# Environmental Preservation

## Our actions aimed at realizing a sustainable global environment

### ● Initiatives for reducing our environmental impact through business activities

**Our Action** **Development of neo-series ships – next-generation environmentally friendly ships**

#### ● Delivery of KIRISHIMA, a VLCC with a capacity of 310,000 DWT, which is among the largest in the world

The reduction of greenhouse gas (GHG) emissions from ships is an urgent task because regulations on $CO_2$ emissions from international shipping have now been introduced. In this situation, the Mitsui E&S Group has developed the neo-series environmentally friendly bulk carriers with low fuel consumption and has been promoting the launch of the ships onto the market. Further, we have developed the neo VLCC, the fifth ship in the neo series, by applying our bulk carrier technologies to large tankers. We have completed the first ship named the KIRISHIMA, a VLCC with a capacity of 310,000 DWT, which is among the largest in the world. We designed this ship to comply with the regulations on emissions of harmful substances such as nitrogen oxides (NOx) and sulfur oxides (SOx), as well as $CO_2$, in our efforts to comprehensively improve the environmental and fuel performance.

KIRISHIMA, a VLCC with a capacity of 310,000 DWT

**Our Action** **Development of propulsion systems that are both environmentally friendly and have excellent economic efficiency**

#### ● Development of a new high-pressure SCR for low-speed marine diesel engines (MAN SCR-HP)

#### ● Development of a next-generation hydraulic waste heat recovery system (THS2)

In April 2017, we conducted a verification test of a new selective catalytic reduction (SCR) system (high-pressure SCR), which can be mounted on low-speed marine diesel engines and which meets the IMO NOx (Nitrogen Oxides) Tire III regulations, jointly with MAN Diesel & Turbo, which is the licenser, thereby contributing to the development of the system.
In May 2017, we developed the Turbo Hydraulic System type2 (THS2), a next-generation hydraulic waste heat recovery system dedicated to electronically controlled low-speed marine diesel engines. This will contribute to reducing greenhouse gas (GHG) emissions from ships and will serve as an effective measure for improving the Energy Efficiency Design Index (EEDI), which will be more strictly regulated in the future.
As a leading manufacturer of large, low-speed marine diesel engines in Japan, we will promote the development of technologies for complying with SOx regulations, as well as NOx regulations, and reducing $CO_2$ emissions (energy-saving technologies).

New high-pressure SCR for low-speed marine diesel engines (MAN SCR-HP)

Actual SCR equipment

**Our Action** **Being proactive in promoting businesses operated using renewable energy**

#### ● Order received for a diesel power plant for the Faroe Islands

In March 2017, Burmeister & Wain Scandinavian Contractor A/S, which is our subsidiary, received an order for the 37-MW highly efficient diesel power plant for Elfelagid SEV, an electric power provider on the Faroe Islands. This diesel power plant runs on heavy fuel oil with a low environmental impact. This is enabled by the use of a selective catalytic reduction (SCR) denitrification system, which significantly reduces NOx.

Diesel power plant for the Faroe Islands



## ● Environmental management data (non-consolidated)

### Energy consumption and $CO_2$ emissions

MES continues its efforts to reduce $CO_2$ emissions through activities such as switching the fuel for in-house power generation from heavy oil to natural gas. The graphs on the right show our total energy consumption, $CO_2$ emissions, and purchased electricity over the past five years. Corresponding with an increase in the manufacturing of ships and diesel engines, our mainstay products, total energy consumption for fiscal 2018 increased slightly year on year. As a result, $CO_2$ emissions rose approximately 5% from the fiscal 2017 level.

### Water consumption

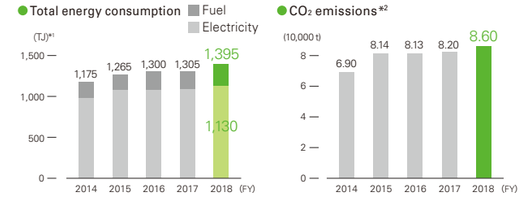
The graph on the right shows the use of water by MES over the last five years. MES uses both service water (clean water) and industrial water (intermediate water). We strived to save water once again during fiscal 2018, but the amount of service and industrial water used was up approximately 14% from the previous year.

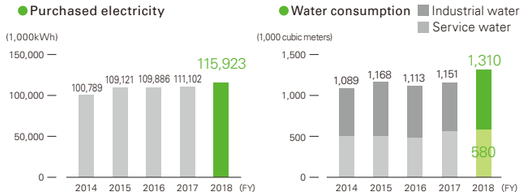
### Waste disposal and recycle rate

The unlawful dumping of industrial waste has become a major social problem. As a producer of industrial waste, MES makes every effort to fulfill its responsibilities in this area. One of these efforts is our strict management of manifest. This is accomplished through periodic on-site inspections of disposal companies. Even more important is our effort to reduce the amount of waste itself. To achieve this objective, we work hard to recycle and thoroughly classify our waste. The graphs on the right show the waste amount and recycle rates over the past five years, and a breakdown of waste for fiscal 2018. We worked to limit waste, but fiscal 2018 saw an approximately 5% increase in waste from the previous fiscal year. In addition, the recycle rate decreased by approximately 0.2% to 86.6% because of the increased amount of waste oil and waste plastic that we generated. We will continue our efforts to reduce waste and improve our recycle rate. In addition, we will continue to properly dispose of our waste through strict management.

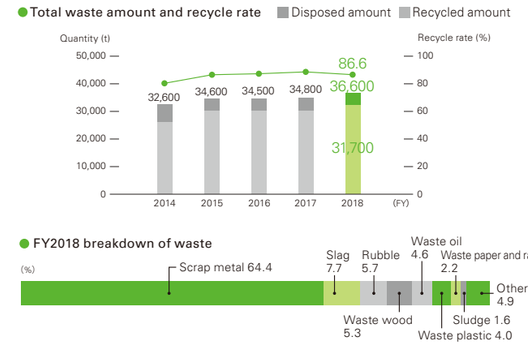
### Proper management of specific chemical substances (PRTR substances)

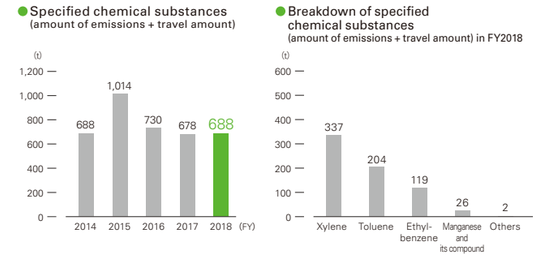
The majority of chemical substances used by MES are the solvents and pigments contained in paint. The changes in the output and travel amount of specific chemical substances over the past five years are shown in the graph on the right. The other chart describes the breakdown of chemical substances used by MES for fiscal 2018. In May 2004, a partial revision to the Air Pollution Control Act was officially announced. By maintaining strict control of usage levels and by using low-emission airtight containers, MES continues its efforts to conform to the objectives of this law.




*1 TJ: Tera Joule (=$10^{12}$J) *2 $CO_2$ emissions were calculated by following the Guidelines for Calculating Corporate Greenhouse Gases Emissions issued by the Ministry of the Environment. $CO_2$ emissions from electric power were calculated by using the adjusted $CO_2$ emission coefficient for designated electric enterprises that was also published by the Ministry of the Environment.




## ● Environmental accounting (non-consolidated)

MES spent a total of 3,820 million yen on investments and costs related to environmental preservation efforts. A detailed breakdown of these expenditures is shown on the right. The categories for environmental preservation costs are based on the Environmental Conservation Cost Categories shown in the Environmental Accounting Guidelines 2005. These expenditures included a total of 800 million yen spent on investment, consisting of 500 million yen spent on research and development, 290 million yen spent on pollution prevention cost such as exhaust gas measures, and 10 million yen spent on energy conservation of global environment conservation. Total non-investment costs came to 3,020 million yen, which included 1,860 million yen spent on the research and development of environmentally friendly energy-saving products, 470 million yen as the cost for preservation of the global environment, including energy conservation, 370 million yen allocated to resource circulation costs such as waste treatment, and 230 million yen for pollution prevention costs.

Environmental preservation cost (= sum of investment and cost: 3,817 million yen) (JPY million)

| Categories corresponding to business activities | Investment | Cost | Major initiatives and effects |
|---|---|---|---|
| 1. Business Area Cost | | | |
| (1) Pollution prevention cost | 294.7 | 471.8 | Exhaust gas measures, wastewater treatment, dust control and other pollution control |
| (2) Global environmental conservation cost | 6.3 | 372.5 | Energy saving |
| (3) Resource circulation cost | 0.0 | 229.4 | Waste treatment |
| 2. Upstream / downstream cost | — | — | |
| 3. Administration cost | — | 83.0 | Environmental management system implementation, integrated reports, and environmental education |
| 4. Research & development cost | 496.0 | 1,861.0 | Development of various environmentally friendly products |
| 5. Social activity cost | — | 2.5 | Road cleaning, seminar sponsorship |
| 6. Environmental remediation cost | — | — | |
| Total | 797.0 | 3,020.2 | |