

# **SOLAR – THE NEW FRONTIER**



**SBI Offshore Ltd**

**Media & Analyst Briefing**

7 July 2015

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**Graess Energy** Pte Ltd  
(Incorporated in Singapore)



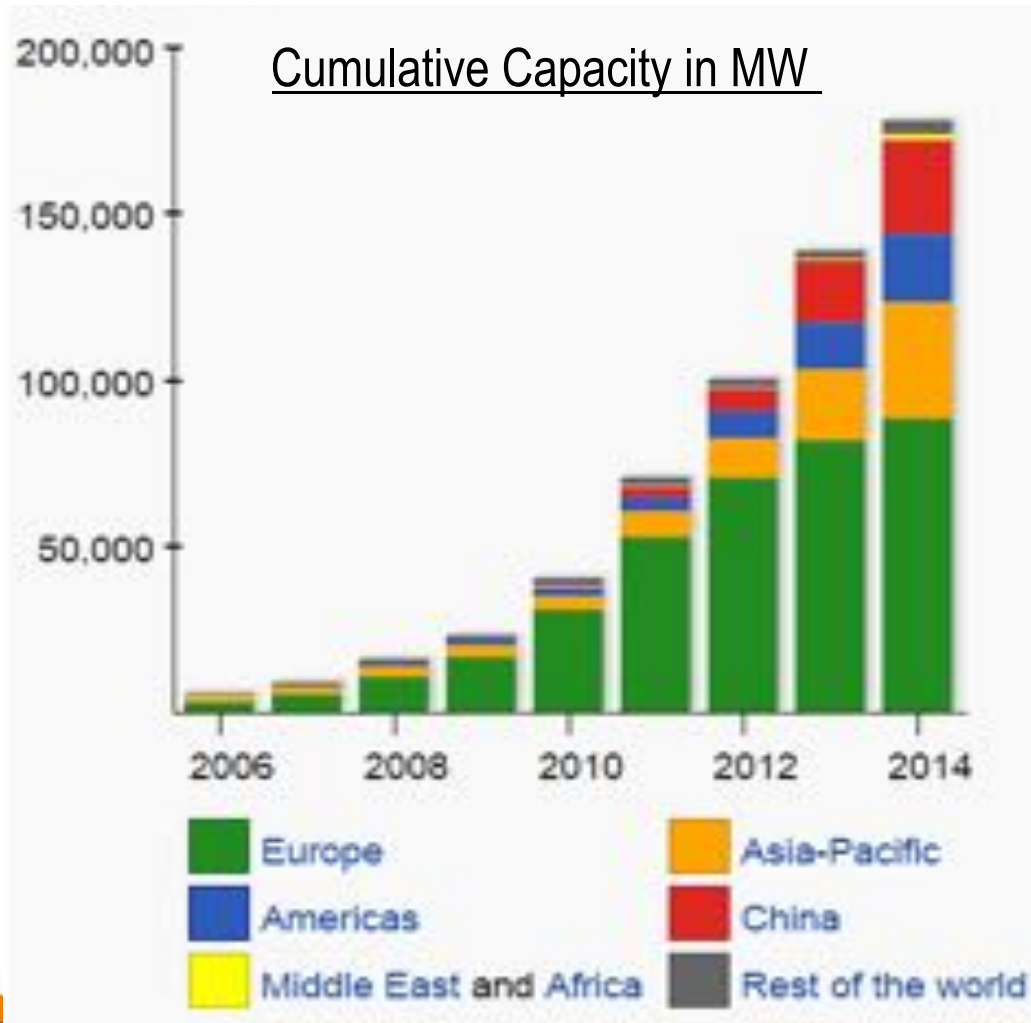
Diversification into renewable energy through  
JV with German solar energy specialist

## SECOND PILLAR OF GROWTH FOR SBI



- 51:49 JV between **SBI Offshore & Gräss Group**
- **Major diversification** into renewable energy for SBI via JV company, **Graess Energy**
- Graess Energy will engineer, build, operate & maintain solar photovoltaic energy systems and plants (“**Solar PV Projects**”)
- Will also undertake independent power producer activities
- Singapore will be Gräss Group’s global **HQ** to expand into Asia
- JV will form second pillar of growth after offshore & marine sector for SBI

## WHY SOLAR ENERGY?



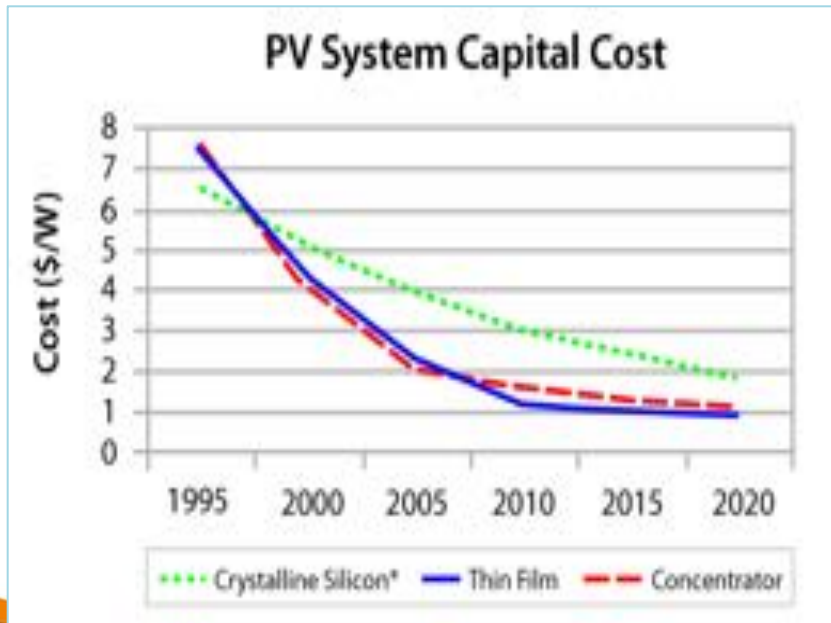
- Fastest growing renewable energy source with substantial potential
- Europe is largest solar market but growth rate is declining
- Asia-Pacific has the largest growth potential
- Projected global capacity for 2015 is 233GW

**Tipping point in 2008  
due to rise in oil prices  
since 2004**

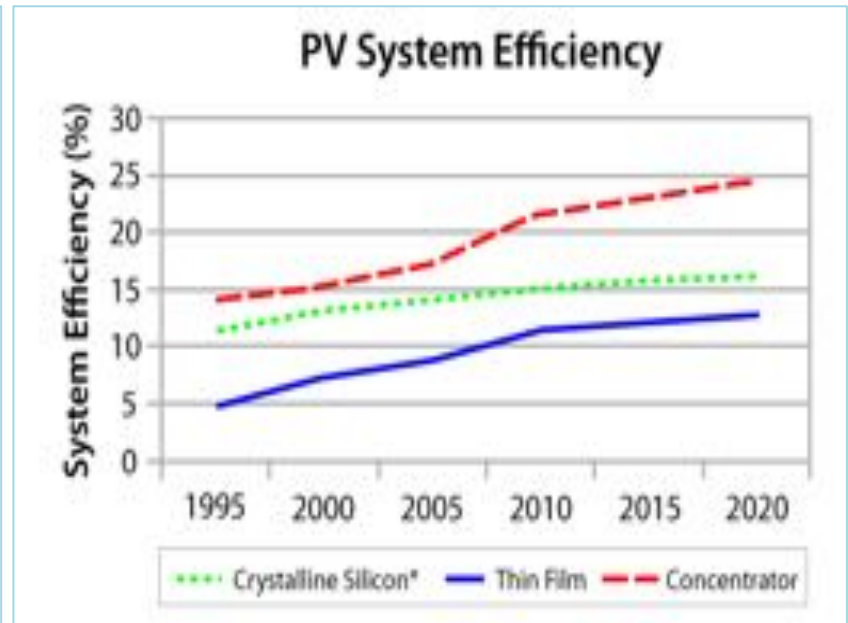
## WHY SOLAR ENERGY?

- Surge in demand due to
  - Lower PV system capital costs
  - Greater PV system efficiency
  - Climate change policies

Falling PV Capital Cost supportive of PV installation growth



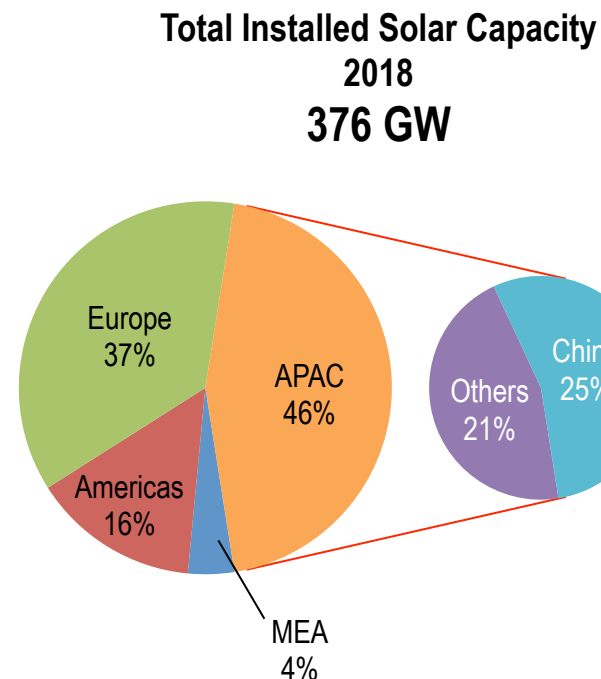
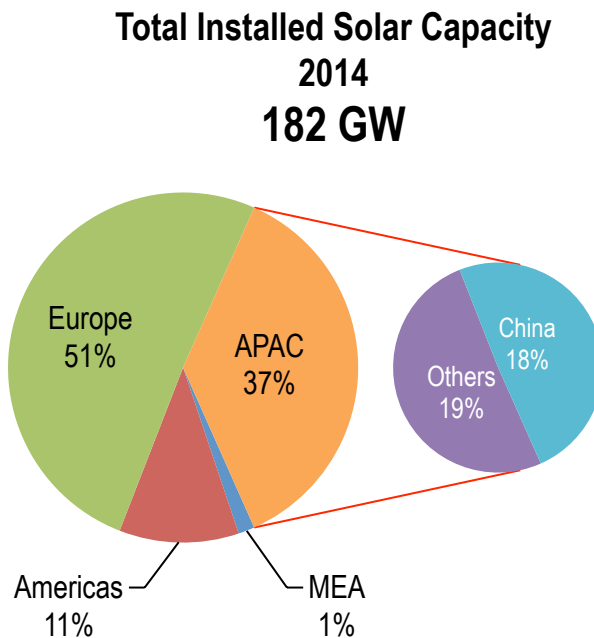
Improving Efficiency with Technology encourage solar usage



Source: U.S Department of Energy

## WHY SOLAR ENERGY?

- Annual solar demand in 2014 was about **43GW** with 61% coming from the Asia-Pacific region, led by China. APAC is expected to become the largest solar user by 2018.



Largest growth markets are in Asia :

- **China** targets to boost its solar capacity from 33GW in 2014 to about **100GW** by 2020<sup>#1</sup>
- **Japan** targets to raise its solar capacity from 23.3GW in 2014 to **67GW** by 2021<sup>#1</sup>
- **India** targets to boost its solar capacity to **100GW** by 2022 from its current 3GW<sup>#2</sup>
- **Philippines** plans to expand their solar power capacity to **500MW**<sup>#3</sup> in 2015
- **Indonesia** recently announced that the country would require an additional **35GW**<sup>#4</sup> of power (some of the capacity would likely be from solar power); target by 2020 is possibly **62GW** of solar PV power

#1 Business Insider article May 2015

#2 RE-invest 2015 conference

#3 Energy Regulatory Commission Resolution March 2015

#4 Jakarta Post May 2015

- **Malaysia** targets its solar power to contribute at least **2GW<sup>#5</sup>** by 2020
- **Thailand** targets to increase its solar power to **3GW<sup>#6</sup>** by 2021
- **Singapore** announced plans to raise its solar capacity from its present 33MW to 350MW by 2020 and is considering to raise its 2020 target to **600MW<sup>#7</sup>**
  - Average monthly power consumption per household is ~400kWh
  - 15MW of solar power sufficient for monthly consumption of 5,600 HDB flats (3-room)
  - Total Power Generation Capacity in 2014 is ~12.5GW (~10.1GW for 2013)
  - HDB tender for 40MW and exploring to install floating solar PV plants (Tengah reservoir)

#5 MPIA, February 2015

#6 Department of Alternative Energy Development & Efficiency, Ministry of Energy – Thailand

#7 Energy Market Authority, Singapore 2015

### Top 10 PV-Countries of Year 2014 in (MW)

| Total Capacity |                                                                                                 |        |
|----------------|-------------------------------------------------------------------------------------------------|--------|
| 1.             |  Germany       | 38,200 |
| 2.             |  China         | 28,199 |
| 3.             |  Japan         | 23,300 |
| 4.             |  Italy         | 18,460 |
| 5.             |  United States | 18,280 |
| 6.             |  France        | 5,660  |
| 7.             |  Spain         | 5,358  |
| 8.             |  UK           | 5,104  |
| 9.             |  Australia   | 4,136  |
| 10.            |  Belgium     | 3,074  |

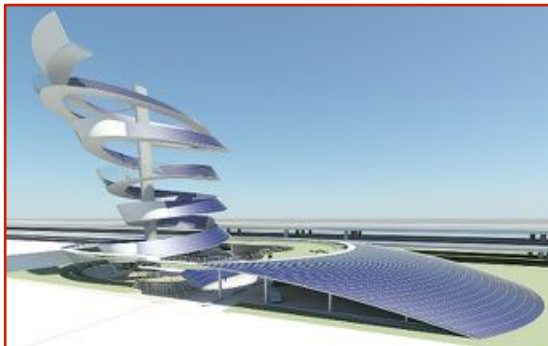
| Added Capacity |                                                                                                    |        |
|----------------|----------------------------------------------------------------------------------------------------|--------|
| 1.             |  China          | 10,560 |
| 2.             |  Japan          | 9,700  |
| 3.             |  United States  | 6,201  |
| 4.             |  UK             | 2,273  |
| 5.             |  Germany        | 1,900  |
| 6.             |  France         | 927    |
| 7.             |  Australia      | 910    |
| 8.             |  South Korea   | 909    |
| 9.             |  South Africa | 800    |
| 10.            |  India        | 616    |

Data: IEA-PVPS Snapshot of Global PV 1992–2014 report, March 2015<sup>[3]:15</sup>

## BENEFITS OF SOLAR ENERGY



- Easy to install, deploy, operate & maintain
- Environmentally-friendly power source
- Cost-competitive
- Abundant natural power supply (sunlight)
- Location not affected by topography
- Flexible build-up capacity & plant layout



- One of the **leading EPC contractors** for Solar PV Projects in Europe
- Founded in 1994 by Harald Gräss as a construction company specializing in cladding works (contracts include Dubai's **Burj Khalifa**, world's tallest building)
- Directed focus on Solar PV Projects since 2000
- Over 15 years of experience in Solar PV Projects in various parts of the world (total installed capacity about **2,000MW**)



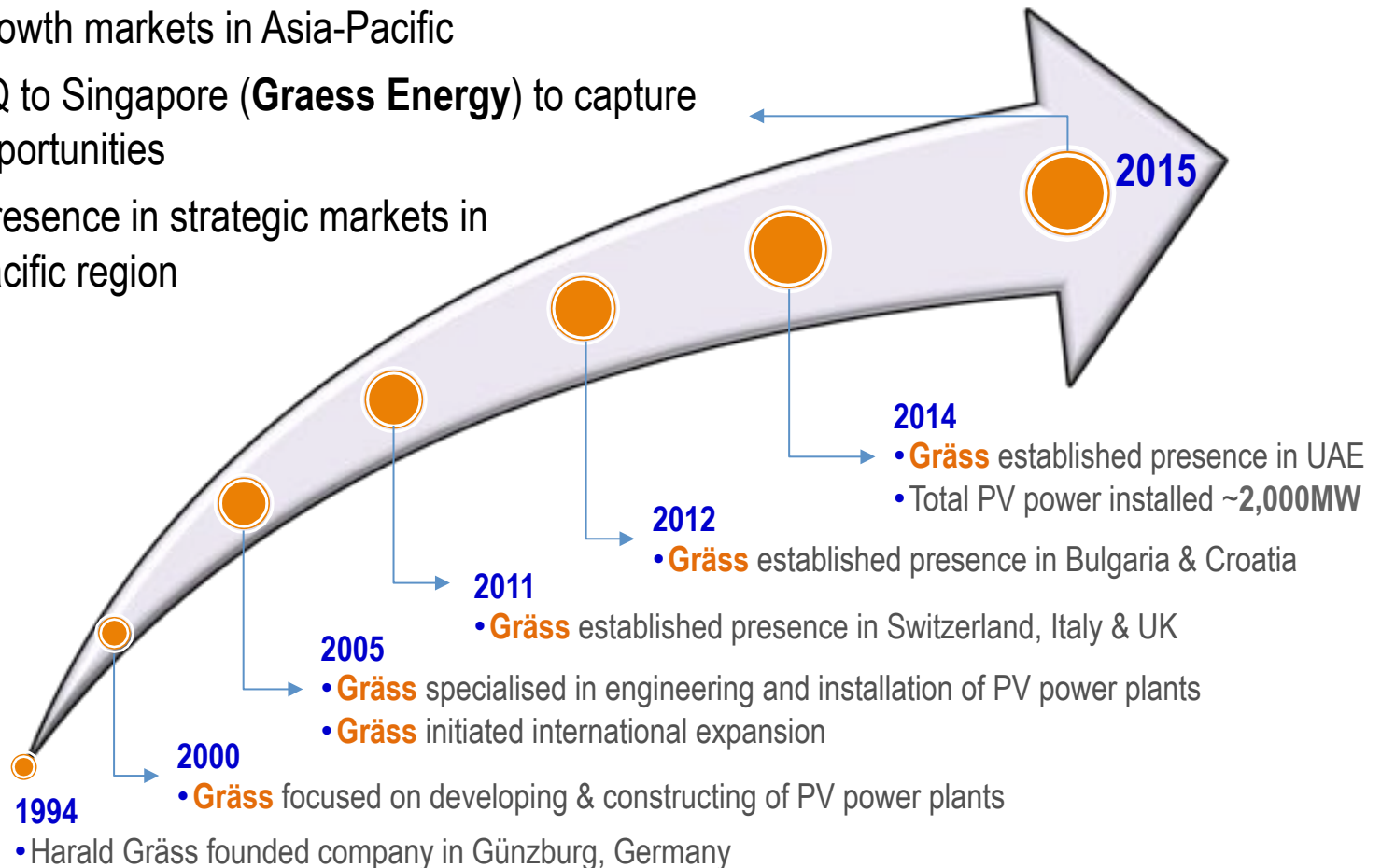
Harald Gräss, Founder

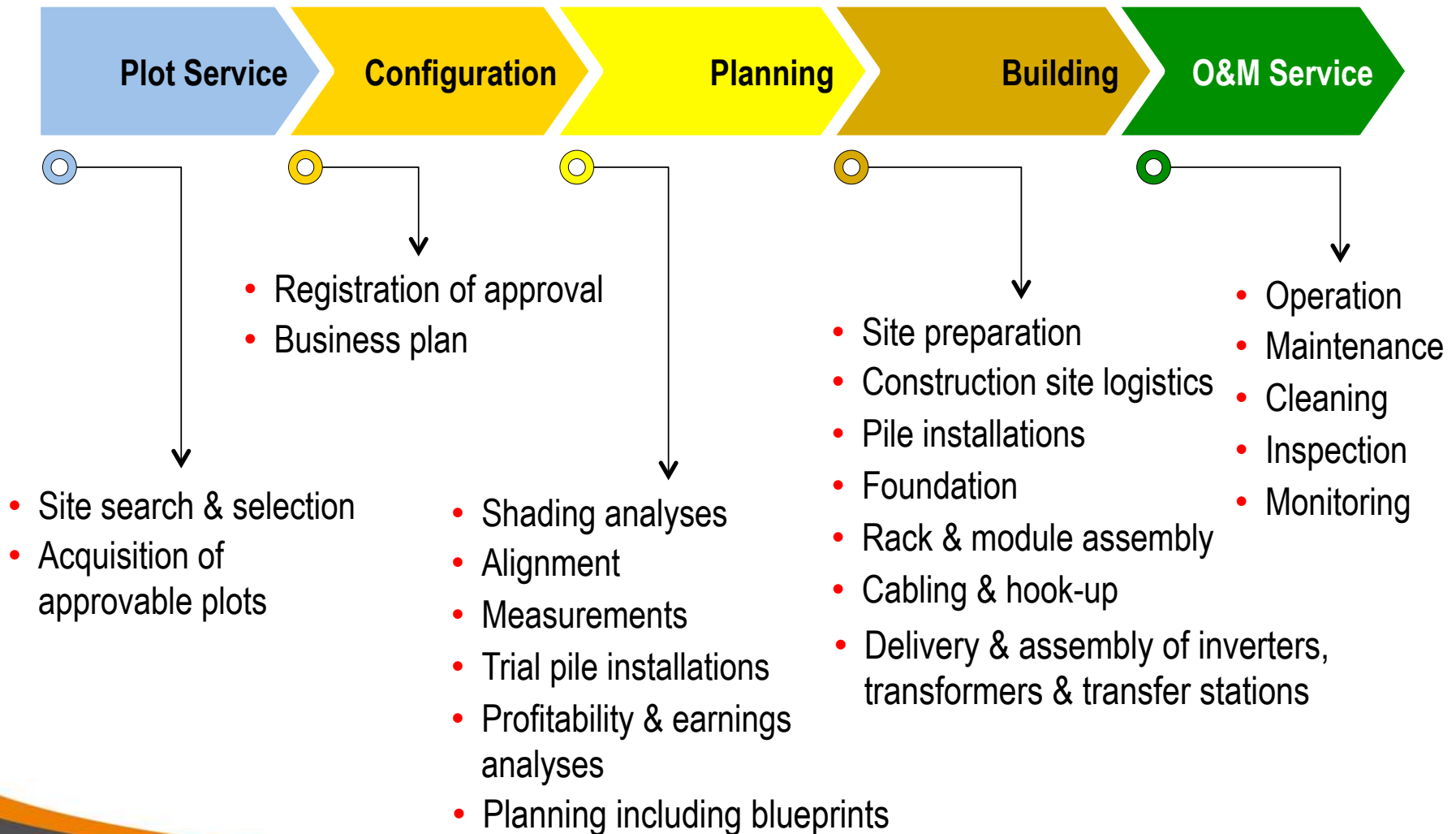


Burj Khalifa – tallest building in the world

## Gräss will

- focus on growth markets in Asia-Pacific
- relocate HQ to Singapore (**Graess Energy**) to capture regional opportunities
- establish presence in strategic markets in the Asia-Pacific region





- All-terrain, multifunctional “Spider-ATM” main workhorse for construction processes
- Efficient, easy to deploy, lightweight & eco-friendly
- Able to work in extreme terrains (inclinations of up to 45°) and in deep trenches

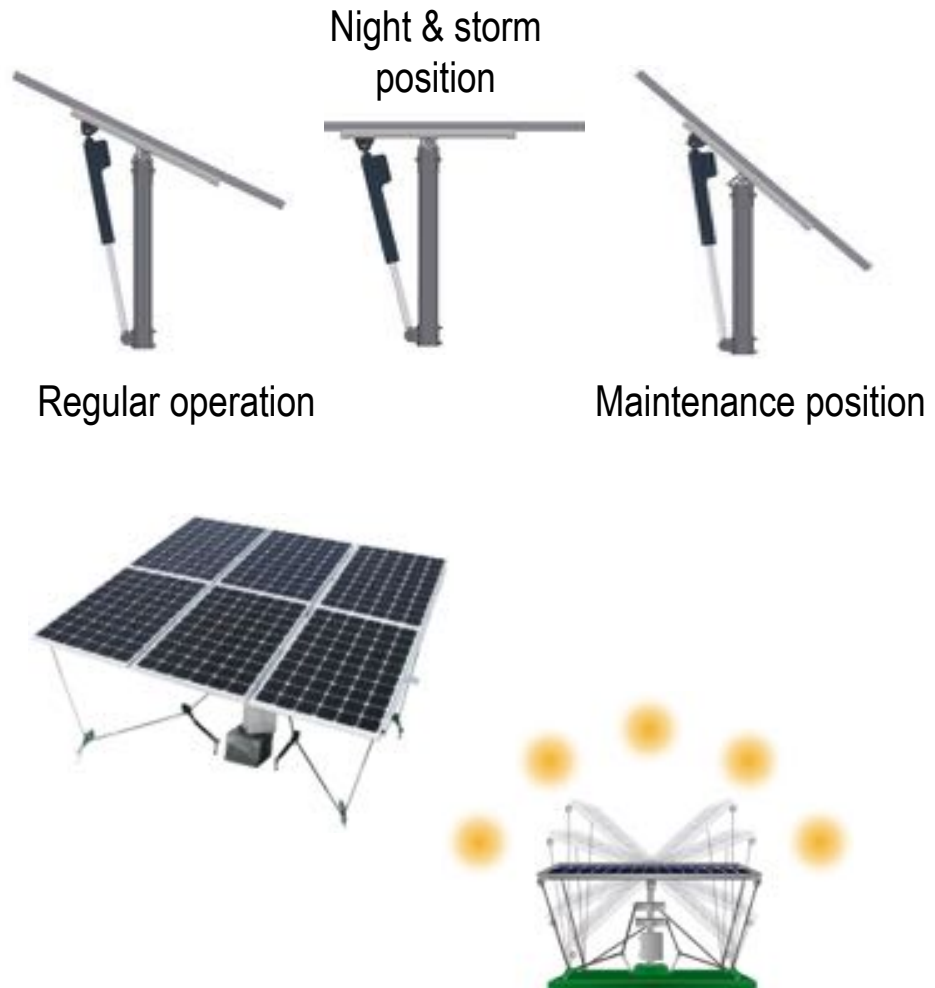
### Specialized Machines



Note: ATM – All Terrain Machine

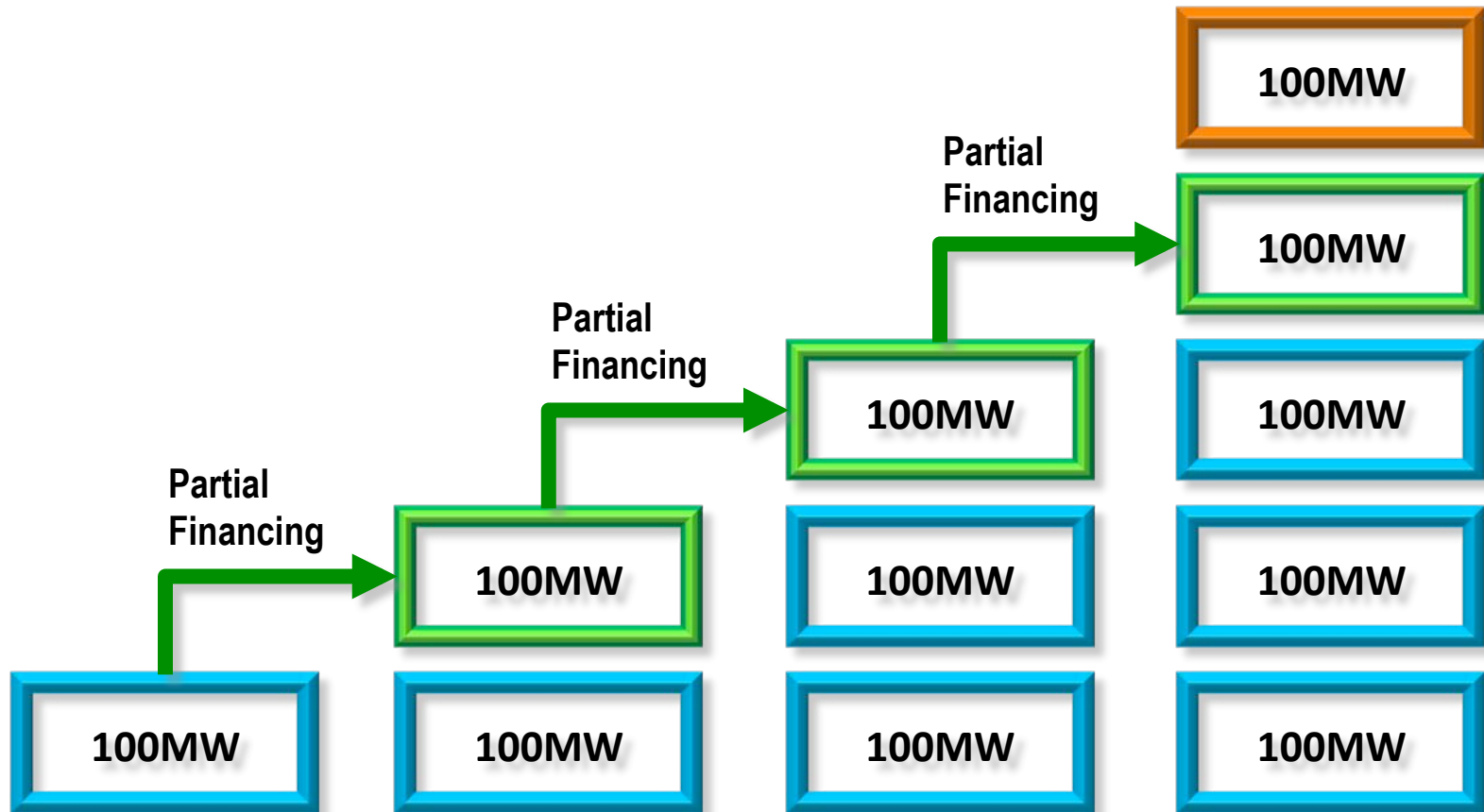
## Tracker System

- Automatic Single-Axis Table Tracker dynamically adjusts the angle of the panels to ensure optimal power production at any time of the day
- Designed to ensure stability even under extreme weather conditions
- Increases total power output by at least 10%
- Plans to use new technology with 3D adjustments that can increase output by a further 35%



## Scope of Business Activities

| Business Activity | Revenue Stream      | Contract Duration                   | Remarks         |
|-------------------|---------------------|-------------------------------------|-----------------|
| EPC               | Contract revenue    | Project life<br>(4-12 months)       | Non-recurring   |
| O&M               | Contract revenue    | Contract life<br>(5-20 years)       | Recurring       |
| IPP               | Contract revenue    | Project life                        | For EPC and O&M |
|                   | Power Sales Revenue | Contract life<br>(approx. 20 years) | Recurring       |



- Revenue stream from existing Solar PV power plant can be used to partially finance a new plant
- Depending on location, plant layout & government approvals, project duration is ~12 mths

## Solar PV Farms



Bries, Germany (92 MW completed in 2011)



Cortina, Italy (1 MW completed in 2010)



Neuhausen, Germany (20 MW completed in 2012)



Marino Pole, Bulgaria (8 MW completed in 2012)

## Roof-top Solar PV Systems





## Floating power plants

- Leverage on SBI's expertise in offshore & marine
- Can significantly extend potential of solar energy sector

**Graess BUILDS ENERGY.**

**Thank You**

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