ADDRESSING ENVIRONMENTAL CHALLENGES

At Sembcorp Marine, we are actively managing the risks and opportunities brought about by climate change, ocean ecosystem degradation and resource availability.

We reduce emissions by operating more efficiently and increasing the proportion of renewable energy in our total energy use. With two of our largest yards already ISO 14001-certified, our environmental management goes beyond compliance with applicable laws, regulations and standards. By focusing on three key areas in our environmental programme, namely Climate, Earth and Ocean, we are constantly exploring new ways to improve our practices and minimise the environmental impact of our operations.

Sembcorp Marine, together with our sustainability partner Carbon Care Asia, has jointly developed a methodology to quantify our indirect carbon emission savings. This methodology provides a quantifiable assessment of the carbon dioxide equivalent (CO_2e) savings attributable to our low-carbon energy solutions, including LNG-battery hybrid tug boats and battery-powered vessels.

In July 2019, Sembcorp Marine delivered the semi-submersible crane vessel (SSCV) Sleipnir to our customer, Heerema Marine Contractors. Sleipnir is the world's first dual-fuel crane vessel with engines running on MGO and LNG for sustainable operation across all environmental jurisdictions.

"Sleipnir scores several firsts in the industry: It is the largest crane vessel yet built; it has the strongest pair of revolving cranes; and it's also the world's first crane vessel with dual-fuel engines running on MGO and LNG, dramatically reducing harmful emissions. Sleipnir's innovative capabilities will place Heerema even firmer at the forefront of developments in the offshore oil, gas and wind energy industry for both installations and decommissioning."

– Mr Pieter Heerema, Chairman of the Board at Heerema Marine Contractors

Singapore's first ship-to-ship LNG bunkering was carried out on Sleipnir in 2019

	Our Commitment	Our Efforts in 2019
	• Increase the proportion of renewal energy in our yard operations total energy use • Replace diesel-powered mobile equipment with electric-powered or gas-powered equipment	• Our 4.5MWp solar panels installed at Tuas Boulevard Yard are fully operational • New corporate building at Tuas Boulevard Yard received Green Mark Gold standard certification[5] from the Building and Construction Authority (BCA) of Singapore • Started our tug fleet renewal programme. Sembcorp Marine's new liquefied natural gas (LNG) hybrid powered tugs will reduce greenhouse gas (GHG) emissions by 30% from our current diesel–powered fleet. We will operate our first hybrid tug in 2020
	• Prevent and reduce marine pollution, including marine debris • Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impact • Prevent and reduce the impact of invasive alien species on water ecosystems	• No significant fines arising from non-compliance with environmental laws and regulations and no significant oil spills • Seabin, a floating debris collector, was piloted at Admiralty Yard in Singapore to remove marine plastics and debris from surrounding waters • Our Brazilian subsidiary Estaleiro Jurong Aracruz (EJA) participated in beach and mangrove cleaning activities along Piraqueacu River
	• Sustainable management and efficient use of natural resources • Reduce waste generation through elimination, prevention, reduction, recycling and reuse • Achieve environmentally sound management of chemicals and hazardous waste	• Rolled out our Eliminate, Reduce, Reuse, Recycle, Recover (E4Rs) Programme at Tuas Boulevard Yard and Admiralty Yard • Achieved 100% contract responsible procurement spend • Continuing efforts towards ISO 50001 certification • Organised an Environmental Awareness Campaign at Tuas Boulevard Yard with our customer Transocean • Launched 'For People Awareness' Programme at EJA • EJA recycled oil drums for solid waste collection

(5) The Green Mark Gold standard certification is part of the BCA Green Mark Scheme launched in 2005 as an initiative to drive Singapore's construction industry towards more environment-friendly buildings.

ADDRESSING ENVIRONMENTAL CHALLENGES

CLIMATE

To manage the environmental challenges associated with climate change, Sembcorp Marine reduces GHG emissions by streamlining our operations to harness energy and other resources more efficiently. We reinforced our commitment to carbon emission reduction by introducing the Climate Action Programme in all our yards in 2019.

Our Sustainability Report 2019 covers energy consumed by Sembcorp Marine yards in Singapore, Brazil and Indonesia. Our energy sources include electricity, diesel, LPG, CNG, acetylene and renewable solar energy. Our total energy consumption in FY2019 amounted to 1.411 million GJ, with electricity consumption accounting for approximately 59.6% of energy use.

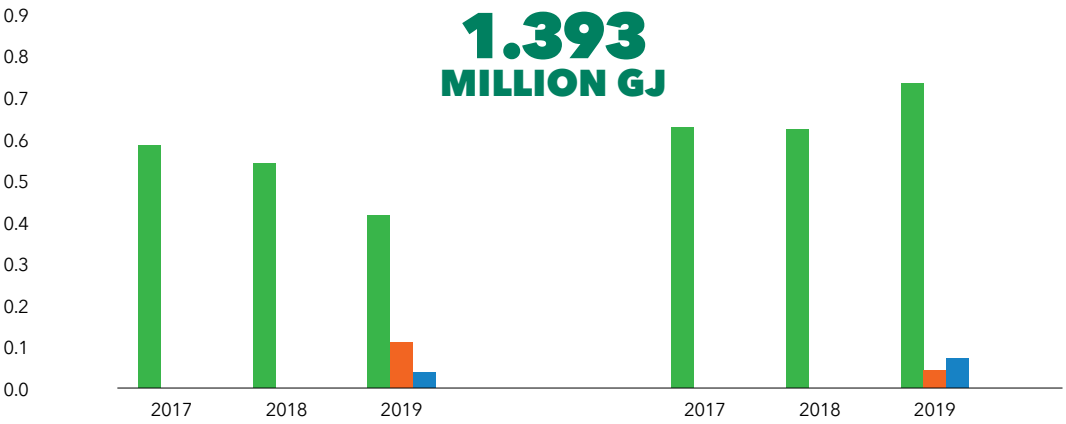
Renewable (solar) energy consumed

0.018 MILLION GJ

Energy Consumed from Non-Renewable Sources (million GJ)

Total Non-Renewable

1.393 MILLION GJ



	Fuel Consumption[6]			Electricity Consumption		
	2017	2018	2019	2017	2018	2019
Singapore	0.580	0.537	0.412	0.625	0.619	0.729
Indonesia	–	–	0.107	–	–	0.042
Brazil	–	–	0.034	–	–	0.069

(6) Net calorific values (NCV) were sourced from Emission Factors for Cross Sector Tools (March 2017). NCV for acetylene was referenced from S. McAllister et al., Fundamentals of Combustion Processes (2011).

" – " Figures for Indonesia and Brazil were not available for 2017 and 2018.

To get a better representation of our energy usage efficiency, we began measuring our energy use based on man-hours of operation in Brazil, Indonesia and Singapore in FY2019. Our energy intensity was 0.117 million GJ/man-hour for the year.

Sembcorp Marine's direct GHG emissions from sources we own or under our direct control, including fuel for vehicles, generators and air compressors (Scope 1), and indirect emissions from electricity consumption (Scope 2) are shown below. We have used the operational control approach to identify the GHG emissions. The boundaries of our reported emissions currently comprise our shipyards operating in Brazil, Indonesia and Singapore, excluding joint ventures.

Solar panels installed at Tuas Boulevard Yard generated 5,052 MWh of electricity, equivalent to:

Avoiding emissions of approximately

>2,100 tCO_2e

Sufficient energy to power about

1,100

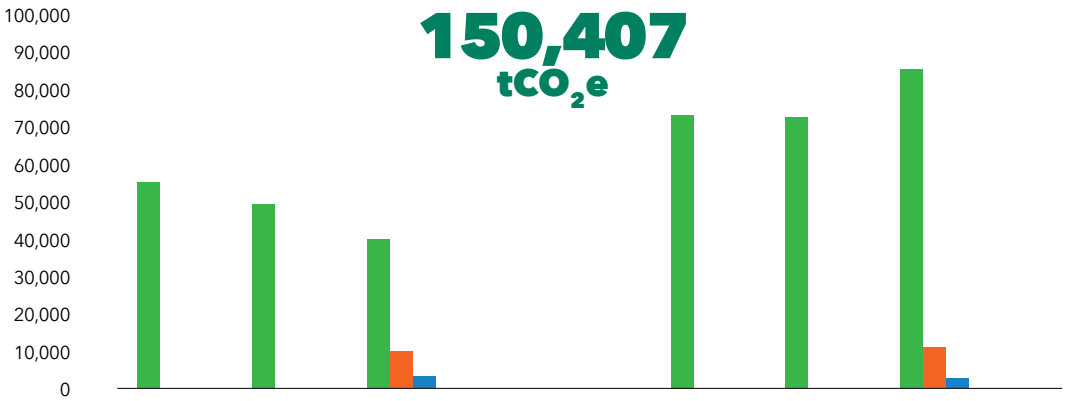
4-room flats for one year

GHG Emissions (tCO_2e)

Scope 1[7] Scope 2[8]

Total GHG Emissions

150,407 tCO_2e



	2017	2018	2019	2017	2018	2019
Singapore	54,827	48,867	39,517	72,738	72,060	84,835
Indonesia	–	–	9,705	–	–	10,724
Brazil	–	–	2,986	–	–	2,640

(7) Emission factors (EF) were sourced from Emission Factors for Cross Sector Tools (March 2017). The scope 1 calculations for 2017 and 2018 have been restated due to revised emission factors used for the fuels. Only CO_2, CH_4 and N_2O emissions are included in the calculation of direct GHG emissions. Global Warming Potential (GWP) factors used are from the 2014 IPCC Fifth Assessment Report. Emission data is derived from combustion of non-renewable fuels consumed in our yards and follows the requirement of GHG Protocol.

(8) Grid EF for Singapore was obtained from Energy Market Authority (EMA), grid EF for Brazil and Indonesia were obtained from Institute for Global Environmental Strategies (2019) – List of Grid Emission Factors version 10.6. Scope 2 emissions for Singapore for 2018 has been restated based on latest Grid EF obtained from Energy Market Authority (EMA). Only CO_2 emissions are included in the calculation of indirect GHG emissions. Emissions data is derived from purchased electricity consumed in our yards and follows the requirement of GHG Protocol.

" – " Figures for Indonesia and Brazil were not available for 2017 and 2018.

ADDRESSING ENVIRONMENTAL CHALLENGES

The Green Mark Gold standard certification awarded to our Corporate Office recognises our best practices in environmental design and performance. All our yards have also adopted these practices in their workshops and offices.

AC variable voltage and variable frequency (VVVF) motor drive

with sleep mode features has been implemented on lifts and escalators to reduce electricity consumption.

Efficient Irrigation System

has been implemented to drip water onto plants at a controlled rate closer to soil level. The system is also fitted with rain sensors that reduce water usage when it rains.

Chiller Plants

are designed to have a maximum energy efficiency of 0.6kW/RT, which means 0.6kW or less electricity is consumed with each tonne of cooling.

Recycling Bins

are available for waste from daily work processes, such as plastic, paper and cans.

Compost Bins

are installed to combine landscape waste, dried plants and food waste for use on site, reducing the need for artificial compost.

Naturally Ventilated

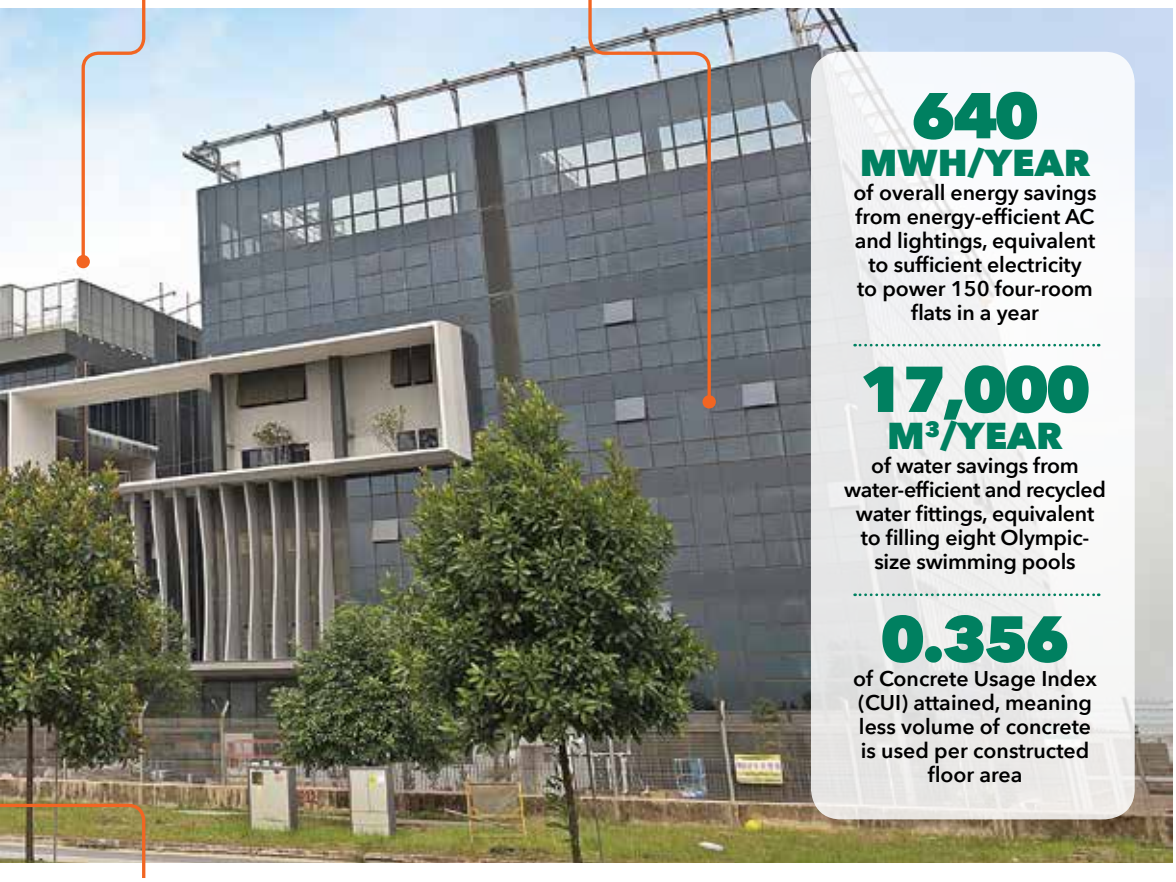
multi-storey car park reduces the load on mechanical forms of ventilation.

AC system designed with super-efficient cooling towers

that can run higher cycles of concentration to reduce the amount of water used. Condensate collected from the air handling units is also recycled.

Energy-efficient LED light fittings

are used in all areas and controlled by presence and motion sensors to reduce energy consumption.



640
MWH/YEAR
of overall energy savings from energy-efficient AC and lightings, equivalent to sufficient electricity to power 150 four-room flats in a year

17,000
M³/YEAR
of water savings from water-efficient and recycled water fittings, equivalent to filling eight Olympic-size swimming pools

0.356
of Concrete Usage Index (CUI) attained, meaning less volume of concrete is used per constructed floor area

Green Transportation

with six lots in the car park designed for electric vehicle parking and charging, 80 sheltered bicycle parking lots and shared transport.

ADDRESSING ENVIRONMENTAL CHALLENGES

OCEAN

According to UNESCO, nearly 3 billion people around the world depend on marine and coastal biodiversity for their needs. The ocean absorbs approximately a third of the carbon dioxide produced by humans, which helps negate the impact of climate change[9]. Many of our products and solutions operate at shore and near shore. Some are deployed across the world's oceans, including the fragile arctic frontier. With this in mind, Sembcorp Marine has implemented responsible corporate practices, policies and programmes as part of our ocean conservation efforts.

We also make sure our production operations comply with discharge requirements. We conduct emergency exercises to maintain our response preparedness to accidental spills. In 2019, Sembcorp Marine neither incurred any significant fines from non-compliance with environmental laws and regulations, nor caused any significant spills.

As a responsible ocean citizen, Sembcorp Marine removes marine plastics and debris from surrounding waters that drift into our yards seasonally. Over the years, we have removed more than 100 tonnes of waste material to protect marine wildlife. Our employees regularly participate in beach and mangrove cleaning activities.

We support and organise community activities that contribute and protect the marine and coastal ecosystems from pollution. Sembcorp Marine's Ocean Community Engagement Programme contributes to a cleaner environment for marine wildlife to thrive in waters surrounding our yards.

To commemorate the 2019 World Cleanup Day, EJA employees participated in beach and mangrove cleaning activities along the Piraqueacu River

In July 2019, we installed a Seabin device (above) at our Admiralty Yard in Singapore to remove floating debris from waters around the shipyard. The collected debris and trash, such as plastic particles, pellets and wrappers, were disposed of through environmentally-responsible methods. The Seabin helped remove 240kg of floating debris in the second half of 2019.

EARTH

Sembcorp Marine consumes material and equipment in our core operational activities, which comprise offshore engineering and construction, ship repairs and conversion and specialised shipbuilding. These activities produce waste and emissions that impact the environment.

Due to climate change, water is also becoming increasingly scarce globally[10]. The Group recognises these challenges. We are committed to using our precious resources responsibly and we take necessary action to reduce our environmental footprint.

(9) https://en.unesco.org/news/deep-sea-marine-science-key-unlocking-potential-our-oceans
(10) https://www.unwater.org/water-facts/climate-change/

Sembcorp Marine's E4Rs programme promotes sustainable living

E4Rs represent:

- **E**liminate: Remove any unnecessary use of resources or substitute with environmentally-friendly resources
- **R**educe: Use only what you need
- **R**euse: Reuse materials that are in usable conditions for their original or new purpose
- **R**ecycle: Convert waste into useful products
- **R**ecover: Recover materials or energy from waste which cannot be reduced, reused or recycled

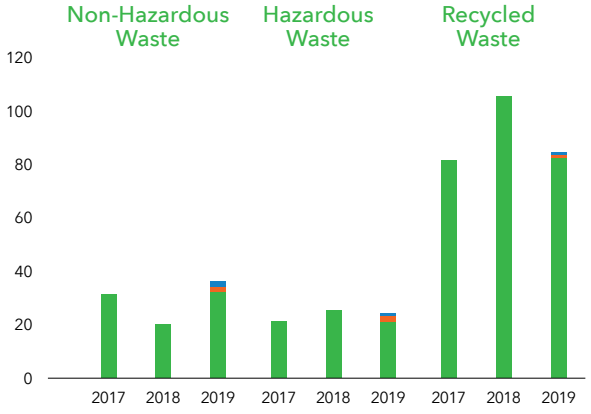
Our key raw materials include steel, copper, welding materials and paint products. We source and choose our materials responsibly during the solutions development, engineering and procurement stages of our project management. In 2019, the total non-renewable materials used by the Group amounted to 1,904,959 metric tonnes, compared to 1,699,320 metric tonnes in 2018. The non-renewable materials used include steel, copper grits and steel grits.

We have put in place environmentally-responsible waste disposal processes in our Singapore yards, including the use of licensed waste management vendors.

Estaleiro Jurong Aracruz (EJA) in Brazil also reuses oil drums for solid waste collection, helping us avoid approximately 8,320 kg of metal waste in FY2019.

Besides monitoring water consumption closely during our operations, we conduct regular checks to reduce leaks in our shipyards' water networks. In 2019, Sembcorp Marine used 2.149 million m^3 of water. By investing in new technology and adopting water efficiency practices such as using seawater for gearbox cooling, we achieved a 9.5% reduction in the consumption of municipal water and NEWater*, compared to 2018.

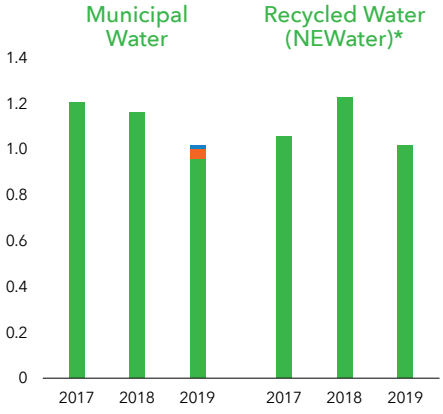
Waste by type (gigatons)



	2017	2018	2019	2017	2018	2019	2017	2018	2019
Singapore	31	20	32	21	25	21	81	105	82
Indonesia	–	–	2	–	–	2	–	–	1
Brazil	–	–	2	–	–	1	–	–	1

** The figure for non-hazardous waste in 2018 has been restated to account for waste generated by our customers' vessels, which was previously excluded.*

Water withdrawal by source (mil m^3)



	2017	2018	2019	2017	2018	2019
Singapore	1.200	1.154	0.962	1.051	1.221	1.131
Indonesia	–	–	0.044	–	–	–
Brazil	–	–	0.012	–	–	–

** Recycled water (NEWater) is used only in Singapore.*

" – " Figures for Indonesia and Brazil were not available for 2017 and 2018.