

The data in this document is presented in accordance with the Global Reporting Initiative (GRI) Standards: Core option, and the relevant GRI Standards topic and indicator is specified. This document contains all relevant disclosures for our material issues and have been grouped according to Environmental, Social and Governance categories.

PricewaterhouseCoopers LLP undertook a limited assurance engagement in respect of selected sustainability information in this document, a subset of which is presented in our 2019 ESG Review that appears in our 2019 Annual Report.

# ENVIRONMENTAL

## ALL ENVIRONMENTAL INDICATORS

### Material Issue – Climate Change

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We continued to build our renewable energy business, in line with our aim to reduce our greenhouse gas (GHG) emissions intensity and move towards a balanced portfolio of low-carbon assets:

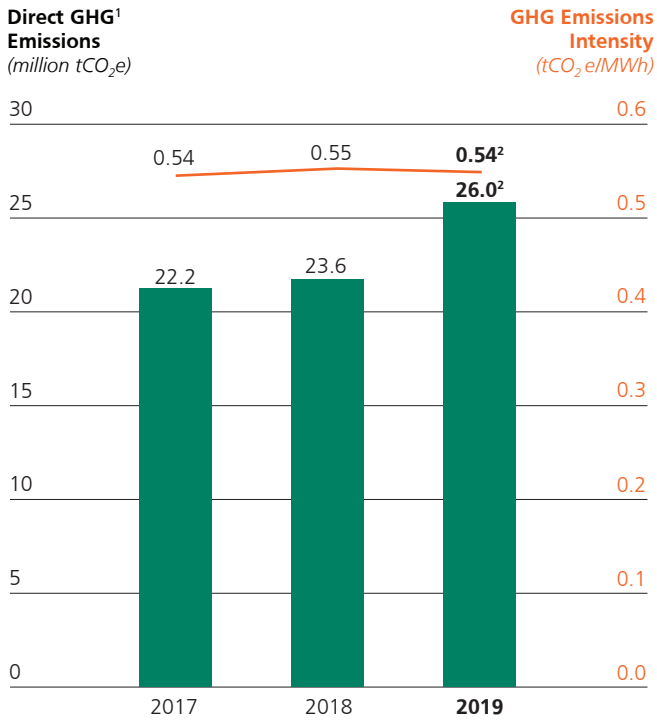
- Our total renewables capacity accounts for over 20% of our total energy capacity
- We improved our CDP Climate Change score from C to B- in 2019
- We were the only Singaporean company to feature in the global Top 100 Green Utilities ranking by Energy Intelligence, and placed 60th in the list

## GRI 305 Emissions

Disclosure 305-1: Direct (Scope 1) GHG emissions

Disclosure 305-4: GHG emissions intensity

### Direct GHG Emissions (Scope 1) and GHG Emissions Intensity



<sup>1</sup> Emissions data covers entities that produce GHGs from the combustion of fossil fuels consumed in our Energy business' assets. It excludes emissions from our anaerobic wastewater treatment plants, chemical waste, and maintenance and servicing equipment. Emission factors used are from the IPCC Guidelines for National Greenhouse Gas Inventories for 2006. 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 factors used are from the IPCC Fifth Assessment Report. A 100-year time horizon is applied. Base year is set to 2017 to compare our Scope 1 GHG emissions intensity over time. Our base year reflects the year we developed our Climate Change Strategy and correspondingly set our GHG emission intensity targets

<sup>2</sup> Includes data from our Urban business

Direct GHG emissions (Scope 1) are from sources owned or controlled by the company. Our GHG emissions data is reported using an equity share approach. Our Scope 1 GHG emissions and GHG emissions intensity by equity share approach was 26 million tonnes of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) and 0.54 tonnes of CO<sub>2</sub> equivalent per megawatt hour (tCO<sub>2</sub>e/MWh) of energy generation respectively. The increase in absolute emissions was due to the commencement of operations of our gas-fired power plants in Bangladesh and Myanmar, our small-scale power generation assets in the United Kingdom, as well as an increase in electricity generation at our Indian thermal power plants. The slight decrease in our overall GHG emissions intensity was due to higher renewable energy generation and gas-fired electricity production. We remain committed to meeting our 2022 GHG emissions intensity target of 0.42tCO<sub>2</sub>e/MWh.

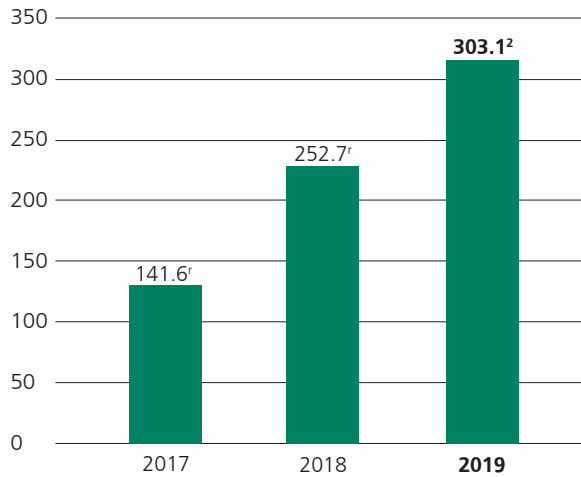
We report emissions from the combustion of biomass separately, in accordance with GRI Standards. Our global biogenic emissions amounted to approximately 531 thousand tCO<sub>2</sub>e in 2019, compared to approximately 446 thousand tCO<sub>2</sub>e the year before. The increase in our biogenic emissions was due to the inclusion of two additional assets to our reporting scope.

## GRI 305 Emissions

### Disclosure 305-2: Energy indirect (Scope 2) GHG emissions

#### Indirect GHG Emissions<sup>1</sup> (Scope 2)

(thousand tCO<sub>2</sub>e)



<sup>1</sup> Indirect GHG emissions include location-based data for all Energy business' assets. In Singapore our operations purchase energy from our own assets; to avoid double counting, the emissions resulting from these have been accounted for under Scope 1 GHG emissions. CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions are included in the calculation of indirect GHG emissions, except for India where their grid emission factor only takes into account CO<sub>2</sub>. Emission factors are taken from the International Energy Agency, Ministry of Energy of Chile, Central Electricity Authority of India, and the UK Department for Environment, Food & Rural Affairs. We are in the process of setting the base year for Scope 2 emissions to compare our performance over time

<sup>2</sup> Includes data from the import of steam, our municipal water businesses in Southeast Asia, our administrative offices in key markets as well as our Urban business

<sup>r</sup> Indicates restated figure. Scope 2 emissions for 2017 and 2018 were decreased to 141.6 and 252.7 thousand tCO<sub>2</sub>e, instead of 260.5 and 359.8 thousand tCO<sub>2</sub>e respectively, as previously reported. Reasons for the restatement can be found on page 11

Indirect GHG emissions (Scope 2) are from purchased electricity, steam, heating and cooling. We report Scope 2 GHG emissions from the majority of our plants. Our Scope 2 emissions amounted to over 303 thousand tonnes or 0.3 million tCO<sub>2</sub>e. The increase in our Scope 2 emissions is largely due to the expansion in our reporting scope.

## GRI 305 Emissions

### Disclosure 305-3: Other indirect (Scope 3) GHG emissions

Other indirect GHG emissions (Scope 3) are generated as a result of the company's activities but are not derived from sources controlled or owned by Sembcorp. We started to measure Scope 3 GHG emissions in 2019, beginning with the emissions from the use of natural gas sold to our customers. Our Scope 3 emissions amounted to 3.81 million tCO<sub>2</sub>e<sup>1</sup>.

<sup>1</sup> Emissions are calculated using the Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories for 2006 emission factors. Data is calculated on the assumption that all gas sold is combusted

## Material Issue – Resource Management

We seek to take a holistic view of resource management in line with our aim to grow and innovate our business solutions to support a circular economy, while ensuring more efficient operations to avoid or minimise the unnecessary use of resources.

## Energy Management

### GRI 302 Energy

Disclosure 302-1: Energy consumption within the organisation

#### Energy consumed and sold<sup>1,2,3</sup> (petajoules)

	CONSUMED FOR GENERATION								SOLD	
	Non-renewable Fuel				Renewable Fuel	Purchased for Consumption		Self-Generated		
Subsidiaries	Natural gas	Fuel oil, diesel or petrol	Coal	Waste	Biomass	Electricity	Steam	Electricity from solar and wind	Electricity	Steam
Energy Utilities	134.8	0.4	167.1	3.5	4.4	0.7	0.3	10.7	124.9	17.6
Water Utilities	-	< 0.01	-	-	-	1.2	0.3	-	-	-
Waste Management	-	< 0.01	-	-	-	< 0.01	-	-	-	-
Others	-	-	-	-	-	< 0.01	-	-	-	-
Mobile Combustion <sup>1</sup> (all subsidiaries)	-	0.3	-	-	-	-	-	-	-	-
<b>Total</b>	306.0				4.4	2.5		10.7	142.6	

<sup>1</sup> Renewable electricity that is generated and consumed within our assets was 5,352 GJ

<sup>2</sup> Data is collected from meters or invoices. Conversion of fuel data to MWh is based on Carbon Disclosure Project's Technical Note and 2006 IPCC Guidelines

<sup>3</sup> Numbers may not add up as they are rounded to the nearest one decimal place

We consumed 324 petajoules (PJ) of energy in 2019, 44% of which was sold as electricity and steam. Total energy consumed within Sembcorp is 181PJ in 2019. We set internal targets for our plants to improve operational performance and efficiency.

## GRI 302 Energy

### Disclosure 302-3: Energy intensity

In 2019, our energy intensity was 3.4 gigajoules per megawatt hour (GJ/MWh) of energy produced for our energy generation plants, and 0.05GJ per cubic of water produced for our water plants.

	2019	2018	2017
Energy intensity <sup>1</sup> of energy generation (GJ/MWh)	3.4	3.5 <sup>r</sup>	3.5 <sup>r</sup>
Energy intensity <sup>1</sup> of water produced / supplied (GJ/m <sup>3</sup> )	0.05	0.05	0.04

<sup>1</sup> Energy intensity is calculated using energy consumed as numerator (GJ), and product energy generated (MWh) or water produced (m<sup>3</sup>) as the denominator. The intensity figure reported is for energy consumed within the organisation. This ratio uses the energy consumption within the organisation

<sup>r</sup> Indicates restated figure. Energy intensity of energy generation for 2017 increased to 3.5 and decreased to 3.5 GJ/MWh in 2018 instead of 3.4 and 3.6 GJ/MWh respectively, as previously reported. Reasons for the restatement can be found on page 11

Our energy intensity of energy generation decreased in 2019 largely due to the increase in our renewable energy generation.

## GRI 302 Energy

### Disclosure 302-4: Reduction of energy consumption

This year, our global energy and water facilities undertook a total of 22 energy optimisation projects at an approximate total cost of S\$2 million with a potential overall annualised savings of over S\$3 million. The projects have led to greater efficiency in our plants and resulted in the reduction of nearly 29,000MWh<sup>1</sup> of electricity or 0.1PJ<sup>2</sup>. This is equivalent to the power consumed by approximately 7,000 households in a year<sup>3</sup>.

For our projects in 2019, the type of energy saved was electricity and the basis for the calculations were from the projected annualised savings that had been realised from each of the projects.

<sup>1</sup> Based on projected annualised energy savings

<sup>2</sup> One petajoule is equal to 277,777.8MWh

<sup>3</sup> Based on the average energy consumption of a four-room public housing unit in Singapore. Source: Energy Market Authority, Singapore, 2017

## Water and Wastewater Management

We revised our disclosures for water to begin aligning with the new GRI 2018: Water and Effluents 2018 Standard.

In adopting the GRI Standards, we have defined the terms as follows:

- Water withdrawal: includes all water we extract from the sea, surface, ground or third party sources such as wastewater from our customers or treated water from water public utilities
- Water discharge: includes all water that is discharged from our operations to various destinations including the sea, surface and third parties such as customers
- Water consumption: comprises the water we use in our own operations and administrative buildings. It excludes water that we withdraw and treat for supply to customers

In our print report the data is presented for both our energy and water assets for greater transparency about our water management for our stakeholders. We reclaimed around 74 million m<sup>3</sup> of water in 2019, driven by higher customer demand.

### GRI 303 Water and Effluents

Disclosure 303-3: Water withdrawal

Water withdrawal by source <sup>1,2</sup>	All areas (megalitres <sup>3</sup> )	Areas with water stress (megalitres <sup>3</sup> )
Seawater (total)	1,592,822.2	1,592,822.2
Surface water (total)	131,954.3	22,515.3
Third party water <sup>4</sup> (total)	101,619.6	95,759.8
Groundwater (total)	74,578.4	72,580.4
Wastewater (total)	70,374.5	59,796.6
<b>Total water withdrawal</b>	<b>1,971,349.1</b>	<b>1,843,474.4</b>

<sup>1</sup> Data is collected from meters

<sup>2</sup> Numbers may not add up as they are rounded to the nearest one decimal place

<sup>3</sup> One megalitre is equivalent to 1,000m<sup>3</sup>

<sup>4</sup> Third party water includes water received from water utilities

Our assets withdrew 1,971,349.1 megalitres (ML) of water in 2019:

- 80.8% was seawater that was used for plant cooling and to produce desalinated water
- 6.7% was surface water which was used for plant cooling and to produced water for municipal customers
- 5.2% was third party water from water utilities of which some was used for cooling in our operations. More than half was treated wastewater which we then reclaimed and supplied to customers
- 3.8% was groundwater that was used for cooling purposes. We are developing new water intake infrastructure to withdraw surface water instead of groundwater. The rest of the groundwater withdrawn was treated and supplied to municipal customers
- 3.6% was wastewater. Out of the total wastewater that we treated, we reclaimed approximately 16% which was supplied to our customers

**GRI 303 Water and Effluents***Disclosure 303-4: Water discharge*

<b>Water discharge by destination<sup>1,2</sup></b>	<b>All areas (megalitres<sup>3</sup>)</b>	<b>Areas with water stress (megalitres<sup>3</sup>)</b>
Seawater	1,221,694.7	
Third party water <sup>2</sup> (total)	670,440.8	
Surface water	33,137.9	
Groundwater	0.0	
<b>Total water discharge</b>	<b>1,925,273.4</b>	<b>1,807,022.3</b>

<sup>1</sup> The data includes water that we treat and discharge for our customers. Discharge figures are derived from a mix of direct measurement and mass balance

<sup>2</sup> Includes cooling water that we discharge for customers

<sup>3</sup> One megalitre is equivalent to 1,000m<sup>3</sup>

Our assets discharged 1,925,273.4ML of water in 2019:

- 63.5% was sent to the sea comprising a mixture of treated effluent, rejected water from seawater desalination and used cooling water
- 34.8% was sent to third parties comprising a mixture of treated industrial and municipal water
- 1.7% was sent to surface water comprising a mixture of treated effluent and process effluent

**GRI 303 Water and Effluents***Disclosure 303-5: Water consumption*

<b>Water consumption</b>	<b>Total water consumption</b>	<b>All areas (megalitres<sup>1</sup>)</b>	<b>Areas with water stress (megalitres<sup>1</sup>)</b>
		46,075.7	36,452.2

<sup>1</sup> One megalitre is equivalent to 1,000m<sup>3</sup>

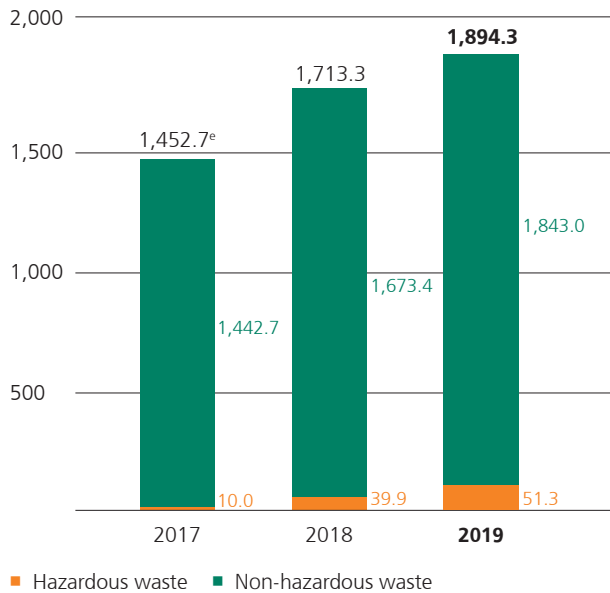
Water consumption is defined by GRI as total water withdrawal minus total water discharge. Our overall water consumption for all of our global assets is over 46,075ML.

## Waste Management

### GRI 306 Effluents and waste

Disclosure 306-2: Waste by type and disposal method

#### Waste Generated<sup>1,2</sup> (thousand tonnes)



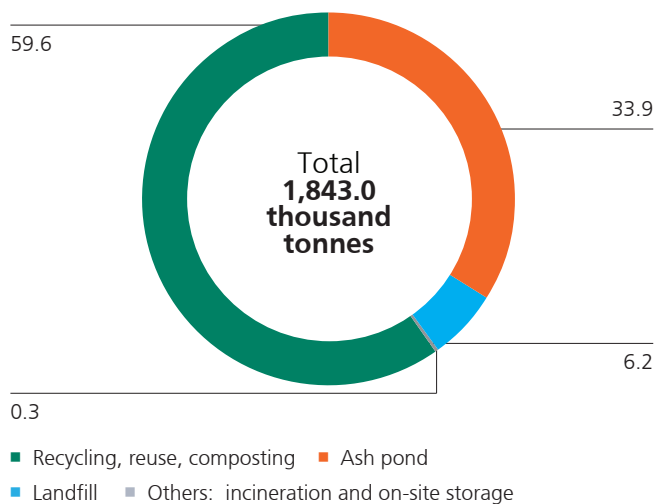
<sup>1</sup> The data excludes waste that is collected and incinerated for our customers

<sup>2</sup> Hazardous and non-hazardous waste materials are defined by the relevant country regulations in each market

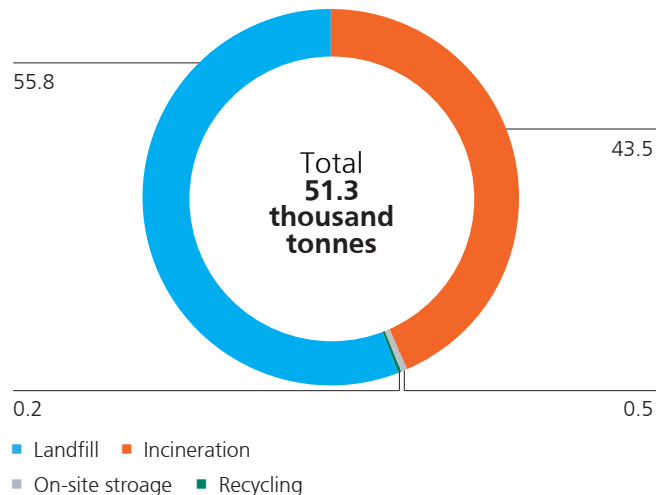
<sup>e</sup> Indicates data is based on management's best estimates

In 2019, total waste generated increased due to more fly ash produced as a result of higher energy output by our thermal power plants in India. About 74%, or approximately 1.1 million tonnes, of fly ash was recycled. To further improve recycling rates, we aim to install a fly ash classification and segregation plant at our thermal assets in India by the second half of 2020. The plant will help process the fly ash into fine quality ash, for which there is greater market demand.

#### Disposal Method for Non-hazardous Waste<sup>1,2</sup> (%)



#### Disposal Method for Hazardous Waste<sup>1</sup> (%)



<sup>1</sup> We do not dispose of waste through deep-well injection. The respective disposal methods are in some cases dependent on the availability of the disposal sites at our operational facilities

<sup>2</sup> Coal ash is directly disposed by Sembcorp in line with local regulations. We have added ash pond as a non-hazardous category to more accurately show non-hazardous waste disposal methods



## Material Issue – Local Environmental Protection

In line with our aim to minimise negative impacts and ensuring the highest standards of environmental management we undertook the following in 2019:

- Enhanced our Environmental Protection Management Standard on hazardous material handling
- Tightened the requirements around hazard analysis and identification, spill prevention, inspection of process equipment and safe transfer of hazardous substances. These enhanced requirements are focused on the early identification of environmental risk, and prioritises the mitigation and management of such risks as well as the maintenance of the integrity and operability of our assets. Training programmes were conducted to support the implementation of the enhanced standard
- Deployed the Virtual Brain platform for water, which allows real-time, round-the-clock automated monitoring

### GRI 305 Emissions

*Disclosure 305-7: Nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and other significant air emissions*

Our atmospheric emissions are largely from our thermal energy assets.

Material air pollutants are NO<sub>x</sub>, SO<sub>x</sub>, and particulate matter. Persistent organic pollutants, volatile organic compounds and hazardous air pollutants emissions are not considered significant and therefore not monitored.

Atmospheric emissions <sup>1,2</sup> (thousand tonnes)	2019	2018	2017
Nitrogen oxides (NO <sub>x</sub> )	30.6	41.1 <sup>r</sup>	23.8 <sup>r</sup>
Sulfur oxides (SO <sub>x</sub> )	74.6	80.0 <sup>r</sup>	48.0 <sup>r</sup>
Particulate matter (PM)	2.5	2.7 <sup>r</sup>	1.6

<sup>1</sup> Emission figures are derived from direct measurement and estimation

<sup>2</sup> Estimations for flue gas flow are based on operational conditions

<sup>r</sup> Indicates restated figure. NO<sub>x</sub> emissions for 2017 and 2018 were increased to 23.8 and 41.1 thousand tonnes, instead of 22.3 and 14.1 thousand tonnes respectively, as previously reported. SO<sub>x</sub> emissions for 2017 and 2018 were increased to 48.0 and 80.0 thousand tonnes, instead of 47.6 and 38.2 thousand tonnes respectively, as previously reported. PM emissions for 2018 were increased to 2.7 thousand tonnes from 1.1 thousand tonnes. Reasons for the restatement can be found on page 11

The decrease in our atmospheric emissions is partly due to the improved data collection and monitoring frequency via continuous emission monitoring systems and a better air-to-fuel mixing and combustion technique in some of our plants.

## **GRI 306** Effluents and waste

### *Disclosure 306-3: Significant spills*

In 2019, we registered zero significant spill incidents across our global operations.

<sup>1</sup> A significant spill refers to an accidental release of a hazardous substance which results in severe and / or persistent environmental damage, and is classified as having major or massive impact in our Group HSE Hazard Identification and Risk Management Standard. Significant spills are reported upon occurrence of the incident

## **GRI 102** General disclosures

### *Disclosure 102-48: Restatements of information*

#### *Disclosure 305-2: Energy indirect (Scope 2) GHG emissions*

In 2019, we refined our methodology for the calculation of energy imported in relation to the scenarios described below:

- Where a power and water asset was simultaneously importing and supplying electricity to the grid
- Where a power and water asset was purchasing and selling to customers

We retroactively applied the changes to the 2017 and 2018 data, and derived the net amount of energy imported.

#### *Disclosure 302-4: Energy intensity*

In 2019, we refined our methodology for the calculation of energy imported in relation to the scenarios described below:

- Where a power and water asset was purchasing and selling steam to customers

We retroactively applied the changes to the 2017 and 2018 data, and derived the net amount of energy imported.

#### *Disclosure 305-7: Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions*

- 2017 data restated to cover operating units included in 2018 and 2019 data for better comparison
- 2018 data restated due to revision of estimation methodology in cases where data is limited, to align with the 2019 method of using continuous emission monitoring system for data collection