

OFFSHORE MARINE

A newsletter of Keppel Offshore & Marine

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Building the first WTIV in the U.S.
**POSITIONING FOR
THE GLOBAL ENERGY
TRANSITION**

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Keppel Offshore & Marine is positioning for the global energy transition by seizing opportunities as a developer and integrator of offshore energy and infrastructure assets

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Improving performance

Keppel Offshore & Marine's (Keppel O&M) 1Q 2021 performance improved quarter-on-quarter with EBITDA turning positive due to improving margins and productivity. This was reported during Keppel Corporation's 1Q 2021 Business Update. Below are extracts from the opening remarks of Mr Loh Chin Hua, CEO of Keppel Corporation and Chairman of Keppel O&M.

“ Keppel O&M's performance has improved quarter on quarter, with EBITDA for 1Q 2021 turning positive due to improving margins and productivity. The team at Keppel O&M has continued to work hard and they have continued to squeeze cost out of the overheads. Last year, we were able to save about S\$90 million in total from the overhead costs, and in the first quarter this year, the team has added another S\$20 million in savings in overheads.

We are making good progress in the organic transformation of Keppel O&M. Keppel O&M is carefully managing costs while actively seizing new opportunities, and is also engaging in discussions with potential buyers and charterers of its rig assets.

Keppel O&M's revenue in 1Q 2021 was lower year-on-year mainly due to termination of the Awilco rigs. During the quarter, Keppel O&M delivered Singapore's first LNG bunkering vessel and an LNG carrier.

Keppel O&M had secured S\$66 million of upgrading and repair contracts for projects including wind turbine installation and gas-related vessels. In addition, in response to media reports, we have disclosed that Keppel O&M is in advanced discussions with Petrobras on the P-78 FPSO project, but no definitive agreements have been entered into yet. Of course, we will have to wait until the contract is officially awarded. If that happens, we could see a doubling of our net orderbook.

As at end-March 2021, Keppel O&M's net orderbook stood at S\$3.0 billion, about 80% of which comprised renewables and gas-related solutions. At this time last year, we were in the midst of the Circuit Breaker, and the workforce at Keppel O&M's yards in Singapore had dropped significantly.

Since the end of 2020, our Singapore yards have been working at close to full capacity, with safe management measures in place. In 1Q 2021, a workforce of about 19,000 has returned to the yards and offices in Singapore.

”

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Keppel O&M secured upgrading and repair contracts worth about \$66 million in 1Q 2021, which includes the modification and upgrade of Fred. Olsen Windcarrier's wind turbine installation vessel (in picture).

New contracts

Keppel O&M's \$66m in new contracts includes the upgrade, modification and repair of a wind turbine installation vessel (WTIV), a Floating Storage and Regasification Unit (FSRU), an LNG tanker and a dredger. The projects are in line with Keppel's Vision 2030, which includes seizing opportunities in offshore renewables and gas and other solutions which support sustainable urbanisation.

The first contract is with Fred. Olsen Windcarrier for the modification and upgrade of one of their GustoMSC NG-9000C WTIVs, to enhance its

capabilities. When completed in 1Q 2022, the vessel will be able to transport, lift and install any wind turbine in the market today.

The second contract is from a wholly owned subsidiary of Mitsui O.S.K. Lines, for the upgrade and repair of an FSRU. The vessel is scheduled for delivery in 4Q 2021.

The third contract is the repair, retrofit and upgrade of an LNG carrier for the Stena Group. The vessel is expected to be re-delivered in 3Q 2021.

The fourth contract, from a wholly owned subsidiary of Royal Boskalis

Westminster N.V. (Boskalis), is for the repair and jumbolisation of the Trailing Suction Hopper Dredger (TSHD) ORANJE. The vessel will be integrated with a new owner-furnished mid-ship block section which would increase the vessel's overall length from its existing 156 metres to 201 metres.

Expected to be re-delivered in 1Q 2022, the TSHD ORANJE supports construction and maintenance of ports and waterways as well as coastal protection against rising sea levels, and land reclamation for growing populations.

140th conversion project

Keppel Offshore & Marine (Keppel O&M) has commenced pre-fabrication work on the topside components of a Floating Production Storage and Offloading vessel (FPSO) project. The contract was secured in November 2020 from a repeat customer for fabrication and integration work on the FPSO.

Scheduled for delivery in 4Q 2022, Keppel O&M's scope of work includes the fabrication, installation and integration

of topside modules, riser balconies and spread mooring support structures, as well as supporting the customer on pre-commissioning and commissioning work.

Mr Chor How Jat, Managing Director (Conversions & Repairs) of Keppel O&M said, "We are pleased to secure our 140th conversion project to help meet the world's need for energy. As the world's leader in FPSO conversion and integration projects, we have

built up strong capabilities to add value to our customers' projects and efficiently deliver high quality FPSOs, while contributing to the circular economy with our conversion solutions.

"With the challenges posed by Covid-19, the health and safety of our workforce is paramount. We have put in place measures to safeguard our people and maintain our operations to ensure that each project entrusted to us is delivered as planned."



Keppel O&M secured its 140th conversion project, a testament to its strong capabilities and expertise in vessel conversions



The keel laying ceremony for the Charybdis WTIV was held on 16 December 2020 at Keppel AMFELS' yard in Brownsville, Texas

First WTIV in the U.S.

As part of its efforts in pivoting to provide solutions in renewables, Keppel Offshore & Marine (Keppel O&M) in October 2020 secured a contract with Dominion Energy Inc., a United States energy company, for the engineering, procurement and construction of a Wind Turbine Installation Vessel (WTIV).

The vessel is being built by Keppel O&M's shipyard in the U.S., Keppel AmFELS, and will be Jones Act compliant. Scheduled for delivery in 2023, it will be available for charter hire to offshore wind developers, in support of several U.S. wind projects. The vessel is expected to be fully utilised on U.S.

East Coast projects exceeding 5 gigawatts of U.S. offshore wind construction through to 2027.

Mr Chris Ong, CEO of Keppel O&M, said, "We are pleased to be selected by Dominion Energy to build the first offshore wind turbine installation vessel in the U.S., which is also one of the largest vessels of its kind in the world. It is a testament to the capabilities of our shipyard in building a wide variety of vessels for the Jones Act market. Keppel AmFELS is proud to be a pioneer in providing offshore wind infrastructure solutions in the U.S. with our partner Dominion Energy.

"With strong engineering, procurement, and construction expertise, we have built a track record of delivering projects on time and on budget. We are able to harness Keppel O&M's global network of yards, and experience in the offshore renewables market to expand our footprint and provide solutions in the clean energy transition."

The vessel's hull will have a length of 472 feet, a width of 184 feet and a depth of 38 feet, making it one of the biggest offshore wind installation vessels in the world. Its features include a main crane with a boom length of 426 feet and an expected lifting

capacity of 2,200 tonnes. The WTIV will have accommodation for up to 119 people. The vessel is designed to handle current turbine technologies as well as next generation turbine sizes of 12 megawatts or larger and will also be capable of the installation of foundations for turbines and other heavy lifts.

“This is a monumental step for the offshore wind industry in America,” said Mr Robert M. Blue, Dominion Energy’s President and CEO. “Dominion Energy is proud to be leading a consortium of respected industry participants in the construction of the first Jones Act compliant offshore wind turbine installation vessel, which will provide significant American

jobs, and provide a reliable, home-grown installation solution with the capacity to handle the next generation of large-scale, highly-efficient turbine technologies. This will better enable the offshore wind industry to bring clean, renewable energy to customers in the U.S.

“We chose Keppel AmFELS to build the vessel as they provided an efficient, economical and versatile solution, backed by a reputation for delivering high quality vessels safely and reliably.”

Work on the vessel, which will be named Charybdis, has commenced. A keel laying ceremony – where steel is laid to form the first part of the keel - was held on 16 December

2020 at Keppel AMFELS’ yard in Brownsville, Texas, marking the start of a major construction milestone.

According to a report by The American Wind Energy Association (AWEA), the US Department of Energy found the U.S. could develop a total of 86 GW of offshore wind projects by 2050. Project developers expect 14 offshore wind projects totalling 9,112 MW to be operational by 2026. States are driving strong demand for offshore wind energy and have established over 29,100 MW of offshore wind procurement targets as of September 2020.

Keppel O&M provides design and construction solutions across the value chain of offshore wind farms, such as wind turbine foundations, substation platforms, as well as installation and support vessels. It is currently building converter stations and substations to support the offshore wind energy industry in the German sector of the North Sea and Taiwan. It delivered and has a stake in Blue Tern, one of the world’s largest and most advanced multipurpose offshore wind turbine installers for the UK North Sea.



Above is an illustration of the converter stations and substations that Keppel O&M is currently building to support the offshore wind energy industry in the German sector of the North Sea and Taiwan

Vessel deliveries

In line with Keppel's Vision 2030 which puts sustainability at the heart of its strategy, Keppel Offshore & Marine (Keppel O&M) is providing value-added solutions to support the energy transition and reduce carbon emissions in the industry. Over the past few months, it delivered several vessels including dual-fuel vessels that can run on Liquefied Natural Gas (LNG), as well as ultra-low emission vessels.

LNG BUNKERING VESSEL

In January 2021, Keppel O&M delivered Singapore's first LNG bunkering vessel (LBV), FueLNG Bellina, to FueLNG with a perfect safety record.

Built in Keppel O&M's Nantong shipyard, the LBV provides LNG bunker to LNG-powered vessels that call at the Port of Singapore. This facilitates the adoption of LNG

as a marine fuel and the growth of Singapore as a global LNG bunkering hub.

FueLNG Bellina subsequently completed its maiden ship-to-ship bunkering operation – which was also Asia's first ship-to-containership LNG bunkering operation – in March 2021 (read page 10 to find out more).

Designed by Keppel O&M's technology arm, Keppel Marine and Deepwater Technology (KMDTech), to its proprietary MTD 7500U LNG design, the LBV has a barge-like extended flat surface to provide bunker to a wide range of vessels. It is also highly maneuverable, minimising tug utilisation during bunkering operations and in turn reducing fuel consumption and emissions.

The dual-fuel FueLNG Bellina is

also the world's first bunkering vessel with Smart Notation for its suite of digital services. Equipped with Keppel O&M's proprietary VesselCare solutions, these smart functions enable remote monitoring and real-time support of vessel operations.

For achieving a perfect safety record and zero lost-time incidents, Keppel O&M was also awarded a safety bonus by FueLNG.

LNG CARRIER

In March 2021, Keppel O&M delivered its second newbuild LNG carrier, the Avenir Accolade to its owner, a subsidiary of Avenir LNG.

Similar to the first vessel delivered to Avenir LNG, the 7,500m³ Avenir Accolade was built at Keppel Nantong Shipyard in China, and is equipped with engines that can run on both diesel and LNG.



Designed and built by Keppel O&M, the FueLNG Bellina is Singapore's first LBV as well as the world's first bunkering vessel with smart notation

Keppel O&M's technology arm, Offshore Technology Development (OTD), also installed and commissioned the vessel's Ballast Water Treatment System.

Avenir Accolade is the sixth dual-fuel vessel delivered by

Keppel O&M. The LNG carrier can also function as an LBV, making it the third LBV that Keppel has delivered, after the Avenir Advantage and FueLNG Bellina.

Avenir Accolade is designed to support small-scale LNG

distribution and bunkering. It will be chartered to LNG Power Limited, a subsidiary of Hygo Energy Transition, and used to deliver LNG to various ports across Brazil.

A month later, Avenir Accolade completed its first LNG bunkering off Malaysia by its sister ship the Avenir Advantage, which was also built by Keppel O&M.

TRAILING SUCTION HOPPER DREDGER

In December 2020, Keppel O&M delivered its fifth Trailing Suction Hopper Dredger (TSHD) to Jan De Nul Group with a perfect safety record.

Ortelius, a 6000m³ TSHD, is the fifth dredger that Keppel O&M has delivered to Jan De Nul Group, following the delivery of three 3500m³ TSHDs and one 6000m³ TSHD in 2019. All five are Ultra-Low Emission vessels (ULEv) and the world's first European Union (EU) Stage V dredgers.

Ortelius is fitted with a two-stage filtering technique for exhaust gases. Built to the requirements of the EU Stage V and International Maritime Organisation's (IMO) Tier III regulations, Ortelius is diesel-electric driven and able to dredge to a maximum depth of 35m. It features a shallow draught, is highly manoeuvrable, and is suitable for working in confined areas.



Avenir Accolade is the third LBV and sixth dual-fuel vessel delivered by Keppel O&M



Ortelius is the fifth dredger that Keppel O&M has delivered to the Jan De Nul Group



From left to right: Ms Quah Ley Hoon, Chief Executive of MPA; Mr Chris Ong, Chairman of FueLNG and CEO of Keppel O&M; Mr Loh Chin Hua, CEO of Keppel Corporation and Chairman of Keppel O&M; Guest-of-Honour Mr Chee Hong Tat, Singapore's Senior Minister of State for Transport and Foreign Affairs; Mr Tan Chong Meng, Group CEO of PSA International; Mr Stephane Courquin, CEO of CMA CGM Asia Pacific; Mr Cyril Ducau, CEO of Eastern Pacific Shipping; Ms Aw Kah Peng, Chairman, Shell Companies in Singapore, at the launch of the LNG bunkering operation

Asia's first ship-to-containership LNG operation

The first ship-to-containership Liquefied Natural Gas (LNG) bunkering operation in Asia was undertaken on 24 March 2021 by FueLNG, a joint venture between Keppel Offshore & Marine (Keppel O&M) and Shell Eastern Petroleum, CMA CGM, and the Maritime and Port Authority of Singapore (MPA).

Singapore's first LNG bunkering vessel, FueLNG Bellina, fuelled the containership, CMA CGM

SCANDOLA, with 7,100m³ of LNG. It is the first operation in Asia where the vessel's container loading and discharging operations is conducted simultaneously alongside LNG bunkering operations, shortening the vessel's port stay time. This is also the first ship-to-ship (STS) operation for FueLNG Bellina.

Mr Chee Hong Tat, Singapore's Senior Minister of State for Transport and Foreign Affairs

was the Guest-of-Honour at the launch of the bunkering operation. He said, "As a global bunkering hub, today's milestone follows MPA's partnership with CMA CGM, FueLNG, Keppel O&M and Shell Eastern Petroleum, to provide more sustainable bunkering solutions for the shipping industry."

Ms Quah Ley Hoon, Chief Executive of MPA, said, "The use of LNG as a marine fuel is fast gaining

traction worldwide amid a global push to use cleaner shipping fuels. As the world's top bunkering and transshipment hub port, MPA is pleased that we are able to facilitate Asia's very first ship-to-ship LNG bunkering operation with simultaneous cargo operations. We will continue to work with the industry to promote LNG bunkering in Singapore and drive the transition to more sustainable shipping."

Mr Chris Ong, Chairman of FueLNG and CEO of Keppel O&M, added, "We are pleased to kickstart ship-to-ship LNG bunkering operations for the FueLNG Bellina in Singapore, which allows us to fuel larger vessels such as containerships. With technical expertise, a customised vessel and an established track record, FueLNG is well-positioned to support maritime companies seeking to reduce their carbon footprint.

"We have a number of ships lined up for FueLNG Bellina's next bunkering operations, reflecting the strong demand for LNG bunkering in Singapore. LNG is an important part of the clean energy transition and this is in line with Keppel's Vision 2030 to pursue greener energy developments."

Designed and built by Keppel O&M, the 7,500m³ FueLNG Bellina provides more options for shipowners and operators to bunker LNG in Singapore. FueLNG aims to provide a total of about 30 to 50 STS LNG bunkering

operations in 2021, extending its track record of over 300 truck-to-ship LNG bunkering operations, and strengthening Keppel O&M's offerings in gas-related solutions.

Mr Stephane Courquin, Chief Executive Officer of CMA CGM Asia Pacific, said, "CMA CGM is committed to the energy transition in the shipping industry. Today, LNG is the most advanced solution when it comes to preserving air quality. This technology is one of the first steps towards achieving CMA CGM Group's ambitious 2050 objective of carbon neutrality. CMA CGM SCANDOLA is the first of more CMA CGM-operated LNG vessels that will undergo simultaneous cargo and LNG bunkering operations in Singapore. The Group's fleet of

LNG containerships will grow to 32 by the end of 2022."

The CMA CGM SCANDOLA is the first of six new 15,000-TEU LNG-powered containerships which CMA CGM Group has lined up to be bunkered in Singapore this year by FueLNG. FueLNG subsequently completed the bunkering of CMA CGM Jacques Saade, the world's largest LNG-fuelled container vessel, in April 2021.

According to Shell's LNG Outlook report, global LNG bunkering demand is estimated to grow to 30 to 50 million tons per annum (MTPA) by 2040. Presently there are about 400 LNG-fuelled vessels in operation or on order, with an expected demand of LNG as marine fuel of nearly 3.5 MTPA.



With the FueLNG Bellina, FueLNG aims to provide a total of about 30 to 50 ship-to-ship LNG bunkering operations in 2021

Bold transformation of offshore & marine business

Keppel Offshore & Marine is positioning for the global energy transition by seizing opportunities as a developer and integrator of offshore energy and infrastructure assets and exiting the offshore rig building business. The company will be restructured into three parts, separating construction and ownership of legacy drilling rig assets from its core operations, which will be slimmer, asset-light and people-light.

Amidst the global energy transition and major disruptions facing the oil industry, Keppel Corporation announced on 28 January 2021 that it will carry out a comprehensive transformation of its wholly-owned subsidiary, Keppel Offshore & Marine (Keppel O&M), to better align it to Keppel's Vision 2030. This is part of Keppel's strategic review of its offshore and marine (O&M) business, with the goal of creating a slimmer, and more competitive Keppel O&M that is well-placed to support the energy transition, even as Keppel continues to explore inorganic options.

Reflecting Keppel's commitment to sustainability and combating climate change, Keppel O&M will exit the offshore rig building business, after completing the existing rigs under construction. In line with the Group's more disciplined approach towards capital allocation, Keppel O&M will not undertake any new project requiring large upfront capex or without milestone payments. It will also progressively exit low value-adding repairs and other activities

with low bottom line contribution, and focus on higher value-adding work.

Mr Loh Chin Hua, CEO of Keppel Corporation and Chairman of Keppel O&M said, "The share of renewables and new energy solutions in the global energy mix has been growing rapidly, driven by environmental concerns as well as technological advancements and the declining cost of renewables. Natural gas, as a transitional fuel, is also projected to overtake oil as the world's largest energy source in the years to come. To seize opportunities in this fast-changing environment, we are making bold and decisive moves to transform Keppel O&M to ensure that it remains relevant and competitive, and fully aligned to Keppel's Vision 2030."

RESTRUCTURING OF KEPPEL O&M

As part of the transformation, Keppel O&M's business will be restructured into three parts: a Rig Co and a Development Co (Dev Co), which will be transient entities created to hold its approximately S\$2.9 billion worth of completed

and uncompleted rig assets; and most importantly, an Operating Co (Op Co), comprising the rest of Keppel O&M, which will be transformed into an asset-light and people-light developer and integrator of offshore energy and infrastructure assets. With a healthy balance sheet and undistracted by its stranded rig assets, the Op Co, which has a strong net order book of S\$3.3 billion, 82% of which is in renewables and gas solutions, will seize opportunities in the energy transition, and is expected to be self-sustaining, financially independent and profitable over time.

Rig Co: Keppel O&M's completed rigs will be placed under the Rig Co, which will put the completed rigs to work, or sell them if there are suitable opportunities. A dedicated team will be appointed to support its chartering and marketing activities. This will only be a transitional arrangement. As the oil market recovers, utilisation and day rates improve, and the rigs generate steady cashflow, the Rig Co will sell the rigs or collaborate



The Op Co will seek opportunities in floating infrastructure and infrastructure-like projects, including renewables projects, gas solutions, production assets and new energy solutions such as hydrogen and tidal energy

with Keppel Capital to seek funding from external investors.

Dev Co: Uncompleted rigs will come under the Dev Co, which will focus on completing the rigs, while prudently managing cashflow. Priority will be given to completing rigs that have firm contracts with customers. The Dev Co will be wound up, once the rigs have been completed and delivered to customers, or transferred to the Rig Co, where they will be put to work or sold.

Op Co: The Op Co, comprising the rest of Keppel O&M, will progressively transit to a developer and integrator role, focusing on design, engineering and procurement. It will be people-light and asset-light, with fabrication work subcontracted

to its eco-system of contractors, including other yards. Keppel O&M's yard operations will be streamlined, including repurposing or divesting part of its global network of yards. At the same time, the Op Co will invest in capability building as it seizes new opportunities.

The Op Co will exit the offshore rig building business, and progressively exit low value-adding repairs and other activities with low bottom line contribution. It will seek opportunities in floating infrastructure and infrastructure-like projects that can deliver predictable streams of cashflow, including renewables projects such as offshore wind farms and solar farms, gas solutions, production assets and new energy solutions such as hydrogen and

tidal energy. It will collaborate with other Keppel business units and harness the synergies of the Group to provide diverse solutions for sustainable urbanisation, such as offshore and nearshore infrastructure and floating data centre parks, and also explore how Keppel O&M's offshore rig technology can be repurposed for other uses.

Mr Loh Chin Hua added, "A key goal of the restructuring is to create a more competitive, asset-light and people-light Keppel O&M, focused on seizing opportunities with higher value capture as a developer and integrator of offshore energy and infrastructure assets. At the same time, the Rig Co and Dev Co will ring-fence Keppel O&M's non-core rig assets, contain any further capital outflow beyond the initial funding, and work towards resolving this legacy issue. Through these changes, we aim to create a nimble industry leader that is well-positioned for the global energy transition and can be a strong contributor to Keppel's target ROE of 15% as we progress towards Vision 2030."

Steady progress

With in-depth engineering expertise, Keppel Offshore & Marine (Keppel O&M) is able to execute sophisticated projects and deliver high quality standards. Over the past months, it marked several milestones for its ongoing newbuild and conversion projects.

OFFSHORE WIND FARM SUBSTATIONS

Keppel O&M marked 3 million manhours without lost time incidents on 11 March 2021 for the two offshore wind farm substations that it is building for Ørsted, a Danish renewable energy

company. Keppel O&M has also successfully fabricated the jacket for one of the two substations. The jacket, which was completed in April 2021, will be installed at the Greater Changhua offshore wind site in Taiwan.

DUAL-FUEL DREDGER

On 28 January 2021, Keppel O&M successfully launched the Vox Ariane, the first of three 10,500m³ Trailing Suction Hopper Dredgers (TSHD) that Keppel is building for Van Oord. It is also the first dual-fuel dredger to be built in Singapore.

The launch ceremony was attended by Guest-of-Honour Her Excellency Margriet Vonno, Ambassador of the Netherlands to Singapore, as well as senior management from Van Oord and Keppel O&M.

This milestone was followed by the keel laying for the second TSHD, Vox Alexia, on 31 March 2021.

To date, Keppel O&M has delivered five dredgers with hopper capacities ranging from 3500m³ to 6000m³.



Vox Ariane (pictured) is the first of three dredgers that Keppel is building for Van Oord



The topsides lifting campaign for the Liza Unity FPSO was completed in March 2021 with over 26,000 tons of topsides lifted in position

ICE-CLASS LNG BUNKERING VESSEL

On 15 December 2020, Keppel O&M successfully launched the ice-class LNG bunkering vessel currently being built for Shturman Koshelev LLC. With an Ice Class Arc 4 notation and a cargo capacity of 5,800m³, the vessel will be chartered to Gazpromneft Marine Bunker Ltd for operations in the Baltic Sea.

This project leverages Keppel O&M's strong track record in ice-class vessels, experience in cryogenics, and comprehensive suite of solutions along the gas value chain. Keppel O&M has delivered 11 ice-class vessels to-date.

FPSO

Keppel O&M struck first steel in February 2021 for the SBM Offshore Prosperity Floating Production Storage and Offloading vessel (FPSO). Keppel O&M's scope of work includes the fabrication, installation and integration of topside modules, riser balconies and spread mooring support structures, as well as supporting the customer on pre-commissioning and commissioning work.

The unit will be the third FPSO operating in the waters of Guyana, following the Liza Destiny and Liza Unity. Keppel O&M delivered the

Liza Destiny, Guyana's first FPSO, in 2019. It is currently also working on the integration of topside modules for the Liza Unity, after having installed its riser, mooring and umbilical structures. The topsides lifting campaign for the Liza Unity FPSO was completed in March 2021 with over 26,000 tons of topsides lifted in position since the vessel came out of dry-dock in October of last year.

Similar to the Liza Unity, the Prosperity FPSO will be dry docked at Keppel O&M's Admiral Dock, tapping on Keppel O&M's ability to leverage combined facilities and utilise resources across its divisions.

Exemplary safety performance

Keppel continuously enhances its safety performance through a constant vigilance to foster a strong HSE-centric culture across the Group.

At the Singapore Workplace Safety & Health Awards 2020, Keppel won 21 awards, the highest number by a single organisation for the year.

Of the 21 awards, Keppel Offshore & Marine (Keppel O&M) received 17 awards under the Safety and Health Award Recognition for Projects (SHARP) category for exemplary project safety and health management systems.

Keppel O&M (New Builds Division) also clinched the WSH Performance (Silver) Award for outstanding safety performance and implementation of strong WSH management systems.

Mr R K Jaggi, GM, Group Health, Safety and Environment, Keppel Corporation, said, "We are proud to receive the highest number of awards for the seventh consecutive year. This is testament to Keppelites' consistent safety performance and the strong systems that we have in place. Against the backdrop of COVID-19, we will strive even harder to ensure the health and safety of our workforce and other stakeholders.

"Keppel is committed to delivering solutions for sustainable urbanisation safely and responsibly. Harnessing technology

has always been one of Keppel's strengths, and we will proactively leverage technology and innovation as we progress together with our stakeholders for a safer future."

In addition, Keppel O&M garnered the WSH Innovation Award, which recognises companies for creating solutions which help to improve safety and enhance operations at the workplace. It won the award for developing the PoRtable In-Situ Machine (PRISM) for safer and more efficient machining operations. Machining is the process of removing excess materials using a cutting tool to achieve the required precise measurements.

Compared to previous machines, PRISM weighs 90% lighter at 200 kilogrammes, and is 70% smaller at 1.2 metres long, making

it more portable and easier to be deployed. Equipped with a Bluetooth camera, PRISM can also be remotely operated, eliminating the risk of personnel having to be stationed in tight constrained spaces to monitor the machine in operation. Since implementing PRISM, the team has stopped using cranes to lift the old machining tools, eliminating lifting hazards and manual handling risk, and improving productivity.

At the individual level, Mr Sappanimuthu Govindaraju, Hull Superintendent at Keppel O&M, clinched the WSH Award for Supervisors for his strong commitment to the safety of workers under his charge. Mr Reza Mohammad Shamim, a Machinery Supervisor from Alpine Engineering, a subcontractor of Keppel Shipyard, also received the same award.



Keppel O&M is also leveraging technologies such as smart watches to enhance safety of yard operations



Compared to previous machines, PRISM weighs 90% lighter at 200 kilogrammes, and is 70% smaller at 1.2 metres long, making it more portable and easier to be deployed

The awards and award recipients were also featured in the WSH Awards 2020 commemorative book. *OM Newsletter* features extracts of their sharing:

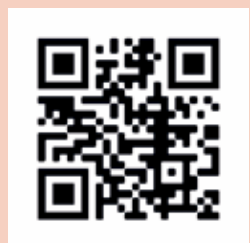
“As a supervisor, I am accountable for my workers’ well-being. Seeing them safe and in good health at work drives me to give my best and continuously improve to be better at my role. I make use of the daily safety toolbox meeting to recognise fellow workers adopting safe work attitudes and practices. This not only allows workers to learn from one another, but also cultivates a strong safety culture.

Mr Sappanimuthu Govindaraju
Hull Superintendent
Keppel O&M New Builds Division

“I believe that verbal reminders alone, cannot make a workplace safe. I would listen to my workers, share achievement goals and reward workers who practice safe work procedures, and spend time with them during break or after work. Connecting with them on both a professional and private basis helps me understand them and better motivate them to practice safety.”

Mr Reza Mohammad Shamim
Machinery Supervisor
Alpine Engineering Services

Scan the QR code below to view the commemorative book and find out more.





Mr Loh Chin Hua, CEO of Keppel Corporation, emphasised the Group's commitment to making sustainability its business and collaborating as OneKeppel, in line with Keppel's Vision 2030

Building a Sustainable Future

The seventh annual Group-wide townhall, the Global Keppelites Forum (GKF), was held on 5 February 2021 at the Keppel Leadership Institute, with a small live audience on site in compliance with safe management measures, and more than 2,000 Keppelites in Singapore and around the world tuning in via live webcast.

In his address, Mr Loh Chin Hua, CEO of Keppel Corporation and Chairman of Keppel Offshore & Marine (Keppel O&M), spoke on the challenges and opportunities created by the shifting global economic and political landscapes, the impact of the COVID-19 pandemic on businesses, as well as the Group's Vision 2030 roadmap.

SUSTAINABILITY AS OUR BUSINESS

2020 was a transformative year for Keppel as the Group unveiled Vision 2030, a long-term strategy to guide the Group's growth from a conglomerate of unrelated parts into one integrated business.

Mr Loh emphasised that sustainability will be at the core of Keppel's strategy with the goal to "not just operate a sustainable business, but to make sustainability our business." "I see Keppel as being a company synonymous with technology and sustainability, where we provide solutions to fight and mitigate the effects of climate change," said Mr Loh.

ASSET LIGHT BUSINESS MODEL

Mr Loh shared that Vision 2030 is also about exercising discipline in capital allocation and that hard work was required to realise the full potential of Keppel as one integrated business.

He elaborated on the steps in the Group's Vision 2030 roadmap, including an asset monetisation plan to recycle capital to fund new growth opportunities and maximise value to shareholders.

On the timeline of the Vision, Mr Loh highlighted that 2030 was

chosen to give Keppel's younger leaders a longer runway to boldly re-imagine a Future Keppel, unencumbered by the current areas of businesses. He said, "It is not our intention to take a decade to execute the Vision. Now that we have determined our future direction, we will accelerate the execution of our Vision with the internal rallying cry of "2030 by 2025"".

To drive the execution of Vision 2030, the Group has established a Transformation Office covering six workstreams: growth initiatives, technology and innovation, cost enhancement, people and culture, monetisation and restructuring.

He highlighted that Keppel's 100-day plan, which was introduced in September 2020 to invigorate Keppelites with the excitement and urgency of a Day 1 company, had been very successful with many targets met.

Mr Loh also underscored the importance of collaboration and building trust as Keppelites and their respective business units work alongside each other. "Diversity strengthens us. We need group synergies to build new business models and create new profit pools. Let's work together to develop and harness the power of OneKeppel, One Business and One Ecosystem," he said.

OVERCOMING OBSTACLES

Mr Loh cautioned about the potential obstacles that could hold Keppel back from achieving Vision 2030. He said, "Keppel has a strong culture founded on our rich heritage. This is one of Keppel's strengths, but it can also have the unintended effect of making some Keppelites more resistant to change." He encouraged all Keppelites to be agile and work together and with customers to try

new ideas and experiment in today's fast-changing world.

He said, "Keppel has many strengths. We should recognise and build on them, harness technology and embrace new business models to take us to the next level."

VALUABLE INSIGHTS

In the Q&A segment, Mr Chris Ong (CO), CEO of Keppel O&M, was part of a panel of Keppel's business leaders taking questions from Keppelites. Below are extracts of his responses.



Mr Chris Ong, CEO of Keppel O&M, was on a panel of responding to questions posed by Keppelites during a live Q&A session

energy space. Keppel O&M is also able to harness strengths and tap on capabilities across the Group as we collaborate with other business units to develop joint infrastructure projects.

Q: Does Keppel intend to keep prospecting opportunities in Brazil for FPSO projects?

CO: We know Brazil remains a source of growth in the pre-salt area and we are still active in it. We are interested in value-added projects that can meaningfully use our EPC (engineering, procurement and construction) capabilities, both to integrate and develop the projects, and be profitable. FPSO EPC is an example of an infrastructure type project that we are looking at.

Q: As we make sustainability our business, what future profit pools do you believe will be most important in replacing traditional sources such as rig building.

CO: We have always been looking

a few steps ahead in our planning and setting the pace for future growth. Right now, with our restructuring and organic plan, we are looking at integration and development as well as providing higher value skill sets for our people so that we can rely on less labour-intensive types of job.

Looking ahead, we will focus even more strongly on sustainable energy and development in line with Vision 2030.

Q: What are some of Keppel O&M's strengths that can help it compete in the renewables industry?

CO: Keppel O&M's engineering, procurement and construction capabilities, as well as track record enable us to provide end-to-end solutions to new customers in the renewables industry and offshore

Reskilling and seizing opportunities

With rapid technological change and an increased focus on sustainability, businesses and workers must adapt to stay relevant. At Keppel, we are upgrading, re-training, and creating more skilled and high-value jobs for our people.

As Keppel Offshore & Marine (Keppel O&M) pivots to gas and renewables, its employees have also been building their expertise to take on new projects. For Andreas Salim and Siah Poh Chiang, Operations Managers of FueLNG, this meant they had to step outside their comfort zones to reskill and gain new expertise. Both joined Keppel O&M in 2007 and spent around 10 years working on new build projects, designing and building megastructures such as platform supply vessels.

They were then seconded to FueLNG, a joint venture between Keppel O&M and Shell Eastern Petroleum, which provides Liquefied Natural Gas (LNG) bunkering solutions in Singapore.

To equip themselves with the necessary technical knowledge, they undertook several courses which were sponsored by FueLNG and often had to put in many hours of hard work at night after work to attend lessons.

“It was not easy transitioning from shipbuilding to LNG bunkering. We had to learn new

technical standards to understand LNG as well as manage bunkering operations such as truck-to-ship bunkering”, said Poh Chiang, whom his colleagues call “Siah”.

Andreas added, “Having both Keppel and Shell as shareholders really helped with the transition as I was able to leverage Keppel’s operational know-how and Shell’s LNG expertise. Having worked in a shipyard, I was also able to better appreciate what shipowners look out for in terms of fuel efficiency, which enables me to cater to their needs as a bunker provider.”

After their two-year secondment, Andreas and Siah transferred

to FueLNG full-time in 2019.

Describing it as a decision he did not take lightly, Andreas said, “The potential of the LNG market and the chance to make a difference in providing cleaner energy for the marine industry eventually convinced me to make the full-time transfer.”

Andreas and Siah are currently undergoing a rigorous two-year training programme which includes commercial training from FueLNG, LNG bunkering training from Shell, third-party courses from companies like DNV, and a professional part-time course which will qualify them as chartered shipbrokers.

Sharing on his most



Siah (middle) and Andreas (first from right) attending the LNG2019 conference in Shanghai, China, together with Mr Saunak Rai (first from left), General Manager of FueLNG



Siah (sixth from left) and Andreas (eighth from left) was also present at Keppel Nantong in January 2019 for the strike steel ceremony of the FueLNG Bellina

memorable achievement in FueLNG so far, Siah said, "FueLNG is the proud owner of the FueLNG Bellina, the first LNG bunkering vessel in Singapore. We have also completed almost 300 truck-to-ship operations – the most in Singapore."

Echoing Siah's sentiments, Andreas shared, "My background in building ships has allowed me to work with the shipyard in customising the FueLNG Bellina for the port of Singapore. Now that she has been delivered and has arrived in Singapore, I am very excited that we will be starting our ship-to-ship LNG bunkering operations in Singapore."

Andreas has contributed over the past few years to the Singapore

Standardisation Programme, specifically the TR56: Technical Reference for LNG Bunkering. He was presented with the Enterprise Singapore and Singapore Standards Council Commendation Award on 15 April 2021 in appreciation of his efforts.

The FueLNG Bellina, which was designed and built by Keppel O&M, was featured on the Channel NewsAsia documentary, Climate for Change, in February 2021.

Told through the experiences of Keppel O&M employees, including Andreas, the documentary highlights the commissioning and delivery of the vessel.

Scan the QR code below to watch the documentary.



Standing tall in the Philippines

It is hard to miss Muhammad Fadley Bin Mohd Amin at the shipyard given his towering presence. At 193cm, he stands out above the rest – literally – during his routine yard walkthroughs.

As President of Keppel Batangas Shipyard (KBS), which is his first overseas assignment, Fadley ensures the growth and competitiveness of KBS amidst the headwinds in the offshore & marine (O&M) industry and the global energy transition. He started as an Electrical Engineer in Keppel Shipyard in 2008, before steadily rising through the ranks to become the Operations Manager of Alpine Engineering Services prior to his posting in the Philippines in August 2018.

Fadley's current position challenges him to take on new roles which require different skill sets from his previous project work management experience. To bring in business for KBS, Fadley has to forge strong business networks, which he does by personally leading and managing the shipyard's sales and marketing initiatives, as well as visiting local clients and foreign shipowners.

Building on Keppel O&M's strong engineering capabilities and track record in execution, the yard has clinched many major contracts in the past two years, including the repair of a Philippine Navy sealift vessel BRP Tarlac, and the Japanese Pure Car Carrier Hoegh Sydney, whose vessel size has not been drydocked in the yard for over 15 years. The yard also recently



Outside of work, Fadley enjoys spending quality time exploring nature in the Philippines with his wife and children

undertook its first Ballast Water Treatment System (BWTS) retrofit project, laying the milestone and track record for future projects. A BWTS is designed to remove biological organisms from a vessel's ballast water, thus contributing to environmental conservation.

That said, the journey was not all smooth sailing. Fadley and his colleagues also had to overcome various challenges, such as natural calamities like the Taal Volcano eruption in early 2020, earthquakes, typhoons, as well as community lockdowns during the COVID-19 pandemic.

"During the Taal Volcano eruption, affected families near the danger zone sought shelter in the evacuation centres. The local community, including Keppel Batangas Shipyard, helped in the relief efforts and some of the

evacuees were accommodated at the Keppel GK Eco Village", recounted Fadley. Due to the yard's distance from the volcano, its operations were unaffected.

During his time in the Philippines, Fadley has built strong rapport with his Filipino colleagues and adapted to the local Filipino culture. He regularly participates in volunteer events with his colleagues and converses in Tagalog, albeit with a Singaporean accent.

Fadley's wife, two sons and daughter joined him on his posting to the Philippines. On weekends, Fadley enjoys spending quality time with his family, including visiting children theme parks, exploring the natural environment in Batangas and shopping at the malls in Metro Manila.

Celebrating women

Women have long played a pivotal part in the Keppel story. Keppel is proud to have women in all business units and at all levels of the Group, running its businesses and driving its growth around the world.

On International Women's Day on 8 March 2021, Keppel launched the #WomenLeadersofKeppel series on LinkedIn to showcase its women leaders, as well as share insights into their perspectives and experiences. *OM Newsletter* shares the insights from Ms Adeline Seah, General Manager of Keppel Sea Scan, one of the ten women leaders featured in the series.

Adeline Seah was just 28 years old when she became one of Keppel Offshore & Marine's first female project managers, delivering one

of the world's largest offshore wind turbine installers. Over the years, she acquired experience in various roles including engineering, project management, business development, procurement and logistics. Today, she is the GM of Keppel Sea Scan, a leading provider of marine accommodation, trading and equipment leasing.

As a young woman leader in an industry which traditionally attracted more men, Adeline worked hard to prove herself. A trailblazer in the field, she quickly gained the respect of her colleagues, and is glad to see many more women joining the industry today.

Her belief in always upskilling saw her take a MSc in Project



Adeline Seah, General Manager of Keppel Sea Scan

Management several years ago, where she emerged as Valedictorian, while juggling work commitments and being a mother of two.

Adeline's leadership style focuses on empathy, communication, and relationship building. She enjoys sharing her experiences with colleagues. "I am always heartened when colleagues tell me I have made a difference in their lives."

Beach cleanup



Volunteers from Keppel Batangas Shipyard in the Philippines cleaned up 2km of shoreline, picking up over 560kg of rubbish

Between September and December 2020, over 120 volunteers from Keppel Offshore & Marine combed the beaches of East Coast Park in Singapore to clear waste off the shores and promote a cleaner environment.

Volunteers were split into separate groups based on work zones to avoid intermingling. With their collective efforts, the volunteers cleared over 290kg of waste, such as plastic bottles and food wrappers.

Over in the Philippines, around 100 volunteers from Keppel Batangas Shipyard cleaned up 2km of shoreline along the Batangas Bay in November 2020, picking up over 560kg of rubbish.

If left unchecked, the garbage and flotsam will cause damage to marine wildlife and water quality, which will in turn negatively affect livelihoods of fishermen in the community.

Doing good well

In recognition of our continued efforts to support the fight against COVID-19, do good and give back to the community, Keppel received awards from the National Volunteer & Philanthropy Centre and the Community Chest.

CHAMPION OF GOOD

Keppel was announced as a Champion of Good for the fourth consecutive year by the National Volunteer & Philanthropy Centre on 19 November 2020. This is a national recognition conferred on companies to encourage corporate giving.

Keppel is committed to uplift lives and care for the underprivileged. In 2020, Keppel supported vulnerable groups most affected by the pandemic through its corporate social responsibility (CSR) initiatives. The award also bears testament to the compassion of Keppelites, who continue to step up to support the less fortunate and the larger community during the year.

COMMUNITY SPIRIT PLATINUM AWARD

In addition, on 11 December 2020, Keppel received the Community Spirit Platinum Award at the Community Chest Awards ceremony. The award recognised Keppel's CSR efforts and donation of \$600,000 to The Courage Fund in 2020 in support of those affected by the COVID-19 pandemic. The event was graced by President Halimah Yacob



Staff volunteers across the Keppel Group stepped up during the COVID-19 pandemic to serve the community. This included delivering care packs to families living in rental flats, and sharing with them proper hand washing techniques

and hosted by Mr Masagos Zulkifli, Minister for Social and Family Development and Second Minister for Health.

Since the start of the pandemic, Keppelites have been donating generously to provide support to frontline workers and those most affected by the pandemic in Singapore. In March 2020, Keppel announced a \$4.2 million care package, comprising voluntary contributions from directors, management and staff, and additional matching contributions from Keppel Corporation. The package was used to provide assistance to lower income households through

rebates from Keppel Electric, M1 and City Gas, support for Keppel's frontline workers and vulnerable communities, as well as the donation to The Courage Fund.

Beyond the contributions in Singapore, Keppel also supported international efforts in the fight against the pandemic through collaboration with the Singapore Red Cross and other organisations in different countries.

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Ammonia as marine fuel

In March 2021, Keppel Offshore & Marine (Keppel O&M) signed a Memorandum of Understanding with A.P. Moller - Maersk A/S, Fleet Management Limited, Maersk Mc-Kinney Moller Center for Zero Carbon Shipping, Sumitomo Corporation and Yara International ASA to jointly conduct a feasibility study with the aim of establishing a comprehensive and competitive supply chain for the provision of green ammonia ship-to-ship bunkering at the Port of Singapore.

The study aims to cover the entire end-to-end supply chain of ammonia bunkering, which includes the development of a

cost-effective green ammonia supply chain, design of ammonia bunkering vessels, as well as related supply chain infrastructure.

The study will assess the supply of ammonia including potential synergies with Liquefied Petroleum Gas (LPG) as a starting point. Considering the comparable requirements for mild refrigerated storage, vessels or barges initially designed for LPG can also handle brown, blue and green ammonia.

Keppel O&M's key role is to develop and design the new build ammonia bunkering vessel and ammonia-ready LPG bunkering vessel and lead in the coordination

with relevant authorities in Singapore to establish port regulations and operational guidelines.

Emitting zero CO₂ when combusted, ammonia has long been considered as one of the most promising alternative marine fuels to reduce greenhouse gas (GHG) emissions within the shipping industry, which is in line with the International Maritime Organization (IMO) strategy to reduce CO₂ emission by 2050. In particular, green ammonia possesses great potential as it is produced from only renewable electricity, water and air with no CO₂ emission.



Mr Chris Ong, CEO of Keppel O&M

“There are multiple routes to the decarbonisation of the marine industry and we are pleased to be able to leverage our expertise in engineering and bunkering to spearhead the development of cleaner marine fuels such as ammonia. This includes the design of ammonia bunkering and ammonia-powered vessels, as well as developing the value chain necessary for the adoption of ammonia. This is in line with Keppel's Vision 2030, which includes seizing opportunities in new energy.”

Mr Chris Ong
CEO of Keppel Offshore & Marine