







# ADDRESSING ENVIRONMENTAL CHALLENGES

EMBRACING NEW TECHNOLOGIES TO PROTECT THE NATURE, REDUCE OUR EMISSIONS AND STRIVE FOR ZERO HARM TO THE ENVIRONMENT

## **We provide safe and reliable cylindrical hull designs to mitigate harsh water environmental risk**

Sevan SSP's cylindrical hull design has been chosen for the Wisting Field Development. This FPSO will also be powered with hydro-generated renewable electrical power via a submarine cable connection to shore to lower its emission.

In a separate project collaboration, Sevan SSP's cylindrical hull is being developed into a Floating CO<sub>2</sub> Storage and Injection Unit, as part of a broader European North Sea Decarbonisation programme.

## ADDRESSING ENVIRONMENTAL CHALLENGES



### Caring for Our Ocean

The ocean is one of the world's most important natural resources, including fish and salt, and a major highway for the transportation of goods and people. More than three billion people depend on the oceans for their livelihood.



The ocean absorbs approximately a third of the atmospheric carbon dioxide, reducing the impact of climate change.



The ocean holds many of life's essentials including global food and water supply.



The ocean offers new spaces for sustainable living.



The ocean potentially holds a rich source of mineral deposits, including copper, zinc, gold and silver, useful in products we use every day.

Increasing levels of carbon dioxide are making the ocean more acidic, and many marine species and ecosystems increasingly vulnerable. Global warming is increasing ocean temperatures that impact corals and diverse ecosystems. Overfishing has led to oceanic degradation.

Sembcorp Marine is committed to protecting our ocean ecosystems. Through investment in research and development of ocean engineering and marine science technologies, we deliver innovative, safe and reliable solutions that operate globally.

As we explore new opportunities, we implement responsible corporate practices and policies, and comply with laws and regulations across our processes and operations.

We mitigate the risks to safety and health of the environment and asset by designing and building solutions in accordance with stringent international standards. These include complying with the IMO regulations and the Polar Code.

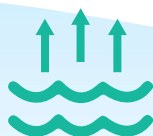
In 2021, the Group did not incur significant fines from non-compliance with environmental laws and regulations. The Group also supports and engages in community activities that protect our ocean health.



#### Discharge

Our yards comply with discharge requirements set by local authorities. We also remove marine plastics and debris from surrounding waters that drift into our yards through the debris collectors installed at our yards.

Our employees across our operations volunteer in coastal, mangrove and beach clean-up activities.



#### Rising Sea Level

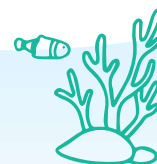
Infrastructures in Tuas Boulevard Yard and Aracruz Yard are built at a higher datum level to address rising sea levels.



#### Bio-Fouling & Corrosion

We reduce the use of microplastics by partnering with experts to test and develop sustainable coating solutions.

We also promote the use of chemical additive-free paints.



#### Ocean Biodiversity

We developed a chemical-free ballast water management system to mitigate the transfer of bio-invasive species at sea.

Our innovative product solutions are designed to operate safely and reliably in the world's oceans.



Sofia Offshore Wind Farm

## NEAR SHORE

Engineering design, manufacturing, installation and commissioning of offshore platforms and stations for offshore wind applications.



Battery-powered Ropax Ferry

## MID-OCEAN

Design and build zero-emission, zero-discharge battery-powered Ropax ferries to protect ocean health.



Wisting Field Development

## COLD & HARSH WATER

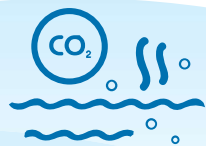
Provide proprietary cylindrical hull design which serves as a safe and stable platform operating in cold and harsh ocean environments.



Energean Power FPSO for Karish Field Development

## DEEPWATER

Design and construct ships and offshore assets for safe operations in deepwater environments.



### Acidification

We actively research and develop carbon capture and storage solutions.

We also explore nature-based solutions to absorb CO<sub>2</sub> and reduce acidity in the ocean.



### Overfishing

We create and design floating structures for offshore aquaculture to meet the growing demand for seafood and help prevent depletion of wild fish stocks.



### Extreme Wave & Seismic Load

We adopt the industry's best practices and standard for designs of solutions that are deployed near high seismic and tsunami prone areas.

These solutions are designed to withstand extreme and abnormal load events and are also equipped with wave monitoring systems.



### Ocean Mining

We develop solutions that promote sustainable and responsible use of resources in the ocean.

## ADDRESSING ENVIRONMENTAL CHALLENGES



### Our Climate Action and Commitment

At Sembcorp Marine, we are proactively managing the risks and opportunities brought about by climate change.

The Group recognises the significance of climate-related risks arising from factors such as policy and regulation, technology, stakeholders' expectations and extreme weather.

Climate-related risks and opportunities are integrated into Sembcorp Marine's business strategy and environmental sustainability framework.

Sembcorp Marine is committed to managing and mitigating our environmental impact across our value chain.

With our Group's environmental policy, ISO 14001 Environmental Management System and Integrated Environmental Framework, we go beyond compliance with applicable laws, regulations and standards as we proactively manage our consumption of energy and GHG emissions from our operations to meet our emission reduction goal by 2030.

# 2030 Reduce our emissions by 40%

#### 2011

Started tracking our Scope 1 and 2 GHG emissions

#### 2018

Established Our Environmental Sustainability framework based on Climate, Ocean and Earth

Joined Singapore Climate Action Pledge

Engaged Carbon Care Asia to evaluate the carbon savings of our sustainable solutions

#### 2019

Operationalised the 4.5 MWp solar panel installed in Tuas Boulevard Yard

#### 2020

Supported and adopted the Task Force on Climate-related Financial Disclosures (TCFD)

Published our Climate Programmes

Our President & CEO was appointed as Co-chair of the International Advisory Panel on Maritime Decarbonisation (IAP)<sup>7</sup>

#### 2021 - 2030

The IAP's recommendations on maritime decarbonisation to the Singapore Government identified nine pathways to maritime decarbonisation, including policy options to accelerate the transition and ways in which Maritime Singapore can support the industry's decarbonisation

Sembcorp Marine is committed to aligning our climate policies and strategy with IAP recommendations. Through this membership, Sembcorp Marine advocates for a robust and efficient roadmap for maritime decarbonisation

We continue to make steady progress towards our target of reducing our total Scope 1 and 2 GHG emissions from 2008 levels by 40% by 2030

<sup>7</sup> Established by the Singapore Maritime Foundation and supported by the Maritime and Port Authority of Singapore, IAP champions decarbonisation efforts in the maritime industry. The panel explore decarbonisation strategies, policies and actions to be taken by the local maritime sector in Singapore, in line with the International Maritime Organization's (IMO) 2050 target to reduce total annual GHG emissions from international shipping by at least 50 per cent.



The Group supports and aligns our disclosures with those recommended by the TCFD. In this report, we voluntarily publish our enhanced climate-related financial disclosures in the four key areas as recommended by the TCFD.

For more details on how we align our disclosures with TCFD, please refer to our website at <https://www.sebmarine.com/sustainability/environment>.



## GOVERNANCE

Sembcorp Marine's Board of Directors and Senior Management Committee (SMC) oversee climate-related risks and opportunities through the Company's annual strategic plan exercise. To guide the Group's strategic direction, the Board and SMC meet twice a year to review key business plans while considering climate-related issues. The SMC then reports to our Board Executive Committee who will review and provide guidance.

Led by the President & CEO, the Sustainability Council comprises senior management from various business units and functions including Risk Management, HR, Finance, Operations, Supply Chain, R&D, and Investors Relations and Corporate Communications. As champions of the EESG working groups, the Council members contribute their expertises to address specific sustainability challenges.

The Council oversees our corporate sustainability strategies, policies, performance and mitigation actions and report to the SMC twice a year on sustainability issues including climate-related matters.



## RISK MANAGEMENT

The Chief Risk Officer and Head of Production Control & Development, being the respective chairpersons of the Corporate Governance and Environmental Sustainability working groups, oversee the climate-related risks matrix.

To advance our responses to energy transition risks, we:

- actively manage risks, explore opportunities and engage in R&D, with strategic collaborations, to deepen our core engineering capabilities
- ensure that our sustainable solutions cause zero harm to people and the environment by complying with strict safety, quality and engineering regulations

To better manage climate risk, the Group will integrate climate factors into risk and credit frameworks by developing:

- methodologies for assessing and mitigating physical and transition risks of climate change
- corresponding metrics for tracking and disclosure
- capacity building and training of relevant staff



## STRATEGY

Climate-related risks and opportunities are identified and integrated into Sembcorp Marine's environmental sustainability framework and business strategy through annual strategic planning by the corporate strategy team, and the environmental sustainability workgroup.

Climate-related risks and opportunities are evaluated based on near- (2021-2025), medium- (2025-2030) and long-term (2030-2050) trends. Our key climate risks include the pace of global energy transition and changes in regulation, extreme weather events, and technology and stakeholder expectations.

Identifying climate-related risks and opportunities help to inform our long-term business strategy and financial planning. We have implemented three key strategies to maximise climate-related opportunities and stay competitive.

In the next two years, we plan to analyse global energy transition scenarios to evaluate the resilience of our business strategy against climate-related risks and opportunities for different time horizons.



## METRICS & TARGETS

We use a set of metrics and targets to manage and monitor our exposure to climate-related risks and opportunities.

Our climate-related metrics include:

- Share of renewable energy in our energy mix
- Share of annual turnover generated from renewable and gas product solutions
- Total energy consumption within our operations
- Scope 1 and 2 (location-based) GHG emissions
- Water usage in water-stressed areas

In 2021, we assessed our relevant Scope 3 emissions and will actively manage those emissions from 2022.

To align with the low-carbon transition, the Group has set internal and public targets including:

- low-carbon energy consumption
- halve Scope 1 and 2 emissions from 2008 levels by 2030
- generate at least 40% of our total revenue from gas and renewable energy solutions by 2030

## ADDRESSING ENVIRONMENTAL CHALLENGES

### Our Carbon Footprint

At Sembcorp Marine, we understand the impact we can have on the GHG emissions in our value chain and have now included, as part of our data collection process, GHG emissions in both our upstream and downstream activities.

This initiative allows us to track and monitor our Scope 3 emissions as well as provide visibility on the environmental impact of our processes to effectively identify opportunities for emissions reduction.

With a global presence, Sembcorp Marine is committed to grow our business responsibly and sustainably. Our total energy consumption in FY2021 amounted to 1.451 million gigajoule (GJ), a 14.6% increase compared to our consumption in FY2020. This is primarily attributed to the inclusion of the energy consumption from one of our subsidiaries in Singapore. Our energy intensity for the same period was 0.018 GJ/man-hour.

The following are the scope of carbon emissions that are relevant to Sembcorp Marine, as defined by the GHG Protocol.

#### UPSTREAM

##### Scope 3 Emissions



##### Purchased Goods & Services

Purchase of equipment, bulk material and consumables for operations and projects.



##### Capital Goods

Our responsible procurement practices undertake a holistic approach which considers the cradle-to-gate emissions of capital goods.



##### Waste Generated in Operations

We see value in encouraging the mindful use of resources through the institutionalisation of E4R programme aimed at eliminating, reducing, reusing, recycling and recovering waste to minimise our operational footprint.

#### OUR BUSINESS OPERATIONS

##### Scope 1 Emissions

Our Scope 1 emissions ensue from business operations. These include the emissions produced by machinery and vehicles as well as the use of gases for cutting and welding steel plates to support production work.

##### Scope 3 Emissions



##### Business Travel

Employees required to travel for business are motivated to reduce their carbon footprint by leveraging on alternative means such as videoconferencing and remote surveys.

##### Scope 2 Emissions

Our Scope 2 emissions are purchased electricity obtained from our national grid. To reduce our reliance on the grid whilst capitalising on our yard infrastructure, we generate clean and renewable solar energy via our 8.5 MWp solar panel installations in our Tuas Boulevard Yard.



##### Employee Commuting

We provide a private transportation network across Singapore that is safe, reliable and environmentally friendly for our employees to commute to work.

#### DOWNSTREAM

##### Scope 3 Emissions



##### Downstream Transportation & Distribution

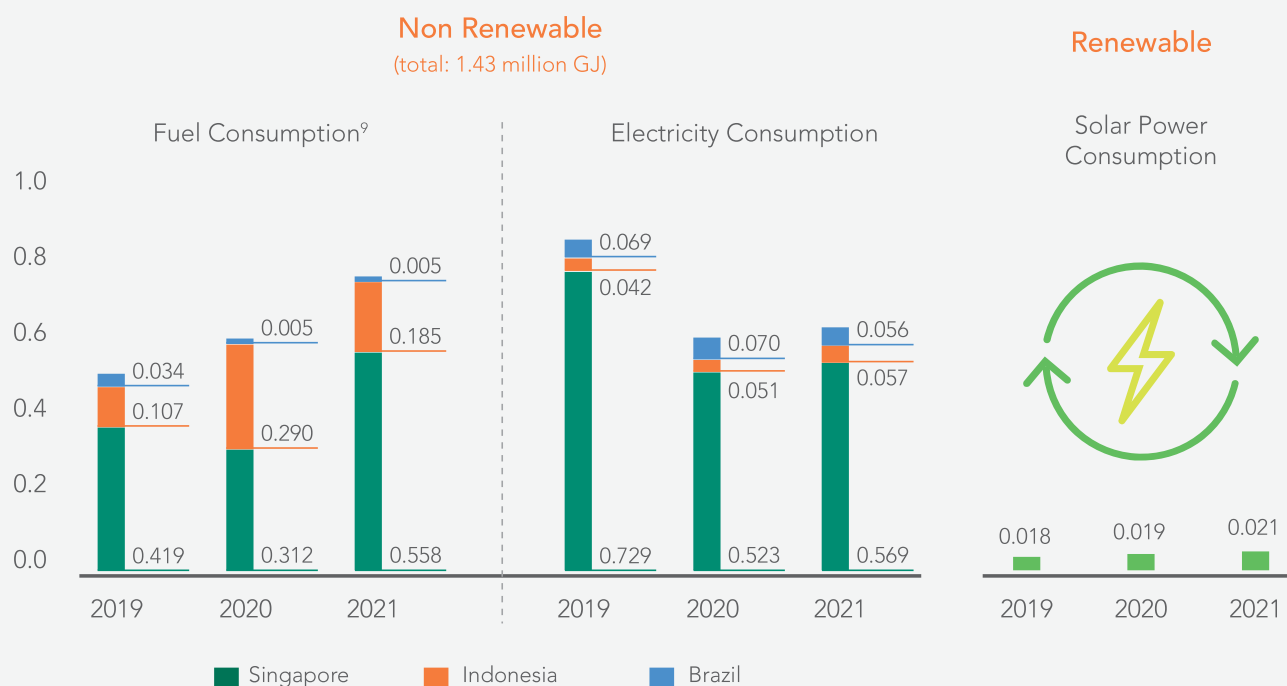
A significant majority of our products are delivered from our production facility directly to our customers. Products which require transportation capitalise on the cost effective and environmentally friendliest option via semisubmersible heavy lift ships.



##### Use of Sold Products

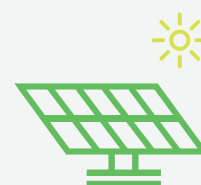
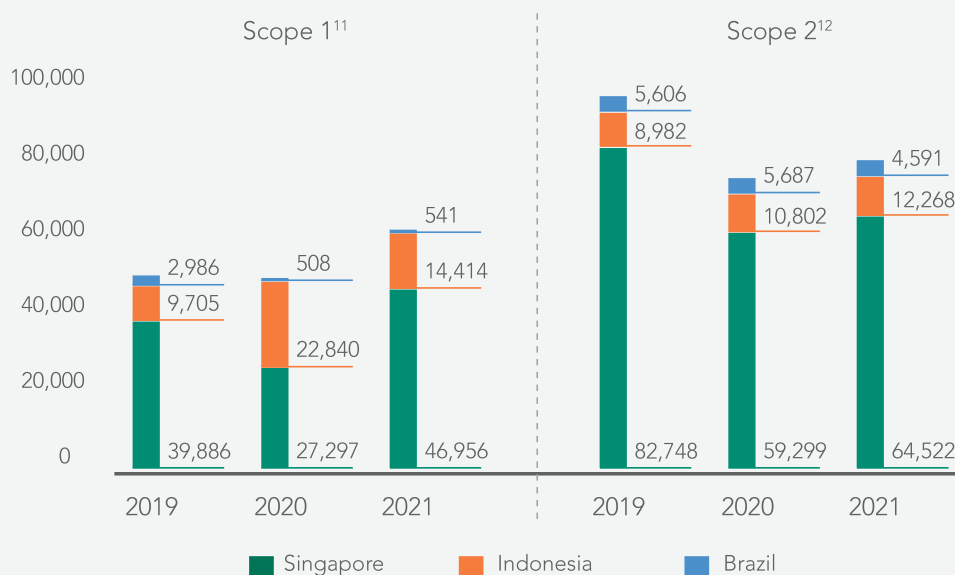
Anchored on five key pillars of innovation, our range of sustainable solutions ensure minimum harm to the environment during operation.



ENERGY CONSUMED<sup>8</sup> (million GJ)

<sup>(8)</sup> Our energy sources include electricity, diesel, LPG, CNG, acetylene and solar energy.

<sup>(9)</sup> Net calorific values (NCV) were sourced from WRI/WBCSD Greenhouse Gas Protocol Emission Factors for Cross Sector Tools (March 2017). NCV for acetylene was referenced from S. McAllister et al. (2011) *Fundamentals of Combustion Processes*. Fuel consumption for Singapore for 2019 and 2020 have been restated due to revised energy consumption conversion methodologies.

GHG EMISSIONS<sup>10</sup> (tCO<sub>2</sub>e)

Solar panels installed at Tuas Boulevard Yard generated 5,725 MWh of electricity, equivalent to:

Avoiding emissions of approximately

**>2,300**  
(tCO<sub>2</sub>e)

<sup>(10)</sup> Operational control approach is used to identify the GHG emissions. The boundaries of our reported emissions currently comprise our shipyards operating in Brazil, Indonesia and Singapore, excluding joint ventures.

<sup>(11)</sup> Emission factors (EF) were sourced from WRI/WBCSD Greenhouse Gas Protocol Emission Factors for Cross Sector Tools (March 2017). Only CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O 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. Fundamentals of Combustion Processes (2011). Scope 1 emissions for Singapore for 2019 and 2020 have been restated due to revised conversion methodologies.

<sup>(12)</sup> 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 (IGES)(2021) – List of Grid Emission Factors version 10.10. Scope 2 emissions for Singapore for 2020 have been restated based on latest Grid EF obtained from Energy Market Authority (EMA). Scope 2 emissions for Indonesia and Brazil for 2019, 2020 and 2021 have been restated based on latest EF obtained from IGES. Only CO<sub>2</sub> emissions are included in the calculation of indirect GHG emissions. Emissions data is derived from purchased electricity consumed in our yards and is aligned with the requirement of GHG Protocol.



## ADDRESSING ENVIRONMENTAL CHALLENGES



### Protecting Our Earth

At Sembcorp Marine, we adopt sustainable practices and environment-friendly operational processes across every stage of our project life-cycles to optimise the use of resources and minimise waste.

The key materials that we use in the production of our sustainable solutions include steel plates, pipes, blasting

consumables, production consumables. In FY2021, the total amount of steel, copper grits, steel grits, steel shots and welding consumables used by the Group amounted to 56,861 metric tonnes (MT) compared to 229,110 metric tonnes in FY2020 and the total amount of paint and thinner used was 1,060,832 litres compared to 938,905 litres in FY2020.

#### UPSTREAM WASTE

Raw Material Handling & Supply

#### UPSTREAM IN VALUE CHAIN



Refer to page 33 of our SR2019 on our E4Rs programme

#### OWN ACTIVITIES



Steel Plates  
Steel Pipes  
Steel Shot/Grit  
Copper Grit  
Welding Consumables  
Paint  
Thinner

#### DOWNSTREAM IN VALUE CHAIN

Deployment

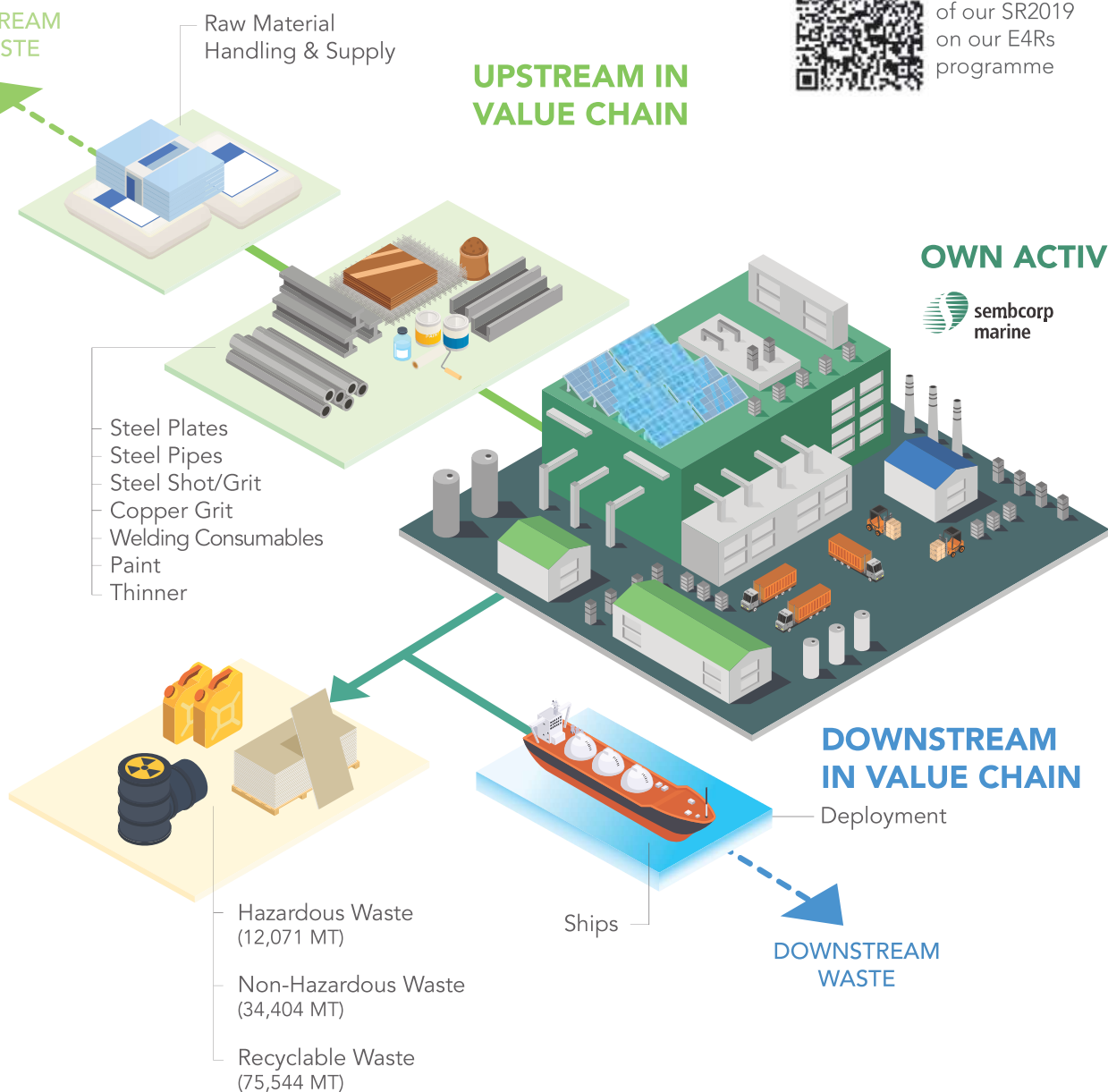
Ships

#### DOWNSTREAM WASTE

Hazardous Waste  
(12,071 MT)

Non-Hazardous Waste  
(34,404 MT)

Recyclable Waste  
(75,544 MT)



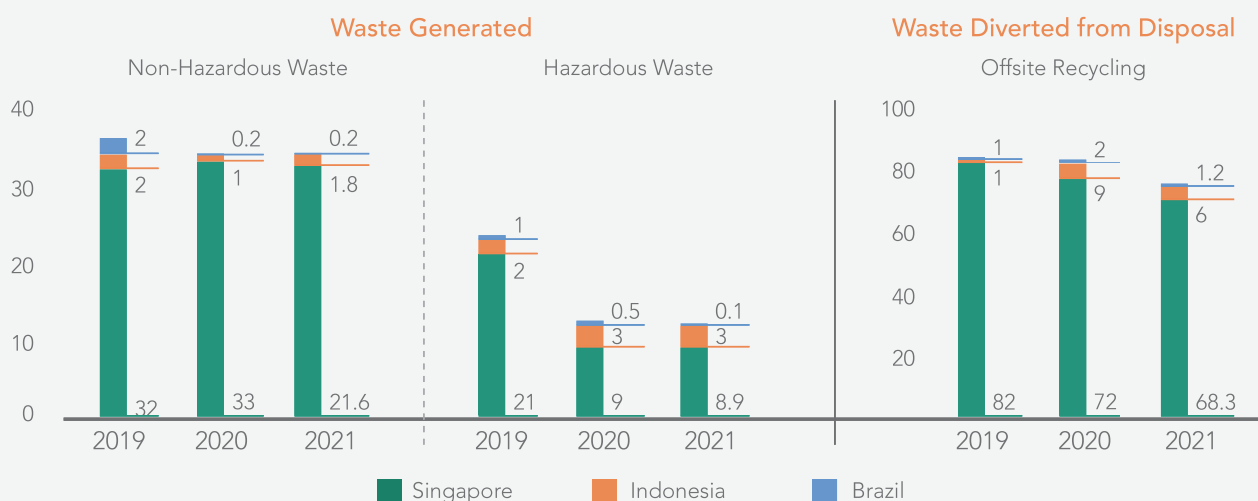
Waste management at Sembcorp Marine is centred on our E4Rs programme where the Group ensures waste is Eliminated, Reduced, Reused, Recycled and Recovered.

Our waste management policies and procedures are reviewed regularly to ensure that waste generated is handled, segregated and disposed of in compliance with applicable local environmental laws and regulations. The waste generated by our yards are collected by licensed waste management vendors for treatment and disposal or recycling.

We conduct audits on the waste vendors to ensure that the waste to be disposed is handled in the required manner and that they have the necessary authorisation to handle waste.

To monitor and track our general and hazardous waste at each site, we use weigh bridges and this is further supplemented by waste manifests provided by waste management vendors. In FY2021, the Group generated a total of 111,184 tonnes of waste of which 75,544 tonnes of waste was recycled.

### WASTE BY TYPE ('000 tonnes)

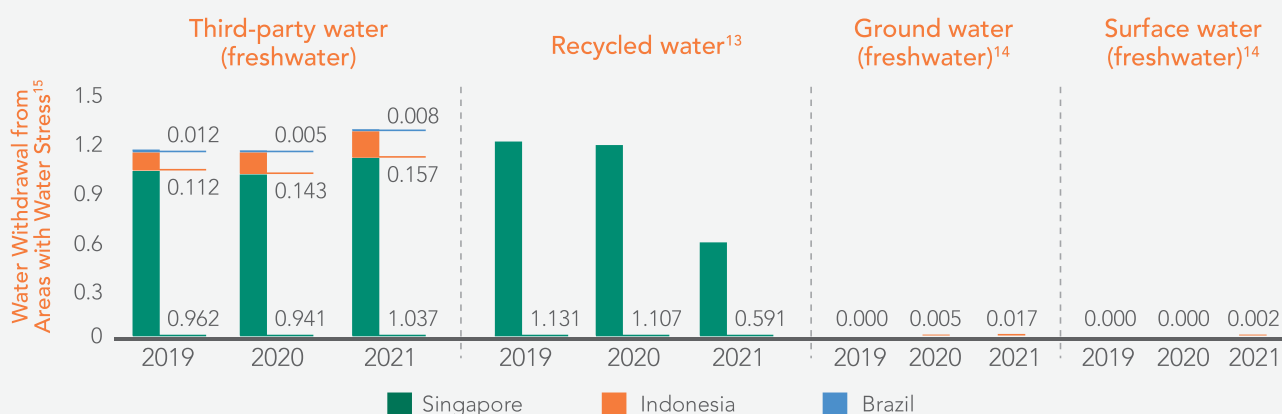


As part of Sembcorp Marine's effort to conserve water, we have installed water-saving devices in the yards and also conducted regular monitoring and leak checks in our yards' water pipe network. Recycled water is used where possible. Water discharged from our yards is treated in accordance with the environmental discharge limits and effluent standards in the countries of operation. Awareness campaigns on water

conservation are done Group-wide to promote responsible water consumption.

Water withdrawal in our business operations includes municipal water and recycled water (NEWater – used in Singapore yards). In FY2021, a total of 1.811 million m<sup>3</sup> of water was consumed, a 17.6% decrease from 2.198 million m<sup>3</sup> used in FY2020.

### WATER WITHDRAWAL BY SOURCE (mil m<sup>3</sup>)



<sup>(13)</sup> Recycled water (NEWater) is used only in Singapore.

<sup>(14)</sup> Ground water and surface water are used only in Indonesia.

<sup>(15)</sup> The water stress index was obtained from the World Resources Institute 'Aqueduct Water Risk Atlas'. Singapore and Indonesia are considered to be areas of low water stress while Brazil is considered a medium-high water stress area.