

# Kawasaki Environmental Report 2017



## Editorial Notes ..... 3

### Promoting Environmental Management ..... 4

- Chief Environmental Officer's Message To Realize a Sustainable Society
- Environmental Charter
- Environmental Management Platform
- Formulating the Kawasaki Global Environmental Vision 2050

### Summary of Environmental Activities in Fiscal 2017 ..... 8

- Summary of Fiscal 2017 Results
- Material Balance of Business Activities for Fiscal 2017 (Overall Picture of the Environmental Impact)

### Realization of a Low-Carbon Society ..... 11

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

- Energy-Saving Promotion Activities
- Reducing CO<sub>2</sub> Emissions from Production Activities
- Estimating CO<sub>2</sub> Emissions in Supply Chain
- Reduction of CO<sub>2</sub> Emissions in Logistics Processes
- Utilizing Renewable Energy
- Reducing CO<sub>2</sub> Emissions through Product-Based Contributions

### Realization of a Recycling-Oriented Society ..... 16

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

- Reduction of Waste Generation
- Promoting PCB Treatment

### Realization of a Society Coexisting with Nature ..... 18

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

- Chemical Substance Reduction
- Responding to the ELV Directive, the RoHS Directive, and the REACH Regulation
- Approaches by the Motorcycle & Engine Company
- Conserving Water
- Forest Conservation Activity
- Biodiversity-Friendly Society

### Establishment of Environmental Management Systems ..... 23

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

- Kawasaki Group EMS
- Risk Management
- Compliance with Laws and Regulations
- Promoting Environmental Communication
- TOPICS: Transition to ISO 14001:2015 Under Way

### Heightened Awareness as an Environmentally Friendly Brand ..... 28

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

- Kawasaki Green Product Promotion Activity
- External Information Disclosure
- Product Assessment
- 2017 Kawasaki-brand Green Products

### Environmental Data ..... 38

- Kawasaki's Environmental Data
- Environmental Data by Business Site
- Environmental Data of Subsidiaries

### Third-Party Verification of Greenhouse Gas Emissions ..... 43

## 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.

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**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.

# Promoting Environmental Management

## Chief Environmental Officer's Message To Realize a Sustainable Society



**Ikuhiro Narimatsu**  
Chief Environmental Officer  
(Managing Executive Officer)

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 guideposts 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 "CO<sub>2</sub> 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 CO<sub>2</sub> 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 Charter (established 1999, revised 2010)

### 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.

### Conduct Guidelines

- 1 Global environmental problems are serious issues shared by people around the world and, making it a management priority to ensure that business activities are conducted in harmony with the environment, we will strive willingly and vigorously toward this goal.
- 2 We will endeavor to conserve resources, save energy, recycle, and reduce industrial waste in production stages, and we will promote efforts to limit the impact of our operations on the environment.
- 3 We will carefully consider environmental impact during product planning, R&D and design stages to limit as much as possible any environmental impact caused during procurement, production, distribution, utilization and disposal stages of the products we make and market.
- 4 We will strive to minimize the impact our business activities have on ecosystems and engage proactively in efforts to protect these ecosystems.
- 5 In seeking solutions to global environmental issues, we will develop and provide new technologies and new products that effectively contribute to environmental protection and reduced consumption of energy and natural resources.
- 6 Going beyond environment-related laws, regulations and conventions and self-established action plans in related industries, we will implement our own environmental control standards, as appropriate, and strive to improve environmental management levels.
- 7 Through environmental training and public relations activities, we will strive to elicit greater awareness of global environmental issues among all employees and will encourage employees to perform a self-improvement review and participate in social contribution activities.
- 8 We will implement an environmental management system for environmental protection activities, hold regular conferences on environmental protection activities, undertake reviews, and strive to achieve continual improvement in our environmental protection activities.

## Environmental Management Platform

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, which is 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.

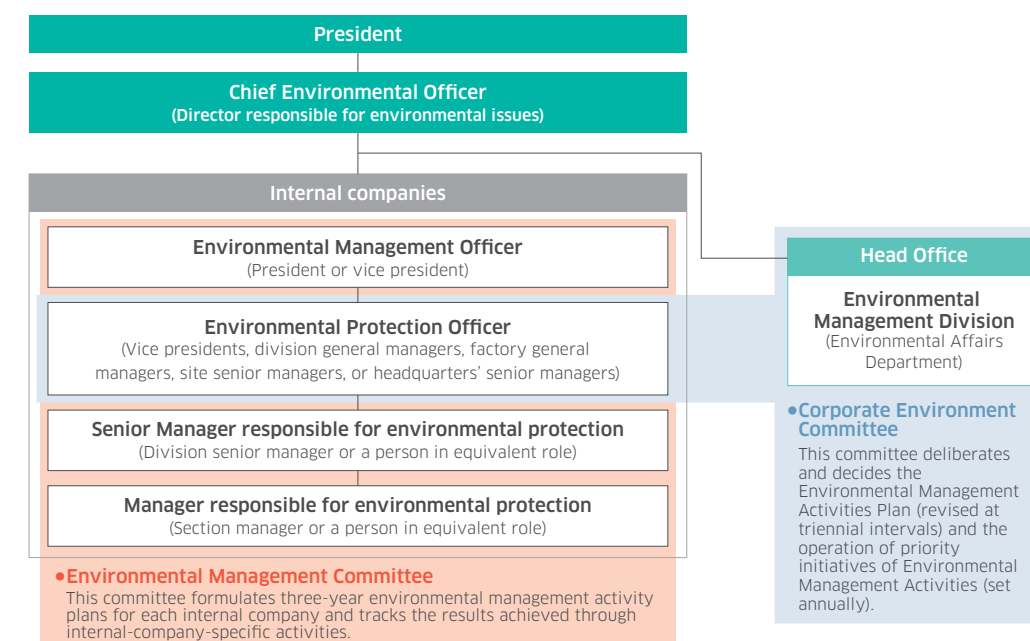


Figure 1: Environmental Management Organization

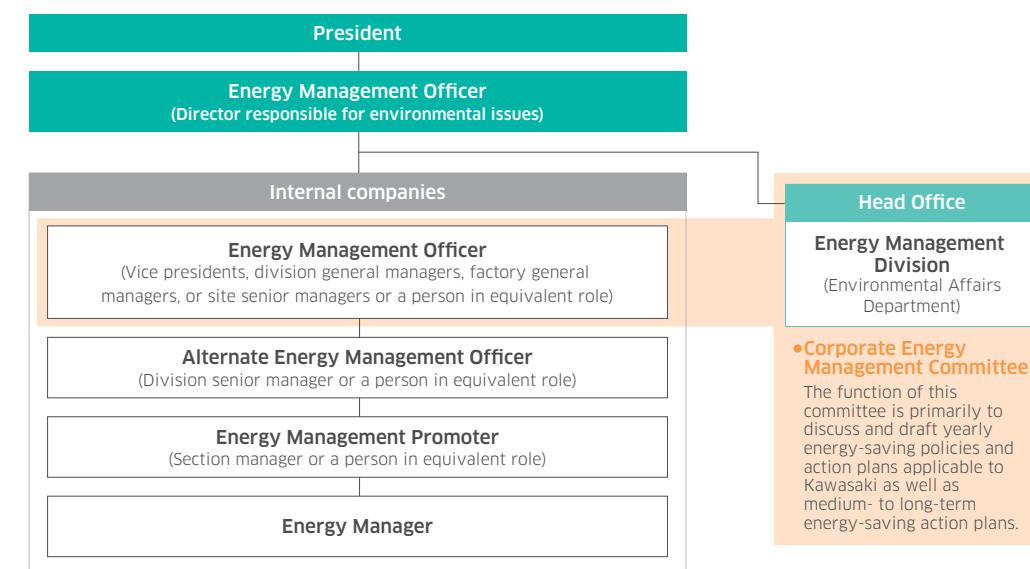


Figure 2: Energy Management Organization



# 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 “CO<sub>2</sub> 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.



## 2050 Kawasaki Challenge!

\*Activity Mark: Designed with the three challenges, imagining a “letter to the future.”

### CO<sub>2</sub> FREE

- Aim for zero CO<sub>2</sub> emissions in business activities
- Provide products and services that greatly curb CO<sub>2</sub> 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

## Summary of Fiscal 2017 Results

Kawasaki has formulated and started implementation of its Ninth Environmental Management Activities Plan, which runs from fiscal 2017 to fiscal 2019. This plan emphasizes sustained efforts to integrate business management and environmental management, which were priorities under the Eighth Environmental Management Activities Plan. In addition, we have positioned as new key aspects a response 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 disclosure and 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) CO<sub>2</sub> and energy cost reduction, (2) promotion of the 3Rs, (3) reduction of environmental load/promotion of resource conservation, and (4) enhancement of the Kawasaki Group environmental management system—and strive to heighten awareness as an environmentally friendly brand.

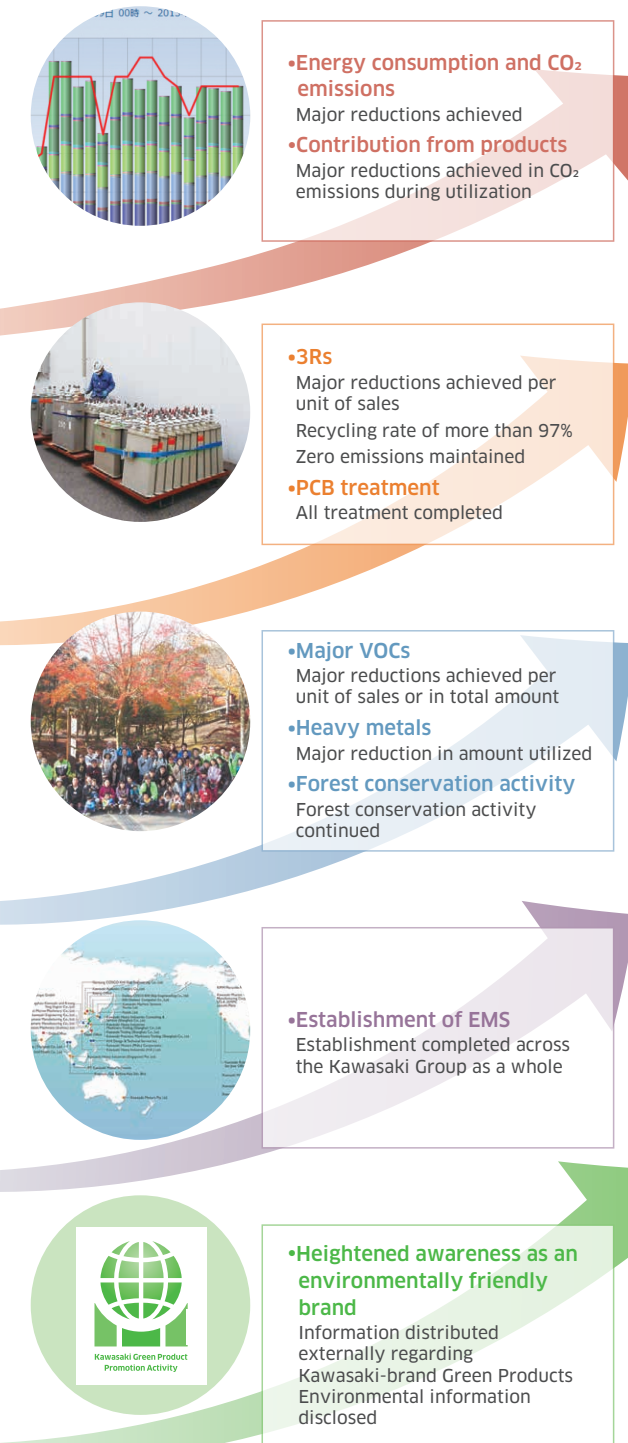
Key Strategies	Ninth Environmental Management Activities Plan (FY2017–FY2019)	Fiscal 2017		Page Number
		Targets	Results	
Realization of a low-carbon society CO <sub>2</sub> and energy cost reduction	1. Reduce resource and energy costs, mainly through wider application of energy visualization system <b>Target</b> Reduce annual resource and energy costs by at least 5%	Reduce annual resource and energy costs by at least 5%	Reduced resource and energy costs by 7.1%, achieving the target.	P.11
	2. Reduce CO <sub>2</sub> emissions <b>Target</b> Reduce CO <sub>2</sub> emissions per unit of sales by at least 3% year on year	Reduce CO <sub>2</sub> emissions per unit of sales <sup>*1</sup> by 3% year on year (previous fiscal year: 28.7t-CO <sub>2</sub> /100 million yen)	CO <sub>2</sub> emissions per unit of sales amounted to 28.6t-CO <sub>2</sub> /100 million yen; the target was not achieved.	
	3. Reduce CO <sub>2</sub> emissions through product-based contributions <b>Target</b> Identify CO <sub>2</sub> emission reduction effect through product-based contributions and disclose to public	Disclose CO <sub>2</sub> emission reduction effect through product-based contributions	The CO <sub>2</sub> emission reduction effect through product-based contributions was 898,000t-CO <sub>2</sub> . This information was disclosed in the Kawasaki Report and the Environmental Report.	
Realization of a recycling-oriented society Promotion of the 3Rs	1. Reduce total waste generation and maintain zero emission status <b>Target</b> Reduce total waste generation per unit of sales by at least 1% from level achieved under the Eighth Plan, and push final disposal ratio below 1%	Reduce total waste generation per unit of sales <sup>*1</sup> by at least 1% from the average achieved under the Eighth Plan (4.65t/100 million yen), and push final disposal (landfill) ratio below 1%	Total waste generation per unit of sales amounted to 4.36t/100 million yen, achieving the target. The final disposal (landfill) ratio was 0.2%, achieving the target.	P.16
	2. Promote reuse and recycling <b>Target</b> Boost recycling rate above 98%	Boost recycling rate above 98%	The recycling rate reached 98%, achieving the target.	
	3. Promote PCB treatment <b>Target</b> Systematically treat high- and low-concentration PCB waste	Systematically treat high- and low-concentration PCB waste	The processing of high- and low-concentration PCB waste progressed to 79%, on a disposal cost basis.	
Realization of a society coexisting with nature Reduction of environmental load/promotion of resource conservation	1. Reduce chemical substances <b>Target</b> Reduce major VOCs <sup>*2</sup> per unit of sales by at least 1% from level achieved under the Eighth Plan Cut dichloromethane by at least 1% year on year Strive to reduce hexavalent chromium to zero, in principle, by fiscal 2021	Reduce major VOCs per unit of sales <sup>*1</sup> by at least 1% from the average achieved under the Eighth Plan (81.6kg/100 million yen) Cut dichloromethane by at least 1% year on year (previous fiscal year: 39t) Reduce hexavalent chromium to zero, in principle, by fiscal 2021	Major VOCs per unit of sales amounted to 72.9kg/100 million yen, achieving the target. Dichloromethane was at 47t; the target was not achieved. The reduction of hexavalent chromium progressed.	P.18
	2. Conserve water <b>Target</b> Reduce annual consumption of water per unit of sales by at least 1% Track cost effect of measures to conserve tap water and prevent leaks from clean-water pipes	Reduce consumption of water per unit of sales <sup>*1</sup> by at least 1% year on year (previous fiscal year: 0.508 thousand m <sup>3</sup> /100 million yen)	The consumption of water per unit of sales was 0.520 thousand m <sup>3</sup> /100 million yen; the target was not achieved.	
	3. Conduct forest conservation activities <b>Target</b> Carry out forest conservation activities at least twice a year	Carry out forest conservation activities at least twice a year	Activities were undertaken a total of four times in Hyogo and Kochi prefectures, achieving the target.	
Establishment of environmental management systems Enhancement of the Kawasaki Group environmental management system	1. Reinforce environmental management capabilities and lower environmental risk <b>Target</b> Certified business sites to complete transition to ISO 14001:2015	Promote the transition to ISO 14001:2015 at certified business sites	Transition was completed at Precision Machinery Company and Ship & Offshore Structure Company. Preparations are under way at other business segments for a renewal audit in fiscal 2018.	P.23
	Visit domestic and overseas production sites to better pinpoint status of environmental management	Pinpoint status of environmental management at domestic and overseas production sites	Visited four companies with high CO <sub>2</sub> emissions among domestic subsidiaries and began studying Group-wide targets. Studies are scheduled to begin at overseas subsidiaries in fiscal 2018.	
Heightened environmental image Heightened awareness as an environmentally friendly brand	1. Leverage Kawasaki Green Product Promotion Activity <b>Target</b> Register Kawasaki-brand Green Products every year and release data to public	Register Kawasaki-brand Green Products and release data to public	Assessed and registered 10 new products in 2017, and released the data in the Kawasaki Report and the Environmental Report.	P.28
	2. Enhance image through external evaluations and rankings <b>Target</b> Announce results of third-party verification, improve evaluations from external organizations such as CDP, and sustain placement in Dow Jones Sustainability Index	Receive third-party verification on environmental data Improve evaluations under such schemes as CDP, and sustain placement in Dow Jones Sustainability Index	Received and announced third-party verification on greenhouse gas emissions. Received a "B" rating (management level) in CDP evaluation, and sustained placement in Dow Jones Sustainability Index.	

\*1 Net sales of Kawasaki used as the denominator in "per unit of sales."

\*2 Main VOCs: For the Kawasaki Group, the major VOCs are toluene, xylene and ethylbenzene. VOCs: Volatile Organic Compounds

\*National CO<sub>2</sub> emissions reduction target COP21 (held December 2015 in Paris, France)  
..... Targeting 26% reduction from fiscal 2014 level by fiscal 2031

## Target Profile of the Kawasaki Group in 2020



## Group Mission

"Kawasaki, working as one for the good of the planet"

## Environmental Vision 2020

### Realization of a low-carbon society

Contribute to the prevention of global warming through our products and manufacturing that use energy without waste

- ① Reduce 2020 greenhouse gas emissions in line with national targets
- ② Offer customers energy-efficient products and services, and reduce emissions of greenhouse gases on a planetary scale
- ③ Promote energy conservation in production and logistics processes, and reduce emissions of greenhouse gases

### Realization of a recycling-oriented society

Engage in manufacturing that uses resources without waste to recycle and fully utilize limited resources

- ① Practice design that uses resources effectively, and work to make products lighter, more durable and more recyclable
- ② Practice the 3Rs (reduce, reuse and recycle of waste) in production activities, and achieve zero emissions at all plants
- ③ Completely and appropriately treat all PCB waste and PCB-containing devices

### Realization of a society coexisting with nature

Contribute to reduction of the environmental impact and conservation of the ecosystem through manufacturing that is in harmony with the global environment

- ① Offer customers products and services that prevent air and water pollution, and advance environment improvements and ecosystem protection
- ② Reduce the use of chemical substances in products and production activities
- ③ Cooperate in regional forest conservation and other activities to protect the environment of ecosystems

### Establishment of environmental management systems

Build a foundation for environmental management that will achieve the Environmental Vision 2020

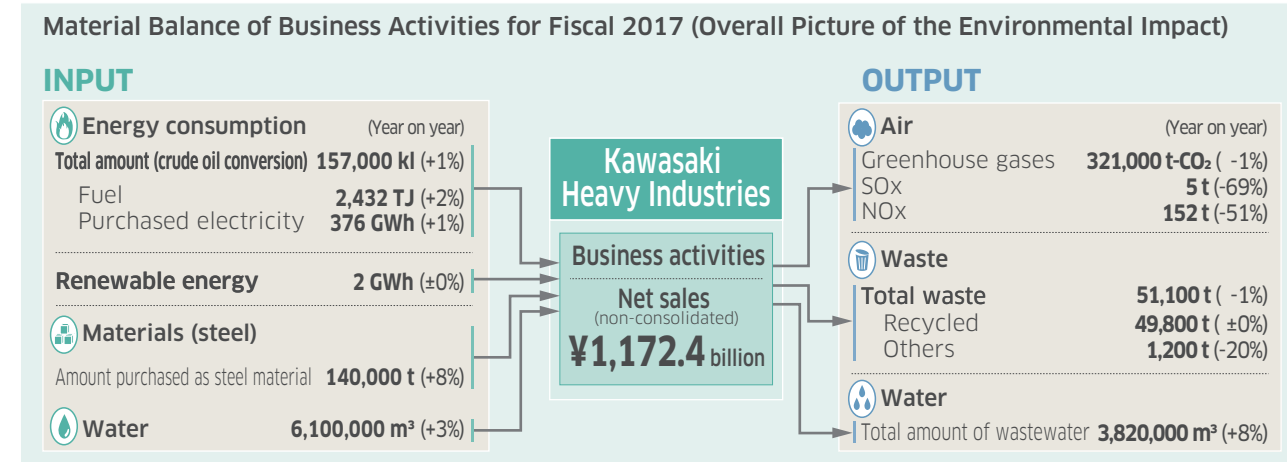
- ① Establish EMS at all consolidated subsidiaries in Japan and overseas to promote environmental management Group-wide
- ② Comply with environmental laws and regulations, and regularly follow up on compliance status
- ③ Communicate environmental data within and beyond the Group, and maintain two-way 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.



# 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 CO<sub>2</sub> emissions during product use, through delivery of highly energy efficient products worldwide.

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

#### CO<sub>2</sub> and energy cost reduction

- |         |   |
|---------|---|
| Targets | <b>1 Reduce resource and energy costs, mainly through wider application of energy visualization system</b><br>→ Reduce annual resource and energy costs by at least 5%                          |
|         | <b>2 Reduce CO<sub>2</sub> emissions</b><br>→ Reduce CO <sub>2</sub> emissions per unit of sales by at least 3% year on year  |
|         | <b>3 Reduce CO<sub>2</sub> emissions through product-based contributions</b><br>→ Identify CO <sub>2</sub> emission reduction effect through product-based contributions and disclose to public |



## Energy-Saving Promotion Activities

Kawasaki is promoting energy-saving activities with the established target of reducing annual resource and energy costs by at least 5%. As a result of our energy-saving activities to make energy "visible," which was fully introduced in 2013 with a focus on our plants, this target was achieved in fiscal 2017, as our energy costs were reduced by 7.1%.

We also make active use of such subsidies as the one by the Ministry of Economy, Trade, and Industry for supporting business operators intending to rationalize their energy use, to introduce energy-efficient equipment. In fiscal 2017, we updated air conditioning equipment, transformers, and other equipment with energy-efficient models at Akashi Works, Kobe Works, Hyogo Works, and Sakaide Works.

We also work to share information and promote energy saving by holding energy-saving practitioners' conferences aimed at disseminating methods internally to promote energy saving, and energy-saving workshops in which we observe improvement through case studies and visit sites to see how energy-saving methods are applied.



Figure 4: LED lighting installed (Seishin Works)



Figure 5: Energy-saving Workshop Dissemination of energy-saving methods (Akashi Works)

## Reducing CO<sub>2</sub> Emissions from Production Activities

Kawasaki set a goal to reduce CO<sub>2</sub> 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 CO<sub>2</sub> emissions of 6,000 tons.

As a result, CO<sub>2</sub> 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 CO<sub>2</sub> Emissions in Supply Chain

The scope that Kawasaki is required to cover in tracking CO<sub>2</sub> emissions is expanding, characterized by an accelerating trend toward the inclusion of not only its own operations but also those of its supply chain. The standards for calculating emissions along our supply chain include the Corporate Value Chain (Scope 3) Accounting and Reporting Standard, established by the Greenhouse Gas Protocol as an internationally accepted greenhouse gas (GHG) calculation and reporting guideline. In Japan, the Basic Guidelines on Accounting for Greenhouse Gas Emissions Throughout the Supply Chain—a Japanese version of Scope 3—were prepared by the Research/Study Committee on Standards for Accounting and Reporting Organization's GHG emissions throughout the Supply Chain, established jointly by the Ministry of Economy, Trade and Industry and the Ministry of the Environment, to look into methods for calculating greenhouse gas emissions along corporate supply chains. Using these basic guidelines, Kawasaki calculated CO<sub>2</sub>

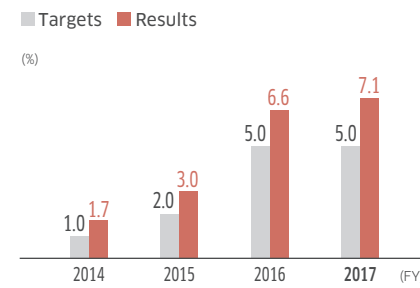


Figure 3: Target and Results of Energy Cost Reduction Effect

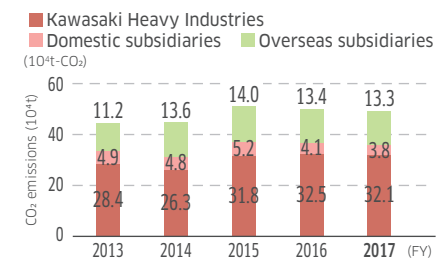


Figure 6: CO<sub>2</sub> Emissions from Production Activities

Notes: 1. For domestic sites, the CO<sub>2</sub> emission factors are based on figures published by Japan's Ministry of the Environment for each power provider in each fiscal year.  
2. For overseas sites, the CO<sub>2</sub> emission factors are based on figures published by the Greenhouse Gas Protocol.

emissions along its 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 CO<sub>2</sub> 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

Category	Calculation Targets	Calculation Results (10 <sup>4</sup> t-CO <sub>2</sub> /year)
<b>Scope 1</b>		
Direct emissions	Direct emissions through use of fuel at Kawasaki and associated industrial processes	17.9
<b>Scope 2</b>		
Indirect emissions from energy-derived sources	Indirect emissions accompanying use of electricity and heat purchased by Kawasaki	31.3

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

Category	Calculation Targets	Calculation Results (10 <sup>4</sup> t-CO <sub>2</sub> /year)
<b>Scope 3 (Other indirect emissions) Upstream</b>		
① Purchased goods and services	Emissions associated with activities up to production of raw materials, parts, purchased goods and sales-related materials	556.6 (9.6%)
② Capital goods	Emissions from construction and production of Kawasaki's capital goods	22.3 (0.4%)
③ Fuel- and energy-related activities not included under Scope 1 or Scope 2	Emissions associated with procurement of fuel purchased from other providers and procurement of fuel required to generate power, such as electricity and heat	3.8 (0.1%)
④ Transportation and distribution (upstream)	Emissions associated with logistics of raw materials, parts, purchased goods and sales-related materials up to delivery to Kawasaki	0.8 (0.0%)
⑤ Waste generated in operations	Emissions associated with transportation and processing of waste generated by Kawasaki	0.7 (0.0%)
⑥ Business travel	Emissions associated with business travel by employees	1.4 (0.0%)
⑦ Employee commuting	Emissions associated with transportation of employees between their homes and their worksites	0.6 (0.0%)
⑧ Leased assets (upstream)	Emissions associated with operation of assets leased by Kawasaki (excluded if included in Scope 1 or Scope 2 calculations)	Included in Scope 1 and Scope 2 calculations
<b>Scope 3 (Other indirect emissions) Downstream</b>		
⑨ Transportation and distribution (downstream)	Emissions associated with transportation, storage, cargo handling and retail sales of products	0.0 (0.0%)
⑩ Processing of sold products	Emissions associated with processing of intermediate products by companies	Excluded*1
⑪ Use of sold products	Emissions associated with use of products by consumers and companies	5,208.8 (89.6%)
⑫ Disposal of sold products	Emissions associated with transportation and treatment of products upon disposal by consumers and companies	Excluded*1
⑬ Leased assets (downstream)	Emissions associated with operation of assets leased to other companies	Excluded*2
⑭ Franchises	Emissions by franchisees	Excluded*2
⑮ Investments	Emissions related to operation of investments	17.1 (0.3%)

\*1 Excluded from calculation target because Kawasaki is unable to confirm reference data at this time.  
\*2 Excluded from calculation target because it is outside of the scope of our business.

## Reduction of CO<sub>2</sub> Emissions in Logistics Processes

Kawasaki takes steps to pinpoint CO<sub>2</sub> emissions and promote energy-saving activities in its logistics processes, which cover some of its supply chain, to realize continuous reduction in CO<sub>2</sub> emissions. In fiscal 2017, CO<sub>2</sub> emissions increased by 12% year on year, to approximately 4,000 tons, due to an increase in freight transport to distant areas.

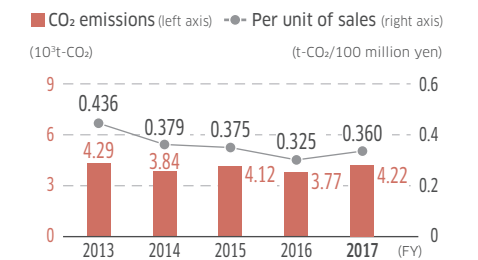


Figure 7: CO<sub>2</sub> Emissions from Logistics Processes and Per Unit of Sales

Notes: 1. Per unit of sales basis is a measurement obtained by dividing CO<sub>2</sub> emissions by net sales.  
2. The CO<sub>2</sub> emissions factor is based on values published by the Agency for Natural Resources and Energy.

## 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 CO<sub>2</sub> 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 CO<sub>2</sub> emissions by approximately 1,000 tons.

**Table 3: The Kawasaki Group's Solar Power Generation Capacity**

Name	Power Usage	Generation Capacity (kW)
Iwaoka Photovoltaic Power Generation Station <sup>*1</sup>	Sold via FIT <sup>*2</sup>	1,505
Nagoya Works 1	Used in-house	750
Seishin Photovoltaic Power Generation Station <sup>*1</sup>	Sold via FIT	701
Nishi-Kobe Works	Used in-house	505
Nishi-Kobe Photovoltaic Power Generation Station <sup>*1</sup>	Sold via FIT	422
Akashi Works	Used in-house	140
Sakaide Works	Used in-house	50
Kakogawa Photovoltaic Power Generation Station <sup>*1</sup>	Sold via FIT	48
Hyogo Works	Used in-house	25
Kobe Works	Used in-house	20
Harima Works	Used in-house	5
<b>Total</b>		<b>4,171</b>

\*1 Power generation facility operated by Kawasaki Trading Co., Ltd.

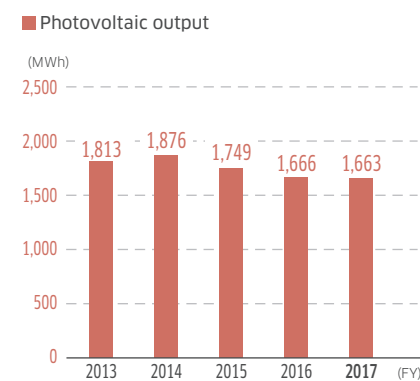
\*2 FIT: Feed-in tariff; a program where renewable energy is bought back at a fixed rate



**Figure 9: Nagoya Works 1: 750-kW power generation facility**



**Figure 10: Kawasaki Trading Co., Ltd. Iwaoka Photovoltaic Power Generation Station: 1,505-kW power generation facility**



**Figure 8: Photovoltaic Output (used in-house)**

## Reducing CO<sub>2</sub> Emissions through Product-Based Contributions

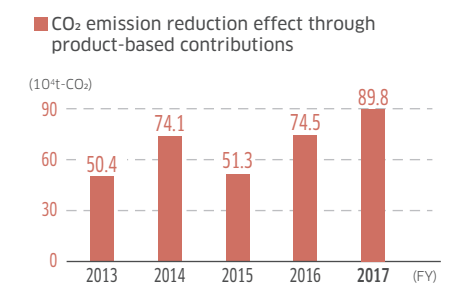
Kawasaki calculates the CO<sub>2</sub> emission reduction effect of products in use in four categories—energy & environmental engineering, air transportation systems, land/sea transportation systems, and ROBO-MECH—to determine the CO<sub>2</sub> emission reduction effect through product-based contributions, and discloses this information to the public.

An analysis of CO<sub>2</sub> emissions along our supply chain reveals that most of the CO<sub>2</sub> emissions are released during product use, so our goal is to contribute to lower CO<sub>2</sub> emissions through delivery of highly energy efficient products.

In fiscal 2017, the CO<sub>2</sub> 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: CO<sub>2</sub> Emission Reduction Effect through Product-Based Contributions by Business Category**

Category	Reduction Effect	Main Products	Reason for Reduction
Energy & environmental engineering	632,000t-CO <sub>2</sub> /year	Gas turbine cogeneration system, compressors, biomass boilers, waste incinerators	Waste heat and waste utilization, higher efficiency
Air transportation systems	199,000t-CO <sub>2</sub> /year	Aircraft (lightweight body)	Better fuel economy
Land/sea transportation systems	39,000t-CO <sub>2</sub> /year	Ships (improved propulsion performance)	Better fuel economy
ROBO-MECH	28,000t-CO <sub>2</sub> /year	Hydraulic equipment, robots	Higher efficiency



**Figure 11: CO<sub>2</sub> Emission Reduction Effect through Product-Based Contributions**

- Notes: 1. Kawasaki used CO<sub>2</sub> emissions factors provided in the list of calculation methods and emissions factors published by Japan's Ministry of the Environment.  
 2. The CO<sub>2</sub> 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 CO<sub>2</sub> emission reduction effect through product-based contributions.



# Realization of a Recycling-Oriented Society

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)

### Promotion of the 3Rs

Targets	<b>① Reduce total waste generation and maintain zero emission status</b> → Reduce total waste generation per unit of sales by at least 1% from level achieved under the Eighth Plan Push final disposal ratio below 1%
	<b>② Promote reuse and recycling</b> → Boost recycling rate above 98%
	<b>③ Promote PCB treatment</b> → Systematically treat high- and low-concentration PCB waste

## Reduction of Waste Generation

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.

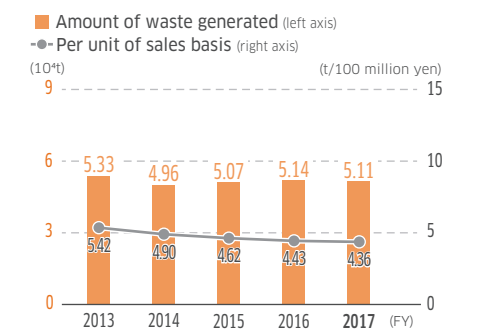


Figure 12: Amount of Waste Generated and Per Unit of Sales Basis

Note: Per unit of sales basis is a measurement obtained by dividing amount of waste generated by net sales.

# 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.

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

### Reduction of environmental load/promotion of resource conservation

- Targets**
- 1 **Reduce chemical substances**  
 → Reduce major VOCs per unit of sales by at least 1% from level achieved under the Eighth Plan  
 Cut dichloromethane by at least 1% year on year  
 Strive to reduce hexavalent chromium to zero, in principle, by fiscal 2021
  - 2 **Conserve water**  
 → Reduce annual consumption of water per unit of sales by at least 1%  
 Track cost effect of measures to conserve tap water and prevent leaks from clean-water pipes
  - 3 **Continue with forest conservation activities**  
 → Carry out forest conservation activities at least twice a year

## 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.

Toward this end, we will emphasize greater efficiency in painting and metal processing and treatment, and also introduce alternatives to current paints and chemical substances.

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<sup>1</sup>, the RoHS Directive<sup>2</sup>, and the REACH Regulation<sup>3</sup>

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 II<sup>4</sup> to collect data about chemical substances and respond to REACH and other applicable chemical substance regulations.

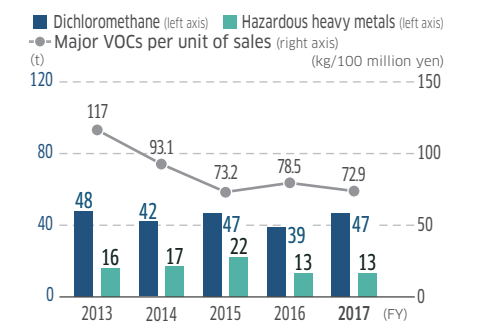


Figure 13: Emissions and Handling Volume of Managed Chemical Substances

Notes: 1. Major VOCs per unit of sales is a measurement obtained by dividing VOC emissions by net sales.  
 2. Hazardous heavy metals represent the combined amount of lead compounds and hexavalent chromium compounds. Reduction activities are undertaken separately for each substance.

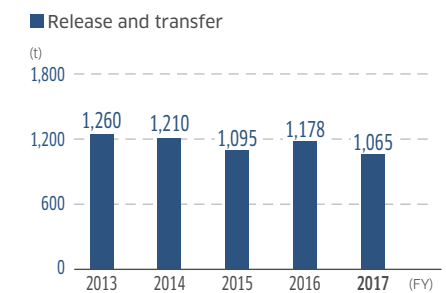


Figure 14: Release and Transfer of Chemical Substances Designated under the PRTR Law\*

\*PRTR Law: Pollutant Release and Transfer Register Law (Order for Enforcement of the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof)

CSR Procurement Guidelines  
<https://global.kawasaki.com/en/corp/sustainability/procurement/guideline.html>



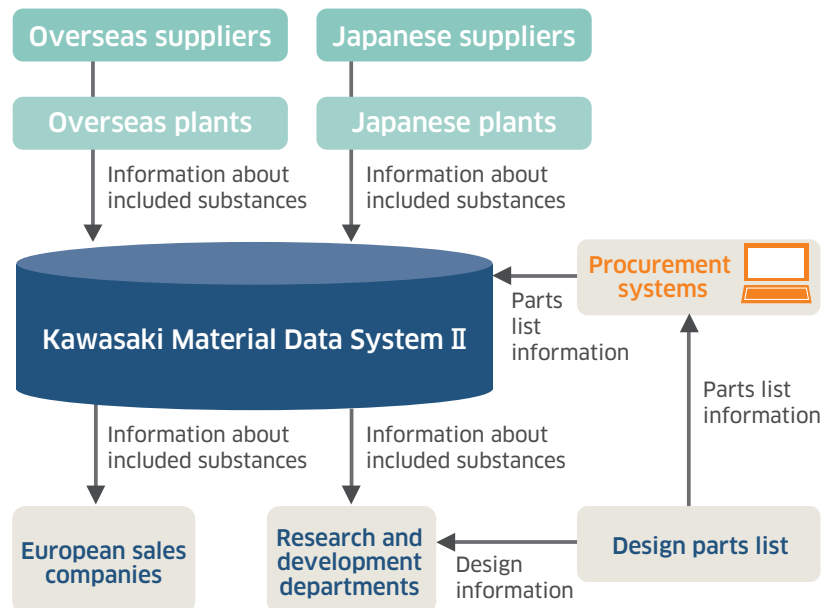


Figure 15: Response to REACH by the Motorcycle & Engine Company

\*1 ELV Directive: End of Life Vehicles Directive

\*2 RoHS Directive: Directive on Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

\*3 REACH Regulation: Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals

\*4 Kawasaki Material Data System II: Currently switching to IMDS (International Material Data System: A reporting system encompassing 26 finished automakers in Japan, South Korea, Europe and the United States which enables suppliers to identify the composition of materials in respective parts delivered to the automotive industry)

## 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 EUROIV, European emission regulations, and R41-04, Europe's new noise emission regulations, it becomes part of our efforts toward enhanced environmental performance.



Figure 16: Z900 (overseas model)

### 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 the 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.

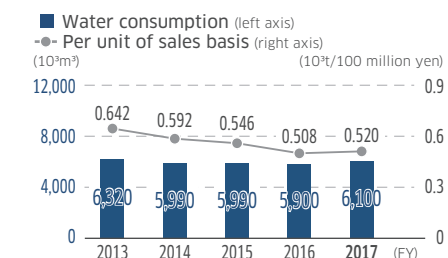


Figure 17: Water Consumption and Per Unit of Sales Basis

Note: Per unit of sales basis is a measurement obtained by dividing water consumption by net sales.

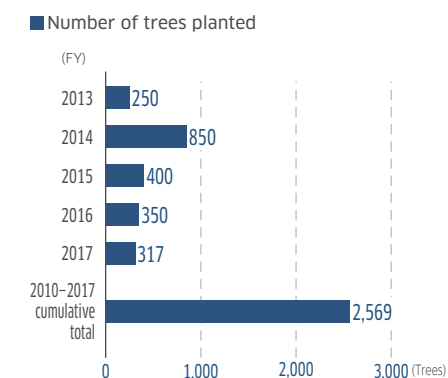


Figure 18: Number of Planted Trees by Fiscal Year

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

Activity location	Town of Taka, in Hyogo Prefecture	Town of Niyodogawa, in Kochi Prefecture
Activity content	Tree pruning, thinning and planting Nature watching and observation events, woodworking classes	Tree thinning, environmental education
Participants	Employees and their families, and others (275 people)	Employees and others (69 people)
Achievements	Area: 1.0ha CO <sub>2</sub> absorbed: 2.20t/CO <sub>2</sub> Trees planted: 317	Area: 0.3ha CO <sub>2</sub> absorbed: 16.5t/CO <sub>2</sub>
Number of events	Three times a year	Once a year

### 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 Nishiku, 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

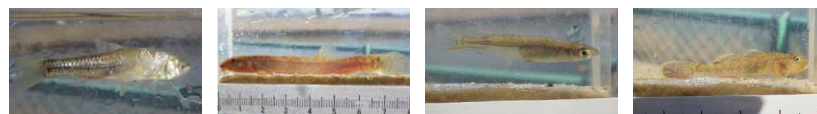


Figure 21: Representative species found

Table 6: Applicability of Important Species Selection Criteria

Species Name	Red List of the Ministry of the Environment	Red Data Book of Hyogo Prefecture
<i>Misgurnus anguillicaudatus</i>	✓	✓
<i>Oryzias latipes</i>	✓	✓
<i>Rhinogobius sp. BF</i>	✓	✓

# Establishment of Environmental Management Systems

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.

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

### Enhancement of environmental management systems

- Targets**
- ① Reinforce environmental management capabilities and lower environmental risk
    - Certified business sites to complete transition to ISO 14001:2015
    - Visit domestic and overseas production sites to better pinpoint status of environmental management



## 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 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**

Internal companies		Date acquired	Registration
Ship & Offshore Structure Company	Kobe Works	Aug. 2002	DNV GL
	Sakaide Works	Aug. 2002	DNV GL
Rolling Stock Company		Feb. 2002	LRQA
Aerospace Company		Feb. 2002	BSK
Gas Turbine & Machinery Company	Gas Turbine Division	Mar. 2000	LRQA
	Machinery Division	Dec. 2000	NK
Plant & Infrastructure Company		Nov. 1999	JICQA
Motorcycle & Engine Company		Feb. 2000	DNV GL
Precision Machinery Company	Nishi-Kobe Works	Feb. 1998	DNV GL
	Robot Division	Mar. 2011	DNV GL

LRQA: Lloyd's Register Quality Assurance Limited, JICQA: JIC Quality Assurance Ltd., NK: Nippon Kaiji Kyokai (ClassNK), BSK: Bouei Kiban Seibi Kyoukai (Defence Structure Improvement Foundation), DNV GL: DNV GL Group

## Risk Management

In addition to approaches based on our risk management structures, we hold liaison conferences from time to time for personnel with environmental 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 preempt environmental accidents and other situations.

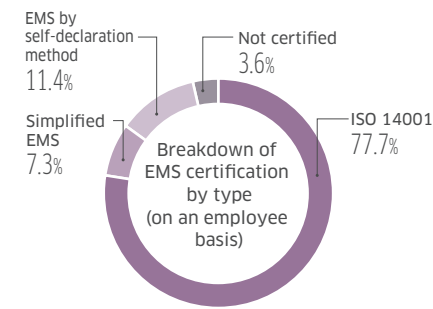
During fiscal 2017, we confirmed the response status to managers responsible for environmental protection in advance of the enforcement of the Act on Preventing Environmental Pollution of Mercury.

## 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.



**Figure 22: Breakdown of EMS Certification, by Type, within the Group (on an employee basis)**

Note: Denominator is the number of employees within the Group on a consolidated basis.

**Table 8: Domestic Subsidiaries**

Oversight organization	Company	EMS level*/	Date of establishment
Ship & Offshore Structure Company	Kawasaki Techno Wave Co., Ltd.	1	Aug. 2000
	Kawaju Support Co., Ltd.	2	Dec. 2005
	Kawasaki Marine Engineering Co., Ltd.	3	Apr. 2013
	KHI JPS Co., Ltd.	3	Mar. 2008
Rolling Stock Company	Alna Yusoki-Yohin Co., Ltd.	1	Nov. 2008
	Kawasaki Rolling Stock Component Co., Ltd.	1	Aug. 2002
	Kawasaki Rolling Stock Technology Co., Ltd.	1	Aug. 2002
	Kansai Engineering Co., Ltd.	3	Aug. 2002
	Sapporo Kawasaki Rolling Stock Engineering Co., Ltd.	2	Jun. 2011
	Nichijo Manufacturing Co., Ltd.	2	Oct. 2005
Aerospace Company	Kawaju Gifu Engineering Co., Ltd.	1	Feb. 2002
	Kawaju Gifu Service Co., Ltd.	1	Feb. 2002
	KGM Co., Ltd.	1	Feb. 2002
	NIPPI Corporation	1	Dec. 2006
Gas Turbine & Machinery Company	Kawaju Akashi Engineering Co., Ltd.	1	Mar. 2000
	Kawasaki Thermal Engineering Co., Ltd.	1	Apr. 2002
	Kawasaki Machine Systems, Ltd.	1	Mar. 2000
	Kawasaki Prime Mover Engineering Co., Ltd.	1	Dec. 2002
	Kawasaki Naval Engine Service, Ltd.	3	Aug. 2016
	KEE Environmental Construction, Co., Ltd.	1	Dec. 2003
Plant & Infrastructure Company	EarthTechnica M&S Co., Ltd.	3	Apr. 2013
	Kawasaki Environmental Plant Engineering Co., Ltd.	1	Jun. 2002
	Kawaju Facilitch Co., Ltd.	2	Jul. 2013
	Kawasaki Engineering Co., Ltd.	3	Oct. 2009
	EarthTechnica Co., Ltd.	1	Sep. 2000
	Kawasaki Motors Corporation Japan	1	Feb. 2008
Motorcycle & Engine Company	K-Tec Corp.	1	Dec. 2014
	Technica Corp.	3	Mar. 2012
	Autopolis	2	Dec. 2011
	Union Precision Die Co., Ltd.	1	Jul. 2006
Precision Machinery Company	Kawasaki Hydromechanics Corporation	1	Jun. 2007
	Kawasaki Robot Service, Ltd.	1	Apr. 2012
Head Office	Kawasaki Trading Co., Ltd.	1	Dec. 2004
	Kawaju Service Co., Ltd.	1	Feb. 2000
	Kawasaki Technology Co., Ltd.	3	Oct. 2011
	Kawasaki Life Corporation	2	Jul. 2006
	K Career Partners Corp.	2	Mar. 2007
	Benic Solution Corporation	2	Feb. 2006

**Table 9: Overseas Subsidiaries**

Oversight organization	Company	Location	EMS level*/	Date of establishment
Rolling Stock Company	Kawasaki Rail Car, Inc.	U.S.A.	3	Jul. 2015
Gas Turbine & Machinery Company	Kawasaki Gas Turbine Asia Sdn. Bhd.	Malaysia	3	Mar. 2013
	Kawasaki Gas Turbine Europe GmbH	Germany	3	Mar. 2013
	Wuhan Kawasaki Marine Machinery Co., Ltd.	China (PRC)	1	Jul. 2009
Plant & Infrastructure Company	KHI Design & Technical Service Inc.	Philippines	3	Nov. 2011
Motorcycle & Engine Company	Kawasaki Motors Corp., U.S.A.	U.S.A.	3	Mar. 2013
	Kawasaki Motors Pty. Ltd.	Australia	3	Mar. 2013
	PT. Kawasaki Motor Indonesia	Indonesia	3	Jan. 2012
	Kawasaki Comonants da Amazonia Ltda	Brazil	3	Jun. 2013
	Kawasaki Motores do Brasil Ltda.	Brazil	3	Jun. 2013
	Kawasaki Motors Europe N.V.	Netherlands	3	Feb. 2014
	Kawasaki Motors (Phils.) Corporation	Philippines	3	Jan. 2012
	Kawasaki Motors Manufacturing Corp., U.S.A.	U.S.A.	1	Apr. 2003
	Kawasaki Motors Enterprise (Thailand) Co., Ltd.	Thailand	1	Dec. 2011
	Canadian Kawasaki Motors Inc.	Canada	3	Feb. 2013
Precision Machinery Company	Kawasaki Precision Machinery (Suzhou) Ltd.	China (PRC)	1	Dec. 2007
	Kawasaki Precision Machinery (UK) Ltd.	UK	1	Nov. 2001
	Kawasaki Chunhui Precision Machinery (Zhejiang) Ltd.	China (PRC)	1	Nov. 2012
	Flutek, Ltd.	South Korea	1	Nov. 2005
	Kawasaki Robotics (Tianjin) Co., Ltd.	China (PRC)	3	Nov. 2012
Head Office	Kawasaki Robotics GmbH	Germany	3	Nov. 2012
	Kawasaki Robotics (U.S.A.) Inc.	U.S.A.	1	Feb. 2006
	KHI (Dalian) Computer Technology Co., Ltd.	China (PRC)	3	May 2013

\*Level 1: ISO 14001 registration  
Level 2: Simplified EMS certification  
Level 3: Self-declaration of EMS establishment

## 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

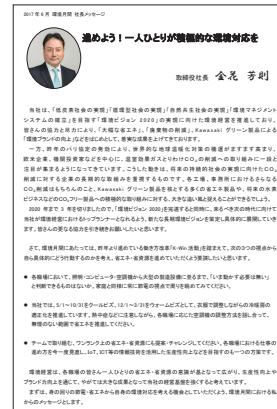


Figure 24: President's message on environmental management

### ● 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.

Table 10: Number of Qualified Pollution Control Managers

Air	82
Water	69
Noise, vibration	38
Others	77
Total	266

Table 11: Number of Qualified Energy Managers

Energy managers	73
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# TOPICS

## 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 the environment through our products. In addition, we work to appropriately disclose information regarding our environmental activities to stakeholders by disclosing information in the Environmental Report and on our website, and by proactively responding to questionnaires, etc., from external evaluation organizations.

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

### Heightened awareness as an environmentally friendly brand

- Targets**
- 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

## 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.



Figure 25: Program logo

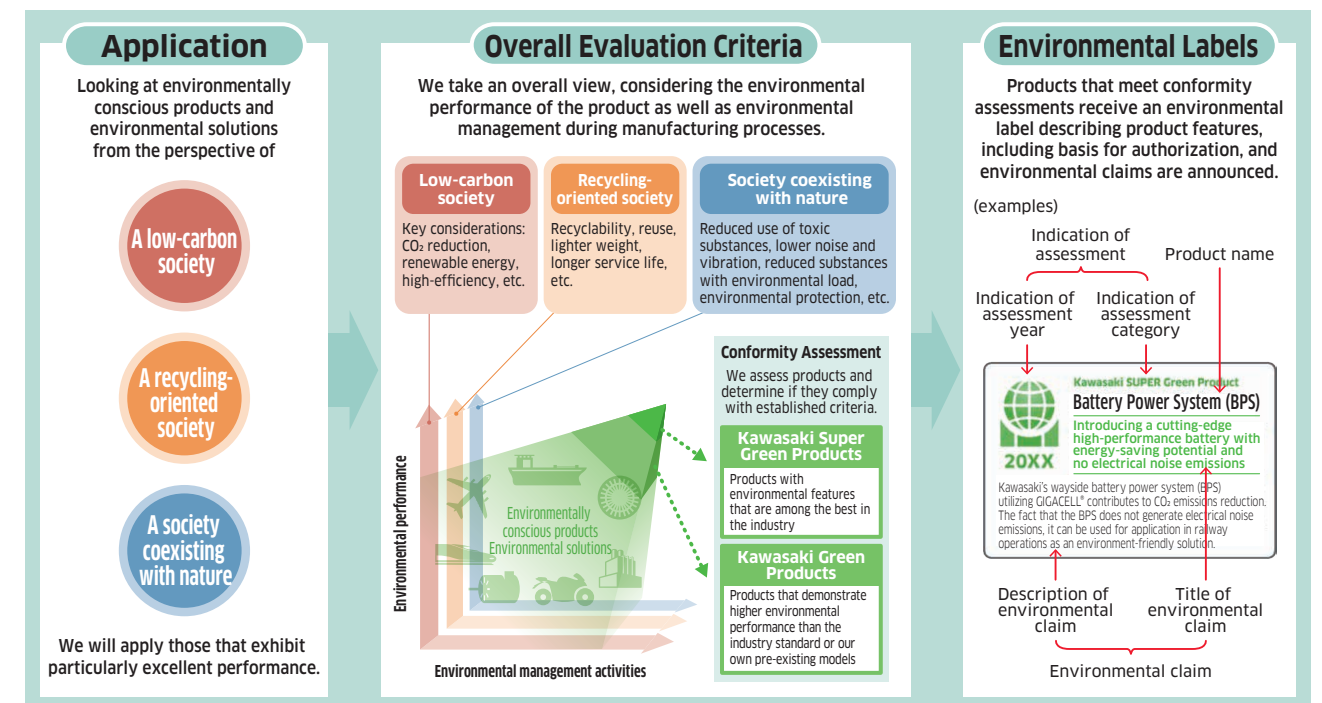


Figure 26: Conformity Assessment Procedure

## 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 DJSI Asia Pacific Index, and the SNAM Sustainable Investment Fund, which is managed by Sampo Japan Nipponkoa Asset Management Co., Ltd. (SNAM).



## 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.

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

## 2017 Kawasaki-brand Green Products

[New]

### Large LNG Carrier with Newly Developed Tank

**Large Moss-type LNG carrier with industry-leading thermal insulation performance, and fuel and volumetric efficiencies**

Achievement of the world's lowest real BOR of 0.05%/d by combining a Kawasaki Panel System with excellent thermal insulation performance, fitted on newly developed non-spherical cargo tanks, with a 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.

Product	Boil-off Rate (%)
Competitor's product	0.08%/day
Our product (Thermal insulation panel only)	0.075%/day
Our product (Thermal insulation panel with partial re-liquefaction)	0.05%/day

(\*)An indicator of the cargo tanks' thermal insulation performance to show the rate of LNG volume that vaporizes spontaneously from the cargo tanks per day. Smaller values indicate better thermal insulation performance.

2017  
Kawasaki  
SUPER Green Product

**Product Description**

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.

**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 adopting twin-skeg, SEA-ARROW-type bow shape and dual fuel low-speed diesel engine (ME-GI engine)
- Adoption of non-spherical cargo tank with excellent volumetric efficiency

Kawasaki Heavy Industries, Ltd.

### efACE Standard Railcar

**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.

2017  
Kawasaki  
SUPER Green Product

**Product Description**

This standard commuter railcar is a clean form of mass transport from the perspectives of energy saving and reduced environmental impact. Its core concepts are "flexibility" supporting both stainless-steel and aluminum cars; "rationality" of quality and price; and "added value" of comfort and environmental performance.

**Special Features**

- Adoption of recyclable stainless-steel structure and interior panels
- Adoption of "harmonica" construction in the aluminum structure and twist bolts in the SUS structure makes the body easy to update, including changing the seating and equipment layout
- Weight reduction achieved through adoption of aluminum composite plates and chamberless ducts

Kawasaki Heavy Industries, Ltd.

## BK117 D-2 Helicopter (Airbus Helicopters Model: H145)



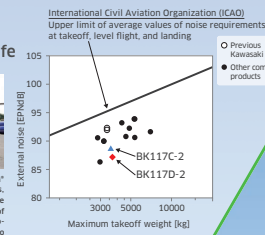
Kawasaki Heavy Industries, Ltd.

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 contributes to the reduction of external noise, and environmental performance throughout the life cycle is also greatly enhanced, including longer service life through a significantly extended overhaul interval. Also, the increased main gearbox rating contributes to improve energy efficiency by 18%.



Through introduction of a Fenestron<sup>®</sup> and increasing the number of blades, higher noise frequency reduces the noise level. In addition, introduction of unequal blade spacing design contributes to further noise reduction due to cancelling of harmonic noise peak.



### Product Description

The introduction of a new tail rotor system and other features achieves the quietest helicopter in its class. In addition, the introduction of a high-power engine and improved main gearbox greatly enhances hovering performance, making this helicopter suitable for multipurpose missions such as firefighting, disaster relief, law enforcement, emergency medical service, TV broadcasting, and passenger transport.

### Special Features

- Achievement of world's quietest helicopter in its class
- Notable increase of rated power through introduction of high-power engine and improvement of main gearbox
- Notable extension of tail rotor gearbox overhaul interval to 5,000 hours instead of 1,500 hours for the C-2



Powering your potential

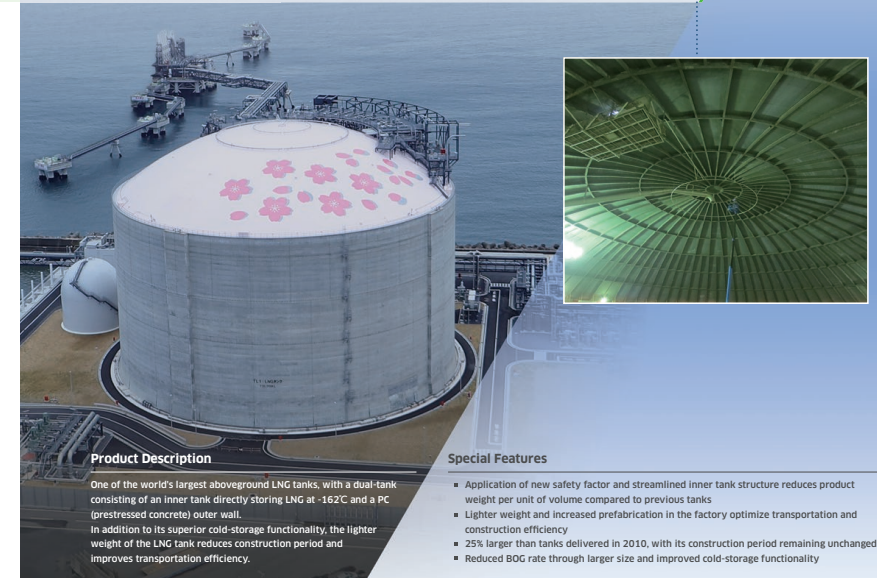
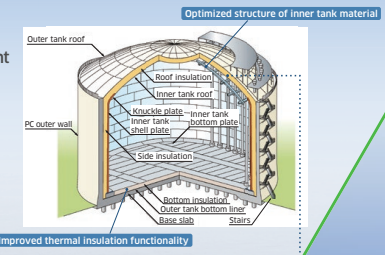
## LNG Tank (New safety factor applied)



Kawasaki Heavy Industries, Ltd.

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

The application of a new safety factor and streamlined structure reduces product weight per unit of volume by 13% compared to tanks delivered in 2010. Enhanced cold-storage functionality and other improvements reduce BOG (boil-off gas) rate by 21%.



### Product Description

One of the world's largest aboveground LNG tanks, with a dual-tank consisting of an inner tank directly storing LNG at -162°C and a PC (prestressed concrete) outer wall. In addition to its superior cold-storage functionality, the lighter weight of the LNG tank reduces construction period and improves transportation efficiency.

### Special Features

- Application of new safety factor and streamlined inner tank structure reduces product weight per unit of volume compared to previous tanks
- Lighter weight and increased prefabrication in the factory optimize transportation and construction efficiency
- 25% larger than tanks delivered in 2010, with its construction period remaining unchanged
- Reduced BOG rate through larger size and improved cold-storage functionality



Powering your potential

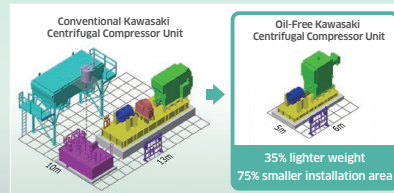
## Oil-Free Kawasaki Centrifugal Compressor



Kawasaki Heavy Industries, Ltd.

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 efficiency and reduces weight and footprint, achieving 3% lower power consumption, 35% lighter weight, and 75% smaller installation area compared to conventional models. Elimination of the need for lubricant oil also reduces environmental impact.



### Product Description

Completely oil-free compression is achieved through the adoption of a high-speed motor and active-control magnetic bearings. The Kawasaki Centrifugal Compressor delivers both industry-leading energy efficiency and a wide, stable operating range.

### Special Features

- Mechanical loss greatly reduced through direct motor drive and contactless support
- Elimination of the need for lubricant oil system greatly reduces equipment weight and installation area
- In addition to not using lubricant oil, it reduces noise and vibration



Powering your potential

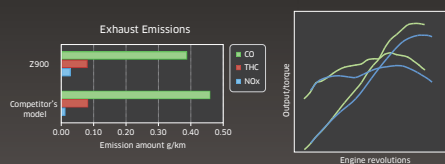
## Z900 (2017MY)



Kawasaki Heavy Industries, Ltd.

Achieves excellent fuel performance and low exhaust emissions with world's highest level of environmental performance

Worldwide-harmonized Motorcycle Test Cycle (WMTC) mode fuel efficiency is top in its class, with 9% better output than a competitor's model. It is compliant with EUROIV, European emission regulations and R41-04, Europe's new noise emission regulations.



### Product Description

This new-generation naked model motorcycle delivers a high level of quality in the three areas of styling, powerful engine performance, and a comfortable easy-to-handle chassis that can be expressed by the word "Sugomi" (meaning, "awe-inspiring energy and intensity"), for an exciting and responsive riding experience.

### Special Features

- Liquid-cooled parallel four-cylinder engine delivers a power feel that smoothly increases at mid to high rpm, with strong torque feel and sharp throttle response at low rpm
- New steel frame design achieves comfort and ease of handling through uncompromising commitment to reducing weight
- Excellent fuel performance conforms to EUROIV, European emission regulations



Powering your potential





## Z650/Ninja650 (2017MY)

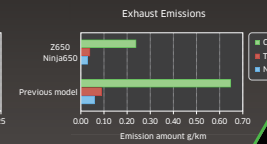
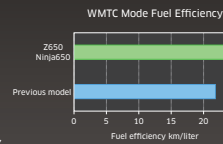


Kawasaki Heavy Industries, Ltd.



### Improved fuel efficiency, reduced power/weight ratio, and greatly reduced exhaust emissions

Compared to the previous models (ER-6n/6f), World-wide-harmonized Motorcycle Test Cycle (WMTc) mode fuel efficiency is 7% better and power/weight ratio is 4%/3% lower. CO, THC and NOx in exhaust emissions are also reduced by 63%, 56%, and 50%, respectively.



WMTc: Worldwide-harmonized Motorcycle Test Cycle



Z650

Ninja650

#### Product Description

These mid-range, new-century naked/full cowlings model motorcycles have styling with a sense of presence comparable to large models. They are easy for beginners to handle and a joy to ride for intermediate to advanced riders.

#### Special Features

- Liquid-cooled parallel two-cylinder engine provides a seamless throttle response focused on a flat torque feel at low to mid rpm, and a power feel that increases smoothly
- New steel-frame design achieves comfort and ease of handling through uncompromising commitment to reducing weight
- Excellent fuel performance conforms to EUROIV, European emission regulations

## HST Motor M7V Series

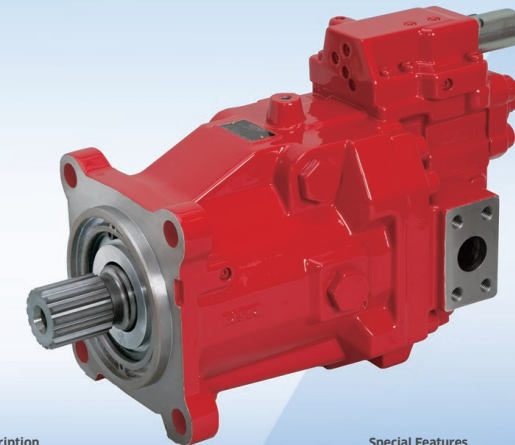
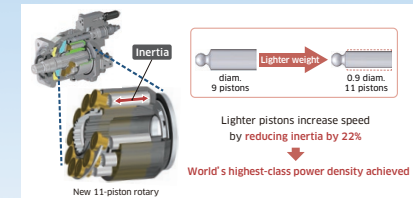


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### High power density (theoretical output horsepower/product weight) easily beats competitors' products

Power density ranks among the highest in the world. Noise level is lower than competitors' products. Bearing life is 90% better than our previous model. (HST: continuously variable transmission with hydraulic pump and hydraulic motor)



#### Product Description

This compact hydraulic motor, featuring one of the world's most outstanding high-speed performances as a swash plate motor, can be used for HST drive systems for various industrial vehicles, winches, and other applications. It starts up efficiently to ensure smooth operation, while its low-speed performance delivers precise handling even when fine control is required.

#### Special Features

- World's highest-class power density
- Longer bearing life
- Smooth start-up and stable speed during slow travel
- Compact shape through swash plate

## HST Pump K8V Series

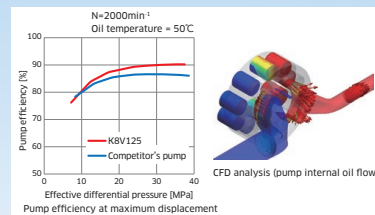


Kawasaki Heavy Industries, Ltd.

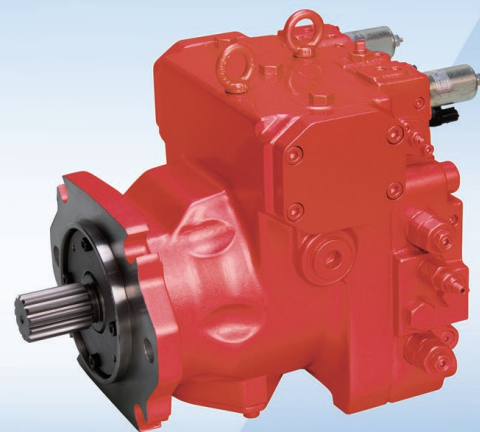


### Delivers world's top-class pump efficiency, low noise, and high reliability

Achieves world's top-class pump efficiency and a low noise level, both of which surpass competitors' products. (HST: continuously variable transmission with hydraulic pump and hydraulic motor)



CFD analysis (pump internal oil flow)



#### Product Description

This dual-tilting hydraulic pump is suitable for closed circuit systems such as HST drive systems for various industrial vehicles. The world's top-class pump efficiency and low noise improve vehicle fuel efficiency and the working environment.

#### Special Features

- Optimized design developed with the K7V, hydraulic pump for excavators, achieving the world's top-class pump efficiency and low noise
- Adoption of side bearing on swash plate supporting structure and other improvements deliver high reliability

## Extra-Large Payload Robot MG Series



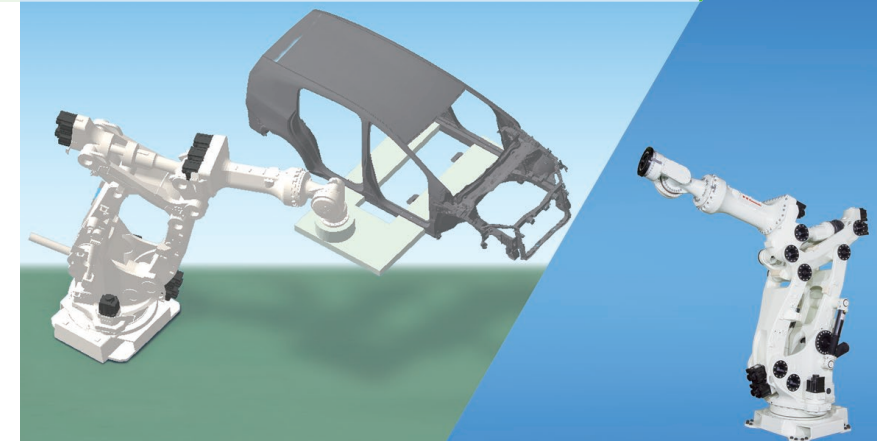
Kawasaki Heavy Industries, Ltd.



### Weight reduced to be lighter than industry standards for 1-ton-plus payload class

Unique arm construction, which features hybrid link and partial use of ball-screw drive, realizes payloads of 1 to 1.5 tons and lighter chassis without use of counterweight

	MG15HL	Competitor
Maximum payload (kg)	1,500	1,200
Maximum reach (mm)	4,005	3,734
Main unit mass (kg)	6,550	8,600



#### Product Description

This extra-large payload robot with a capacity of 1 to 1.5 tons realizes both high rigidity and accuracy achieved through its unique construction (parallel two-reducer mechanism on the first axis, ball-screw mechanism on the second and third axes)

#### Special Features

- Achieves 1-ton-plus payloads through adoption of hybrid link mechanism and dual servos
- Reduces arm deflection and achieves high positioning accuracy by adopting ball screws with high rigidity and minimal backlash
- Hybrid link mechanism and counterweight-less arm deliver a wide work envelope for practical use



[Renewal]

After registration, products are reassessed every three years, and registration is renewed for products that meet the criteria.

**Battery Power System (BPS)**

Introducing a cutting-edge high-performance battery with energy-saving potential and no electrical noise emissions.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**M1A-17D Gas Turbine**

Highest power generation efficiency in its class with lowest NOx emissions, made possible by Koi's integrated technology.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**Ninja ZX-6R**

New model requested for lower CO<sub>2</sub> emissions and enhanced recyclability.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**Hydraulic Pump for Excavators (K7V)**

A world leader in environmental performance, offering higher efficiency and lower noise.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**Green Gas Engine**

The world's highest power generation efficiency in its class.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**MAG Turbo**

Domestic industry's highest level of efficiency and low environmental impact achieved through use of magnetic bearings.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**Spot Welding Robot (BX200L)**

Industry's lightest, slimmest and most compact spot welding robot minimizes footprint.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**Centrifugal Chiller Using Water as Refrigerant**

Each-making HFC-free, high-efficiency chiller cuts greenhouse gas emissions.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

**CKK System**

Conserving energy and resources through effective use of waste.

**2017 Kawasaki SUPER Green Product**

Kawasaki Heavy Industries, Ltd.

# Environmental Data

**Kawasaki's Environmental Data (Fiscal 2017)** 39

**Environmental Data by Business Site (Fiscal 2017)** 40

- 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)** 42

Domestic/Overseas

## Kawasaki's Environmental Data (Fiscal 2017)

		Unit	Amount	Change from fiscal 2016	
INPUT	Total energy consumption (crude oil conversion)	kl	156,987	101%	
	Purchased electricity	MWh	375,571	101%	
	Fuel	TJ	2,432	102%	
	Renewable energy	MWh	1,664	100%	
	Materials	10,000 t	14	156%	
	Water	1,000 m <sup>3</sup>	6,099	103%	
OUTPUT	Air	CO <sub>2</sub> emissions from energy sources	t	321,343	99%
		SO <sub>x</sub>	t	5	29%
		NO <sub>x</sub>	t	155	50%
		Soot and dust	t	3	41%
		PRTR regulated substance	t	812	90%
	Water	Wastewater	1,000 m <sup>3</sup>	3,824	108%
		COD	t	9	105%
		Nitrogen	t	37	175%
		Phosphorus	t	0.4	248%
		PRTR regulated substance	t	2	140%
	Waste	Total emitted	t	51,057	99%
		Recycled	t	49,846	100%
		Others	t	1,191	81%
		PRTR regulated substance in above total	t	250	90%
	Others	CO <sub>2</sub> emissions during transport	t	4,223	112%

## Environmental Data by Business Site (Fiscal 2017) 1/2

		Unit	Gifu Works	Nagoya Works 1	Kobe Works	Hyogo Works	Nishi-Kobe Works	
INPUT	Total energy consumption (crude oil conversion)	kl	37,281	13,998	12,489	5,567	17,281	
	Purchased electricity	MWh	75,049	54,959	31,074	17,588	62,394	
	Fuel	TJ	712	12	182	43	63	
	Renewable energy	MWh	0	870	23	28	525	
	Water	1,000 m <sup>3</sup>	3,973	64	303	75	226	
OUTPUT	Air	CO <sub>2</sub> emissions from energy sources	t	75,084	25,131	25,682	11,076	34,160
		SOx	t	1	0	4	0	0
		NOx	t	48	0.4	94	0.7	0.7
		Soot and dust	t	0.5	Under 0.1	0.2	Under 0.1	Under 0.1
		PRTR regulated substance	t	130	1	48	87	28
	Water	Wastewater	1,000 m <sup>3</sup>	2,504	16	130	75	61
		COD	t	9	0.2	Under 0.1	Under 0.1	0.3
		Nitrogen	t	32	0.1	Under 0.1	Under 0.1	0.8
		Phosphorus	t	0.3	Under 0.1	Under 0.1	Under 0.1	Under 0.1
		PRTR regulated substance	t	2	0	0	0	0
	Waste	Total emitted	t	5,679	1,019	9,111	4,343	4,123
		Recycled	t	5,679	1,019	9,111	4,342	4,108
		Other (incineration/reclamation)	t	0	0	0	1	15
		PRTR regulated substance in above total	t	62	1	13	54	38

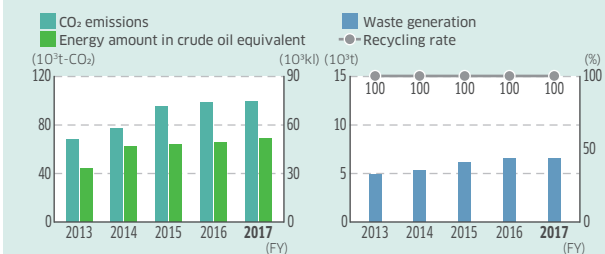
## Environmental Data by Business Site (Fiscal 2017) 2/2

		Unit	Seishin Works	Akashi Works	Kakogawa Works	Harima Works	Sakaide Works	
INPUT	Total energy consumption (crude oil conversion)	kl	8,435	42,939	3,283	4,602	9,994	
	Purchased electricity	MWh	26,293	45,744	6,448	15,437	36,883	
	Fuel	TJ	72	1,220	65	27	29	
	Renewable energy	MWh	0	154	0	5	60	
	Water	1,000 m <sup>3</sup>	82	857	12	95	413	
OUTPUT	Air	CO <sub>2</sub> emissions from energy sources	t	16,716	88,223	7,556	9,115	26,510
		SOx	t	0	0	0	0	0
		NOx	t	2	9	0	0.3	Under 0.1
		Soot and dust	t	Under 0.1	2	0	Under 0.1	Under 0.1
		PRTR regulated substance	t	3	65	0	57	392
	Water	Wastewater	1,000 m <sup>3</sup>	49	546	5	45	394
		COD	t	-	-	Under 0.1	Under 0.1	0.4
		Nitrogen	t	-	-	Under 0.1	Under 0.1	0.5
		Phosphorus	t	-	-	Under 0.1	Under 0.1	Under 0.1
		PRTR regulated substance	t	0	0	0	0	0
	Waste	Total emitted	t	847	8,201	1,480	3,570	12,685
		Recycled	t	847	8,174	1,446	3,570	11,584
		Other (incineration/reclamation)	t	0	27	15	0	1,101
		PRTR regulated substance in above total	t	11	53	0	4	14

### Gifu Works and Nagoya Works 1

**Location** 1, Kawasaki-cho, Kakamigahara, Gifu 504-8710, Japan  
20-3, Kusunoki 3-chome, Yatomi, Aichi 498-0066, Japan

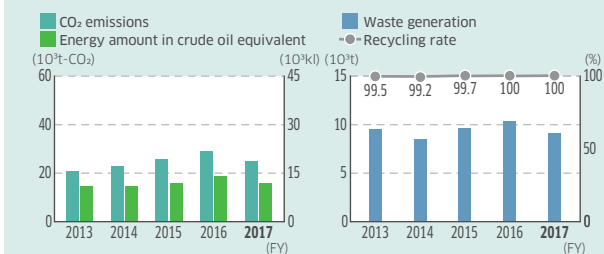
**Main products** Transport airplanes, helicopters, spacecraft, component parts for airplanes



### Kobe Works

**Location** 1-1, Higashikawasaki-cho 3-chome, Chuo-ku, Kobe, Hyogo 650-8670, Japan

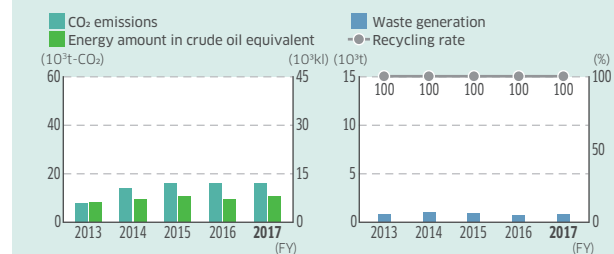
**Main products** Ships & maritime application equipment, steam turbines for ground and maritime applications, diesel engines



### Seishin Works

**Location** 8-1, Takatsukadai 2-chome, Nishi-ku, Kobe, Hyogo 651-2271, Japan

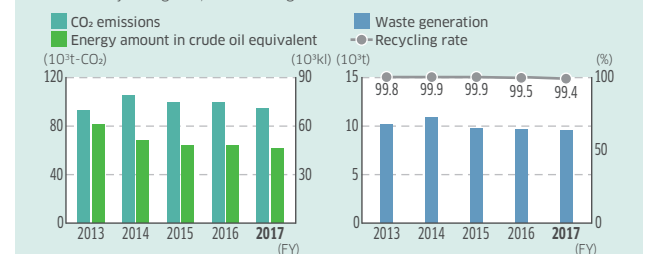
**Main products** Component parts for jet engines and gas turbines



### Akashi Works and Kakogawa Works

**Location** 1-1, Kawasaki-cho, Akashi, Hyogo 673-8666, Japan  
170, Yamanoue Mukohara, Hiraoka-cho, Kakogawa, Hyogo 675-0112, Japan

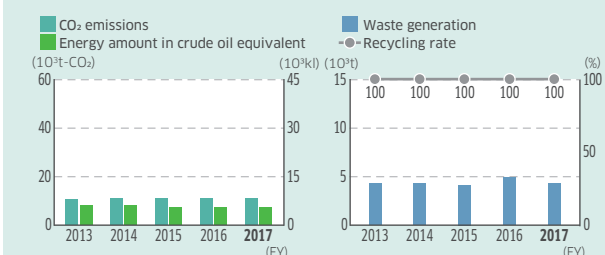
**Main products** Motorcycles, general-purpose gasoline engines, industrial robots, jet engines, industrial gas turbines



### Hyogo Works

**Location** 1-18, Wadayama-dori 2-chome, Hyogo-ku, Kobe, Hyogo 652-0884, Japan

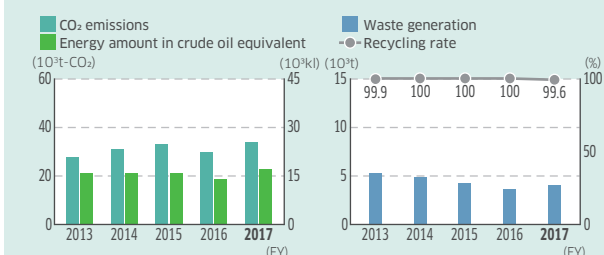
**Main products** Rolling stock, automated guideway transit systems, platform screen doors



### Nishi-Kobe Works

**Location** 234, Matsumoto, Hazetani-cho, Nishi-ku, Kobe, Hyogo 651-2239, Japan

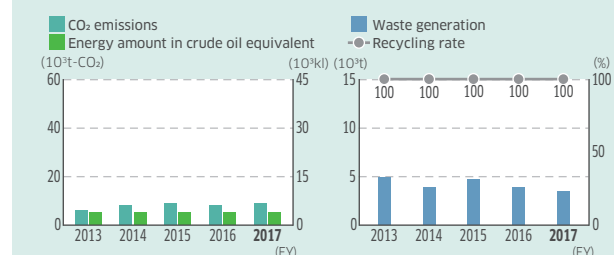
**Main products** Various hydraulic systems for industrial use, marine machinery, precision machinery and equipment



### Harima Works

**Location** 8, Nijjima, Harima-cho, Kako-gun, Hyogo 675-0180, Japan

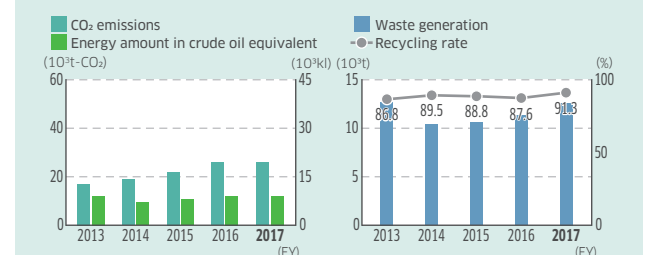
**Main products** Industrial & environmental plants, boilers, construction machinery, rolling stock



### Sakaide Works

**Location** 1, Kawasaki-cho, Sakaide, Kagawa 762-8507, Japan

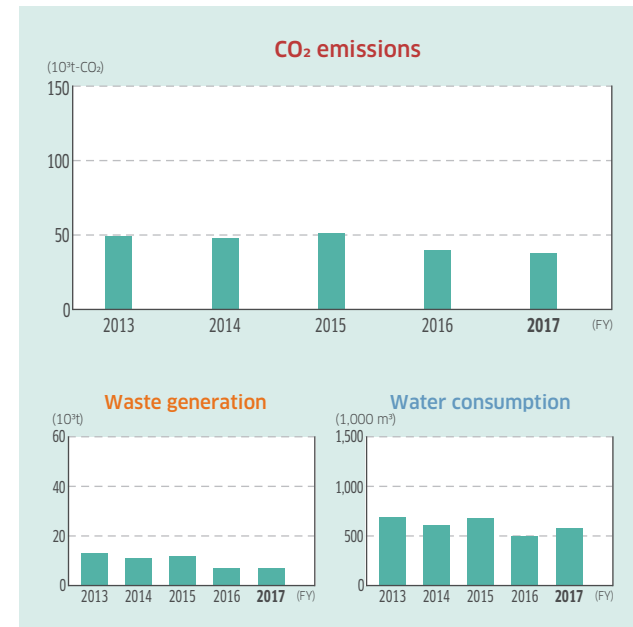
**Main products** Ships & maritime application equipment (LNG carriers, LPG carriers, container ships, etc.)



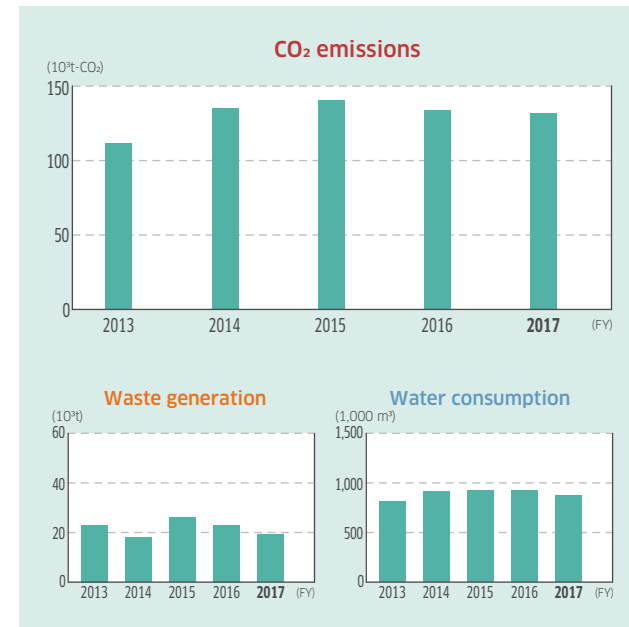


## Environmental Data of Subsidiaries (Fiscal 2017)

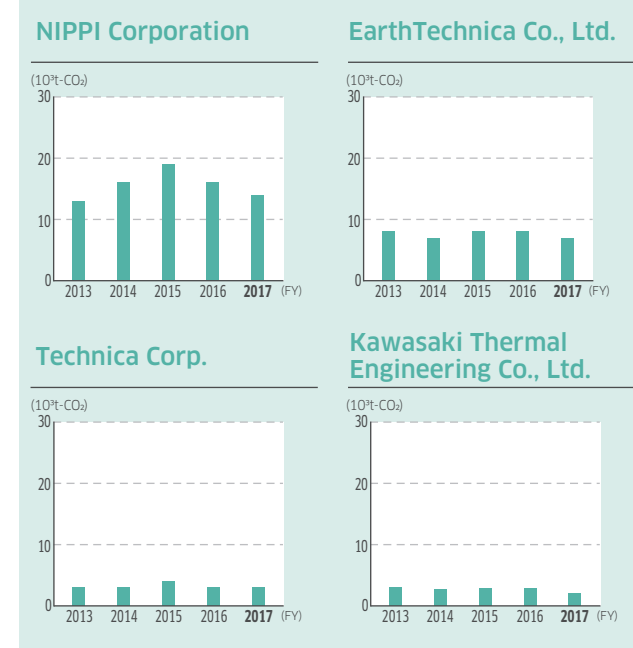
### Total for Domestic Subsidiaries



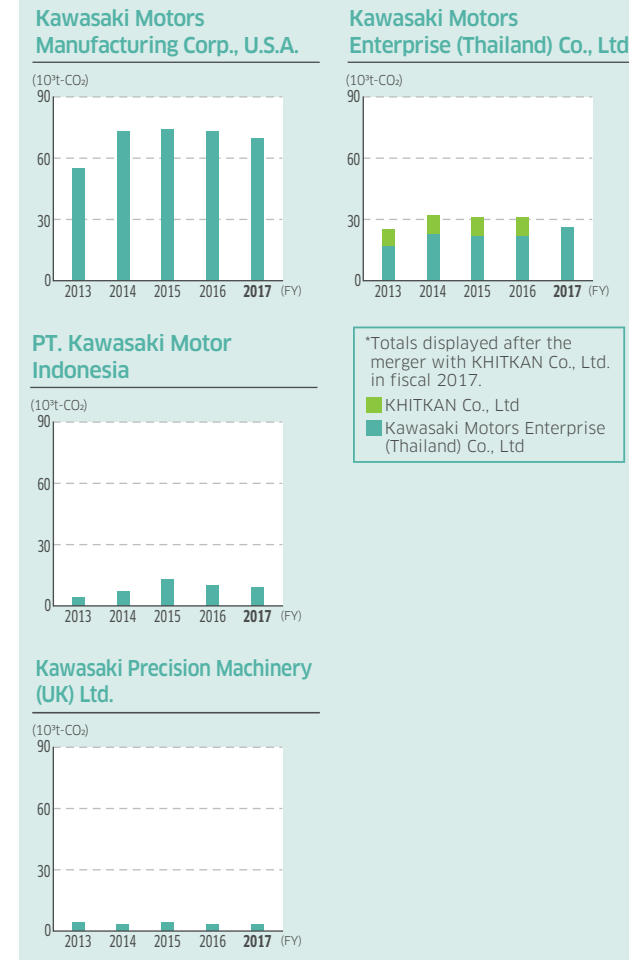
### Total for Overseas Subsidiaries



### CO<sub>2</sub> Emissions of Domestic Major Subsidiaries



### CO<sub>2</sub> Emissions of Overseas Major Subsidiaries



## 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.

### 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

**GHG Emissions Verification Statement**  
19 June 2017

Mr. Yoshinori Kanehana  
President  
Kawasaki Heavy Industries, Ltd.

**Objective**  
SGS Japan Inc. (hereinafter referred to as "SGS") was commissioned by Kawasaki Heavy Industries, Ltd. (hereinafter 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 conformance with the criteria, and to express our views as a third party.

**Scope**  
The scope of verification is limited to the GHG assertion at 42 the Organization and its domestic subsidiaries sites, and 24 its overseas subsidiaries sites.  
GHG emissions included in this performance data are Scope 1 and 2; CO<sub>2</sub> 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 equipments 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 Nishi-Kobe Works, Seishin Works and analytical procedures and interviews carried out at all works included in the scope of verification

The criteria for this review are based on the protocol specified by the Organization.

**Conclusion**  
Within 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 (Scope1: 178,959 t-CO<sub>2</sub>, Scope2: 313,366 t-CO<sub>2</sub>, Scope3: 5,565,949 t-CO<sub>2</sub> (category 1), 52,088,318 t-CO<sub>2</sub>(category 11)) was not calculated and reported in conformance 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  
Yuji Takeuchi

Signed:

