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## Editorial Notes

### Period
The report covers fiscal 2017 (from April 1, 2016 to March 31, 2017). However, some activities from outside this period are also included. For overseas subsidiaries, the dates of the fiscal year and the period covered by statistics may differ depending on their country of location.

### Scope
Kawasaki Heavy Industries, Ltd.
However, where the Kawasaki Group is described, the scope of reference includes subsidiaries (listed on page 25) that are subject to environmental management criteria.

### Issued: October 2017
Edited and issued by: General Administration Division Environmental Affairs Department
Editorial responsibility: Senior Manager, Environmental Affairs Department

### Guidelines
In preparing the report, the editorial office referred to the Environmental Reporting Guidelines (2012 Edition) issued by the Ministry of the Environment.

### Disclaimer
This report not only describes actual past and present conditions at the Kawasaki Group but also includes forward-looking statements based on plans, forecasts, business plans and management policy as of the publication date. These represent suppositions and judgments based on information available at the time. Due to changes in circumstances, the results and features of future business operations may differ from the content of such statements.
Chief Environmental Officer’s Message
To Realize a Sustainable Society

Sound and sustainable solutions to social issues, such as preventing global warming, reducing environmental impact, and protecting biodiversity are needed in order to realize a sustainable society. With the aim of resolving these issues, Kawasaki established its Environmental Charter in 1999, stipulating the sense of values to be shared across the Kawasaki Group, the underlying principles of environmental management activities, and guidelines for daily conduct that all members of the organization are required to follow.

The Kawasaki Group formulates its long-term environmental vision to provide guidelines for planning concrete measures. The Environmental Vision 2020, which was formulated in 2010, is now within sight of its target year. We have therefore formulated the Kawasaki Global Environmental Vision 2050, which defines our super-long-term identity, based on monitoring of worldwide trends. Aiming for zero emissions in three key categories under our goals of “CO2 FREE,” “Waste FREE,” and “Harm FREE,” we will steadily achieve the specific targets of our Environmental Management Activities Plan.

Kawasaki Environmental Report 2017 highlights the results of our environmental management activities undertaken in fiscal 2017, the first year of our three-year Ninth Environmental Management Activities Plan, which was formulated based on the Environmental Vision 2020.

In fiscal 2017, we succeeded in reducing our resource and energy costs by 7%, which surpassed our target of 5%. The key contributing factors were ongoing energy saving measures through the introduction of our energy visualization system at manufacturing sites, elimination of waste and irregularities in energy use while raising facility efficiency, and a proactive response to the liberalization of electricity. Meanwhile, although we were not able to achieve our target of a 3% reduction in CO₂ emissions (per unit of sales), this was mainly due to the impact of launching new facilities, and we expect to be able to meet our target in fiscal 2018 and beyond. Furthermore, the Kawasaki-brand Green Product program for assessing and registering products with exceptional environmental performance is now in its fourth year, and has acquired greater recognition throughout Kawasaki. A total of 41 products registered as of 2017 are contributing to reducing environmental impact around the world.

The Kawasaki Group will contribute to protecting and enhancing the global environment, both through its business activities and its products, and will work in cooperation with all involved parties to create a sustainable future society. I hope that the information contained in this report will provide readers with a deeper understanding of the environment-oriented management practices undertaken within the Kawasaki Group.

Environmental Philosophy

The Kawasaki Group pursues business activities globally in key industries related to land, sea, and air, guided by the desire to contribute to the development of society through monozukuri manufacturing. In this effort, as a group, we emphasize the “realization of a low-carbon society,” “realization of a recycling-oriented society,” and “realization of a society coexisting with nature” to help solve global environmental issues, and we strive to help build a sustainable society through environmentally harmonious business activities and environmentally conscious Kawasaki-brand products and services.

Promoting Environmental Management

Kawasaki appoints a chief environmental officer (director responsible for environmental management), who coordinates corporate environmental management activities and assumes full responsibility and authority for environment-oriented issues, and maintains a corporate environmental management structure. (Fig. 1: Environmental Management Organization)

To ensure continuous improvement in environmental management activities, the Corporate Environment Committee—chaired by the chief environmental officer, discusses specific approaches and implementation methods, and has the final say on which activities are pursued.

Similarly, in accordance with the Energy Saving Law, an energy management structure has been established under the direction of an energy management officer. (Fig. 2: Energy Management Organization)

The Corporate Energy Management Committee holds regular meetings and vigorously promotes energy-saving activities in line with business scale.

Kawasaki has been working to build and maintain an effective environmental management structure since 1994. Looking to the future, we will consistently refine our approaches to realize improvements.
Formulating the Kawasaki Global Environmental Vision 2050

In light of the Paris Agreement enacted to restrict global warming and the Sustainable Development Goals (SDGs) adopted by the United Nations, the Kawasaki Group has announced that it will collaborate toward the realization of a sustainable society in the future, and formulated the “Kawasaki Global Environmental Vision 2050.”

The embodiment of the Group’s environmental management is based on the three visions of “CO₂ FREE,” “Waste FREE,” and “Harm FREE,” and the Group will contribute to controlling global warming, promoting a recycling-oriented society and protecting biodiversity toward the year 2050.

CO₂ FREE
- Aim for zero CO₂ emissions in business activities
- Provide products and services that greatly curb CO₂ emissions

Waste FREE
- Aim for zero waste emissions in business activities
- Thoroughly enforce conservation and recycling of water resources

Harm FREE
- Aim for zero harmful chemical substances emissions in business activities
- Develop business with respect for biodiversity

Initiatives for Environmental Management

As an initiative for environmental management, Kawasaki formulated the First Environment Management Activities Plan in 1994, and the entire Company started work on environmental conservation activities. Later, in 1999, we established the “Environmental Charter” to demonstrate our commitment to the environment both inside and outside the Company, and as a long-term vision, formulated the “Environmental Vision 2010” in 2003 and the “Environmental Vision 2020” in 2010. We implement specific environment management activities plans based on the above and are steadily carrying them out.

With the realization of “Environmental Vision 2020” in sight, we have formulated the new “Kawasaki Global Environmental Vision 2050” with the aim of making a significant contribution to the global environment through products and services, in addition to zero environmental impact from business activities. Through steady environmental management activities constantly aiming for a vision that anticipates the times, we will make progress toward realizing the Group Mission “Kawasaki, working as one for the good of the planet.”
Summary of Environmental Activities in Fiscal 2017

Kawasaki has formulated and implemented its Ninth Environmental Management Activities Plan, which runs from fiscal 2017 to fiscal 2019. This plan emphasizes sustained efforts to improve business management and environmental management, which were priorities under the Eighth Environmental Management Activities Plan. In addition, we have positioned new key areas as responses to procurement diversification accompanying liberalization of energy supply in Japan, compliance with country emissions targets set at the 21st Conference of Parties (COP) under the United Nations Framework Convention on Climate Change, and efforts to ensure appropriate transparency in providing environmental information to institutional investors, corporate assessment organizations and other performance-tracking groups. Toward achieving Environmental Vision 2020, we will tackle key strategies related to four issues—(1) CO2 and energy cost reduction, (2) promotion of the 3Rs, (3) reduction of environmental load/promise of resource conservation, and (4) enhancement of the Kawasaki Group environmental management system—and strive to heighten awareness as an environmentally friendly brand.

### Summary of Fiscal 2017 Results

**Kawasaki Environmental Report 2017**

- **Realization of a low-carbon society:**
  - Reduce greenhouse gas emissions in line with national targets.
  - Offer customers energy-efficient products and services, and reduce emissions of greenhouse gases on a planetary scale.
  - Promote energy conservation in production and logistics, processes, and reduce greenhouse gases.

- **Realization of a recycling-oriented society:**
  - Engage in manufacturing that uses resources without waste and recycle and utilize limited resources.
  - Practice design that uses resources effectively, and work to make products lighter, more durable and more recyclable.
  - Practice the 3Rs (reduce, reuse and recycle of waste) in production activities, and achieve zero emissions at all plants.

- **Realization of a society coexisting with nature:**
  - Contribute to reduction of the environmental impact and conservation of the ecosystem through manufacturing that is harmonious with the global environment.
  - Offer customers products and services that prevent air and water pollution, and advance environment improvements and ecosystem protection.
  - Reduce the use of chemical substances in products and production activities.
  - Cooperate in regional forest conservation and other activities to protect the environment.

- **Establishment of environmental management systems:**
  - Build a foundation for environmental management that will achieve the Environmental Vision 2020.
  - Establish EMS at all consolidated subsidiaries in Japan and overseas to promote environmental management Group-wide.
  - Comply with environmental laws and regulations, and regularly follow up on compliance status.
  - Communicate environmental data within and beyond the Group, and maintain two-way dialogue while protecting the environment.

### Key Strategies

**Environmental Management Activities Plan (P.2017: P.2018)**

<table>
<thead>
<tr>
<th>Key Strategies</th>
<th>Target</th>
<th>Fiscal 2017</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reduce resource and energy costs, mainly through wider application of energy visualization system</td>
<td>Reduce resource and energy costs by at least 5%</td>
<td>Reduce resource and energy costs by 7.1%, achieving the target</td>
<td></td>
</tr>
<tr>
<td>2. Reduce CO2 emissions</td>
<td>Reduce CO2 emissions per unit of sales by at least 5% year on year</td>
<td>Reduce CO2 emissions per unit of sales by 4.7% year on year</td>
<td></td>
</tr>
<tr>
<td>3. Reduce CO2 emissions through product-based contributions</td>
<td>Reduce CO2 emissions reduction effect through product-based contributions</td>
<td>Reduce CO2 emissions reduction effect by 0.2%, achieving the target</td>
<td></td>
</tr>
</tbody>
</table>

**On-Site and Group-wide Environmental Activities**

- **Realization of a society coexisting with nature:**
  - Contribute to reduction of the environmental impact and conservation of the ecosystem through manufacturing that is harmonious with the global environment.
  - Offer customers products and services that prevent air and water pollution, and advance environment improvements and ecosystem protection.
  - Reduce the use of chemical substances in products and production activities.
  - Cooperate in regional forest conservation and other activities to protect the environment.

- **Establishment of environmental management systems:**
  - Build a foundation for environmental management that will achieve the Environmental Vision 2020.
  - Establish EMS at all consolidated subsidiaries in Japan and overseas to promote environmental management Group-wide.
  - Comply with environmental laws and regulations, and regularly follow up on compliance status.
  - Communicate environmental data within and beyond the Group, and maintain two-way dialogue while protecting the environment.

**Environmental Data**

- **Realization of a recycling-oriented society:**
  - Engage in manufacturing that uses resources without waste and recycle and utilize limited resources.
  - Practice design that uses resources effectively, and work to make products lighter, more durable and more recyclable.
  - Practice the 3Rs (reduce, reuse and recycle of waste) in production activities, and achieve zero emissions at all plants.

- **Realization of a society coexisting with nature:**
  - Contribute to reduction of the environmental impact and conservation of the ecosystem through manufacturing that is harmonious with the global environment.
  - Offer customers products and services that prevent air and water pollution, and advance environment improvements and ecosystem protection.
  - Reduce the use of chemical substances in products and production activities.
  - Cooperate in regional forest conservation and other activities to protect the environment.

- **Establishment of environmental management systems:**
  - Build a foundation for environmental management that will achieve the Environmental Vision 2020.
  - Establish EMS at all consolidated subsidiaries in Japan and overseas to promote environmental management Group-wide.
  - Comply with environmental laws and regulations, and regularly follow up on compliance status.
  - Communicate environmental data within and beyond the Group, and maintain two-way dialogue while protecting the environment.

### Summary of Results

- **Realization of a low-carbon society:**
  - Reduce greenhouse gas emissions in line with national targets.
  - Offer customers energy-efficient products and services, and reduce emissions of greenhouse gases on a planetary scale.
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- **Realization of a recycling-oriented society:**
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  - Establish EMS at all consolidated subsidiaries in Japan and overseas to promote environmental management Group-wide.
  - Comply with environmental laws and regulations, and regularly follow up on compliance status.
  - Communicate environmental data within and beyond the Group, and maintain two-way dialogue while protecting the environment.
Material Balance of Business Activities for Fiscal 2017 (Overall Picture of the Environmental Impact)

Kawasaki has drawn up a summary of the impact of our business activities on the environment during fiscal 2017.

Compared with fiscal 2016, energy consumption, materials, and water, which are inputs, all increased. In terms of outputs, although there was a decrease in air pollution and waste, the amount of wastewater increased.

Furthermore, compared with the average for fiscal 2014 to fiscal 2016, which is the period of the Eighth Environmental Management Activities Plan, although inputs increased, there was a reduction in the outputs of SOx and NOx emissions and wastewater.

### Material Balance of Business Activities for Fiscal 2017

#### OUTPUT

| Air | Greenhouse gases | 321,000 t-CO₂/two.dnom | (−1%) |
| SOx | 5 t | (−69%) |
| NOx | 152 t | (−51%) |

#### Waste

| Total waste | 51,100 t | (−1%) |
| Recycled | 49,800 t | (−20%) |
| Others | 1,200 t | (−20%) |

#### Water

| Total amount of wastewater | 3,820,000 m³ | (+8%) |

### Key Strategies and Targets under Ninth Environmental Management Activities Plan (FY2017–FY2019)

**CO₂ and energy cost reduction**

- Reduce resource and energy costs, mainly through wider application of energy visualization system
  - Reduce annual resource and energy costs by at least 5%
- Reduce CO₂ emissions
  - Reduce CO₂ emissions per unit of sales by at least 3% year on year
- Reduce CO₂ emissions through product-based contributions
  - Identify CO₂ emission reduction effect through product-based contributions and disclose to public

**Targets**

### Realization of a Low-Carbon Society

Various global initiatives aimed at controlling global warming have started to come into force, including the taking of effect of the Paris Agreement set at the United Nations Framework Convention on Climate Change. Kawasaki is contributing to the prevention of global warming through its products and manufacturing that use energy without waste.

In order to achieve improvements in the efficiency of manufacturing at plants in Japan, we are introducing the energy visualization system and working toward the early discovery of waste, and are also promoting the use of renewable energy. In addition, we are contributing to lower CO₂ emissions during product use, through delivery of highly energy efficient products worldwide.
Reducing CO2 Emissions from Production Activities

Kawasaki set a goal to reduce CO2 emissions from production activities by 3% year on year, on a per unit of sales basis, and is pursuing activities to cut energy consumption.

In fiscal 2017, improvement activities at production sites and a reduction in energy consumption using the energy visualization system were key factors in achieving a reduction of CO2 emissions of 6,000 tons. As a result, CO2 emissions decreased by 1.1% year on year to 321,000 tons. On a per unit of sales basis, using net sales as the denominator, emissions decreased by 0.2% year on year to 28.6 tons/100 million yen, falling below the target of 3%. This is attributable to an increase in energy consumption resulting mainly from the launch of new facilities, and we expect to achieve the target in the future as sales grow due to operation of the new facilities.

Estimating CO2 Emissions in Supply Chain

The scope that Kawasaki is required to cover in tracking CO2 emissions is gas emissions throughout the supply chain, and presents the results below. According to this data, the GHG effect accompanying the use of Kawasaki-sold products over the whole supply chain is extremely high. We have been making progress in reducing CO2 emissions through product-based contributions, but going forward, we will take an even more proactive approach.

Table 1: Fiscal 2017—the Kawasaki Group’s Scope 1 and Scope 2 Calculation Results

<table>
<thead>
<tr>
<th>Category</th>
<th>Calculation Targets</th>
<th>Calculation Results (104 t-CO2/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct emissions</td>
<td>Direct emissions through use of fossil fuel</td>
<td>17.9</td>
</tr>
<tr>
<td>Scope 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect emissions from</td>
<td>Indirect emissions accompanying use of electricity and</td>
<td>31.3</td>
</tr>
<tr>
<td>energy-related sources</td>
<td>heat purchased by Kawasaki</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Fiscal 2017—Kawasaki’s Scope 3 Calculation Results

<table>
<thead>
<tr>
<th>Category</th>
<th>Calculation Targets</th>
<th>Calculation Results (104 t-CO2/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased goods and services</td>
<td>Emissions associated with activities up to distribution of raw materials</td>
<td>156.6 (9.6%)</td>
</tr>
<tr>
<td>Capital goods</td>
<td>Emissions from construction and production of Kawasaki’s capital goods</td>
<td>22.3 (9.6%)</td>
</tr>
<tr>
<td>Fuel-related activities</td>
<td>Emissions associated with procurement of fossil fuel purchased from other providers and procurement of fuel required to generate power, such as electricity and fuel</td>
<td>3.8 (0.1%)</td>
</tr>
<tr>
<td>Transportation and</td>
<td>Emissions associated with logistics of raw materials, parts, purchased goods and sales-related materials up to delivery to Kawasaki</td>
<td>0.8 (0.0%)</td>
</tr>
<tr>
<td>distribution (upstream)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee commuting</td>
<td>Emissions associated with transportation of employees between their homes and their worksites</td>
<td>0.0 (0.0%)</td>
</tr>
<tr>
<td>Business travel</td>
<td>Emissions associated with business travel by employees</td>
<td>1.0 (0.0%)</td>
</tr>
<tr>
<td>Leased assets (upstream)</td>
<td>Emissions associated with operation of assets leased by Kawasaki (excluded if included in Scope 1 or Scope 2 calculations)</td>
<td>Included in Scope 1 and Scope 2 calculations</td>
</tr>
<tr>
<td>Processing of waste</td>
<td>Emissions associated with processing of intermediate products by companies</td>
<td>Excluded*</td>
</tr>
<tr>
<td>Use of sold products</td>
<td>Emissions associated with use of products by consumers and companies</td>
<td>558.8 (103.6%)</td>
</tr>
<tr>
<td>Disposal of sold products</td>
<td>Emissions associated with transportation and treatment of products upon disposal by consumers and companies</td>
<td>Excluded*</td>
</tr>
<tr>
<td>Lowest leased assets (downstream)</td>
<td>Emissions associated with operation of assets leased to other companies</td>
<td>Excluded*</td>
</tr>
<tr>
<td>Franchises</td>
<td>Emissions by franchises</td>
<td>Excluded*</td>
</tr>
<tr>
<td>Investments</td>
<td>Emissions related to operation of investments</td>
<td>17.3 (0.3%)</td>
</tr>
</tbody>
</table>

Reduction of CO2 Emissions in Logistics Processes

Kawasaki takes steps to pinpoint CO2 emissions and promote energy-saving activities in its logistics processes, which cover some of its supply chain, to realize continuous reduction in CO2 emissions. In fiscal 2017, CO2 emissions increased by 12% year on year, to approximately 4,000 tons, due to an increase in freight transport to distant areas.

Figure 7: CO2 Emissions from Logistics Processes and Per Unit of Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>CO2 emissions (t-CO2)</th>
<th>Per Unit of Sales (t-CO2/100 million yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>104</td>
<td>0.56</td>
</tr>
<tr>
<td>2014</td>
<td>119</td>
<td>0.91</td>
</tr>
<tr>
<td>2015</td>
<td>126</td>
<td>0.57</td>
</tr>
<tr>
<td>2016</td>
<td>117</td>
<td>0.17</td>
</tr>
<tr>
<td>2017</td>
<td>122</td>
<td>0.22</td>
</tr>
</tbody>
</table>
Utilizing Renewable Energy

The Kawasaki Group is making its production and other equipment more energy efficient, and advancing the use of renewable energy, as efforts to reduce the CO₂ emissions from its plants. We are installing solar power generating systems at our plants, and have a total generation capacity of 4,171 kW, including subsidiaries (some of the equipment installations were subsidized by the New Energy Promotion Council).

In fiscal 2017, we used about 1.7GWh of power from renewable energy sources in-house and reduced CO₂ emissions by approximately 1,000 tons.

Table 3: The Kawasaki Group’s Solar Power Generation Capacity

<table>
<thead>
<tr>
<th>Name</th>
<th>Power Usage</th>
<th>Generation Capacity (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iwaoka Photovoltaic Power Station*</td>
<td>Sold via FIT*</td>
<td>1.505</td>
</tr>
<tr>
<td>Nagoya Works 1</td>
<td>Used in house</td>
<td>750</td>
</tr>
<tr>
<td>Sesshin Photovoltaic Power Station*</td>
<td>Sold via FIT*</td>
<td>701</td>
</tr>
<tr>
<td>Nishi-Naka Works</td>
<td>Used in house</td>
<td>505</td>
</tr>
<tr>
<td>Nishi-Naka Photovoltaic Power Station*</td>
<td>Sold via FIT*</td>
<td>422</td>
</tr>
<tr>
<td>Akashi Works</td>
<td>Used in house</td>
<td>140</td>
</tr>
<tr>
<td>Sakaike Works</td>
<td>Used in house</td>
<td>10</td>
</tr>
<tr>
<td>Kakegawa Photovoltaic Power Station*</td>
<td>Sold via FIT*</td>
<td>48</td>
</tr>
<tr>
<td>Hyogo Works</td>
<td>Used in house</td>
<td>25</td>
</tr>
<tr>
<td>Naka Works</td>
<td>Used in house</td>
<td>20</td>
</tr>
<tr>
<td>Harima Works</td>
<td>Used in house</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>4,171</td>
</tr>
</tbody>
</table>

*1 Power generation facility operated by Kawasaki Trading Co., Ltd
*2 FIT: Feed-in tariff, a program where renewable energy is bought back at a fixed rate

Reducing CO₂ Emissions through Product-Based Contributions

Kawasaki calculates the CO₂ emission reduction effect of products in use in four categories—energy & environmental engineering, air transportation systems, land/sea transportation systems, and ROBO-MECH—to determine the CO₂ emission reduction effect through product-based contributions, and discloses this information to the public.

An analysis of CO₂ emissions along our supply chain reveals that most of the CO₂ emissions are released during product use, so our goal is to contribute to lower CO₂ emissions through delivery of highly energy efficient products.

In fiscal 2017, the CO₂ emission reduction effect through product-based contributions amounted to 898,000 tons, up 20% year on year, thanks to an increase in the number of high-efficiency power generation systems and biomass boilers, high-propulsion performance ships, and other systems delivered.

Table 4: CO₂ Emission Reduction Effect through Product-Based Contributions by Business Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Reduction Effect</th>
<th>Main Products</th>
<th>Reason for Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy &amp; environmental engineering</td>
<td>632,000 CO₂/year</td>
<td>Gas turbine cogeneration systems, compressors, biomass boilers, waste incinerators</td>
<td>Waste heat and waste utilization, higher efficiency</td>
</tr>
<tr>
<td>Air transportation systems</td>
<td>199,000 CO₂/year</td>
<td>Aircraft (lightweight body)</td>
<td>Better fuel economy</td>
</tr>
<tr>
<td>Land/sea transportation systems</td>
<td>39,000 CO₂/year</td>
<td>Ships (improved propulsion performance)</td>
<td>Better fuel economy</td>
</tr>
<tr>
<td>ROBO-MECH</td>
<td>28,000 CO₂/year</td>
<td>Hydraulic equipment, robots</td>
<td>Higher efficiency</td>
</tr>
</tbody>
</table>

Notes: 1. Kawasaki used CO₂ emissions factors provided in the list of calculation methods and emissions factors published by Japan’s Ministry of the Environment.
2. The CO₂ emission reduction effect through product-based contributions achieved through higher energy efficiency of products is based on a comparison using standard, existing products.
3. Application of waste heat and energy derived from waste materials is counted toward the CO₂ emission reduction effect through product-based contributions.

Figure 8: Photovoltaic Output (used in-house)
Efforts to curb consumption of natural resources and reduce waste have acquired greater social urgency, paralleling wider economic activity and population growth. Kawasaki takes great care to fully utilize and recycle the limited resources procured for our products and manufacturing processes, which consume these resources without waste. To that end, we promote waste reduction and recycling during manufacturing, and systematically treat PCB waste.

### Key Strategies and Targets under Ninth Environmental Management Activities Plan (FY2017–FY2019)

<table>
<thead>
<tr>
<th>Targets</th>
<th>Promotion of the 3Rs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce total waste generation and maintain zero emission status</td>
<td>Reduce total waste generation per unit of sales by at least 1% from level achieved under the Eighth Plan, push final disposal rate below 1%</td>
</tr>
<tr>
<td>Promote reuse and recycling</td>
<td>Boost recycling rate above 95%</td>
</tr>
<tr>
<td>Promote PCB treatment</td>
<td>Systematically treat high- and low-concentration PCB waste</td>
</tr>
</tbody>
</table>

### Realization of a Recycling-Oriented Society

We are continuing activities to achieve our targets to reduce waste generated through our manufacturing processes on a per unit of sales basis by using resources effectively, and to achieve zero status for waste disposed into landfills through the promotion of recycling.

In fiscal 2017, waste generated per unit of sales amounted to 4.36 tons/100 million yen, a reduction of 6.2% compared to the average from fiscal 2014 to fiscal 2016. The final disposal (landfill) ratio was 0.2%, achieving the target of 1% or less. Moreover, our recycling rate was 98%, which is up from 97% in the previous year. Going forward, we will continue to pursue initiatives with a focus on the 3Rs.

### Promoting PCB Treatment

The disposal of PCB (polychlorinated biphenyl) waste is proceeding through a worldwide effort, in line with the Stockholm Convention, which stipulates procedures and requirements including proper treatment of PCBs. In Japan, disposal is undertaken in a systematic manner, mainly by the Japan Environmental Storage & Safety Corporation (JESCO), which was established by the Ministry of the Environment, and we are undertaking the treatment of our PCBs with its completion targeted ahead of the national schedule.

To achieve these targets, we are steadily implementing steps to address PCB waste, including ceasing use of products and devices that contain PCBs and putting such items into storage, confirming disposal volume, and looking into providers with facilities to treat low-concentration PCB waste on our behalf. As of fiscal 2017, we had made favorable progress toward our target, with completed disposal reaching 79% on a disposal cost basis.
Realization of a Society Coexisting with Nature

Modern society is maintained through the benefits of various ecosystem services from nature, including resource renewal and reproduction in air, water, and soil environments. Kawasaki strives to reduce environmental impact through products and manufacturing processes in harmony with the global environment and seeks to contribute to the protection of ecosystems. For that reason, we promote improvements in the environment and protection of the ecosystem through the reduction of chemical substances in production activities, while also cooperating with environmental conservation activities in local communities.

Chemical Substance Reduction

As chemical substances used in processes to manufacture products can have a detrimental effect on human health and ecosystems, we will conduct proper management and strive to reduce consumption of such substances. We have set targets for major VOCs (toluene, xylene and ethylbenzene), dichloromethane and hazardous heavy metals (lead compounds and hexavalent chromium compounds) in each business segment, and applied approaches to curb consumption and emissions.

In fiscal 2017, we achieved our reduction targets for major VOCs. Although we reduced hazardous heavy metals, use of dichloromethane increased, so we were not able to reach our target.

Going forward, we will continue to conduct proper management of chemical substances, while aiming to reduce consumption and emissions.

Furthermore, we are appropriately identifying chemical substances at each business site and notifying the government based on the PRTR Law (Pollutant Release and Transfer Register Law).

Responding to the ELV Directive*, the RoHS Directive**, and the REACH Regulation***

Since 2000, laws and regulations related to chemical substances have been strengthened in the European Union (EU) by the establishment of such controls as the ELV Directive, the RoHS Directive, and the REACH Regulation. The ELV Directive focuses on automobiles, and while motorcycles are not subject to the content of this directive, the Motorcycle & Engine Company has embraced the voluntary actions espoused by the Japan Automobile Manufacturers Association (JAMA). The Precision Machinery Company also applies this directive to some of our products. The RoHS Directive covers electric and electronic products, and in Kawasaki, the Precision Machinery Company, which includes the Robot Division, complies with the directive for some of its products. The REACH Regulation went into effect in June 2007 and applies to all chemical substances manufactured in and imported by the EU. Enterprises that manufacture or import one ton or more of chemical substances a year are required to register the chemical substances.

As Kawasaki products are mainly molded articles, only a limited number need to be registered. Registration and notification are, however, compulsory for all substances that are deliberately emitted and all substances that are carcinogenic or otherwise of high concern. In addition to registration and notification, regulations exist for the evaluation, authorization, restriction and communication of information regarding chemical substances, necessitating a system to identify information about the chemical substances in products throughout our entire supply chain.

Laws and regulations related to chemical substances have been strengthened not only in the EU but in many countries around the world. As requirements vary by country, for instance regarding substances and products covered, we believe that our response must be based on a firm understanding of the law.

Kawasaki practices CSR procurement and responds to requests from customers to gather chemical substance information. In addition, the Motorcycle & Engine Company has created the Kawasaki Material Data System** to collect data about chemical substances and respond to REACH and other applicable chemical substance regulations.

Key Strategies and Targets under Ninth Environmental Management Activities Plan (FY2017–FY2019)

<table>
<thead>
<tr>
<th>Reduction of environmental load/promotion of resource conservation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Targets</strong></td>
</tr>
<tr>
<td>→ Reduce chemical substances</td>
</tr>
<tr>
<td>▶ Reduce major VOCs per unit of sales by at least 1% from level achieved under the Eighth Plan</td>
</tr>
<tr>
<td>▶ Reduce dichloromethane by at least 1% year on year</td>
</tr>
<tr>
<td>▶ 50% to reduce hexavalent chromium to zero, in principle, by fiscal 2021</td>
</tr>
<tr>
<td>→ Conserve water</td>
</tr>
<tr>
<td>▶ Reduce annual consumption of water per unit of sales by at least 1%</td>
</tr>
<tr>
<td>▶ Track cost effect of measures to conserve tap water and prevent leaks from clean water pipes</td>
</tr>
<tr>
<td>→ Continue with forest conservation activities</td>
</tr>
<tr>
<td>▶ Carry out forest conservation activities at least twice a year</td>
</tr>
</tbody>
</table>
Promoting the 3Rs
Since October 2004, we have operated an independent motorcycle recycling system in cooperation with three other motorcycle manufacturers and 12 importers in Japan. In fiscal 2017, we achieved a recycling rate of 97.5%. Since October 2011, the user burden of recycling costs has become completely free of charge.

For new-model motorcycles, we emphasize environmentally conscious designs highlighting reduced materials and more recycling, right from the development phase. We conduct preliminary evaluations of efforts related to the 3Rs—reduce, reuse and recycle—before commencing design, prototyping and mass production phases. In particular, we seek to increase recyclability through greater use of materials that are easy to recycle and we have achieved a potential recycling rate exceeding 90% on every model, with most models exceeding 95%. This potential recycling rate was calculated based on the Guidelines for Definition and Calculation Method on the Recyclability Rate for New Vehicles (1998 Japan Automobile Manufacturers Association).

Reducing and Eliminating Environmental Substances of Concern
For new-model motorcycles sold in Japan, we already meet the voluntary targets of reduced environmental substances of concern (lead, mercury, hexavalent chromium and cadmium) set by the Japan Automobile Manufacturers Association, and we have also achieved voluntary targets for older models still being sold.

For general-purpose engines and JET SKI watercraft, there are no Japanese regulations such as the JAMA voluntary reduction targets, but we are making elimination and reduction efforts that follow those applied to motorcycles, and we had achieved voluntary reduction targets for lead, mercury and cadmium by fiscal 2008. Hexavalent chromium had been contained to a very small amount, but we completed its elimination in fiscal 2009.

Conserving Water
Kawasaki has set reduction targets on a per unit of sales basis for the effective use of water. In fiscal 2017, while we made progress on measures to repair leaks at factories, water consumption per unit of sales increased 2.3% year on year due to an increase in usage, mainly for hydrostatic testing of tanks.

Forest Conservation Activity
We are engaged in forest conservation activities in two locations: Hyogo Prefecture and Kochi Prefecture.

In Hyogo Prefecture, we have participated in a prefecture’s corporate forest restoration project since December 2008. Our forest conservation activities started out at a community forest named Kawasaki Heavy Industries Saidani Nagomi-no-Mori, in the town of Taka. In 2014, we changed the location of our activities within this town, and are continuing our efforts under the new name, Kawasaki Heavy Industries Yokamura Park Nagomi-no-Mori.

Since the start of our forest conservation activities in 2008, the number of participating employees and their family members has reached a cumulative total of approximately 1,700 people, and approximately 2,600 trees consisting of 45 varieties, including Japanese red pine, konara oak, and mountain cherry have been planted.

Approaches by the Motorcycle & Engine Company
Reducing Exhaust Emissions
In fiscal 2017, we began sales in Europe of Z900, a model that exemplifies our efforts to achieve cleaner exhaust gas from motorcycles on a world-caliber level. In addition to securing the top level of output in its class, this model realizes the world’s highest level of environmental performance by achieving both top results in fuel performance and low exhaust emissions. By maintaining low levels of exhaust emissions, such as CO and NOx, it is compliant with both EU6/IV, European emission regulations, and R41-04, Europe’s new noise emission regulations. In addition to securing the top level of output in its class, this model realizes the world’s highest level of environmental performance by achieving both top results in fuel performance and low exhaust emissions. By maintaining low levels of exhaust emissions, such as CO and NOx, it is compliant with both EU6/IV, European emission regulations, and R41-04, Europe’s new noise emission regulations.

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Since the start of our forest conservation activities in 2008, the number of participating employees and their family members has reached a cumulative total of approximately 1,700 people, and approximately 2,600 trees consisting of 45 varieties, including Japanese red pine, konara oak, and mountain cherry have been planted.
In addition, in Kochi Prefecture, we have participated in a prefecture-organized forest restoration project aimed at forest regeneration, and have been active in the town of Niyodogawa since 2007. Every year, new employees conduct forest conservation activities such as thinning and deepen our level of exchange with local communities.

### Table 5: Fiscal 2017 Achievements

<table>
<thead>
<tr>
<th>Activity location</th>
<th>Activity content</th>
<th>Participants</th>
<th>Achievements</th>
<th>Number of events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town of Taka, in Hyogo Prefecture</td>
<td>Tree pruning, thinning and planting native trees, nature watching and observation</td>
<td>Employees and families, and others (275 people)</td>
<td>Area: 1.0ha CO2 absorbed: 2.20t/CO2 Trees planted: 317</td>
<td>Three times a year</td>
</tr>
<tr>
<td>Town of Niyodogawa, in Kochi Prefecture</td>
<td>Tree thinning, environmental education</td>
<td>Employees and others (89 people)</td>
<td>Area: 0.3ha CO2 absorbed: 16.5t/CO2</td>
<td>Once a year</td>
</tr>
</tbody>
</table>

**Biodiversity-Friendly Society**

In addition to activities for creating corporate forests, we have embraced collaborative opportunities with local groups from the perspective of biodiversity, including cleanup events and greening programs around our business locations.

In fiscal 2017, we conducted aquatic life habitat surveys on idle land in Nishi-ku, Kobe, in Hyogo Prefecture, as a new initiative. As a result, we observed the habitats of five species of fish, including *Pseudorasbora parva* and the important species, *Misgurnus anguillicaudatus*, *Oryzias latipes*, and *Rhinogobius sp. BF*. It is believed that these species are already reproducing (breeding) at that location.

As there are no specific introduced species such as bluegill, this pond was confirmed to be functioning as a living environment for rare fish in accordance with the local ecosystem. Going forward, we are planning to conduct surveys on benthic animals and plants, in order to assess the current state of biodiversity at the site. Through such efforts, we are considering how to achieve environmental harmony in local communities.

#### Figure 19: Pond where the surveys were conducted

#### Figure 20: Casting a net for the survey

#### Figure 21: Representative species found

- *Pseudorasbora parva*
- *Misgurnus anguillicaudatus*
- *Oryzias latipes*
- *Rhinogobius sp. BF*

**Table 6: Applicability of important Species Selection Criteria**

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Red List of the Ministry of the Environment</th>
<th>Red Data Book of Hyogo Prefecture</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Misgurnus anguillicaudatus</em></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td><em>Oryzias latipes</em></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td><em>Rhinogobius sp. BF</em></td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

Kawasaki is establishing environmental management systems (EMS), and is conducting various initiatives aimed at realization of a low-carbon society, realization of a recycling-oriented society, and realization of a society coexisting with nature.

The long-term vision set forth for 2010 and 2020 serves as a guideline for the achievements we intend to realize through EMS operation. The appropriate operation of EMS has led to continued reductions in our environmental impact, and we will continue EMS operations going forward, with an aim toward further achievements.

### Table: Enhancement of Environmental Management Systems

<table>
<thead>
<tr>
<th>Key Strategies and Targets under Ninth Environmental Management Activities Plan (FY2017–FY2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforce environmental management capabilities and lower environmental risk</td>
</tr>
<tr>
<td>→ Certified business sites to complete transition to ISO 14001:2015</td>
</tr>
<tr>
<td>Visit domestic and overseas production sites to better pinpoint status of environmental management</td>
</tr>
</tbody>
</table>
Kawasaki Group EMS

To promote environmental management throughout the Group, Kawasaki and its subsidiaries embrace the practice of building an environmental management system. Kawasaki’s manufacturing sites and domestic and overseas subsidiaries have completed the acquisition of ISO 14001 certification or simplified EMS certification, or established EMS through self-declaration within the scope of its stipulation.

The latest information on the establishment of EMS within the Group is shown in Figure 22, while the current situations for acquiring ISO 14001 certification for Kawasaki’s manufacturing sites is shown in Table 7 and the status of EMS establishment at subsidiaries is shown in tables 8 and 9. In response to the revision of ISO 14001, we are promoting the transition to ISO 14001:2015 for sites that have implemented EMS.

For sites engaged in EMS implementation, efforts are being directed toward the collection of environmental data and the sharing of such data at the Head Office Environmental Management Division. In addition, this division makes visits to subsidiaries, in order to further instill our environmental management policy as a Group. During fiscal 2017, visits were made to four large-scale subsidiaries in Japan, in order to share awareness with local departments.

Table 7: Current Situations for Acquiring ISO 14001 (JIS Q 14001) Certification for Kawasaki Production Bases

<table>
<thead>
<tr>
<th>Internal companies</th>
<th>Date acquired</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rolling Stock Company</td>
<td>Kobe Works</td>
<td>Aug. 2002</td>
</tr>
<tr>
<td>Aerospace Company</td>
<td>Feb. 2002</td>
<td>LRQA</td>
</tr>
<tr>
<td>Gas Turbine &amp; Machinery Company</td>
<td>Gas Turbine Division</td>
<td>Mar. 2000</td>
</tr>
<tr>
<td>Plant &amp; Infrastructure Company</td>
<td>Feb. 2002</td>
<td>NSK</td>
</tr>
<tr>
<td>Motorcycle &amp; Engine Company</td>
<td>Feb. 2000</td>
<td>DIN GL</td>
</tr>
<tr>
<td>Precision Machinery Company</td>
<td>Kobe Works</td>
<td>Dec. 1998</td>
</tr>
<tr>
<td>Robot Division</td>
<td>Mar. 2011</td>
<td>DIN GL</td>
</tr>
</tbody>
</table>

Risk Management

In addition to approaches based on our risk management structures, we hold liaison conferences from time to time with environmental corporate responsibilities to ensure adherence to environmental laws and regulations, dissemination and full understanding of legal revisions, and the enhancement of their capabilities. These conferences, which are held under the direction of the Head Office Environmental Management Division and personnel with environmental responsibilities at the Group, focus on compliance with environmental laws and regulations to prevent environmental accidents and other situations.

During fiscal 2017, we confirmed the response status to managers responsible for environmental protection in advance of the enforcement of the Act on Preventing Environmental Pollution of Mercury.

Compliance with Laws and Regulations

Within the Kawasaki Group, environmental management activities are undertaken in the Group’s efforts to comply with environmental laws and regulations.

There were no cases subject to administrative actions in fiscal 2017.

While there was one case involving a complaint from neighborhood residents related to noise generated from a defect in a portion of the steam piping within a plant, the issue was resolved by repairing the piping. In order to prevent the occurrence of similar incidents, information is shared internally through our environmental management systems.

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Promoting Environmental Communication

● Raising Environmental Awareness
We are engaged in public relations activities aimed at enhancing the perception and awareness of environmental issues among each and every employee of the Group. We conduct ongoing awareness raising activities including the publication of environment-related articles in the Kawasaki internal bulletin, distribution of the President’s message for Environment Month, and distribution of information (environmental data, case examples of energy saving, etc.) through our intranet, so that employees can put environmentally conscious activities into practice not only at the workplace, but also in local communities and homes.

Figure 23: Articles featured in internal bulletins

Table 10: Number of Qualified Pollution Control Managers

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>62</td>
</tr>
<tr>
<td>Water</td>
<td>69</td>
</tr>
<tr>
<td>Noise, vibration</td>
<td>38</td>
</tr>
<tr>
<td>Others</td>
<td>77</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
</tr>
</tbody>
</table>

Table 11: Number of Qualified Energy Managers

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy managers</td>
<td>73</td>
</tr>
</tbody>
</table>

● Environmental e-Learning
To maintain and improve environmental awareness among employees throughout the domestic Group, we offer environmental e-learning opportunities to new employees at both Kawasaki and domestic subsidiaries. In fiscal 2017, approximately 1,100 people completed the training.

● Cultivating Qualified Managers
To enrich management activities emphasizing energy and the environment, we are striving to cultivate individuals with legal qualifications required under laws and regulations related to energy and the environment. The number of employees with qualifications in fiscal 2017 is shown in tables 10 and 11. In addition, as an internal qualification, we offer training for internal ISO 14001 environmental management and environmental auditors, through which approximately 80 employees acquired qualifications in fiscal 2017. Furthermore, follow-up training has been conducted for employees that have already participated in training to support the transition to ISO 14001:2015, and approximately 1,200 employees acquired qualifications in fiscal 2017.

Transition to ISO 14001:2015 Under Way

In September 2015, ISO 14001:2004, the international standard for environmental management systems, was revised to ISO 14001:2015. An overview of the main revisions is as follows:

• Approach toward strategic environmental management
• Strengthening of leadership
• Consideration of environmental protection
• Improvements in environmental performance
• Consideration from lifecycle perspective
• Development of communication
• Approach toward documentation that strengthens the independence of organizations

By adopting these concepts, a departure has been made from conventional supportive environmental protection, to a form of environmental management that shifts from protective to proactive environmental activities, requiring environmental contributions in the core business, as well.

At the implementation stage aimed at transition, we are establishing environmental management systems and conducting activities based on ISO 14001:2015, and conducting internal audits within the organization to confirm the status of these activities. As it is necessary to develop internal auditors who understand ISO 14001:2015 for these internal audits, basic internal training is being conducted to that end. During fiscal 2017, intensive training for the transition to ISO 14001:2015 was conducted for employees who have already received qualifications as internal auditors for ISO 14001:2004 within the Group, as we constructed a structure capable of supporting the revised standard.

The deadline for the transition to ISO 14001:2015 is September 14, 2018, and in fiscal 2017, this transition was completed for the Precision Machinery Company and Ship & Offshore Structure Company. Work towards this transition is also under way as planned for our other business segments.
Heightened Awareness as an Environmentally Friendly Brand

Kawasaki believes that one of its important responsibilities is to make its environmental policies and initiatives easy to understand and to disclose those policies with transparency. We conduct Kawasaki Green Product Promotion Activity that includes the registration of products based on an assessment of product performance and the manufacturing process in consideration of the environment, with the aim of broadly communicating and instilling our support for environmental management activities.

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Key Strategies and Targets under Ninth Environmental Management Activities Plan (FY2017–FY2019)

- **Heightened awareness as an environmentally friendly brand**
  - Leverage Kawasaki Green Product Promotion Activity
    - Register Kawasaki-brand Green Products every year and release data to public.
  - Enhance image through external evaluations and rankings
    - Announce results of third-party verification, improve evaluations from external organizations such as CDP, and sustain placement in Dow Jones Sustainability Index.

**External Information Disclosure**

Kawasaki discloses information to our stakeholders through means such as the Kawasaki Report, the Environmental Report, and our website. In addition, we receive questionnaires from many external evaluation organizations, including the CDP Climate Change Information Request, published by the CDP, the Environmental Management Survey, conducted by Nikkei Research Inc., the Toyo Keizai CSR Survey, and the Dow Jones Sustainability Index, which we view as the voice of stakeholders representing investors, and we vigorously pursue the disclosure of environmental information by responding to such questionnaires.

As a result, we have continuously been selected as a stock for investment for the DJASIA Asia Pacific Index, and the SNAM Sustainable Investment Fund, which is managed by Sampo Japan Nipponkoa Asset Management Co., Ltd. (SNAM).

**Figure 25: Program logo**

**Figure 26: Conformity Assessment Procedure**

**Application**

Looking at environmentally conscious products and environmental actions from the perspective of a low-carbon society, a recycling-oriented society, a society consisting with nature.

We will apply those that exhibit particularly excellent performance.

**Overall Evaluation Criteria**

We take an overall view, considering the environmental performance of the product as well as environmental management during manufacturing processes.

**Environmental Labels**

Products that meet conformity assessments receive an environmental label describing product features, including basis for authorization, and environmental claims are announced.

**Kawasaki Green Product Promotion Activity**

To realize our Group Mission “Kawasaki, working as one for the good of the planet,” we will draw on high-level, comprehensive technological capabilities over the Kawasaki Group’s extensive range of business pursuits to create new value for coexisting with nature and building a brighter, more comfortable future for generations to come. We have launched Kawasaki-brand Green Products, a program in support of the Group Mission objective and through which we will boost the environmental performance of products and accelerate the reduction of environmental impact caused by associated manufacturing processes. The products selected for this program must meet self-established criteria and are categorized as either Kawasaki Green Products or Kawasaki Super Green Products. The products are then labeled compliant with ISO 14021, and the list is made public.

The program logo embodies the Group’s commitment to environmental sustainability through products and manufacturing. The three pillars in the logo represent our primary business areas—land, sea and air transport systems, energy and environmental engineering, and industrial equipment—and the innovative and advanced technological capabilities in these respective areas form a firm foundation for these pillars, which together support the global environment.
Product Assessment

For newly developed and designed products, as well as for particularly important products, Kawasaki assesses products according to such criteria as resource and energy savings and recycling potential, with the goal of reducing the environmental impact of our products during their life cycles. Because specific evaluation techniques vary depending on the type of product, each business segment draws up product assessment rules appropriate to the characteristics of the respective product. The main evaluation items of product assessment are shown below.

- Product weight reduction
- Product energy saving
- Longer product life
- Product safety and environmental conservation effectiveness
- Measures for product disposal and recycling
- Environmental impacts when problems or other extraordinary circumstances occur
- Provision of information for use and maintenance
- Compliance with regulations

2017 Kawasaki-brand Green Products

Newly Developed Tank

Large LNG Carrier with

- Industry-leading thermal insulation performance, and fuel and volumetric efficiencies
- Boil-off Rate (*): 0.05%/day

- Thermo insulation panel with partial re-liquefaction
- Thermo insulation panel only

- Competitor’s product
- Boil-off Rate (*): 0.08%/day

- Our product
- Boil-off Rate (*): 0.075%/day

In addition to improving fuel efficiency and reducing environmental impact, this large LNG carrier features a hull size capable of entering LNG terminals worldwide and passing through the newly expanded Panama Canal. Furthermore, the adoption of non-spherical cargo tanks greatly increases its LNG transport capacity.

Product Description

- Special Features
  - Adoption of Kawasaki Panel System with industry-leading thermal insulation performance
  - World’s lowest real BOR (boil-off rate) achieved through partial re-liquefaction system
  - Improvement of fuel efficiency by about 15%, compared with our previous ships, due to the combination of a unique hull form with dual fuel engines.

Large LNG Carrier with Newly Developed Tank

Boil-off Rate (*): 0.05%/day

- Thermo insulation panel with partial re-liquefaction
- Thermo insulation panel only

- Competitor’s product
- Boil-off Rate (*): 0.08%/day

- Our product
- Boil-off Rate (*): 0.075%/day

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Product Description

- Special Features
  - Adoption of Kawasaki Panel System with industry-leading thermal insulation performance
  - World’s lowest real BOR (boil-off rate) achieved through partial re-liquefaction system
  - Improvement of fuel efficiency by about 15%, compared with our previous ships, due to the combination of a unique hull form with dual fuel engines.

Crew Working Condition

- Adoption of friction stir welding (FSW) on structure
- Side plates joined using FSW

- Achieves energy and resource savings through relentless pursuit of recycling and reuse, and thorough weight reduction

- The railcar uses stainless steel as a structural material and aluminum composite plates in the interior panels, both recyclable materials, and promotes use of monoalloys in the aluminum structure.

- Reduced weight decreases electricity consumption.

- Friction stir welding (FSW), which requires less heat than MIG welding, is applied during manufacture.
**BK117 D-2 Helicopter (Airbus Helicopters Model: H145)**

Achieves the quietest helicopter in its class, providing outstanding hovering performance and longer service life.

- The introduction of a new tail rotor system and other features contribute to the reduction of external noise, and environmental performance throughout the life cycle is greatly enhanced, allowing longer service life through reduction of noise and vibration. The new main gearbox greatly reduces the maximum noise rating, contributing to improved energy efficiency by 18%.

**Oil-Free Kawasaki Centrifugal Compressor**

Completely oil-free compressor achieved through adoption of a high-speed motor and magnetic bearings.

- The adoption of a high-speed motor and magnetic bearings improves energy efficiency and reduces weight and noise. A 15% lower power consumption, 10% lighter weight, and 7% smaller installation area compared to conventional models. Equalization of the noise for buoys also reduces noise emission.

**Z900 (2017MY)**

**LNG Tank (New safety factor applied)**

Application of new safety factor and optimized structure reduces product weight and improves cold-storage functionality.

- The application of a new safety factor and structural improvements reduces product weight per unit of volume by 13% compared to tanks delivered in 2010. Enhanced cold-storage functionality reduces boil-off gas loss by 11%.

**Wireless Fueling System**

- Trade name: Kawasaki Super Green Product
- Expected of the Super Green Product: Kawasaki Environmental Report 2017

**Other companies’ models**

- Kawasaki model: Z900
- Competitor’s model: Yamaha R41-04, Europe

**Exhaust Emissions**

- 

<table>
<thead>
<tr>
<th>Engine revolutions</th>
<th>0.30</th>
<th>0.40</th>
<th>0.50</th>
</tr>
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<tbody>
<tr>
<td>NOx</td>
<td>0.005</td>
<td>0.006</td>
<td>0.007</td>
</tr>
<tr>
<td>THC</td>
<td>0.005</td>
<td>0.006</td>
<td>0.007</td>
</tr>
<tr>
<td>CO</td>
<td>0.005</td>
<td>0.006</td>
<td>0.007</td>
</tr>
</tbody>
</table>

**Worldwide-harmonized emission target**

- CO: 0.005, NOx: 0.005, THC: 0.005

- Kawasaki Environmental Report 2017
**HST Pump**

**K8V Series**

Product Description

Achieves world’s top-class pump efficiency, low noise, and high reliability

- Optimizes positional deviation of inner and outer rings to achieve higher performance and longer bearing life.
- Lower pump pressure losses thanks to higher bearing rigidity.
- Special features:
  - A high-rigidity bearing structure eliminates positional deviation.
  - Low noise thanks to optimized bearing rigidity.

**Special Features**

- Lower pressure losses achieve high performance and longer bearing life.
- High rigidity bearing structure eliminates positional deviation.
- Low noise thanks to optimized bearing rigidity.

**HST Motor**

**M7V Series**

Product Description

New 11-piston rotary motor

- Achieves world’s top-class power density: the world’s highest-class power density achieved through the world’s most outstanding high-speed performance.

**Special Features**

- Unique axis, ball-screw mechanism on the second and third axes
- Smooth start-up and stable speed during slow travel
- Long bearing life
- World’s highest-class power density
- Low-speed performance
- High rigidity

**Extra-Large Payload Robot**

**MG Series**

Product Description

Unique case construction, which features hybrid link and partial use of ball screws, to achieve payloads of 3-ton to 5-ton levels and lighter chassis. The world’s highest-class power density achieved through the world’s most outstanding high-speed performance.

**Special Features**

- Smooth start-up and stable speed during slow travel
- Long bearing life
- World’s highest-class power density
- Low-speed performance
- High rigidity
After registration, products are reassessed every three years, and registration is renewed for products that meet the criteria.

This HFC-free chiller, using water as a refrigerant, cuts greenhouse gas emissions with energy-saving potential. The world's best in terms of power generation efficiency—49.0%—in its class, as of April 1, 2014. Using clean natural gas, the Green Gas Engine achieves the world's lowest level of NOx emissions, at 0.04%.

For a more detailed description of the Kawasaki Environmental Report 2017, please refer to the full document.
Kawasaki’s Environmental Data (Fiscal 2017)

Environmental Data by Business Site (Fiscal 2017)
- Gifu Works
- Nagoya Works 1
- Kobe Works
- Hyogo Works
- Nishi-Kobe Works
- Seishin Works
- Akashi Works
- Kakogawa Works
- Harima Works
- Sakaide Works

Environmental Data of Subsidiaries (Fiscal 2017)
- Domestic/Overseas

### Kawasaki’s Environmental Data (Fiscal 2017)

<table>
<thead>
<tr>
<th>Category</th>
<th>Unit</th>
<th>Amount</th>
<th>Change from fiscal 2016</th>
</tr>
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<tbody>
<tr>
<td><strong>INPUT</strong></td>
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<td></td>
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<tr>
<td>Total energy consumption (crude oil equivalent)</td>
<td>kl</td>
<td>356,987</td>
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<td>Purchased electricity</td>
<td>MWh</td>
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<td>Fuel</td>
<td>TJ</td>
<td>2,432</td>
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<td>Renewable energy</td>
<td>MWh</td>
<td>1,664</td>
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<tr>
<td>Materials</td>
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<td>14</td>
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<tr>
<td>Water</td>
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<td><strong>OUTPUT</strong></td>
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<tr>
<td><strong>Air</strong></td>
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<td>CO₂ emissions from energy sources</td>
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<td>99%</td>
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<td>SO₂</td>
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<td>5</td>
<td>29%</td>
</tr>
<tr>
<td>NOₓ</td>
<td>t</td>
<td>155</td>
<td>50%</td>
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<td>Soot and dust</td>
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<td>3</td>
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<tr>
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<td>49,846</td>
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<td>Others</td>
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<td>1,191</td>
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<td>PRTR regulated substance in above total</td>
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<td><strong>Others</strong></td>
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<td></td>
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<tr>
<td>CO₂ emissions during transport</td>
<td>t</td>
<td>4,223</td>
<td>112%</td>
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### Environment Data by Business Site (Fiscal 2017) 1/2

<table>
<thead>
<tr>
<th>Location</th>
<th>Unit</th>
<th>Gifu Works</th>
<th>Nagoya Works 1</th>
<th>Kobe Works</th>
<th>Hyogo Works</th>
<th>Nishi-Kobe Works</th>
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<tr>
<td><strong>INPUT</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Total energy consumption (crude oil equivalent)</td>
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<td>712</td>
<td>12</td>
<td>182</td>
<td>43</td>
<td>63</td>
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<td>Renewable energy</td>
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<td>CO₂ emissions from energy sources</td>
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<td>25,131</td>
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<td>NOx</td>
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<td>Under 0.1</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
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<tr>
<td>PM10 regulated substance</td>
<td>t</td>
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<td>1</td>
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<td>32</td>
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<td>Under 0.1</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td><strong>Waste</strong></td>
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<td></td>
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<tr>
<td>Total emitted</td>
<td>t</td>
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<td>1,019</td>
<td>9,111</td>
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<td>1,019</td>
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<td>4,108</td>
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<td>Other (incineration/vegetation)</td>
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<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>PM10 regulated substance in above total</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Recycling rate (%)</td>
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<td>62</td>
<td>1</td>
<td>13</td>
<td>54</td>
<td>38</td>
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### Environment Data by Business Site (Fiscal 2017) 2/2

<table>
<thead>
<tr>
<th>Location</th>
<th>Unit</th>
<th>Seishin Works</th>
<th>Akashi Works</th>
<th>Kagokawa Works</th>
<th>Harima Works</th>
<th>Sakaide Works</th>
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<tbody>
<tr>
<td><strong>INPUT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total energy consumption (crude oil equivalent)</td>
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<td>42,939</td>
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<td>4,602</td>
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<tr>
<td>Renewable energy</td>
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<td>Water</td>
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<td>857</td>
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<td>95</td>
<td>413</td>
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<tr>
<td>CO₂ emissions from energy sources</td>
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<td>88,223</td>
<td>7,556</td>
<td>9,315</td>
<td>26,510</td>
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<td>Under 0.1</td>
<td>Under 0.1</td>
<td>0.4</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>PM10 regulated substance</td>
<td>t</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Water waste</td>
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<td>1,480</td>
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<td>15</td>
<td>0</td>
<td>1,101</td>
</tr>
<tr>
<td>N/CNOx</td>
<td>t</td>
<td>-</td>
<td>-</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
</tr>
<tr>
<td>Phosphorus</td>
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<td>-</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
<td>Under 0.1</td>
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<tr>
<td>PM10 regulated substance</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Waste</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total emitted</td>
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<td>847</td>
<td>8,174</td>
<td>1,446</td>
<td>3,570</td>
<td>11,584</td>
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<tr>
<td>Recycled</td>
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<td>8,174</td>
<td>1,446</td>
<td>3,570</td>
<td>11,584</td>
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<tr>
<td>Other (incineration/vegetation)</td>
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<td>27</td>
<td>15</td>
<td>0</td>
<td>1,101</td>
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<td>PM10 regulated substance in above total</td>
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<td>11</td>
<td>53</td>
<td>0</td>
<td>4</td>
<td>14</td>
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</table>
Environmental Data of Subsidiaries (Fiscal 2017)

Total for Domestic Subsidiaries

Total for Overseas Subsidiaries

CO₂ Emissions of Domestic Major Subsidiaries

NIPPI Corporation

EarthTechnica Co., Ltd.

Technica Corp.

Kawasaki Thermal Engineering Co., Ltd.

Kawasaki Motors Manufacturing Corp., U.S.A.

Kawasaki Motors Enterprise (Thailand) Co., Ltd

PT. Kawasaki Motor Indonesia

Kawasaki Precision Machinery UK Ltd.

Scope of Verification

Greenhouse gas emissions associated with business activities in fiscal 2017
- Scope 1 and 2 greenhouse gas emissions associated with business activities at 42 domestic and 24 overseas sites in the Kawasaki Group
- Category 1 (purchased products and services) and Category 11 (use of sold products), which account for a large percentage of Kawasaki’s Scope 3 greenhouse gas emissions

Third-Party Verification of Greenhouse Gas Emissions

For the purpose of ensuring credibility, the Kawasaki Group received a third-party verification from SGS Japan Inc. on greenhouse gas emissions of the Group.

GHG Emissions Verification Statement

Mr. Yoshio Kanazawa
President
Kawasaki Heavy Industries, Ltd.

Objective

SGS Japan Inc. (hereafter referred to as “SGS”) was commissioned by Kawasaki Heavy Industries, Ltd. (hereafter referred to as “the Organization”) to conduct independent verification based on Criteria of Verification (ISO14064-3:2006 and the SGS verification protocol) regarding the data prepared by the Organization on the scope of verification (hereinafter referred to as the “GHG assertion”). The objective of this verification is to confirm that the GHG assertion in the Organization’s applicable scope has been correctly calculated and reported in the GHG assertion in compliance with the criteria, and to express our views as a third party.

Scope

The scope of verification is limited to the GHG assertion of 42 Organization and its domestic subsidiaries sites, and 24 of its overseas subsidiaries sites.

GHG emissions included in this performance data are Scope 1 and 2; CO₂ emissions from energy consumption, excluded the vehicles which run outside of the sites, and Scope 3; category 1 and 11 within the sites and the equipment defined by the Organization.

The period subject to report is from 1 April 2016 to 31 March 2017.

Procedure of Verification

The GHG assertion was verified in accordance with Criteria of Verification, and the following processes were implemented at a limited level of assurance:
- Verification of the calculation system: Interviews on the measurement, tabulation, calculation and reporting methods employed by the Organization as well as review of related documents and records;
- Verification of the GHG assertion: On-site verification, review of vouchers at Ishikawa Works, Sendai Works and analytical procedures and interviews carried out at all works included in the scope of verification.

Conclusion

While the scope of the verification activities employing the methodologies mentioned above, nothing has come to our attention that caused us to believe that the Organization’s GHG assertion (Scope 1: 178,959 t-CO₂, Scope 2: 313,366 t-CO₂, Scope 3: 5,565,949 t-CO₂ (category 1), 52,089,310 t-CO₂ (category 11)) was not calculated and reported in compliance with the criteria.

SGS Japan Inc. affirms our independence from the organization, being free from bias and conflicts of interest with the Organization.

For and on behalf of SGS Japan Inc
Senior Executive & Business Manager Certification and Business Enhancement
Yui Takeou/HI
Signed:

18 June 2017