4.3 Water Management

With regard to water use, Wan Hai's freshwater sources aboard ships can be divided into "generated onboard" and "supplied from the shore." Freshwater generated onboard" is produced from distilled seawater, while "freshwater supplied from the shore" is delivered according to Wan Hai's Freshwater Requisition Procedures and applicable laws and rules. In 2019, Wan Hai's entire fleet consumed about 138,000 TON of freshwater.

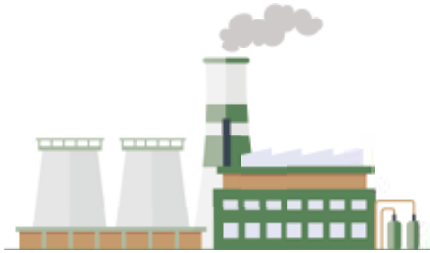
Wan Hai's offices and terminals fall under the category of general office buildings and terminals. Both use legal tap water and reverse osmosis (RO) drinking water. Water resources are not used in large quantities, and we do not extract groundwater or seawater. Furthermore, our Taichung terminal recycles and reuses container cleaning water; in 2019, a total of 5,289 tons of water was recycled and saved, equivalent to roughly 33% of water consumption at the Taichung terminal. In 2019, our offices and terminals consumed around 46,800 tons of water. In 2019, the power consumption of our terminals in Taiwan amounted to 21.99 million kWh (7.9x107 megajoules) and fuel consumption reached 1,095,583 liters. These resources were used for regular operations of terminal machinery, freezer containers, vehicles, and offices.

Standardized ballast water management helps safeguard marine biodiversity

How are ballast water and marine biodiversity connected? This can be best explained from the perspective of the ballast water. When a large container ship is sailing the ocean, it will take in water in special compartments in order to weigh down and stabilize itself for greater safety. This is called "ballast water."
When ballast water containing local life is exchanged or discharged in different waters, invasive species may be introduced and breed in their new natural environment, resulting in varying degrees of environmental pollution and ecological disruption around ports in different countries. Therefore, Wan Hais has advocated and complied with the IMO' s relevant regulations in stipulating ballast water management methods.
Wan Hai has completed the Ballast Water Management Plan and obtained certification.

Moving forward, Wan Hai will adopt more stringent management approaches concerning marine biodiversity. To allow for greater flexibility in our ships' deployment across shipping routes in the future, all of our ships will be retrofitted with new ballast water treatment systems to help preserve marine biodiversity around the globe.

4.4 Gas Emissions Management



GHG Emissions Management

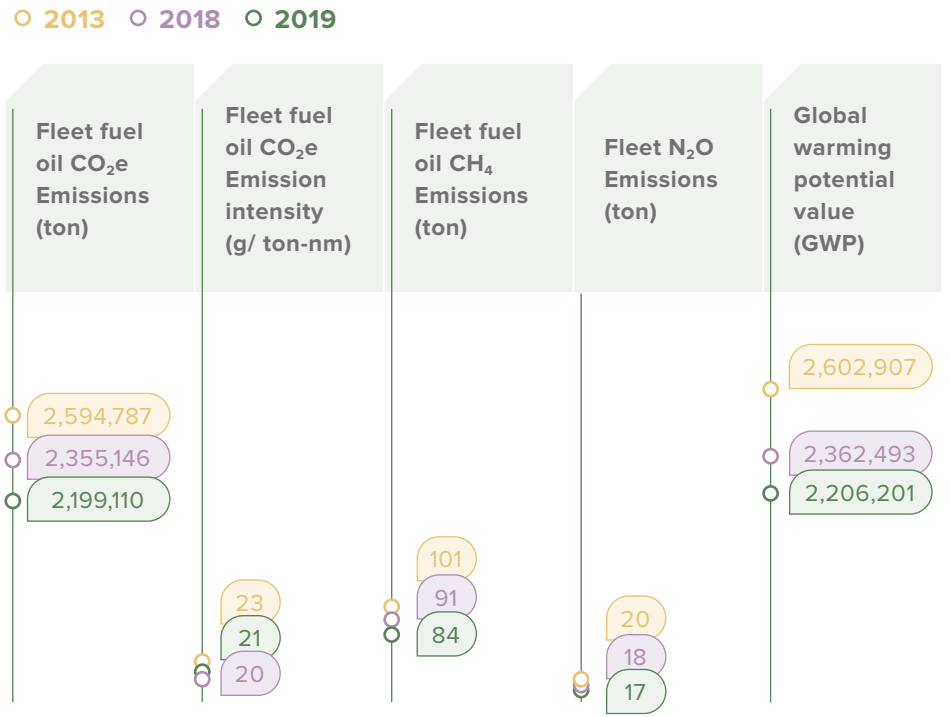
Measured from the baseline year 2013, Wan Hai aims to reduce its carbon emissions by 2% each year.

Wan Hai's greenhouse gases (GHG) emissions are divided into two categories. Scope 1 is direct GHG emissions from our fleet (diesel fuel). Scope 2 is indirect GHG emissions from the consumption of purchased electricity. GHG emissions from Scopes 1 and 2 are estimated from fuel usage figures. This year's GHG emissions amounted to 2,211,877 TON CO_2e.

In the future, Wan Hai will apply various approaches to decrease our CO_2e emissions to reach the desired level. These approaches include operational management, energy conservation, and carbon reduction measures, ship speed control, route optimization, ship maintenance management, and draft level adjustments before/after sailing.

GHG emissions: Scope 1 : fuel consumption emissions

The main sources of fuel-related emissions from our ships are diesel engines, power generators, and boilers for a total of 2,199,110 ton CO_2e, a 15.2% decline from 2013.



Note :

1. GHG emissions volume = fuel usage volume* GHG emission coefficient ; this coefficient is taken from IMO MEPC/29/18/Dec. 1989.
2. The coefficients for methane and nitrous oxide are taken from the Taiwan Environmental Protection Administration's Table of greenhouse gas emission coefficients. The GWP value of 6.0.4 is taken from the 5th IPCC report (2013).
3. Fleet fuel oil CO_2e emission intensity (g/ton-nm)=ship CO_2e emission (g)/(cargo weight (ton) * distance (nm)).

GHG emissions: Scope 2 : indirect emissions from electricity

2017

Taiwan offices

Roughly **207** (ten thousand) kW·h

Dedicated terminals

Roughly **2,175** (ten thousand) kW·h

Total power consumption in 2017

Roughly **2,382** (ten thousand) kW·h

= **13,197** Tonnes CO_2e

2018

Taiwan offices

Roughly **198** (ten thousand) kW·h

Dedicated terminals

Roughly **2,107** (ten thousand) kW·h

Total power consumption in 2017

Roughly **2,305** (ten thousand) kW·h

= **12,773** Tonnes CO_2e

2019

Taiwan offices

Roughly **196** (ten thousand) kW·h

Dedicated terminals

Roughly **2,199** (ten thousand) kW·h

Total power consumption in 2017

Roughly **2,395** (ten thousand) kW·h

= **12,767** Tonnes CO_2e

Note :

1. The carbon emission in 2019 was 0.533 kg CO_2e/kW·h, it was calculated based on the Bureau of Energy, Ministry of Economic Affairs' 2018 national discharge coefficient. (Statistics for 2019 have not been announced yet, hence the calculations were carried out based on 2018 data).
2. Global Warming Potential value (GWP) is taken from the 5th IPCC report (2013), where the GWP value of CO_2 is set as 1.
3. The above CO_2 emissions have been recognized by Wan Hai Lines Ltd.

Other Gas Emissions: Ozone Depleting Substances (ODS)

In complying with the regulations of Montreal Protocol on Substances that Deplete the Ozone Layer, Wan Hai has replaced the expansion valves of the fleet' s AC units and chiller units, and eco-friendly R407F refrigerant will be adopted progressively. Additionally, Wan Hai uses eco-friendly refrigerants R134A and R404A for our freezers to prevent emissions of ODS. For ODS in the form of CFC-11 (Trichlorofluoromethane), 0 tons were produced, imported, or exported.

Other Gas Emissions: Analysis of NO_X Emissions

In 2019, Wan Hai implemented various measures to reduce our fleet's nitrogen oxide (NO_X) emissions. These measures include: improved ship propulsion efficiency, reduced and reasonable distribution of ballast water, adjusted trim, and adopted more economical and eco-friendly ship speeds as necessary in order to comply with the emission standards of international conventions and further minimize our NO_X emissions.

Year	Fleet SO_X emissions (ton)	Fleet fuel oil SO_X intensity g/ton-nm
2018	32,318	0.28
2019	31,338	0.29

Calculation method :

1. SO_X emission volume (ton) = total fuel consumption (kg) * sulfur content (%) * 20 (g/kg)/1,000,000.
2. Fleet SO_X intensity (g/ton-nm)= SO_X emissions (g)/(cargo weight (ton) * distance (nm))
3. NO_X emission rate: Under the Engine International Air Pollution Prevention (EIAPP) certification, this is defined as the quantity (in grams) of NO_X produced by 1 hour of operation of an engine per 1,000W of output.

Other Gas Emissions: Analysis of SO_X Emissions.

With regard to SO_X emissions volume in 2019, Wan Hai's fleet has complied with the regulations of national and port authorities of various regions, including switching to low sulfur fuel in Emission Control Area (ECA) such as the US; ships approaching the ports in Taiwan, Hong Kong, and China must switch to low sulfur fuel oil. As of January 1,2019, ships along the Chinese coast and Taiwan are prohibited from using fuel oil with a sulfur content of more than 0.5%. Low-sulfur fuel restrictions have been implemented in 2020 around the world to reduce our SO_X emissions.

Year	Fleet SO_X emissions (ton)	Fleet fuel oil SO_X intensity g/ton-nm
2018	41,627	0.355
2019	33,605	0.313

Calculation method :

1. SO_X emission volume (ton) = total fuel consumption (kg) * sulfur content (%) * 20 (g/kg)/1,000,000.
2. Fleet SO_X intensity (g/ton-nm)= SO_X emissions (g)/(cargo weight (ton) * distance (nm))