

KEPPEL SECURED FPSO CONTRACT FROM MODEC

Keppel Offshore & Marine Ltd (Keppel O&M) has through its wholly-owned subsidiary, Keppel Shipyard, secured a Floating Production Storage and Offloading (FPSO) contract from MODEC Offshore Production Systems (Singapore) Pte Ltd. The shipyard has been engaged to fabricate, complete and integrate the topside modules and mooring support structure for a FPSO.

Components for the modules and mooring support structure are scheduled to arrive in the third quarter of 2020 for completion as well as integration and installation with the FPSO hull. The FPSO hull is expected to arrive in

the yard in the fourth quarter of 2020. Slated for delivery in the second quarter of 2021, the FPSO will be equipped to process 90,000 barrels of oil and 75 million standard cubic feet of gas per day and with a storage capacity of 700,000 barrels of oil.

Mr Chris Ong, CEO of Keppel O&M, said, "We have built a solid track record of 11 projects completed with the MODEC group of companies over the years, which include FPSO conversions, module fabrication and integration works, as well as turret projects. Against the backdrop of COVID-19, Keppel O&M has implemented enhanced safety measures to ensure the safety of our

staff and customers, while leveraging technology and innovation to ensure that our operations can continue in a safe and efficient manner."

Mr Anthony Quinn, President and COO of MODEC Offshore Production Systems (Singapore), said, "We have confidence in Keppel's track record and ability to deliver in spite of the current challenging environment, as we continue to support Brazil's significant oil and gas industry. While low oil prices amidst a global pandemic marks a difficult time for the industry, we are confident that there is continued demand for energy in the long-term as the global economy gears up for recovery."

ST ENGINEERING LAUNCHED SERVICE OPERATION VESSEL DESIGN

In June 2020, ST Engineering Marine launched its Service Operation Vessel (SOV) design to meet the operational needs of the offshore renewables industry. Fitted with an electric propulsion system including energy storage system, the SOV is designed based on ST Engineering's innovative Eco-hull for low fuel consumption and enhanced seakeeping characteristics to maximise comfort of the crew, service personnel and specialists.

The SOV concept is targeted at operators looking for a more cost-effective and reliable engineering solution. The SOV design can be customised to cater to the needs of global developers and operators.

The SOV is configured with two azimuth-type main propellers, two tunnel bow thrusters and one retractable azimuth forward thruster. The one propulsion system coupled with an advanced dynamic positioning system and heave-compensated gangway equips the vessel for its primary function – safe transfer of personnel from onboard to offshore wind turbines.

Additionally, a cargo/passenger lift with six fixed levels provides zero-step access and transfer for personnel and cargo

from the vessel to the turbine's transition piece (TP) through the gangway. It is well-equipped with a 3D-motion compensated knuckle boom crane to provide covering access to TP and operational areas for boat landings. It also has a large clear space for deck preparation and is fitted with a container skidding system for 10 and 20 feet size containers.

To maximise operational efficiency and reduce any unplanned downtime, ST Engineering has integrated its proven in-house NERVA ship management and

sensmaking systems. These ABS certified systems adopt data analytics and machine learning techniques to perform predictive maintenance and condition-based monitoring of equipment, hence providing prescriptive and pre-emptive data to operators for better decision making.

With a 5-star hotel standard interior design and customisable facilities, the SOV can accommodate up to 85 personnel for servicing the offshore windfarm infrastructure.



ST Engineering Marine's new Service Operation Vessel (SOV) design for developers and operators in the offshore renewables industry.

ST ENGINEERING UPGRADED STRAUM SUCCESSFULLY ON TIME

Straum, a 10 year old chemical tanker with an overall length of 164m and a gross tonnage of 12,862, had her maiden drydocking and upgrading in the Tuas yard of ST Engineering Marine. The vessel is owned by Utkilen AS, a family-owned shipping company with headquarters in Bergen, Norway. Utkilen is one of the leading players in the transportation of chemicals products.

Upgrading works for *Straum* included installation of the Ballast Water Treatment System (BWTS), conversion of an existing fuel oil tank into a new pump room, installation of scrubber system and modification of existing sea chests. The tanker arrived in March, and the key challenge was to re-deliver her within schedule with limited workforce due to

COVID-19 pandemic. The successful delivery of *Straum*, without any lost time injury, was made possible by close cooperation between the project teams from Utkilen and ST Engineering.

Through 3D modelling, proper planning and communication on engineering work, the marine team started the pre-fabrication work for the extensive pipe structures. This shortened the drydocking lead time and minimised disruptions to her operations.

Most of the pipe structures were pre-fabricated, installed and system tested prior to the ship's arrival to maximise the downtime. When *Straum* came into the yard, the marine team immediately performed the modification and upgrading works onboard.



Straum, a 10 year old chemical tanker, had her maiden drydocking in the Tuas yard of ST Engineering Marine.

Structures for the scrubber were also pre-fabricated. Other works carried out included the installation of a scrubber tower, modification and relocation of the existing piping and equipment, and the installation of the scrubber systems equipment, automatic instrument, power distribution arrangement, monitoring and control system, alarm and fire detection system.

KEPPEL FLNG CONVERSION SOLUTION ACHIEVED 33% GHG EMISSION SAVINGS

Keppel Offshore & Marine's (Keppel O&M) conversion of a Liquefied Natural Gas Carrier (LNGC) into a Floating Liquefaction Vessel (FLNG) using a design and execution model jointly engineered by Keppel O&M and Golar LNG Limited, is estimated to save approximately 33% of greenhouse gas (GHG) emissions compared to a new build FLNG.

This is according to a study conducted by Environmental Resources Management which assesses the converted FLNG *Hilli Episeyo* and a new build FLNG of a comparable design and specification. The study concluded that the converted FLNG saves a total of 63,343 tons of GHG emissions.

The repurposing of LNGCs into FLNGs contributes to the circular economy, adding decades to the life of the vessel and recapturing value that would have been lost through disposal, as well as reducing the consumption of materials that would have been needed for a new build. For example, utilisation of virgin steel was reduced by 39% in the converted FLNG *Hilli Episeyo*, contributing significantly to the reduction in GHG emissions.

Mr Chor How Jat, Managing Director (Conversions & Repairs) of Keppel O&M said, "We are committed to driving cleaner and more sustainable solutions for the offshore, marine and energy industries. As a pioneer of vessel conversions, Keppel O&M promotes a circular economy as well as supports customers in reducing their emissions and achieving significant savings in resource consumption. In comparison to a new build FLNG, a converted FLNG has a smaller carbon footprint, is more cost-effective, and is faster-to-market."

Hilli Episeyo – the world's first converted FLNG – has performed consistently, providing proof of concept and attesting to the innovative and reliable solution put forth by Keppel O&M and Golar. The FLNG has maintained 100% commercial uptime since its delivery in 2017, and recently surpassed its 42nd cargo dispatch.

Keppel Shipyard is currently undertaking its second FLNG conversion, *Gimi*, for Golar. *Gimi* is being repurposed for the 20-year BP Greater Tortue Ahmeyim contract offshore West Africa.



The converted FLNG *Hilli Episeyo* is estimated to save approximately 33% of GHG emissions compared to a new build FLNG.

SEMBCORP MARINE PARTNERS GE RENEWABLE ENERGY'S GRID SOLUTIONS TO DEVELOP STATE-OF-THE-ART ELECTRICAL TRANSMISSION SYSTEM FOR RWE

Sembcorp Marine and GE Renewable Energy's Grid Solutions have been chosen by RWE to supply the high voltage direct current (HVDC) electrical transmission system for the Sofia Offshore Wind Farm. RWE is the second largest generator of electricity in the United Kingdom.

Sembcorp Marine will be building and installing the offshore converter platform. At the heart of the wind farm, it will comprise a 10,000-tonne topside attached to a jacket foundation piled into the seabed. The onshore converter station will convert the electricity generated by the wind farm to 400 kV, before it enters the national grid.

"Sembcorp Marine is excited to team up with GE to support the Sofia Offshore Wind Farm project," said Samuel Wong, Sembcorp Marine Head of Offshore Platforms.

As the consortium leader, GE's Grid Solutions will be responsible for the engineering, procurement, construction and installation of two HVDC converter stations capable of transmitting 1,400 megawatts (MW) of power at 320 kilovolts (kV).

GE's Grid Solutions and Sembcorp Marine began early design works in July, with the full contract subject to the project's final investment decision, due in the first quarter of 2021. The HVDC transmission system represents Sofia's second largest contract and will include the design, manufacture, installation, commissioning and maintenance of the offshore converter platform and the onshore converter station, including all ancillary equipment.

Sven Utermöhlen, Chief Operating Officer Wind Offshore Global of RWE Renewables, said: "We are keen to support the growth of both onshore and offshore wind energy." Located on the Dogger Bank, 195 km off the UK coast in the Central North Sea, Sofia spans an area of 593 km². With a capacity of 1.4 gigawatt (GW) that will power nearly 1.2 million UK homes with clean and renewable energy, Sofia will be one of the largest wind farms in the world once completed.

Construction of the Sofia Wind Farm is due to begin onshore at its Teesside converter station site early next year, with offshore construction expected to get underway in 2023.



Source: RWE

ST ENGINEERING MARINE UNVEILED NEW LNG CATAMARAN DESIGN FOR OFFSHORE OPERATIONS

ST Engineering Marine has unveiled a new LNG catamaran design for offshore operations to promote green and sustainable shipping through the design of cleaner and green ships. The new design reduces toxic emissions, and at the same time enhances passenger comfort and provides cost-effective and safe transfer of offshore personnel.

The 76m dual fuel LNG catamaran marine fast crew boat design was developed in collaboration with Incat Crowther. ST Engineering Marine has utilised the latest generation Wave Piercing Semi-SWATH hull form, where the vessel is able to transit at high speed with low hull motions.

The innovative hull design is fitted with a ride control system comprising a pair of forward-mounted active T-foils and aft-mounted active Interceptors. These technologies enable comfortable high-speed transit, and when coupled with the advanced Dynamic Positioning System (DP2), provide an excellent platform to operate a broad range of Walk to Work Gangways on the rear deck.

The vessel offers an unrivalled transit experience for 150 passengers with two classes of seats, entertainment solutions, and elevated privacy and comfort for the most discerning

executives. It can comfortably house 30 guests in single cabins with en-suite facilities and all the amenities for high-quality offshore living.

Four robust and reliable 10-cylinder dual fuel engines allow the vessel to cruise at 34 knots or achieve a maximum speed of 40 knots through four waterjets. The LNG catamaran is well positioned to fulfil this market demand for safer and more cost-effective transfer solutions.



ST Engineering Marine's dual fuel LNG catamaran fast crew boat is designed for offshore operations.

ST ENGINEERING MARINE DELIVERED SEVEN EAGLE TO SUBSEA 7

Seven Eagle, a construction, flex-lay and diving vessel for field development and construction activities, was successfully delivered incident-free to Subsea 7.

The 138m long vessel with a gross tonnage of 9,556t arrived in ST Engineering Marine's Tuas yard in January for the installation of the Self-Propelled Hyperbaric Lifeboat (SPHL).

The SPHL was transferred from sister vessel, *Seven Osprey*, onto *Seven Eagle*. Due to differences between the two vessels in terms of weight, geometry, and manway entry, several modifications were required. The scope of work was challenging and alignment of the SPHL trunk was identified early on as the most critical activity.

Seven Eagle has an integrated saturation dive system which can be deployed through two moon pools with a depth

rating of 230m. The SPHL modification was a critical modification for Subsea 7 to replace an obsolete 16-man SPHL with a modern boat conforming to the latest industry standards.

Hyperbaric rescue of divers in saturation is a mandatory requirement for diving operations. In the event of any incident that endangers the vessel, the ship crew will abandon the ship by conventional lifeboats while the divers will be extracted and rescued with the use of SPHL that helps to keep them in hyperbaric condition. *Seven Eagle* is classed by DNV GL.

Subsea 7 is a global leader in the delivery of offshore projects and services for the evolving energy industry. ST Engineering Marine has been a ship repair partner for Subsea 7 for the past ten years for the dry-docking, maintenance repair, and modification works of its vessels.



Seven Eagle was installed with a self-propelled hyperbaric lifeboat and an integrated saturation dive system.