

Media release

Industry partners to jointly explore the development of a liquefied hydrogen supply infrastructure for Keppel's data centres in Singapore

12 May 2021, Singapore – Kawasaki Heavy Industries, Ltd. (Kawasaki), Keppel Data Centres Holdings Pte Ltd (Keppel Data Centres), Linde Gas Singapore Pte Ltd (Linde), Mitsui O.S.K. Lines, Ltd (MOL) and Vopak LNG Holding B.V (Vopak LNG) have entered into a Memorandum of Understanding (MOU) to jointly explore the concept development of a supply infrastructure to bring liquefied hydrogen (LH2) into Singapore to power Keppel's data centres.

Under this MOU, the five industry partners will jointly study the technical and commercial viability of a LH2 supply chain, including the feasibility of having a production and liquefaction plant and export terminal at the exporting country, transportation via ocean-going tankers, as well as an import terminal, storage units and regasification facilities in Singapore. The study is expected to continue till the end of 2021. At that juncture, the partners will decide on the next phase of their collaboration.

The partners envision that the LH2 supply infrastructure will benefit data centre facilities such as the floating data centre park project in Singapore that Keppel Data Centres is currently pursuing¹.

There is growing interest worldwide in the use of hydrogen as an energy source because its combustion does not emit carbon dioxide. In its liquid state, hydrogen occupies 800 times less volume compared to its gaseous state, allowing for more compact and efficient storage and transportation. As such, LH2 is gaining traction as a compelling clean energy alternative for land-scarce markets.

Mr Wong Wai Meng, CEO of Keppel Data Centres, said, "In line with Keppel's Vision 2030, which puts sustainability at the heart of the Group's strategy, Keppel Data Centres is working hard to decarbonise our operations. We are actively tapping the capabilities of the Keppel Group as well as working with industry partners to explore a range of green solutions such as hydrogen, floating data centres and CCUS (carbon capture, utilisation and sequestration) technologies. With this MOU, we take another step in our journey to use sustainable energy sources for power generation."

Dr Motohiko Nishimura, the Executive Officer and Deputy General Manager of Hydrogen Strategy Division of Kawasaki, said, "Kawasaki is promoting a LH2 supply chain pilot demonstration project for the first time in the world. We have accumulated experience and expertise in LH2 technology, including the world's

¹ "Keppel Data Centres partners with Toll Group and Royal Vopak to explore Floating Data Centre Park and LNG-to-power solutions in Singapore", 20 April 2020 (www.kepcorp.com/en/media/media-releases-sgx-filings/keppel-data-centres-partners-with-toll-group-and-royal-vopak-to-explore-floating-data-centre-park-and-lng-to-power-solutions-in-singapore/)

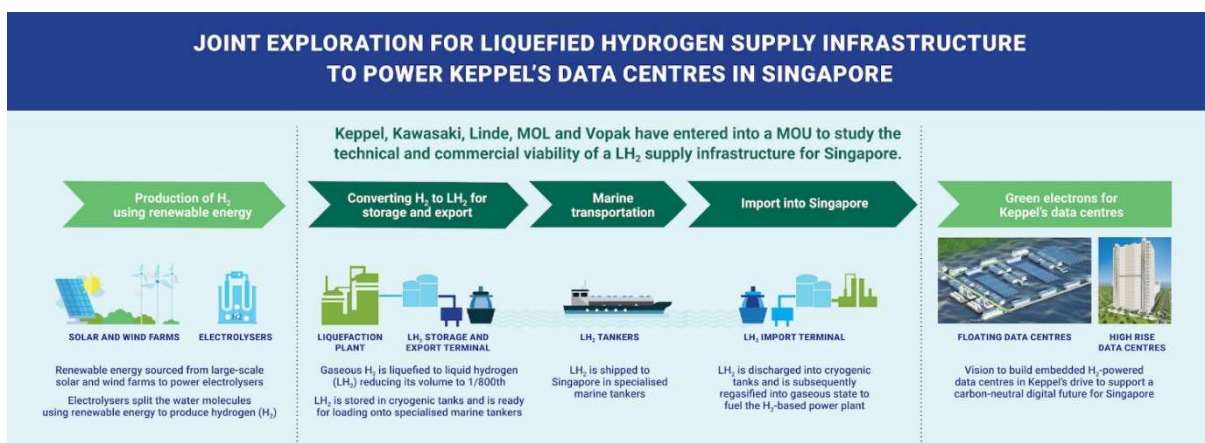
first LH2 carrier, hydrogen liquefaction facility, LH2 storage tank and LH2 handling facility with loading arm system.”

“Kawasaki will contribute to the establishment of LH2 supply infrastructure by providing optimal solutions to Keppel Data Centres. We are excited to join this innovative project led by Keppel, and look forward to our five companies’ collaboration contributing to decarbonisation and sustainability in Singapore.”

Mr David Burns, Vice President of Clean Energy, Linde, said, "Hydrogen is a powerful energy carrier and is expected to play a significant role in the reduction of carbon emissions, as part of the larger energy transition that is currently underway. Due to its versatile nature, hydrogen can be used for many applications, including the decarbonisation of data centres. We are proud to be working with Keppel and other partners in the development of a climate-friendly solution for their operations in Singapore."

Mr Kenta Matsuzaka, Senior Managing Executive Officer of MOL, said “MOL is pursuing strategies to achieve net-zero emissions by 2050, and hydrogen is one of the strong candidates as fuel. MOL targets to develop a commercial and sustainable deep-sea Net Zero Emission vessel by deploying vessels powered by the next-generation fuels by around 2030, which is well-aligned with where this project is going.”

Mr Kees van Seventer, President, Vopak LNG, said, “In 2020, we announced our collaboration with Keppel for an LNG and hydrogen feasibility study. The assessments from that study supports our decision to further explore the development of a LH2 supply infrastructure for Singapore. A hydrogen import terminal has the potential to transform industries like the data centre sector. It will also support long-term emissions reduction in Singapore. Vopak is committed to support the energy transition through development of infrastructure for sustainable energy solutions, underpinned by our New Energy strategy.”



Hydrogen, which does not emit carbon dioxide during combustion, is gaining traction as a clean energy alternative for land-scarce markets. In liquid form, hydrogen occupies 800 times less volume than in gaseous state, allowing for more compact and efficient storage and transportation.

About Keppel Data Centres

Keppel Data Centres Holding (Keppel Data Centres) is a 70-30 joint venture between Keppel Telecommunications & Transportation (Keppel T&T) and Keppel Land, both subsidiaries of Keppel Corporation, one of Singapore's flagship multinational companies with a global footprint in more than 20 countries. Keppel provides solutions for sustainable urbanisation, focusing on four key areas comprising Energy & Environment, Urban Development, Connectivity and Asset Management.

Keppel Data Centres has a track record of more than a decade in owning, developing and managing high-quality carrier-neutral data centre facilities that support mission-critical computer systems. Strongly committed to environmentally sustainable business practices, Keppel Data Centres offers a comprehensive range of wholesale, build-to-suit and co-location solutions built to the highest industry standards.

Keppel T&T is also the sponsor of Keppel DC REIT, the first data centre Real Estate Investment Trust (REIT) listed in Asia and on the SGX-ST. Keppel Data Centres, together with other members of Keppel Group, owns and operates a global portfolio of more than 25 data centres located in key data centre hubs across Asia Pacific and Europe.

For more information, please visit www.keppeldatacentres.com

About Kawasaki Heavy Industries

Together with about 100 group companies in Japan and overseas, Kawasaki Heavy Industries oversees the formation of a "technology corporate group." Our technological capabilities, polished over a history that exceeds a century, send diverse products forth into wide-ranging fields that go beyond land, sea, and air, extending from the ocean depths to space.

Our aerospace division is active in products ranging from aircraft to satellites. The products that our rolling stock division delivers to the world include Shinkansen and New York subway cars, while our ship and offshore structure division's products range from gas carriers and large tankers to submarines, and our energy solutions division covers the spectrum from development and manufacture of energy equipment to management systems. We are also active in wide-ranging businesses driven by diverse and high-level engineering technologies, including environmental and recycling plants, industrial plants, precision machinery, industrial robots, and infrastructure equipment. Finally, we operate our leisure and power products business that features the motorcycles known as the Kawasaki brand.

Through the development of unique and broad businesses unmatched elsewhere, we will continue to create new values that solve the issues facing our customers and society.

About Linde

Linde is a leading global industrial gases and engineering company with 2020 sales of US\$27 billion. Linde serves a variety of end markets including chemicals & refining, food & beverage, electronics, healthcare, manufacturing and primary metals. Linde's industrial gases are used in countless applications, from life-saving oxygen for hospitals to high-purity & specialty gases for electronics manufacturing, hydrogen for clean fuels and much more. Linde also delivers state-of-the-art gas processing solutions to support customer expansion, efficiency improvements and emissions reductions.

About Mitsui O.S.K. Lines

Mitsui O.S.K. Lines, Ltd. (MOL), as a multi-modal transport group, meets the needs of the era in a wide variety of fields including dry bulkers, tankers, car carriers, ferries, RORO ships, offshore business, logistics etc. MOL's activities are truly borderless, based on the operation of one of the world's largest merchant fleets, backed by expertise and technology developed throughout our over 130-year history.

As a leading company in LNG marine transport and FSRU industry, MOL is involved in over 100 LNG carrier and FSRU projects around the world serving the oil majors, trading companies and key LNG sellers and buyers. As it has contributed to the development of the LNG value chain in the last 40 years, MOL strongly aims to contribute to the establishment of the hydrogen and ammonia value chain.

About Royal Vopak

Royal Vopak is the world's leading independent tank storage company. We store vital products with care. With over 400 years of history and a focus on sustainability, we ensure safe, clean and efficient storage and handling of bulk liquid products and gases for our customers. By doing so, we enable the delivery of products that are vital to our economy and daily lives, ranging from chemicals, oils, gases and LNG to biofuels and vegoils. We are determined to develop key infrastructure solutions for the world's changing energy and feedstock systems, while simultaneously investing in digitalization and innovation. Vopak is listed on the Euronext Amsterdam and is headquartered in Rotterdam, the Netherlands. For more information, please visit www.vopak.com