ENVIRONMENTAL

OUR PERFORMANCE

In 2018, Sembcorp was ranked 27th in the Top 100 Green Utilities and 11th in the Top Generators ranked by Renewables Capacity in the Energy Intelligence's Top 100 Green Utilities. Sembcorp is the only company from Singapore on the list, which ranks the world's leading electric utilities based on their renewable energy portfolios and GHG emissions. In 2018, we grew our renewables capacity by over 400 megawatts to 2,600 megawatts, resulting in renewables accounting for over 20% of our total energy generation capacity of nearly 12,500 megawatts.

As part of our continual efforts to ensure the accuracy and consistency of our environmental data, we adopted a cloud-based environmental data reporting system in 2018.

To further encourage innovation from the bottom up, Sembcorp's !DEA Awards Programme recognises innovative ideas and efforts across the Group. Some of the winning ideas in 2018 included autonomous drones for inspections, insulator and heater temperature controls, and the use of ultra low frequency technology to reduce biofouling.

Climate Change

We launched our Climate Change Strategy in 2018 and set reduction targets for our GHG emissions intensity as well as growth targets for our renewables capacity by 2022. We achieved healthy growth of our renewables portfolio in 2018. Our emissions intensity registered a slight increase. However, we remain committed to meeting our 2022 target. We increased our engagement on numerous platforms to highlight the importance for businesses to take action to combat climate change. Our Group President & CEO and other senior executives participated in various climate-related panel discussions, including a Carbon Pricing Leadership Coalition plenary and the CleanEnviro Summit.

Resource Management

Across our plants, we pursue initiatives to increase efficiency. In the UK, we introduced the use of kaolin, a naturally occurring mineral, in our biomass power plant processes. This helps to reduce slag formation, leading to increased reliability, reduced maintenance costs and financial savings. In our India thermal plants, we introduced electric vehicles, buggies, and bicycles for employees to quickly and safely move around our sites. This helps us reduce vehicular emissions. We launched our Virtual Brain water monitoring system in our water plants in China. This system monitors and predicts water effluent quality against regulatory compliance standards and recommends corrective actions through machine learning. The Virtual Brain monitoring system will be progressively rolled out to our other water plants. In one of our Singapore wastewater treatment plants, we piloted a project using cutting-edge membrane and ozonator technologies to lower energy consumption. We also partnered with a Singapore university to develop an advanced biological process to achieve higher quality effluent at a lower treatment cost. These two projects are ongoing and, if successful, will help us reduce our environmental impact while bringing about energy and cost savings.

** The data in this document is presented in accordance with the GRI standards: Core option, and the relevant GRI Standards topic and indicator is specified*

ALL ENVIRONMENTAL INDICATORS

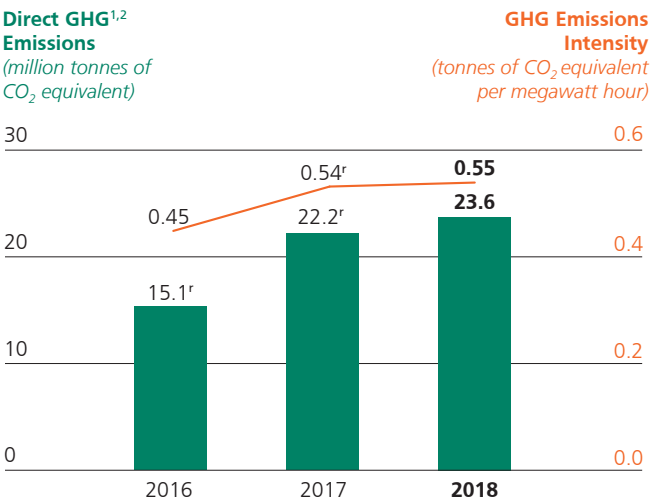
Material Issue – Climate Change

GRI 305-1 **GRI 305-4** **Environmental: Emissions**

Direct GHG emissions and GHG emissions intensity (Scope 1)

In line with the methodology used for the development of our GHG emissions targets, we started reporting our GHG emissions and GHG emissions intensity using an equity share approach from 2017.

Direct GHG Emissions (Scope 1) and GHG Emissions Intensity



[1] Emissions data covers entities that produce GHG from the combustion of fossil fuels consumed in our Utilities business' assets. It excludes emissions from anaerobic wastewater treatment plants, and maintenance and servicing equipment. Emission factors used are from 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Only CO_2, CH_4 and N_2O emissions are included in the calculation of direct GHG emissions. Global warming potential factors used are from the IPCC Fourth Assessment Report for 2016 data, and the IPCC Fifth Assessment Report for the 2017 and 2018 data. The time horizon applied is a 100-year time horizon.

[2] Emissions data for 2016 was reported using an operational approach while emissions data for 2017 and 2018 are reported using an equity share approach.

[r] Indicates restated figure. After an internal verification exercise, direct GHG emissions figure for 2016 has been restated to 15.1 million tonnes of CO_2 equivalent, instead of 15.4 million tonnes of CO_2 equivalent as previously reported. GHG emission intensity for 2017 has been restated to 0.54 tonnes of CO_2 equivalent per megawatt hour instead of 0.55 tonnes of CO_2 equivalent per megawatt hour as previously reported.

Our GHG emissions and GHG emissions intensity by equity approach was 23.6 million tonnes of CO_2 equivalent and 0.55 tonnes of CO_2 equivalent per megawatt hour respectively.

The slight increase in the absolute emissions and emissions intensity is due to increased electricity generation in our India thermal plants.

We report emissions from the combustion of biomass separately, in accordance with Global Reporting Initiative (GRI) Standards. These emissions amounted to about 446,000 tonnes of CO_2 equivalent in 2018, compared to around 442,000 tonnes in 2017.

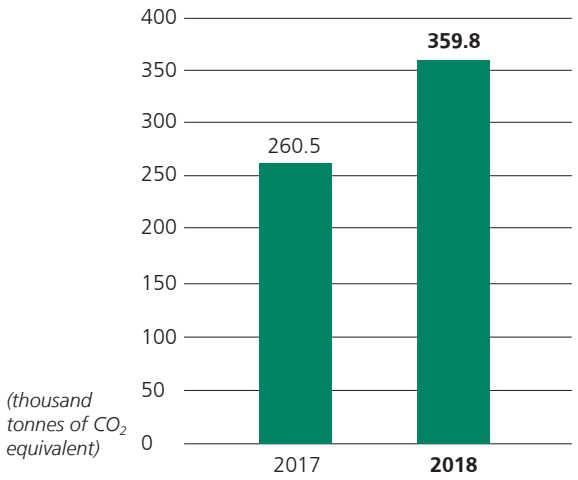
GRI 305-2 Environmental: Emissions

Energy indirect (Scope 2) GHG emissions

We started reporting our Scope 2 emissions in 2017 and we use an equity share approach for our calculations.

Indirect GHG[1] Emissions (Scope 2)

(applying equity share approach)



[1] Indirect GHG emissions includes location-based data for all utilities business' assets; to avoid double counting between Scope 1 and 2, data from Singapore businesses and the Singapore corporate office were excluded. CO_2 (including fugitive emissions), CH_4 and N_2O emissions are included in the calculation of indirect GHG emissions, except for India which only includes CO_2. Emission factors are taken from the International Energy Agency (IEA), Ministry of Energy of Chile, Central Electricity Authority (CEA) of India, and the UK Department for Environment, Food & Rural Affairs (DEFRA).

Our indirect GHG emissions for 2018 was 359.8 thousand tonnes of CO_2 equivalent. This was mainly due to the increase in electricity imported at one of our sites.

Material Issue – Local Environmental Protection

GRI 305-7 Environmental: Emissions

Nitrogen oxides (NO_x) , sulfur oxides (SO_x), and other significant air emissions

Material air pollutants are NO_x, SO_x, and particulate matter. Persistent organic pollutants, volatile organic compounds and hazardous air pollutants emissions are not considered significant and therefore not monitored.

Atmospheric emissions[1] (thousand tonnes)	**2018**	2017	2016
Nitrogen oxides (NO_x)	**14.4**	22.3	17.1
Sulphur oxides (SO_x)	**38.2**	47.6	19.6
Particulate matter (PM)	**1.1**	1.6	1.1

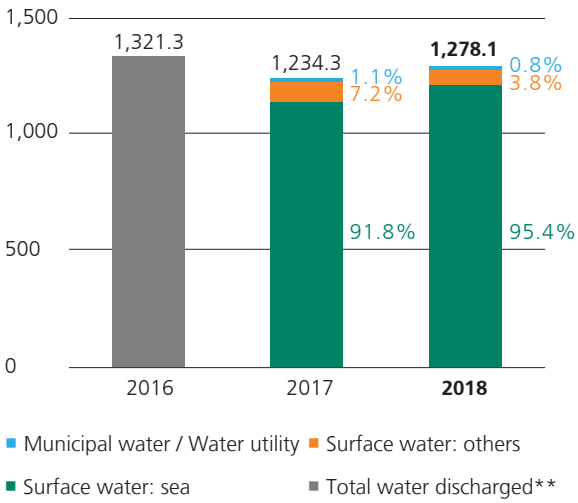
[1] Emission figures are derived from direct measurement.

We saw decreases in our NO_X, SO_X, and PM due to more stable operations in our thermal plants in India, which directly resulted in a decreased use of fuel oil.

GRI 306-1 Environmental: Effluents and Waste

Water discharge by quality and destination

Water discharge by destination* (million m³)



* The data includes water that is treated and discharged for our customers. Discharge figures are derived from a mix of direct measurement and mass balance. Water was not reused by another organisation

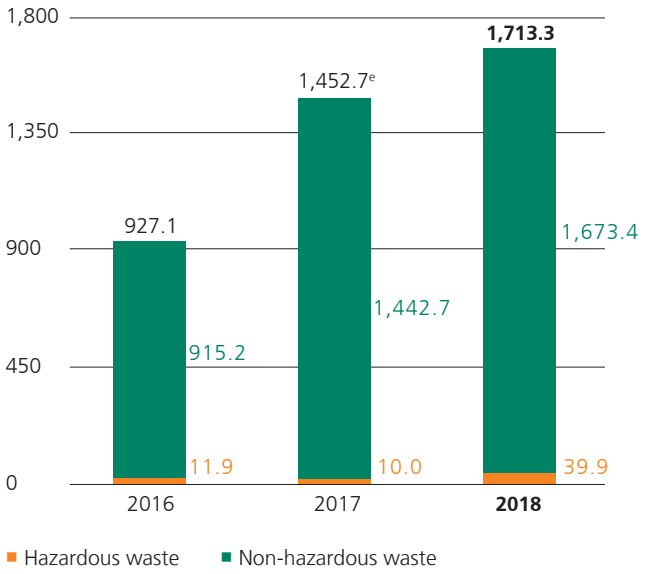
** Water discharge data by destination was not available in 2016

We discharge our treated wastewater in compliance with all of the local and national statutory laws and regulations.

GRI 306-2 Environmental: Effluents and Waste

Waste by type and disposal method

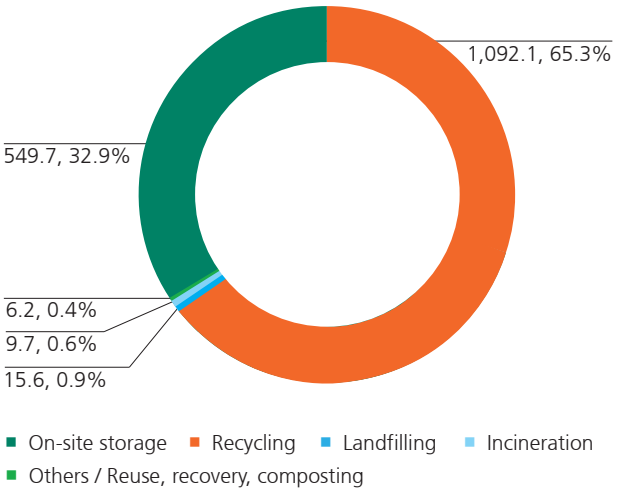
Waste Generated[1,2] (thousand tonnes)



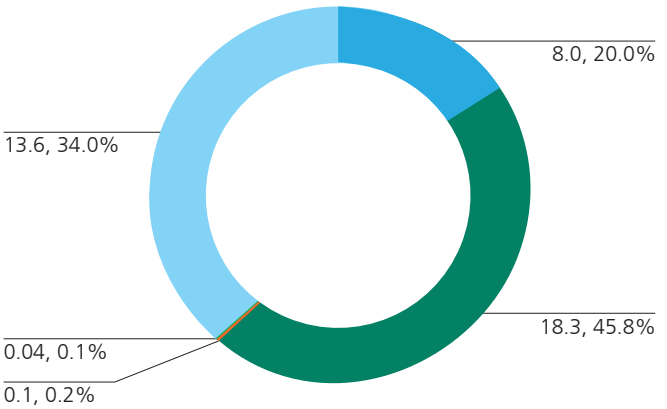
[1] The data excludes waste that is collected and incinerated for our customers
[2] Hazardous and non-hazardous waste are defined by relevant country regulations in each market
[e] Indicates data is based on management's best estimates; we look to further refine the accuracy and consistency of the data

The increase in non-hazardous waste in 2018 was due to increased electricity generation of our India thermal plants. The non-hazardous waste comprised mainly fly ash, a by-product of coal combustion in power plants. In 2018, we achieved an overall fly ash recycling rate of nearly 75% in 2018, which amounted to nearly 1.1 million tonnes.

Disposal Method for Non-hazardous Waste[1, 2]
(thousand tonnes, %)



Disposal Method for Hazardous Waste[1, 2]
(thousand tonnes, %)



[1] We do not dispose waste through deep-well injection. The respective disposal methods have been determined through organisational defaults of waste disposal contractors, except for coal ash, which is largely directly disposed by Sembcorp, in line with local regulations
[2] Percentages may not add up to 100% as they are rounded to the nearest one decimal place

GRI 306-3 Environmental: Effluents and Waste

Significant spills

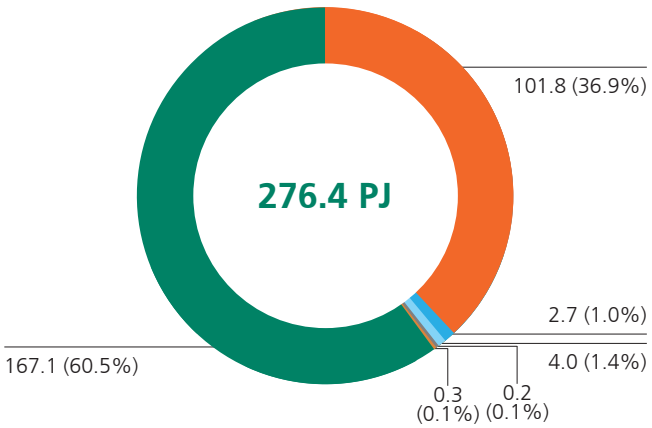
In 2018, we registered zero significant spills at our global operations. A significant spill is defined as that which resulted in a fine equal to or above S$50,000.

Material Issue – Energy and Water Efficiency

GRI 302-1 Environmental: Energy

Energy consumption within the organisation

Primary Energy Consumption[1] (PJ, %)



[1] Mobile combustion of fuel oil and diesel by company-owned vehicles has been included in 2018. This amounts to less than 0.1% of total energy consumption

* Renewable electricity that is generated and consumed within our assets is not included as it is not a significant amount

Energy Consumed and Sold (in PJ)

Subsidiaries	Non-renewable Fuel				Renew-able Fuel	Purchased for Consumption		Self-Generated	Sold	
	Natural gas	Fuel oil , diesel or petrol	Coal	Others	Biomass	Electricity	Steam	Electricity from solar, wind and waves	Electricity	Steam
Energy Utilities	101.8	0.1	167.1	2.7	4.0	2.6	1.3	6.2	106.3	21.1
Water Utilities	0.02	0.001	0.01	-	-	1.1	0.06	-	-	-
Waste Management	-	0.021	-	-	-	0.00	-	-	-	-
Others	-	-	-	-	-	0.01	-	-	-	-
Mobile Combustion[1] (all subsidiaries)	-	0.3	-	-	-	-	-	-	-	-
Total	272.1				4.0	3.8	1.4	6.2	106.3	21.1

[1] Conversion of fuel data to MWh is based on Carbon Disclosure Project's Technical Note and 2006 IPCC Guidelines

Total energy consumed within Sembcorp was 160.01 petajoules in 2018. Data was collected from meters or invoices.

GRI 302-3 Environmental: Energy

Energy intensity

In 2018, our energy intensity is 3.6 gigajoules per megawatt hour of energy produced for our Energy Utilities, and 0.05 gigajoules per cubic metres of water produced.

GRI 302-4 Environmental: Energy

Reduction of energy consumption

Our asset optimisation programme at all of our energy plants globally has helped us to effectively reduce our energy consumption. Additionally Sembcorp's !DEA Awards programme also recognises innovative ideas and efforts across the group.

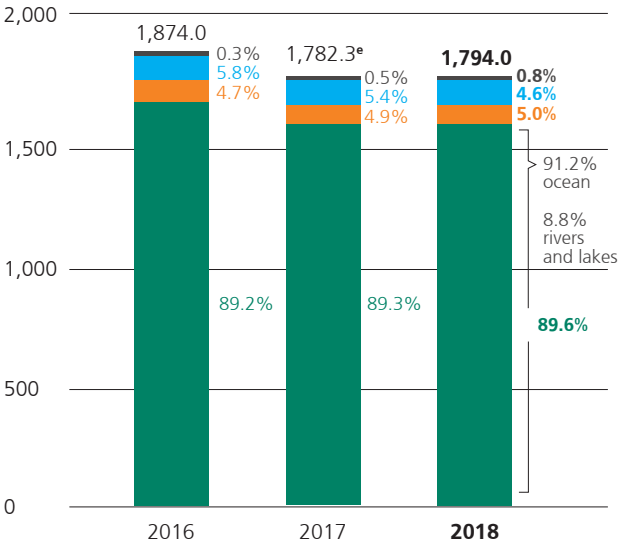
Below are a selection of projects from across the group from 2018 .

- Introduced the use of kaolin in our biomass boilers in the UK to reduce maintenance costs, increase reliability and produce estimated financial savings of around S$850,000 for cleaning one bed
- Introduced electric vehicles, buggies and bicycles for employees to quickly and safely move around our Indian thermal plants
- Using virtual intelligence and predictive maintenance technology, the Semborp Virtual Brain proactively identifies and enhances existing plant processes and optimises current assets

GRI 303-1 **Environmental: Water**

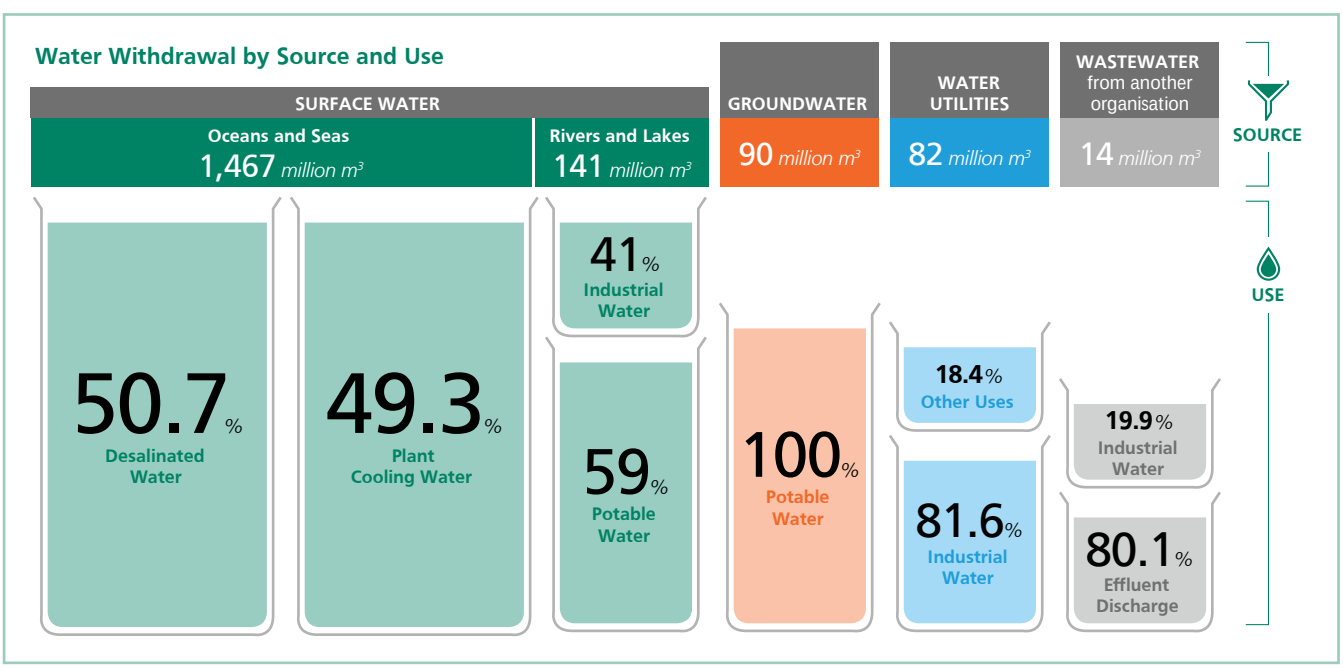
Water withdrawal by source

Water Withdrawal[1,2,3] (million m³)



1 Data is collected from meters
2 Water that is withdrawn during plant commissioning for a closed-loop cooling system is excluded from the reporting scope
3 Percentages may not add up to 100% as they are rounded to the nearest one decimal place
e Indicates data is based on management's best estimates; we look to further refine the accuracy and consistency of the data

In 2018, over 90% of the surface water drawn comprised water from oceans and seas. We saw a decrease of nearly 11% in the amount of water drawn from rivers and lakes. There was a decrease of around 14% in the water we obtained from water utilities, which was treated non-potable industrial and domestic wastewater. These decreases were due to the divestment of our South African municipal assets in 2018 .



GRI 102-48 General: Restatements of Information

Figures below are restated after an internal verification exercise:

- 2016 Direct GHG Emissions 15.4 million tonnes of CO_2 equivalent (erroneous), 15.1 million tonnes of CO_2 equivalent (restated)
- 2017 Direct GHG Emissions 22.2 million tonnes of CO_2 equivalent (erroneous), 22.7 million tonnes of CO_2 equivalent (restated)
- 2017 GHG Emissions 0.55 tCO_2e/MWh (erroneous), 0.54 tCO_2e/MWh (restated)