
Current portion of debentures		-	3,000,000	-	3,000,000
Excise duty payables		3,320,952	4,814,818	3,320,952	4,814,818
Income tax payables		1,110,205	548,625	720,715	-
Other current liabilities		288	239	288	239
Total current liabilities		29,884,924	38,020,051	27,917,476	36,413,736
Non-current liabilities					
Long-term borrowings		14,723,984	15,054,311	49,313,181	52,028,386
Debentures		81,715,567	85,065,239	32,361,212	33,008,687
Deferred tax liabilities		108,001	37,020	-	-
Employee benefit obligations		4,087,746	3,586,980	3,579,681	3,183,164
Other non-current liabilities		779,010	376,973	1,046,911	524,496
Total non-current liabilities		101,414,308	104,120,523	86,300,985	88,744,733
Total liabilities		131,299,232	142,140,574	114,218,461	125,158,469

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Thai Oil Public Company Limited
Statement of Financial Position
As at 30 June 2019

	Consolidated financial information		Separate financial information	
	Unaudited 30 June 2019 Thousand Baht	Audited 31 December 2018 Thousand Baht	Unaudited 30 June 2019 Thousand Baht	Audited 31 December 2018 Thousand Baht
Liabilities and equity (Continued)				
Equity				
Share capital				
Authorised share capital	20,400,279	20,400,279	20,400,279	20,400,279
Issued and paid-up share capital	20,400,279	20,400,279	20,400,279	20,400,279
Share premium on ordinary shares	2,456,261	2,456,261	2,456,261	2,456,261
Other surpluses (deficits)	(2,823,349)	303,597	-	-
Retained earnings				
Appropriated				
Legal reserve	2,040,028	2,040,028	2,040,028	2,040,028
Other reserves	244,500	244,500	244,500	244,500
Unappropriated	99,027,572	96,400,250	75,538,277	73,487,768
Other components of equity	(192,103)	(132,892)	100,915	57,763
Equity attributable to the owners of the parent	121,153,188	121,712,023	100,780,260	98,686,599
Non-controlling interests	4,000,536	4,760,356	-	-
Total equity	125,153,724	126,472,379	100,780,260	98,686,599
Total liabilities and equity	256,452,956	268,612,953	214,998,721	223,845,068

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Thai Oil Public Company Limited
Statement of Income
For the three-month period ended 30 June 2019

Unaudited

	Note	Consolidated financial information		Separate financial information	
		2019	2018	2019	2018
		Thousand Baht	Thousand Baht	Thousand Baht	Thousand Baht
Revenue from sales and services	5	91,961,995	96,636,641	94,543,981	100,668,694
Subsidy from oil fuel fund		602,077	562,892	602,077	562,892
Total revenue		92,564,072	97,199,533	95,146,058	101,231,586
Cost of sales of goods and services		(91,699,820)	(89,270,301)	(95,699,043)	(95,108,940)
Gross profit		864,252	7,929,232	(552,985)	6,122,646
Dividend income		159,893	154,487	1,259,632	277,661
Net derivative gain on hedging instruments		89,951	69,694	36,204	77,294
Net foreign exchange gain (loss)		593,679	(1,158,809)	599,935	(1,158,548)
Other income		665,026	330,547	1,132,505	869,825
Selling expenses		(100,327)	(106,254)	(18,508)	(11,364)
Administrative expenses		(700,379)	(588,923)	(695,993)	(557,671)
Share of profit of joint ventures and associates, net		351,431	338,903	-	-
Profit before finance costs and income tax expense		1,923,526	6,968,877	1,760,790	5,619,843
Finance costs		(1,195,564)	(645,977)	(1,056,222)	(698,748)
Finance costs from repurchase of debentures		-	(431,100)	-	(431,100)
Profit before income tax expense		727,962	5,891,800	704,568	4,489,995
Income tax benefit (expense)		(116,186)	(1,080,700)	114,088	(838,206)
Profit for the period		611,776	4,811,100	818,656	3,651,789
Profit attributable to:					
Owners of the parent		566,912	4,794,747	818,656	3,651,789
Non-controlling interests		44,864	16,353	-	-
		611,776	4,811,100	818,656	3,651,789
Basic earnings per share (Baht)		0.28	2.35	0.40	1.79

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

	Consolidated financial information		Separate financial information	
	2019	2018	2019	2018
	Thousand Baht	Thousand Baht	Thousand Baht	Thousand Baht
Profit for the period	611,776	4,811,100	818,656	3,651,789
Other comprehensive income (expense)				
Items that will be reclassified subsequently to profit or loss				
Net changes in fair value of available-for-sale investments, net of tax	18,410	(50,885)	18,410	(50,885)
Exchange difference on translation	(60,674)	76,971	-	-
Share of other comprehensive income (expense) of an associate accounted for using the equity method, net of tax	(20,043)	8,257	-	-
Total items that will be reclassified subsequently to profit or loss	(62,307)	34,343	18,410	(50,885)
Items that will not be reclassified subsequently to profit or loss				
Share of other comprehensive expense of associates accounted for using the equity method, net of tax	(1,283)	-	-	-
Total items that will not be reclassified subsequently to profit or loss	(1,283)	-	-	-
Other comprehensive income (expense) for the period, net of tax	(63,590)	34,343	18,410	(50,885)
Total comprehensive income for the period	548,186	4,845,443	837,066	3,600,904
Total comprehensive income (expense) attributable to:				
Owners of the parent	507,205	4,827,586	837,066	3,600,904
Non-controlling interests	40,981	17,857	-	-
	548,186	4,845,443	837,066	3,600,904

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Thai Oil Public Company Limited
Statement of Income
For the six-month period ended 30 June 2019

Unaudited

		Consolidated financial information		Separate financial information	
		2019	2018	2019	2018
	Notes	Thousand Baht	Thousand Baht	Thousand Baht	Thousand Baht
Revenue from sales and services	5	183,587,592	188,172,167	189,629,559	195,120,011
Subsidy from oil fuel fund		765,591	1,256,571	765,591	1,256,571
Total revenue		184,353,183	189,428,738	190,395,150	196,376,582
Cost of sales of goods and services		(177,772,337)	(175,509,523)	(187,416,906)	(186,753,211)
Gross profit		6,580,846	13,919,215	2,978,244	9,623,371
Dividend income		167,106	157,372	1,869,223	2,516,443
Net derivative gain (loss) on hedging instruments		(76,381)	171,662	(21,080)	187,748
Net foreign exchange gain		1,245,583	311,606	1,259,931	212,011
Other income		1,337,103	708,192	2,284,966	1,740,911
Selling expenses		(218,340)	(224,553)	(33,163)	(36,036)
Administrative expenses		(1,128,590)	(1,059,212)	(1,149,815)	(1,036,511)
Share of profit of joint ventures and associates, net	9	702,524	671,884	-	-
Profit before finance costs and income tax expense		8,609,851	14,656,166	7,188,306	13,207,937
Finance costs		(2,410,359)	(1,396,343)	(2,142,216)	(1,358,881)
Finance costs from repurchase of debentures		-	(431,100)	-	(431,100)
Profit before income tax expense		6,199,492	12,828,723	5,046,090	11,417,956
Income tax expense		(1,116,163)	(2,289,843)	(649,555)	(1,779,892)
Profit for the period		5,083,329	10,538,880	4,396,535	9,638,064
Profit attributable to:					
Owners of the parent		4,975,226	10,402,643	4,396,535	9,638,064
Non-controlling interests		108,103	136,237	-	-
		5,083,329	10,538,880	4,396,535	9,638,064
Basic earnings per share (Baht)		2.44	5.10	2.16	4.72

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

	Consolidated financial information		Separate financial information	
	2019 Thousand Baht	2018 Thousand Baht	2019 Thousand Baht	2018 Thousand Baht
Profit for the period	5,083,329	10,538,880	4,396,535	9,638,064
Other comprehensive income (expense)				
Items that will be reclassified subsequently to profit or loss				
Net changes in fair value of available-for-sale investments, net of tax	43,152	(7,571)	43,152	(7,571)
Exchange difference on translation	(81,126)	12,391	-	-
Share of other comprehensive income (expense) of an associate accounted for using the equity method, net of tax	(25,964)	7,853	-	-
Total items that will be reclassified subsequently to profit or loss	(63,938)	12,673	43,152	(7,571)
Items that will not be reclassified subsequently to profit or loss				
Share of other comprehensive expense of associates accounted for using the equity method, net of tax	(2,112)	-	-	-
Total items that will not be reclassified subsequently to profit or loss	(2,112)	-	-	-
Other comprehensive income (expense) for the period, net of tax	(66,050)	12,673	43,152	(7,571)
Total comprehensive income for the period	<u>5,017,279</u>	<u>10,551,553</u>	<u>4,439,687</u>	<u>9,630,493</u>
Total comprehensive income (expense) attributable to:				
Owners of the parent	4,914,137	10,413,886	4,439,687	9,630,493
Non-controlling interests	103,142	137,667	-	-
	<u>5,017,279</u>	<u>10,551,553</u>	<u>4,439,687</u>	<u>9,630,493</u>

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Thai Oil Public Company Limited
Statement of Changes in Equity
For the six-month period ended 30 June 2019

Unaudited

Consolidated financial information														
														Thousand Baht
Equity attributable to the owners of the parent														
Note	Issued and paid-up share capital	Share premium	Other surpluses (deficits)		Retained earnings				Other components of equity			Total owners of the parent	Non-controlling interests	Total equity
			Surplus from business restructuring under common control	Deficit from the change in the ownership interests in subsidiaries	Deficit from the change in the net assets in an associate	Appropriated - legal reserves	Appropriated - other reserve	Unappropriated	Fair value changes in available-for-sale investments	Translation of financial statements	Share of other comprehensive income (expense) of associates			
Opening balance as at 1 January 2018	20,400,279	2,456,261	330,836	(127,795)	-	2,040,028	244,500	96,975,467	68,910	(159,142)	(5,867)	122,223,477	4,924,769	127,148,246
Dividends	-	-	-	-	-	-	-	(7,648,727)	-	-	-	(7,648,727)	(260,502)	(7,909,229)
Acquisition of non-controlling interest without a change in control	-	-	-	100,556	-	-	-	-	-	-	-	100,556	(100,556)	-
Total comprehensive income (expense) for the period														
Profit for the period	-	-	-	-	-	-	-	10,402,643	-	-	-	10,402,643	136,237	10,538,880
Other comprehensive income (expense) for the period	-	-	-	-	-	-	-	-	(7,571)	12,391	6,423	11,243	1,430	12,673
Closing balance as at 30 June 2018	<u>20,400,279</u>	<u>2,456,261</u>	<u>330,836</u>	<u>(27,239)</u>	<u>-</u>	<u>2,040,028</u>	<u>244,500</u>	<u>99,729,383</u>	<u>61,339</u>	<u>(146,751)</u>	<u>556</u>	<u>125,089,192</u>	<u>4,701,378</u>	<u>129,790,570</u>
Opening balance as at 1 January 2019	20,400,279	2,456,261	330,836	(27,239)	-	2,040,028	244,500	96,400,250	57,763	(189,932)	(723)	121,712,023	4,760,356	126,472,379
Dividends	-	-	-	-	-	-	-	(2,346,026)	-	-	-	(2,346,026)	(166,909)	(2,512,935)
Deficit from the change in the net assets in an associate 9	-	-	-	-	(3,126,946)	-	-	-	-	-	-	(3,126,946)	(696,053)	(3,822,999)
Total comprehensive income (expense) for the period														
Profit for the period	-	-	-	-	-	-	-	4,975,226	-	-	-	4,975,226	108,103	5,083,329
Other comprehensive income (expense) for the period	-	-	-	-	-	-	-	(1,878)	43,152	(81,126)	(21,237)	(61,089)	(4,961)	(66,050)
Closing balance as at 30 June 2019	<u>20,400,279</u>	<u>2,456,261</u>	<u>330,836</u>	<u>(27,239)</u>	<u>(3,126,946)</u>	<u>2,040,028</u>	<u>244,500</u>	<u>99,027,572</u>	<u>100,915</u>	<u>(271,058)</u>	<u>(21,960)</u>	<u>121,153,188</u>	<u>4,000,536</u>	<u>125,153,724</u>

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Separate financial information							
							Thousand Baht
Note	Issued and paid-up share capital	Share premium	Appropriated - legal reserve	Retained earnings		Other components of equity	Total equity
				Appropriated - other reserves	Unappropriated	Other comprehensive income (expense) Fair value changes in available-for-sale investments	
Opening balance as at 1 January 2018	20,400,279	2,456,261	2,040,028	244,500	75,955,970	68,910	101,165,948
Dividends	-	-	-	-	(7,648,727)	-	(7,648,727)
Total comprehensive income (expense) for the period							
Profit for the period	-	-	-	-	9,638,064	-	9,638,064
Other comprehensive expense for the period	-	-	-	-	-	(7,571)	(7,571)
Closing balance as at 30 June 2018	<u>20,400,279</u>	<u>2,456,261</u>	<u>2,040,028</u>	<u>244,500</u>	<u>77,945,307</u>	<u>61,339</u>	<u>103,147,714</u>
Opening balance as at 1 January 2019	20,400,279	2,456,261	2,040,028	244,500	73,487,768	57,763	98,686,599
Dividends	-	-	-	-	(2,346,026)	-	(2,346,026)
Total comprehensive income for the period							
Profit for the period	-	-	-	-	4,396,535	-	4,396,535
Other comprehensive income for the period	-	-	-	-	-	43,152	43,152
Closing balance as at 30 June 2019	<u>20,400,279</u>	<u>2,456,261</u>	<u>2,040,028</u>	<u>244,500</u>	<u>75,538,277</u>	<u>100,915</u>	<u>100,780,260</u>

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

	Notes	Consolidated financial information		Separate financial information	
		2019 Thousand Baht	2018 Thousand Baht	2019 Thousand Baht	2018 Thousand Baht
Cash flows from operating activities					
Profit for the period		5,083,329	10,538,880	4,396,535	9,638,064
Adjustments to reconcile profit (loss) to cash:					
Reversal of allowance for decline in value of inventories adjusted to net realisable value		(548,209)	(1,148)	(564,549)	-
Depreciation and amortisation		3,574,605	3,573,433	1,856,971	1,887,655
Finance costs		2,410,359	1,396,343	2,142,217	1,358,881
Finance costs from repurchase of debentures		-	431,100	-	431,100
Unrealised (gain) loss on foreign exchange		(791,594)	282,546	(795,952)	306,204
Share of profit of joint ventures and associates, net	9	(702,524)	(671,884)	-	-
Dividend income		(167,106)	(157,372)	(1,869,223)	(2,516,443)
(Gain) loss on disposal of investments		58	(4,545)	58	(4,545)
Impairment loss on non-current assets classified as held-for-sale	8	43,808	-	-	-
Loss on disposal of property, plant and equipment		6,108	1,598	6,097	449
Amortisation of advance receipts for land lease and others		(12,442)	(12,369)	(76,015)	(74,151)
Income tax expense		1,116,163	2,289,843	649,555	1,779,892
		10,012,555	17,666,425	5,745,694	12,807,106
Changes in operating assets and liabilities					
Trade accounts receivable		5,640,862	(525,691)	6,907,857	275,800
Other receivables		729,308	170,964	982,181	282,991
Inventories		(1,370,827)	(5,963,017)	(1,445,232)	(6,389,639)
Value added tax receivables		27,239	144,519	(78,905)	-
Other non-current assets		102,519	88,083	(8,755)	(6,172)
Trade accounts payable		(4,559,905)	4,936,508	(5,713,870)	4,137,964
Other payables		(678,593)	(929,749)	(361,533)	(299,310)
Excise duty payables		(1,493,866)	(832,033)	(1,493,866)	(832,033)
Other non-current liabilities		906,590	72,697	927,584	62,239
		9,315,882	14,828,706	5,461,155	10,038,946
Cash generated from operating activities		9,315,882	14,828,706	5,461,155	10,038,946
Income tax paid		(668,893)	(3,644,441)	(56,836)	(2,934,171)
Net cash generated from operating activities		8,646,989	11,184,265	5,404,319	7,104,775

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Thai Oil Public Company Limited
Statement of Cash Flows
For the six-month period ended 30 June 2019

Unaudited

		Consolidated financial information		Separate financial information	
		2019	2018	2019	2018
	Notes	Thousand Baht	Thousand Baht	Thousand Baht	Thousand Baht
Cash flows from investing activities					
Dividends received		540,621	567,842	1,869,223	2,512,043
Payments for deposits at a financial institution used as collaterals		(19,537)	-	-	-
Proceeds from disposal of short-term investments, net		36,258,891	10,419,621	36,065,641	10,317,231
Proceeds from disposal of available-for-sale investments		-	919,043	-	919,043
Purchase of other long-term investments		(34,841)	-	(34,841)	-
Payments for short-term loans to related parties	14	-	-	(519,517)	(210,000)
Proceeds from short-term loans to related parties	14	-	-	1,173,000	9,378,000
Proceeds from short-term loans to a third party		45,000	45,000	-	-
Proceeds from long-term loans to savings co-operative of employees		(1,281)	14,605	(1,281)	14,605
Proceeds from disposal of property, plant and equipment		542	128,643	524	-
Purchase of property, plant and equipment		(10,377,210)	(2,461,214)	(9,128,748)	(2,079,925)
Purchase of intangible assets		(146,542)	(29,196)	(144,821)	(26,691)
Net cash from investing activities		26,265,643	9,604,344	29,279,180	20,824,306
Cash flows from financing activities					
Finance costs paid		(2,482,024)	(1,826,733)	(2,185,839)	(1,793,839)
Finance costs paid for repurchase of debentures		-	(56,631)	-	(56,631)
Dividends paid to the Group's shareholders		(2,346,026)	(7,648,727)	(2,346,026)	(7,648,727)
Dividends paid to non-controlling interests		(166,909)	(260,502)	-	-
Proceeds from short-term borrowings from third parties		3,929,009	22,646,334	-	18,990,293
Repayment of short-term borrowings from third parties		(4,464,201)	(22,215,671)	-	(18,990,293)
Proceeds from (repayment of) short-term borrowings from related parties	14	-	-	(480,050)	132,035
Proceeds from long-term borrowings from related parties	14	-	-	-	18,915,356
Proceeds from long-term borrowings from third parties		49,503	8,654,676	-	-
Repayment of long-term borrowings from third parties		(616,000)	(871,159)	-	-
Proceeds from debenture		-	18,915,473	-	-
Redemption of debenture		(3,000,000)	(20,076,406)	(3,000,000)	(20,076,406)
Net cash used in financing activities		(9,096,648)	(2,739,346)	(8,011,915)	(10,528,212)

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

Statements of Cash Flows

For the six-month period ended 30 June 2019

	Consolidated financial information		Separate financial information	
	2019	2018	2019	2018
	Thousand Baht	Thousand Baht	Thousand Baht	Thousand Baht
Net increase in cash and cash equivalents	25,815,984	18,049,263	26,671,584	17,400,869
Cash and cash equivalents at the beginning of the period	33,741,253	15,623,427	29,868,078	11,914,510
Effect of exchange rate changes	(2,218,969)	880,092	(2,203,505)	864,272
Cash and cash equivalents at the end of the period	57,338,268	34,552,782	54,336,157	30,179,651
Non-cash transactions				
Payables on purchase of property, plant and equipment	2,508,267	185,650	2,462,542	146,316
Payables on purchase of intangible assets	140	202,243	-	-
Payables on purchase of investment securities (in private funds)	44,758	5,051	44,758	5,051

The accompanying condensed notes to the interim financial information on pages 14 to 27 are an integral part of this interim financial information.

1 General information

Thai Oil Public Company Limited (the Company) is a public limited company which is incorporated and domiciled in Thailand and is listed on the Stock Exchange of Thailand. The address of the Company's registered offices and refinery plants as follows:

Head office : 555/1 Energy Complex Building A, 11th Floor, Vibhavadi Rangsit Road,
Kwang Chatuchak, Khet Chatuchak, Bangkok 10900, Thailand

Sriracha office and refinery plants : 42/1 Moo 1, Sukhumvit Road Km. 124, Tambol Tungsukla, Amphur Sriracha,
Chonburi 20230, Thailand

For the purpose of reporting this interim financial information, the Company and its subsidiaries are referred to as the Group.

The principal business operations of the Group is oil refinery and distributions, petrochemicals, lube base oil and other businesses in domestic and overseas.

This interim consolidated and separate financial information is presented in Thai Baht and rounded to the nearest thousand, unless otherwise stated.

This interim consolidated and separate financial information was authorised for issue by the Board of Directors on 9 August 2019.

2 Basis of preparation of the interim financial information

The interim consolidated and separate financial information has been prepared in accordance with Thai Accounting Standard (TAS) 34, "Interim Financial Reporting" and other financial reporting requirements issued under the Securities and Exchange Act.

The interim financial information should be read in conjunction with the annual financial statements for the year ended 31 December 2018.

An English version of the interim consolidated and separate financial information has been prepared from the interim financial information that is in the Thai language. In the event of a conflict or a difference in interpretation between the two languages, the Thai language interim financial information shall prevail.

3 Accounting policies

The accounting policies used in the preparation of the interim financial information are consistent with those used in the annual financial statements for the year ended 31 December 2018, except for the new accounting policies for revenue from contracts with customers as described in note 3.2.

3.1 Revised accounting standards, revised financial reporting standards, and related interpretations

The Group has applied the revised financial reporting standards which were effective for annual periods beginning on or after 1 January 2019, which are relevant to the Group. The application has no material impact to the Group.

The Group has not yet adopted new financial reporting standards and revised accounting standards which are effective for annual periods beginning on or after 1 January 2020. The Group's management is currently assessing the impact of initial adoption of these standards.

3.2 New accounting policies for revenue from contracts with customers

Sales of goods

Revenue from contracts with customers that is derived in connection with oil refinery, lube base oil refinery, petrochemical, power generation, solvent and ethanol business is recognised when the Group satisfies a performance obligation by transferring the petroleum products, petrochemical products and other products to customers via vessel, truck, or pipeline. A transfer of goods generally occurs at the same time when legal ownerships are transferred to customers and customers have physical goods in their possession. In that case, the Group satisfies a performance obligation at a point in time.

Revenue from services

Revenue from services is mainly derived from marine transportation services and is recognised as service is performed. The Group satisfies a performance obligation over time.

The accounting for revenue under Thai Financial Reporting Standards 15, "Revenue from contracts with customers", does not result in a substantive change from the Group's current practice.

4 Estimates

The preparation of interim financial information requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets and liabilities, income and expense. Actual results may differ from these estimates.

In preparing this interim financial information, the significant judgements made by management in applying the Group's accounting policies and the key sources of uncertain estimation were the same as those that applied to the consolidated and separate financial statements for the year ended 31 December 2018.

5 Segment and revenue information

Segment information is presented in respect of the Group's operating segments. The primary format, business segments, is based on the Group's management and the internal reporting structure provided to the chief operating decision maker.

Segment results, assets and liabilities include items directly attributable to a segment as well as those that can be allocated on a reasonable basis.

Reportable segments

The Group comprises the following main business segments:

- Segment 1 : Oil refinery
- Segment 2 : Lube base oil refinery
- Segment 3 : Petrochemical
- Segment 4 : Power generation
- Segment 5 : Marine transportation services
- Segment 6 : Solvent
- Segment 7 : Ethanol
- Segment 8 : Others

Thai Oil Public Company Limited
Condensed notes to the interim financial information (Unaudited)
For the six-month period ended 30 June 2019

Total asset, revenue and operating results, based on business segments, in the interim consolidated financial information for the three-month and six-month periods ended 30 June 2019 and 2018 are as follows:

For the three-month period ended 30 June 2019										
	Oil refinery	Lube base oil refinery	Petro-chemical	Power generation	Marine transportation services	Solvent	Ethanol	Others	Eliminations	Total
	Million Baht									
Revenue from sale and services										
- External customers	79,293	3,670	5,229	1,287	96	2,152	235	-	-	91,962
- Intersegment	15,251	1,157	8,269	1,682	60	24	127	1,002	(27,572)	-
Total	94,544	4,827	13,498	2,969	156	2,176	362	1,002	(27,572)	91,962
Segment profit (loss) before income tax expense	704	403	48	778	(70)	3	(17)	43	(1,165)	727
Timing of revenue recognition										
- At a point in time	94,544	4,827	13,498	2,969	-	2,176	362	1,002	(27,512)	91,866
- Over time	-	-	-	-	156	-	-	-	(60)	96
Total revenue	94,544	4,827	13,498	2,969	156	2,176	362	1,002	(27,572)	91,962
For the three-month period ended 30 June 2018										
	Oil refinery	Lube base oil refinery	Petro-chemical	Power generation	Marine transportation services	Solvent	Ethanol	Others	Eliminations	Total
	Million Baht									
Revenue from sale and services										
- External customers	82,601	3,845	6,128	1,209	90	2,497	266	-	-	96,636
- Intersegment	18,067	1,181	9,457	1,671	69	27	113	416	(31,001)	-
Total	100,668	5,026	15,585	2,880	159	2,524	379	416	(31,001)	96,636
Segment profit (loss) before income tax expense	4,490	450	221	740	(1)	111	(30)	14	(103)	5,892
Timing of revenue recognition										
- At a point in time	100,668	5,026	15,585	2,880	-	2,524	379	416	(30,932)	96,546
- Over time	-	-	-	-	159	-	-	-	(69)	90
Total revenue	100,668	5,026	15,585	2,880	159	2,524	379	416	(31,001)	96,636

Thai Oil Public Company Limited
Condensed notes to the interim financial information (Unaudited)
For the six-month period ended 30 June 2019

For the six-month period ended 30 June 2019										
	Oil refinery	Lube base oil refinery	Petro-chemical	Power generation	Marine transportation services	Solvent	Ethanol	Others	Eliminations	Total
	Million Baht									
Revenue from sale and services										
- External customers	157,547	7,143	11,397	2,454	205	4,379	463	-	-	183,588
- Intersegment	32,083	2,388	16,549	3,486	121	56	276	1,923	(56,882)	-
Total	189,630	9,531	27,946	5,940	326	4,435	739	1,923	(56,882)	183,588
Segment profit (loss) before income tax expense	5,046	472	983	1,286	(72)	63	(1)	75	(1,653)	6,199
Timing of revenue recognition										
- At a point in time	189,630	9,531	27,946	5,940	-	4,435	739	1,923	(56,761)	183,383
- Over time	-	-	-	-	326	-	-	-	(121)	205
Total revenue	189,630	9,531	27,946	5,940	326	4,435	739	1,923	(56,882)	183,588
Total segment assets at 30 June 2019	214,999	5,584	26,130	22,015	3,521	6,469	2,769	50,544	(75,578)	256,453
at 31 December 2018	223,845	6,161	29,134	25,053	3,631	6,926	2,643	53,123	(81,903)	268,613

For the six-month period ended 30 June 2018										
	Oil refinery	Lube base oil refinery	Petro-chemical	Power generation	Marine transportation services	Solvent	Ethanol	Others	Eliminations	Total
	Million Baht									
Revenue from sale and services										
- External customers	159,780	7,807	12,826	2,330	178	4,742	509	-	-	188,172
- Intersegment	35,340	2,204	18,589	3,250	135	49	235	615	(60,417)	-
Total	195,120	10,011	31,415	5,580	313	4,791	744	615	(60,417)	188,172
Segment profit (loss) before income tax expense	11,418	974	1,147	1,428	(2)	159	13	21	(2,329)	12,829
Timing of revenue recognition										
- At a point in time	195,120	10,011	31,415	5,580	-	4,791	744	615	(60,282)	187,994
- Over time	-	-	-	-	313	-	-	-	(135)	178
Total revenue	195,120	10,011	31,415	5,580	313	4,791	744	615	(60,417)	188,172

The Group generates revenue from sales and services by utilising the assets mostly located in Thailand and sales are mostly originated in Thailand.

6 Financial instruments

Carrying amount and fair value of financial instruments measured by fair value

The table below analyses financial instruments carried at fair value by valuation method. The different levels have been defined as follows:

- Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities.
- Level 2: Inputs other than quoted prices included within level 1 that are observable for the asset or liability, either directly (that is, as prices) or indirectly (that is, derived from prices).
- Level 3: Inputs for the asset or liability that are not based on observable market data (unobservable inputs).

The fair value of financial assets together with the carrying amount in the consolidated and separate statement of financial position are as follows:

	Consolidated and separate financial information				
	Carrying amount	Fair value			Total
	Million Baht	Level 1 Million Baht	Level 2 Million Baht	Level 3 Million Baht	Million Baht
As at 30 June 2019					
Available-for-sale investments					
Debt investments (in private funds)	12,037	-	12,037	-	12,037
Equity investment	397	397	-	-	397
As at 31 December 2018					
Available-for-sale investments					
Debt investments (in private funds)	11,903	-	11,903	-	11,903
Equity investment	361	361	-	-	361

Valuation techniques used to measure fair value level 2

Type	Valuation technique
Debt investments (in private funds)	Thai Bond Market Association Government Bond Yield Curve as of the reporting date.

7 Trade accounts receivable, net

As at	Consolidated financial information		Separate financial information	
	30 June 2019 Million Baht	31 December 2018 Million Baht	30 June 2019 Million Baht	31 December 2018 Million Baht
Related parties (Note 14)	8,579	11,812	12,175	17,390
Other parties	10,126	12,547	6,097	7,804
Total	18,705	24,359	18,272	25,194
<u>Less</u> Allowance for doubtful accounts	-	-	-	-
Net	18,705	24,359	18,272	25,194

Aging analyses for trade accounts receivable are as follows:

As at	Consolidated financial information		Separate financial information	
	30 June 2019 Million Baht	31 December 2018 Million Baht	30 June 2019 Million Baht	31 December 2018 Million Baht
Related parties				
Within credit terms	8,579	11,812	12,175	17,390
<u>Less</u> Allowance for doubtful accounts	-	-	-	-
Net	8,579	11,812	12,175	17,390
Other parties				
Within credit terms	10,124	12,545	6,097	7,804
Overdue:				
- Less than 3 months	2	2	-	-
	10,126	12,547	6,097	7,804
<u>Less</u> Allowance for doubtful accounts	-	-	-	-
Net	10,126	12,547	6,097	7,804
Total	18,705	24,359	18,272	25,194

The normal credit term granted by the Group ranges from 15 days to 90 days.

8 Non-current assets classified as held-for-sale

The Group's indirect subsidiary's crew boat which is the asset under marine transportation services segment was classified as non-current assets held-for-sale during the period at the lower of its carrying amount and fair value less costs to sell from the time the Group considered that this asset is held for sale. Therefore, the Group recognised its loss of Baht 43.81 million as the administrative expenses in the statement of income. Also, the Group measured the non-recurring fair value using the market approach, and this fair value falls within a level 2 of the fair value hierarchy.

The classification of the non-current assets held-for-sale was in line with the operating business strategy and sales obligations of the indirect subsidiary's management. The management expects the sales to be completed by August 2019.

9 Investments in joint ventures and associates

Movements of investments in joint ventures and associates for the six-month period ended 30 June 2019 and 2018 are as follows:

For the six-month period ended 30 June	Consolidated financial information		Separate financial information	
	2019 Million Baht	2018 Million Baht	2019 Million Baht	2018 Million Baht
At 1 January	14,941	14,368	1,261	1,261
Share of profit of joint ventures and associates, net	702	672	-	-
Dividend income	(374)	(372)	-	-
Exchange difference on translation	(51)	8	-	-
Share of other comprehensive income (expense) of associates, net of tax	(2)	8	-	-
Deficit from the change in the net assets in an associate	(3,823)	-	-	-
At 30 June	11,393	14,684	1,261	1,261
At 31 December	-	14,941	-	1,261

On 20 June 2018, an associate of the Group entered into Share Purchase Agreement with a company which is a shareholder of Glow Energy Public Company Limited (GLOW) to purchase shares of GLOW. The shares purchase transaction has already been completed on 14 March 2019. The associate has purchased both direct and indirect shares of GLOW for 69.11% of total registered and paid-up capital.

Subsequently, during 25 March 2019 to 17 May 2019, the associate submitted the tender offer to purchase remaining shares from GLOW's minority shareholders. The associate has acquired additional 26.14% of total registered and paid-up capital from the tender offer, causing the associate to be the major shareholders of GLOW with a 95.25% of total registered and paid-up capital in total. Therefore, the investment has been reclassified as investment in subsidiary.

10 Property, plant and equipment, net

Acquisitions, disposals and transfers of property, plant and equipment during the six-month period ended 30 June 2019 and 2018 are as follows:

**For the six-month period ended
30 June**

	Consolidated financial information			
	2019		2018	
	Acquisitions and transfers in - at cost Million Baht	Disposals and transfers out - net book value Million Baht	Acquisitions and transfers in - at cost Million Baht	Disposals and transfers out - net book value Million Baht
Land	130	(1)	69	-
Buildings	788	(1)	9	-
Refinery plant and equipment	829	(5)	59	(1)
Petrochemical plants	913	-	25	-
Power plants	25	-	2	-
Machinery, equipment and plant equipment	267	-	31	-
Oil and liquid chemical tanker and crew boats	156	(102)	14	(117)
Furniture, fixtures, office equipment and others	40	-	8	(1)
Vehicles	-	-	1	-
Construction in progress	10,783	(1,524)	2,085	(61)
Total	13,931	(1,633)	2,303	(180)

**For the six-month period ended
30 June**

	Separate financial information			
	2019		2018	
	Acquisitions and transfers in - at cost Million Baht	Disposals and transfers out - net book value Million Baht	Acquisitions and transfers in - at cost Million Baht	Disposals and transfers out - net book value Million Baht
Land	130	(1)	69	-
Buildings	784	(1)	1	-
Refinery plant and equipment	829	(5)	59	-
Machinery, equipment and plant equipment	11	-	16	-
Furniture, fixtures, office equipment and others	38	-	6	-
Construction in progress	10,391	(1,085)	1,744	(19)
Total	12,183	(1,092)	1,895	(19)

11 Trade accounts payable

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Related parties (Note 14)	9,513	10,595	10,330	12,726
Other parties	7,753	11,249	7,454	10,791
Total	17,266	21,844	17,784	23,517

12 Commitments and significant contracts

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Capital commitments				
Project construction agreements	78,848	4,162	78,623	4,051
Total	78,848	4,162	78,623	4,051
Non-cancellable operating lease commitments				
Within one year	246	238	231	231
After one year but within five years	1,260	1,418	1,200	1,390
After five years	17,913	17,724	17,666	17,591
Total	19,419	19,380	19,097	19,212
Other commitments				
Letters of guarantee issued by financial institutions	2,401	2,007	1,800	1,426
Forward exchange contract	85	-	85	-
Crude oil and raw material purchase agreements	44,982	44,543	44,974	44,543
Total	47,468	46,550	46,859	45,969

Investment in Clean Fuel Project

The Company has engaged contractors for construction of Clean Fuel Project (CFP) which has been approved in the Extraordinary General Meeting of Shareholders held on 27 August 2018, with the investment project value of not exceeding US Dollar 4,825 million or equivalent to Baht 160,279 million. The project cost includes the investment of Energy Recovery Unit (ERU). The ERU is an electrical power plant, with the designed generating capacity of 250 megawatts and steam, to supply the production process of the CFP.

Interest Rate Swap Contracts

A subsidiary has entered into interest rate swap contracts with financial institutions to manage exposure and fluctuations in interest rate on long-term loans of Thai Baht currency. As at 30 June 2019, a subsidiary had notional amount of Baht 6,133 million (31 December 2018: Baht 6,241 million), whereby exchanging floating interest rate based on THBFIX 3M plus certain margin per annum with fixed interest rate. The swap contracts are effective from April 2018 to March 2028.

13 Contingent liabilities and contingent assets

As at 30 June 2019, the Company had the following contingent liabilities and contingent assets:

The Company has crack spread swap with foreign companies (counterparties). The Company has or the counterparties have commitments to make payments for the differences between the fixed price and floating price of each period.

As at 30 June 2019, the Company had oil volume under the agreements totalling 6.06 million barrels (31 December 2018: 1.10 million barrels).

14 Related party transactions

The Company is an entity in the PTT Public Company Limited (PTT) group of companies. PTT is incorporated in Thailand and is the major shareholder and the parent of the Company. PTT owned 48.03% of the Company's issued and paid-up share capital as at 30 June 2019 (31 December 2018: 48.03%).

The pricing policies for particular types of transactions are explained further below:

Transactions	Pricing policies
Revenue from sales and services, lease income, purchase of goods and assets	Market prices or, where no market price exists, at contractually agreed prices
Interest income and expense	Agreed rates stipulated in the agreements
Dividend income	Right to receive dividends
Other income and expenses	Contractually agreed prices
Directors' remuneration	Amounts approved by the Group's shareholders

Significant transactions for the three-month and six-month periods ended 30 June 2019 and 2018 with related parties are as follows:

For the three-month period ended 30 June	Consolidated financial information		Separate financial information	
	2019	2018	2019	2018
	Million Baht	Million Baht	Million Baht	Million Baht
Parent company				
Revenue from sales and services	802	43,481	793	42,468
Purchase of crude oil and feedstock	30,012	39,071	27,830	37,021
Other income	-	5	-	5
Other expenses	23	28	22	28
Subsidiaries				
Revenue from sales and services	-	-	15,265	18,078
Purchase of crude oil and feedstock	-	-	10,772	11,941
Interest income	-	-	37	58
Dividend income	-	-	975	-
Land lease income	-	-	16	18
Other income	-	-	378	488
Interest expense	-	-	661	224
Other expenses	-	-	315	207
Purchase of assets	-	-	29	5
Joint ventures				
Other expenses	307	349	307	349
Associates				
Revenue from sales and services	-	2	-	-
Purchase of crude oil and feedstock	61	169	54	169
Dividend income	374	123	124	123
Land lease income	2	2	2	2
Other income	5	5	5	5
Other expenses	82	69	72	63
Purchase of assets	5	17	5	17
Other related parties				
Revenue from sales and services	44,217	1,581	41,983	89
Purchase of crude oil and feedstock	5,684	1,767	4,301	250
Purchase or sale of crude oil and feedstock for legal reserve	1,302	1,204	1,302	1,204
Dividend income	160	154	160	154
Other income	16	-	16	-
Other expenses	94	90	83	78
Directors' remuneration	41	57	39	55

Thai Oil Public Company Limited
Condensed notes to the interim financial information (Unaudited)
For the six-month period ended 30 June 2019

For the six-month period ended 30 June	Consolidated financial information		Separate financial information	
	2019	2018	2019	2018
	Million Baht	Million Baht	Million Baht	Million Baht
Parent company				
Revenue from sales and services	803	84,447	793	82,392
Purchase of crude oil and feedstock	63,009	67,738	58,620	63,779
Other income	1	8	1	8
Other expenses	64	65	63	64
Purchase of assets	1	-	1	-
Subsidiaries				
Revenue from sales and services	-	-	32,103	35,360
Purchase of crude oil and feedstock	-	-	21,688	23,304
Interest income	-	-	76	185
Dividend income	-	-	1,577	2,236
Land lease income	-	-	35	36
Other income	-	-	936	899
Interest expense	-	-	1,331	230
Other expenses	-	-	548	410
Purchase of assets	-	-	59	9
Joint ventures				
Other expenses	625	678	625	678
Associates				
Revenue from sales and services	-	2	-	-
Purchase of crude oil and feedstock	136	300	125	300
Dividend income	374	-	124	123
Land lease income	4	4	4	4
Other income	10	11	10	10
Other expenses	117	124	106	113
Purchase of assets	18	21	18	21
Other related parties				
Revenue from sales and services	88,562	3,150	83,876	180
Purchase of crude oil and feedstock	8,685	3,485	6,103	745
Purchase or sale of crude oil and feedstock for legal reserve	1,302	1,204	1,302	1,204
Dividend income	160	154	160	154
Other income	19	-	19	-
Other expenses	181	178	161	157
Directors' remuneration	48	65	43	59

Balances as at 30 June 2019 and 31 December 2018 with related parties are as follows:

Trade accounts receivable - related parties

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Parent company	40	85	40	85
Subsidiaries	-	-	4,149	6,490
Associates	-	5	-	5
Other related parties	8,539	11,722	7,986	10,810
	8,579	11,812	12,175	17,390
<u>Less</u> Allowance for doubtful accounts	-	-	-	-
Trade accounts receivable - related parties, net	8,579	11,812	12,175	17,390

Other receivables - related parties

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Parent company	-	1	-	1
Subsidiaries	-	-	137	327
Associates	1	1	1	1
Other related parties	3	-	3	-
Total	4	2	141	329

Short-term loans to related parties

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Subsidiaries	-	-	3,621	4,274
Total	-	-	3,621	4,274

Interest rates during the six-month period ended 30 June 2019 and 2018 were charged at highest money market rate for short-term loan based on BIBOR 3M plus certain fixed margin per annum.

Movements of short-term loans to related parties during the six-month period ended 30 June 2019 and 2018 are as follows:

	Consolidated financial information		Separate financial information	
	2019	2018	2019	2018
	Million Baht	Million Baht	Million Baht	Million Baht
At 1 January	-	-	4,274	15,651
Cash flows:				
Payments for short-term loans	-	-	520	210
Proceeds from short-term loans	-	-	(1,173)	(9,378)
At 30 June	-	-	3,621	6,483

Long-term loan to a related party

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Subsidiary	-	-	400	400
Total	-	-	400	400

Interest rates during the six-month period ended 30 June 2019 and 2018 were charged at highest money market rate for short-term loan based on BIBOR 3M plus certain fixed margin per annum.

There is no movement of long-term loan to a related party for the six-month period ended 30 June 2019 and 2018.

Trade accounts payable - related parties

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Parent company	8,669	9,546	7,286	8,093
Subsidiaries	-	-	2,675	3,916
Associates	13	27	8	23
Other related parties	831	1,022	361	694
Total	9,513	10,595	10,330	12,726

Other payables - related parties

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Parent company	-	5	-	2
Subsidiaries	-	-	698	705
Associates	22	51	22	51
Other related parties	29	28	25	24
Total	51	84	745	782

Short-term borrowings from related parties

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Subsidiaries	-	-	1,026	1,506
Total	-	-	1,026	1,506

Interest rates during the six-month period ended 30 June 2019 and 2018 were charged at highest money market rate for short-term loan based on BIBOR 1M plus certain fixed margin per annum.

Movements of short-term borrowings from related parties during the six-month period ended 30 June 2019 and 2018 are as follows:

	Consolidated financial information		Separate financial information	
	2019	2018	2019	2018
	Million Baht	Million Baht	Million Baht	Million Baht
At 1 January	-	-	1,506	503
Cash flows:				
Proceeds from (repayment of)				
short-term borrowings	-	-	(480)	132
At 30 June	-	-	1,026	635

Long-term borrowings from a related party

As at	Consolidated financial information		Separate financial information	
	30 June 2019	31 December 2018	30 June 2019	31 December 2018
	Million Baht	Million Baht	Million Baht	Million Baht
Subsidiary	-	-	49,313	52,028
Total	-	-	49,313	52,028

Movements of long-term borrowings from a related party during the six-month period ended 30 June 2019 and 2018 are as follows:

	Consolidated financial information		Separate financial information	
	2019	2018	2019	2018
	Million Baht	Million Baht	Million Baht	Million Baht
At 1 January	-	-	52,028	-
<u>Cash flows:</u>				
Proceeds from long-term borrowings	-	-	-	18,915
<u>Other non-cash movements:</u>				
Amortisation of deferred financing fee	-	-	5	1
(Gain) loss on exchange rate	-	-	(2,720)	1,407
At 30 June	-	-	49,313	20,323

Long-term loan agreements

On 11 April 2018 and 21 November 2018, the Company has entered into long-term loan agreements with a subsidiary at the total amount of US Dollar 1,600.40 million. The loans bear a fixed interest rate of 4.03 to 5.96 per annum with maturity dates in 2023 to 2048.

Significant agreements with related parties

As at 30 June 2019, the Group has significant agreements with related parties in addition to those disclosed in the financial statements for the year ended 31 December 2018 as follows:

Asset Sale and Purchase Agreement for the ERU

The Company has entered into the Asset Sale and Purchase Agreement for the ERU with a related company to support energy and utilities for CFP whereby the purchase price is specified in the agreement. The Company will transfer ownership in the ERU to the purchaser upon satisfaction of all the conditions precedent set out in the agreement (Closing Date). Such conditions precedent include the Company's countersigning of the Provisional Acceptance Certificate (PAC) to the contractor which is expected to occur in 2023 and purchaser and seller receive all necessary certification from relevant authorities.

Fuel and Utilities Supply Agreement

The Company has entered into the Fuel and Utilities Supply Agreement with a related company to supply pitch, other fuels and utilities used in the operation of the ERU. The term of the agreement is 25 years from the Closing Date and the parties may agree to extend the term for another 5 years.

Power Purchase Agreement

The Company has entered into the Power Purchase Agreement with a related company to purchase electricity, steam and other by-products generated by the ERU. The term of the agreement is 25 years from the Closing Date and the parties may agree to extend the term for another 5 years.

Operation and Maintenance Services Agreement

The Company has entered into the Operation and Maintenance Services Agreement with a related company to provide the services of operation and maintenance of the ERU. The term of the agreement is 25 years from the Closing Date and the parties may agree to extend the term for another 5 years.

15 Reclassifications

The comparative figures have been reclassified to conform with changes in presentation in the current period. The Group has reclassified each financial statement line item as follows:

	Consolidated financial information			Separate financial information		
	Previously reported Million Baht	Reclassification Million Baht	After reclassification Million Baht	Previously reported Million Baht	Reclassification Million Baht	After reclassification Million Baht
Statement of financial position as at 31 December 2018						
Cash and cash equivalents	34,041	(300)	33,741	-	-	-
Deposits at a financial institutions used as collaterals	-	300	300	-	-	-
Statement of income for the three-month period ended 30 June 2018						
Revenue from sales and services	96,711	(74)	96,637	100,743	(74)	100,669
Subsidy from oil fuel fund	-	563	563	-	563	563
Cost of sales of goods and services	(88,781)	(489)	(89,270)	(94,620)	(489)	(95,109)
Statement of income for the six-month period ended 30 June 2018						
Revenue from sales and services	188,328	(156)	188,172	195,276	(156)	195,120
Subsidy from oil fuel fund	-	1,257	1,257	-	1,257	1,257
Cost of sales of goods and services	(174,408)	(1,101)	(175,509)	(185,652)	(1,101)	(186,753)

16 Dividend

At the Annual General Meeting of Shareholders of the Company held on 10 April 2019, the shareholders approved the payment of dividends in respect of the operating result of 2018 at Baht 2.65 per share, totalling Baht 5,406 million. After a deduction of the interim dividends of Baht 1.50 per share which were paid to the Company's shareholders in September 2018, the dividends remain for distribution were Baht 1.15 per share, totalling Baht 2,346 million. The dividends were paid to the shareholders on 26 April 2019.

17 Events during the reporting period

The share purchase for indirect subsidiary

On 31 May 2019, the Board of Directors' meeting of TOP Solvent Company Limited (TS), an indirect subsidiary of the Company, resolved to approve TS to purchase the shares for investment in PT. Tirta Surya Raya (TSR) for the amount of up to US Dollar 1.50 million, or approximately of Baht 47.70 million. TS will purchase 15,410 ordinary shares from the existing shareholders of TSR or equivalent to shareholding of 67%.

Establishment of subsidiaries

On 25 June 2019, the Board of Directors' meeting of Thail Oil Treasury Center Co.,Ltd. (TTC), a direct subsidiary of the Company, has resolved to establish TOP Ventures Company Limited, a company registered in Thailand, and TOP Ventures Hong Kong Limited, a company registered in Hong Kong, to invest in Venture Capital (VC) Fund and/or Start-up Business. The objective of this establishment is to expand into new business segment in which the Group has expertise of, and to prepare for emerging business disruption. TOP Ventures Company Limited and TOP Ventures Hong Kong Limited are 100% owned by TTC with registered share capital of Baht 35 million and Hong Kong Dollar 1, respectively.

18 Events occur after the reporting period

The provision of support to an associate

On 26 July 2019, the Board of Directors meeting (extra) No. 1/2019 has passed a resolution on the provision of support to Global Power Synergy Public Company Limited (GPSC) which is the associate of the Group. The Company and a subsidiary hold shareholding interest in GPSC at 8.91% and 20.79%, respectively. GPSC will propose the increase in its registered capital at its Extraordinary General Meeting of Shareholders to seek further approval on this transaction. The Group plans to subscribe additional shares in proportion of their shareholding interests under the terms and conditions of the capital increase subscription proposed by GPSC.

Independent Auditor's Report

To the Shareholders of Thai Oil Public Company Limited

Opinion

I have audited the consolidated and separate financial statements of Thai Oil Public Company Limited and its subsidiaries (the "Group") and of Thai Oil Public Company Limited (the "Company"), respectively, which comprise the consolidated and separate statements of financial position as at 31 December 2018, the consolidated and separate statements of income, comprehensive income, changes in equity and cash flows for the year then ended, and notes, comprising a summary of significant accounting policies and other explanatory information.

In my opinion, the accompanying consolidated and separate financial statements present fairly, in all material respects, the financial position of the Group and the Company, respectively, as at 31 December 2018 and their financial performance and cash flows for the year then ended in accordance with Thai Financial Reporting Standards (TFRSs).

Basis for Opinion

I conducted my audit in accordance with Thai Standards on Auditing (TSAs). My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Consolidated and Separate Financial Statements* section of my report. I am independent of the Group and the Company in accordance with the Code of Ethics for Professional Accountants issued by the Federation of Accounting Professions that is relevant to my audit of the consolidated and separate financial statements, and I have fulfilled my other ethical responsibilities in accordance with these requirements. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Key Audit Matters

Key audit matters are those matters that, in my professional judgment, were of most significance in my audit of the consolidated and separate financial statements of the current period. These matters were addressed in the context of my audit of the consolidated and separate financial statements as a whole, and in forming my opinion thereon, and I do not provide a separate opinion on these matters.

<i>Impairment of goodwill</i>	
Refer to Note 3 and 16 to the financial statements.	
The key audit matter	How the matter was addressed in the audit
TOP Solvent (Vietnam) Limited Liability Company (“TSV”), an indirect subsidiary of the Company which operates in Vietnam, has a historical business combination which resulted significant goodwill balance amounting to Baht 585 million. Goodwill is subjected to an annual impairment test. No impairment charge has been recorded by management against this balance in the current financial year. Due to the high level of the management’s judgement involved in respect of the assumptions used to support goodwill value, and the significance of the carrying amounts involved, this is one of the key judgmental areas that my audit is concentrated on.	My audit procedures in this area included, among others: - understanding and evaluating the Group’s forecasting and budgeting procedures and testing of the principles and accuracy of the calculation derived from forecast model and evaluating the reasonableness of key inputs in the calculations such as revenue growth, discount rate and working capital assumptions, by reference to the Board approved forecast models, data external to the Group and my own views; - evaluating the accuracy of forecasts by comparing with the actual results; and - evaluating the adequacy of disclosure in accordance with Thai Financial Reporting Standards.

<i>Valuation of inventory</i>	
Refer to Note 3 and 10 to the financial statements.	
The key audit matter	How the matter was addressed in the audit
Inventory is required to be carried at the lower of its cost and net realisable value. Inventory is a significant balance and the group’s main raw materials and finished goods are commodities which can be subject to price volatility which may lead to lower of net realisable value comparing to cost. Due to the high level of the management’s judgement involved, this is one of the key judgmental areas that my audit is concentrated on.	My audit procedures in this area included, among others: - understanding and performing test of design and implementation as well as operating effectiveness of controls over inventory valuation process; - assessing the appropriateness of the methodology used to calculate the provisions held against inventory at year end, considering the reasonableness of selling price used by reference to commodity price, and assessing the accuracy of the calculation; and - evaluating the adequacy of disclosure in accordance with Thai Financial Reporting Standards.

<i>Impairment of property, plant and equipment in the consolidated financial statements and loan to and investment in subsidiary in separate financial statements in marine transportation business</i>	
Refer to Note 3 5 11 and 15 to the financial statements.	
The key audit matter	How the matter was addressed in the audit
The Group has certain vessels and crew boats which are not fully used in operation due to the fact that the exploration business is in the downturn from prolonged falls in prevailing oil and gas price which resulted in low freight charge and demand in marine transportation business. This situation indicated that property, plant and equipment, loan to and investment in subsidiary in marine transportation business may be impaired. As a result, for impairment assessment, the Group has assessed the recoverable amount based on the higher of the fair value less costs of disposal and value in use. Due to a significant judgment involved in respect of the assumptions used to support valuation of property, plant and equipment, loan to and investment in subsidiary, and the significance of the carrying amount involved, this is one of the key judgmental areas that my audit is concentrated on.	My audit procedures in this area included, among others: - understanding of impairment assessment, procedures to assess the recoverable amount and forecasting and budgeting process and testing of the principles and accuracy of the calculation derived from forecast model and evaluating the reasonableness of key inputs in the calculations such as freight and utilisation rate, discount rate and working capital assumptions, by reference to the Board approved forecast models, actual result, data external to the Group and my own views; - challenging the source of information and weighted factors that management and independent appraiser used to evaluate the fair value of underlying assets using market approach for selling consideration purpose; - assessing the competency of the independent appraiser engaged by the Group; - using the work of expert engaged by KPMG in evaluating the appropriateness of valuation methodology used by the independent appraiser including the appraisal reports; and - evaluating the adequacy of disclosure in accordance with Thai Financial Reporting Standards.

Other Information

Management is responsible for the other information. The other information comprises the information included in the annual report, but does not include the consolidated and separate financial statements and my auditor's report thereon.

My opinion on the consolidated and separate financial statements does not cover the other information and I do not express any form of assurance conclusion thereon.

In connection with my audit of the consolidated and separate financial statements, my responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated and separate financial statements or my knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work I have performed, I conclude that there is a material misstatement of this other information, I am required to report that fact. I have nothing to report in this regard.

Responsibilities of Management and Those Charged with Governance for the Consolidated and Separate Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated and separate financial statements in accordance with TFRSs, and for such internal control as management determines is necessary to enable the preparation of consolidated and separate financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated and separate financial statements, management is responsible for assessing the Group's and the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Group and the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Group's and the Company's financial reporting process.

Auditor's Responsibilities for the Audit of the Consolidated and Separate Financial Statements

My objectives are to obtain reasonable assurance about whether the consolidated and separate financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with TSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated and separate financial statements.

As part of an audit in accordance with TSAs, I exercise professional judgment and maintain professional skepticism throughout the audit. I also:

- Identify and assess the risks of material misstatement of the consolidated and separate financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's and the Company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's and the Company's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the consolidated and separate financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Group and the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated and separate financial statements, including the disclosures, and whether the consolidated and separate financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. I am responsible for the direction, supervision and performance of the group audit. I remain solely responsible for my audit opinion.

I communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

I also provide those charged with governance with a statement that I have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on my independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, I determine those matters that were of most significance in the audit of the consolidated and separate financial statements of the current period and are therefore the key audit matters. I describe these matters in my auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, I determine that a matter should not be communicated in my report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

(Waiyawat Kosamarnchaiyakij)
 Certified Public Accountant
 Registration No. 6333

KPMG Phoomchai Audit Ltd.
 Bangkok
 15 February 2019

Thai Oil Public Company Limited and its Subsidiaries
Statement of financial position

Assets	Note	Consolidated financial statements		Separate financial statements	
		31 December		31 December	
		2018	2017	2018	2017
(in Baht)					
Current assets					
Cash and cash equivalents	6, 19	34,041,471,033	15,623,426,718	29,868,078,023	11,914,509,851
Current investments	7, 19	73,220,568,315	52,318,064,256	73,027,317,304	51,897,422,875
Trade accounts receivable	5, 8	24,359,024,864	22,327,840,296	25,193,925,665	24,241,795,223
Other receivables	5, 9	1,381,634,279	1,170,683,073	1,443,680,409	1,126,898,197
Short-term loans	5	45,000,000	90,000,000	4,274,000,000	15,650,500,000
Inventories	5, 10	28,738,502,329	32,840,901,647	24,423,642,318	28,094,465,957
Prepaid corporate income tax		937,573,494	59,703,747	860,134,701	-
Value added tax receivable		630,751,760	751,588,384	36,760,012	-
Receivable from Oil Fuel Fund		1,388,932,491	1,029,053,483	1,388,932,491	1,029,053,483
Other current asset		-	126,927	-	-
Total current assets		164,743,458,565	126,211,388,531	160,516,470,923	133,954,645,586
Non-current assets					
Investments held as available-for-sale	7	360,515,845	3,103,250,531	360,515,845	3,103,250,531
Investments in subsidiaries	11	-	-	14,555,419,002	14,555,419,002
Investments in joint ventures	13	624,895,464	541,978,290	-	-
Investments in associates	13	14,315,601,209	13,825,697,677	1,260,604,927	1,260,604,927
Other long-term investments	7	779,871,900	779,871,900	779,871,900	779,871,900
Long-term loan to related party	5	-	-	400,000,000	-
Investment properties	14	102,520,270	102,520,270	1,100,443,418	1,100,443,418
Property, plant and equipment	15, 19	79,929,021,500	78,612,409,186	39,989,649,341	36,082,112,102
Goodwill	16	584,726,509	601,368,612	-	-
Other intangible assets	16	2,460,315,414	2,590,047,381	529,008,978	530,131,630
Deferred tax assets	17	629,338,970	507,431,217	515,758,780	481,089,961
Other non-current assets	18	4,082,687,830	1,232,329,261	3,837,325,375	958,875,127
Total non-current assets		103,869,494,911	101,896,904,325	63,328,597,566	58,851,798,598
Total assets		268,612,953,476	228,108,292,856	223,845,068,489	192,806,444,184

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of financial position

Liabilities and shareholders' equity	Note	Consolidated		Separate	
		financial statements		financial statements	
		31 December		31 December	
		2018	2017	2018	2017
		(in Baht)			
Current liabilities					
Short-term borrowings	19	2,391,675,227	968,802,956	-	-
Trade accounts payable	5, 20	21,844,262,665	18,963,172,436	23,516,749,444	21,060,997,897
Other payables	5, 21	3,871,803,863	3,475,927,189	3,575,377,315	2,909,892,064
Short-term borrowings from related parties	5, 19	-	-	1,506,552,107	503,218,068
Current portion of long-term borrowing	19	1,548,627,370	1,592,435,944	-	-
Current portion of debentures	19	3,000,000,000	-	3,000,000,000	-
Excise duty payable		4,814,818,139	4,784,895,265	4,814,818,139	4,784,895,265
Income tax payable		548,624,898	3,562,808,719	-	2,886,929,511
Other current liability		238,733	-	238,733	-
Total current liabilities		38,020,050,895	33,348,042,509	36,413,735,738	32,145,932,805
Non-current liabilities					
Long-term borrowings	5, 19	15,054,311,238	8,068,138,044	52,028,386,444	-
Debentures	19	85,065,238,416	55,838,586,219	33,008,687,149	55,838,586,219
Deferred tax liabilities	17	37,020,089	8,980,502	-	-
Provision for employee benefits	22	3,586,980,032	3,510,907,406	3,183,164,072	3,161,123,920
Other non-current liabilities		376,974,231	185,392,041	524,495,928	494,853,398
Total non-current liabilities		104,120,524,006	67,612,004,212	88,744,733,593	59,494,563,537
Total liabilities		142,140,574,901	100,960,046,721	125,158,469,331	91,640,496,342
Shareholders' equity					
Share capital	23				
Authorised share capital		20,400,278,730	20,400,278,730	20,400,278,730	20,400,278,730
Issued and paid share capital		20,400,278,730	20,400,278,730	20,400,278,730	20,400,278,730
Share premium					
Share premium on ordinary shares	24	2,456,261,491	2,456,261,491	2,456,261,491	2,456,261,491
Other surpluses (deficits)		303,596,612	203,040,571	-	-
Retained earnings					
Appropriated					
Legal reserve	24	2,040,027,873	2,040,027,873	2,040,027,873	2,040,027,873
Other reserves		244,500,000	244,500,000	244,500,000	244,500,000
Unappropriated		96,400,250,174	96,975,466,730	73,487,768,327	75,955,969,926
Other components of shareholders' equity		(132,892,315)	(96,098,367)	57,762,737	68,909,822
Equity attributable to owners of the parent		121,712,022,565	122,223,477,028	98,686,599,158	101,165,947,842
Non-controlling interests	12	4,760,356,010	4,924,769,107	-	-
Total shareholders' equity		126,472,378,575	127,148,246,135	98,686,599,158	101,165,947,842
Total liabilities and shareholders' equity		268,612,953,476	228,108,292,856	223,845,068,489	192,806,444,184

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of income

	Note	Consolidated financial statements		Separate financial statements	
		For the year ended		For the year ended	
		31 December		31 December	
		2018	2017	2018	2017
		<i>(in Baht)</i>			
Revenue from sale and rendering of services	5, 25	389,343,525,761	337,387,694,059	405,130,578,690	349,828,812,257
Cost of sale and rendering of services	5, 10	(373,127,967,756)	(305,385,582,808)	(398,208,441,819)	(328,442,071,503)
Gross profit		16,215,558,005	32,002,111,251	6,922,136,871	21,386,740,754
Dividend income	5	157,371,998	157,889,657	4,257,840,783	11,125,418,007
Net derivative loss on hedging		(820,524,349)	(133,218,287)	(236,862,872)	(127,593,664)
Net foreign exchange gain		626,683,439	3,181,552,556	430,095,814	2,881,989,819
Other income	5, 26	1,718,921,457	1,190,071,115	3,704,131,833	3,271,699,114
Selling expenses	5	(423,970,790)	(491,804,822)	(72,892,487)	(188,744,447)
Administrative expenses	5, 27	(2,357,752,867)	(2,969,440,802)	(2,435,738,911)	(2,493,162,306)
Share of profit of joint ventures and associates	13	1,192,891,937	1,196,663,512	-	-
Profit before finance costs and income tax expense		16,309,178,830	34,133,824,180	12,568,711,031	35,856,347,277
Finance costs	5, 30	(3,510,847,618)	(3,285,063,447)	(2,942,417,762)	(2,863,593,581)
Finance costs from repurchase of debentures	19, 30	(431,099,841)	-	(431,099,841)	-
Profit before income tax expense		12,367,231,371	30,848,760,733	9,195,193,428	32,992,753,696
Income tax expense	31	(1,982,789,060)	(5,529,487,003)	(954,711,119)	(4,253,115,118)
Profit for the year		10,384,442,311	25,319,273,730	8,240,482,309	28,739,638,578
Profit for the year attributable to:					
Owners of the parent		10,149,038,048	24,856,198,552	8,240,482,309	28,739,638,578
Non-controlling interests	12	235,404,263	463,075,178	-	-
Profit for the year		10,384,442,311	25,319,273,730	8,240,482,309	28,739,638,578
Basic earnings per share	33	4.97	12.18	4.04	14.09

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of comprehensive income

	<i>Note</i>	Consolidated financial statements		Separate financial statements	
		For the year ended		For the year ended	
		31 December	31 December	31 December	31 December
		2018	2017	2018	2017
			(in Baht)		
Profit for the year		10,384,442,311	25,319,273,730	8,240,482,309	28,739,638,578
Other comprehensive income (loss)					
<i>Items that will be reclassified subsequently to profit or loss</i>					
Net change in fair value of available-for-sale investments		(11,147,085)	147,378,167	(11,147,085)	147,378,167
Exchange difference on translating foreign operations		(30,790,007)	(120,752,573)	-	-
Share of other comprehensive income (loss) of associate		5,355,995	(16,205,521)	-	-
Total items that will be reclassified subsequently to profit or loss		(36,581,097)	10,420,073	(11,147,085)	147,378,167
<i>Items that will not be reclassified to profit or loss</i>					
Loss on remeasurements of defined benefit plans	22	(412,747)	(323,414,348)	-	(291,993,637)
Share of other comprehensive income (loss) of associate		(17,600,081)	-	-	-
Total items that will not be reclassified to profit or loss		(18,012,828)	(323,414,348)	-	(291,993,637)
Other comprehensive income (loss) for the year, net of income tax		(54,593,925)	(312,994,275)	(11,147,085)	(144,615,470)
Total comprehensive income for the year		10,329,848,386	25,006,279,455	8,229,335,224	28,595,023,108
Total comprehensive income attributable to:					
Owners of the parent		10,096,673,404	24,546,308,167	8,229,335,224	28,595,023,108
Non-controlling interests	12	233,174,982	459,971,288	-	-
Total comprehensive income for the year		10,329,848,386	25,006,279,455	8,229,335,224	28,595,023,108

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of changes in shareholders' equity

Consolidated financial statements														
Note	Issued and paid share capital	Share Premium on ordinary shares	Other surpluses (deficits)		Retained earnings			Other components of shareholders' equity			Equity attributable to owners of the parent	Non-controlling interests	Total shareholders' equity	
			Surplus on business restructuring under common control	Surplus (deficit) from the change in the ownership interests in subsidiary	Legal reserves	Other reserves	Unappropriated (in Baht)	Other comprehensive income (loss)						
								Fair value changes in available-for-sale investments	Translating foreign operations	Share of other comprehensive income (loss) of associate				
Year ended 31 December 2017														
Balance at 1 January 2017	20,400,278,730	2,456,261,491	330,835,954	(127,795,383)	2,040,027,873	244,500,000	81,621,935,504	(78,468,345)	(38,389,563)	7,388,929	106,856,575,190	4,740,728,828	111,597,304,018	
Dividend	34	-	-	-	-	-	(9,179,406,329)	-	-	-	(9,179,406,329)	(275,931,009)	(9,455,337,338)	
Comprehensive income (loss) for the year														
Profit for the year		-	-	-	-	-	24,856,198,552	-	-	-	24,856,198,552	463,075,178	25,319,273,730	
Other comprehensive income (loss)		-	-	-	-	-	(323,260,997)	147,378,167	(120,752,573)	(13,254,982)	(309,890,385)	(3,103,890)	(312,994,275)	
Total comprehensive income (loss) for the year		-	-	-	-	-	24,532,937,555	147,378,167	(120,752,573)	(13,254,982)	24,546,308,167	459,971,288	25,006,279,455	
Balance at 31 December 2017	20,400,278,730	2,456,261,491	330,835,954	(127,795,383)	2,040,027,873	244,500,000	96,975,466,730	68,909,822	(159,142,136)	(5,866,053)	122,223,477,028	4,924,769,107	127,148,246,135	
Year ended 31 December 2018														
Balance at 1 January 2018	20,400,278,730	2,456,261,491	330,835,954	(127,795,383)	2,040,027,873	244,500,000	96,975,466,730	68,909,822	(159,142,136)	(5,866,053)	122,223,477,028	4,924,769,107	127,148,246,135	
Dividend	34	-	-	-	-	-	(10,708,683,908)	-	-	-	(10,708,683,908)	(297,032,038)	(11,005,715,946)	
Acquisition of non-controlling interests without a change in control	4	-	-	-	100,556,041	-	-	-	-	-	100,556,041	(100,556,041)	-	
Comprehensive income (loss) for the year														
Profit for the year		-	-	-	-	-	10,149,038,048	-	-	-	10,149,038,048	235,404,263	10,384,442,311	
Other comprehensive income (loss)		-	-	-	-	-	(15,570,696)	(11,147,085)	(30,790,007)	5,143,144	(52,364,644)	(2,229,281)	(54,593,925)	
Total comprehensive income (loss) for the year		-	-	-	-	-	10,133,467,352	(11,147,085)	(30,790,007)	5,143,144	10,096,673,404	233,174,982	10,329,848,386	
Balance at 31 December 2018	20,400,278,730	2,456,261,491	330,835,954	(27,239,342)	2,040,027,873	244,500,000	96,400,250,174	57,762,737	(189,932,143)	(722,909)	121,712,022,565	4,760,356,010	126,472,378,575	

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of changes in shareholders' equity

		Separate financial statements					Other components of shareholders' equity	
						Retained earnings	Fair value changes in available-for-sale investments	Total shareholders' equity
	Note	Issued and paid share capital	Share Premium on ordinary shares	Legal reserve	Other reserves (in Baht)	Unappropriated		
Year ended 31 December 2017								
Balance at 1 January 2017		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	56,687,731,314	(78,468,345)	81,750,331,063
Dividend	34	-	-	-	-	(9,179,406,329)	-	(9,179,406,329)
Comprehensive income (loss) for the year								
Profit for the year		-	-	-	-	28,739,638,578	-	28,739,638,578
Other comprehensive income (loss)		-	-	-	-	(291,993,637)	147,378,167	(144,615,470)
Total comprehensive income (loss) for the year		-	-	-	-	28,447,644,941	147,378,167	28,595,023,108
Balance at 31 December 2017		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	75,955,969,926	68,909,822	101,165,947,842
Year ended 31 December 2018								
Balance at 1 January 2018		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	75,955,969,926	68,909,822	101,165,947,842
Dividend	34	-	-	-	-	(10,708,683,908)	-	(10,708,683,908)
Comprehensive income (loss) for the year								
Profit for the year		-	-	-	-	8,240,482,309	-	8,240,482,309
Other comprehensive income (loss)		-	-	-	-	-	(11,147,085)	(11,147,085)
Total comprehensive income (loss) for the year		-	-	-	-	8,240,482,309	(11,147,085)	8,229,335,224
Balance at 31 December 2018		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	73,487,768,327	57,762,737	98,686,599,158

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of cash flows

		Consolidated financial statements		Separate financial statements	
		For the year ended 31 December		For the year ended 31 December	
	Note	2018	2017	2018	2017
		(in Baht)			
Cash flows from operating activities					
Profit for the year		10,384,442,311	25,319,273,730	8,240,482,309	28,739,638,578
<i>Adjustments for reconcile profit (loss) to cash receipts (payments)</i>					
(Reversal of) Allowance for decline in value of inventories adjusted to net realisable value		1,350,443,972	(93,066,711)	1,313,858,368	(72,798,534)
Depreciation and amortisation	29	7,263,783,285	7,641,956,999	3,787,642,038	3,956,228,840
Finance costs	30	3,510,847,618	3,285,063,447	2,942,417,762	2,863,593,581
Finance costs from repurchase of debentures	19, 30	431,099,841	-	431,099,841	-
Unrealised (gain) loss on foreign exchange		428,191,957	(2,335,144,065)	427,512,032	(2,013,562,075)
Share of profit of joint ventures and associates	13	(1,192,891,937)	(1,196,663,512)	-	-
Dividend income	5	(157,371,998)	(157,889,657)	(4,257,840,783)	(11,125,418,007)
Impairment loss on property, plant and equipment	15	-	546,355,384	-	-
(Gain) loss on disposal of investment		(1,523,522)	33,223,606	(1,523,522)	71,850,322
Loss on disposal of property, plant and equipment		2,808,995	20,392,717	1,622,872	27,991
Realisation of deferred land lease and other income		(24,758,209)	(24,475,755)	(147,874,075)	(143,187,307)
Income tax expense	31	1,982,789,060	5,529,487,003	954,711,119	4,253,115,118
		23,977,861,373	38,568,513,186	13,692,107,961	26,529,488,507
Changes in operating assets and liabilities					
Trade accounts receivable		(2,061,153,981)	(2,791,694,120)	(963,003,532)	(3,396,869,165)
Other receivables		(559,425,087)	(524,254,021)	(630,982,298)	(430,974,011)
Inventories		2,751,955,346	441,048,195	2,356,965,271	974,328,151
Value add tax receivable		120,836,623	190,443,380	(36,760,012)	41,899,088
Receivable from Oil Fuel Fund		(359,879,008)	(864,928,898)	(359,879,008)	(864,928,899)
Other non-current assets		(2,951,945,960)	(157,942,426)	(2,977,634,638)	42,690,633
Trade accounts payable		2,977,035,656	(927,669,858)	2,550,746,871	(1,498,321,028)
Other payables		142,307,634	671,588,852	1,050,028,233	357,425,364
Excise duty payable		29,922,874	3,335,282,422	29,922,874	3,335,282,422
Other non-current liabilities		220,682,015	(381,726,948)	68,138,049	(154,795,864)
Cash generated from operating activities		24,288,197,485	37,558,659,764	14,779,649,771	24,935,225,198
Income tax paid		(5,975,151,623)	(3,141,476,623)	(4,736,444,150)	(1,986,846,267)
Net cash from operating activities		18,313,045,862	34,417,183,141	10,043,205,621	22,948,378,931

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of cash flows

	<i>Note</i>	Consolidated financial statements		Separate financial statements	
		For the year ended		For the year ended	
		31 December		31 December	
		2018	2017	2018	2017
<i>(in Baht)</i>					
Cash flows from investing activities					
Dividends received		772,443,637	740,393,772	4,257,840,783	11,125,418,007
Increase in current investment		(21,597,119,763)	(23,423,007,008)	(21,824,510,133)	(23,458,465,627)
Purchase of investments held as available-for-sale		(5,010,249)	(3,016,015,165)	(5,010,249)	(3,016,015,165)
Sale of investments held as available-for-sale		2,737,427,082	150,575,691	2,737,427,082	150,575,691
Proceeds from sales of investments in associates	13	-	50,625,000	-	-
Cash outflows on investments in subsidiary	11	-	-	-	(10,000,000)
Cash outflows on short-term loans to related parties	5	-	-	(310,000,000)	(7,220,500,000)
Cash inflows on short-term loans to related parties	5	-	-	11,686,500,000	4,153,500,000
Cash outflows on long-term loans to related parties	5	-	-	(400,000,000)	-
Cash inflows on short-term loans		45,000,000	-	-	-
Cash inflows on long-term loans to					
savings co-operative of employees		45,991,743	21,989,620	45,991,743	21,989,620
Cash outflows on other long-term investments		-	(375,000)	-	(375,000)
Purchase of property, plant and equipment		(7,863,692,892)	(3,679,007,164)	(6,975,873,167)	(3,257,293,377)
Sale of property, plant and equipment		128,649,619	1,936,392	16,400	15,700
Purchase of intangible assets		(130,835,947)	(920,624,370)	(82,816,383)	(96,526,356)
Exchange differences on translating foreign operations		20,867,660	(18,874,068)	-	-
Net cash used in investing activities		(25,846,279,110)	(30,092,382,300)	(10,870,433,924)	(21,607,676,507)

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of cash flows

	<i>Note</i>	Consolidated financial statements		Separate financial statements	
		For the year ended		For the year ended	
		31 December	31 December	31 December	31 December
		2018	2017	2018	2017
<i>(in Baht)</i>					
Cash flows from financing activities					
Finance costs paid		(3,371,009,367)	(3,364,337,657)	(3,374,795,938)	(2,946,483,285)
Finance costs paid for repurchase of debentures		(56,631,225)	-	(56,631,225)	-
Dividends paid		(11,005,715,946)	(9,455,337,338)	(10,708,683,908)	(9,179,406,329)
Proceeds from short-term borrowings		29,126,652,825	3,571,377,956	18,990,292,661	-
Repayment of short-term borrowings		(27,622,780,554)	(3,470,000,000)	(18,990,292,661)	-
Net proceeds (repayments) of short-term borrowings from related parties	5	-	-	1,003,334,040	(27,955,034)
Proceed of long-term borrowings from related parties	5	-	-	51,606,332,137	-
Proceeds from long-term borrowings		14,943,975,491	110,052,978	-	-
Repayment of long-term borrowings		(8,006,998,447)	(1,685,992,899)	-	-
Proceeds from debenture		51,634,496,961	-	-	-
Redemption of debenture		(20,076,405,723)	(4,931,799,674)	(20,076,405,723)	(4,931,799,674)
Net cash from (used in) financing activities		25,565,584,015	(19,226,036,634)	18,393,149,383	(17,085,644,322)
Net increase (decrease) in cash and cash equivalents		18,032,350,767	(14,901,235,793)	17,565,921,080	(15,744,941,898)
Effect of exchange rate change on cash and cash equivalents		385,693,548	(596,099,490)	387,647,092	(580,525,685)
Cash and cash equivalents as at 1 January		15,623,426,718	31,120,762,001	11,914,509,851	28,239,977,434
Cash and cash equivalents at 31 December	6	34,041,471,033	15,623,426,718	29,868,078,023	11,914,509,851
Non-cash transactions					
Payable for purchase of property, plant and equipment		567,076,652	391,724,053	496,162,798	350,450,144
Payable for purchase of intangible assets		243,155,260	202,242,529	-	-
Payable on purchase of securities (Private funds)		-	49,839,374	-	49,839,374

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Note	Contents
1	General information
2	Basis of preparation of the financial statements
3	Significant accounting policies
4	Acquisition of non-controlling interests
5	Related parties
6	Cash and cash equivalents
7	Other investments
8	Trade accounts receivable
9	Other receivables
10	Inventories
11	Investments in subsidiaries
12	Non-controlling interests
13	Investments in joint ventures and associates
14	Investment properties
15	Property, plant and equipment
16	Intangible assets
17	Deferred tax
18	Other non-current assets
19	Interest-bearing liabilities
20	Trade accounts payable
21	Other payables
22	Provisions for employee benefits
23	Share capital
24	Additional paid-in capital and reserves
25	Segment information
26	Other income
27	Administrative expenses
28	Employee benefit expenses
29	Expenses by nature
30	Finance costs
31	Income tax expense
32	Promotional privileges
33	Basic earnings per share
34	Dividends
35	Financial instruments
36	Commitments with non-related parties
37	Contingent liabilities and contingent assets
38	Insurance policy
39	Event after the reporting period
40	Thai Financial Reporting Standards (TFRS) not yet adopted

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

These notes form an integral part of the financial statements.

The financial statements issued for Thai statutory and regulatory reporting purposes are prepared in the Thai language. These English language financial statements have been prepared from the Thai language statutory financial statements, and were approved and authorised for issue by the Board of Directors on 15 February 2019.

1 General information

Thai Oil Public Company Limited, the “Company”, is incorporated in Thailand and has its registered offices and refinery plant as follows:

Head office	:	555/1 Energy Complex Building A, 11 th Floor, Vibhavadi Rangsit Road, Kwang Chatuchak, Khet Chatuchak, Bangkok 10900, Thailand
Sriracha office and refinery plant	:	42/1 Moo 1, Sukhumvit Road Km. 124, Tambol Tungsukla, Amphur Sriracha, Choburi 20230, Thailand

The Company was listed on the Stock Exchange of Thailand on 26 October 2004.

The Company is an entity in the PTT Public Company Limited (“PTT”) group of companies. PTT is incorporated in Thailand and is the major shareholder and the parent of the Company and owned 48.03% of the Company’s issued and paid-up share capital as at 31 December 2018 (31 December 2017: 49.1%).

The principal businesses of the Company are oil refining and distributions. Details of the Company’s direct and indirect subsidiaries as at 31 December 2018 and 2017 were as follows:

Name of the entity	Type of business	Country of incorporation	Ownership interest (%)	
			2018	2017
Direct subsidiaries				
Thai Paraxylene Co., Ltd.	Paraxylene manufacturing and distribution	Thailand	99.99	99.99
Thai Lube Base Public Company Limited	Lube base oil refining and distribution	Thailand	99.99	99.99
Thaioil Marine Co., Ltd.	Providing marine transportation services for petroleum and liquid chemical products	Thailand	99.99	99.99
Thaioil Energy Services Co., Ltd.	Providing human resource management	Thailand	99.99	99.99
Thaioil Solvent Co., Ltd.	Investment in solvent and chemical businesses	Thailand	99.99	99.99
Thaioil Ethanol Co., Ltd.	Investment in ethanol business and alternative energy products	Thailand	99.99	99.99

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Name of the entity	Type of business	Country of incorporation	Ownership interest (%)	
			2018	2017
Thaioil Power Co., Ltd.	Power and steam generation and distribution	Thailand	73.99	73.99
TOP SPP Co., Ltd.	Power and steam generation and distribution	Thailand	99.99	99.99
Thaioil Treasury Center Co., Ltd.	Treasury center for the Group's business	Thailand	99.99	99.99
Indirect subsidiaries				
TOP Solvent Co., Ltd.	Distribution of solvent and chemical products	Thailand	99.99	99.99
Sak Chaisidhi Co., Ltd.	Solvent and chemical products manufacturing and distribution	Thailand	80.52	80.52
TOP Solvent (Vietnam) LLC.	Distribution of solvent and chemical products	Vietnam	100.00	100.00
Sapthip Co., Ltd.	Ethanol products manufacturing and distribution	Thailand	50.00	50.00
Sapthip Green Energy Co., Ltd.	Biogas power generation and Distribution	Thailand	50.00	-
Thaioil Marine International Pte. Ltd.	Investment in marine transportation for crude oil and petroleum product business	Singapore	100.00	100.00
TOP Maritime Service Co., Ltd.	Providing marine transportation services for crew and utilities in Gulf of Thailand	Thailand	99.99	55.00
LABIX Co., Ltd.	Linear Alkyl Benzene manufacturing and distribution	Thailand	75.00	75.00

2 Basis of preparation of the financial statements

(a) Statement of compliance

The financial statements are prepared in accordance with Thai Financial Reporting Standards (TFRS), guidelines promulgated by the Federation of Accounting Professions (“FAP”), and applicable rules and regulations of the Thai Securities and Exchange Commission.

The FAP has issued new and revised TFRS effective for annual accounting periods beginning on or after 1 January 2018. The initial application of these new and revised TFRS has resulted in changes in certain of the Group's accounting policies. These changes have no material effect on the financial statements.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

In addition to the above new and revised TFRS, the FAP has issued a number of new and revised TFRS which are not yet effective for current period. The Group has not early adopted these standards in preparing these financial statements. Those new and revised TFRS that are relevant to the Group's operations are disclosed in note 40.

(b) *Basis of measurement*

The financial statements have been prepared on the historical cost basis except for the following items.

<i>Items</i>	<i>Measurement bases</i>
Available-for-sale investment	Fair value
Provisions for employee benefits	Present value of employee benefit obligations as explained in Note 22

(c) *Functional and presentation currency*

The financial statements are prepared and presented in Thai Baht, which is the Company's functional currency. All financial information presented in Thai Baht has been rounded in the notes to the financial statements to the nearest million unless otherwise stated.

(d) *Use of judgements and estimates*

The preparation of financial statements in conformity with TFRS requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised prospectively.

Assumptions and estimation uncertainties

Information about assumption and estimation uncertainties that have a significant risk of resulting in a material adjustments to the amounts recognised in the financial statements is included in the following notes:

Note 10	Allowance for decline in value of inventories adjusted to net realisable value
Note 5 11 and 16	Impairment test of loan to and investment in subsidiaries, goodwill and customer database - key assumptions underlying recoverable amounts
Note 15	Determining the fair value less costs of disposal of marine transportation services segment's assets on the basis of significant unobservable inputs
Note 22	Measurement of provisions for employee benefits - key actuarial assumption

Measurement of fair values

A number of the Group's accounting policies and disclosures require the measurement of fair values, for both financial and non-financial assets and liabilities.

The Group has an established control framework with respect to the measurement of fair values. This includes a valuation team that has overall responsibility for overseeing all significant fair value measurements, including Level 3 fair values, and reports directly to the CFO.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

The valuation team regularly reviews significant unobservable inputs and valuation adjustments. If third party information, such as broker quotes or pricing services, is used to measure fair values, then the valuation team assesses the evidence obtained from the third parties to support the conclusion that such valuations meet the requirements of TFRS, including the level in the fair value hierarchy in which such valuations should be classified.

Significant valuation issues are reported to the Group's Audit Committee.

When measuring the fair value of an asset or a liability, the Group uses observable market data as far as possible. Fair values are categorised into different levels in a fair value hierarchy based on the inputs used in the valuation techniques as follows:

- Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities.
- Level 2: inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).
- Level 3: inputs for the asset or liability that are not based on observable market data.

If the inputs used to measure the fair value of an asset or liability might be categorised in different levels of the fair value hierarchy, then the fair value measurement is categorised in its entirety in the same level of the fair value hierarchy as the lowest level input that is significant to the entire measurement.

The Group recognises transfers between levels of the fair value hierarchy at the end of the reporting period during which the change has occurred.

Further information about the assumptions made in measuring fair values is included in following notes:

Note 14	Investment properties
Note 15	Property plant and equipment
Note 35	Financial instruments

3 Significant accounting policies

The accounting policies set out below have been applied consistently to all periods presented in these financial statements.

(a) Basis of consolidation

The consolidated financial statements relate to the Company and its subsidiaries (together referred to as the "Group") and the Group's interests in joint ventures and associates

Business combinations

The Group applies the acquisition method for all business combinations when control is transferred to the Group other than those with entities under common control.

The Group controls an entity when it is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. The acquisition date is the date on which control is transferred to the acquirer. Judgment is applied in determining the acquisition date and determining whether control is transferred from one party to another.

Goodwill is measured as the fair value of the consideration transferred including the recognised amount of any non-controlling interest in the acquiree, less the net recognised amount (generally fair value) of the identifiable assets acquired and liabilities assumed, all measured as of the acquisition date. Any gain on bargain purchase is recognised in profit or loss immediately.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Consideration transferred includes the fair values of the assets transferred, liabilities incurred by the Group to the previous owners of the acquiree, and equity interests issued by the Group. Consideration transferred also includes the fair value of any contingent consideration and share-based payment awards of the acquiree that are replaced mandatorily in the business combination. If a business combination results in the termination of pre-existing relationships between the Group and the acquiree, then the lower of the termination amount, as contained in the agreement, and the value of the off-market element is deducted from the consideration transferred and recognised in other expenses.

A contingent liability of the acquiree is assumed in a business combination only if such a liability represents a present obligation and arises from a past event, and its fair value can be measured reliably.

Transaction costs that the Group incurs in connection with a business combination, such as legal fees, and other professional and consulting fees are expensed as incurred.

If the initial accounting for a business combination is incomplete by the end of the reporting period in which the combination occurs, the Group reports provisional amounts for the items for which the accounting is incomplete. Those provisional amounts are adjusted during the measurement period, or additional assets or liabilities are recognised, to reflect new information obtained about facts and circumstances that existed at the acquisition date that, if known, would have affected the amounts recognised at that date.

Acquisitions from entities under common control

Business combination under common control are accounted for using a method similar to the pooling of interest method. Under that method the acquirer recognises assets and liabilities of the acquired businesses at their carrying amounts in the consolidated financial statements of the ultimate parent company at the moment of the transaction. The difference between the carrying amount of the acquired net assets and the consideration transferred is recognised as surplus or discount from business combinations under common control in shareholder's equity. The surplus or discount will be transferred to retained earnings upon divestment of the businesses acquired.

The results from operations of the acquired businesses will be included in the consolidated financial statements of the acquirer from the beginning of the comparative period or the moment the businesses came under common control, whichever date is later, until control ceases.

Subsidiaries

Subsidiaries are entities controlled by the Group. The Group controls an entity when it is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. The financial statements of subsidiaries are included in the consolidated financial statements from the date on which control commences until the date on which control ceases.

Non-controlling interests

At the acquisition date, the Group measures any non-controlling interest at its proportionate interest in the identifiable net assets of the acquiree.

Changes in the Group's interest in a subsidiary that do not result in a loss of control are accounted for as equity transactions.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Loss of control

When the Group loses control over a subsidiary, it derecognises the assets and liabilities of the subsidiary, and any related non-controlling interests and other components of equity. Any resulting gain or loss is recognised in profit or loss. Any interest retained in the former subsidiary is measured at fair value when control is lost.

Interests in equity-accounted investees

The Group's interests in equity-accounted investees comprise interests in joint ventures and associates.

A joint venture is an arrangement in which the Group has joint control, whereby the Group has rights to the net assets of the arrangement, rather than rights to its assets and obligations for its liabilities. Associates are those entities in which the Group has significant influence, but not control or joint control, over the financial and operating policies.

Interests in joint ventures and associates are accounted for using the equity method. They are initially recognised at cost, which includes transaction costs. Subsequent to initial recognition, the consolidated financial statements include the Group's share of the profit or loss and other comprehensive income of equity-accounted investees, until the date on which joint control or significant influence ceases.

Transactions eliminated on consolidation

Intra-group balances and transactions, and any unrealised income or expenses arising from intra-group transactions, are eliminated in preparing the consolidated financial statements. Unrealised gains arising from transactions with joint ventures and associates are eliminated against the investment to the extent of the Group's interest in the investee. Unrealised losses are eliminated in the same way as unrealised gains, but only to the extent that there is no evidence of impairment.

(b) Foreign currencies

Foreign currency transactions

Transactions in foreign currencies are translated to the respective functional currencies of Group entities at exchange rates at the dates of the transactions.

Monetary assets and liabilities denominated in foreign currencies are translated to the functional currency at the exchange rate at the reporting date. Foreign exchange differences arising on translation are recognised in profit or loss.

Non-monetary assets and liabilities measured at cost in foreign currencies are translated to the functional currency at the exchange rates at the dates of the transactions.

Foreign operations

The assets and liabilities of foreign operations, including goodwill and fair value adjustments arising on acquisition, are translated to Thai Baht at the exchange rates at the reporting date.

The revenues and expenses of foreign operations are translated to Thai Baht at the average foreign exchange rates ruling during the periods.

Foreign exchange differences are recognised in other comprehensive income and accumulated in the translation reserve, except to extent that the translation difference is allocated to non-controlling interest.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

When a foreign operation is disposed of in its entirety or partially such that control, significant influence or joint control is lost, the cumulative amount in the translation reserve related to that foreign operation is reclassified to profit or loss as part of the gain or loss on disposal. If the Group disposes of part of its interest in a subsidiary but retains control, then the relevant proportion of the cumulative amount is reattributed to non-controlling interests. When the Group disposes of only part of a joint venture or associate while retaining joint control or significant influence, the relevant proportion of the cumulative amount is reclassified to profit or loss.

When the settlement of a monetary item receivable from or payable to a foreign operation is neither planned nor likely in the foreseeable future, exchange gains and losses arising from such a monetary item are considered to form part of a net investment in a foreign operation and are recognised in other comprehensive income, and presented in the foreign currency translation reserve in equity until disposal of the investment.

(c) *Derivative*

Derivative are used to manage exposure to foreign exchange, interest rate and commodity price risks arising from operational, financing and investment activities. Derivative are not used for trading purposes. However, derivatives that do not qualify for hedge accounting are accounted for as trading instruments.

Hedge of future foreign currency transactions

Forward foreign exchange contracts protect the Group from fluctuations in exchange rates by establishing the rates at which foreign currency assets will be realised or foreign currency liabilities will be settled. Forward foreign exchange contracts are recognised in the financial statements on inception. The premium or discount on the establishment of each agreement is amortised over the contract period.

Cross currency swap and interest rate swap contracts

Cross currency swap and interest rate swap contracts hedging future fluctuations in exchange rates and interest rates. Foreign financial assets and liabilities hedged by cross currency swap contracts are translated into the functional currency at the foreign exchange rates determined in the contracts and revalued at the reporting date at the foreign exchange rate ruling on that date. Foreign exchange differences are recognised in profit or loss. The differences under interest rate swaps are recorded as adjustments to the interest expense relating to the financial obligations in profit or loss.

Hedge of crack spread and time spread

Differences between the fixed prices of contracts and the settlement prices are recognised in the profit or loss in the period in which the contracts mature.

(d) *Cash and cash equivalents*

Cash and cash equivalents in the statements of cash flows comprise cash balances, current and savings accounts, and highly liquid short-term investments. Bank overdrafts that are repayable on demand are a component of financing activities for the purpose of the statement of cash flows.

(e) *Trade and other accounts receivable*

Trade and other accounts receivable are stated at their invoice value less allowance for doubtful accounts.

The allowance for doubtful accounts is assessed primarily on analysis of payment histories and future expectations of customer payments. Bad debts are written off when incurred.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

(f) Inventories

Inventories are measured at the lower of cost and net realisable value.

Cost of inventories is calculated using the weighted average cost principle, and comprises all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition. In the case of manufactured inventories and work in progress, cost includes an appropriate share of production overheads based on normal operating capacity.

Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs to complete and to make the sale.

(g) Non-current assets classified as held for sale

Non-current assets that are expected to be recovered primarily through sale rather than through continuing use, are classified as held for sale. The assets are measured at the lower of their carrying value and fair value less cost to sell. Any impairment loss on a disposal group is first allocated to goodwill, and then to remaining assets and liabilities on a pro rata basis, except that no loss is allocated to inventories, financial assets, deferred tax assets and investment properties. Impairment losses on initial classification as held for sale and subsequent gains and losses on remeasurement are recognised in profit or loss.

(h) Investments

Investments in subsidiaries, joint ventures and associates

Investments in subsidiaries, joint ventures and associates in the separate financial statements of the Company are accounted for using the cost method. Investments in joint ventures and associates in the consolidated financial statements are accounted for using the equity method.

Any changes in the equity interest in subsidiaries of the Group while control is retained are recorded in equity.

Investments in other debt and equity securities

Debt securities that the Group has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are stated at amortised cost, less any impairment losses. The difference between the acquisition cost and redemption value of such debt securities is amortised using the effective interest rate method over the period to maturity.

Debt securities and marketable equity securities, other than those securities held for intended to be held to maturity, are classified as investments in available-for-sale securities. Investments in available-for-sale securities are, subsequent to initial recognition, stated at fair value, therein, other than impairment losses and foreign currency differences on available-for-sale monetary items, are recognised directly in equity. Impairment losses and foreign exchange differences are recognised in profit or loss. When these investments are derecognised, the cumulative gain or loss previously recognised directly in equity is recognised in profit or loss. When these investments are interest-bearing, interest calculated using the effective interest method is recognised in profit or loss.

Equity securities which are not marketable are stated at cost less any impairment losses.

The fair value of financial instruments classified as available-for-sale is determined as the quoted bid price at the reporting date.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Disposal of investments

On disposal of an investment, the difference between net disposal proceeds and the carrying amount together with the associated cumulative gain or loss that was reported in equity is recognised in profit or loss.

If the Group disposes of part of its holding of a particular investment, the deemed cost of the part sold is determined using the weighted average method applied to the carrying value of the total holding of the investment.

(i) Investment properties

Investment properties are properties which are held to earn rental income, for capital appreciation or for both, but not for sale in the ordinary course of business, use in the production or supply of goods or services or for administrative purposes.

Investment properties are measured at cost less accumulated depreciation and impairment losses.

Cost includes expenditure that is directly attributable to the acquisition of the investment property. The cost of self-constructed investment property includes the cost of materials and direct labour, and other costs directly attributable to bringing the investment property to a working condition for its intended use and capitalised borrowing costs.

(j) Property, plant and equipment

The Group's owned assets

Property, plant and equipment are measured at cost less accumulated depreciation and impairment losses.

Cost includes expenditure that is directly attributable to the acquisition of the asset. The cost of self-constructed assets includes the cost of materials and direct labour, any other costs directly attributable to bringing the assets to a working condition for their intended use, the costs of dismantling and removing the items and restoring the site on which they are located, and capitalised borrowing costs. Cost also may include transfers from other comprehensive income of any gain or loss on qualifying cash flow hedges of foreign currency purchases of property, plant and equipment. Purchased software that is integral to the functionality of the related equipment is capitalised as part of that equipment.

When parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

Any gains and losses on disposal of an item of property, plant and equipment are determined by comparing the proceeds from disposal with the carrying amount of property, plant and equipment, and are recognised in profit or loss.

Reclassification to investment property

When the use of a property changes from owner-occupied to investment property, its carrying amount at the date of reclassification becomes its cost for subsequent accounting.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Subsequent costs

The cost of replacing a part of an item of property, plant and equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the part will flow to the Group, and its cost can be measured reliably. The carrying amount of the replaced part is derecognised. The costs of the day-to-day servicing of property, plant and equipment are recognised in profit or loss as incurred.

Depreciation

Depreciation is calculated based on the depreciable amount, which is the cost of an asset, or other amount substituted for cost, less its residual value.

Depreciation is charged to the profit or loss on a straight line basis over the estimated useful lives of each component of an item of property, plant and equipment. The estimated useful lives are as follows:

Buildings	10 - 25	years
Leasehold improvements	5 - 20	years
Refinery plant and equipment (depreciated over the remaining estimated useful life starting from 1 October 1994)	20 - 35	years
Lube base oil refinery plants and equipment	16 - 20	years
Petrochemical plants	10 - 25	years
Power plants	20 - 25	years
Transmission facilities	25	years
Machinery, equipment and plant equipment	3 - 20	years
Oil and liquid chemical tankers and crew boats	10 - 25	years
Furniture, fixtures, office equipment and others	5 - 10	years
Vehicles	5	years

No depreciation is provided on freehold land and assets under construction.

Depreciation methods, useful lives and residual values are reviewed at each financial year-end and adjusted if appropriate.

(k) Intangible assets

Goodwill

Goodwill that arises upon the acquisition of subsidiaries is included in intangible assets. The measurement of goodwill at initial recognition is described in note 3 (a). Subsequent to initial recognition, goodwill is measured at cost less accumulated impairment losses. In respect of equity-accounted investees, the carrying amount of goodwill is included in the carrying amount of the investment, and an impairment loss on such an investment is not allocated to any asset, including goodwill, that forms part of the carrying amount of the equity-accounted investee.

Customer database

Customer database is stated at cost less accumulated impairment losses.

License fee, computer software and patent

License fee, computer software and patent that are acquired by the Group, which have finite useful lives, are stated at cost less accumulated amortisation and accumulated impairment losses.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Subsequent expenditure

Subsequent expenditure is capitalised only when it increases the future economic benefits embodied in the specific asset to which it relates. All other expenditure, including expenditure on internally generated goodwill and brands, is recognised in profit or loss as incurred.

Amortisation

Amortisation is calculated over the cost of the asset, or other amount substituted for cost, less its residual value.

Amortisation is recognised in profit or loss on a straight-line basis over the estimated useful lives of intangible assets, other than goodwill, from the date that they are available for use.

The estimated useful lives are as follows:

License fee	10 - 25	years
Computer software	5 - 10	years
Patent	10	years

Amortisation methods, useful lives and residual values are reviewed at each financial year-end and adjusted if appropriate.

(l) Impairment

The carrying amounts of the Group's assets are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, the assets' recoverable amounts are estimated. For goodwill and intangible assets that have indefinite useful lives or are not yet available for use, the recoverable amount is estimated each year at the same time.

An impairment loss is recognised if the carrying amount of an asset or its cash-generating unit exceeds its recoverable amount. The impairment loss is recognised in profit or loss.

When a decline in the fair value of an available-for-sale financial asset has been recognised directly in equity and there is objective evidence that the value of the asset is impaired, the cumulative loss that had been recognised directly in equity is recognised in profit or loss even though the financial asset has not been derecognised. The amount of the cumulative loss that is recognised in profit or loss is the difference between the acquisition cost and current fair value, less any impairment loss on that financial asset previously recognised in profit or loss.

Calculation of recoverable amount

The recoverable amount of the Group's investments in held-to-maturity securities carried at amortised cost is calculated as the present value of estimated future cash flows, discounted at the original effective interest rate.

The recoverable amount of available-for-sale assets is calculated by reference to the fair value.

The recoverable amount of a non-financial asset is the greater of the asset's value in use and fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. For an asset that does not generate cash inflows largely independent of those from other assets, the recoverable amount is determined for the cash-generating unit to which the asset belongs.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Reversals of impairment

An impairment loss in respect of a financial asset is reversed if the subsequent increase in recoverable amount can be related objectively to an event occurring after the impairment loss was recognised in profit or loss. For financial assets carried at amortised cost and available-for-sale financial assets that are debt securities, the reversal is recognised in profit or loss. For available-for-sale financial assets that are equity securities, the reversal is recognised in other comprehensive income.

An impairment loss in respect of goodwill is not reversed. Impairment losses recognised in prior periods in respect of other non-financial assets are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised.

(m) Interest-bearing liabilities

Interest-bearing liabilities are recognised initially at amortised cost less attributable transaction charges.

(n) Trade and other accounts payable

Trade and other accounts payable are stated at cost.

(o) Employee benefits

Defined contribution plans

A defined contribution plan, provident fund, is a post-employment benefit plan under which an entity pays fixed contributions into a separate entity and will have no legal or constructive obligation to pay further amounts. Obligations for contributions to defined contribution pension plans are recognised as an employee benefit expense in profit or loss in the periods during which services are rendered by employees.

Defined benefit plans

A defined benefit plan is a post-employment benefit plan other than a defined contribution plan. The Group's net obligation in respect of defined benefit plans is calculated separately for each plan by estimating the amount of future benefit that employees have earned in the current and prior periods, discounting that amount.

The calculation of defined benefit obligations is performed annually by a qualified actuary using the projected unit credit method. When the calculation results in a potential asset for the Group, the recognised asset is limited to the present value of economic benefits available in the form of any future refunds from the plan or reductions in future contributions to the plan. To calculate the present value of economic benefits, consideration is given to any application minimum funding requirements.

Remeasurements of the net defined benefit liability, actuarial gain or loss are recognised immediately in other comprehensive income. The Group determines the interest expense on the net defined benefit liability for the period by applying the discount rate used to measure the defined benefit obligation at the beginning of the annual period, taking into account any changes in the net defined benefit liability during the period as a result of contributions and benefit payments. Net interest expense and other expenses related to defined benefit plans are recognised in profit or loss.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

When the benefits of a plan are changed or when a plan is curtailed, the resulting change in benefit that relates to past service or the gain or loss on curtailment is recognised immediately in profit or loss. The Group recognises gains and losses on the settlement of a defined benefit plan when the settlement occurs.

Other long-term employee benefits

The Group's net obligation in respect of long-term employee benefits is the amount of future benefit that employees have earned in return for their service in the current and prior periods. That benefit is discounted to determine its present value. Remeasurements are recognised in profit or loss in the period in which they arise.

Termination benefits

Termination benefits are expensed at the earlier of when the Group can no longer withdraw the offer of those benefits and when the Group recognises costs for a restructuring. If benefits are not expected to be settled wholly within 12 months of the end of the reporting period, then they are discounted.

Short-term employee benefits

Short-term employee benefits are expensed as the related service is provided. A liability is recognised for the amount expected to be paid if the Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

(p) Provisions

A provision is recognised if, as a result of a past event, the Group has a present legal or constructive obligation that can be estimated reliably, and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognised as a finance cost.

(q) Revenue

Revenue excludes value added taxes or other sales taxes and is arrived at after deduction of trade discounts.

Sale of goods and services rendered

Revenue is recognised in profit or loss when the significant risks and rewards of ownership have been transferred to the buyer. No revenue is recognised if there is continuing management involvement with the goods or there are significant uncertainties regarding recovery of the consideration due, associated costs or the probable return of goods. Service income is recognised as services are provided.

Rental income

Rental income from investment property is recognised in profit or loss on a straight-line basis over the term of the lease. Lease incentives granted are recognised as an integral part of the total rental income. Contingent rentals are recognised as income in the accounting period in which they are earned.

Interest and dividend income

Interest income is recognised in the profit or loss as it accrues. Dividend income is recognised in the profit or loss on the date the Group's right to receive payments is established which in the case of quoted securities is usually the ex-dividend date.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

(r) Expenses

Lease payments

Payments made under operating leases are recognised in profit or loss on a straight line basis over the term of the lease.

Repair and maintenance expenses

Expenditure on repair and maintenance is charged to profit or loss in the period in which the expenditure is incurred. Expenditure of a capital nature is added to the cost of the related plant and equipment.

Finance costs

Interest expenses and similar costs are charged to profit or loss for the period in which they are incurred, except to the extent that they are capitalised as being directly attributable to the acquisition, construction or production of an asset which necessarily takes a substantial year of time to be prepared for its intended use or sale.

(s) Income tax

Income tax expense on the profit or loss for the year comprises current and deferred tax.

Current tax is the expected tax payable or receivable on the taxable income or loss for the year, using tax rates enacted or substantively enacted at the reporting date, and any adjustment to tax payable in respect of previous years.

Deferred tax is recognised in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognised for the following temporary differences: the initial recognition of goodwill; the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss; and differences relating to investments in subsidiaries and jointly-controlled entities to the extent that it is probable that they will not reverse in the foreseeable future.

The measurement of deferred tax reflects the tax consequences that would follow the manner in which the Group expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax is measured at the tax rates that are expected to be applied to the temporary differences when they reverse, using tax rates enacted or substantively enacted by the reporting date.

In determining the amount of current and deferred tax, the Group takes into account the impact of uncertain tax positions and whether additional taxes and interest may be due. The Group believes that its accruals for tax liabilities are adequate for all open tax years based on its assessment of many factors, including interpretations of tax law and prior experience. This assessment relies on estimates and assumptions and may involve a series of judgements about future events. New information may become available that causes the Group to change its judgement regarding the adequacy of existing tax liabilities; such changes to tax liabilities will impact tax expense in the period that such a determination is made.

Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realised simultaneously.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

A deferred tax asset is recognised to the extent that it is probable that future taxable profits will be available against which the temporary differences can be utilised. Deferred tax assets are reviewed at each reporting date and reduced to the extent that it is no longer probable that the related tax benefit will be realised.

(t) *Earnings per share*

The Group presents basic earnings per share (EPS) data for its ordinary shares. Basic EPS is calculated by dividing the profit or loss attributable to ordinary shareholders of the Company by the weighted average number of ordinary shares outstanding during the period, adjusted for own shares held.

(u) *Segment Reporting*

Segment results that are reported to the Group's the chief operating decision maker include items directly attributable to a segment as well as those that can be allocated on a reasonable basis.

4 Acquisition of non-controlling interests

On 23 April 2018, Thaioil Marine Co., Ltd. ("TM"), a subsidiary, signed a shares sale and purchase agreement with a company ("a seller") which is a shareholder of TOP Maritime Service Co., Ltd. ("TMS") (an indirect subsidiary) to enter into an agreement to sell and purchase shares of TMS.

This transaction is completed by 21 June 2018 and caused TM increase its shareholding of TMS from 55% to 99.99%. This transaction has total value of Baht 81 million consisting of purchasing 45% ordinary shares of TMS at Baht 1 considering from financial statements, performance and capital expenditures plan and loan repayment of Baht 81 million which TMS borrowing from a seller in accordance with novation agreement. Novation agreement is for period of 3 years by repayment amount of Baht 27 per annum from the date as stipulated in the agreement and bears a fix interest rate of 2.5% per annum. As at 31 December 2018, the outstanding amount of loan was Baht 54 million. This transaction is consistent with the Company's strategy and industry outlook.

The carrying amount of TMS's net assets in the Group's financial statements on the date of the acquisition was Baht 223 million. The Group recognised a decrease in non-controlling interests of Baht 100 million attributable to owners of the Group.

5 Related parties

For the purposes of these financial statements, parties are considered to be related to the Group if the Group has the ability, directly or indirectly, to control or joint control the party or exercise significant influence over the party in making financial and operating decisions, or vice versa, or where the Group and the party are subject to common control or common significant influence. Related parties may be individuals or other entities.

Relationships with key management and other related parties were as follows:

Name of entities	Country of incorporation	Nature of relationships
PTT Public Company Limited	Thailand	Parent company
Thai Paraxylene Co., Ltd.	Thailand	Subsidiary and/or common directors
Thai Lube Base Public Company Limited	Thailand	Subsidiary and/or common directors
Thaioil Marine Co., Ltd.	Thailand	Subsidiary and/or common directors
Thaioil Energy Services Co., Ltd.	Thailand	Subsidiary and/or the Company's management as a director

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Name of entities	Country of incorporation	Nature of relationships
Thaioil Solvent Co., Ltd.	Thailand	Subsidiary and/or common directors
Thaioil Ethanol Co., Ltd.	Thailand	Subsidiary and/or the Company's management as a director
Thaioil Power Co., Ltd.	Thailand	Subsidiary and/or common directors
TOP SPP Co., Ltd.	Thailand	Subsidiary and/or common directors
Thaioil Treasury Center Co., Ltd.	Thailand	Subsidiary and/or the Company's management as a director
TOP Solvent Co., Ltd.	Thailand	Indirect subsidiary and/or common directors
Sak Chaisidhi Co., Ltd.	Thailand	Indirect subsidiary and/or the Company's management as a director
TOP Solvent (Vietnam) LLC.	Vietnam	Indirect subsidiary and/or the Company's management as a director
Sapthip Co., Ltd.	Thailand	Indirect subsidiary and/or the Company's management as a director
Sapthip Green Energy Co., Ltd. ⁽¹⁾	Thailand	Indirect subsidiary and/or the Company's management as a director
Thaioil Marine International Pte. Ltd.	Singapore	Indirect subsidiary and/or the Company's management as a director
TOP Maritime Service Co., Ltd.	Thailand	Indirect subsidiary and/or the Company's management as a director
LABIX Co., Ltd.	Thailand	Indirect subsidiary and/or common directors
TOP-NTL Pte. Ltd.	Singapore	Joint venture of subsidiary
TOP-NTL Shipping Trust	Singapore	Joint venture of subsidiary
TOP Nautical Star Co., Ltd.	Thailand	Joint venture of subsidiary and/or the Company's management as a director
TOP-NYK MarineOne Pte. Ltd.	Singapore	Joint venture of indirect subsidiary and/or the Company's management as a director
PTT Digital Solutions Co., Ltd.	Thailand	Associate and/or the Company's management as a director
PTT Energy Solutions Co., Ltd.	Thailand	Associate and/or the Company's management as a director
Global Power Synergy Public Company Limited	Thailand	Indirect associate and/or common directors
Ubon Bio Ethanol Public Company Limited ⁽²⁾	Thailand	Indirect associate and/or the Company's management as a director
T.I.M. Ship Management Co., Ltd.	Thailand	Indirect associate and/or the Company's management as a director
PTT International Trading Pte. Ltd.	Singapore	Subsidiary of the parent company
PTT Oil and Retail Business Public Company Limited ⁽³⁾	Thailand	Subsidiary of the parent company and/or Common directors
PTT Exploration and Production Public Company Limited	Thailand	Subsidiary of the parent company
Energy Complex Co., Ltd.	Thailand	Subsidiary of the parent company
IRPC Public Company Limited	Thailand	Subsidiary of the parent company
PTT Tank Terminal Co., Ltd.	Thailand	Subsidiary of the parent company and/or common directors
PTT Global Chemical Public Company Limited	Thailand	Subsidiary of the parent company
PTT International Trading London Ltd.	England	Subsidiary of the parent company

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Name of entities	Country of incorporation	Nature of relationships
PTT Phenol Co., Ltd.	Thailand	Indirect subsidiary of the parent company
PTT Exploration and Production International Company Limited	Thailand	Indirect subsidiary of the parent company
Solution Creation Co., Ltd.	Thailand	Indirect subsidiary of the parent company
Thai Tank Terminal Ltd.	Thailand	Indirect subsidiary of the parent company
Global Green Chemicals Public Company Limited	Thailand	Indirect subsidiary of the parent company
Vencorex (Thailand) Co., Ltd.	Thailand	Indirect subsidiary of the parent company
GC Glycol Co., Ltd. ⁽⁴⁾	Thailand	Indirect subsidiary of the parent company
Thai Petroleum Pipeline Co., Ltd.	Thailand	Related company and/or the Company's management as a director
Sarn Palung Social Enterprise Co., Ltd.	Thailand	Related company and/or the Company's management as a director

(1) On 10 May 2018, an indirect subsidiary registered Sapthip Green Energy Co., Ltd.

(2) On 23 April 2018, it was registered as a public company.

(3) On 28 April 2017, PTT Public Company Limited ("PTT") resolved to approve the restructuring of PTT in relation to the transfer of the oil business unit to PTT Oil and Retail Business Public Company Limited ("PTTOR"). PTT and PTTOR successfully executed Business Transfer Agreement on 18 June 2018 and PTT commenced the process of transferring the assets and liabilities and shares of related companies to PTTOR since 1 July 2018.

(4) On 21 December 2018, TOC Glycol Co., Ltd. has changed its registered name to GC Glycol Co., Ltd.

The pricing policies for particular types of transactions are explained further below:

Transactions	Pricing policies
Revenue from sale and rendering of services, lease income, purchase of goods and assets	Market prices or, where no market price exists, at contractually agreed prices
Interest income and expense	Agreed rates stipulated in the agreements
Dividend income	Right to receive dividends
Other income and expenses	Contractually agreed prices
Directors' remuneration	Amounts approved by the Group's shareholders

Significant transactions for the years ended 31 December 2018 and 2017 with related parties were as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Parent Company				
Revenue from sale and rendering of services	84,544	151,356	82,490	147,470
Purchase of crude oil and feedstock	142,972	108,358	134,494	100,709
Other income	9	13	9	13
Other expenses	118	130	117	129
Purchase of assets	3	-	-	-

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Subsidiaries				
Revenue from sale and rendering of services	-	-	75,109	64,717
Purchase of crude oil and feedstock	-	-	49,740	44,165
Interest income	-	-	276	492
Dividend income	-	-	3,917	10,798
Land lease income	-	-	72	68
Other income	-	-	2,334	1,614
Interest expense	-	-	927	17
Other expenses	-	-	1,022	1,105
Purchase of assets	-	-	41	8
Joint ventures				
Revenue from sale and rendering of services	-	91	-	91
Other expenses	1,263	1,101	1,263	1,101
Associates				
Revenue from sale and rendering of services	10	5	6	2
Purchase of crude oil and feedstock	623	619	622	619
Dividend income	-	-	183	169
Land lease income	8	8	8	8
Other income	21	32	19	30
Other expenses	289	287	270	259
Purchase of assets	63	89	63	89
Other related parties				
Revenue from sale and rendering of services	100,564	4,677	91,517	285
Purchase of crude oil and feedstock	10,424	5,690	4,905	1,098
Purchase - sale of crude oil and feedstock for legal reserve	1,668	-	1,668	-
Dividend income	154	158	154	158
Other income	7	2	7	2
Other expenses	368	257	318	202
Directors' remuneration	79	77	69	69

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Balances as at 31 December 2018 and 2017 with related parties were as follows:

Trade accounts receivable - related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Parent Company				
PTT Public Company Limited	85	10,416	85	10,188
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	2,959	3,552
Thai Lube Base Public Company Limited	-	-	1,254	1,237
Thaioil Power Co., Ltd.	-	-	39	37
TOP SPP Co., Ltd.	-	-	75	45
Sak Chaisidhi Co., Ltd.	-	-	-	37
LABIX Co., Ltd.	-	-	2,163	1,841
Associates				
Global Power Synergy Public Company Limited	5	5	5	2
Other related parties				
PTT Oil and Retail Business Public Company Limited	10,592	-	10,346	-
PTT International Trading Pte. Ltd.	1,077	36	431	36
IRPC Public Company Limited	7	142	33	-
PTT Exploration and Production Public Company Limited	10	16	-	-
PTT Global Chemical Public Company Limited	35	11	-	-
Vencorex (Thailand) Co., Ltd.	-	2	-	-
PTT Exploration and Production International Company Limited	1	-	-	-
	11,812	10,628	17,390	16,975
Less allowance for doubtful accounts	-	-	-	-
Net	11,812	10,628	17,390	16,975
Bad and doubtful debts expense for the year	-	-	-	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Other accounts receivable - related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Parent Company				
PTT Public Company Limited	1	4	1	4
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	148	40
Thai Lube Base Public Company Limited	-	-	7	6
Thaioil Marine Co., Ltd.	-	-	11	78
Thaioil Energy Services Co., Ltd.	-	-	5	14
Thaioil Solvent Co., Ltd.	-	-	1	6
Thaioil Ethanol Co., Ltd.	-	-	2	6
Thaioil Power Co., Ltd.	-	-	31	30
TOP SPP Co., Ltd.	-	-	51	76
TOP Solvent Co., Ltd.	-	-	4	13
Sak Chaisidhi Co., Ltd.	-	-	5	6
LABIX Co., Ltd.	-	-	27	40
Thaioil Treasury Center Co., Ltd.	-	-	32	-
Sapthip Co., Ltd.	-	-	3	-
Associates				
Global Power Synergy Public Company Limited	1	5	1	5
Ubon Bio Ethanol Public Company Limited	-	43	-	-
T.I.M. Ship Management Co., Ltd.	-	5	-	-
Total	2	57	329	324

Short-term loans to related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	3,500	5,500
Thaioil Marine Co., Ltd.*	-	-	300	210
Thaioil Solvent Co., Ltd.	-	-	362	1,008
Thaioil Ethanol Co., Ltd.	-	-	112	433
TOP SPP Co., Ltd.	-	-	-	8,500
Total	-	-	4,274	15,651

* Please see Note 11 impairment assessment for loan to and investment in a subsidiary

Interest rates during the years of 2018 and 2017 were charged at highest money market rate for short-term loan based on BIBOR 3M plus margin and at money market rate (MMR) but not exceeding the average minimum loan rate (MLR) of 5 financial institutions less margin, respectively.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Movements of short-term loans to related parties during the years ended 31 December 2018 and 2017 were as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
At 1 January	-	90	15,651	12,584
Increases	-	-	310	7,221
Decreases	-	(90)	(11,687)	(4,154)
At 31 December	-	-	4,274	15,651

Loan Agreement

On 29 September 2017, a subsidiary entered into term loan facility agreements with financial institutions in Thailand for a credit facility of Baht 8,500 million, to repay short-term borrowing from related parties. The borrowing bears the interest rate at THBFIX plus margin. Under the terms of the agreements, a subsidiary agrees to maintain certain financial ratio and comply with conditions stipulated in the agreements.

During 2018, the credit facility has been utilised. As at 31 December 2018, the Company had outstanding long-term loan from financial institutions totalling Baht 8,209 million (*31 December 2017: nil*).

Short-term loan

In February 2017, a subsidiary has disposed shares in Maesod Clean Energy Company Limited, which is an indirect associate company to existing shareholders. Hence, in the consolidated financial statements for the year ended 2017, the Group has reclassified of Baht 90 million “Short-term loan to related company” to “Short-term loan to other company”, by other terms and conditions has remained with original loan agreement.

Long-term loans to related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Subsidiaries				
Thaioil Marine Co., Ltd.*	-	-	400	-
Total	-	-	400	-

* Please see Note 11 impairment assessment for loan to and investment in a subsidiary

On 14 November 2018, a subsidiary entered into a loan agreement with the Company at the amount of Baht 400 million for financial restructuring. The borrowing bears the interest rate at highest money market rate for short-term loan based on BIBOR 3M plus margin. The agreement is effective for a period of 3 years from signing date.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Trade accounts payable - related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	(in million Baht)			
Parent Company				
PTT Public Company Limited	9,546	10,928	8,093	9,773
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	1,829	2,270
Thai Lube Base Public Company Limited	-	-	389	252
Thaioil Marine Co., Ltd.	-	-	17	12
Thaioil Power Co., Ltd.	-	-	153	129
TOP SPP Co., Ltd.	-	-	273	228
Sak Chaisidhi Co., Ltd.	-	-	6	10
Sapthip Co., Ltd.	-	-	17	14
LABIX Co., Ltd.	-	-	1,232	1,099
Associates				
Ubon Bio Ethanol Public Company Limited	23	32	23	32
T.I.M. Ship Management Co., Ltd.	4	4	-	-
Other related parties				
PTT Oil and Retail Business Public Company Limited	159	-	158	-
IRPC Public Company Limited	138	148	-	-
PTT Global Chemical Public Company Limited	178	178	-	-
PTT Phenol Co., Ltd.	10	31	-	-
GC Glycol Co., Ltd.	1	-	-	-
PTT International Trading London Ltd.	489	-	489	-
Global Green Chemicals Public Company Limited	47	68	47	68
Total	10,595	11,389	12,726	13,887

Other accounts payable - related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	(in million Baht)			
Parent Company				
PTT Public Company Limited	5	5	2	4
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	1	-
Thaioil Marine Co., Ltd.	-	-	1	6
Thaioil Energy Services Co., Ltd.	-	-	73	60
TOP Solvent Co., Ltd.	-	-	3	2
LABIX Co., Ltd.	-	-	-	2
Thaioil Treasury Center Co., Ltd.	-	-	627	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Associates				
PTT Digital Solutions Co., Ltd.	25	62	25	61
PTT Energy Solutions Co., Ltd.	26	26	26	26
T.I.M. Ship Management Co., Ltd.	-	5	-	-
Other related parties				
PTT Oil and Retail Business Public Company Limited	2	-	-	-
PTT International Trading Pte. Ltd.	-	1	-	-
Energy Complex Co., Ltd.	1	1	1	1
IRPC Public Company Limited	18	8	18	8
Thai Tank Terminal Ltd.	1	2	-	-
PTT Tank Terminal Co., Ltd.	1	-	-	-
Thai Petroleum Pipeline Co., Ltd.	5	2	5	2
Total	84	112	782	172

Short-term borrowings from related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	1,076	226
Thai Lube Base Public Company Limited	-	-	422	261
Thaioil Marine Co., Ltd.	-	-	8	16
Total	-	-	1,506	503

Interest rates during the years of 2018 and 2017 were charged at highest money market rate for short-term loan based on BIBOR 3M plus margin and at money market rate (MMR) but not exceeding the average minimum loan rate (MLR) of 5 financial institutions less margin, respectively.

Movements of short-term loans from related parties during the years ended 31 December 2018 and 2017 were as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
At 1 January	-	-	503	531
Increase (Decrease)	-	-	1,003	(28)
At 31 December	-	-	1,506	503

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Long-term borrowings from related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
<i>Subsidiaries</i>				
Thaioil Treasury Center Co., Ltd.	-	-	52,197	-
<i>Less</i> deferred cost of borrowings	-	-	(169)	-
Total	-	-	52,028	-

Long-term loan Agreement

On 11 April 2018, a subsidiary has entered into a long-term loan agreement with the Company from the net proceeds from the issuance of the new notes at the amount of U.S. Dollars 283.6 million, equivalent to Baht 9,250 million, with maturity date in 2023 and bears a fixed interest rate of 4.09% per annum and U.S. Dollars 327.6 million, equivalent to Baht 10,684 million, with maturity date in 2043 and bears a fixed interest rate of 5.35% per annum for the purpose of liability management.

On 21 November 2018, a subsidiary has entered into a long-term loan agreement with the Company from the net proceeds from the issuance of the new notes at the amount of U.S. Dollars 396.1 million, equivalent to Baht 13,140 million, with maturity date in 2028 and bears a fixed interest rate of 5.22% per annum and U.S. Dollars 593.1 million, equivalent to Baht 19,676 million, with maturity date in 2048 and bears a fixed interest rate of 5.96% per annum. These loans shall be used for capital expenditure and general corporate purpose.

Significant agreements with related parties

As at 31 December 2018, the Group had the following significant agreements with related parties.

Raw Materials and Oil-Products Purchases and Sales Agreements

The Company has raw materials and oil products purchase and sale agreements with a subsidiary, whereby the purchase and sale volumes and prices of raw materials and oil products are specified in the agreements. These agreements are effective on the agreement date and shall be terminated by either party giving at least 6 months notice in writing to the other party.

Oil-Products Sale and Purchase Agreements

The Company has oil products purchase and sale agreements with a subsidiary, whereby the purchase and sale volumes and prices are specified in the agreements. These agreements are effective on the agreement date and shall be terminated if either party does not comply with the terms stipulated in the agreements.

By-Product Sale and Purchase Agreement

The Company has a by-product purchase and sale agreement with a subsidiary, whereby the purchase and sale volumes and prices of the by-product are specified in the agreement. The agreement is for a period of 16 years expiring in September 2020, or until the termination by mutual consent.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Technology and Communication Service Agreement

The Company has a technology and communication service agreement with an associate, whereby the service fees are specified in the agreement. The agreement is for a period of 2 years expiring in December 2020 and is renewable for additional periods as mutual agreement until either party giving at least 180 days before contract end date notice in writing to other party.

Crack Spread Swap Agreements

The Company has crack spread swap agreements with a subsidiary and a related company ("counterparties"). The Company or the counterparties have commitments to make payments for the differences between the fixed price and floating price for each period.

As at 31 December 2018, the Company has oil volume under the agreements of 90,000 tons with the subsidiary (31 December 2017: nil).

Product Offtake and Crude Oil Supply Agreement

The Company has a product off take and crude oil supply agreement with a related company, whereby (a) the Company will sell and the related company will purchase refined petroleum products produced by the refinery for 49.99% of 270,000 barrels per day; and (b) the related party will supply and the Company will purchase crude oil and/or feedstock for the refinery required to produce 49.99% of 270,000 barrels per day. The credit term for crude oil shall be mutually agreed.

On 10 May 2018, Novation Agreement has been made to transfer rights, obligations and partial responsibility to another related party, effective since 1 July 2018 onward.

Throughput Agreement

The Company has a throughput agreement with a related company, whereby the tariff fee is specified in the agreement. The agreement is for a period of 20 years expiring in 2014 or when a target is achieved and is renewable.

The Company has a throughput agreement with a related company, whereby the tariff fee is specified in the agreement. The agreement is for a period of 20 years from the service date and shall be renewed for periods of 5 years.

Natural Gas Supply Agreements

The Company and certain subsidiaries have natural gas supply agreements with a related company, whereby the related company agrees to supply the natural gas to the Company and the subsidiaries at quantities and prices as stipulated in the agreements. These agreements are effective for periods of 10 to 25 years expiring during 2022 and 2041.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Cost Reimbursement Agreements

A subsidiary and an associate have cost reimbursement agreements with the Company covering the reimbursement of construction costs of natural gas pipeline facilities and the use of the pipeline facilities, raw water pipeline and the use of land for the construction of a transmission line connecting the subsidiary and the associate to the Electricity Generating Authority of Thailand (EGAT). Under the terms of the agreements, the subsidiary and the associate agree to share the cost of investments with the Company on the basis and conditions stipulated in the agreements. These agreements are effective for a period of 25 years, or until the termination of the power purchase agreements entered into by the subsidiary and the associate with EGAT, whichever is sooner.

Power Purchase Agreements

Certain subsidiaries (“sellers”) have power purchase agreements with the Company and certain subsidiaries for periods of 24 and 25 years expiring in 2023, 2027 and 2040, whereby the sellers will sell power energy to the Company and the subsidiaries at the agreed quantities and prices as stipulated in the agreements.

Steam Purchase Agreements

The Company and certain subsidiaries have entered into steam purchase agreements for periods of 20 and 25 years expiring in 2023, 2027 and 2040, whereby the agreed quantities and prices are specified in the agreements.

Services and Supplies Agreements

Certain subsidiaries and an associate have services and supplies agreements with the Company and a subsidiary, whereby the Company and a subsidiary provide the subsidiaries and the associate for the operating, repair and maintenance, management, controlling and administration, procurement, fuel transmission, waste water treatment and utilities, information technology, financial, accounting and human resource services. The subsidiaries and the associate agree to pay certain fees as stipulated in the agreements. These agreements are for periods of 5 years or 28 years or until the termination of the land lease agreement entered into by a subsidiary with the Company, whichever is sooner or until the termination of the power purchase agreement entered into by the associate with EGAT.

Land Lease Agreements

Certain subsidiaries and an associate have land lease agreements with the Company to lease/sublease certain parcels of land ending in September 2022, May 2041, and August 2043 with the rate as stipulated in the agreements, and the rate will be adjusted every 5 years.

The Company have land lease agreements with certain subsidiaries to lease certain parcels of land ending in September 2046 with the rate as stipulated in the agreements, and the rate will be adjusted every 5 years.

The Company has a land lease agreement with a related company to lease certain parcels of land ending in August 2026 with the rate as stipulated in the agreements. If the Company does not giving a cancelable notice within a month before contract end date, the contract shall be renewed for additional 15 years.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Raw Materials and Petrochemical Products Purchase and Sale Agreements

An indirect subsidiary has raw materials and petrochemical products purchase and sale agreements with related companies, whereby the purchase and sale volumes and prices of raw materials and petrochemical products are specified in the agreements. These agreements are for periods of 1 year to 15 years expiring during 2019 and 2025.

Technical Service Agreements

An associate has a technical service agreement with the Company to provide a consultancy technical solutions service for energy-related and petrochemical businesses, whereby the service fees are specified in the agreements. This agreement expires in December 2019.

Time Charter and Affreightment Agreements

A subsidiary has time charter and affreightment agreements with the Company, subsidiary and another indirect subsidiary, whereby the freight rate is specified in the agreements. These agreements are for periods of 1 year and 5 years and 8 years expiring during 2019, 2020, and 2024.

Certain joint ventures have time charter agreements with the Company, whereby the freight rate is specified in the agreements. These agreements are for periods of 10 years expiring in 2021, 2022 and 2024.

Charter of Crew Boat Agreements

An indirect subsidiary has charter of crew boat agreement with a related company, whereby the service fees are specified in the agreements. These agreements are for period of 3 years expiring in 2019 and 2020.

Office Rental Agreements

The Company has office rental and service agreements with a related party, whereby the rental and service fees are specified in the agreements. These agreements are for the periods of 3 years expiring in November 2021 and are renewable for additional periods of 3 years.

Ethanol Products Purchase and Sale Agreements

An associate has ethanol products purchase and sale agreements with the Company, whereby the purchase and sale volumes and prices of the ethanol products are specified in the agreements. This agreement expired in December 2019. This agreement shall be automatically renewed for additional period of 1 year until either party giving notice in writing to the other party.

An indirect subsidiary has an ethanol products purchase and sale agreement with a related company, whereby the purchase and sale volumes and prices of the ethanol products are specified in the agreement. The agreement is for a period of 10 years expiring in June 2021 and shall be renewed by either party giving at least 6 months before contract end date notice in writing to the other party.

Service Agreements

A subsidiary has human resource service agreements with the Company, whereby the service fees are specified in the agreements. This agreement expires in December 2019.

The Company has a human resource service agreements with certain subsidiaries, whereby the service fees are specified in the agreement. These agreements expire in May and December 2019.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Crude Oil Storage Tank Service Agreement

A related company has a crude oil storage tank service agreement with the Company, whereby the service fees are specified in the agreement. These agreements are for a period of 2 years expiring in September 2019 and December 2019.

Sea berth and throughput Agreement

A related company has a sea berth and throughput agreement with the Company, whereby the tariff fee is specified in the agreement. The agreement is for a period of 20 years and is renewable for additional periods of 5 years.

Loan Agreement

The Company has uncommitted unsecured short term inter-company borrowing and lending agreements with a related company to manage liquidity. Each of the borrowing credit line and lending credit line is not exceeding Baht 2,000 million, bearing the interest rate reference by BIBOR or LIBOR, plus interest rate margin by considering short-term borrowing interest rate, the return on short-term investment and credit rating of the Company and the counterparty. This agreement is for a period of 1 year expiring in December 2019.

6 Cash and cash equivalents

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Cash on hand	6	37	1	2
Cash at banks - savings and current accounts	14,431	7,998	10,262	4,325
Cash at banks - savings account (Private Funds)	36	84	36	84
Cash at banks - fixed deposits (maturity period less than 3 months from the investment date)	19,569	4,888	19,569	4,888
Certificate of deposits (maturity period less than 3 months from the investment date)	-	2,616	-	2,616
Total	34,042	15,623	29,868	11,915

As at 31 December 2018, the Group's savings accounts, current accounts and fixed deposits (maturity period less than 3 months from the investment date) totalling Baht 1,772 million have been pledged as collateral for credit facilities as described in note 19 to the financial statements (2017: Baht 54 million).

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

7 Other investments

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
<i>Current investments</i>				
Cash at bank - fixed deposits	60,596	43,140	60,403	42,719
Debt securities held to maturity	721	-	721	-
Debt securities - available-for-sale securities (Private funds)	11,903	9,178	11,903	9,178
	<u>73,220</u>	<u>52,318</u>	<u>73,027</u>	<u>51,897</u>
<i>Investments held as available-for-sale</i>				
Equity securities - available-for-sale securities	361	363	361	363
Debt securities - available-for-sale securities (Private funds)	-	2,740	-	2,740
	<u>361</u>	<u>3,103</u>	<u>361</u>	<u>3,103</u>
<i>Other long-term investments</i>				
Other non-marketable securities	780	780	780	780
	<u>780</u>	<u>780</u>	<u>780</u>	<u>780</u>
Total	<u>74,361</u>	<u>56,201</u>	<u>74,168</u>	<u>55,780</u>

Cash at bank - fixed deposits

As at 31 December 2018, the Group's fixed deposits totalling Baht 540 million have been pledged as collateral for credit facilities as described in note 19 to the financial statements (2017: Baht 421 million).

Equity securities - available-for-sale securities

In 2017 the Company entered into CIMB-Principal Energy and Petrochemical Index Fund (CIMB - PRINCIPAL EPIF), to invest in equities issued by the energy and petrochemical companies listed in The Stock Exchange of Thailand. The Company purchased 28.85 million units or amounting to Baht 300 million which its fair value as at 31 December 2018 is Baht 361 million. (2017: Baht 364 million)

Debt securities - available-for-sale securities

The Company established private funds and engaged independent assets management companies. As at 31 December 2018, the value of private funds outstanding totalling Baht 11,939 million (2017: Baht 12,002 million) (including cash at banks - savings account as disclosed in note 6 to financial statements). Those private funds have invested in debt securities which are considered investment grade.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Other non-marketable securities

		Consolidated/Separate financial statements							
	Type of Business	Ownership interest		Paid-up capital		Cost method		Dividend income	
		2018	2017	2018	2017	2018	2017	2018	2017
		(%)				(in million Baht)			
Related party									
Thai Petroleum Pipeline Co., Ltd.	Oil transportation by pipeline	9.19	9.19	8,479	8,479	779	779	154	158
Sarn Palung Social Enterprise Co., Ltd.	Social enterprise	15.00	15.00	3	3	<u>1</u>	<u>1</u>	<u>-</u>	<u>-</u>
						780	780	154	158

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

8 Trade accounts receivable

		Consolidated financial statements		Separate financial statements	
	<i>Note</i>	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Related parties	5	11,812	10,628	17,390	16,975
Other parties		12,547	11,700	7,804	7,267
Total		24,359	22,328	25,194	24,242
Less allowance for doubtful accounts		-	-	-	-
Net		24,359	22,328	25,194	24,242
Bad and doubtful debts expenses for the year		-	-	-	-

Aging analyses for trade accounts receivable are as follows:

		Consolidated financial statements		Separate financial statements	
	<i>Note</i>	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Related parties					
Within credit terms		11,812	10,628	17,390	16,975
		11,812	10,628	17,390	16,975
Less allowance for doubtful accounts		-	-	-	-
Net	5	11,812	10,628	17,390	16,975
Other parties					
Within credit terms		12,545	11,699	7,804	7,267
Overdue:					
Less than 3 months		2	1	-	-
		12,547	11,700	7,804	7,267
Less allowance for doubtful accounts		-	-	-	-
Net		12,547	11,700	7,804	7,267
Total		24,359	22,328	25,194	24,242

The normal credit term granted by the Group ranges from 15 days to 90 days.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

9 Other receivables

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Prepaid expenses	601	571	500	452
Other accounts receivable	256	362	502	469
Current portion of long-term loans to savings co-operative of employees	34	37	34	37
Other	491	201	408	169
Total	1,382	1,171	1,444	1,127

10 Inventories

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Crude oil and feedstock	9,874	12,016	8,835	10,796
Materials, spare parts and supplies	1,560	1,479	1,115	1,027
Finished and semi-finished oil products	6,995	8,820	4,245	5,812
Goods in transit				
Crude oil	11,652	10,533	11,541	10,458
Materials, spare parts and supplies	16	1	2	1
	30,097	32,849	25,738	28,094
Less allowance for decline in value of inventories adjusted to net realisable value	1,358	8	1,314	-
Net	28,739	32,841	24,424	28,094

As at 31 December 2018, the Company's inventories as stated above included a legal reserve amounting to Baht 10,413 million (2017: Baht 10,829 million).

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Inventories recognised as an expense in 'cost of sale of goods':				
- Cost	369,354	303,821	396,894	328,515
- (Reversal of) write-down to net realisable value	1,350	(93)	1,314	(73)
Net	370,704	303,728	398,208	328,442

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

11 Investments in subsidiaries

	Separate financial statements	
	2018	2017
	<i>(in million Baht)</i>	
At 1 January	14,555	14,545
Acquisition	-	10
At 31 December	14,555	14,555

At the meeting of the Board of the Director of the Company held on 29 September 2017, the Company's Board of Directors has resolved to establish Thailoil Treasury Center Co., Ltd. to conduct as treasury center for the Group's business. Thailoil Treasury Center Co., Ltd. is 99.99% owned by the Company. On 3 October 2017, Thailoil Treasury Center Co., Ltd. has been incorporated with the registered share capital of 1 million ordinary shares at par value of Baht 10 each, totalling Baht 10 million. All shares have been fully paid-up in December 2017.

Under the Sponsors Support Agreement with financial institutions, a subsidiary, as a shareholder in an indirect subsidiary, has some commitments as specified in the agreement such as maintain its shareholding, provide financial support in proportion of its shareholding in order to enter into a Credit Facilities Agreement.

Impairment assessment for loan to and investment in a subsidiary

The Company has assessed the recoverable amount of loan to and investment in Thailoil Marine Co., Ltd. by determine discounting future cash flows. The key assumptions used to determine recoverable amount included utilisation and freight rate, operating cost, long-term growth rate derived from expectations of future outcomes taking into account past experience, adjusted for anticipated revenue growth and discount rate referred to weighted average cost of capital (WACC) at 8.2%. The recoverable amount was estimated to be higher than its carrying amount and no impairment was required to these financial statements. Increasing in discount rate higher than 2.2% could cause the carrying amount to exceed the recoverable amount.

Capital increase of TOP Maritime Service Company Limited

On 20 November 2018, the Extraordinary Meeting of Shareholders of TOP Maritime Service Company Limited ("TMS") resolved to approve on capital increase for the amount of Baht 250 million, the registered capital shall increase from Baht 270 million to Baht 520 million. The registration has been completed by the end of November 2018. The objective of capital increase is mainly for liability restructuring to be consistent with current business environment.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Investments in subsidiaries as at 31 December 2018 and 2017, and dividend income from those investments for the years then ended were as follows:

	Separate financial statements							
	Ownership interest		Paid-up capital		Cost method		Dividend income	
	2018	2017	2018	2017	2018	2017	2018	2017
	(%)				(in million Baht)			
Subsidiaries								
Thai Paraxylene Co., Ltd.	99.99	99.99	2,572	2,572	2,161	2,161	1,029	6,688
Thai Lube Base Public Company Limited	99.99	99.99	1,758	1,758	1,979	1,979	1,318	1,846
Thaioil Marine Co., Ltd.	99.99	99.99	970	970	970	970	-	-
Thaioil Energy Services Co., Ltd.	99.99	99.99	40	40	40	40	-	60
Thaioil Solvent Co., Ltd.	99.99	99.99	1,250	1,250	1,250	1,250	-	-
Thaioil Ethanol Co., Ltd.	99.99	99.99	1,450	1,450	1,450	1,450	-	-
Thaioil Power Co., Ltd.	73.99	73.99	2,810	2,810	3,195	3,195	520	769
TOP SPP Co., Ltd.	99.99	99.99	3,500	3,500	3,500	3,500	1,050	1,435
Thaioil Treasury Center Co., Ltd.	99.99	99.99	10	10	10	10	-	-
Total			14,360	14,360	14,555	14,555	3,917	10,798

None of the Company's investment in subsidiaries are publicly listed and consequently do not have published price quotations.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

12 Non-controlling interests

The following table summarises the information relating to each of the Group's subsidiaries that has a material non-controlling interest, before any intra-group eliminations:

	Thaioil Power Co., Ltd. 31 December		LABIX Co., Ltd. 31 December		Other individually immaterial subsidiaries 31 December		Total 31 December	
	2018	2017	2018	2017	2018	2017	2018	2017
	<i>(in million Baht)</i>							
Non-controlling interest percentage	26.01	26.01	25	25				
Current assets	1,196	927	2,615	2,628				
Non-current assets	10,381	10,304	11,371	12,008				
Current liabilities	(630)	(675)	(3,573)	(3,986)				
Non-current liabilities	-	-	(5,994)	(6,053)				
Net assets	10,947	10,556	4,419	4,597				
Carrying amount of non-controlling interest	2,847	2,746	1,105	1,149	808	1,030	4,760	4,925
Revenue from sale and rendering of services	4,409	4,150	19,117	15,409				
Profit (loss)	1,101	1,160	(178)	161				
Other comprehensive income (loss)	1	(11)	-	-				
Total comprehensive income (loss)	1,102	1,149	(178)	161				
Profit (loss) allocated to non-controlling interest	286	302	(45)	40	(6)	121	235	463
Total comprehensive income (loss) allocated to non-controlling interest	284	299	(45)	40	(6)	121	233	460
Cash flows from operating activities	671	890	1,345	1,516				
Cash flows from investing activities	390	339	157	(840)				
Cash flows from financing activities	(871)	(1,222)	(1,163)	(938)				
Net increase (decrease) in cash and cash equivalents	190	7	339	(262)				
Dividends paid to non-controlling interest	183	270	-	-				
		50						

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

13 Investments in joint ventures and associates

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
At 1 January	14,368	13,866	1,261	1,261
Share of net gain of investments - equity method	1,193	1,197	-	-
Disposal	-	(12)	-	-
Dividend income	(605)	(625)	-	-
Currency translation differences	(3)	(42)	-	-
Share of other comprehensive income (loss) of associate	(12)	(16)	-	-
At 31 December	<u>14,941</u>	<u>14,368</u>	<u>1,261</u>	<u>1,261</u>

On 16 February 2017, a subsidiary has diverted all its shareholding in Maesod Clean Energy Company Limited, an indirect associate, to existing shareholders.

On 20 June 2018, an associate entered into a shares purchase agreement with a company which is a shareholder of Glow Energy Public Company Limited ("GLOW") to enter into an agreement to purchase shares of GLOW. At present, the shares purchase transaction is not yet completed.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Investments in joint ventures and associates as at 31 December 2018 and 2017, and dividend income for the years then ended were as follows:

	Consolidated financial statements								Market price of listed securities		Dividend income	
	Ownership interest		Paid-up capital		Cost method		Equity method		2018	2017	2018	2017
	2018	2017	2018	2017	2018	2017	2018	2017				
	(%)						(in million Baht)					
Joint ventures												
TOP-NTL Pte. Ltd.	50.00	50.00	1	1	-	-	16	11	-	-	-	-
TOP-NTL Shipping Trust	50.00	50.00	48	48	24	24	67	43	-	-	-	-
TOP Nautical Star Co., Ltd.	35.00	35.00	150	150	53	53	110	66	-	-	-	-
TOP-NYK MarineOne Pte. Ltd.	50.00	50.00	548	548	274	274	432	422	-	-	33	34
			<u>747</u>	<u>747</u>	<u>351</u>	<u>351</u>	<u>625</u>	<u>542</u>			<u>33</u>	<u>34</u>
Associates												
PTT Digital Solutions Co., Ltd.	20.00	20.00	150	150	30	30	368	319	-	-	16	16
PTT Energy Solutions Co., Ltd.	20.00	20.00	150	150	30	30	48	51	-	-	-	-
Global Power Synergy Public Company Limited	29.70	29.70	14,983	14,983	3,855	3,855	13,081	12,652	26,026	32,032	556	511
Ubon Bio Ethanol Public Company Limited	21.28	21.28	2,740	2,740	769	769	819	804	-	-	-	64
T. I. M. Ship Management Co., Ltd.	33.33	33.33	3	3	1	1	-	-	-	-	-	-
			<u>18,026</u>	<u>18,026</u>	<u>4,685</u>	<u>4,685</u>	<u>14,316</u>	<u>13,826</u>			<u>572</u>	<u>591</u>
			<u>18,773</u>	<u>18,773</u>	<u>5,036</u>	<u>5,036</u>	<u>14,941</u>	<u>14,368</u>			<u>605</u>	<u>625</u>

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

	Separate financial statements									
	Ownership interest		Paid-up capital		Cost method		Market price of listed securities		Dividend income	
	2018	2017	2018	2017	2018	2017	2018	2017	2018	2017
	(%)						(in million Baht)			
PTT Digital Solutions Co., Ltd.	20.00	20.00	150	150	30	30	-	-	16	16
PTT Energy Solutions Co., Ltd.	20.00	20.00	150	150	30	30	-	-	-	-
Global Power Synergy Public Company Limited	8.91	8.91	<u>14,983</u>	<u>14,983</u>	<u>1,201</u>	<u>1,201</u>	7,808	9,610	<u>167</u>	<u>153</u>
Total			<u>15,283</u>	<u>15,283</u>	<u>1,261</u>	<u>1,261</u>			<u>183</u>	<u>169</u>

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Joint ventures and Associates

The following table summarises the financial information of the joint ventures and associates as included in their own financial statements, adjusted for fair value adjustments at acquisition and differences in accounting policies. The table also reconciles the summarised financial information to the carrying amount of the Group's interest in these companies.

	Global Power Synergy Public Company Limited	
	2018	2017
	<i>(in million Baht)</i>	
Revenue	24,235	19,325
Net profit	3,889	3,340
Other comprehensive income (loss)	(41)	(55)
Total comprehensive income	3,848	3,285
Attributable to NCI	530	165
Attributable to investee's shareholders	3,318	3,120
Current assets	12,164	9,918
Non-current assets	52,275	50,050
Current liabilities	(4,727)	(4,087)
Non-current liabilities	(17,363)	(15,507)
Net assets	42,349	40,374
Attributable to NCI	2,357	1,827
Attributable to investee's shareholders	39,992	38,547
Group's interest in net assets of investee at 1 January	12,652	12,236
Total comprehensive income (loss) attributable to the Group	985	927
Dividends received during the year	(556)	(511)
Group's interest in net assets of investee at end of year	13,081	12,652
Carrying amount of interest in investee at 31 December	13,081	12,652

Immaterial joint ventures and associates

The following is summarised financial information for the Group's interest in immaterial joint ventures and associates based on the amounts reported in the Group's consolidated financial statements:

	Immaterial Joint ventures		Immaterial Associates	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Carrying amount of interests in immaterial joint ventures and associates	625	542	1,235	1,174
Group's share of:				
- Profit from continuing operations	118	113	77	141
- Other comprehensive income (loss)	(35)	(42)	-	-
- Total comprehensive income	83	71	77	141

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

14 Investment properties

		Consolidated financial statements		Separate financial statements	
	Note	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Cost					
At 1 January		103	94	1,111	1,097
Reclassification from property, plant and equipment, net	15	-	9	-	14
At 31 December		103	103	1,111	1,111
Impairment losses					
At 1 January		-	-	(11)	(11)
At 31 December		-	-	(11)	(11)
Net book value					
At 1 January		103	94	1,100	1,086
At 31 December		103	103	1,100	1,100

Investment properties as at 31 December 2018 and 2017 were valued by a firm of independent professional valuers, at open market values on an existing use basis and income approach. The appraised value of the Group and the Company was Baht 273 million and Baht 1,764 million respectively (2017: Baht 273 million and Baht 1,764 million respectively).

Measurement of fair value

Fair value hierarchy

The fair value of investment property was determined by external, independent property valuers, having appropriate recognised professional qualifications and recent experience in the category of the property being valued. The independent valuers provide the fair value of the Group's investment property portfolio on a regular basis.

The fair value measurement for all investment property has been categorised as a Level 3 fair value based on the inputs to the valuation technique used.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Valuation technique and significant unobservable inputs

The following table shows the valuation technique used in measuring the fair value of investment property, as well as the significant unobservable inputs used.

Valuation technique	Significant Unobservable inputs	Inter-relationship between key unobservable inputs and fair value measurement
<i>Discounted cash flows</i> ; The valuation model considers the present value of net cash flows to be generated from the property, taking into account expected rental growth rate. The expected net cash flows are discounted using risk-adjusted discount rates. Among other factors, the discount rate estimation considers the quality of its location (prime vs secondary), tenant credit quality and lease terms.	- Contractually agreed lease income over the remaining period. - Risk-adjusted discount rates (9%)	The estimated fair value increase (decrease) if: - Expected market rental growth were higher (lower); - The risk-adjusted discount rate were lower (higher).
<i>Market approach</i>	The adjusted quoted price and the actual selling price of comparable investment properties	The estimated fair value increase (decrease) if land price were higher (lower).

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

15 Property, plant and equipment

	Consolidated financial statements												
	Land	Buildings	Leasehold improve- ments	Refinery plant and equipment	Petro- chemical plants	Power plants	Trans- mission facilities	Machinery, equipment and plant equipment	Oil and liquid chemical tankers and crew boats	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress	Total
	(in million Baht)												
Cost													
At 1 January 2017	6,194	1,935	211	102,781	34,683	17,360	193	6,158	4,543	821	23	3,589	178,491
Additions	52	-	-	136	25	-	-	15	23	24	4	3,567	3,846
Transfers, net	-	78	-	1,754	175	28	-	68	-	68	-	(2,171)	-
Reclassification to investment properties, net <i>(Note 14)</i>	(9)	-	-	-	-	-	-	-	-	-	-	-	(9)
Disposals	-	-	-	-	(21)	-	-	(5)	-	(2)	(9)	-	(37)
Translation differences on consolidation	-	(2)	-	-	-	-	-	(14)	-	-	-	-	(16)
At 31 December 2017 and 1 January 2018	6,237	2,011	211	104,671	34,862	17,388	193	6,222	4,566	911	18	4,985	182,275
Additions	302	1	-	200	6	-	-	54	35	16	1	7,412	8,027
Transfers, net	-	726	-	14	62	32	-	353	-	15	-	(1,202)	-
Disposals	-	(47)	-	(133)	-	-	-	(4)	(1,246)	(4)	(1)	-	(1,435)
Translation differences on consolidation	-	(1)	-	-	-	-	-	(4)	-	-	-	-	(5)
At 31 December 2018	6,539	2,690	211	104,752	34,930	17,420	193	6,621	3,355	938	18	11,195	188,862

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Consolidated financial statements													
	Land	Buildings	Leasehold improve- ments	Refinery plant and equipment	Petro- chemical plants	Power plants	Trans- mission facilities	Machinery, equipment and plant equipment	Oil and liquid chemical tankers and crew boats	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress	Total
	(in million Baht)												
Depreciation													
At 1 January 2017	-	1,266	8	72,637	13,051	4,373	150	3,043	1,024	595	21	-	96,168
Depreciation charge for the year	-	73	8	3,699	1,822	729	6	341	209	71	-	-	6,958
Disposals	-	-	-	-	-	-	-	(5)	-	(2)	(7)	-	(14)
Translation differences on consolidation	-	-	-	-	-	-	-	(7)	-	-	-	-	(7)
At 31 December 2017 and 1 January 2018	-	1,339	16	76,336	14,873	5,102	156	3,372	1,233	664	14	-	103,105
Depreciation charge for the year	-	83	8	3,178	2,018	722	6	349	149	72	1	-	6,586
Disposals	-	(46)	-	(131)	-	-	-	(3)	(600)	(3)	(1)	-	(784)
Translation differences on consolidation	-	-	-	-	-	-	-	(3)	-	-	-	-	(3)
At 31 December 2018	-	1,376	24	79,383	16,891	5,824	162	3,715	782	733	14	-	108,904
Impairment losses													
At 1 January 2017	11	-	-	-	-	-	-	-	-	-	-	-	11
At 31 December 2017 and 1 January 2018	11	-	-	-	-	-	-	-	547	-	-	-	558
At 31 December 2018	11	-	-	-	-	-	-	-	18	-	-	-	29
Net book value													
At 1 January 2017	6,183	669	203	30,144	21,632	12,987	43	3,115	3,519	226	2	3,589	82,312
At 31 December 2017 and 1 January 2018	6,226	672	195	28,335	19,989	12,286	37	2,850	2,786	247	4	4,985	78,612
At 31 December 2018	6,528	1,314	187	25,369	18,039	11,596	31	2,906	2,555	205	4	11,195	79,929

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

				Separate financial statements				
	Land	Buildings	Refinery plant and equipment	Machinery, equipment and plant equipment <i>(in million Baht)</i>	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress	Total
Cost								
At 1 January 2017	3,830	844	94,578	1,235	492	4	3,255	104,238
Additions	40	-	136	4	9	-	3,250	3,439
Transfers, net	-	-	1,739	19	56	-	(1,814)	-
Reclassification to investment properties, net <i>(Note 14)</i>	(14)	-	-	-	-	-	-	(14)
Disposals	-	-	-	(1)	-	-	-	(1)
At 31 December 2017 and 1 January 2018	3,856	844	96,453	1,257	557	4	4,691	107,662
Additions	298	-	200	27	13	-	6,584	7,122
Transfers, net	-	642	14	2	2	-	(660)	-
Disposals	-	(47)	(132)	(2)	-	-	-	(181)
At 31 December 2018	4,154	1,439	96,535	1,284	572	4	10,615	114,603
Depreciation								
At 1 January 2017	-	706	66,144	974	338	4	-	68,166
Depreciation charge for the year	-	20	3,290	61	44	-	-	3,415
Disposals	-	-	-	(1)	-	-	-	(1)
At 31 December 2017 and 1 January 2018	-	726	69,434	1,034	382	4	-	71,580
Depreciation charge for the year	-	28	3,078	61	45	-	-	3,212
Disposals	-	(46)	(131)	(2)	-	-	-	(179)
At 31 December 2018	-	708	72,381	1,093	427	4	-	74,613

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

				Separate financial statements				
	Land	Buildings	Refinery plant and equipment	Machinery, equipment and plant equipment <i>(in million Baht)</i>	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress	Total
<i>Net book value</i>								
At 1 January 2017	<u>3,830</u>	<u>138</u>	<u>28,434</u>	<u>261</u>	<u>154</u>	<u>-</u>	<u>3,255</u>	<u>36,072</u>
At 31 December 2017 and 1 January 2018	<u>3,856</u>	<u>118</u>	<u>27,019</u>	<u>223</u>	<u>175</u>	<u>-</u>	<u>4,691</u>	<u>36,082</u>
At 31 December 2018	<u>4,154</u>	<u>731</u>	<u>24,154</u>	<u>191</u>	<u>145</u>	<u>-</u>	<u>10,615</u>	<u>39,990</u>

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

The gross amounts of the Group's fully depreciated property, plant and equipment that were still in use as at 31 December 2018, amounted to Baht 56,387 million in the consolidated financial statements (2017: Baht 49,402 million) and amounted to Baht 47,894 million in the separate financial statements (2017: Baht 41,010 million).

Certain subsidiaries mortgaged their land, building, petrochemical plant, machines and crew boats as collateral for long-term borrowings as described in note 19 to the financial statements. The net book value of land, building, petrochemical plant, machines and crew boats as at 31 December 2018 amounted to Baht 21,373 million (2017: Baht 11,672 million).

Impairment assessment for vessels and crew boats

During 2017 and 2018, certain subsidiaries have vessels and crew boats which are not fully used in operation due to the fact that the exploration business is in the downturn from prolonged falls in prevailing oil and gas price which resulted in low freight charge and demand in marine transportation business. This situation indicated that vessels and crew boats may be impaired. Management of subsidiaries and independent appraiser determined fair value of underlying assets using market approach. Fair value less costs of disposal was less than its carrying amount therefore subsidiaries recognised impairment loss amounting to Baht 547 million in 2017. Impairment loss recognised as an expenses in consolidated statement of income. In 2018, the subsidiaries did not recognise additional impairment loss because the fair value less costs of disposal of assets was higher than its carrying amount.

Measurement of fair value

Fair value hierarchy

The fair value of assets of subsidiaries which are not fully used in operation was determined by management of subsidiaries and external independent appraiser, having appropriate recognised professional qualifications and recent experience in the category of the asset being valued. The fair value measurement for assets which are not fully used in operation has been categorised as a Level 3 fair value based on the input to the valuation technique used by using market approach.

16 Intangible assets

	Consolidated financial statements					
	License fee	Computer software	Customer database	Goodwill	Patent	Total
	<i>(in million Baht)</i>					
Cost						
At 1 January 2017	3,013	759	205	655	-	4,632
Additions	261	96	-	-	1	358
Translation differences on consolidation	-	-	-	(54)	-	(54)
At 31 December 2017 and 1 January 2018	3,274	855	205	601	1	4,936
Additions	58	73	-	-	-	131
Adjustment	(79)	-	-	-	-	(79)
Translation differences on consolidation	-	-	-	(16)	-	(16)
At 31 December 2018	3,253	928	205	585	1	4,972

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

	Consolidated financial statements					
	License fee	Computer software	Customer database (in million Baht)	Goodwill	Patent	Total
<i>Accumulated amortisation</i>						
At 1 January 2017	1,210	316	-	-	-	1,526
Amortisation charge for the year	154	65	-	-	-	219
At 31 December 2017 and 1 January 2018	1,364	381	-	-	-	1,745
Amortisation charge for the year	122	67	-	-	-	189
Adjustment	(7)	-	-	-	-	(7)
At 31 December 2018	1,479	448	-	-	-	1,927
<i>Net book value</i>						
At 1 January 2017	1,803	443	205	655	-	3,106
At 31 December 2017 and 1 January 2018	1,910	474	205	601	1	3,191
At 31 December 2018	1,774	480	205	585	1	3,045

Impairment testing for carrying amount of goodwill and other intangible assets within indefinite useful life

The recoverable amount was based on its value in use, determined by discounting future cash flows to be generated in the future from the continuing use of assets. Those cash flows are determined by annual earnings before interest, taxes, depreciation, and amortisation (EBITDA) estimated by management, adjusted by corporate income tax, change in working capital and capital expenditures considered necessary. A long-term growth rate has been determined with reference to gross domestic product (GDP) growth rates for the countries in which the asset operates and experiences by management.

Based on the impairment testing by the discounted cash flow method using the estimated post-tax rates referred to weighted average cost of capital (WACC) at the rates 8.9% and 8.8% for goodwill and other intangible assets within indefinite useful life, respectively. The recoverable amount was estimated to be higher than its carrying amount and no impairment was required to these financial statements. Management has identified that a reasonably possible change in a key assumption could cause the carrying amount to exceed the recoverable amount. The following table shows the amount by which this key assumption would need to change individually for the estimated recoverable amount to be equal the carrying amount.

	Goodwill	Customer database
		(%)
Change required for carrying amount to be equal to the recoverable amount		
Discount rate increase	1.0	18.2

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

	Separate financial statements			
	License fee	Computer software (in million Baht)	Patent	Total
Cost				
At 1 January 2017	838	613	-	1,451
Additions	-	95	1	96
At 31 December 2017 and 1 January 2018	838	708	1	1,547
Additions	17	66	-	83
At 31 December 2018	855	774	1	1,630
Accumulated amortisation				
At 1 January 2017	750	184	-	934
Amortisation charge for the year	25	58	-	83
At 31 December 2017 and 1 January 2018	775	242	-	1,017
Amortisation charge for the year	25	59	-	84
At 31 December 2018	800	301	-	1,101
Net book value				
At 1 January 2017	88	429	-	517
At 31 December 2017 and 1 January 2018	63	466	1	530
At 31 December 2018	55	473	1	529

17 Deferred tax

Deferred tax assets and liabilities as at 31 December 2018 and 2017 were as follows:

	Consolidated financial statements			
	Assets		Liabilities	
	2018	2017	2018	2017
	(in million Baht)			
Total	792	725	(200)	(227)
Set off of tax	(163)	(218)	163	218
Net deferred tax assets (liabilities)	629	507	37	(9)
	Separate financial statements			
	Assets		Liabilities	
	2018	2017	2018	2017
	(in million Baht)			
Total	708	695	(192)	(214)
Set off of tax	(192)	(214)	192	214
Net deferred tax assets (liabilities)	516	481	-	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Movements in total deferred tax assets and liabilities during the years 2018 and 2017 were as follows:

	At 1 January 2018	Consolidated financial statements (Charged) / credited to:		At 31 December 2018
		Statement of income (Note 31) (in million Baht)	Equity	
Deferred tax assets				
Employee benefits	703	14	-	717
Impairment losses on assets	2	-	-	2
Other	20	53	-	73
Total	725	67	-	792
Deferred tax liabilities				
Depreciation	(204)	51	-	(153)
Deferred cost of debenture	-	(28)	-	(28)
Other	(23)	4	-	(19)
Total	(227)	27	-	(200)
Net	498	94	-	592
	At 1 January 2017	Consolidated financial statements (Charged) / credited to:		At 31 December 2017
		Statement of Income (Note 31) (in million Baht)	Equity	
Deferred tax assets				
Employee benefits	658	(36)	81	703
Impairment losses on assets	2	-	-	2
Other	5	15	-	20
Total	665	(21)	81	725
Deferred tax liabilities				
Depreciation	(211)	7	-	(204)
Other	(23)	-	-	(23)
Total	(234)	7	-	(227)
Net	431	(14)	81	498

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

	At 1 January 2018	Separate financial statements (Charged) / credited to:		At 31 December 2018
		Statement of income (Note 31) (in million Baht)	Equity	
Deferred tax assets				
Employee benefit	693	13	-	706
Impairment losses on assets	2	-	-	2
Total	695	13	-	708
Deferred tax liabilities				
Depreciation	(204)	51	-	(153)
Deferred cost of borrowing	-	(34)	-	(34)
Other	(10)	5	-	(5)
Total	(214)	22	-	(192)
Net	481	35	-	516

	At 1 January 2017	Separate financial statements (Charged) / credited to:		At 31 December 2017
		Statement of income (Note 31) (in million Baht)	Equity	
Deferred tax assets				
Employee benefit	651	(31)	73	693
Impairment losses on assets	2	-	-	2
Total	653	(31)	73	695
Deferred tax liabilities				
Depreciation	(211)	7	-	(204)
Other	(9)	(1)	-	(10)
Total	(220)	6	-	(214)
Net	433	(25)	73	481

Certain subsidiaries have not recognised deferred tax asset arising from loss carry forward in the financial statements as at 31 December 2018 amounted to Baht 474 million, which expire during 2019 - 2023 (2017: Baht 224 million), because it is not probable that future taxable profit will be available against which the subsidiaries can utilise the benefits.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

18 Other non-current assets

		Consolidated financial statements		Separate financial statements	
	Note	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Deferred land lease arrangement and registration fees, net	36	3,244	221	3,169	242
Long-term loans to savings co-operative of employees		538	583	538	583
Deferred natural gas pipeline facilities, raw material pipeline and the use of land, net		64	77	41	50
Other deferred charges, net		112	310	22	22
Refundable deposits and others		125	41	67	62
Total		4,083	1,232	3,837	959

19 Interest-bearing liabilities

		Consolidated financial statements		Separate financial statements	
	Note	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Current					
Short-term borrowings					
- Secured		1,365	595	-	-
- Unsecured		1,027	374	-	-
Short-term borrowings from related companies	5	-	-	1,506	503
Current portion of long-term borrowings					
- Secured		863	1,112	-	-
- Unsecured		685	480	-	-
Unsecured debentures		3,000	-	3,000	-
		6,940	2,561	4,506	503
Non-current					
Long-term borrowings					
- Secured		13,587	6,235	-	-
- Unsecured		1,468	1,833	52,028	-
Unsecured debentures		85,065	55,839	33,009	55,839
		100,120	63,907	85,037	55,839
Total		107,060	66,468	89,543	56,342

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

The periods to maturity of interest-bearing liabilities as at 31 December 2018 and 2017 were as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Within one year	6,940	2,561	4,506	503
After one year but within five years	18,495	15,460	13,031	9,000
After five years	81,625	48,447	72,006	46,839
Total	107,060	66,468	89,543	56,342

Secured interest-bearing liabilities as at 31 December 2018 and 2017 were secured on the following assets:

		Consolidated financial statements		Separate financial statements	
	<i>Note</i>	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Cash at banks - current, savings and fixed deposits	6	1,772	54	-	-
Current investments in fixed deposits	7	540	421	-	-
Land, building, petrochemical plant, machines and crew boat - carrying value	15	21,373	11,672	-	-
Total		23,685	12,147	-	-

Changes in liabilities arising from financing activities

	Consolidated financial statements			
	Short-term borrowing	Long-term borrowing	Debentures	Total
	<i>(in million Baht)</i>			
Balance at 1 January 2018	969	8,068	55,839	64,876
Changes from financing cash flows	1,504	6,937	31,558	39,999
The effect of changes in foreign exchange rates	-	1,598	343	1,941
Other changes	(81)	-	325	(244)
Balance at 31 December 2018	2,392	16,603	88,065	107,060

	Separate financial statements			
	Short-term borrowing	Long-term borrowing	Debentures	Total
	<i>(in million Baht)</i>			
Balance at 1 January 2018	503	-	55,839	56,342
Changes from financing cash flows	1,003	51,606	(20,076)	32,533
The effect of changes in foreign exchange rates	-	422	(75)	347
Other changes	-	-	321	321
Balance at 31 December 2018	1,506	52,028	36,009	89,543

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

As at 31 December 2018, the Group and the Company had unutilised long-term credit facilities totalling Baht 6,039 million and Baht 4,700 million respectively (2017: Baht 5,069 million and Baht 5,000 million respectively).

Interest-bearing liabilities as at 31 December 2018 and 2017 were as follows:

		Consolidated financial statements		Separate financial statements	
	<i>Note</i>	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Short-term borrowings		2,392	969	-	-
Short-term borrowings from related companies	5	-	-	1,506	503
Long-term borrowings		16,603	9,660	-	-
Long-term borrowings from related companies	5	-	-	52,028	-
Debentures		88,065	55,839	36,009	55,839
Total		107,060	66,468	89,543	56,342

Long-term borrowings

Details of principal features of the Group's long-term borrowings as at 31 December 2018 and 2017 were as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	(in million Baht)			
Company :				
1) U.S. Dollars 1,600.4 million Loan Agreements with a subsidiary from net proceeds from bond issuance (<i>note 5</i>)	-	-	52,028	-
Subsidiaries :				
2) Baht 1,500 million Loan Facility Agreement at interest MLR less a margin, payable in semi-annual installments commencing in September 2012	688	737	-	-
3) Baht 324 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in April 2012	-	117	-	-
4) Baht 228 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in January 2013	-	95	-	-
5) Baht 365 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in June 2014	-	280	-	-
6) Baht 365 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in October 2014	-	292	-	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
7) Baht 300 million Loan Facility Agreement at interest MLR less a margin, payable in semi-annual installments commencing in September 2015	125	175	-	-
8) Baht 1,200 million Loan Facility Agreement at interest 6-month FDR plus a margin, payable in semi-annual installment June 2014	-	164	-	-
9) Baht 1,800 million Loan Facility Agreement at interest 6-month FDR plus a margin, payable in semi-annual installments commencing in June 2015	804	1,020	-	-
10) Baht 3,875 million Loan Facility Agreement at interest THBFIX plus a margin, payable in three-months installments commencing in June 2016	-	3,065	-	-
11) Baht 3,875 million Loan Facility Agreement at interest THBFIX plus a margin, payable in three-months installments commencing in June 2016	-	3,027	-	-
12) Baht 420 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in October 2016	-	400	-	-
13) Baht 141 million Loan Facility Agreement at interest 6-month FDR plus a margin, payable in semi-annual installment June 2017	72	72	-	-
14) Baht 8,500 million Loan Facility Agreement at interest THBFIX 3M plus a margin, payable in semi-annual installment June 2018	8,209	-	-	-
15) Baht 800 million Loan Facility Agreement at interest FDR plus a margin, payable in three-months installments commencing in March 2020	796	-	-	-
16) Baht 5,400 million Loan Facility Agreement at interest THBFIX plus a margin, payable in semi-annual installment June 2019	5,374	-	-	-
17) Baht 434 million Loan Facility Agreement at 6.40% fixed interest payable in semi-annual installment July 2019	319	-	-	-
18) Baht 217 million Loan Facility Agreement at interest THBFIX plus a margin, payable in conditions as stipulated in the agreement.	216	216	-	-
Total	16,603	9,660	52,028	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Debentures

Details of the Company's debentures as at 31 December 2018 and 2017 were as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Debentures	88,729	56,347	36,180	56,347
Less discount on debentures	(664)	(508)	(171)	(508)
Total	88,065	55,839	36,009	55,839

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Bond	Currency	Amount (million)	Years	Interest rate (%/annum)	Payment term	Maturity date
Company						
BhtBond-1/2010	Baht	3,000	12	4.80	Semi-annual basis	April 2022
BhtBond-1/2012	Baht	7,500	15	5.05	Semi-annual basis	March 2027
Bond USD-1/2013	U.S. Dollars	216.4	10	3.625	Semi-annual basis	January 2023
Bond USD-1/2013	U.S. Dollars	172.4	30	4.875	Semi-annual basis	January 2043
BhtBond-1/2014	Baht	3,000	5	4.13	Semi-annual basis	March 2019
BhtBond-1/2014	Baht	3,000	7	4.61	Semi-annual basis	March 2021
BhtBond-1/2014	Baht	7,000	10	4.84	Semi-annual basis	March 2024
Subsidiary						
Bond USD-1/2013	U.S. Dollars	283.6	10	3.625	Semi-annual basis	January 2023
Bond USD-1/2013	U.S. Dollars	327.6	30	4.875	Semi-annual basis	January 2043
Bond USD-1/2018	U.S. Dollars	400	10	4.625	Semi-annual basis	November 2028
Bond USD-1/2018	U.S. Dollars	600	30	5.375	Semi-annual basis	November 2048

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Repurchase and issuance and offering of debentures

The Company has repurchased US\$500,000,000 3.625% Senior Unsecured Notes due 2023 (the "2023 Notes") and US\$500,000,000 4.875% Senior Unsecured Notes due 2043 (the "2043 Notes" and together with the 2023 Notes, the "Existing Notes") from investors overseas in aggregate principal amount of U.S. Dollars 283.6 million for the 2023 Notes and U.S. Dollars 327.6 million for the 2043 Notes. The repurchase of the Existing Notes completed on 10 April 2018. The Company amortised deferred discount on debenture and recorded related expenses relevant to repurchase of debentures at amount of Baht 431.1 million in profit or loss.

On 10 April 2018, a subsidiary also completed its issue and offering of US\$283,619,000 3.625% Senior Unsecured Notes due 2023 (the "New Notes Serie 1") which have the aggregate principal amount of U.S. Dollars 283.6 million, due on 2023 and bear a fixed interest rate of 3.625% per annum and US\$327,587,000 4.875% Senior Unsecured Notes due 2043 (the "New Notes Serie 2") which have the aggregate principal amount of U.S. Dollars 327.6 million, due on 2043 and bear a fixed interest rate of 4.875% per annum to investors overseas under the Medium Term Note Program of the Company and a subsidiary Payment under the New Notes Serie 1 and the New Notes Serie 2 (the "New Notes") is guaranteed by the Company.

On 20 November 2018, a subsidiary has issued Senior Unsecured Notes to foreign institutional investors for the total amount of U.S. Dollars 1,000 million, comprising of U.S. Dollars 400 million carrying a coupon of 4.625% per annum with tenor of 10 years and U.S. Dollars 600 million carrying a coupon of 5.375% per annum with the tenor of 30 years, fully guaranteed by the Company.

20 Trade accounts payable

	<i>Note</i>	Consolidated financial statements		Separate financial statements	
		2018	2017	2018	2017
			<i>(in million Baht)</i>		
Related parties	5	10,595	11,389	12,726	13,887
Other parties		11,249	7,574	10,791	7,174
Total		21,844	18,963	23,517	21,061

21 Other payables

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
			<i>(in million Baht)</i>	
Payable for purchase of securities (Private funds)	-	50	-	50
Accrued operating expenses	103	327	39	67
Oil Fuel Fund payable	517	104	517	104
Other payables	1,739	1,491	2,133	1,289
Other	1,513	1,504	886	1,400
Total	3,872	3,476	3,575	2,910

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

22 Provisions for employee benefits

Movement in the present value of the defined benefit obligations:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Provisions for employee benefits at 1 January	3,511	3,297	3,161	3,003
Recognised in profit or loss:				
Current service costs and interest	305	286	244	238
Actuarial gain recognised in the year	-	(66)	-	(40)
	305	220	244	198
Recognised in other comprehensive income:				
Actuarial loss recognised in the year	1	404	-	365
	1	404	-	365
Benefit paid	(230)	(410)	(222)	(405)
	(230)	(410)	(222)	(405)
Provisions for employee benefits at 31 December	3,587	3,511	3,183	3,161

Actuarial (gains) losses recognised in other comprehensive income arising from:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Demographic assumptions	1	13	-	(3)
Financial assumptions	-	(34)	-	(19)
Experience adjustment	-	425	-	387
Total	1	404	-	365

Principal actuarial assumptions as at 31 December 2018 and 2017:

	Consolidated financial statements and Separate financial statements	
	2018	2017
	<i>% per annum</i>	
Discount rate	Interest rate of long-term Thai Government Bond	Interest rate of long-term Thai Government Bond
Salary increases rate	5.0-10.0	5.0-10.0
Employee turnover	0.0-2.1	0.0-2.1

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Assumptions regarding future mortality have been based on published statistics and mortality tables.

At 31 December 2018, the weighted-average duration of the defined benefit obligation was 19 years (2017: 19 years).

Sensitivity analysis

Reasonably possible changes at the reporting date to one of the relevant actuarial assumptions, holding other assumptions constant, would have affected the defined benefit obligation by the amounts shown below.

	Consolidated financial statements		Separate financial statements	
	<i>(in million Baht)</i>			
31 December 2018	Increase	Decrease	Increase	Decrease
Discount rate (1% movement)	(299)	350	(247)	285
Salary growth (1% movement)	403	(354)	362	(319)

Although the analysis does not take account of the full distribution of cash flows expected under the plan, it does provide an approximation of the sensitivity of the assumptions shown.

The increase in employee benefits

On 13 December 2018, the National Legislative Assembly passed a bill amending the Labor Protection Act to include a requirement that an employee who is terminated after having been employed by the same employer for an uninterrupted period of twenty years or more, receives severance payment of 400 days of wages at the most recent rate. The Group will amend its retirement plan in the period in which the amendment will have become law and is announced in the Royal Gazette. As a result of this change, the provision for retirement benefits as at that future period end as well as past service cost recognised during that period in the consolidated and the separate financial statements is estimated to increase by an amount of approximately Baht 368.6 million and Baht 294.6 million, respectively.

23 Share capital

		2018		2017	
	<i>Par value per share (in Baht)</i>	<i>Number of shares</i>	<i>Amount (million shares / million Baht)</i>	<i>Number of shares</i>	<i>Amount</i>
Authorised					
At 1 January					
- Ordinary shares	10	2,040	20,400	2,040	20,400
At 31 December					
- Ordinary shares	10	2,040	20,400	2,040	20,400
Issued and paid-up					
At 1 January					
- Ordinary shares	10	2,040	20,400	2,040	20,400
At 31 December					
- Ordinary shares	10	2,040	20,400	2,040	20,400

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

24 Additional paid-in capital and reserves

Share premium

Section 51 of the Public Companies Act B.E. 2535 requires companies to set aside share subscription monies received in excess of the par value of the shares issued to a reserve account (“share premium”). Share premium is not available for dividend distribution.

Legal reserve

Section 116 of the Public Companies Act B.E. 2535 requires that a company shall allocate not less than 5% of its annual net profit, less any accumulated losses brought forward (if any), to a reserve account (“legal reserve”), until this account reaches an amount not less than 10% of the registered authorised capital. The legal reserve is not available for dividend distribution.

Fair value changes

The fair value changes account within equity comprises the cumulative net change in the fair value of available-for-sale financial assets until the investments are derecognised or impaired.

Exchange differences on translating foreign operations

The exchange differences on translating foreign operations account within equity comprises all foreign currency differences arising from the translation of the financial statements of foreign operations.

25 Segment information

Segment information is presented in respect of the Group’s business segments. The primary format, business segments, is based on the Group’s management and the internal reporting structure provided to the chief operating decision maker.

Segment results, assets and liabilities include items directly attributable to a segment as well as those that can be allocated on a reasonable basis.

Reportable segments

The Group comprises the following main business segments:

Segment 1:	Oil refinery
Segment 2:	Lube base oil refinery
Segment 3:	Petrochemical
Segment 4:	Power generation
Segment 5:	Marine transportation services
Segment 6:	Solvent
Segment 7:	Ethanol
Segment 8:	Other

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Information about reportable segments

	<i>For the year ended 31 December 2018</i>									
	Oil refinery	Lube base oil refinery	Petro-chemical	Power generation	Marine transportation services (in million Baht)	Solvent	Ethanol	Other	Eliminations	Total
Revenue from sale and rendering of services										
- External	330,063	15,671	27,583	4,839	354	9,851	983	-	-	389,344
- Inter-segment	75,067	5,288	39,118	6,895	267	141	494	1,925	(129,195)	-
Cost of sale and rendering of services	(398,208)	(19,533)	(62,776)	(9,795)	(616)	(9,193)	(1,381)	(1,846)	130,220	(373,128)
Gross profit	6,922	1,426	3,925	1,939	5	799	96	79	1,025	16,216
Dividend income	4,258	-	-	-	-	-	-	-	(4,101)	157
Net derivative loss on hedging	(237)	-	(584)	-	-	-	-	-	-	(821)
Net foreign exchange gain	430	14	159	3	10	11	-	-	-	627
Other income	3,705	87	299	26	45	16	6	2	(2,467)	1,719
Selling expenses	(73)	(97)	(207)	-	-	(291)	(19)	-	263	(424)
Administrative expenses	(2,436)	(76)	(118)	(34)	(122)	(279)	(77)	(40)	824	(2,358)
Share of gain of joint ventures and associates	-	-	-	997	118	-	15	-	63	1,193
Profit (loss) before finance costs and income tax expense	12,569	1,354	3,474	2,931	56	256	21	41	(4,393)	16,309
Finance costs	(3,374)	(4)	(409)	(321)	(123)	(76)	(17)	-	382	(3,942)
Profit (loss) before income tax expense	9,915	1,350	3,065	2,610	(67)	180	4	41	(4,011)	12,367
Income tax (expense) income	(955)	(271)	(581)	(140)	1	(40)	-	3	-	(1,983)
Profit (loss) for the year	8,240	1,079	2,484	2,470	(66)	140	4	44	(4,011)	10,384
Profit (loss) attributable to :										
Owners of the parent	8,240	1,079	2,530	2,470	(43)	123	4	44	(4,298)	10,149
Non-controlling interests	-	-	(46)	-	(23)	17	-	-	287	235
Profit (loss) for the year	8,240	1,079	2,484	2,470	(66)	140	4	44	(4,011)	10,384

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

For the year ended 31 December 2017

	Oil refinery	Lube base oil refinery	Petro- chemical	Power generation	Marine transportation Services <i>(in million Baht)</i>	Solvent	Ethanol	Other	Eliminations	Total
Revenue from sale and rendering of services										
- External	285,137	15,044	22,082	4,561	473	9,046	1,045	-	-	337,388
- Inter-segment	64,692	3,618	35,799	6,368	328	136	575	985	(112,501)	-
Cost of sale and rendering of services	(328,442)	(16,310)	(54,238)	(8,772)	(776)	(8,184)	(1,212)	(898)	113,446	(305,386)
Gross profit	21,387	2,352	3,643	2,157	25	998	408	87	945	32,002
Dividend income	11,125	-	-	-	-	-	-	-	(10,967)	158
Net derivative loss on hedging	(128)	-	(5)	-	-	-	-	-	-	(133)
Net foreign exchange gain (loss)	2,882	-	333	1	(7)	(29)	1	-	-	3,181
Other income	3,272	93	235	21	32	14	6	1	(2,484)	1,190
Selling expenses	(189)	(95)	(217)	-	-	(257)	(19)	-	285	(492)
Administrative expenses	(2,493)	(84)	(148)	(70)	(664)	(254)	(18)	(23)	785	(2,969)
Share of gain of joint venture and associates	-	-	-	943	113	-	75	-	66	1,197
Profit (loss) before finance costs and income tax expense	35,856	2,266	3,841	3,052	(501)	472	453	65	(11,370)	34,134
Finance costs	(2,863)	(1)	(418)	(302)	(103)	(77)	(29)	-	508	(3,285)
Profit (loss) before income tax expense	32,993	2,265	3,423	2,750	(604)	395	424	65	(10,862)	30,849
Income tax (expense) income	(4,253)	(453)	(653)	(107)	3	(57)	2	(12)	-	(5,530)
Profit (loss) for the year	28,740	1,812	2,770	2,643	(601)	338	426	53	(10,862)	25,319
Profit (loss) attributable to :										
Owners of the parent	28,740	1,812	2,730	2,643	(530)	309	263	53	(11,164)	24,856
Non-controlling interests	-	-	40	-	(71)	29	163	-	302	463
Profit (loss) for the year	28,740	1,812	2,770	2,643	(601)	338	426	53	(10,862)	25,319

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

As at 31 December 2018

	Oil refinery	Lube base oil refinery	Petro- chemical	Power generation	Marine transportation Services	Solvent	Ethanol	Other	Eliminations	Total
					(in million Baht)					
Trade accounts receivable	25,194	1,547	5,098	1,482	55	1,491	114	697	(11,319)	24,359
Inventories	24,423	1,865	1,347	113	33	738	245	-	(26)	28,738
Other current assets	110,899	809	2,170	2,506	204	990	92	203	(6,228)	111,645
Investments in subsidiaries	14,555	-	-	-	-	-	-	-	(14,555)	-
Investments in joint ventures	-	-	-	-	625	-	-	-	-	625
Investments in associates	1,261	-	-	9,115	-	-	819	-	3,121	14,316
Property, plant and equipment	39,990	1,301	18,609	11,753	2,707	2,341	1,366	-	1,862	79,929
Other non-current assets	7,523	639	1,910	84	7	1,366	7	52,223	(54,758)	9,001
Total assets	223,845	6,161	29,134	25,053	3,631	6,926	2,643	53,123	(81,903)	268,613
Trade accounts payable	23,517	1,362	5,419	1,514	31	640	39	626	(11,304)	21,844
Current portion of long-term borrowings	-	-	535	288	150	535	40	-	-	1,548
Current portion of Debentures	3,000	-	-	-	-	-	-	-	-	3,000
Other current liabilities	9,897	715	4,706	144	456	1,435	426	106	(6,258)	11,627
Long-term borrowings	52,028	-	5,054	7,921	1,459	589	32	-	(52,028)	15,055
Debentures	33,009	-	-	-	-	-	-	51,793	263	85,065
Other non-current liabilities	3,708	46	256	17	477	62	12	442	(1,018)	4,002
Total liabilities	125,159	2,123	15,970	9,884	2,573	3,261	549	52,967	(70,345)	142,141

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

As at 31 December 2017

	Oil refinery	Lube base oil refinery	Petro- chemical	Power generation	Marine transportation services	Solvent	Ethanol	Other	Eliminations	Total
					(in million Baht)					
Trade accounts receivable	24,242	1,272	4,848	1,268	84	1,479	113	60	(11,038)	22,328
Inventories	28,094	2,083	1,631	102	40	703	214	-	(26)	32,841
Other current assets	81,618	618	1,580	2,072	367	852	392	120	(16,577)	71,042
Investments in subsidiaries	14,555	-	-	-	-	-	-	-	(14,555)	-
Investments in joint ventures	-	-	-	-	542	-	-	-	-	542
Investments in associates	1,261	-	-	8,814	-	-	804	-	2,947	13,826
Property, plant and equipment	36,082	1,582	20,523	12,394	2,799	2,152	1,423	-	1,657	78,612
Other non-current assets	6,954	463	1,906	159	6	1,415	3	372	(2,361)	8,917
Total assets	192,806	6,018	30,488	24,809	3,838	6,601	2,949	552	(39,953)	228,108
Trade accounts payable	21,061	1,331	5,558	1,200	131	795	19	-	(11,132)	18,963
Current portion of long-term borrowings	-	-	1,030	164	142	216	40	-	-	1,592
Other current liabilities	11,085	369	6,806	8,671	460	1,167	650	83	(16,498)	12,793
Long-term borrowings	-	-	5,278	-	1,954	804	32	-	-	8,068
Debentures	55,839	-	-	-	-	-	-	-	-	55,839
Other non-current liabilities	3,656	41	108	15	21	59	9	357	(561)	3,705
Total liabilities	91,641	1,741	18,780	10,050	2,708	3,041	750	440	(28,191)	100,960

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Major customer

Revenue from two customers represents Baht 176,610 million (2017: revenue from one customer represented Baht 151,356 million) of the Group's revenue from sale of goods and rendering of service.

Geographical segments

In presenting information on the basis of geographical segments, segment revenue is based on the geographical location of customers. Segment assets are based on the geographical location of the assets.

Geographical information

	Revenues		Non-current assets	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Thailand	344,795	296,837	102,794	101,145
Other countries	44,549	40,551	1,075	752
Total	389,344	337,388	103,869	101,897

26 Other income

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Interest income	1,381	915	1,618	1,369
Land lease income	20	18	92	87
Service income and other	318	257	1,994	1,816
Total	1,719	1,190	3,704	3,272

27 Administrative expenses

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Advisory and legal fees	203	99	178	91
Personnel expenses	1,020	1,007	838	836
Depreciation	65	65	35	37
Impairment losses on assets	-	547	-	-
Other	1,070	1,251	1,385	1,529
Total	2,358	2,969	2,436	2,493

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

28 Employee benefit expenses

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Management				
Salaries and wages	223	210	170	159
Contributions to provident fund	21	19	16	14
Retirement gratuity fund	17	10	17	10
Other	126	124	113	111
	387	363	316	294
Other employees				
Salaries and wages	2,464	2,462	1,385	1,454
Contributions to provident fund	142	137	99	101
Retirement gratuity fund	148	146	144	146
Other	439	360	360	290
	3,193	3,105	1,988	1,991
Total	3,580	3,468	2,304	2,285

The Group established a contributory registered provident fund to which the employees contribute monthly at rates ranging from 3% to 15% of their basic salaries and by the Group at rates ranging from 3% to 15% of the employees' basic salaries. Membership to the funds is on a voluntary basis. The provident funds are registered with the Ministry of Finance as juristic entities and are managed by licensed Fund Managers.

29 Expenses by nature

The statements of income include an analysis of expenses by function. Significant expenses by nature are detailed as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Changes in finished goods and work in progress	2,400	(55)	2,112	469
Purchase and raw materials used	282,928	222,268	323,252	257,399
Natural gas used	10,677	8,946	2,214	1,322
Employee benefits expense	3,580	3,468	2,304	2,285
Depreciation and amortisation	7,264	7,642	3,788	3,956
Excise tax	57,313	56,924	57,256	56,665

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

30 Finance costs

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Interest expense:				
financial institutions and other	3,426	3,265	2,883	2,846
Finance costs from repurchase of debenture	431	-	431	-
Financial expenses	96	23	60	18
	<u>3,953</u>	<u>3,288</u>	<u>3,374</u>	<u>2,864</u>
Capitalised as cost of property plant and equipment under construction	(11)	(3)	-	-
Net	<u><u>3,942</u></u>	<u><u>3,285</u></u>	<u><u>3,374</u></u>	<u><u>2,864</u></u>

31 Income tax expense

		Consolidated financial statements		Separate financial statements	
	<i>Note</i>	2018	2017	2018	2017
		<i>(in million Baht)</i>			
Current tax expense					
Current year		2,078	5,518	991	4,228
Adjustment for prior years		(1)	(2)	(1)	-
Deferred tax expense	17				
Movements in temporary differences		(94)	14	(35)	25
Total		<u><u>1,983</u></u>	<u><u>5,530</u></u>	<u><u>955</u></u>	<u><u>4,253</u></u>

Reconciliation of effective tax rate

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Profit before income tax expense	12,367	30,849	9,195	32,993
Income tax using the Thai corporation tax rate	2,473	6,170	1,839	6,599
Income not subject to tax	(517)	(729)	(896)	(2,363)
Expenses not deductible for tax purposes	29	137	13	17
Utilisation of previously unrecognised tax losses	(1)	(46)	-	-
Over provided in prior years	(1)	(2)	(1)	-
Total	<u><u>1,983</u></u>	<u><u>5,530</u></u>	<u><u>955</u></u>	<u><u>4,253</u></u>

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

The Group's consolidated effective tax rate in respect of continuing operations for the year ended 31 December 2018 and 2017 were 16.03% and 17.92%, respectively. The effective tax rate is less than Thai corporation tax rate principally because:

- (a) a significant portion of the Company's profit was derived from promoted activities for which concessionary tax rates apply, and
- (b) unutilised tax losses brought forward from the previous year have been utilised during the year to set-off against the current year's tax charge.

Revenues, profit before finance costs and income tax expense, and income tax expense from operation in foreign countries of the Group for the year ended 31 December 2018 are as follow:

Country	Revenues⁽¹⁾	Profit before finance costs and income tax expense (million Baht)	Income tax expense
Thailand	389,166	16,298	1,983
Vietnam	2,681	(62)	-(⁽²⁾)
Singapore	-	73	-(⁽³⁾)
Total	391,847	16,309	1,983

Notes:

- (1) Revenues subject to tax consist of revenue from sale of goods and rendering of services, dividend income, net derivative gain on hedging, net foreign exchange gain, and other income from interest received, land lease agreement, other services rendered, etc.
- (2) No income tax expense due to unutilised tax losses brought forward from the previous year.
- (3) No income tax expense due to tax exemption for specific business by the government of Singapore.

32 Promotional privileges

By virtue of the provisions of the Industrial Investment Promotion Act of B.E. 2520, the Company and certain local subsidiaries have been granted privileges by the Board of Investment relating to power and steam generation, petroleum product production, chemical product production, ethanol product production, marine transportation, offshore crude oil unloading facilities and industrial zone. The privileges granted include:

- a) an exemption from payment of import duty and tax on machinery and equipment as approved by the Board of Investment,
- b) an exemption from payment of corporate income tax for promoted operations for periods of 7 to 8 years from the dates on which the income is first derived from such operations or 8 years from the date on which the income is received subsequent to when the privileges were granted, and
- c) a 50% reduction in the normal corporate income tax rate on the net profit derived from certain promotional operations for a period of five years, commencing from the expiry date in (b) above.

As promoted companies, the Company and its subsidiaries must comply with certain conditions and restrictions provided for in the promotional certificates.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Summary of revenue from promoted and non-promoted businesses:

Consolidated financial statements						
	Promoted businesses	2018 Non- promoted businesses	Total <i>(in million Baht)</i>	Promoted businesses	2017 Non- promoted businesses	Total
Export sales	5,195	39,574	44,769	15,830	25,082	40,912
Local sales	28,922	449,511	478,433	274,609	138,446	413,055
Eliminations			<u>(133,858)</u>			<u>(116,579)</u>
Total revenues			<u>389,344</u>			<u>337,388</u>
Separate financial statements						
	Promoted businesses	2018 Non- promoted businesses	Total <i>(in million Baht)</i>	Promoted businesses	2017 Non- promoted businesses	Total
Export sales	-	16,838	16,838	13,056	3,916	16,972
Local sales	-	388,292	388,292	252,235	80,622	332,857
Total revenues			<u>405,130</u>			<u>349,829</u>

33 Basic earnings per share

The calculations of basic earnings per share for the years ended 31 December 2018 and 2017 were based on the profit for the years attributable to owners of the Company and the weighted average number of ordinary shares outstanding during the years as follows:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(million Baht/million shares)</i>			
Profit for the year attributable to owner of the Company	10,149	24,856	8,240	28,740
Weighted average number of ordinary shares outstanding during the year	<u>2,040</u>	<u>2,040</u>	<u>2,040</u>	<u>2,040</u>
Basic earnings per share (in Baht)	<u>4.97</u>	<u>12.18</u>	<u>4.04</u>	<u>14.09</u>

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

34 Dividends

At the meeting of the Board of the Director of the Company held on 31 August 2018, the Company's Board of Directors approved the appropriation of 2018 interim dividends at Baht 1.50 per share, totalling Baht 3,060 million. The interim dividends were paid to the Company's shareholders in September 2018.

At the annual general meeting of the shareholders of the Company held on 11 April 2018, the shareholders approved the appropriation of 2017 annual dividends at Baht 5.25 per share, totalling Baht 10,710 million. After a deduction of the interim dividends of Baht 1.50 per share which were paid to the Company's shareholders in September 2017, the remaining dividends of Baht 3.75 per share, totalling Baht 7,650 million. The dividend was paid to the shareholders in April 2018.

At the meeting of the Board of the Director of the Company held on 25 August 2017, the Company's Board of Directors approved the appropriation of 2017 interim dividends at Baht 1.50 per share, totalling Baht 3,060 million. The interim dividends were paid to the Company's shareholders in September 2017.

At the annual general meeting of the shareholders of the Company held on 7 April 2017, the Company's shareholders approved the appropriation of 2016 annual dividends at Baht 4.50 per share, totalling Baht 9,180 million. After a deduction of the interim dividends of Baht 1.50 per share which were already paid to the Company's shareholders in September 2016, the remaining dividends of Baht 3.00 per share, totalling Baht 6,120 million, were already paid to the Company's shareholders in April 2017.

35 Financial instruments

Financial risk management policies

The Group is exposed to normal business risks from changes in market interest rates and currency exchange rates and from non-performance of contractual obligations by counterparties. The Group does not hold or issue derivative financial instruments for speculative or trading purposes.

Risk management is integral to the whole business of the Group. The Group has a system of controls in place to create an acceptable balance between the cost of risks occurring and the cost of managing the risks. The management continually monitors the Group's risk management process to ensure that an appropriate balance between risk and control is achieved.

Capital management

The objectives of the Group's capital management are to safeguard the Group's ability to continue as a going concern in order to provide returns to the Group's shareholders and benefits to other stakeholders. The management sets strategies to support the Group's operations for more efficiency, and better performances and stronger financial status, including dividend and capital management policies to maintain the optimal capital structure and cost of capital.

Interest rate risk

Interest rate risk is the risk that future movements in market interest rates will affect the results of the Group's operations and its cash flows. Hence, the Group has hedging agreements with various investment-grade financial institutions to protect against the risk of rising interest rates.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

The effective interest rates of loans as at 31 December 2018 and 2017 and the periods in which those assets mature were as follows:

Consolidated financial statements				
	Effective interest rate (% per annum)	Within 1 year	After 1 year (in million Baht)	Total
2018				
Non-current				
Long-term loans to savings co-operative of employees	MLR less margin	34	538	572
Loans to employees	MMR less margin	1	6	7
Total		35	544	579
2017				
Non-current				
Long-term loans to savings co-operative of employees	MLR less margin	37	583	620
Loans to employees	MMR less margin	-	6	6
Total		37	589	626
Separate financial statements				
	Effective interest rate (% per annum)	Within 1 year	After 1 year (in million Baht)	Total
2018				
Current				
Short-term loans to subsidiaries	BIBOR 3 M Plus margin	4,274	-	4,274
Non-current				
Long-term loans to subsidiaries	BIBOR 3 M Plus margin	-	400	400
Long-term loans to savings co-operative of employees	MLR less margin	34	538	572
Total		4,308	938	5,246
2017				
Current				
Short-term loans to subsidiaries	MMR rate not exceeding the average MLR of 5 banks less margin	15,651	-	15,651
Non-current				
Long-term loans to savings co-operative of employees	MLR less margin	37	583	620
Total		15,688	583	16,271

The effective interest rates of borrowings from financial institutions and debentures as at 31 December 2018 and 2017 and the periods in which those liabilities mature were disclosed in note 19 to the financial statements.

Interest Rate Swap Contract

A subsidiary has entered into interest rate swap contract with financial institutions to manage exposure and fluctuations in interest rates of long-term loans for Thai Baht currency. As at 31 December 2018, a subsidiary had notional amount of baht 6,241 million (31 December 2017: nil), whereby exchanging floating interest rate based on THBFIX 3M plus margin with fixed interest rate. The swap contract effective from April 2018 to March 2028.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Foreign currency risk

The Group is exposed to foreign currency risk relating to purchases of raw materials and long-term borrowings which are denominated in foreign currencies. However, the Group enters into short-term currency hedging contracts for short term foreign currency exposures when appropriate.

As at 31 December 2018 and 2017, the Group was exposed to foreign currency risk in respect of financial assets and liabilities denominated in the following currencies:

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
U.S. Dollars				
Cash and cash equivalents	17,548	5,657	17,062	5,243
Other investments	39,076	10,889	39,076	10,889
Trade accounts receivable	3,004	2,345	983	693
Other receivables	165	184	162	177
Interest-bearing liabilities	(64,706)	(35,920)	(64,706)	(32,339)
Trade accounts payable	(4,425)	(1,810)	(4,128)	(1,546)
Other payables	(1,016)	(355)	(104)	(95)
	(10,354)	(19,010)	(11,655)	(16,978)
Other currencies				
Cash and cash equivalents	38	70	-	-
Trade accounts receivable	327	276	-	-
Other receivables	18	10	4	-
Interest-bearing liabilities	(576)	(50)	-	-
Trade accounts payable	(13)	(14)	-	-
Other payables	(98)	(30)	(15)	(6)
	(304)	262	(11)	(6)
Gross exposure in statement of financial position	(10,658)	(18,748)	(11,664)	(16,984)
Currency forwards	2,806	233	2,806	-
Currency and interest rate swaps	-	(3,581)	-	-
Net exposure	(7,852)	(22,096)	(8,858)	(16,984)

Credit risk

Credit risk is the potential financial loss resulting from the failure of a customer or counterparty to settle its financial and contractual obligations to the Group as and when they fall due. The Group has no significant credit risk with any single counterparty or group of counterparties since the Group maintains business with large customers in petroleum and power industries and requires full first class collateral for the rest.

Liquidity risk

The Group monitors its liquidity risk and maintains a level of cash and cash equivalents deemed adequate by management to finance the Group's operations and to mitigate the effects of fluctuations in cash flows.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

Fair values of financial assets and liabilities

The fair value of current portion of financial assets and liabilities are taken to approximate the carrying value due to the relatively short-term maturity of these financial instruments.

The fair value of long-term loans and borrowings carrying a floating rate, which is considered to be market rate, are taken to approximate their fair values.

Other financial assets and liabilities not stated above had the fair and carrying value as at 31 December 2018 and 2017 as following:

		Consolidated financial statements			
	Carrying amount	Fair value			
		Level 1	Level 2	Level 3	Total
		(in million Baht)			
31 December 2018					
<i>Financial assets/Financial liabilities measured at fair value</i>					
Equity securities -					
available-for-sale securities	361	361	-	-	361
Debt securities -					
available-for-sale securities					
(Private funds)	11,903	-	11,903	-	11,903
<i>Financial assets/Financial liabilities not measured at fair value</i>					
Debt securities held to maturity	721	-	721	-	721
Debentures	(85,605)	-	(89,035)	-	(89,035)
Forward exchange contracts	(24)	-	(9)	-	(9)
Crack spread swap and time spread swap	-	-	(278)	-	(278)
Interest rate swap contracts	-	-	(112)	-	(112)
31 December 2017					
<i>Financial assets/Financial liabilities measured at fair value</i>					
Equity securities -					
available-for-sale securities	364	364	-	-	364
Debt securities -					
available-for-sale securities					
(Private funds)	11,918	-	11,918	-	11,918
<i>Financial assets/Financial liabilities not measured at fair value</i>					
Debentures	(55,839)	-	(60,546)	-	(60,546)
Forward exchange contracts	(14)	-	(12)	-	(12)
Crack spread swap and time spread swap	-	-	40	-	40
Cross currency and interest rate swap contracts	185	-	201	-	201

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

		Separate financial statements			
	Carrying amount	Fair value			
		Level 1	Level 2	Level 3	Total
		(in million Baht)			
31 December 2018					
<i>Financial assets/Financial liabilities measured at fair value</i>					
Equity securities - available-for-sale securities	361	361	-	-	361
Debt securities - available-for-sale securities (Private funds)	11,903	-	11,903	-	11,903
<i>Financial assets/Financial liabilities not measured at fair value</i>					
Debt securities held to maturity	721	-	721	-	721
Long-term borrowings	(52,028)	-	(51,652)	-	(51,652)
Debentures	(36,009)	-	(37,624)	-	(37,624)
Forward exchange contracts	(24)	-	(9)	-	(9)
Crack spread swap and time spread swap	-	-	(33)	-	(33)
31 December 2017					
<i>Financial assets/Financial liabilities measured at fair value</i>					
Equity securities - available-for-sale securities	364	364	-	-	364
Debt securities - available-for-sale securities (Private funds)	11,918	-	11,918	-	11,918
<i>Financial assets/Financial liabilities not measured at fair value</i>					
Debentures	(55,839)	-	(60,546)	-	(60,546)
Crack spread swap and time spread swap	-	-	37	-	37

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Measurement of fair values

Valuation techniques

The following tables show the valuation techniques used in measuring Level 2 fair values.

Type	Valuation technique
Debt securities - available-for-sale securities (Private funds)	Thai Bond Market Association Government Bond Yield Curve as of the reporting date.
Debentures/Long-term borrowings	<i>Market comparison technique:</i> The valuation model is based on ask prices or latest price of comparable market securities.
Forward exchange contracts/Crack spread swap and time spread swap/Cross currency and interest rate swap contracts/Interest rate swap contracts	<i>Market comparison technique:</i> The fair values are based on broker quotes. Similar contracts are traded in an active market and the quotes reflect the actual transactions in similar instruments.

36 Commitments with non-related parties

	Consolidated financial statements		Separate financial statements	
	2018	2017	2018	2017
	<i>(in million Baht)</i>			
Capital commitments				
Project construction agreements	4,162	6,013	4,051	4,388
Other agreement	-	21	-	-
Total	4,162	6,034	4,051	4,388
Non-cancellable operating lease commitments				
Within one year	238	250	231	231
After one year but within five years	1,418	880	1,390	852
After five years	17,724	140	17,591	-
Total	19,380	1,270	19,212	1,083
Other commitments				
Letters of guarantee issued by financial institutions	2,007	2,019	1,426	1,428
Crude oil purchase agreements	44,543	47,706	44,543	47,706
Total	46,550	49,725	45,969	49,134

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

Investment in Clean Fuel Project

The Company is in process of engaging contractors for construction of Clean Fuel Project (“CFP”) which has been approved in the Extraordinary General Meeting of Shareholder held on 27 August 2018, with the investment project value of USD 4,825 million or equivalent to Baht 160,279 million. The project cost includes the investment of Energy Recovery Unit (“ERU”). The ERU is an electrical power plant, with the designed generating capacity of 250 megawatts and steam, to supply the production process of the CFP.

The Board of Directors’ meeting No. 1/2019 held on 21 January 2019 has passed the resolutions and approved the execution of the relevant agreements, the novation agreement and any other agreements necessary for and in connection with the disposal of assets to transfer the ownership in the ERU with Global Power Synergy Public Company Limited (“GPSC”) or a wholly-owned subsidiary of GPSC and approved that the ERU project to be proposed to the 2019 Annual General Meeting of Shareholders for consideration and approval. The ERU project has significant aims to reduce investment costs of the CFP, enhance liquidity and efficiently support future investment.

Investment in Corporate Venture Capital

On 17 December 2018, the Company entered into Subscription Agreement to invest in corporate venture capital with the amount of U.S. Dollars 3 million or equivalent to Baht 97 million to increase business capability and exploring new business opportunity. The Company shall pay in accordance with capital call notice.

Power Purchase Agreements

Two subsidiaries have power purchase agreements for a period of 25 years with the Electricity Generating Authority of Thailand (“EGAT”) expiring in 2023 and 2041 whereby the subsidiaries will supply the electric energy to EGAT at the agreed quantity and price. As the contracted party with EGAT, the subsidiaries must comply with conditions and restrictions provided for in the agreement.

Joint Venture Agreement on Leasing State Properties

On 21 August 2018, the Company has signed an agreement on leasing state properties with Ministry of Finance. The Company agrees to pay annually for the period of 30 years from 2022 until 2052.

On a signing date, the Company paid up-front fee amounting to Baht 2,962 million.

37 Contingent liabilities and contingent assets

As at 31 December 2018, the Company had the following contingent liabilities and contingent assets:

The Company has crack spread swap and time spread swap with foreign companies (“counterparties”). The Company has or the counterparties have commitments to make payments for the differences between the fixed price and floating price for each period.

As at 31 December 2018, the Company had oil volume under the agreements totalling 1.1 million barrels (2017: 5.5 million barrels).

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2018

38 Insurance policy

As at 31 December 2018, the Group has an All Risks and Loss of Profit Insurance Policy (“ALOP”) from a syndicate of insurers and reinsurers for a total insured value of U.S. Dollars 15,168 million (2017: U.S. Dollars 9,699 million). Such policy is renewed on an annual basis. Certain subsidiaries have assigned their rights to proceeds from insurance claims under the ALOP to the lenders under certain borrowings agreements.

39 Event after the reporting period

At the meeting of the Board of Directors of the Company held on 15 February 2019, the Company’s Board of Directors approved the submission for approval at the annual general meeting of the shareholders of the Company the appropriation of 2018 annual dividends at Baht 2.65 per share, totalling Baht 5,406 million. After a deduction of the interim dividends of Baht 1.50 per share which were paid to the Company’s shareholders in September 2018, the remaining dividends of Baht 1.15 per share, totalling Baht 2,346 million, are scheduled for payment on 26 April 2019. This dividend is subject to the approval of the Company’s shareholders at the annual general meeting to be held on 10 April 2019.

40 Thai Financial Reporting Standards (TFRS) not yet adopted

A number of new and revised TFRS which relevant to the Group operations are expected to have significant impact on the consolidated and separate financial statements on the date of initial application. Those TFRS become effective for annual financial reporting periods beginning on or after 1 January of the following years.

TFRS	Topic	Effective
TFRS 7*	Financial Instruments: Disclosures	2020
TFRS 9*	Financial Instruments	2020
TFRS 15	Revenue from Contracts with Customers	2019
TAS 32*	Financial Instruments: Presentation	2020
TFRIC 16*	Hedges of a Net Investment in a Foreign Operation	2020
TFRIC 19*	Extinguishing Financial Liabilities with Equity Instruments	2020

* TFRS - Financial instruments standards

(a) TFRS 15 Revenue from Contracts with Customers

TFRS 15 establishes a comprehensive framework for determining whether, how much and when revenue is recognised. Revenue should be recognised when (or as) an entity transfers control over goods or services to a customer, measured at the amount to which the entity expects to be entitled. It replaces existing revenue recognition standards as follows:

- TAS 11 (revised 2017) *Construction Contracts*,
- TAS 18 (revised 2017) *Revenue*,
- TSIC 31 (revised 2017) *Revenue-Barter Transactions Involving Advertising Services*,
- TFRIC 13 (revised 2017) *Customer Loyalty Programmes*,
- TFRIC 15 (revised 2017) *Agreements for the Construction of Real Estate*, and
- TFRIC 18 (revised 2017) *Transfers of Assets from Customers*.

Management has considered the potential impact of adopting and initially applying TFRS 15 on the consolidated and separate financial statements and found that there is no material impact on the financial statements in the period of initial application.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2018

(b) TFRS - Financial instruments standards

These TFRS establish requirements related to definition, recognition, measurement, impairment and derecognition of financial assets and financial liabilities, including accounting for derivatives and hedge accounting.

Management is presently considering the potential impact of adopting and initially applying TFRS - Financial instruments standards on the consolidated and separate financial statements.

Independent Auditor's Report

To the Shareholders of Thai Oil Public Company Limited

Opinion

I have audited the consolidated and separate financial statements of Thai Oil Public Company Limited and its subsidiaries (the “Group”) and of Thai Oil Public Company Limited (the “Company”), respectively, which comprise the consolidated and separate statements of financial position as at 31 December 2017, the consolidated and separate statements of income, comprehensive income, changes in equity and cash flows for the year then ended, and notes, comprising a summary of significant accounting policies and other explanatory information.

In my opinion, the accompanying consolidated and separate financial statements present fairly, in all material respects, the financial position of the Group and the Company, respectively, as at 31 December 2017 and their financial performance and cash flows for the year then ended in accordance with Thai Financial Reporting Standards (TFRSs).

Basis for Opinion

I conducted my audit in accordance with Thai Standards on Auditing (TSAs). My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Consolidated and Separate Financial Statements* section of my report. I am independent of the Group and the Company in accordance with the Code of Ethics for Professional Accountants issued by the Federation of Accounting Professions that is relevant to my audit of the consolidated and separate financial statements, and I have fulfilled my other ethical responsibilities in accordance with these requirements. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Key Audit Matters

Key audit matters are those matters that, in my professional judgment, were of most significance in my audit of the consolidated and separate financial statements of the current period. These matters were addressed in the context of my audit of the consolidated and separate financial statements as a whole, and in forming my opinion thereon, and I do not provide a separate opinion on these matters.

<i>Impairment of goodwill</i>	
Refer to Note 3 and 15 to the financial statements.	
The key audit matter	How the matter was addressed in the audit
TOP Solvent (Vietnam) Limited Liability Company (“TSV”), an indirect subsidiary of the Company which operates in Vietnam, has a historical business combination which resulted significant goodwill balance amounting to Baht 601 million. Goodwill is subjected to an annual impairment test. No impairment charge has been recorded by management against this balance in the current financial year. Due to the high level of the management's judgement involved in respect of the assumptions used to support goodwill value, and the significance of the carrying amounts involved, this is one of the key judgmental areas that my audit is concentrated on.	My audit procedures in this area included, among others: - understanding and evaluating the Group's forecasting and budgeting procedures and testing of the principles and accuracy of the calculation derived from forecast model and evaluating the reasonableness of key inputs in the calculations such as revenue growth, discount rate and working capital assumptions, by reference to the Board approved forecast models, data external to the Group and my own views; - consulting KPMG valuation specialists in Vietnam when considering the reasonableness of the discount rate and growth rate; - evaluating the accuracy of forecasts by comparing with the actual results; and - evaluating the adequacy of disclosure in accordance with Thai Financial Reporting Standards.

<i>Valuation of inventory</i>	
Refer to Note 3 and 9 to the financial statements.	
The key audit matter	How the matter was addressed in the audit
Inventory is required to be carried at the lower of its cost and net realisable value. Inventory is a significant balance and the group's main raw materials and finished goods are commodities which can be subject to price volatility which may lead to lower of cost comparing to net realisable value. Due to the high level of the management's judgement involved, this is one of the key judgmental areas that my audit is concentrated on.	My audit procedures in this area included, among others: - understanding and performing test of design and implementation as well as operating effectiveness of controls over inventory valuation process; - assessing the appropriateness of the methodology used to calculate the provisions held against inventory at year end, considering the reasonableness of selling price used by reference to commodity price, and assessing the accuracy of the calculation; and - evaluating the adequacy of disclosure in accordance with Thai Financial Reporting Standards.

<i>Impairment of property, plant and equipment in the consolidated financial statements and loan to and investment in subsidiary in separate financial statements in marine transportation business</i>	
Refer to Note 3 4 10 and 14 to the financial statements.	
The key audit matter	How the matter was addressed in the audit
The Group has certain vessels and crew boats which are not fully used in operation due to the fact that the exploration business is in the downturn from prolonged falls in prevailing oil and gas price which resulted in low freight charge and demand in marine transportation business. This situation indicated that property, plant and equipment, loan to and investment in subsidiary in marine transportation business may be impaired. As a result, for impairment assessment, the Group has assessed the recoverable amount based on the higher of the fair value less costs of disposal and value in use. Due to a significant judgment involved in respect of the assumptions used to support valuation of property, plant and equipment, loan to and investment in subsidiary, and the significance of the carrying amount involved, this is one of the key judgmental areas that my audit is concentrated on.	My audit procedures in this area included, among others: - Understanding of impairment assessment, procedures to assess the recoverable amount and forecasting and budgeting process and testing of the principles and accuracy of the calculation derived from forecast model and evaluating the reasonableness of key inputs in the calculations such as freight and utilization rate, discount rate and working capital assumptions, by reference to the Board approved forecast models, actual result, data external to the Group and my own views; - challenging the source of information and weighted factors that management and independent appraiser used to evaluate the fair value of underlying assets using market approach for selling consideration purpose; - assessing the competency of the independent appraiser engaged by the Group; - consulting KPMG specialists when considering the appropriateness of assumption, the discounted rate and valuation methodologies used by the independent appraiser including the appraisal reports; - evaluating the adequacy of disclosure in accordance with Thai Financial Reporting Standards.

Other Information

Management is responsible for the other information. The other information comprises the information included in the annual report, but does not include the consolidated and separate financial statements and my auditor's report thereon.

My opinion on the consolidated and separate financial statements does not cover the other information and I do not express any form of assurance conclusion thereon.

In connection with my audit of the consolidated and separate financial statements, my responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated and separate financial statements or my knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work I have performed, I conclude that there is a material misstatement of this other information, I am required to report that fact. I have nothing to report in this regard.

Responsibilities of Management and Those Charged with Governance for the Consolidated and Separate Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated and separate financial statements in accordance with TFRSs, and for such internal control as management determines is necessary to enable the preparation of consolidated and separate financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated and separate financial statements, management is responsible for assessing the Group's and the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Group and the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Group's and the Company's financial reporting process.

Auditor's Responsibilities for the Audit of the Consolidated and Separate Financial Statements

My objectives are to obtain reasonable assurance about whether the consolidated and separate financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with TSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated and separate financial statements.

As part of an audit in accordance with TSAs, I exercise professional judgment and maintain professional skepticism throughout the audit. I also:

- Identify and assess the risks of material misstatement of the consolidated and separate financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's and the Company's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's and the Company's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the consolidated and separate financial statements or, if such disclosures are

inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Group and the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated and separate financial statements, including the disclosures, and whether the consolidated and separate financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. I am responsible for the direction, supervision and performance of the group audit. I remain solely responsible for my audit opinion.

I communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

I also provide those charged with governance with a statement that I have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on my independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, I determine those matters that were of most significance in the audit of the consolidated and separate financial statements of the current period and are therefore the key audit matters. I describe these matters in my auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, I determine that a matter should not be communicated in my report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

(Waiyawat Kosamarnchaiyakij)
Certified Public Accountant
Registration No. 6333

KPMG Phoomchai Audit Ltd.
Bangkok
15 February 2018

Thai Oil Public Company Limited and its Subsidiaries
Statement of financial position

Assets	Note	Consolidated financial statements		Separate financial statements	
		31 December		31 December	
		2017	2016	2017	2016
		(in Baht)			
Current assets					
Cash and cash equivalents	5, 18	15,623,426,718	31,120,762,001	11,914,509,851	28,239,977,434
Current investments	6, 18	52,318,064,256	29,653,734,039	51,897,422,875	29,197,634,039
Trade accounts receivable	4, 7	22,327,840,296	19,535,642,239	24,241,795,223	20,842,637,445
Other receivables	4, 8	1,170,683,073	934,198,672	1,126,898,197	1,014,115,419
Short-term loans	4	90,000,000	90,000,000	15,650,500,000	12,583,500,000
Inventories	4, 9	32,840,901,647	33,188,883,131	28,094,465,957	28,995,995,574
Prepaid corporate income tax		59,703,747	99,075,367	-	52,772,768
Value added tax receivable		751,588,384	942,031,764	-	41,899,088
Receivable from Oil Fuel Fund		1,029,053,483	164,124,584	1,029,053,483	164,124,584
Other current asset		126,927	2,190,579	-	786,816
Total current assets		126,211,388,531	115,730,642,376	133,954,645,586	121,133,443,167
Non-current assets					
Investments held as available-for-sale	6	3,103,250,531	244,372,264	3,103,250,531	244,372,264
Investments in subsidiaries	10	-	-	14,555,419,002	14,545,419,002
Investments in joint ventures	12	541,978,290	505,359,648	-	-
Investments in associates	12	13,825,697,677	13,361,234,567	1,260,604,927	1,260,604,927
Other long-term investments	6	779,871,900	779,496,900	779,871,900	779,496,900
Investment properties	13	102,520,270	94,359,064	1,100,443,418	1,086,066,587
Property, plant and equipment	14	78,612,409,186	82,311,540,232	36,082,112,102	36,072,463,472
Goodwill	15	601,368,612	655,258,473	-	-
Other intangible assets	15	2,590,047,381	2,450,756,941	530,131,630	516,587,191
Deferred tax assets	16	507,431,217	440,702,577	481,089,961	433,160,060
Other non-current assets	17	1,232,329,261	1,157,489,075	958,875,127	1,073,959,885
Total non-current assets		101,896,904,325	102,000,569,741	58,851,798,598	56,012,130,288
Total assets		228,108,292,856	217,731,212,117	192,806,444,184	177,145,573,455

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of financial position

Liabilities and shareholders' equity	Note	Consolidated financial statements		Separate financial statements	
		31 December		31 December	
		2017	2016	2017	2016
		<i>(in Baht)</i>			
Current liabilities					
Short-term borrowings	18	968,802,956	867,425,000	-	-
Trade accounts payable	4, 19	18,963,172,436	19,887,404,066	21,060,997,897	22,550,468,532
Other payables	4, 20	3,475,927,189	3,564,903,748	2,909,892,064	2,850,182,768
Short-term borrowings from related parties	4, 18	-	-	503,218,068	531,173,102
Current portion of long-term borrowing	18	1,592,435,944	2,206,025,140	-	-
Current portion of debentures	18	-	4,931,799,674	-	4,931,799,674
Excise duty payable		4,784,895,265	1,449,612,843	4,784,895,265	1,449,612,843
Income tax payable		3,562,808,719	1,238,657,600	2,886,929,511	698,501,935
Total current liabilities		33,348,042,509	34,145,828,071	32,145,932,805	33,011,738,854
Non-current liabilities					
Long-term borrowings	18	8,068,138,044	9,374,480,980	-	-
Debentures	18	55,838,586,219	58,921,228,965	55,838,586,219	58,921,228,965
Deferred tax liability	16	8,980,502	9,600,547	-	-
Provisions for employee benefits	21	3,510,907,406	3,296,501,237	3,161,123,920	3,003,033,386
Other non-current liabilities		185,392,041	386,268,299	494,853,398	459,241,187
Total non-current liabilities		67,612,004,212	71,988,080,028	59,494,563,537	62,383,503,538
Total liabilities		100,960,046,721	106,133,908,099	91,640,496,342	95,395,242,392
Shareholders' equity					
Share capital	22				
Authorised share capital		20,400,278,730	20,400,278,730	20,400,278,730	20,400,278,730
Issued and paid share capital		20,400,278,730	20,400,278,730	20,400,278,730	20,400,278,730
Share premium					
Share premium on ordinary shares	23	2,456,261,491	2,456,261,491	2,456,261,491	2,456,261,491
Other surpluses (deficits)		203,040,571	203,040,571	-	-
Retained earnings					
Appropriated					
Legal reserve	23	2,040,027,873	2,040,027,873	2,040,027,873	2,040,027,873
Other reserves		244,500,000	244,500,000	244,500,000	244,500,000
Unappropriated		96,975,466,730	81,621,935,504	75,955,969,926	56,687,731,314
Other components of shareholders' equity		(96,098,367)	(109,468,979)	68,909,822	(78,468,345)
Equity attributable to owners of the Company		122,223,477,028	106,856,575,190	101,165,947,842	81,750,331,063
Non-controlling interests	11	4,924,769,107	4,740,728,828	-	-
Total shareholders' equity		127,148,246,135	111,597,304,018	101,165,947,842	81,750,331,063
Total liabilities and shareholders' equity		228,108,292,856	217,731,212,117	192,806,444,184	177,145,573,455

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of income

		Consolidated financial statements		Separate financial statements	
		For the year ended		For the year ended	
		31 December		31 December	
	Note	2017	2016	2017	2016
		<i>(in Baht)</i>			
Revenue from sale and rendering of services	4, 31	337,387,694,059	274,738,948,755	349,828,812,257	283,293,177,390
Cost of sale and rendering of services	4, 9	<u>(305,385,582,808)</u>	<u>(247,261,172,102)</u>	<u>(328,442,071,503)</u>	<u>(265,517,766,964)</u>
Gross profit		32,002,111,251	27,477,776,653	21,386,740,754	17,775,410,426
Dividend income	4	157,889,657	247,336,954	11,125,418,007	14,475,224,501
Net derivative loss on hedging		(133,218,287)	(243,242,172)	(127,593,664)	(244,566,022)
Net foreign exchange gain		3,181,552,556	446,107,240	2,881,989,819	372,391,866
Other income	4, 25	1,190,071,115	1,118,812,470	3,271,699,114	2,925,959,797
Selling expenses	4	(491,804,822)	(451,266,945)	(188,744,447)	(270,370,604)
Administrative expenses	4, 26	(2,969,440,802)	(2,182,087,017)	(2,493,162,306)	(2,176,040,397)
Share of profit of joint ventures and associates	12	<u>1,196,663,512</u>	<u>929,669,665</u>	<u>-</u>	<u>-</u>
Profit before finance costs and income tax expense		34,133,824,180	27,343,106,848	35,856,347,277	32,858,009,567
Finance costs	4, 29	<u>(3,285,063,447)</u>	<u>(3,460,705,140)</u>	<u>(2,863,593,581)</u>	<u>(3,133,580,838)</u>
Profit before income tax expense		30,848,760,733	23,882,401,708	32,992,753,696	29,724,428,729
Income tax expense	30	<u>(5,529,487,003)</u>	<u>(2,295,464,004)</u>	<u>(4,253,115,118)</u>	<u>(1,221,333,598)</u>
Profit for the year		<u>25,319,273,730</u>	<u>21,586,937,704</u>	<u>28,739,638,578</u>	<u>28,503,095,131</u>
Profit for the year attributable to:					
Owners of the Company		24,856,198,552	21,221,910,756	28,739,638,578	28,503,095,131
Non-controlling interests	11	<u>463,075,178</u>	<u>365,026,948</u>	<u>-</u>	<u>-</u>
Profit for the year		<u>25,319,273,730</u>	<u>21,586,937,704</u>	<u>28,739,638,578</u>	<u>28,503,095,131</u>
Basic earnings per share (in Baht)	32	<u>12.18</u>	<u>10.40</u>	<u>14.09</u>	<u>13.97</u>

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of comprehensive income

	<i>Note</i>	Consolidated financial statements		Separate financial statements	
		For the year ended		For the year ended	
		31 December		31 December	
		2017	2016	2017	2016
		<i>(in Baht)</i>			
Profit for the year		25,319,273,730	21,586,937,704	28,739,638,578	28,503,095,131
Other comprehensive income (loss)					
<i>Items that will be reclassified subsequently to profit or loss</i>					
Net change in fair value of available-for-sale investments		147,378,167	10,950,198	147,378,167	10,950,198
Exchange differences on translating foreign operations		(120,752,573)	(21,032,170)	-	-
Share of other comprehensive income (loss) of associate		(16,205,521)	5,448,281	-	-
Total items that will be reclassified subsequently to profit or loss		10,420,073	(4,633,691)	147,378,167	10,950,198
<i>Items that will not be reclassified to profit or loss</i>					
Losses on remeasurements of defined benefit plans	21	(323,414,348)	-	(291,993,637)	-
Total items that will not be reclassified to profit or loss		(323,414,348)	-	(291,993,637)	-
Other comprehensive income (loss) for the year, net of income tax		(312,994,275)	(4,633,691)	(144,615,470)	10,950,198
Total comprehensive income for the year		25,006,279,455	21,582,304,013	28,595,023,108	28,514,045,329
Total comprehensive income attributable to:					
Owners of the Company		24,546,308,167	21,216,285,097	28,595,023,108	28,514,045,329
Non-controlling interests	11	459,971,288	366,018,916	-	-
Total comprehensive income for the year		25,006,279,455	21,582,304,013	28,595,023,108	28,514,045,329

The accompanying notes are an integral part of these financial statements.

Consolidated financial statements																
Note	Issued and paid share capital	Share Premium on ordinary shares	Other surpluses (deficits)		Retained earnings			Other components of shareholders' equity			Equity attributable to owners of the Company	Non-controlling interests	Total shareholders' equity			
			Surplus on business restructuring under common control	Deficit from the change in the ownership interests in subsidiary	Legal reserves	Other reserves	Unappropriated (in Baht)	Other comprehensive income (loss)								
								Fair value changes in available-for-sale investments	Translating foreign operations	Share of other comprehensive income (loss) of associate						
Year ended 31 December 2016																
Balance at 1 January 2016	20,400,278,730	2,456,261,491	330,835,954	(127,795,383)	2,040,027,873	244,500,000	67,131,185,613	(89,418,543)	(17,357,393)	2,932,616	92,371,450,958	4,637,290,947	97,008,741,905			
Dividend	33	-	-	-	-	-	(6,731,160,865)	-	-	-	(6,731,160,865)	(262,581,035)	(6,993,741,900)			
Comprehensive income (loss) for the year																
Profit for the year		-	-	-	-	-	21,221,910,756	-	-	-	21,221,910,756	365,026,948	21,586,937,704			
Other comprehensive income (loss)		-	-	-	-	-	-	10,950,198	(21,032,170)	4,456,313	(5,625,659)	991,968	(4,633,691)			
Total comprehensive income (loss) for the year		-	-	-	-	-	21,221,910,756	10,950,198	(21,032,170)	4,456,313	21,216,285,097	366,018,916	21,582,304,013			
Balance at 31 December 2016	20,400,278,730	2,456,261,491	330,835,954	(127,795,383)	2,040,027,873	244,500,000	81,621,935,504	(78,468,345)	(38,389,563)	7,388,929	106,856,575,190	4,740,728,828	111,597,304,018			
Year ended 31 December 2017																
Balance at 1 January 2017	20,400,278,730	2,456,261,491	330,835,954	(127,795,383)	2,040,027,873	244,500,000	81,621,935,504	(78,468,345)	(38,389,563)	7,388,929	106,856,575,190	4,740,728,828	111,597,304,018			
Dividend	33	-	-	-	-	-	(9,179,406,329)	-	-	-	(9,179,406,329)	(275,931,009)	(9,455,337,338)			
Comprehensive income (loss) for the year																
Profit for the year		-	-	-	-	-	24,856,198,552	-	-	-	24,856,198,552	463,075,178	25,319,273,730			
Other comprehensive income (loss)		-	-	-	-	-	(323,260,997)	147,378,167	(120,752,573)	(13,254,982)	(309,890,385)	(3,103,890)	(312,994,275)			
Total comprehensive income (loss) for the year		-	-	-	-	-	24,532,937,555	147,378,167	(120,752,573)	24,546,308,167	459,971,288	25,006,279,455				
Balance at 31 December 2017	20,400,278,730	2,456,261,491	330,835,954	(127,795,383)	2,040,027,873	244,500,000	96,975,466,730	68,909,822	(159,142,136)	(5,866,053)	122,223,477,028	4,924,769,107	127,148,246,135			

10

Thai Oil Public Company Limited and its Subsidiaries
Statement of changes in shareholders' equity

		Separate financial statements					Other components of shareholders' equity	
						Retained earnings		
	Note	Issued and paid share capital	Share Premium on ordinary shares	Legal reserve	Other reserves (in Baht)	Unappropriated	Fair value changes in available-for-sale investments	Total shareholders' equity
Year ended 31 December 2016								
Balance at 1 January 2016		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	34,915,797,048	(89,418,543)	59,967,446,599
Dividend	33	-	-	-	-	(6,731,160,865)	-	(6,731,160,865)
Comprehensive income (loss) for the year								
Profit for the year		-	-	-	-	28,503,095,131	-	28,503,095,131
Other comprehensive income (loss)		-	-	-	-	-	10,950,198	10,950,198
Total comprehensive income (loss) for the year		-	-	-	-	28,503,095,131	10,950,198	28,514,045,329
Balance at 31 December 2016		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	56,687,731,314	(78,468,345)	81,750,331,063
Year ended 31 December 2017								
Balance at 1 January 2017		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	56,687,731,314	(78,468,345)	81,750,331,063
Dividend	33	-	-	-	-	(9,179,406,329)	-	(9,179,406,329)
Comprehensive income (loss) for the year								
Profit for the year		-	-	-	-	28,739,638,578	-	28,739,638,578
Other comprehensive income (loss)		-	-	-	-	(291,993,637)	147,378,167	(144,615,470)
Total comprehensive income (loss) for the year		-	-	-	-	28,447,644,941	147,378,167	28,595,023,108
Balance at 31 December 2017		20,400,278,730	2,456,261,491	2,040,027,873	244,500,000	75,955,969,926	68,909,822	101,165,947,842

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of cash flows

		Consolidated		Separate	
		financial statements		financial statements	
		For the year ended		For the year ended	
		31 December		31 December	
	Note	2017	2016	2017	2016
		(in Baht)			
Cash flows from operating activities					
Profit for the year		25,319,273,730	21,586,937,704	28,739,638,578	28,503,095,131
<i>Adjustments to reconcile profit (loss) to cash receipts (payments)</i>					
Reversal of allowance for decline in value of inventories adjusted to net realisable value		(93,066,711)	(1,052,609,007)	(72,798,534)	(1,040,788,174)
Depreciation and amortisation	28	7,641,956,999	7,761,793,520	3,956,228,840	4,373,672,953
Finance costs	29	3,285,063,447	3,460,705,140	2,863,593,581	3,133,580,838
Unrealised gain on foreign exchange		(2,335,144,065)	(97,403,092)	(2,013,562,075)	(218,926,173)
Share of profit of joint ventures and associates	12	(1,196,663,512)	(929,669,665)	-	-
Dividend income	4	(157,889,657)	(247,336,954)	(11,125,418,007)	(14,475,224,501)
(Reversal of) impairment loss on property, plant and equipment	14	546,355,384	(1,405,620)	-	-
Bad debt		-	28,472,981	-	-
Loss on disposal of investment		33,223,606	-	71,850,322	-
(Gain) loss on disposal of property, plant and equipment		20,392,717	52,536,630	27,991	(1,078)
Realisation of deferred land lease and other income		(24,475,755)	(25,834,791)	(143,187,307)	(140,107,684)
Income tax expense	30	5,529,487,003	2,295,464,004	4,253,115,118	1,221,333,598
		38,568,513,186	32,831,650,850	26,529,488,507	21,356,634,910
Changes in operating assets and liabilities					
Trade accounts receivable		(2,791,694,120)	(5,370,916,668)	(3,396,869,165)	(6,911,018,387)
Other receivables		(1,389,182,919)	971,492,580	(1,295,902,910)	786,385,785
Inventories		441,048,195	(13,237,297,570)	974,328,151	(11,897,584,487)
Value add tax receivable		190,443,380	40,513,080	41,899,088	198,847,666
Other non-current assets		(157,942,426)	145,829,924	42,690,633	(105,199,815)
Trade accounts payable		(927,669,858)	7,846,884,729	(1,498,321,028)	9,221,945,029
Other payable		671,588,852	92,916,646	357,425,364	187,512,485
Excise duty payable		3,335,282,422	417,532,937	3,335,282,422	417,532,937
Other non-current liabilities		(381,726,948)	141,562,292	(154,795,864)	128,074,355
Cash generated from operating activities		37,558,659,764	23,880,168,800	24,935,225,198	13,383,130,478
Income tax received (paid)		(3,141,476,623)	(698,536,565)	(1,986,846,267)	199,752,825
Net cash from operating activities		34,417,183,141	23,181,632,235	22,948,378,931	13,582,883,303

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Statement of cash flows

		Consolidated		Separate	
		financial statements		financial statements	
		For the year ended		For the year ended	
		31 December		31 December	
	Note	2017	2016	2017	2016
		(in Baht)			
Cash flows from investing activities					
Dividends received		740,393,772	753,954,120	11,125,418,007	14,475,224,501
Purchase of current investments		(23,423,007,008)	(12,056,729,550)	(23,458,465,627)	(12,214,929,550)
Sale of investments held as available-for-sale		150,575,691	-	150,575,691	-
Purchase of investments held as available-for-sale		(3,016,015,165)	(27,660,014)	(3,016,015,165)	(27,660,014)
Proceeds from sales of investments in associates	12	50,625,000	-	-	-
Cash outflows on investments in subsidiary	10	-	-	(10,000,000)	-
Cash outflows on short-term loans to related parties	4	-	-	(7,220,500,000)	(5,723,500,000)
Cash inflows on short-term loans to related parties	4	-	-	4,153,500,000	2,549,000,000
Cash inflows on long-term loans to savings co-operative of employees		21,989,620	595,910	21,989,620	595,910
Cash outflows on other long-term investments		(375,000)	-	(375,000)	-
Sale of property, plant and equipment		1,936,392	597,728	15,700	18,000
Purchase of property, plant and equipment		(3,679,007,164)	(6,393,094,429)	(3,257,293,377)	(2,070,514,173)
Purchase of intangible assets		(920,624,370)	(625,814,122)	(96,526,356)	(193,971,674)
Exchange differences on translating foreign operations		(18,874,068)	(3,636,586)	-	-
Net cash used in investing activities		(30,092,382,300)	(18,351,786,943)	(21,607,676,507)	(3,205,737,000)
Cash flows from financing activities					
Finance costs paid		(3,364,337,657)	(3,443,153,947)	(2,946,483,285)	(3,116,753,040)
Dividends paid		(9,455,337,338)	(6,993,741,900)	(9,179,406,329)	(6,731,160,865)
Proceeds from short-term borrowings		3,571,377,956	1,324,000,000	-	-
Repayment of short-term borrowings		(3,470,000,000)	(870,000,000)	-	-
Proceeds from short-term borrowings from related parties	4	-	800,000,000	-	800,000,000
Repayment of short-term borrowings from related parties	4	-	(800,000,000)	(27,955,034)	(6,108,437,636)
Proceeds from long-term borrowings		110,052,978	1,967,222,563	-	-
Repayment of long-term borrowings		(1,685,992,899)	(1,381,629,843)	-	-
Redemption of debenture		(4,931,799,674)	-	(4,931,799,674)	-
Net cash used in financing activities		(19,226,036,634)	(9,397,303,127)	(17,085,644,322)	(15,156,351,541)
Net decrease in cash and cash equivalents		(14,901,235,793)	(4,567,457,835)	(15,744,941,898)	(4,779,205,238)
Effect of exchange rate change on cash and cash equipments		(596,099,490)	(76,216,453)	(580,525,685)	(54,752,702)
Cash and cash equivalents as at 1 January		31,120,762,001	35,764,436,289	28,239,977,434	33,073,935,374
Cash and cash equivalents as at 31 December	5	15,623,426,718	31,120,762,001	11,914,509,851	28,239,977,434
Non-cash transactions					
Payable for purchase of property, plant and equipment		391,724,053	230,524,656	350,450,144	168,492,913
Payable for purchase of intangible assets		202,242,529	778,553,475	-	-
Payable on purchase of securities (Private funds)		49,839,374	304,017,736	49,839,374	304,017,736

The accompanying notes are an integral part of these financial statements.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Note	Contents
1	General information
2	Basis of preparation of the financial statements
3	Significant accounting policies
4	Related parties
5	Cash and cash equivalents
6	Other investments
7	Trade accounts receivable
8	Other receivables
9	Inventories
10	Investments in subsidiaries
11	Non-controlling interests
12	Investments in joint ventures and associates
13	Investment properties
14	Property, plant and equipment
15	Intangible assets
16	Deferred tax
17	Other non-current assets
18	Interest-bearing liabilities
19	Trade accounts payable
20	Other payables
21	Provisions for employee benefits
22	Share capital
23	Additional paid-in capital and reserves
24	Segment information
25	Other income
26	Administrative expenses
27	Employee benefit expenses
28	Expenses by nature
29	Finance costs
30	Income tax expense
31	Promotional privileges
32	Basic earnings per share
33	Dividends
34	Financial instruments
35	Commitments with non-related parties
36	Contingent liabilities and contingent assets
37	Insurance policy
38	Event after the reporting period
39	Reclassification of accounts

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

These notes form an integral part of the financial statements.

The financial statements issued for Thai statutory and regulatory reporting purposes are prepared in the Thai language. These English language financial statements have been prepared from the Thai language statutory financial statements, and were approved and authorized for issue by the Board of Directors on 15 February 2018.

1 General information

Thai Oil Public Company Limited, the “Company”, is incorporated in Thailand and has its registered offices and refinery plant as follows:

Head office	:	555/1 Energy Complex Building A, 11 th Floor, Vibhavadi Rangsit Road, Kwang Chatuchak, Khet Chatuchak, Bangkok 10900, Thailand
Sriracha office and refinery plant	:	42/1 Moo 1, Sukhumvit Road Km. 124, Tambol Tungsukla, Amphur Sriracha, Choburi 20230, Thailand

The Company was listed on the Stock Exchange of Thailand on 26 October 2004.

The Company is an entity in the PTT Public Company Limited (“PTT”) group of companies. PTT is incorporated in Thailand and is the major shareholder and the parent of the Company and owned 49.1% of the Company’s issued and paid-up share capital as at 31 December 2017 (31 December 2016: 49.1%).

The principal businesses of the Company are oil refining and distributions. Details of the Company’s direct and indirect subsidiaries as at 31 December 2017 and 2016 were as follows:

Name of the entity	Type of business	Country of incorporation	Ownership interest (%)	
			2017	2016
Direct subsidiaries				
Thai Paraxylene Co., Ltd.	Paraxylene manufacturing and distribution	Thailand	99.99	99.99
Thai Lube Base Public Company Limited	Lube base oil refining and distribution	Thailand	99.99	99.99
Thaioil Marine Co., Ltd.	Providing marine transportation services for petroleum and liquid chemical products	Thailand	99.99	99.99
Thaioil Energy Services Co., Ltd.	Providing human resource management	Thailand	99.99	99.99
Thaioil Solvent Co., Ltd.	Investment in solvent and chemical businesses	Thailand	99.99	99.99
Thaioil Ethanol Co., Ltd.	Investment in ethanol business and alternative			

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Name of the entity	Type of business energy products	Country of incorporation Thailand	Ownership interest (%)	
			2017 99.99	2016 99.99
Thaioil Power Co., Ltd.	Power and steam generation and distribution	Thailand	73.99	73.99
TOP SPP Co., Ltd.	Power and steam generation and distribution	Thailand	99.99	99.99
Thaioil Treasury Center Co., Ltd.	Treasury center for the Group's business	Thailand	99.99	-
Indirect subsidiaries				
TOP Solvent Co., Ltd.	Distribution of solvent and chemical products	Thailand	99.99	99.99
Sak Chaisidhi Co., Ltd.	Solvent and chemical products manufacturing and distribution	Thailand	80.52	80.52
TOP Solvent (Vietnam) LLC.	Distribution of solvent and chemical products	Vietnam	100.00	100.00
Sapthip Co., Ltd.	Ethanol products manufacturing and distribution	Thailand	50.00	50.00
Thaioil Marine International Pte. Ltd.	Investment in marine transportation for crude oil and petroleum product business	Singapore	100.00	100.00
TOP Maritime Service Co., Ltd.	Providing marine transportation services for crew and utilities in Gulf of Thailand	Thailand	55.00	55.00
LABIX Co., Ltd.	Linear Alkyl Benzene manufacturing and distribution	Thailand	75.00	75.00

2 Basis of preparation of the financial statements

(a) Statement of compliance

The financial statements are prepared in accordance with Thai Financial Reporting Standards (TFRS), guidelines promulgated by the Federation of Accounting Professions ("FAP"), and applicable rules and regulations of the Thai Securities and Exchange Commission.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

The FAP has issued new and revised TFRS effective for annual accounting periods beginning on or after 1 January 2017. The initial application of these new and revised TFRS has resulted in changes in certain of the Group's accounting policies. These changes have no material effect on the financial statements.

In addition to the above new and revised TFRS, the FAP has issued a number of other new and revised TFRS which are effective for annual financial periods beginning on or after 1 January 2018 and have not been adopted in the preparation of these financial statements. The Group has made a preliminary assessment of the potential initial impact on the consolidated and separate financial statements of these new and revised TFRS and expects that there will be no material impact on the financial statements in the period of initial application.

(b) *Basis of measurement*

The financial statements have been prepared on the historical cost basis except for the following items.

<i>Items</i>	<i>Measurement bases</i>
Available-for-sale investment	Fair value
Provisions for employee benefits	Present value of employee benefit obligations as explained in Note 21

(c) *Functional and presentation currency*

The financial statements are prepared and presented in Thai Baht, which is the Company's functional currency. All financial information presented in Thai Baht has been rounded in the notes to the financial statements to the nearest million unless otherwise stated.

(d) *Use of judgements and estimates*

The preparation of financial statements in conformity with TFRS requires management to make judgements, estimates and assumptions that affect the application of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised prospectively.

Assumptions and estimation uncertainties

Information about assumption and estimation uncertainties that have a significant risk of resulting in a material adjustments to the amounts recognised in the financial statements is included in the following notes:

Note 9	Allowance for decline in value of inventories adjusted to net realisable value
Note 4 10 and 15	Impairment test of loan to and investment in subsidiaries, goodwill and customer database - key assumptions underlying recoverable amounts
Note 14	Determining the fair value less costs of disposal of marine transportation services segment's assets on the basis of significant unobservable inputs

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Note 21 Measurement of provisions for employee benefits - key actuarial assumption

Measurement of fair values

A number of the Group's accounting policies and disclosures require the measurement of fair values, for both financial and non-financial assets and liabilities.

The Group has an established control framework with respect to the measurement of fair values. This includes a valuation team that has overall responsibility for overseeing all significant fair value measurements, including Level 3 fair values, and reports directly to the CFO.

The valuation team regularly reviews significant unobservable inputs and valuation adjustments. If third party information, such as broker quotes or pricing services, is used to measure fair values, then the valuation team assesses the evidence obtained from the third parties to support the conclusion that such valuations meet the requirements of TFRS, including the level in the fair value hierarchy in which such valuations should be classified.

Significant valuation issues are reported to the Group's Audit Committee.

When measuring the fair value of an asset or a liability, the Group uses observable market data as far as possible. Fair values are categorised into different levels in a fair value hierarchy based on the inputs used in the valuation techniques as follows:

- Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities.
- Level 2: inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).
- Level 3: inputs for the asset or liability that are not based on observable market data.

If the inputs used to measure the fair value of an asset or liability might be categorised in different levels of the fair value hierarchy, then the fair value measurement is categorised in its entirety in the same level of the fair value hierarchy as the lowest level input that is significant to the entire measurement.

The Group recognises transfers between levels of the fair value hierarchy at the end of the reporting period during which the change has occurred.

Further information about the assumptions made in measuring fair values is included in following notes:

Note 13 Investment properties

Note 34 Financial instruments

3 Significant accounting policies

The accounting policies set out below have been applied consistently to all periods presented in these financial statements.

(a) Basis of consolidation

The consolidated financial statements relate to the Company and its subsidiaries (together referred to as the "Group") and the Group's interests in joint ventures and associates.

Business combinations

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

The Group applies the acquisition method for all business combinations when control is transferred to the Group other than those with entities under common control.

The Group controls an entity when it is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. The acquisition date is the date on which control is transferred to the acquirer. Judgment is applied in determining the acquisition date and determining whether control is transferred from one party to another.

Goodwill is measured as the fair value of the consideration transferred including the recognized amount of any non-controlling interest in the acquiree, less the net recognised amount (generally fair value) of the identifiable assets acquired and liabilities assumed, all measured as of the acquisition date. Any gain on bargain purchase is recognised in profit or loss immediately.

Consideration transferred includes the fair values of the assets transferred, liabilities incurred by the Group to the previous owners of the acquiree, and equity interests issued by the Group. Consideration transferred also includes the fair value of any contingent consideration and share-based payment awards of the acquiree that are replaced mandatorily in the business combination. If a business combination results in the termination of pre-existing relationships between the Group and the acquiree, then the lower of the termination amount, as contained in the agreement, and the value of the off-market element is deducted from the consideration transferred and recognised in other expenses.

A contingent liability of the acquiree is assumed in a business combination only if such a liability represents a present obligation and arises from a past event, and its fair value can be measured reliably.

Transaction costs that the Group incurs in connection with a business combination, such as legal fees, and other professional and consulting fees are expensed as incurred.

If the initial accounting for a business combination is incomplete by the end of the reporting period in which the combination occurs, the Group reports provisional amounts for the items for which the accounting is incomplete. Those provisional amounts are adjusted during the measurement period, or additional assets or liabilities are recognized, to reflect new information obtained about facts and circumstances that existed at the acquisition date that, if known, would have affected the amounts recognized at that date.

Acquisitions from entities under common control

Business combinations of entities or businesses under common control are accounted for using a method similar to the pooling of interest method and in accordance with the Guideline issued in 2009 by the FAP.

Subsidiaries

Subsidiaries are entities controlled by the Group. The Group controls an entity when it is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. The financial statements of subsidiaries are included in the consolidated financial statements from the date on which control commences until the date on which control ceases.

Non-controlling interests

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

At the acquisition date, the Group measures any non-controlling interest at its proportionate interest in the identifiable net assets of the acquiree.

Changes in the Group's interest in a subsidiary that do not result in a loss of control are accounted for as equity transactions.

Loss of control

When the Group loses control over a subsidiary, it derecognises the assets and liabilities of the subsidiary, and any related non-controlling interests and other components of equity. Any resulting gain or loss is recognised in profit or loss. Any interest retained in the former subsidiary is measured at fair value when control is lost.

Interests in equity-accounted investees

The Group's interests in equity-accounted investees comprise interests in joint ventures and associates.

A joint venture is an arrangement in which the Group has joint control, whereby the Group has rights to the net assets of the arrangement, rather than rights to its assets and obligations for its liabilities. Associates are those entities in which the Group has significant influence, but not control or joint control, over the financial and operating policies.

Interests in joint ventures and associates are accounted for using the equity method. They are initially recognised at cost, which includes transaction costs. Subsequent to initial recognition, the consolidated financial statements include the Group's share of the profit or loss and other comprehensive income of equity-accounted investees, until the date on which joint control or significant influence ceases.

Transactions eliminated on consolidation

Intra-group balances and transactions, and any unrealised income or expenses arising from intra-group transactions, are eliminated in preparing the consolidated financial statements. Unrealised gains arising from transactions with joint ventures and associates are eliminated against the investment to the extent of the Group's interest in the investee. Unrealised losses are eliminated in the same way as unrealised gains, but only to the extent that there is no evidence of impairment.

(b) Foreign currencies

Foreign currency transactions

Transactions in foreign currencies are translated to the respective functional currencies of Group entities at exchange rates at the dates of the transactions.

Monetary assets and liabilities denominated in foreign currencies are translated to the functional currency at the exchange rate at the reporting date. Foreign exchange differences arising on translation are recognised in profit or loss.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Non-monetary assets and liabilities measured at cost in foreign currencies are translated to the functional currency at the exchange rates at the dates of the transactions.

Foreign operations

The assets and liabilities of foreign operations, including goodwill and fair value adjustments arising on acquisition, are translated to Thai Baht at the exchange rates at the reporting date.

The revenues and expenses of foreign operations are translated to Thai Baht at the average foreign exchange rates ruling during the periods.

Foreign exchange differences are recognised in other comprehensive income and accumulated in the translation reserve, except to extent that the translation difference is allocated to non-controlling interest.

When a foreign operation is disposed of in its entirety or partially such that control, significant influence or joint control is lost, the cumulative amount in the translation reserve related to that foreign operation is reclassified to profit or loss as part of the gain or loss on disposal. If the Group disposes of part of its interest in a subsidiary but retains control, then the relevant proportion of the cumulative amount is reattributed to non-controlling interests. When the Group disposes of only part of a joint venture or associate while retaining joint control or significant influence, the relevant proportion of the cumulative amount is reclassified to profit or loss.

When the settlement of a monetary item receivable from or payable to a foreign operation is neither planned nor likely in the foreseeable future, exchange gains and losses arising from such a monetary item are considered to form part of a net investment in a foreign operation and are recognised in other comprehensive income, and presented in the foreign currency translation reserve in equity until disposal of the investment.

(c) *Derivative financial instruments*

Derivative financial instruments are used to manage exposure to foreign exchange, interest rate and commodity price risks arising from operational, financing and investment activities. Derivative financial instruments are not used for trading purposes. However, derivatives that do not qualify for hedge accounting are accounted for as trading instruments.

Hedge of future foreign currency transactions

Forward foreign exchange contracts protect the Group from fluctuations in exchange rates by establishing the rates at which foreign currency assets will be realised or foreign currency liabilities will be settled. Forward foreign exchange contracts are recognised in the financial statements on inception. The premium or discount on the establishment of each agreement is amortised over the contract period.

Cross currency swap and interest rate swap contracts

Cross currency swap and interest rate swap contracts hedging future fluctuations in exchange rates and interest rates. Foreign financial assets and liabilities hedged by cross currency swap contracts are translated into the functional currency at the foreign exchange rates determined in the contracts and revalued at the reporting date at the foreign exchange rate ruling on that date. Foreign exchange differences are recognised in profit or loss. The differences under interest rate swaps are recorded as adjustments to the interest expense relating to the financial obligations in profit or loss.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Hedge of crack spread and time spread

Differences between the fixed prices of contracts and the settlement prices are recognised in the profit or loss in the period in which the contracts mature.

(d) Cash and cash equivalents

Cash and cash equivalents in the statements of cash flows comprise cash balances, current and savings accounts, and highly liquid short-term investments. Bank overdrafts that are repayable on demand are a component of financing activities for the purpose of the statement of cash flows.

(e) Trade and other accounts receivable

Trade and other accounts receivable are stated at their invoice value less allowance for doubtful accounts.

The allowance for doubtful accounts is assessed primarily on analysis of payment histories and future expectations of customer payments. Bad debts are written off when incurred.

(f) Inventories

Inventories are measured at the lower of cost and net realisable value.

Cost of inventories is calculated using the weighted average cost principle, and comprises all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition. In the case of manufactured inventories and work in progress, cost includes an appropriate share of production overheads based on normal operating capacity.

Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs to complete and to make the sale.

(g) Non-current assets classified as held for sale

Non-current assets that are expected to be recovered primarily through sale rather than through continuing use, are classified as held for sale. The assets are measured at the lower of their carrying value and fair value less cost to sell. Any impairment loss on a disposal group is first allocated to goodwill, and then to remaining assets and liabilities on a pro rata basis, except that no loss is allocated to inventories, financial assets, deferred tax assets and investment properties. Impairment losses on initial classification as held for sale and subsequent gains and losses on remeasurement are recognised in profit or loss. Gains are not recognised in excess of any cumulative impairment loss.

(h) Investments

Investments in subsidiaries, joint ventures and associates

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Investments in subsidiaries, joint ventures and associates in the separate financial statements of the Company are accounted for using the cost method. Investments in joint ventures and associates in the consolidated financial statements are accounted for using the equity method.

Any changes in the equity interest in subsidiaries of the Group while control is retained are recorded in equity.

Investments in other debt and equity securities

Debt securities that the Group has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are stated at amortised cost, less any impairment losses. The difference between the acquisition cost and redemption value of such debt securities is amortised using the effective interest rate method over the period to maturity.

Debt securities and marketable equity securities, other than those securities held for intended to be held to maturity, are classified as investments in available-for-sale securities. Investments in available-for-sale securities are, subsequent to initial recognition, stated at fair value, therein, other than impairment losses and foreign currency differences on available-for-sale monetary items, are recognised directly in equity. Impairment losses and foreign exchange differences are recognised in profit or loss. When these investments are derecognised, the cumulative gain or loss previously recognised directly in equity is recognised in profit or loss. When these investments are interest-bearing, interest calculated using the effective interest method is recognised in profit or loss.

Equity securities which are not marketable are stated at cost less any impairment losses.

The fair value of financial instruments classified as available-for-sale is determined as the quoted bid price at the reporting date.

Disposal of investments

On disposal of an investment, the difference between net disposal proceeds and the carrying amount together with the associated cumulative gain or loss that was reported in equity is recognised in profit or loss.

If the Group disposes of part of its holding of a particular investment, the deemed cost of the part sold is determined using the weighted average method applied to the carrying value of the total holding of the investment.

(i) Investment properties

Investment properties are properties which are held to earn rental income, for capital appreciation or for both, but not for sale in the ordinary course of business, use in the production or supply of goods or services or for administrative purposes.

Investment properties are measured at cost less accumulated depreciation and impairment losses.

Cost includes expenditure that is directly attributable to the acquisition of the investment property. The cost of self-constructed investment property includes the cost of materials and direct labour, and other

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

costs directly attributable to bringing the investment property to a working condition for its intended use and capitalised borrowing costs.

(j) *Property, plant and equipment*

The Group's owned assets

Property, plant and equipment are measured at cost less accumulated depreciation and impairment losses.

Cost includes expenditure that is directly attributable to the acquisition of the asset. The cost of self-constructed assets includes the cost of materials and direct labour, any other costs directly attributable to bringing the assets to a working condition for their intended use, the costs of dismantling and removing the items and restoring the site on which they are located, and capitalised borrowing costs. Cost also may include transfers from other comprehensive income of any gain or loss on qualifying cash flow hedges of foreign currency purchases of property, plant and equipment. Purchased software that is integral to the functionality of the related equipment is capitalised as part of that equipment.

When parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

Any gains and losses on disposal of an item of property, plant and equipment are determined by comparing the proceeds from disposal with the carrying amount of property, plant and equipment, and are recognised in profit or loss.

Reclassification to investment property

When the use of a property changes from owner-occupied to investment property, its carrying amount at the date of reclassification becomes its cost for subsequent accounting.

Subsequent costs

The cost of replacing a part of an item of property, plant and equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the part will flow to the Group, and its cost can be measured reliably. The carrying amount of the replaced part is derecognised. The costs of the day-to-day servicing of property, plant and equipment are recognised in profit or loss as incurred.

Depreciation

Depreciation is calculated based on the depreciable amount, which is the cost of an asset, or other amount substituted for cost, less its residual value.

Depreciation is charged to the profit or loss on a straight line basis over the estimated useful lives of each component of an item of property, plant and equipment. The estimated useful lives are as follows:

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Buildings	10 - 25 years
Leasehold improvements	5 - 20 years
Refinery plant and equipment (depreciated over the remaining estimated useful life starting from 1 October 1994)	20 - 35 years
Lube base oil refinery plants and equipment	16 - 20 years
Petrochemical plants	10 - 25 years
Power plants	20 - 25 years
Transmission facilities	25 years
Machinery, equipment and plant equipment	3 - 20 years
Oil and liquid chemical tankers and crew boats	10 - 25 years
Furniture, fixtures, office equipment and others	5 - 10 years
Vehicles	5 years

No depreciation is provided on freehold land and assets under construction.

Depreciation methods, useful lives and residual values are reviewed at each financial year-end and adjusted if appropriate.

(k) *Intangible assets*

Goodwill

Goodwill that arises upon the acquisition of subsidiaries is included in intangible assets. The measurement of goodwill at initial recognition is described in note 3 (a). Subsequent to initial recognition, goodwill is measured at cost less accumulated impairment losses. In respect of equity-accounted investees, the carrying amount of goodwill is included in the carrying amount of the investment, and an impairment loss on such an investment is not allocated to any asset, including goodwill, that forms part of the carrying amount of the equity-accounted investee.

Customer database

Customer database is stated at cost less accumulated impairment losses.

License fee, computer software and patent

License fee, computer software and patent that are acquired by the Group, which have finite useful lives, are stated at cost less accumulated amortisation and accumulated impairment losses.

Subsequent expenditure

Subsequent expenditure is capitalised only when it increases the future economic benefits embodied in the specific asset to which it relates. All other expenditure, including expenditure on internally generated goodwill and brands, is recognised in profit or loss as incurred.

Amortisation

Amortisation is calculated over the cost of the asset, or other amount substituted for cost, less its residual value.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Amortisation is recognised in profit or loss on a straight-line basis over the estimated useful lives of intangible assets, other than goodwill, from the date that they are available for use.

The estimated useful lives are as follows:

License fee	10 - 25	years
Computer software	5 - 10	years
Patent	10	years

Amortisation methods, useful lives and residual values are reviewed at each financial year-end and adjusted if appropriate.

(d) *Impairment*

The carrying amounts of the Group's assets are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, the assets' recoverable amounts are estimated. For goodwill and intangible assets that have indefinite useful lives or are not yet available for use, the recoverable amount is estimated each year at the same time.

An impairment loss is recognised if the carrying amount of an asset or its cash-generating unit exceeds its recoverable amount. The impairment loss is recognised in profit or loss.

When a decline in the fair value of an available-for-sale financial asset has been recognised directly in equity and there is objective evidence that the value of the asset is impaired, the cumulative loss that had been recognised directly in equity is recognised in profit or loss even though the financial asset has not been derecognised. The amount of the cumulative loss that is recognised in profit or loss is the difference between the acquisition cost and current fair value, less any impairment loss on that financial asset previously recognised in profit or loss.

Calculation of recoverable amount

The recoverable amount of the Group's investments in held-to-maturity securities carried at amortised cost is calculated as the present value of estimated future cash flows, discounted at the original effective interest rate.

The recoverable amount of available-for-sale assets is calculated by reference to the fair value.

The recoverable amount of a non-financial asset is the greater of the asset's value in use and fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. For an asset that does not generate cash inflows largely independent of those from other assets, the recoverable amount is determined for the cash-generating unit to which the asset belongs.

Reversals of impairment

An impairment loss in respect of a financial asset is reversed if the subsequent increase in recoverable amount can be related objectively to an event occurring after the impairment loss was recognised in profit or loss. For financial assets carried at amortised cost and available-for-sale financial assets that are

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

debt securities, the reversal is recognised in profit or loss. For available-for-sale financial assets that are equity securities, the reversal is recognised in other comprehensive income.

An impairment loss in respect of goodwill is not reversed. Impairment losses recognised in prior periods in respect of other non-financial assets are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised.

(m) Interest-bearing liabilities

Interest-bearing liabilities are stated at cost.

(n) Trade and other accounts payable

Trade and other accounts payable are stated at cost.

(o) Employee benefits

Defined contribution plans

A defined contribution plan, provident fund, is a post-employment benefit plan under which an entity pays fixed contributions into a separate entity and will have no legal or constructive obligation to pay further amounts. Obligations for contributions to defined contribution pension plans are recognised as an employee benefit expense in profit or loss in the periods during which services are rendered by employees.

Defined benefit plans

A defined benefit plan is a post-employment benefit plan other than a defined contribution plan. The Group's net obligation in respect of defined benefit plans is calculated separately for each plan by estimating the amount of future benefit that employees have earned in the current and prior periods, discounting that amount.

The calculation of defined benefit obligations is performed annually by a qualified actuary using the projected unit credit method. When the calculation results in a potential asset for the Group, the recognised asset is limited to the present value of economic benefits available in the form of any future refunds from the plan or reductions in future contributions to the plan. To calculate the present value of economic benefits, consideration is given to any application minimum funding requirements.

Remeasurements of the net defined benefit liability, actuarial gain or loss are recognized immediately in other comprehensive income. The Group determines the interest expense on the net defined benefit liability for the period by applying the discount rate used to measure the defined benefit obligation at the beginning of the annual period, taking into account any changes in the net defined benefit liability during the period as a result of contributions and benefit payments. Net interest expense and other expenses related to defined benefit plans are recognized in profit or loss.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

When the benefits of a plan are changed or when a plan is curtailed, the resulting change in benefit that relates to past service or the gain or loss on curtailment is recognised immediately in profit or loss. The Group recognises gains and losses on the settlement of a defined benefit plan when the settlement occurs.

Other long-term employee benefits

The Group's net obligation in respect of long-term employee benefits is the amount of future benefit that employees have earned in return for their service in the current and prior periods. That benefit is discounted to determine its present value. Remeasurements are recognized in profit or loss in the period in which they arise.

Termination benefits

Termination benefits are expensed at the earlier of when the Group can no longer withdraw the offer of those benefits and when the Group recognises costs for a restructuring. If benefits are not expected to be settled wholly within 12 months of the end of the reporting period, then they are discounted.

Short-term employee benefits

Short-term employee benefits are expensed as the related service is provided. A liability is recognised for the amount expected to be paid if the Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

(p) Provisions

A provision is recognised if, as a result of a past event, the Group has a present legal or constructive obligation that can be estimated reliably, and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognised as a finance cost.

(q) Revenue

Revenue excludes value added taxes or other sales taxes and is arrived at after deduction of trade discounts.

Sale of goods and services rendered

Revenue is recognised in profit or loss when the significant risks and rewards of ownership have been transferred to the buyer. No revenue is recognised if there is continuing management involvement with the goods or there are significant uncertainties regarding recovery of the consideration due, associated costs or the probable return of goods. Service income is recognised as services are provided.

Rental income

Rental income from investment property is recognised in profit or loss on a straight-line basis over the term of the lease. Lease incentives granted are recognised as an integral part of the total rental income. Contingent rentals are recognised as income in the accounting period in which they are earned.

Interest and dividend income

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Interest income is recognised in the profit or loss as it accrues. Dividend income is recognised in the profit or loss on the date the Group's right to receive payments is established which in the case of quoted securities is usually the ex-dividend date.

(r) **Expenses**

Lease payments

Payments made under operating leases are recognised in profit or loss on a straight line basis over the term of the lease.

Repair and maintenance expenses

Expenditure on repair and maintenance is charged to profit or loss in the period in which the expenditure is incurred. Expenditure of a capital nature is added to the cost of the related plant and equipment.

Finance costs

Interest expenses and similar costs are charged to profit or loss for the period in which they are incurred, except to the extent that they are capitalised as being directly attributable to the acquisition, construction or production of an asset which necessarily takes a substantial year of time to be prepared for its intended use or sale.

(s) **Income tax**

Income tax expense on the profit or loss for the year comprises current and deferred tax.

Current tax is the expected tax payable or receivable on the taxable income or loss for the year, using tax rates enacted or substantively enacted at the reporting date, and any adjustment to tax payable in respect of previous years.

Deferred tax is recognised in respect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. Deferred tax is not recognised for the following temporary differences: the initial recognition of goodwill; the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss; and differences relating to investments in subsidiaries and jointly-controlled entities to the extent that it is probable that they will not reverse in the foreseeable future.

The measurement of deferred tax reflects the tax consequences that would follow the manner in which the Group expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax is measured at the tax rates that are expected to be applied to the temporary differences when they reverse, using tax rates enacted or substantively enacted by the reporting date.

In determining the amount of current and deferred tax, the Group takes into account the impact of uncertain tax positions and whether additional taxes and interest may be due. The Group believes that its accruals for tax liabilities are adequate for all open tax years based on its assessment of many factors, including interpretations of tax law and prior experience. This assessment relies on estimates and assumptions and may involve a series of judgements about future events. New information may become

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

available that causes the Group to change its judgement regarding the adequacy of existing tax liabilities; such changes to tax liabilities will impact tax expense in the period that such a determination is made.

Deferred tax assets and liabilities are offset if there is a legally enforceable right to offset current tax liabilities and assets, and they relate to income taxes levied by the same tax authority on the same taxable entity, or on different tax entities, but they intend to settle current tax liabilities and assets on a net basis or their tax assets and liabilities will be realised simultaneously.

A deferred tax asset is recognised to the extent that it is probable that future taxable profits will be available against which the temporary differences can be utilised. Deferred tax assets are reviewed at each reporting date and reduced to the extent that it is no longer probable that the related tax benefit will be realised.

(t) *Earnings per share*

The Group presents basic earnings per share (EPS) data for its ordinary shares. Basic EPS is calculated by dividing the profit or loss attributable to ordinary shareholders of the Company by the weighted average number of ordinary shares outstanding during the period, adjusted for own shares held.

(u) *Segment Reporting*

Segment results that are reported to the Group's the chief operating decision maker include items directly attributable to a segment as well as those that can be allocated on a reasonable basis.

4 Related parties

For the purposes of these financial statements, parties are considered to be related to the Group if the Group has the ability, directly or indirectly, to control or joint control the party or exercise significant influence over the party in making financial and operating decisions, or vice versa, or where the Group and the party are subject to common control or common significant influence. Related parties may be individuals or other entities.

Relationships with key management and other related parties were as follows:

Name of entities	Country of incorporation	Nature of relationships
PTT Public Company Limited	Thailand	Parent company
Thai Paraxylene Co., Ltd.	Thailand	Subsidiary and/or common directors
Thai Lube Base Public Company Limited	Thailand	Subsidiary and/or common directors
Thaioil Marine Co., Ltd.	Thailand	Subsidiary and/or common directors
Thaioil Energy Services Co., Ltd.	Thailand	Subsidiary and/or the Company's management as a director
Thaioil Solvent Co., Ltd.	Thailand	Subsidiary and/or common directors
Thaioil Ethanol Co., Ltd.	Thailand	Subsidiary and/or the Company's management as a director
Thaioil Power Co., Ltd.	Thailand	Subsidiary and/or common directors
TOP SPP Co., Ltd.	Thailand	Subsidiary and/or common directors
TOP Solvent Co., Ltd.	Thailand	Indirect subsidiary and/or common directors
Sak Chaisidhi Co., Ltd.	Thailand	Indirect subsidiary and/or the Company's management as a director
TOP Solvent (Vietnam) LLC.	Vietnam	Indirect subsidiary and/or the Company's

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Name of entities	Country of incorporation	Nature of relationships
Sapthip Co., Ltd.	Thailand	management as a director Indirect subsidiary and/or the Company's
Thaioil Marine International Pte. Ltd.	Singapore	management as a director Indirect subsidiary and/or the Company's
TOP Maritime Service Co., Ltd.	Thailand	management as a director Indirect subsidiary and/or the Company's
LABIX Co., Ltd.	Thailand	management as a director Indirect subsidiary and/or common directors
TOP-NTL Pte. Ltd.	Singapore	Joint venture of subsidiary
TOP-NTL Shipping Trust	Singapore	Joint venture of subsidiary
TOP Nautical Star Co., Ltd.	Thailand	Joint venture of subsidiary and/or the Company's management as a director
TOP-NYK MarineOne Pte. Ltd.	Singapore	Joint venture of indirect subsidiary and/or the Company's management as a director
PTT Digital Solutions Co., Ltd. ⁽¹⁾	Thailand	Associate and/or the Company's management as a director
PTT Energy Solutions Co., Ltd.	Thailand	Associate and/or the Company's management as a director
Global Power Synergy Public Company Limited	Thailand	Indirect associate and/or common directors
Maesod Clean Energy Co., Ltd. ⁽²⁾	Thailand	Indirect associate
Ubon Bio Ethanol Co., Ltd.	Thailand	Indirect associate and/or the Company's management as a director
T.I.M. Ship Management Co., Ltd.	Thailand	Indirect associate and/or the Company's management as a director
PTT International Trading Pte. Ltd.	Singapore	Subsidiary of the parent company
PTT Exploration and Production Public Company Limited	Thailand	Subsidiary of the parent company
Energy Complex Co., Ltd.	Thailand	Subsidiary of the parent company
IRPC Public Company Limited	Thailand	Subsidiary of the parent company
PTT Tank Terminal Co., Ltd.	Thailand	Subsidiary of the parent company
PTT Global Chemical Public Company Limited	Thailand	Subsidiary of the parent company and/or common directors
Thai ABS Co., Ltd.	Thailand	Indirect subsidiary of the parent company
PTT Maintenance and Engineering Co., Ltd.	Thailand	Indirect subsidiary of the parent company
PTT Phenol Co., Ltd.	Thailand	Indirect subsidiary of the parent company
Thai Styrenics Co., Ltd.	Thailand	Indirect subsidiary of the parent company
Solution Creation Co.,Ltd.	Thailand	Indirect subsidiary of the parent company
Thai Tank Terminal Ltd.	Thailand	Indirect subsidiary of the parent company
Global Green Chemicals Public Company Limited	Thailand	Indirect subsidiary of the parent company
Vencorex (Thailand) Co., Ltd.	Thailand	Indirect subsidiary of the parent company
Thai Petroleum Pipeline Co., Ltd.	Thailand	Related company and/or the Company's

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Name of entities	Country of incorporation	Nature of relationships
Sarn Palung Social Enterprise Co., Ltd. ⁽³⁾	Thailand	management as a director Related company and/or the Company's management as a director

(1) Change its name from "PTT ICT Solutions Co., Ltd.", effective from 22 June 2017 onwards.

(2) On 16 February 2017, Thailoil Ethanol Co., Ltd., which is a subsidiary of the Company, has divested all its shareholding in Maesod Clean Energy Co., Ltd. as disclosed in note 12 Investments in joint ventures and associates.

(3) On 7 September 2017, the Company invested in Sarn Palung Social Enterprise Co., Ltd. together with company in PTT Group, in which the Company owned 15%, has a share capital of 1 million ordinary shares with a par value of Baht 10 each, totalling Baht 10 million. The first call was 25% of par value, amounted to Baht 0.38 million.

The pricing policies for particular types of transactions are explained further below:

Transactions	Pricing policies
Revenue from sale and rendering of services, lease income, purchase of goods and assets	Market prices or, where no market price exists, at contractually agreed prices
Interest income and expense	Agreed rates stipulated in the agreements
Dividend income	Right to receive dividends
Other income and expenses	Contractually agreed prices
Directors' remuneration	Amounts approved by the Group's shareholders

Significant transactions for the years ended 31 December 2017 and 2016 with related parties were as follows:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Parent Company				
Revenue from sale and rendering of services	151,356	131,473	147,470	127,877
Purchase of crude oil and feedstock	108,358	106,713	100,709	100,076
Other income	13	25	13	24
Other expenses	130	45	129	42
Purchase of assets	-	207	-	-
Subsidiaries				
Revenue from sale and rendering of services			64,717	51,496
Purchase of crude oil and feedstock			44,165	36,570
Interest income			492	430
Dividend income			10,798	14,075

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Land lease income			68	65
Other income			1,614	1,385
Interest expense			17	37
Other expenses			1,105	1,083
Purchase of assets			8	33
Joint ventures				
Revenue from sale and rendering of services	91		91	
Other income	-	1	-	-
Other expenses	1,101	1,563	1,101	1,563
Associates				
Revenue from sale and rendering of services	5	3	2	2
Purchase of crude oil and feedstock	619	383	619	382
Interest income	-	4	-	-
Dividend income	-	-	169	153
Land lease income	8	8	8	8
Other income	32	23	30	21
Other expenses	287	271	259	239
Purchase of assets	89	105	89	105
Other related parties				
Revenue from sale and rendering of services	4,677	3,570	285	93
Purchase of crude oil and feedstock	5,690	5,786	1,098	1,471
Dividend income	158	247	158	247
Other income	2	7	2	7
Other expenses	257	328	202	262
Directors' remuneration	77	62	69	54

Balances as at 31 December 2017 and 2016 with related parties were as follows:

Trade accounts receivable - related parties

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Parent Company				
PTT Public Company Limited	10,416	8,095	10,188	7,884
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	3,552	3,456
Thai Lube Base Public Company Limited	-	-	1,237	1,554
Thaioil Power Co., Ltd.	-	-	37	48

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

TOP SPP Co., Ltd.	-	-	45	35
Sak Chaisidhi Co., Ltd.	-	-	37	17
LABIX Co., Ltd.	-	-	1,841	1,025

Associates

Global Power Synergy Public Company Limited	5	-	2	-

Other related parties

PTT International Trading Pte. Ltd.	36	-	36	-
IRPC Public Company Limited	142	33	-	2
PTT Exploration and Production Public Company Limited	16	14	-	-
PTT Global Chemical Public Company Limited	11	13	-	-
Vencorex (Thailand) Co., Ltd.	2	-	-	-

	10,628	8,155	16,975	14,021
Less allowance for doubtful accounts	-	-	-	-
Net	10,628	8,155	16,975	14,021

Bad and doubtful debts expense for the year

	-	-	-	-

Other accounts receivable - related parties

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Parent Company				
PTT Public Company Limited	4	1	4	1
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	40	43
Thai Lube Base Public Company Limited	-	-	6	53
Thaioil Marine Co., Ltd.	-	-	78	10
Thaioil Energy Services Co., Ltd.	-	-	14	8
Thaioil Solvent Co., Ltd.	-	-	6	1
Thaioil Ethanol Co., Ltd.	-	-	6	3
Thaioil Power Co., Ltd.	-	-	30	27
TOP SPP Co., Ltd.	-	-	76	85
TOP Solvent Co., Ltd.	-	-	13	4
Sak Chaisidhi Co., Ltd.	-	-	6	3
LABIX Co., Ltd.	-	-	40	33
Associates				
PTT Energy Solutions Co., Ltd.	-	1	-	1
Maesod Clean Energy Co., Ltd.	-	1	-	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Global Power Synergy Public Company Limited	5	7	5	7
Ubon Bio Ethanol Co., Ltd.	43	-	-	-
T.I.M. Ship Management Co., Ltd.	5	4	-	-
Other related party				
PTT Maintenance and Engineering Co., Ltd.	-	1	-	1
Total	57	15	324	280

Short-term loans to related parties

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	5,500	2,300
Thaioil Marine Co., Ltd.*	-	-	210	100
Thaioil Solvent Co., Ltd.	-	-	1,008	1,129
Thaioil Ethanol Co., Ltd.	-	-	433	492
TOP SPP Co., Ltd.	-	-	8,500	8,563
Associate				
Maesod Clean Energy Co., Ltd.	-	90	-	-
Total	-	90	15,651	12,584

*Please see Note 10 Impairment assessment for loan to and investment in a subsidiary

Interest rates during the years of 2017 and 2016 were charged at money market rate (MMR) but not exceeding the average minimum loan rates (MLR) of 5 financial institutions less margin.

Movements of short-term loans to related parties during the years ended 31 December 2017 and 2016 were as follows:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
At 1 January	90	90	12,584	9,409
Increases	-	-	7,221	5,724
Decreases	(90)	-	(4,154)	(2,549)
At 31 December	-	90	15,651	12,584

In February 2017, a subsidiary has disposed shares in Maesod Clean Energy Company Limited, which is an indirect associate company to existing shareholders. Hence, in the consolidated financial statements for the year ended 2017, the Group has reclassified of Baht 90 million "Short-term loan to related company" to "Short-term loan to other company", by other terms and conditions has remained with original loan agreement.

Trade accounts payable - related parties

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	(in million Baht)			
Parent Company				
PTT Public Company Limited	10,928	11,730	9,773	11,119
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	2,270	2,290
Thai Lube Base Public Company Limited	-	-	252	245
Thaioil Marine Co., Ltd.	-	-	12	6
Thaioil Power Co., Ltd.	-	-	129	135
TOP SPP Co., Ltd.	-	-	228	392
Sak Chaisidhi Co., Ltd.	-	-	10	8
Sapthip Co., Ltd.	-	-	14	28
LABIX Co., Ltd.	-	-	1,099	891
Joint venture				
TOP-NTL Pte. Ltd.	-	21	-	21
Associates				
Maesod Clean Energy Co., Ltd.	-	3	-	3
Ubon Bio Ethanol Co., Ltd.	32	28	32	28
T.I.M. Ship Management Co., Ltd.	4	12	-	-
Other related parties				
IRPC Public Company Limited	148	189	-	-
PTT Global Chemical Public Company Limited	178	151	-	-
PTT Phenol Co., Ltd.	31	21	-	-
Global Green Chemicals Public Company Limited	68	50	68	50
Total	11,389	12,205	13,887	15,216

Other accounts payable - related parties

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	(in million Baht)			
Parent Company				
PTT Public Company Limited	5	4	4	1
Subsidiaries				
Thaioil Marine Co., Ltd.	-	-	6	26
Thaioil Energy Services Co., Ltd.	-	-	60	66
Thaioil Solvent Co., Ltd.	-	-	-	1
TOP Solvent Co., Ltd.	-	-	2	-
LABIX Co., Ltd.	-	-	2	-
Associates				

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
PTT Digital Solutions Co., Ltd.	62	20	61	20
PTT Energy Solutions Co., Ltd.	26	-	26	-
Global Power Synergy Public Company Limited	-	3	-	-
T.I.M. Ship Management Co., Ltd.	5	4	-	-
Other related parties				
PTT International Trading Pte. Ltd.	1	37	-	37
Energy Complex Co., Ltd.	1	1	1	1
IRPC Public Company Limited	8	8	8	8
Thai Tank Terminal Ltd.	2	1	-	-
Thai Petroleum Pipeline Co., Ltd.	2	8	2	8
Total	112	86	172	168

Short-term borrowings from related parties

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Subsidiaries				
Thai Paraxylene Co., Ltd.	-	-	226	68
Thai Lube Base Public Company Limited	-	-	261	443
Thaioil Marine Co., Ltd.	-	-	16	20
Total	-	-	503	531

Interest rates during the years of 2017 and 2016 were charged at money market rate (MMR) but not exceeding the average minimum loan rate (MLR) of 5 financial institutions less margin.

Movements of short-term borrowings from related parties during the years ended 31 December 2017 and 2016 were as follows:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			

Parent Company

At 1 January	-	-	-	-
	37			

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Increase	-	800	-	800
Decrease	-	(800)	-	(800)
At 31 December	-	-	-	-
Subsidiaries				
At 1 January	-	-	531	5,840
Decrease	-	-	(28)	(5,309)
At 31 December	-	-	503	531

Significant agreements with related parties

As at 31 December 2017 the Group had the following significant agreements with related parties.

Raw Materials and Oil-Products Purchases and Sales Agreements

The Company has raw materials and oil products purchase and sale agreements with a subsidiary, whereby the purchase and sale volumes and prices of raw materials and oil products are specified in the agreements. These agreements are effective on the agreement date and shall be terminated by either party giving at least 6 months notice in writing to the other party.

Oil-Products Sale and Purchase Agreements

The Company has oil products purchase and sale agreements with a subsidiary, whereby the purchase and sale volumes and prices are specified in the agreements. These agreements are effective on the agreement date and shall be terminated if either party does not comply with the terms stipulated in the agreements.

By-Product Sale and Purchase Agreement

The Company has a by-product purchase and sale agreement with a subsidiary, whereby the purchase and sale volumes and prices of the by-product are specified in the agreement. The agreement is for a period of 16 years expiring in September 2020, or until the termination by mutual consent.

Technology and Communication Service Agreement

The Company has a technology and communication service agreement with an associate, whereby the service fees are specified in the agreement. The agreement is for a period of 3 years expiring in December 2018 and is renewable for additional periods as mutual agreement until either party giving at least 180 days before contract end date notice in writing to other party.

Crack Spread Swap Agreements

The Company has crack spread swap agreements with a related company ("counterparty"). The Company or the counterparty has commitments to make payments for the differences between the fixed price and floating price for each period.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

As at 31 December 2017, the Company had no oil volume under the agreements with the related company (31 December 2016: nil).

Product Offtake and Crude Oil Supply Agreement

The Company has a product off take and crude oil supply agreement with a related company, whereby (a) the Company will sell and the related company will purchase refined petroleum products produced by the refinery for 49.99% of 270,000 barrels per day; and (b) the related party will supply and the Company will purchase crude oil and/or feedstock for the refinery required to produce 49.99% of 270,000 barrels per day. The credit term for crude oil shall be mutually agreed.

Throughput Agreement

The Company has a throughput agreement with a related company, whereby the tariff fee is specified in the agreement. The agreement is for a period of 20 years expiring in 2014 or when a target is achieved and is renewable.

The Company has a throughput agreement with a related company, whereby the tariff fee is specified in the agreement. The agreement is for a period of 20 years from the service date and shall be renewed for periods of 5 years.

Natural Gas Supply Agreements

The Company and certain subsidiaries have natural gas supply agreements with a related company, whereby the related company agrees to supply the natural gas to the Company and the subsidiaries at quantities and prices as stipulated in the agreements. These agreements are effective for periods of 5 to 25 years expiring during 2018 and 2041.

Cost Reimbursement Agreements

A subsidiary and an associate have cost reimbursement agreements with the Company covering the reimbursement of construction costs of natural gas pipeline facilities and the use of the pipeline facilities, raw water pipeline and the use of land for the construction of a transmission line connecting the subsidiary and the associate to the Electricity Generating Authority of Thailand (EGAT). Under the terms of the agreements, the subsidiary and the associate agree to share the cost of investments with the Company on the basis and conditions stipulated in the agreements. These agreements are effective for a period of 25 years, or until the termination of the power purchase agreements entered into by the subsidiary and the associate with EGAT, whichever is sooner.

Power Purchase Agreements

Certain subsidiaries ("sellers") have power purchase agreements with the Company and certain subsidiaries for periods of 24 and 25 years expiring in 2023, 2027 and 2040, whereby the sellers will sell power energy to the Company and the subsidiaries at the agreed quantities and prices as stipulated in the agreements.

Steam Purchase Agreements

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

The Company and certain subsidiaries have entered into steam purchase agreements for periods of 20 and 25 years expiring in 2023, 2027 and 2040, whereby the agreed quantities and prices are specified in the agreements.

Services and Supplies Agreements

Certain subsidiaries and an associate have services and supplies agreements with the Company and a subsidiary, whereby the Company and a subsidiary provide the subsidiaries and the associate for the operating, repair and maintenance, management, controlling and administration, procurement, fuel transmission, waste water treatment and utilities, information technology, financial, accounting and human resource services. The subsidiaries and the associate agree to pay certain fees as stipulated in the agreements. These agreements are for periods of 5 years or 28 years or until the termination of the land lease agreement entered into by a subsidiary with the Company, whichever is sooner or until the termination of the power purchase agreement entered into by the associate with EGAT.

Land Lease Agreements

Certain subsidiaries and an associate have land lease agreements with the Company to lease/sublease certain parcels of land ending in September 2022, May 2041, and August 2043 with the rate as stipulated in the agreements, and the rate will be adjusted every 5 years.

The Company have land lease agreements with certain subsidiaries to lease certain parcels of land ending in September 2046 with the rate as stipulated in the agreements, and the rate will be adjusted every 5 years.

The Company has a land lease agreement with a related company to lease certain parcels of land ending in August 2026 with the rate as stipulated in the agreements. If the Company does not giving a cancelable notice within a month before contract end date, the contract shall be renewed for additional 15 years.

Raw Materials and Petrochemical Products Purchase and Sale Agreements

An indirect subsidiary has raw materials and petrochemical products purchase and sale agreements with related companies, whereby the purchase and sale volumes and prices of raw materials and petrochemical products are specified in the agreements. These agreements are for periods of 1 year to 15 years expiring during 2018.

Technical Service Agreements

An associate has a technical service agreement with the Company to provide a consultancy technical solutions service for energy-related and petrochemical businesses, whereby the service fees are specified in the agreements. This agreement expires in December 2019.

Time Charter and Affreightment Agreements

A subsidiary has time charter and affreightment agreements with the Company, subsidiary and another indirect subsidiary, whereby the freight rate is specified in the agreements. These agreements are for periods of 1 year and 5 years and 8 years expiring during 2017, 2020, and 2024.

Certain joint ventures have time charter agreements with the Company, whereby the freight rate is specified in the agreements. These agreements are for periods of 10 years expiring in 2021, 2022 and 2024.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Charter of Crew Boat Agreements

An indirect subsidiary has charter of crew boat agreement with a related company, whereby the service fees are specified in the agreements. These agreements are for period of 3 years expiring in 2018, 2019 and 2020.

Office Rental Agreements

The Company has office rental and service agreements with a related party, whereby the rental and service fees are specified in the agreements. These agreements are for the periods of 3 years expiring in November 2018 and are renewable for additional periods of 3 years.

Ethanol Products Purchase and Sale Agreements

An associate has ethanol products purchase and sale agreements with the Company, whereby the purchase and sale volumes and prices of the ethanol products are specified in the agreements. This agreement expired in December 2017. This agreement shall be automatically renewed for additional period of 1 year until either party giving notice in writing to the other party.

An indirect subsidiary has an ethanol products purchase and sale agreement with a related company, whereby the purchase and sale volumes and prices of the ethanol products are specified in the agreement. The agreement is for a period of 10 years expiring in June 2021 and shall be renewed by either party giving at least 6 months before contract end date notice in writing to the other party.

Service Agreements

A subsidiary has human resource service agreements with the Company, whereby the service fees are specified in the agreements. This agreement expires in December 2018.

The Company has a human resource service agreements with certain subsidiaries, whereby the service fees are specified in the agreement. These agreements expire in December 2018 and December 2019.

Crude Oil Storage Tank Service Agreement

A related company has a crude oil storage tank service agreement with the Company, whereby the service fees are specified in the agreement. These agreements are for a period of 2 years expiring in September 2018 and December 2019.

Sea berth and throughput Agreement

A related company has a sea berth and throughput agreement with the Company, whereby the tariff fee is specified in the agreement. The agreement is for a period of 20 years and is renewable for additional periods of 5 years.

Loan Agreement

The Company has uncommitted unsecured short term inter-company borrowing and lending agreements with a related company to manage liquidity. Each of the borrowing credit line and lending credit line is not exceeding Baht 2,000 million, bearing the interest rate reference by BIBOR or LIBOR, plus interest rate margin by taking into account on the short term borrowing interest rate, the return on short term

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

investment and credit rating of the Company and the counterparty. These agreements are for a period of 1 year expiring in December 2018.

5 Cash and cash equivalents

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Cash on hand	37	55	2	2
Cash at banks - savings and current accounts	10,592	24,270	6,919	21,723
Cash at banks - savings account (Private Funds)	84	1,004	84	1,004
Cash at banks - fixed deposits (maturity period less than 3 months from the investment date)	2,294	5,791	2,294	5,511
Certificate of deposits (maturity period less than 3 months from the investment date)	2,616	-	2,616	-
Total	15,623	31,120	11,915	28,240

As at 31 December 2017, the Group's savings, current and fixed deposits (maturity period less than 3 months from the investment date) totalling Baht 54 million have been pledged as collateral for credit facilities as described in note 18 to the financial statements (2016: Baht 316 million).

6 Other investments

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Current investments				
Cash at bank - fixed deposits	43,140	28,953	42,719	28,497
Debt securities - available-for-sale securities (Private funds)	9,178	701	9,178	701
	52,318	29,654	51,897	29,198
Investments held as available-for-sale				
Equity securities - available-for-sale securities	363	147	363	147
Debt securities - available-for-sale securities (Private funds)	2,740	98	2,740	98
	3,103	245	3,103	245

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Other long-term investments

Other non-marketable securities	780	779	780	779
	<u>780</u>	<u>779</u>	<u>780</u>	<u>779</u>
Total	<u>56,201</u>	<u>30,678</u>	<u>55,780</u>	<u>30,222</u>

Cash at bank - fixed deposits

As at 31 December 2017, the Group's fixed deposits totalling Baht 421 million have been pledged as collateral for credit facilities as described in note 18 to the financial statements (2016: Baht 456 million).

Equity securities - available-for-sale securities

In 2007 the Company entered into MFC Energy Open End Fund with certain companies so as to raise funds from financial institution investors who are interested in investing in energy or relating energy business. Later, in May 2014 the Fund was renamed to Core Flexible Fund and changed to its investment policy, which the Fund can invest in assets of other industry groups at register in the Stock Exchange. In consideration thereof, the Company has a commitment to purchase a holding in this Fund, comprising 40 million units at par value of Baht 10, amounting to Baht 400 million. During 2017, the Fund redeemed automatically from the Company for 16.50 million units or amounting to Baht 110.4 million. On 28 August 2017, the Fund matured and redeemed all remaining 5.99 million units, amounting to Baht 40.2 million. Hence, as at 31 December 2017 the Company had no investment unit left in this Fund (2016: 22.5 million units).

In 2017 the Company entered into CIMB-Principal Energy and Petrochemical Index Fund (CIMB - PRINCIPAL EPIF), to invest in equities issued by the energy and petrochemical companies listed in The Stock Exchange of Thailand. The Company purchased 28.85 million units or amounting to Baht 300 million which its fair value as at 31 December 2017 is Baht 364 million.

Debt securities - available-for-sale securities

During the year 2016 and 2017, the Company established private funds and engaged independent assets management companies. As at 31 December 2017, the value of private funds outstanding totalling Baht 12,002 million (including cash at banks - savings account as disclosed in note 5 to financial statements). Those private funds have invested in debt securities which are considered investment grade.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Other non-marketable securities

		Consolidated/Separate financial statements							
	Type of Business	Ownership interest		Paid-up capital		Cost method		Dividend income	
		2017	2016	2017	2016	2017	2016	2017	2016
		(%)		(in million Baht)					
Related party									
Thai Petroleum Pipeline Co., Ltd.	Oil transportation by pipeline	9.19	9.19	8,479	8,479	779	779	158	247
Sarn Palung Social Enterprise Co., Ltd. (Note 4)	Social enterprise	15.00	-	3	-	1	-	-	-
						780	779	158	247

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

7 Trade accounts receivable

		Consolidated financial statements		Separate financial statements	
	Note	2017	2016	2017	2016
		<i>(in million Baht)</i>			
Related parties	4	10,628	8,155	16,975	14,021
Other parties		11,700	11,381	7,267	6,822
Total		22,328	19,536	24,242	20,843
Less allowance for doubtful accounts		-	-	-	-
Net		22,328	19,536	24,242	20,843
Bad and doubtful debts expenses for the year		-	-	-	-

Aging analyses for trade accounts receivable are as follows:

		Consolidated financial statements		Separate financial statements	
	Note	2017	2016	2017	2016
		<i>(in million Baht)</i>			
Related parties					
Within credit terms		10,628	8,154	16,975	14,021
Overdue:					
Less than 3 months		-	1	-	-
		10,628	8,155	16,975	14,021
Less allowance for doubtful accounts		-	-	-	-
Net	4	10,628	8,155	16,975	14,021
Other parties					
Within credit terms		11,699	11,373	7,267	6,822
Overdue:					
Less than 3 months		1	8	-	-
		11,700	11,381	7,267	6,822
Less allowance for doubtful accounts		-	-	-	-
Net		11,700	11,381	7,267	6,822
Total		22,328	19,536	24,242	20,843

The normal credit term granted by the Group ranges from 15 days to 90 days.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

8 Other receivables

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Prepaid expenses	571	523	452	405
Other accounts receivable	362	151	469	395
Current portion of long-term loans to savings co-operative of employees	37	40	37	40
Other	201	220	169	174
Total	1,171	934	1,127	1,014

9 Inventories

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Crude oil and feedstock	12,016	11,595	10,796	10,379
Materials, spare parts and supplies	1,479	1,426	1,027	1,005
Finished and semi-finished oil products	8,820	8,832	5,812	6,281
Goods in transit				
Crude oil	10,533	11,428	10,458	11,404
Materials, spare parts and supplies	1	9	1	-
	32,849	33,290	28,094	29,069
Less allowance for decline in value of inventories adjusted to net realisable value	8	101	-	73
Net	32,841	33,189	28,094	28,996

As at 31 December 2017 the Company's inventories as stated above included a legal reserve amounting to Baht 10,829 million. (2016: 9,562 million).

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Inventories recognised as an expense in cost of sale of goods:				
- Cost	303,821	246,805	328,515	266,559
- Reversal of write-down to net realisable value	(93)	(1,053)	(73)	(1,041)
Net	303,728	245,752	328,442	265,518

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

10 Investments in subsidiaries

	Separate financial statements	
	2017	2016
	<i>(in million Baht)</i>	
At 1 January	14,545	14,545
Acquisition	10	-
At 31 December	14,555	14,545

At the meeting of the Board of the Director of the Company held on 29 September 2017, the Company's Board of Directors has resolved to establish Thailoil Treasury Center Co., Ltd. to conduct as treasury center for the Group's business. Thailoil Treasury Center Co., Ltd. is 99.99% owned by the Company. On 3 October 2017, Thailoil Treasury Center Co., Ltd. has been incorporated with the registered share capital of 1 million ordinary shares at par value of Baht 10 each, totalling Baht 10 million. All shares have been fully paid-up in December 2017.

Under the Sponsors Support Agreement with financial institutions, a subsidiary, as a shareholder in an indirect subsidiary, has some commitments as specified in the agreement such as maintain its shareholding, provide financial support in proportion of its shareholding in order to enter into a Credit Facilities Agreement.

Impairment assessment for loan to and investment in a subsidiary

The Company has assessed the recoverable amount of loan to and investment in Thailoil Marine Co., Ltd. by determine discounting future cash flows. The key assumptions used to determine recoverable amount included utilization and freight rate, operating cost, long-term growth rate derived from expectations of future outcomes taking into account past experience, adjusted for anticipated revenue growth and discount rate referred to weighted average cost of capital (WACC) at 7.9%. The recoverable amount was estimated to be higher than its carrying amount and no impairment was required to these financial statements. Increasing in discount rate higher than 4.7% could cause the carrying amount to exceed the recoverable amount.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Investments in subsidiaries as at 31 December 2017 and 2016, and dividend income from those investments for the years then ended were as follows:

	Separate financial statements							
	Ownership interest		Paid-up capital		Cost method		Dividend income	
	2017	2016	2017	2016	2017	2016	2017	2016
	(%)				<i>(in million Baht)</i>			
Subsidiaries								
Thai Paraxylene Co., Ltd.	99.99	99.99	2,572	2,572	2,161	2,161	6,688	7,974
Thai Lube Base Public Company Limited	99.99	99.99	1,758	1,758	1,979	1,979	1,846	5,274
Thaioil Marine Co., Ltd.	99.99	99.99	970	970	970	970	-	39
Thaioil Energy Services Co., Ltd.	99.99	99.99	40	40	40	40	60	60
Thaioil Solvent Co., Ltd.	99.99	99.99	1,250	1,250	1,250	1,250	-	-
Thaioil Ethanol Co., Ltd.	99.99	99.99	1,450	1,450	1,450	1,450	-	-
Thaioil Power Co., Ltd.	73.99	73.99	2,810	2,810	3,195	3,195	769	728
TOP SPP Co., Ltd.	99.99	99.99	3,500	3,500	3,500	3,500	1,435	-
Thaioil Treasury Center Co., Ltd.	99.99	-	10	-	10	-	-	-
Total			14,360	14,350	14,555	14,545	10,798	14,075

None of the Company's investment in subsidiaries are publicly listed and consequently do not have published price quotations.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

11 Non-controlling interests

The following table summarises the information relating to each of the Group's subsidiaries that has a material non-controlling interest, before any intra-group eliminations:

	Thaioil Power Co., Ltd.		LABIX Co., Ltd.		Other individually immaterial subsidiaries		Total	
	31 December 2017	31 December 2016	31 December 2017	31 December 2016	31 December 2017	31 December 2016	31 December 2017	31 December 2016
	<i>(in million Baht)</i>							
Non-controlling interest percentage	26.01	26.01	25	25				
Current assets	927	910	2,628	2,767				
Non-current assets	10,304	10,221	12,008	12,391				
Current liabilities	(675)	(521)	(3,986)	(3,267)				
Non-current liabilities	-	(164)	(6,053)	(7,455)				
Net assets	10,556	10,446	4,597	4,436				
Carrying amount of non-controlling interest	2,746	2,717	1,149	1,109	1,030	914	4,925	4,740
Revenue from sale and rendering of services	4,150	4,264	15,409	11,276				
Profit (loss)	1,160	1,116	161	(5)				
Other comprehensive income (loss)	(11)	4	-	-				
Total comprehensive income (loss)	1,149	1,120	161	(5)				
Profit (loss) allocated to non-controlling interest	302	290	40	(1)	121	76	463	365
Total comprehensive income (loss) allocated to non-controlling interest	299	291	40	(1)	121	76	460	366
Cash flows from operating activities	890	843	1,516	180				
Cash flows from investing activities	339	314	(840)	(2,165)				
Cash flows from financing activities	(1,222)	(1,172)	(938)	2,218				

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

	Thaioil Power Co., Ltd.		LABIX Co., Ltd.		Other individually immaterial subsidiaries		Total	
	31 December		31 December		31 December		31 December	
	2017	2016	2017	2016	2017	2016	2017	2016
	<i>(in million Baht)</i>							
Net increase (decrease) in cash and cash equivalents	<u>7</u>	<u>(15)</u>	<u>(262)</u>	<u>233</u>				
Dividends paid to non-controlling interest	270	256	-	-				

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

12 Investments in joint ventures and associates

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
At 1 January	13,866	13,441	1,261	1,261
Share of net gain of investments - equity method	1,197	930	-	-
Disposal	(12)	-	-	-
Dividend income	(625)	(507)	-	-
Currency translation differences	(42)	(3)	-	-
Share of other comprehensive income (loss) of associate	(16)	5	-	-
At 31 December	<u>14,368</u>	<u>13,866</u>	<u>1,261</u>	<u>1,261</u>

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Investments in joint ventures and associates as at 31 December 2017 and 2016, and dividend income for the years then ended were as follows:

	Consolidated financial statements								Market price of listed securities		Dividend income	
	Ownership interest		Paid-up capital		Cost method		Equity method		2017	2016	2017	2016
	2017	2016	2017	2016	2017	2016	2017	2016				
	(%)						(in million Baht)					
Joint ventures												
TOP-NTL Pte. Ltd.	50.00	50.00	1	1	-	-	11	10	-	-	-	-
TOP-NTL Shipping Trust	50.00	50.00	48	48	24	24	43	28	-	-	-	-
TOP Nautical Star Co., Ltd.	35.00	35.00	150	150	53	53	66	22	-	-	-	-
TOP-NYK MarineOne Pte. Ltd.	50.00	50.00	548	548	274	274	422	445	-	-	34	27
			<u>747</u>	<u>747</u>	<u>351</u>	<u>351</u>	<u>542</u>	<u>505</u>			<u>34</u>	<u>27</u>
Associates												
PTT Digital Solutions Co., Ltd.	20.00	20.00	150	150	30	30	319	272	-	-	16	13
PTT Energy Solutions Co., Ltd.	20.00	20.00	150	150	30	30	51	48	-	-	-	-
Global Power Synergy Public Company Limited	29.70	29.70	14,983	14,983	3,855	3,855	12,652	12,236	32,032	16,572	511	467
Maesod Clean Energy Co., Ltd.*	-	30.00	-	675	-	203	-	3	-	-	-	-
Ubon Bio Ethanol Co., Ltd.	21.28	21.28	2,740	2,740	769	769	804	802	-	-	64	-
T. I. M. Ship Management Co., Ltd.	33.33	33.33	3	3	1	1	-	-	-	-	-	-
			<u>18,026</u>	<u>18,701</u>	<u>4,685</u>	<u>4,888</u>	<u>13,826</u>	<u>13,361</u>			<u>591</u>	<u>480</u>
			<u>18,773</u>	<u>19,448</u>	<u>5,036</u>	<u>5,239</u>	<u>14,368</u>	<u>13,866</u>			<u>625</u>	<u>507</u>

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

	Separate financial statements									
	Ownership interest		Paid-up capital		Cost method		Market price of listed securities		Dividend income	
	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016
	(%)		(in million Baht)							
PTT Digital Solutions Co., Ltd.	20.00	20.00	150	150	30	30	-	-	16	13
PTT Energy Solutions Co., Ltd.	20.00	20.00	150	150	30	30	-	-	-	-
Global Power Synergy Public Company Limited	8.91	8.91	14,983	14,983	1,201	1,201	9,610	4,972	153	140
Total			15,283	15,283	1,261	1,261			169	153

* On 16 February 2017, Thailoil Ethanol Co., Ltd. which is a subsidiary of the Company has diverted all its shareholding, in total of 20.25 million shares or equivalents to 30%, in Maesod Clean Energy Co., Ltd. at Baht 2.50 per share, totalling Baht 50.63 million.

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Joint ventures and Associates

The following table summarises the financial information of the joint ventures and associates as included in their own financial statements, adjusted for fair value adjustments at acquisition and differences in accounting policies. The table also reconciles the summarized financial information to the carrying amount of the Group's interest in these companies.

	Global Power Synergy Public Company Limited	
	2017	2016
	<i>(in million Baht)</i>	
Revenue	19,325	20,037
Net profit	3,340	2,872
Other comprehensive income (loss)	(55)	17
Total comprehensive income (loss)	3,285	2,889
Attributable to NCI	165	172
Attributable to investee's shareholders	3,120	2,717
Current assets	9,918	11,665
Non-current assets	50,050	46,363
Current liabilities	(4,087)	(4,195)
Non-current liabilities	(15,507)	(15,079)
Net assets	40,374	38,754
Attributable to NCI	1,827	1,604
Attributable to investee's shareholders	38,547	37,150
Group's interest in net assets of investee at 1 January	12,236	11,896
Total comprehensive income (loss) attributable to the Group	927	807
Dividends received during the year	(511)	(467)
Group's interest in net assets of investee at end of year	12,652	12,236
Carrying amount of interest in investee at 31 December	12,652	12,236

Immaterial joint ventures and associates

The following is summarized financial information for the Group's interest in immaterial joint ventures and associates based on the amounts reported in the Group's consolidated financial statements:

	Immaterial Joint ventures		Immaterial Associates	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Carrying amount of interests in immaterial joint ventures and associates	542	505	1,174	1,125
Group's share of:				
- Profit from continuing operations	113	80	141	48
- Other comprehensive income (loss)	(42)	(2)	-	-
- Total comprehensive income (loss)	71	78	141	48

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

13 Investment properties

		Consolidated financial statements		Separate financial statements	
	Note	2017	2016	2017	2016
		<i>(in million Baht)</i>			
Cost					
At 1 January		94	88	1,097	1,096
Reclassification from property, plant and equipment, net	14	9	6	14	1
At 31 December		103	94	1,111	1,097
Impairment losses					
At 1 January		-	-	(11)	(11)
At 31 December		-	-	(11)	(11)
Net book value					
At 1 January		94	88	1,086	1,085
At 31 December		103	94	1,100	1,086

Investment properties as at 31 December 2017 and 2016 were valued by a firm of independent professional valuers, at open market values on an existing use basis and income approach. The appraised value of the Group and the Company was Baht 273 million and Baht 1,764 million respectively (2016: Baht 247 million and Baht 1,730 million respectively).

Measurement of fair value

Fair value hierarchy

The fair value of investment property was determined by external, independent property valuers, having appropriate recognised professional qualifications and recent experience in the category of the property being valued. The independent valuers provide the fair value of the Group's investment property portfolio on a regular basis.

The fair value measurement for all investment property has been categorised as a Level 3 fair value based on the inputs to the valuation technique used.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Valuation technique and significant unobservable inputs

The following table shows the valuation technique used in measuring the fair value of investment property, as well as the significant unobservable inputs used.

Valuation technique	Significant Unobservable inputs	Inter-relationship between key unobservable inputs and fair value measurement
<i>Discounted cash flows</i> ; The valuation model considers the present value of net cash flows to be generated from the property, taking into account expected rental growth rate. The expected net cash flows are discounted using risk-adjusted discount rates. Among other factors, the discount rate estimation considers the quality of its location (prime vs secondary), tenant credit quality and lease terms.	- Contractually agreed lease income over the remaining period. - Risk-adjusted discount rates (9%)	The estimated fair value increase (decrease) if: - Expected market rental growth were higher (lower); - The risk-adjusted discount rate were lower (higher).
<i>Market approach</i>	The adjusted quoted price and the actual selling price of comparable investment properties	The estimated fair value increase (decrease) if land price were higher (lower).

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

14 Property, plant and equipment

	Consolidated financial statements												
	Land	Buildings	Leasehold improve- ments	Refinery plant and equipment	Petro- chemical plants	Power plants	Trans- mission facilities <i>(in million Baht)</i>	Machinery, equipment and plant equipment	Oil and liquid chemical tankers and crew boats	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress	Total
Cost													
At 1 January 2016	6,027	1,927	211	99,850	23,466	6,419	193	5,671	4,154	636	23	23,953	172,530
Additions	173	1	-	72	45	-	-	20	231	23	-	5,476	6,041
Transfers, net	-	46	-	2,864	11,172	10,941	-	472	158	169	-	(25,822)	-
Reclassification to investment properties, net <i>(Note 13)</i>	(6)	-	-	-	-	-	-	-	-	-	-	-	(6)
Disposals	-	(39)	-	(5)	-	-	-	(2)	-	(7)	-	(18)	(71)
Translation differences on consolidation	-	-	-	-	-	-	-	(3)	-	-	-	-	(3)
At 31 December 2016 and 1 January 2017	6,194	1,935	211	102,781	34,683	17,360	193	6,158	4,543	821	23	3,589	178,491
Additions	52	-	-	136	25	-	-	15	23	24	4	3,567	3,846
Transfers, net	-	78	-	1,754	175	28	-	68	-	68	-	(2,171)	-
Reclassification to investment properties, net <i>(Note 13)</i>	(9)	-	-	-	-	-	-	-	-	-	-	-	(9)
Disposals	-	-	-	-	(21)	-	-	(5)	-	(2)	(9)	-	(37)
Translation differences on consolidation	-	(2)	-	-	-	-	-	(14)	-	-	-	-	(16)
At 31 December 2017	6,237	2,011	211	104,671	34,862	17,388	193	6,222	4,566	911	18	4,985	182,275

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Consolidated financial statements													
	Land	Buildings	Leasehold improve- ments	Refinery plant and equipment	Petro- chemical plants	Power plants	Trans- mission facilities	Machinery, equipment and plant equipment	Oil and liquid chemical tankers and crew boats	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress	Total
	(in million Baht)												
Depreciation													
At 1 January 2016	-	1,186	-	68,720	11,343	3,798	144	2,701	823	524	20	-	89,259
Depreciation charge for the year	-	84	8	3,922	1,708	575	6	346	201	77	1	-	6,928
Disposals	-	(4)	-	(5)	-	-	-	(2)	-	(6)	-	-	(17)
Translation differences on consolidation	-	-	-	-	-	-	-	(2)	-	-	-	-	(2)
At 31 December 2016 and 1 January 2017	-	1,266	8	72,637	13,051	4,373	150	3,043	1,024	595	21	-	96,168
Depreciation charge for the year	-	73	8	3,699	1,822	729	6	341	209	71	-	-	6,958
Disposals	-	-	-	-	-	-	-	(5)	-	(2)	(7)	-	(14)
Translation differences on consolidation	-	-	-	-	-	-	-	(7)	-	-	-	-	(7)
At 31 December 2017	-	1,339	16	76,336	14,873	5,102	156	3,372	1,233	664	14	-	103,105
Impairment losses													
At 31 December 2016 and 1 January 2017	11	-	-	-	-	-	-	-	-	-	-	-	11
At 31 December 2017	11	-	-	-	-	-	-	-	547	-	-	-	558
Net book value													
At 1 January 2016	6,016	741	211	31,130	12,123	2,621	49	2,968	3,331	112	3	23,953	83,258
At 31 December 2016 and 1 January 2017	6,183	669	203	30,144	21,632	12,987	43	3,115	3,519	226	2	3,589	82,312
At 31 December 2017	6,226	672	195	28,335	19,989	12,286	37	2,850	2,786	247	4	4,985	78,612

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

	Separate financial statements						
	Land	Buildings	Refinery plant and equipment	Machinery, equipment and plant equipment	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress
	<i>(in million Baht)</i>						
Cost							
At 1 January 2016	3,831	828	91,764	1,110	340	4	4,304
Additions	-	-	72	13	19	-	1,966
Transfers, net	-	16	2,747	112	140	-	(3,015)
Reclassification to investment properties, net <i>(Note 13)</i>	(1)	-	-	-	-	-	-
Disposals	-	-	(5)	-	(7)	-	-
At 31 December 2016 and 1 January 2017	3,830	844	94,578	1,235	492	4	3,255
Additions	40	-	136	4	9	-	3,250
Transfers, net	-	-	1,739	19	56	-	(1,814)
Reclassification to investment properties, net <i>(Note 13)</i>	(14)	-	-	-	-	-	-
Disposals	-	-	-	(1)	-	-	-
At 31 December 2017	3,856	844	96,453	1,257	557	4	4,691
Depreciation							
At 1 January 2016	-	683	62,635	901	295	4	-
Depreciation charge for the year	-	23	3,514	73	49	-	-
Disposals	-	-	(5)	-	(6)	-	-
At 31 December 2016 and 1 January 2017	-	706	66,144	974	338	4	-
Depreciation charge for the year	-	20	3,290	61	44	-	-
Disposals	-	-	-	(1)	-	-	-
At 31 December 2017	-	726	69,434	1,034	382	4	-

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

				Separate financial statements				
	Land	Buildings	Refinery plant and equipment	Machinery, equipment and plant equipment <i>(in million Baht)</i>	Furniture, fixtures, office equipment and others	Vehicles	Construction in progress	Total
<i>Net book value</i>								
At 1 January 2016	<u>3,831</u>	<u>145</u>	<u>29,129</u>	<u>209</u>	<u>45</u>	<u>-</u>	<u>4,304</u>	<u>37,663</u>
At 31 December 2016 and 1 January 2017	<u>3,830</u>	<u>138</u>	<u>28,434</u>	<u>261</u>	<u>154</u>	<u>-</u>	<u>3,255</u>	<u>36,072</u>
At 31 December 2017	<u>3,856</u>	<u>118</u>	<u>27,019</u>	<u>223</u>	<u>175</u>	<u>-</u>	<u>4,691</u>	<u>36,082</u>

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

The gross amounts of the Group's fully depreciated property, plant and equipment that were still in use as at 31 December 2017, amounted to Baht 49,402 million in the consolidated financial statements (2016: Baht 34,435 million) and amounted to Baht 41,010 million in the separate financial statements (2016: Baht 32,508 million).

Certain subsidiaries mortgaged their land, building, petrochemical plant, machines and crew boats as collateral for long-term borrowings as described in note 18 to the financial statements. The net book value of land, building, petrochemical plant, machines and crew boats as at 31 December 2017 amounted to Baht 11,672 million (2016: Baht 12,224 million).

Impairment assessment for vessels and crew boats

During 2017, certain subsidiaries have vessels and crew boats which are not fully used in operation due to the fact that the exploration business is in the downturn from prolonged falls in prevailing oil and gas price which resulted in low freight charge and demand in marine transportation business. This situation indicated that vessels and crew boats may be impaired. Management of subsidiaries and independent appraiser determined fair value of underlying assets using market approach. Fair value less costs of disposal was less than its carrying amount therefore subsidiaries recognised impairment loss amounting to Baht 547 million in 2017. Impairment loss recognised as an expenses in consolidated statement of income.

Measurement of fair value

Fair value hierarchy

The fair value of assets of subsidiaries which are not fully used in operation was determined by management of subsidiaries and external independent appraiser, having appropriate recognised professional qualifications and recent experience in the category of the asset being valued. The fair value measurement for assets which are not fully used in operation has been categorised as a Level 3 fair value based on the input to the valuation technique used by using market approach.

15 Intangible assets

	Consolidated financial statements					
	License fee	Computer software	Customer database	Goodwill	Patent	Total
	<i>(in million Baht)</i>					
Cost						
At 1 January 2016	1,792	575	205	667	-	3,239
Additions	1,221	184	-	-	-	1,405
Translation differences on consolidation	-	-	-	(12)	-	(12)
At 31 December 2016 and 1 January 2017	3,013	759	205	655	-	4,632
Additions	261	96	-	-	1	358
Translation differences on consolidation	-	-	-	(54)	-	(54)
At 31 December 2017	3,274	855	205	601	1	4,936

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements					
	License fee	Computer software	Customer database	Goodwill	Patent	Total
	(in million Baht)					
Accumulated amortisation						
At 1 January 2016	1,077	256	-	-	-	1,333
Amortisation charge for the year	133	60	-	-	-	193
At 31 December 2016 and 1 January 2017	1,210	316	-	-	-	1,526
Amortisation charge for the year	154	65	-	-	-	219
At 31 December 2017	1,364	381	-	-	-	1,745
Net book value						
At 1 January 2016	715	319	205	667	-	1,906
At 31 December 2016 and 1 January 2017	1,803	443	205	655	-	3,106
At 31 December 2017	1,910	474	205	601	1	3,191

Impairment testing for carrying amount of goodwill and other intangible assets within indefinite useful life

The recoverable amount was based on its value in use, determined by discounting future cash flows to be generated from the continuing use of assets.

Five years of cash flows were included in the discounted cash flow model. A long-term growth rate into perpetuity has been determined as the lower of the nominal gross domestic product (GDP) rates for the countries in which the asset operates and the long-term compound annual Earnings Before Interest, Taxes, Depreciation, and Amortisation (EBITDA) growth rate estimated by management.

Budgeted EBITDA was based on expectations of future outcomes taking into account past experience, adjusted for anticipated revenue growth. Revenue growth was projected taking into account the average growth levels experienced over the past five years and the estimated sales volume and price growth for the next five years. It was assumed that sales prices would grow at a constant margin above forecast inflation over the next five years, in line with information obtained from external brokers who publish a statistical analysis of long-term market trends.

Based on the impairment testing by the discounted cash flow method using the estimated post-tax rates referred to weighted average cost of capital (WACC) at the rates between 8.7% - 11.7%, the recoverable amount was estimated to be higher than its carrying amount and no impairment was required to these financial statements. Management has identified that a reasonably possible change in a key assumption could cause the carrying amount to exceed the recoverable amount. The following table shows the amount by which this assumption would need to change individually for the estimated recoverable amount to be equal the carrying amount.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Goodwill	Customer database (%)
Change required for carrying amount to be equal the recoverable amount		
Discount rate increase	1.4	9.1
EBITDA growth rate decrease	4.7	17.2

	Separate financial statements			
	License fee	Computer software (in million Baht)	Patent	Total
Cost				
At 1 January 2016	827	430	-	1,257
Additions	11	183	-	194
At 31 December 2016 and 1 January 2017	838	613	-	1,451
Additions	-	95	1	96
At 31 December 2017	838	708	1	1,547
Accumulated amortisation				
At 1 January 2016	725	131	-	856
Amortisation charge for the year	25	53	-	78
At 31 December 2016 and 1 January 2017	750	184	-	934
Amortisation charge for the year	25	58	-	83
At 31 December 2017	775	242	-	1,017
Net book value				
At 1 January 2016	102	299	-	401
At 31 December 2016 and 1 January 2017	88	429	-	517
At 31 December 2017	63	466	1	530

16 Deferred tax

Deferred tax assets and liabilities as at 31 December 2017 and 2016 were as follows:

	Consolidated financial statements			
	Assets		Liabilities	
	2017	2016	2017	2016
	(in million Baht)			
Total	725	665	(227)	(234)
Set off of tax	(218)	(224)	218	224
Net deferred tax assets (liabilities)	507	441	(9)	(10)

	Separate financial statements			
	Assets		Liabilities	
	2017	2016	2017	2016
	(in million Baht)			
Total	695	653	(214)	(220)
Set off of tax	(214)	(220)	214	220
Net deferred tax assets (liabilities)	481	433	-	-

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Movements in total deferred tax assets and liabilities during the years 2017 and 2016 were as follows:

	Consolidated financial statements (Charged)/credited to:			
	At 1 January 2017	Statement of income (Note 30)	Equity	At 31 December 2017
		(in million Baht)		
Deferred tax assets				
Employee benefits	658	(36)	81	703
Impairment losses on assets	2	-	-	2
Other	5	15	-	20
Total	665	(21)	81	725
Deferred tax liabilities				
Depreciation	(211)	7	-	(204)
Other	(23)	-	-	(23)
Total	(234)	7	-	(227)
Net	431	(14)	81	498

	Consolidated financial statements (Charged)/credited to:			
	At 1 January 2016	Statement of income (Note 30)	Equity	At 31 December 2016
		(in million Baht)		
Deferred tax assets				
Employee benefits	634	24	-	658
Impairment losses on assets	2	-	-	2
Loss carry forward	179	(179)	-	-
Other	5	-	-	5
Total	820	(155)	-	665
Deferred tax liabilities				
Depreciation	(232)	21	-	(211)
Other	(9)	(14)	-	(23)
Total	(241)	7	-	(234)

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Net	<u>579</u>	<u>(148)</u>	<u>-</u>	<u>431</u>

	At 1 January 2017	Separate financial statements (Charged) / credited to:		At 31 December 2017
		Statement of income (Note 30)	Equity	
		(in million Baht)		
Deferred tax assets				
Employee benefit	651	(31)	73	693
Impairment losses on assets	2	-	-	2
Total	653	(31)	73	695
Deferred tax liabilities				
Depreciation	(211)	7	-	(204)
Other	(9)	(1)	-	(10)
Total	(220)	6	-	(214)
Net	433	(25)	73	481

	At 1 January 2016	Separate financial statements (Charged) / credited to:		At 31 December 2016
		Statement of income (Note 30)	Equity	
		(in million Baht)		
Deferred tax assets				
Employee benefit	628	23	-	651
Impairment losses on assets	2	-	-	2
Loss carry forward	179	(179)	-	-
Total	809	(156)	-	653
Deferred tax liabilities				
Depreciation	(233)	22	-	(211)
Other	(6)	(3)	-	(9)
Total	(239)	19	-	(220)

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Net	<u>570</u>	<u>(137)</u>	<u>-</u>	<u>433</u>

Certain subsidiaries have not recognised deferred tax asset arising from loss carry forward in the financial statements as at 31 December 2017 amounted to Baht 224 million, which expire during 2018 - 2023 (2016: Baht 149 million), because it is not probable that future taxable profit will be available against which the subsidiaries can utilise the benefits.

17 Other non-current assets

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Long-term loans to savings co-operative of employees	583	605	583	605
Deferred natural gas pipeline facilities, raw material pipeline and the use of land, net	77	73	50	59
Deferred land lease arrangement and registration fees, net	221	236	242	254
Other deferred charges, net	310	161	22	104
Refundable deposits and other	41	82	62	52
Total	<u>1,232</u>	<u>1,157</u>	<u>959</u>	<u>1,074</u>

18 Interest-bearing liabilities

		Consolidated financial statements		Separate financial statements	
	Note	2017	2016	2017	2016
		<i>(in million Baht)</i>			
Current					
Short-term borrowings					
- Secured		595	630	-	-
- Unsecured		374	237	-	-
Short-term borrowings from related companies	4	-	-	503	531
Current portion of long-term borrowings					
- Secured		1,112	1,400	-	-
- Unsecured		480	806	-	-
Unsecured debentures		-	4,932	-	4,932
		<u>2,561</u>	<u>8,005</u>	<u>503</u>	<u>5,463</u>
Non-current					
Long-term borrowings					
- Secured		6,235	7,396	-	-
- Unsecured		1,833	1,979	-	-
Unsecured debentures		55,839	58,921	55,839	58,921
		<u>63,907</u>	<u>68,296</u>	<u>55,839</u>	<u>58,921</u>
Total		<u>66,468</u>	<u>76,301</u>	<u>56,342</u>	<u>64,384</u>

The periods to maturity of interest-bearing liabilities as at 31 December 2017 and 2016 were as follows:

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Within one year	2,561	8,005	503	5,463
After one year but within five years	15,460	12,768	9,000	6,000
After five years	48,447	55,528	46,839	52,921
Total	66,468	76,301	56,342	64,384

Secured interest-bearing liabilities as at 31 December 2017 and 2016 were secured on the following assets:

		Consolidated financial statements		Separate financial statements	
	<i>Note</i>	2017	2016	2017	2016
		<i>(in million Baht)</i>			
Cash at banks - current, savings and fixed deposits	5	54	316	-	-
Current investments in fixed deposits	6	421	456	-	-
Land, building, petrochemical plant, machines and crew boat - carrying value	14	11,672	12,224	-	-
Total		12,147	12,996	-	-

As at 31 December 2017 the Group and the Company had unutilised long-term credit facilities totalling Baht 5,069 million and Baht 5,000 million respectively (2016: Baht 5,383 million and Baht 5,000 million respectively).

Interest-bearing liabilities as at 31 December 2017 and 2016 were as follows:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Short-term borrowings	969	867	-	-
Short-term borrowings from related companies	-	-	503	531
Long-term borrowings	9,660	11,581	-	-
Debentures	55,839	63,853	55,839	63,853
Total	66,468	76,301	56,342	64,384

Long term borrowings

Details of principal features of the Group's long term borrowings as at 31 December 2017 and 2016 were as follows:

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	(in million Baht)			
Subsidiaries :				
1) Baht 600 million Loan Facility Agreement at interest MLR less a margin, payable in three-month installments commencing in November 2010	-	95	-	-
2) Baht 1,500 million Loan Facility Agreement at interest MLR less a margin, payable in semi-annual installments commencing in September 2012	737	787	-	-
3) Baht 324 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in April 2012	117	129	-	-
4) Baht 228 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in January 2013	95	102	-	-
5) Baht 365 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in June 2014	280	295	-	-
6) Baht 365 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in October 2014	292	307	-	-
7) Baht 300 million Loan Facility Agreement at interest MLR less a margin, payable in semi-annual installments commencing in September 2015	175	225	-	-
	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	(in million Baht)			
8) Baht 1,200 million Loan Facility Agreement at interest 6-month FDR plus a margin, payable in semi-annual installment June 2014	164	336	-	-
9) Baht 1,800 million Loan Facility Agreement at interest 6-month FDR plus a margin, payable in semi-annual installments commencing in June 2015	1,020	1,260	-	-
10) Baht 3,875 million Loan Facility Agreement at interest THBFIX plus a margin, payable in three-months installments commencing in June 2016	3,065	3,733	-	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

11) Baht 3,875 million Loan Facility Agreement at interest THBFIX plus a margin, payable in three-months installments commencing in June 2016	3,027	3,696	-	-
12) Baht 420 million Loan Facility Agreement at interest MLR less a margin, payable in monthly installments commencing in October 2016	400	416	-	-
13) Baht 141 million Loan Facility Agreement at interest 6-month FDR plus a margin, payable in semi-annual installment June 2017	72	23	-	-
14) Baht 217 million Loan Agreement at interest THBFIX plus a margin, payable in conditions as stipulated in the agreement.	216	177	-	-
Total	9,660	11,581	-	-

Debentures

Details of the Company's debentures as at 31 December 2017 and 2016 were as follows:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Debentures	56,347	64,434	56,347	64,434
Less discount on debentures	(508)	(581)	(508)	(581)
Total	55,839	63,853	55,839	63,853

As at 31 December 2017 the Group had cross currency swap contracts with the local financial institutions for hedging foreign exchange and interest rate exposure of long-term debts for Baht currency totalling Baht 3,767 million (2016: Baht 6,848 million for the Group and Baht 2,500 million for the Company). All counterparties agree to pay the interest and the notional amount according to terms and conditions of the contracts.

19 Trade accounts payable

		Consolidated financial statements		Separate financial statements	
	Note	2017	2016	2017	2016
		<i>(in million Baht)</i>			
Related parties	4	11,389	12,205	13,887	15,216
Other parties		7,574	7,682	7,174	7,334
Total		18,963	19,887	21,061	22,550

20 Other payables

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Payable for purchase of securities (Private funds)	50	304	50	304
Accrued operating expenses	327	592	67	75
Oil Fuel Fund payable	104	47	104	47
Other payables	1,491	1,189	1,289	1,049
Other	1,504	1,433	1,400	1,375
Total	3,476	3,565	2,910	2,850

21 Provisions for employee benefits

Movement in the present value of the defined benefit obligations:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Provisions for employee benefits at 1 January	3,297	3,176	3,003	2,922
Recognised in profit or loss:				
Current service costs and interest	286	293	238	245
Actuarial gain recognised in the year	(66)	-	(40)	-
	220	293	198	245
Recognised in other comprehensive income:				
Actuarial loss recognised in the year	404	-	365	-
	404	-	365	-
Benefit paid	(410)	(172)	(405)	(164)
	(410)	(172)	(405)	(164)
Provisions for employee benefits at 31 December	3,511	3,297	3,161	3,003

Actuarial (gains) losses recognised in other comprehensive income arising from:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Demographic assumptions	13	-	(3)	-
Financial assumptions	(34)	-	(19)	-
Experience adjustment	425	-	387	-
Total	404	-	365	-

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Principal actuarial assumptions as at 31 December 2017 and 2016:

	Consolidated financial statements and Separate financial statements	
	2017	2016
	<i>% per annum</i>	
Discount rate	Interest rate of long-term Thai Government Bond	Interest rate of long-term Thai Government Bond
Salary increases rate	5.0-10.0	4.0-10.0
Employee turnover	0.0-2.1	0.0-1.5

Assumptions regarding future mortality have been based on published statistics and mortality tables.

At 31 December 2017, the weighted-average duration of the defined benefit obligation was 19 years (2016: 19 years).

Sensitivity analysis

Reasonably possible changes at the reporting date to one of the relevant actuarial assumptions, holding other assumptions constant, would have affected the defined benefit obligation by the amounts shown below.

	Consolidated financial statements		Separate financial statements	
	<i>(in million Baht)</i>			
31 December 2017	Increase	Decrease	Increase	Decrease
Discount rate (1% movement)	(299)	348	(253)	292
Salary growth (1% movement)	411	(361)	374	(330)

Although the analysis does not take account of the full distribution of cash flows expected under the plan, it does provide an approximation of the sensitivity of the assumptions shown.

22 Share capital

	<i>Par value per share (in Baht)</i>	2017		2016	
		Number of shares	Amount <i>(million shares / million Baht)</i>	Number of shares	Amount
Authorised					
At 1 January					
- Ordinary shares	10	2,040	20,400	2,040	20,400
At 31 December					
- Ordinary shares	10	<u>2,040</u>	<u>20,400</u>	<u>2,040</u>	<u>20,400</u>
Issued and paid-up					
At 1 January					
- Ordinary shares	10	2,040	20,400	2,040	20,400
At 31 December					
- Ordinary shares	10	<u>2,040</u>	<u>20,400</u>	<u>2,040</u>	<u>20,400</u>

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

23 Additional paid-in capital and reserves

Share premium

Section 51 of the Public Companies Act B.E. 2535 requires companies to set aside share subscription monies received in excess of the par value of the shares issued to a reserve account ("share premium"). Share premium is not available for dividend distribution.

Legal reserve

Section 116 of the Public Companies Act B.E. 2535 requires that a company shall allocate not less than 5% of its annual net profit, less any accumulated losses brought forward (if any), to a reserve account ("legal reserve"), until this account reaches an amount not less than 10% of the registered authorised capital. The legal reserve is not available for dividend distribution.

Fair value changes

The fair value changes account within equity comprises the cumulative net change in the fair value of available-for-sale financial assets until the investments are derecognised or impaired.

Exchange differences on translating foreign operations

The exchange differences on translating foreign operations account within equity comprises all foreign currency differences arising from the translation of the financial statements of foreign operations.

24 Segment information

Segment information is presented in respect of the Group's business segments. The primary format, business segments, is based on the Group's management and the internal reporting structure provided to the chief operating decision maker.

Segment results, assets and liabilities include items directly attributable to a segment as well as those that can be allocated on a reasonable basis.

Reportable segments

The Group comprises the following main business segments:

Segment 1:	Oil refinery
Segment 2:	Lube base oil refinery
Segment 3:	Petrochemical
Segment 4:	Power generation
Segment 5:	Marine transportation services
Segment 6:	Solvent
Segment 7:	Ethanol
Segment 8:	Other

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

Information about reportable segments

For the year ended 31 December 2017

	Oil refinery	Lube base oil refinery	Petro- chemical	Power generation	Marine transportation services (in million Baht)	Solvent	Ethanol	Other	Eliminations	Total
Revenue from sale and rendering of services										
- External	285,137	15,044	22,082	4,561	473	9,046	1,045	-	-	337,388
- Inter-segment	64,692	3,618	35,799	6,368	328	136	575	985	(112,501)	-
Cost of sale and rendering of services	(328,442)	(16,310)	(54,238)	(8,772)	(776)	(8,184)	(1,212)	(898)	113,446	(305,386)
Gross profit	21,387	2,352	3,643	2,157	25	998	408	87	945	32,002
Dividend income	11,125	-	-	-	-	-	-	-	(10,967)	158
Net derivative loss on hedging	(128)	-	(5)	-	-	-	-	-	-	(133)
Net foreign exchange gain (loss)	2,882	-	333	1	(7)	(29)	1	-	-	3,181
Other income	3,272	93	235	21	32	14	6	1	(2,484)	1,190
Selling expenses	(189)	(95)	(217)	-	-	(257)	(19)	-	285	(492)
Administrative expenses	(2,493)	(84)	(148)	(70)	(664)	(254)	(18)	(23)	785	(2,969)
Share of gain of joint ventures and associates	-	-	-	943	113	-	75	-	66	1,197
Profit (loss) before finance costs and income tax expense	35,856	2,266	3,841	3,052	(501)	472	453	65	(11,370)	34,134
Finance costs	(2,863)	(1)	(418)	(302)	(103)	(77)	(29)	-	508	(3,285)
Profit (loss) before income tax expense	32,993	2,265	3,423	2,750	(604)	395	424	65	(10,862)	30,849
Income tax expense	(4,253)	(453)	(653)	(107)	3	(57)	2	(12)	-	(5,530)
Profit (loss) for the year	28,740	1,812	2,770	2,643	(601)	338	426	53	(10,862)	25,319
Profit (loss) attributable to :										
Owners of the Company	28,740	1,812	2,730	2,643	(530)	309	263	53	(11,164)	24,856
Non-controlling interests	-	-	40	-	(71)	29	163	-	302	463
Profit (loss) for the year	28,740	1,812	2,770	2,643	(601)	338	426	53	(10,862)	25,319

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

For the year ended 31 December 2016

	Oil refinery	Lube base oil refinery	Petro- chemical	Power generation	Marine transportation services (in million Baht)	Solvent	Ethanol	Other	Eliminations	Total
Revenue from sale and rendering of services										
- External	231,814	11,123	19,414	3,327	505	7,540	1,016	-	-	274,739
- Inter-segment	51,479	2,413	28,970	5,804	373	90	523	900	(90,552)	-
Cost of sale and rendering of services	(265,518)	(11,870)	(44,416)	(7,308)	(745)	(6,573)	(1,298)	(793)	91,260	(247,261)
Gross profit	17,775	1,666	3,968	1,823	133	1,057	241	107	708	27,478
Dividend income	14,475	-	-	-	-	-	-	-	(14,228)	247
Net derivative gain (loss) on hedging	(244)	-	1	-	-	-	-	-	-	(243)
Net foreign exchange gain (loss)	372	10	58	5	(3)	6	(2)	-	-	446
Other income	2,926	82	196	10	28	54	8	1	(2,186)	1,119
Selling expenses	(270)	(81)	(170)	-	-	(236)	(21)	-	327	(451)
Administrative expenses	(2,176)	(99)	(102)	(25)	(102)	(291)	(57)	(21)	691	(2,182)
Share of gain (loss) of joint venture and associates	-	-	-	802	75	-	(18)	-	70	929
Profit before finance costs and income tax expense	32,858	1,578	3,951	2,615	131	590	151	87	(14,618)	27,343
Finance costs	(3,134)	(1)	(330)	(229)	(101)	(110)	(43)	-	487	(3,461)
Profit before income tax expense	29,724	1,577	3,621	2,386	30	480	108	87	(14,131)	23,882
Income tax expense	(1,221)	(316)	(535)	(135)	(6)	(66)	-	(16)	-	(2,295)
Profit for the year	28,503	1,261	3,086	2,251	24	414	108	71	(14,131)	21,587
Profit (loss) attributable to :										
Owners of the Company	28,503	1,261	3,087	2,251	57	376	37	71	(14,421)	21,222
Non-controlling interests	-	-	(1)	-	(33)	38	71	-	290	365
Profit for the year	28,503	1,261	3,086	2,251	24	414	108	71	(14,131)	21,587

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

	<i>As at 31 December 2017</i>									
	Oil	Lube base	Petro-	Power	Marine					
	refinery	oil refinery	chemical	generation	transportation	Solvent	Ethanol	Other	Eliminations	Total
					services					
					(in million Baht)					
Trade accounts receivable	24,242	1,272	4,848	1,268	84	1,479	113	60	(11,038)	22,328
Inventories	28,094	2,083	1,631	102	40	703	214	-	(26)	32,841
Other current assets	81,618	618	1,580	2,072	367	852	392	120	(16,577)	71,042
Investments in subsidiaries	14,555	-	-	-	-	-	-	-	(14,555)	-
Investments in joint ventures	-	-	-	-	542	-	-	-	-	542
Investments in associates	1,261	-	-	8,814	-	-	804	-	2,947	13,826
Property, plant and equipment	36,082	1,582	20,523	12,394	2,799	2,152	1,423	-	1,657	78,612
Other non-current assets	6,954	463	1,906	159	6	1,415	3	372	(2,361)	8,917
Total assets	192,806	6,018	30,488	24,809	3,838	6,601	2,949	552	(39,953)	228,108
Trade accounts payable	21,061	1,331	5,558	1,200	131	795	19	-	(11,132)	18,963
Current portion of long-term borrowings	-	-	1,030	164	142	216	40	-	-	1,592
Other current liabilities	11,085	369	6,806	8,671	460	1,167	650	83	(16,498)	12,793
Long-term borrowings	-	-	5,278	-	1,954	804	32	-	-	8,068
Debentures	55,839	-	-	-	-	-	-	-	-	55,839
Other non-current liabilities	3,656	41	108	15	21	59	9	357	(561)	3,705
Total liabilities	91,641	1,741	18,780	10,050	2,708	3,041	750	440	(28,191)	100,960

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

	As at 31 December 2016									
	Oil refinery	Lube base oil refinery	Petro-chemical	Power generation	Marine transportation services (in million Baht)	Solvent	Ethanol	Other	Eliminations	Total
Trade accounts receivable	20,843	970	4,986	1,425	103	1,484	130	66	(10,471)	19,536
Inventories	28,996	1,956	1,474	63	51	504	172	-	(27)	33,189
Other current assets	71,295	865	1,406	1,485	194	983	132	125	(13,479)	63,006
Investments in subsidiaries	14,545	-	-	-	-	-	-	-	(14,545)	-
Investments in joint ventures	-	-	-	-	505	-	-	-	-	505
Investments in associates	1,260	-	-	8,524	-	-	805	-	2,772	13,361
Property, plant and equipment	36,073	2,417	22,319	13,053	3,535	2,281	1,448	-	1,186	82,312
Other non-current assets	4,133	51	1,768	80	5	1,322	1	305	(1,843)	5,822
Total assets	177,145	6,259	31,953	24,630	4,393	6,574	2,688	496	(36,407)	217,731
Trade accounts payable	22,550	1,688	4,644	661	70	734	16	-	(10,476)	19,887
Current portion of long-term borrowings	-	-	993	172	565	360	116	-	-	2,206
Current portion of debentures	4,932	-	-	-	-	-	-	-	-	4,932
Other current liabilities	5,530	260	3,767	8,736	260	1,226	772	63	(13,493)	7,121
Long-term borrowings	-	-	6,613	164	1,696	900	2	-	-	9,375
Debentures	58,921	-	-	-	-	-	-	-	-	58,921
Other non-current liabilities	3,462	-	311	12	17	56	8	296	(470)	3,692
Total liabilities	95,395	1,948	16,328	9,745	2,608	3,276	914	359	(24,439)	106,134

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Major customer

Revenue from one customer represents approximately Baht 151,356 million (2016: Baht 131,473 million) of the Group's revenue from sale of goods and rendering of service.

Geographical segments

In presenting information on the basis of geographical segments, segment revenue is based on the geographical location of customers. Segment assets are based on the geographical location of the assets.

Geographical information

	Revenues		Non-current assets	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Thailand	296,837	242,953	101,145	101,261
Other countries	40,551	31,786	752	740
Total	337,388	274,739	101,897	102,001

25 Other income

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Interest income	915	853	1,369	1,244
Land lease income	18	19	87	83
Service income and other	257	247	1,816	1,599
Total	1,190	1,119	3,272	2,926

26 Administrative expenses

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Advisory and legal fees	99	187	91	182
Personnel expenses	1,007	946	836	806
Depreciation	65	75	37	36
Impairment losses on assets	547	-	-	-
Other	1,251	974	1,529	1,152
Total	2,969	2,182	2,493	2,176

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

27 Employee benefit expenses

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Management				
Salaries and wages	210	223	159	177
Contributions to provident fund	19	20	14	17
Retirement gratuity fund	10	13	10	13
Other	124	104	111	91
	<u>363</u>	<u>360</u>	<u>294</u>	<u>298</u>
Other employees				
Salaries and wages	2,462	2,223	1,454	1,343
Contributions to provident fund	137	132	101	98
Retirement gratuity fund	146	151	146	151
Other	360	433	290	348
	<u>3,105</u>	<u>2,939</u>	<u>1,991</u>	<u>1,940</u>
Total	<u><u>3,468</u></u>	<u><u>3,299</u></u>	<u><u>2,285</u></u>	<u><u>2,238</u></u>

The Group established a contributory registered provident fund to which the employees contribute monthly at rates ranging from 3% to 15% of their basic salaries and by the Group at rates ranging from 3% to 15% of the employees' basic salaries. Membership to the funds is on a voluntary basis. The provident funds are registered with the Ministry of Finance as juristic entities and are managed by licensed Fund Managers.

28 Expenses by nature

The statements of income include an analysis of expenses by function. Significant expenses by nature are detailed as follows:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Changes in finished goods and work in progress	(55)	(3,838)	469	(3,073)
Purchase and raw materials used	222,268	176,919	257,399	205,901
Natural gas used	8,946	7,636	1,322	1,306
Employee benefits expense	3,468	3,299	2,285	2,238
Depreciation and amortisation	7,642	7,762	3,956	4,374
Excise tax	56,924	48,800	56,665	48,800

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

29 Finance costs

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Interest expense:				
financial institutions and other	3,265	3,529	2,846	3,086
Financial expenses	23	58	18	48
	<u>3,288</u>	<u>3,587</u>	<u>2,864</u>	<u>3,134</u>
Capitalised as cost of property plant and equipment under construction	(3)	(126)	-	-
Net	<u>3,285</u>	<u>3,461</u>	<u>2,864</u>	<u>3,134</u>

30 Income tax expense

		Consolidated financial statements		Separate financial statements	
	Note	2017	2016	2017	2016
		<i>(in million Baht)</i>			
Current tax expense					
Current year		5,518	2,141	4,228	1,084
Adjustment for prior years		(2)	6	-	-
Deferred tax expense	16				
Movements in temporary differences		14	148	25	137
Total		<u>5,530</u>	<u>2,295</u>	<u>4,253</u>	<u>1,221</u>

Reconciliation of effective tax rate

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Profit before income tax expense	<u>30,849</u>	<u>23,882</u>	<u>32,993</u>	<u>29,724</u>
Income tax using the Thai corporation tax rate	6,170	4,776	6,599	5,945
Income not subject to tax	(729)	(2,313)	(2,363)	(4,736)
Expenses not deductible for tax purposes	137	26	17	12
Utilisation of previously unrecognised tax losses	(46)	(200)	-	-
Under (over) provided in prior years	(2)	6	-	-
Total	<u>5,530</u>	<u>2,295</u>	<u>4,253</u>	<u>1,221</u>

Thai Oil Public Company Limited and its Subsidiaries
Notes to the financial statements
For the year ended 31 December 2017

The Group's consolidated effective tax rate in respect of continuing operations for the year ended 31 December 2017 and 2016 were 17.92% and 9.61% respectively. The effective tax rate is less than Thai corporation tax rate principally because:

- (a) a significant portion of the Company's profit was derived from promoted activities for which concessionary tax rates apply, and
- (b) unutilised tax losses brought forward from the previous year have been utilised during the year to set-off against the current year's tax charge.

Revenues, profit before finance costs and income tax expense, and income tax expense from operation in foreign countries of the Group for the year ended 31 December 2017 are as follow:

Country	Revenues⁽¹⁾	Profit before finance costs and income tax expense (million Baht)	Income tax expense
Thailand	339,682	34,053	5,530
Vietnam	2,235	12	— ⁽²⁾
Singapore	—	69	— ⁽³⁾
Total	341,917	34,134	5,530

Notes:

- (1) Revenues subject to tax consist of revenue from sale of goods and rendering of services, dividend income, net derivative gain on hedging, net foreign exchange gain, and other income from interest received, land lease agreement, other services rendered, etc.
- (2) No income tax expense due to unutilised tax losses brought forward from the previous year.
- (3) No income tax expense due to tax exemption for specific business by the government of Singapore.

Income tax reduction

Revenue Code Amendment Act No. 42 B.E. 2559 dated 3 March 2016 grants a reduction of the corporate income tax rate to 20% of net taxable profit for accounting periods which begin on or after 1 January 2016.

31 Promotional privileges

By virtue of the provisions of the Industrial Investment Promotion Act of B.E. 2520, the Company and certain local subsidiaries have been granted privileges by the Board of Investment relating to oil refinery, power and steam generation, petroleum product production, chemical product production, ethanol product production, marine transportation, offshore crude oil unloading facilities and industrial zone. The privileges granted include:

- a) an exemption from payment of import duty and tax on machinery and equipment as approved by the Board of Investment,
- b) an exemption from payment of corporate income tax for promoted operations for periods of 7 to 8 years from the dates on which the income is first derived from such operations or 8 years from the date on which the income is received subsequent to when the privileges were granted, and
- c) a 50% reduction in the normal corporate income tax rate on the net profit derived from certain promotional operations for a period of five years, commencing from the expiry date in (b) above.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

As promoted companies, the Company and its subsidiaries must comply with certain conditions and restrictions provided for in the promotional certificates.

Summary of revenue from promoted and non-promoted businesses:

Consolidated financial statements						
	Promoted businesses	2017 Non- promoted businesses	Total (in million Baht)	Promoted businesses	2016 Non- promoted businesses	Total
Export sales	15,830	25,082	40,912	20,026	11,922	31,948
Local sales	274,609	138,446	413,055	249,357	87,250	336,607
Eliminations			(116,579)			(93,816)
Total revenues			337,388			274,739
Separate financial statements						
	Promoted businesses	2017 Non- promoted businesses	Total (in million Baht)	Promoted businesses	2016 Non- promoted businesses	Total
Export sales	13,056	3,916	16,972	8,204	1,953	10,157
Local sales	252,235	80,622	332,857	217,571	55,565	273,136
Total revenues			349,829			283,293

32 Basic earnings per share

The calculations of basic earnings per share for the years ended 31 December 2017 and 2016 were based on the profit for the years attributable to owners of the Company and the weighted average number of ordinary shares outstanding during the years as follows:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(million Baht/million shares)</i>			
Profit for the year attributable to owner of the Company	24,856	21,222	28,740	28,503
Weighted average number of ordinary shares outstanding during the year	2,040	2,040	2,040	2,040
Basic earnings per share (in Baht)	12.18	10.40	14.09	13.97

33 Dividends

At the meeting of the Board of the Director of the Company held on 25 August 2017, the Company's Board of Directors approved the appropriation of 2017 interim dividends at Baht 1.50 per share, totalling Baht 3,060 million. The interim dividends were paid to the Company's shareholders in September 2017.

At the annual general meeting of the shareholders of the Company held on 7 April 2017, the Company's shareholders approved the appropriation of 2016 annual dividends at Baht 4.50 per share, totalling Baht 9,180 million. After a deduction of the interim dividends of Baht 1.50 per share which were already paid

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

to the Company's shareholders in September 2016, the remaining dividends of Baht 3.00 per share, totalling Baht 6,120 million, were already paid to the Company's shareholders in April 2017.

At the meeting of the Board of the Director of the Company held on 26 August 2016, the Company's Board of Directors approved the appropriation of 2016 interim dividends at Baht 1.50 per share, totalling Baht 3,060 million. The interim dividends were paid to the Company's shareholders in September 2016.

At the annual general meeting of the shareholders of the Company held on 7 April 2016, the Company's shareholders approved the appropriation of 2015 annual dividends at Baht 2.70 per share, totalling Baht 5,508 million. After a deduction of the interim dividends of Baht 0.90 per share which were already paid to the Company's shareholders in September 2015, the remaining dividends of Baht 1.80 per share, totalling Baht 3,672 million, were already paid to the Company's shareholders in April 2016.

34 Financial instruments

Financial risk management policies

The Group is exposed to normal business risks from changes in market interest rates and currency exchange rates and from non-performance of contractual obligations by counterparties. The Group does not hold or issue derivative financial instruments for speculative or trading purposes.

Risk management is integral to the whole business of the Group. The Group has a system of controls in place to create an acceptable balance between the cost of risks occurring and the cost of managing the risks. The management continually monitors the Group's risk management process to ensure that an appropriate balance between risk and control is achieved.

Capital management

The objectives of the Group's capital management are to safeguard the Group's ability to continue as a going concern in order to provide returns to the Group's shareholders and benefits to other stakeholders. The management sets strategies to support the Group's operations for more efficiency, and better performances and stronger financial status, including dividend and capital management policies to maintain the optimal capital structure and cost of capital.

Interest rate risk

Interest rate risk is the risk that future movements in market interest rates will affect the results of the Group's operations and its cash flows. Hence, the Group has hedging agreements with various investment-grade financial institutions to protect against the risk of rising interest rates.

The effective interest rates of loans as at 31 December 2017 and 2016 and the periods in which those assets mature were as follows:

Consolidated financial statements				
	Effective interest rate (%per annum)	Within 1 year	After 1 year (in million Baht)	Total
2017				
Non-current				
Long-term loans to savings co-operative of employees	MLR less margin	37	583	620
Loans to employees	MMR less margin	-	6	6

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

		Consolidated financial statements		
Total		<u>37</u>	<u>589</u>	<u>626</u>
2016				
Non-current				
Long-term loans to savings				
co-operative of employees	MLR less margin	40	605	645
Loans to employees	MMR less margin	-	5	5
Total		<u>40</u>	<u>610</u>	<u>650</u>

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Effective interest rate (%per annum)	Separate financial statements		Total
		Within 1 year	After 1 year (in million Baht)	
2017				
Current				
Short-term loans to subsidiaries	MMR rate not exceeding the average MLR of 5 banks less margin	15,651	-	15,651
Non-current				
Long-term loans to savings co-operative of employees	MLR less margin	37	583	620
Total		15,688	583	16,271
2016				
Current				
Short-term loans to subsidiaries	MMR rate not exceeding the average MLR of 5 banks less margin	12,584	-	12,584
Non-current				
Long-term loans to savings co-operative of employees	MLR less margin	40	605	645
Total		12,624	605	13,229

The effective interest rates of borrowings from financial institutions and debentures as at 31 December 2017 and 2016 and the periods in which those liabilities mature were disclosed in note 18 to the financial statements.

Foreign currency risk

The Group is exposed to foreign currency risk relating to purchases of raw materials and long-term borrowings which are denominated in foreign currencies. However, the Group enters into short-term currency hedging contracts for short term foreign currency exposures when appropriate.

As at 31 December 2017 and 2016 the Group was exposed to foreign currency risk in respect of financial assets and liabilities denominated in the following currencies:

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	(in million Baht)			
U.S. Dollars				
Cash and cash equivalents	5,657	16,848	5,243	16,648
Other investments	10,889	-	10,889	-
Trade accounts receivable	2,345	3,517	693	1,832
Other receivables	184	167	177	160
Interest-bearing liabilities	(35,920)	(42,884)	(32,339)	(38,353)
Trade accounts payable	(1,810)	(4,168)	(1,546)	(3,911)
Other payables	(355)	(38)	(95)	(12)
	(19,010)	(26,558)	(16,978)	(23,636)
Other currencies				
Cash and cash equivalents	70	109	-	-
Trade accounts receivable	276	248	-	-
Other receivables	10	18	-	-
Interest-bearing liabilities	(50)	-	-	-

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Consolidated financial statements		Separate financial statements	
Trade accounts payable	(14)	(15)	-	-
Other payables	(30)	(41)	(6)	(32)
	<u>262</u>	<u>319</u>	<u>(6)</u>	<u>(32)</u>
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Gross exposure in statement of financial position	(18,748)	(26,239)	(16,984)	(23,668)
Currency forwards	233	4,786	-	4,002
Currency and interest rate swaps	3,581	7,463	-	2,932
Net exposure	<u>(14,934)</u>	<u>(13,990)</u>	<u>(16,984)</u>	<u>(16,734)</u>

Credit risk

Credit risk is the potential financial loss resulting from the failure of a customer or counterparty to settle its financial and contractual obligations to the Group as and when they fall due. The Group has no significant credit risk with any single counterparty or group of counterparties since the Group maintains business with large customers in petroleum and power industries and requires full first class collateral for the rest.

Liquidity risk

The Group monitors its liquidity risk and maintains a level of cash and cash equivalents deemed adequate by management to finance the Group's operations and to mitigate the effects of fluctuations in cash flows.

Fair values of financial assets and liabilities

The fair value of current portion of financial assets and liabilities are taken to approximate the carrying value due to the relatively short-term maturity of these financial instruments.

The fair value of long-term loans and borrowings carrying a floating rate, which is considered to be market rate, are taken to approximate their fair values.

Other financial assets and liabilities not stated above had the fair and carrying value as at 31 December 2017 and 2016 as following:

		Consolidated financial statements			
	Carrying amount	Fair value			
		Level 1	Level 2	Level 3	Total
		(in million Baht)			
31 December 2017					
<i>Financial assets/Financial liabilities measured at fair value</i>					
Equity securities -					
available-for-sale securities	364	364	-	-	364
Debt securities -					
available-for-sale securities					
(Private funds)	11,918	-	11,918	-	11,918

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	Carrying amount	Consolidated financial statements			
		Fair value			Total
		Level 1	Level 2	Level 3	
		(in million Baht)			
Financial assets/Financial liabilities not measured at fair value					
Debentures	(55,839)	-	(60,546)	-	(60,546)
Forward exchange contracts	(16)	-	(12)	-	(12)
Crack spread swap and time spread swap	-	-	40	-	40
Cross currency and interest rate swap contracts	185	-	201	-	201

31 December 2016

Financial assets/Financial liabilities measured at fair value

Equity securities -					
available-for-sale securities	147	147	-	-	147
Debt securities -					
available-for-sale securities (Private funds)	799	-	799	-	799

Financial assets/Financial liabilities not measured at fair value

Debentures	(63,853)	-	(66,500)	-	(66,500)
Forward exchange contracts	7	-	44	-	44
Crack spread swap and time spread swap	-	-	117	-	117
Cross currency and interest rate swap contracts	(615)	-	(605)	-	(605)

	Carrying amount	Separate financial statements			
		Fair value			Total
		Level 1	Level 2	Level 3	
		(in million Baht)			
31 December 2017					
<i>Financial assets/Financial liabilities</i>					
<i>measured at fair value</i>					
Equity securities -					
available-for-sale securities	364	364	-	-	364
Debt securities -					
available-for-sale securities					
(Private funds)	11,918	-	11,918	-	11,918

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

		Separate financial statements			
	Carrying amount	Fair value			
		Level 1	Level 2	Level 3	Total
		(in million Baht)			
Financial assets/Financial liabilities					
not measured at fair value					
Debentures	(55,839)	-	(60,546)	-	(60,546)
Crack spread swap and time spread swap	-	-	37	-	37

		Separate financial statements			
	Carrying amount	Fair value			
		Level 1	Level 2	Level 3	Total
		(in million Baht)			
31 December 2016					
<i>Financial assets/Financial liabilities</i>					
<i>measured at fair value</i>					
Equity securities -					
available-for-sale securities	147	147	-	-	147
Debt securities -					
available-for-sale securities	799	-	799	-	799
<i>Financial assets/Financial liabilities</i>					
<i>not measured at fair value</i>					
Debentures	(63,853)	-	(66,500)	-	(66,500)
Forward exchange contracts	2	-	33	-	33
Crack spread swap and time spread swap	-	-	122	-	122
Cross currency and interest rate swap contracts	(432)	-	(422)	-	(422)

Measurement of fair values

Valuation techniques

The following tables show the valuation techniques used in measuring Level 2 fair values.

Type	Valuation technique
Debt securities - available-for-sale securities (Private funds)	Thai Bond Market Association Government Bond Yield Curve as of the reporting date.
Debentures	A valuation technique incorporating observable market data which is adjusted with counterparty credit risk (excluding own credit risk) and other risks to reflect true economic value.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Type	Valuation technique
Forward exchange contracts/Crack spread swap and time spread swap/Cross currency and interest rate swap contracts	<i>Market comparison technique:</i> The fair values are based on broker quotes. Similar contracts are traded in an active market and the quotes reflect the actual transactions in similar instruments.

35 Commitments with non-related parties

	Consolidated financial statements		Separate financial statements	
	2017	2016	2017	2016
	<i>(in million Baht)</i>			
Capital commitments				
Project construction agreements	6,013	2,319	5,823	2,117
Other agreement	21	69	-	-
Total	6,034	2,388	5,823	2,117
Non-cancellable operating lease commitments				
Within one year	250	229	231	210
After one year but within five years	880	963	852	923
After five years	140	307	-	160
Total	1,270	1,499	1,083	1,293
Other commitments				
Inventory management services agreements	-	248	-	-
Cross currency and interest rate swap contracts	3,581	7,463	-	2,932
Letters of guarantee issued by financial institutions	2,019	806	1,428	225
Crude oil purchase agreements	47,706	41,646	47,706	41,646
Total	53,306	50,163	49,134	44,803

Power Purchase Agreements

Two subsidiaries have power purchase agreements for a period of 25 years with the Electricity Generating Authority of Thailand (“EGAT”) expiring in 2023 and 2041 whereby the subsidiaries will supply the electric energy to EGAT at the agreed quantity and price. As the contracted party with EGAT, the subsidiaries must comply with conditions and restrictions provided for in the agreement.

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

Loan Agreement

On 29 September 2017, a subsidiary entered into term loan facility agreements with financial institutions in Thailand for a credit facility of Baht 8,500 million, to repay short-term borrowing from related parties. The borrowing bears the interest rate at THBFIX plus margin. Under the terms of the agreements, a subsidiary agree to maintain certain financial ratios and comply with conditions stipulated in the agreements.

As at 31 December 2017, the credit facility has not been utilised.

36 Contingent liabilities and contingent assets

As at 31 December 2017 the Company had the following contingent liabilities and contingent assets:

The Company has crack spread swap and time spread swap with foreign companies ("counterparties"). The Company has or the counterparties have commitments to make payments for the differences between the fixed price and floating price for each period.

As at 31 December 2017 the Company had oil volume under the agreements totalling 5.5 million barrels (2016: 1.9 million barrels).

37 Insurance policy

As at 31 December 2017 the Group has an All Risks and Loss of Profit Insurance Policy ("ALOP") from a syndicate of insurers and reinsurers for a total insured value of U.S. Dollars 9,699 million (2016: U.S. Dollars 9,078 million). Such policy is renewed on an annual basis. Certain subsidiaries have assigned their rights to proceeds from insurance claims under the ALOP to the lenders under certain borrowings agreements.

38 Event after the reporting period

At the meeting of the Board of Directors of the Company held on 15 February 2018, the Company's Board of Directors approved the submission for approval at the annual general meeting of the shareholders of the Company the appropriation of 2017 annual dividends at Baht 5.25 per share, totalling Baht 10,710 million. After a deduction of the interim dividends of Baht 1.50 per share which were paid to the Company's shareholders in September 2017, the remaining dividends of Baht 3.75 per share, totalling Baht 7,650 million, are scheduled for payment on 27 April 2018. This dividend is subject to the approval of the Company's shareholders at the annual general meeting to be held on 11 April 2018.

39 Reclassification of accounts

Certain accounts in the statement of financial position as at 31 December 2016, which are included in the 2017 financial statements for comparative purposes, have been reclassified to conform to the presentation in the 2017 financial statements as follows:

Thai Oil Public Company Limited and its Subsidiaries

Notes to the financial statements

For the year ended 31 December 2017

	2016					
	Consolidated			Separate		
	financial statements			financial statements		
	Before reclass.	Reclass.	After reclass.	Before reclass.	Reclass.	After reclass.
	<i>(in million Baht)</i>					
Statement of financial position as at 31 December 2016						
Investments held as available-for-sale	-	244	244	-	244	244
Other long-term investment	1,024	(244)	780	1,024	(244)	780
Goodwill	-	655	655	-	-	-
Other intangible assets	3,106	(655)	2,451	516	-	516
Other surpluses (deficits)	-	203	203	-	-	-
Surplus on business restructuring under common control	331	(331)	-	-	-	-
Other components of shareholders' equity	(237)	128	(109)	(78)	-	(78)
		<u>-</u>			<u>-</u>	

The reclassifications have been made in order to comply with the classification set out in the Pronouncement of the Department of Business Development “*Determination of items in the financial statements B.E. 2559*” dated 11 October 2016 which is effective for accounting periods starting on or after 1 January 2017.

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