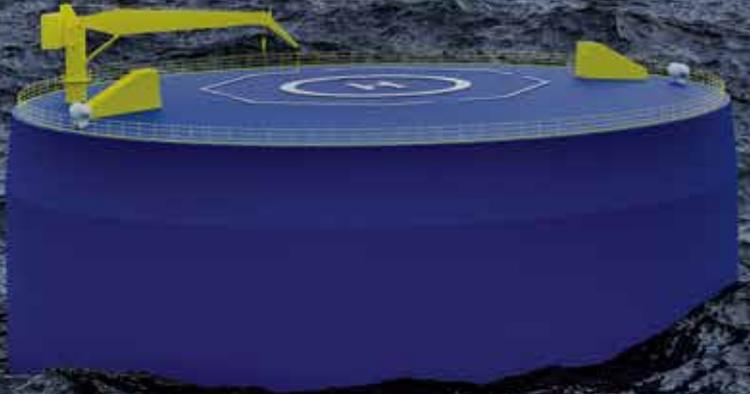


DELIVERING INNOVATIVE & SUSTAINABLE SOLUTIONS

ADVANCING TECHNOLOGICAL RESPONSE
AND THE CREATION OF INNOVATIVE
SOLUTIONS, FROM CONCEPTUALISATION
TO COMMERCIALISATION, TO SUPPORT
GLOBAL DECARBONISATION GOALS





SOFIA OFFSHORE WIND FARM - ONE OF THE WORLD'S BIGGEST OFFSHORE WIND FARMS AT THE UK NORTH SEA

In July 2020, Sembcorp Marine and GE's Grid Solutions were selected by German utilities company RWE Renewables as the preferred suppliers for the high voltage direct current (HVDC) electrical transmission system for the 1.4 gigawatt Sofia Offshore Wind Farm. This further strengthens our strategic diversification into greener solutions.

DELIVERING INNOVATIVE & SUSTAINABLE SOLUTIONS

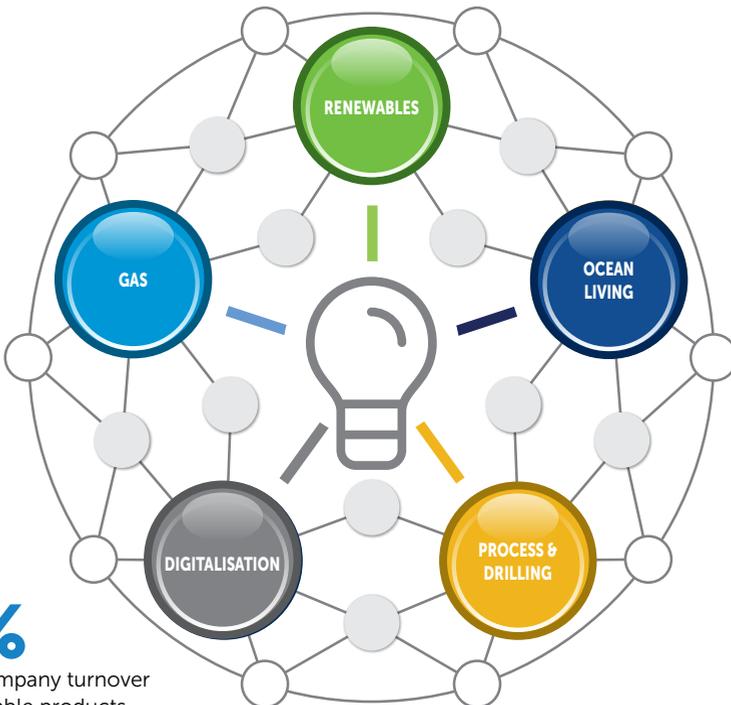
Our contribution towards decarbonisation is realised through our sustainable products and solutions aligned to our five areas of innovation focus. For each focus area, we actively manage the risks, explore opportunities and engage in research and development, with strategic collaborations, to deepen our core engineering capabilities. Our pipeline of sustainable products and solutions also comply with some of the world’s strictest safety, quality and engineering regulations. This ensures that our solutions achieve zero harm to people and the environment.



“Decarbonisation is a multi-faceted issue requiring different perspectives and collaborations. Sembcorp Marine is proud to support Singapore’s push for decarbonisation and we look forward to contributing our experiences from developing low-carbon engineering products and solutions for the global markets, and from our ongoing efforts to tap solar power in our yard operations.”

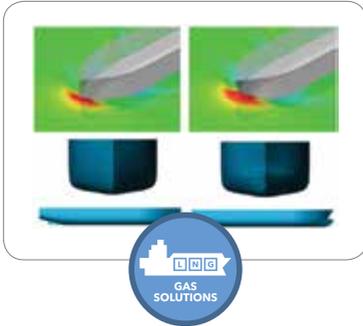
- Mr Wong Weng Sun, President & CEO of Sembcorp Marine

OUR INNOVATION FOCUS



Achieved
26%
of annual company turnover
from sustainable products
and solutions in 2020

OUR WORK IN 2020



Largest membrane type LNG bunker vessel in Asia

The 12,000 cubic metre GTT Mark III Flex membrane tanks are the largest ever built in Singapore and the rest of Asia. This state-of-the-art design allows for safe transfer of LNG during bunkering operations as well as reducing loss of cryogenic LNG through evaporation. This vessel also boasts an optimised vessel hull form using computational fluid dynamics (CFD) as shown on the left, and energy-efficient designs that effectively reduce carbon emissions during operation.



Floating offshore wind turbine solution for moderate to harsh environment based on the SWACH design

As the offshore wind market is moving into deeper and harsher environments with larger turbines, our subsidiary, Sevan SSP, developed a cost-efficient floating foundation for offshore wind turbines. Based on our proprietary Sevan SWACH (Small Waterplane Area Cylindrical Hull) design, the cylindrical floating foundation solution is scalable to house the largest wind turbines and offers excellent motion characteristics in harsh conditions.



Work Boat World Best of 2020 Awards "Best Medium Ro-Pax" design – Hjeljestad

Hjeljestad, an aluminium hybrid plug-in double-ended ferry LMG-16-DEH, designed by our wholly-owned subsidiary, LMG Marin, won the Best Medium Ro-Pax Award at the Work Boat World awards. This ferry, which accommodates 16 cars and 80 passengers, is powered by a biodiesel and electrical propulsion system. The lithium-ion batteries onboard are charged by onshore hydroelectric power, reducing the emissions of vessel operation to zero.



Strength through collaboration – Bringing ideas to life

In February 2020, Sembcorp Marine inked a Master Research Collaborative Agreement (MRCA) with Singapore's Agency of Science, Technology and Research (A*STAR) to set up Joint Lab@TBY to pursue innovation in Digital Design and Advanced Manufacturing. This collaboration aims to pave the way for shorter time-to-market solutions by boosting our engineering capabilities, production capacity and efficiency. Joint Lab@TBY will capitalise on ongoing construction projects which will provide a real-world environment for research.

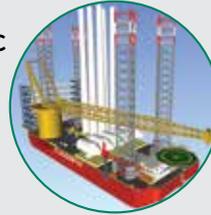
DELIVERING INNOVATIVE & SUSTAINABLE SOLUTIONS

Sembcorp Marine Offshore Wind Innovation & Solutions

Sembcorp Marine is committed to providing innovative and sustainable engineering solutions for the global offshore, marine and energy industries. In keeping with the global shift towards a cleaner and greener energy mix, we developed a suite of solutions across the entire offshore wind value chain.



Sofia HVDC Substation
Offshore Fixed Platform



PC1200 | 1600 | 2000 WTIV
Wind Turbine Installation Vessel



OUR OFFSHORE WIND VALUE CHAIN



Marine & Geophysical Survey
Hydrographic Vessels, Offshore Survey Vessels



Fixed & Floating Foundations
Jackets, Monopiles, Spars, TLPs, Semi-submersibles



Substations & Platforms
Offshore Substations, Renewable Hub



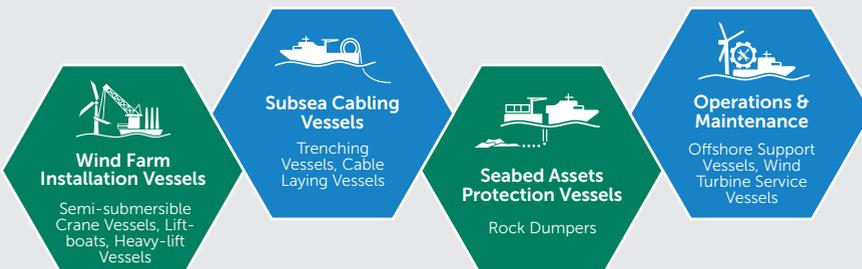
ASEAN Explorer
Cable Laying Vessel



FLINSTONE
Offshore Rock Placement Vessel

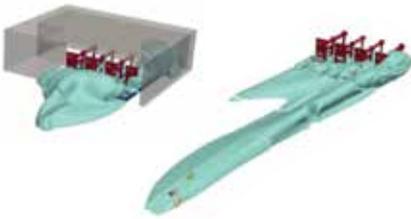


LMG 400 Offshore Service Operation Vessel (SOV)
Support Vessels, Wind Turbine Service Vessels



DELIVERING INNOVATIVE & SUSTAINABLE SOLUTIONS

TOWARDS A LOW CARBON FUTURE THROUGH COLLABORATIONS



Gas Collaboration

Successfully completed Joint Development Projects (JDP) on LNG with American Bureau of Shipping (ABS) and A*STAR's Institute of High Performance Computing (IHPC) comprising Risk Analysis for LNG Bunkering Leakage & Explosion and LNG Boil-off Rate Determination & Management. The image (left) is the result obtained from a CFD simulation showing a gas cloud (cyan color) resulting from an LNG leak during bunkering operation for two designs of bunkering station: with enclosure (first from left) and without (second from left).

Large Scale Maritime Fuel Cell Systems

A collaboration between Corvus, Toyota, Equinor, Norled, Wilhelmsen, LMG Marin, the NCE Maritime CleanTech cluster and University of South-Eastern Norway (USN) to develop and produce modularised and cost-effective Proton Exchange Membrane (PEM) fuel cell systems for the international marine market.



Carbon Capture Project - Stella Maris

A collaboration by Alterra Infrastructure, TGE, Moss Maritime and Sevan SSP (a wholly-owned subsidiary of Sembcorp Marine) to explore and develop a commercially competitive solution for large scale maritime transport, offshore discharge, floating storage and injection of CO₂ for permanent storage in subsea reservoirs.

ENSURING A SUSTAINABLE FUTURE THROUGH COMPLIANCE

Marine and offshore assets are capital intensive and often operate under harsh environment. To ensure the safety of the crew, the environment and the asset, we design, build and deliver our products and solutions according to stringent international standards. These regulatory and statutory requirements include among others Norwegian's NORSOK standard, UK HSE requirements, Norwegian Maritime Authority Regulations as well as the Code for Construction and Equipment of Mobile Offshore Drilling Units (MODU).

The responsibility to ensure these regulations are met lies with a dedicated team of regulatory compliance and technical safety engineers who are involved in every stage of the project. Using tools such as standard operating procedures, flowcharts, checklists and experience transfer from past projects, our engineers continuously innovate their work processes to execute projects seamlessly. As new regulations addressing different aspects of Health, Safety and Environment are introduced periodically, our team undergoes regular competency development courses to be kept up-to-date and relevant.

In addition to safety and environmental regulations, Sembcorp Marine is also cognisant of the need to secure solutions and protect assets from cyberspace threats. To this end, we have developed competencies in implementing cybersecurity requirements, including the Cyber Manage Prepared (CMP) notation from Bureau Veritas which we have done for a newbuild LNG carrier to meet the IMO's Resolution MSC (98).

BUILT TO THE WORLD'S STRICTEST REQUIREMENTS

