

MEDIA RELEASE

Keppel pioneers digital twin and innovative hybrid AC/DC grid to manage distributed energy with NUS

Singapore, 20 November 2023 – Keppel Corporation, through its Infrastructure Division (Keppel), has launched a multi-pronged project for the National University of Singapore (NUS), aimed at advancing its Campus Sustainability Roadmap 2030 and the Singapore Green Plan 2030.

Under the Master Research Collaboration Agreement (MRCA) signed by Keppel and NUS in April 2022, the University's Kent Ridge campus will serve as a low-carbon living laboratory to create, test-bed and scale commercially viable climate technologies and sustainability-related innovation. To this end, Keppel and NUS will implement a digital twin, leveraging comprehensive sensing technologies and modelling and a novel AC/DC hybrid microgrid that will seamlessly integrate different onsite and remote renewable energy resources, energy storage technologies, and smart electric vehicle charging solutions. These innovations are envisaged to create an infrastructure network that reduces energy consumption while enhancing grid reliability and climate resilience.

In addition, Keppel will also implement a district-wide innovative cooling network at the NUS University Hall and its adjacent developments, comprising the use of proprietary phase change material¹-based thermal energy storage, interconnected cooling systems and innovative outdoor cooling technologies. These technologies will be integrated with the AC/DC hybrid microgrid, which can lead to significant reductions in carbon footprint and serve as a showcase of AI-optimised energy consumption. This multi-pronged project is aimed to scale across the entire NUS campus in different phases, and replicated for third-party customers locally and abroad.

The Keppel-NUS Low Carbon Living Laboratory at the University's Kent Ridge pioneers sustainable technologies and fosters a greener, more energy efficient future. This collaboration will also serve as a platform to offer educational and training opportunities for NUS students, and as a way to nurture the next generation of sustainability leaders. Furthermore, it will encourage open innovation collaboration with various ecosystem players, including, startups, SMEs, and researchers.

Ms Cindy Lim, CEO, Infrastructure, Keppel, said, "As a global asset manager and operator, Keppel is focused on continually sharpening our competitive advantages. We are pleased to work with like-minded partners, such as NUS, to pioneer leading-edge energy and sustainability-related solutions that will help businesses and communities decarbonise and work towards carbon-neutrality."

Professor Tan Eng Chye, NUS President, said, "At NUS, we are presenting the campus as a Living Lab, where our physical infrastructure and operational systems serve as an integrative test-bed for sustainability solutions. This opens up a myriad of possibilities for impactful discoveries, game-changing innovations, and transformative education. This collaboration leverages NUS' expertise in energy and sustainability research and Keppel's technological capabilities to develop

¹ The proprietary phase change material was jointly designed and developed by NUS and Keppel DHCS. The project was funded by the Energy Market Authority of Singapore under its Energy Resilience Grant Call in 2018.

cutting-edge technologies for smart grid management and district cooling which, once validated, could be applied within NUS, on a national-scale, and even globally.

Beyond these initiatives, Keppel and NUS are also exploring partnerships in other energy innovations, such as ammonia cracking and solar energy-related research.

Both Keppel and NUS were recipients of the President's Award for the Environment (PAE) conferred on 10 October 2023. The PAE is the highest environmental accolade for individuals, educational institutions and organisations that have made outstanding contributions towards environment and sustainability, as well as building a resilient future for Singapore. The biennial award is administered by the Ministry of Sustainability and the Environment.

The abovementioned collaboration is not expected to have any material impact on the earnings per share and net tangible asset per share of Keppel Corporation for the company's current financial year.

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About Keppel Corporation

Keppel Corporation (SGX:BN4) is a global asset manager and operator with strong expertise in sustainability-related solutions spanning the areas of infrastructure, real estate and connectivity. Headquartered in Singapore, Keppel operates in more than 20 countries worldwide, providing critical infrastructure and services for renewables, clean energy, decarbonisation, sustainable urban renewal and digital connectivity.

Keppel creates value for investors and stakeholders through its quality investment platforms and diverse asset portfolios, including private funds and listed real estate and business trusts, and has a total portfolio with more than \$65 billion of assets under management.

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