

# 4 Environment

We will pursue “manufacturing that makes the Earth smile.”



The KHI Group has undertaken business whose foundation calls for the advancement of society and the nation through manufacturing, and has sought to develop a global enterprise in key industries related to land, sea, and air. In doing so, we have worked to resolve global environmental problems by seeking to realize a low-carbon society, a recycling-oriented society, and a society coexisting with nature. We will contribute to the sustainable development of society through business activities that are in harmony with the environment as well as through products and services that show consideration for the global environment.

## Category

Global environment (sustainable development)

### Goals/Approaches and Actions of Medium-term Business Plan 2013 (FY2014 - 2016)

Goals/Approaches	Actions
<ul style="list-style-type: none"> <li>Steadily reduce annual CO<sub>2</sub> emissions and energy consumption</li> </ul>	<ul style="list-style-type: none"> <li>Use and promote a system to visualize energy use</li> </ul>
<ul style="list-style-type: none"> <li>Reduce waste emissions and promote reuse and recycling</li> </ul>	<ul style="list-style-type: none"> <li>Reduce waste, promote reuse and recycling, and promote PCB* treatment</li> </ul>
<ul style="list-style-type: none"> <li>Steadily reduce substances of the environmental load</li> </ul>	<ul style="list-style-type: none"> <li>Reduce chemical substances</li> </ul>

\* PCB: Polychlorinated biphenyl

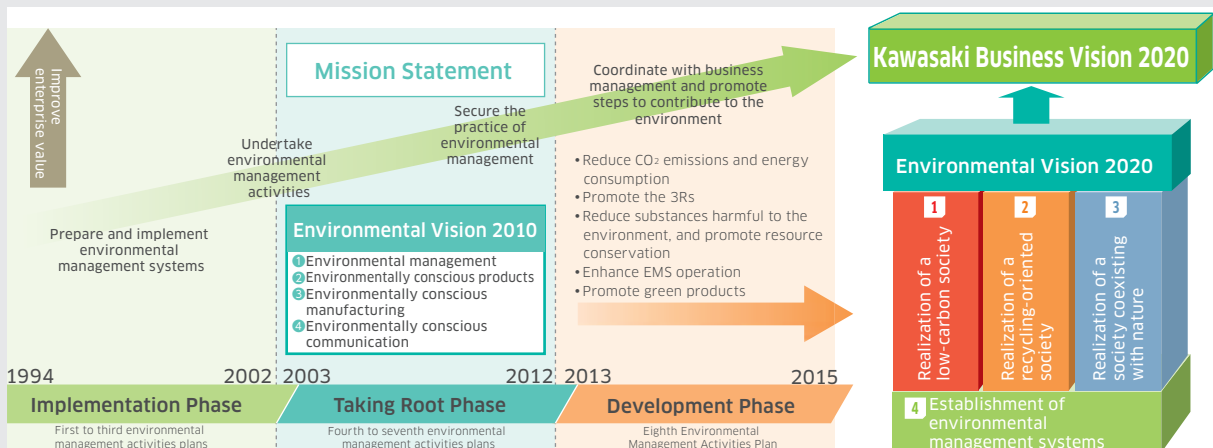
### Overview of Activities in Fiscal 2014

Fiscal 2014 was the first year of the Eighth Environmental Management Activities Plan (FY2014–FY2016), and during this kickoff year, we pushed ahead on key strategies designed to achieve stated targets related to four issues: reduction of greenhouse gas emissions, reduction of total waste on a unit basis, reduction of chemical substances, and the establishment of environmental management systems (EMS).

Greenhouse gas emissions steadily declined, mainly due to improvement activities taken because of information provided by equipment to visualize energy consumption, and we reached our reduction target for total waste on a unit basis. We also made progress on EMS, enhancing our status in Japan and overseas.

### Environmental Management Flow

The basic direction of Environmental Vision 2020, drafted in line with the Group Mission, highlights four points. Three deal with realization of specific types of societies—a low-carbon society, a recycling-oriented society, and a society that coexists with nature—and the fourth point provides a foundation—the establishment of environmental management systems—that form the cornerstone of such societies. Through Environmental Vision 2020, we will contribute to a sustainable society. Toward this end, we draw up environmental management activities plans every three years—we are now on the Eighth Environmental Management Activities Plan—which lay out basic policy, key strategies, and concrete targets to achieve during each three-year period.



# Promoting Environmental Management

## Coordinating Environmental Management with Business Management



Chief Environmental Officer  
(Executive Office and General  
Manager, General Administration  
Division)

**Shiro Nakabayashi**

The concept of environmental management is evolving from current regulatory responses that emphasize reduction of environmental risk into the acquisition of added value directly linked to business management and efforts to solve social issues in core operations.

KHI drafted Environmental Vision 2020 to define the Group's identity in 2020 from an environmental perspective in line with its Group Mission: "Kawasaki, working as one for the good of the planet (Enriching lifestyles and helping safeguard the environment: Global Kawasaki)." The environmental management activities plan launched in fiscal 2014 lays out specific measures in four areas—(1) realization of a low-carbon society, (2) realization of a recycling-oriented society, (3) realization of a society coexisting with nature, and (4) establishment of an environmental management system (EMS)—that we will follow to achieve our vision. We seek to accelerate the shift toward greater energy- and resource-saving practices anticipating society's environmental needs and to promote reduced environmental impact through our products.

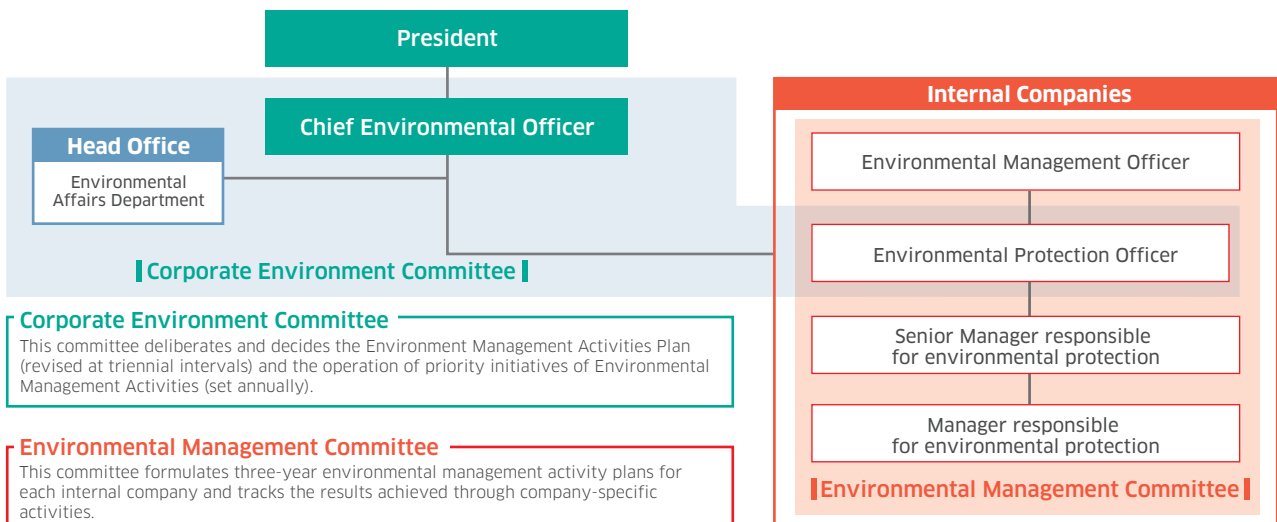
Recently, as a way to reinforce these measures, KHI initiated a program to promote ISO 14021-compliant Kawasaki Green Products. This program is intended to boost the environmental performance of products and accelerate the reduction of environmental impact caused by associated manufacturing processes. Toward this end, products which demonstrate particularly excellent environmentally conscious performance undergo a conformity assessment process. Based on their level of compliance with ISO 14021, they are selected as either a Kawasaki Green Product or Kawasaki Super Green Product. KHI then discloses the results of the assessment. Through this program, we will sharpen the competitiveness of products with an underlying environmental focus and roll out solutions to social concerns through our products.

Also, we aim to realize a sustainable society through such steps as the use of an energy visualization system, which was introduced at all key factories in fiscal 2013 and has accelerated progress toward energy and resource savings, and also through enhanced efforts to curb CO<sub>2</sub> emissions, which are a cause of climate change.

# Environmental Management Platform

## Environmental and Energy Management Organization

The director for environmental issues at KHI is appointed the Chief Environmental Officer and in this position chairs the Corporate Environment Committee, which deliberates and formulates policy on a variety of important matters related to the environment. To enable each internal company to independently promote the environmental management activities plan as formulated, an Environmental Management Officer, an Environmental Protection Officer, a Senior Manager responsible for environmental protection, and a Manager responsible for environmental protection are appointed to match the structure of each internal company with such activities. Furthermore, organization systems are in place to facilitate coordinated efforts among all employees to implement environment-oriented initiatives. In 2010, KHI established an energy management structure to develop proactive initiatives for the management of energy. Environmental management and energy management structures at subsidiaries are being established under the direction of each designated oversight division (head office or internal company).



# Eighth Environmental Management Activities Plan

The Eighth Environmental Management Activities Plan (referred to below as the Eighth Plan), covers the period from fiscal 2014 to fiscal 2016. It lays down a basic policy for coordinating environmental management with business management as well as specific measures in four areas—(1) realization of a low-carbon society, (2) realization of a recycling-oriented society, (3) realization of a society coexisting with nature, and (4) establishment of EMS—that are key to accelerating the shift toward greater energy- and resource-saving practices anticipating society’s environmental needs and establishing an appealing Kawasaki environmental brand.

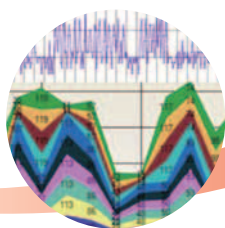
To reinforce these measures, KHI initiated a program in fiscal 2015 to promote Kawasaki Green Products.

## Coordination with Business Management and Promotion of Environmental Contribution

Key strategy	Targets
<p><b>Realization of a low-carbon society</b> CO<sub>2</sub> and energy reduction</p>	<p><b>Use the energy visualization system</b> By fiscal 2016, have equipment and system in place to reduce annual CO<sub>2</sub> emissions and energy consumption by at least 5%</p> <p><b>Reduce CO<sub>2</sub> emissions through the contribution from products</b> Achieve cumulative values equal to or more than the initial plan values for each business segment and disclose the reduction of CO<sub>2</sub> emissions to the public</p>
<p><b>Realization of a recycling-oriented society</b> Promotion of the 3Rs</p>	<p><b>Promoting reduction in waste generation, greater reuse and more recycling</b> Reduce total waste emissions per unit of sales, and maintain zero emissions Boost recycling rate above previous years’ level</p> <p><b>Promoting PCB treatment</b> Look into and apply better treatment methods for low-concentration PCB waste</p>
<p><b>Realization of a society coexisting with nature</b> Reduction of environmental load/ promotion of resource conservation</p>	<p><b>Reduce chemical substances</b> Major VOCs* per unit of sales to be at or below the average of results achieved in the Seventh Plan Seek to reduce heavy metals to zero, in principle, by fiscal 2021</p> <p><b>Continue with forest conservation activity</b> Carry out forest conservation activity more than twice a year</p> <p><b>Conserving Water</b> Reduce water consumption and amount of wastewater</p>
<p><b>Establishment of environmental management systems</b> Enhancement of the KHI Group environmental management system</p>	<p><b>Reinforce the environmental management ability of KHI and consolidated subsidiaries in Japan</b> Set reduction targets, and provide appropriate feedback</p> <p><b>Reinforce the environmental management ability of overseas consolidated subsidiaries</b> Promote information-sharing, identify issues at overseas locations, and support solutions</p>
<p><b>Kawasaki Green Product Promotion Activity</b></p>	<p><b>Implementing compliancy evaluation</b> Thoroughly review compliancy of products for environmental friendliness and establish a system for registering such products</p> <p><b>Communicating information within and beyond the Company</b> Communicate environmental aspects of products in compliance with ISO 14021</p>

\*Main VOCs: For the KHI Group, the major VOCs are toluene, xylene and ethyl benzene. VOCs: Volatile Organic Compounds

## Target Profile of the KHI Group in 2020



- **Energy consumption and CO<sub>2</sub> emissions**  
Major reductions achieved
- **Contribution from products**  
Major reductions achieved in CO<sub>2</sub> emissions during utilization



- **3Rs**  
Major reductions achieved per unit of sales  
Recycling rate more than 97%  
Zero emissions maintained
- **PCB treatment**  
All treatment completed



- **Major VOCs**  
Major reductions achieved per unit of sales and in total amount
- **Heavy metals**  
Major reduction in amount utilized
- **Forest conservation activity**  
Forest conservation activity continued



- **Establishment of EMS**  
Establishment completed across the KHI Group as a whole

## 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.

# Fiscal 2014 Results and Evaluation

Eighth Environmental Management Activities Plan (FY2014-FY2016)	
Realization of a low-carbon society	<p><b>Specific measure</b> Reducing CO<sub>2</sub> emissions and energy consumption</p> <p>1. Use energy visualization system</p> <p><b>Approach</b> Reduce CO<sub>2</sub> emissions and energy consumption through improvement activities using an energy visualization system</p> <p><b>Target</b> By fiscal 2016, reduce annual CO<sub>2</sub> emissions and energy consumption by at least 5%</p>
	<p>2. Cutting CO<sub>2</sub> emissions through product-based contributions</p> <p><b>Approach</b> Calculate reduced CO<sub>2</sub> amount separately for energy-related products, transportation-related products, industrial machinery, and other products</p> <p><b>Target</b> Achieve cumulative CO<sub>2</sub> emissions reduction equal to or more than the initial plan values for each business segment through product-based contributions</p>
Realization of a recycling-oriented society	<p><b>Specific measure</b> Promoting 3Rs (reduce, reuse, recycle)</p> <p>1. Promoting reduced waste generation, greater reuse and more recycling</p> <p><b>Approach</b> Steadily implement measures to reduce total amount of waste generated. Promote high-level treatment and shift away from thermal recycling to material recycling and reuse</p> <p><b>Target</b> Reduce total amount of CO<sub>2</sub> emissions per unit of sales, and maintain zero emission status at all business sites</p>
	<p>2. Promoting PCB treatment</p> <p><b>Approach</b> Draft appropriate treatment plans and follow through with stated measures</p> <p><b>Target</b> Sustain commitment to treatment of high-concentration PCB waste in cooperation with JESCO*. Apply optimum method to treat low-concentration PBC waste *Japan Environmental Safety Corporation</p>
Realization of society coexisting with nature	<p><b>Specific measure</b> Reduction of substances harmful to the environment</p> <p>1. Reducing chemical substances</p> <p><b>Approach</b> Switch to either alternative materials that do not contain hazardous substances or materials with low-content concentrations. Reduce emissions into the atmosphere and prevent movement beyond the borders of business sites through such efforts as collection and treatment of chemical substances</p> <p><b>Target</b> Set major VOC reduction target below the average achieved through the Seventh Plan per unit of sales. Seek to reduce heavy metals to zero, in principle, by fiscal 2021</p>
	<p><b>Specific measure</b> Promoting resource conservation</p> <p>1. Forest conservation activities</p> <p><b>Approach</b> Continue to pursue forest conservation activities</p> <p><b>Target</b> Conduct forest conservation activities at least twice a year</p>
	<p>2. Conserving Water</p> <p><b>Approach</b> Promote water conservation programs</p> <p><b>Target</b> Reduce water consumption and amount of wastewater</p>
	<p><b>Specific measure</b> Enriching scope of environmental management systems in the KHI Group</p> <p>1. Reinforcing environmental management ability of KHI and affiliated companies in Japan</p> <p><b>Approach</b> Communicate environmental data to stakeholders</p> <p><b>Target</b> Set reasonable reduction targets and provide appropriate feedback</p>
Establishment of environmental management systems	<p>2. Strengthening overseas affiliated companies' environmental management capabilities</p> <p><b>Approach</b> Pinpoint environmental data and evaluate environmental performance (impact on environment and effectiveness of measures to limit such impact)</p> <p><b>Target</b> Identify legal requirements and other criteria, and support efforts to mitigate environmental risk</p>
	<p><b>Specific measure</b> Kawasaki Green Product Promotion Activity</p> <p>1. Establishing compliancy evaluation system to assess environmental performance of Kawasaki green products</p> <p><b>Approach</b> Establish system for self-declared environmental claims regarding products</p> <p><b>Target</b> Establish system conforming to ISO 14021</p>

Results of Fiscal 2014 Activities	Evaluation	Page Number:
<p><b>Reducing CO<sub>2</sub> emissions and energy consumption</b></p> <p>1. Use of energy visualization system Implemented energy visualization system and began improvement activities</p>	○	▶ P.66
<p>2. Reducing CO<sub>2</sub> emissions through product-based contributions Cumulative CO<sub>2</sub> emissions reduction through product-based contributions reached 741,000t-CO<sub>2</sub> in fiscal 2014.</p>	△	▶ P.65
<p><b>Promoting 3Rs (reduce, reuse, recycle)</b></p> <p>1. Promoting reduction in waste generation, greater reuse and more recycling Total waste per unit of sales edged down 0.52 point from fiscal 2014, and zero emission status was maintained with final disposal ratio of 1% or less.</p>	○	▶ P.69
<p>2. Promoting PCB treatment High-concentration PCB waste continued to be treated at JESCO. For low-concentration PCB waste, information about treatment methods was collected and passed on to each business segment.</p>	○	▶ P.69
<p><b>Reduction of substances harmful to the environment</b></p> <p>1. Reducing chemical substances Promoted reduction measures for major VOCs, dichloromethane, and heavy metals</p>	○	▶ P.70
<p><b>Promoting resource conservation</b></p> <p>1. Forest conservation activities Continued forest conservation activities in Hyogo Prefecture, Miyagi Prefecture and Kochi Prefecture through the efforts of employees and their families</p>	○	▶ P.70
<p>2. Conserving water Promoted efforts to conserve water, and collected data on usage in fiscal 2014</p>	○	▶ P.70
<p><b>Enriching scope of environmental management systems in the KHI Group</b></p> <p>1. Reinforcing environmental management ability of affiliated companies in Japan Introduced in-house environmental data management system (ECOKEEP) and began collecting environmental data. Communicate environmental information to stakeholders</p>	○	▶ P.72
<p>2. Reinforcing environmental management ability of affiliated companies overseas Identified and tabulated environmental data and encouraged steps to lower environmental risk</p>	○	▶ P.72
<p><b>Kawasaki Green Product Promotion Activity</b></p> <p>1. Establishing conformity assessment system for Kawasaki green products Established system to check for conformity with ISO 14021, from the perspective of product performance and environmental management</p>	○	▶ P.15 ▶ P.75



# Realization of a Low-Carbon Society

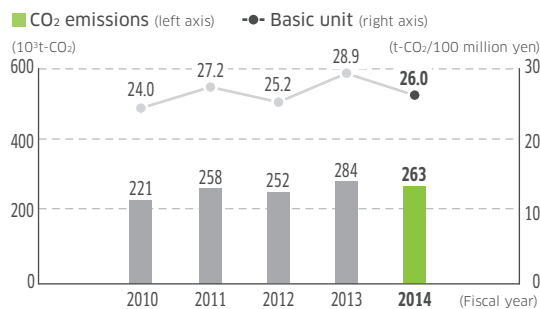
## Reduction of Greenhouse Gas Emissions

Our response to climate change is a key issue affecting the continuity of our operations. The reduction of greenhouse gases is particularly important, and we emphasize measures that curb CO<sub>2</sub> emissions generated in our own production work as well as CO<sub>2</sub> emissions released when delivered products are in use.

The KHI Group is committed to contributing to the prevention of global warming worldwide through products and manufacturing that use energy without waste. Under the Eighth Plan, action is directed toward targets set separately for reduction of the CO<sub>2</sub> emissions generated during production and reduction of CO<sub>2</sub> emissions through product-based contributions. The results of fiscal 2014 are presented below.

Through implementing energy-saving measures in working toward our goal of reducing annual CO<sub>2</sub> emissions by at least 5% by fiscal 2016, we cut CO<sub>2</sub> emissions by 3,000 tons in fiscal 2014. CO<sub>2</sub> emissions amounted to 263,000 tons, a result that takes us closer to our goal as we employ further energy-saving measures under the energy visualization system.

### CO<sub>2</sub> Emissions and Basic Unit at KHI

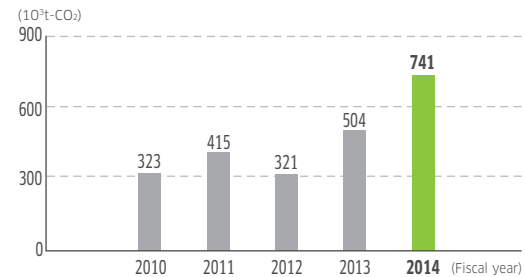


- Notes: 1. The CO<sub>2</sub> emissions value for fiscal 2014 includes a credit adjustment of a 31,500t-CO<sub>2</sub>.  
 2. Basic unit is a measurement obtained by dividing CO<sub>2</sub> emissions by net sales.  
 3. CO<sub>2</sub> emissions in logistics processes are calculated from our position as a specified consignor (a Japanese legal designation applied to consignors that ship 30 million ton-kilometers of freight or more per year), under the revised Energy Saving Law.

## CO<sub>2</sub> Reduction Through Product-based Contributions

Through products delivered by KHI to its customers, the Company made an estimated annual contribution to CO<sub>2</sub> emissions reduction of 741,000t-CO<sub>2</sub> in fiscal 2014. CO<sub>2</sub> emissions reduction in Energy & Environmental Engineering, Transportation Systems, and Industrial Equipment is shown in the table above right. The reduction effect is based on a comparison with existing models or improved efficiency through the application of new technology.

### CO<sub>2</sub> Emissions Reduction\* Through Product-based Contributions



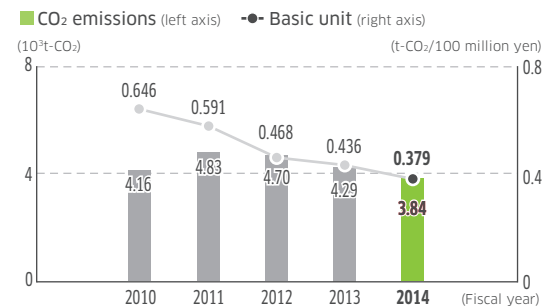
\*Estimate based on delivery results

- Notes: 1. Emission factors for electricity, heat, fuel and other types of energy were established with reference to the manual for the Law Concerning the Promotion of Measures to Cope with Global Warming.  
 2. CO<sub>2</sub> emission reduction effect through improved efficiency is based on a comparison with products before replacement or with standard products on the market.  
 3. All energy derived from the use of waste energy and energy produced from wastes is counted toward the CO<sub>2</sub> reduction effect.

## Environmentally Conscious Logistics

KHI promotes energy-saving activities and data tracking to curb CO<sub>2</sub> emissions from logistics processes. Evaluating the Company's freight traffic on the basis of freight tonkilometers carried (freight weight multiplied by distance), truck transport accounts for about half, with the balance of the freight carried by train or ship, which exerts less impact on the environment. In fiscal 2014, CO<sub>2</sub> emissions reached 3,840 t-CO<sub>2</sub> and CO<sub>2</sub> emissions per unit of sales totaled 0.379. We will continue to look at ways of boosting the load factor for truck transport and using modal shift from truck to other modes, such as train.

### CO<sub>2</sub> Emissions from Logistics Processes and Basic Unit



- Notes: 1. CO<sub>2</sub> basic unit is a measurement obtained by dividing CO<sub>2</sub> emissions by net sales.  
 2. Emissions in logistics processes are calculated from our position as a specified consignor (a Japanese legal designation applied to consignors that ship 30 million tonkilometers of freight or more per year), under the revised Energy Saving Law.  
 3. CO<sub>2</sub> emissions from logistics processes in fiscal 2010 do not include emissions by Kawasaki Shipbuilding Corporation and other subsidiaries before they merged into the Company on October 1, 2010.

## Installation of Solar Power Generating Facility

Kawasaki Trading Co., Ltd., a KHI Group company, began selling power under Japan's Feed-in Tariff Scheme for Renewable Energy. The photo shows the 1,500kW Iwaoka Photovoltaic Power Generation Station, which has annual power generating capacity of about 1,897MWh.



Iwaoka Photovoltaic Power Generation Station

## Use of Energy Visualization System

The amount of energy used in a year at all KHI business sites is equivalent to about 150,000kl of crude oil. During MTBP2013, we aim to reduce annual CO<sub>2</sub> emissions and energy consumption by at least 5% by fiscal 2016 as part of our efforts to realize a low-carbon society. To reach this target, we are currently installing an energy visualization system throughout our factory network and making progress in reducing CO<sub>2</sub> emissions and energy consumption.

The underlying objective in introducing this system into our operations is to have all employees participate in saving energy.

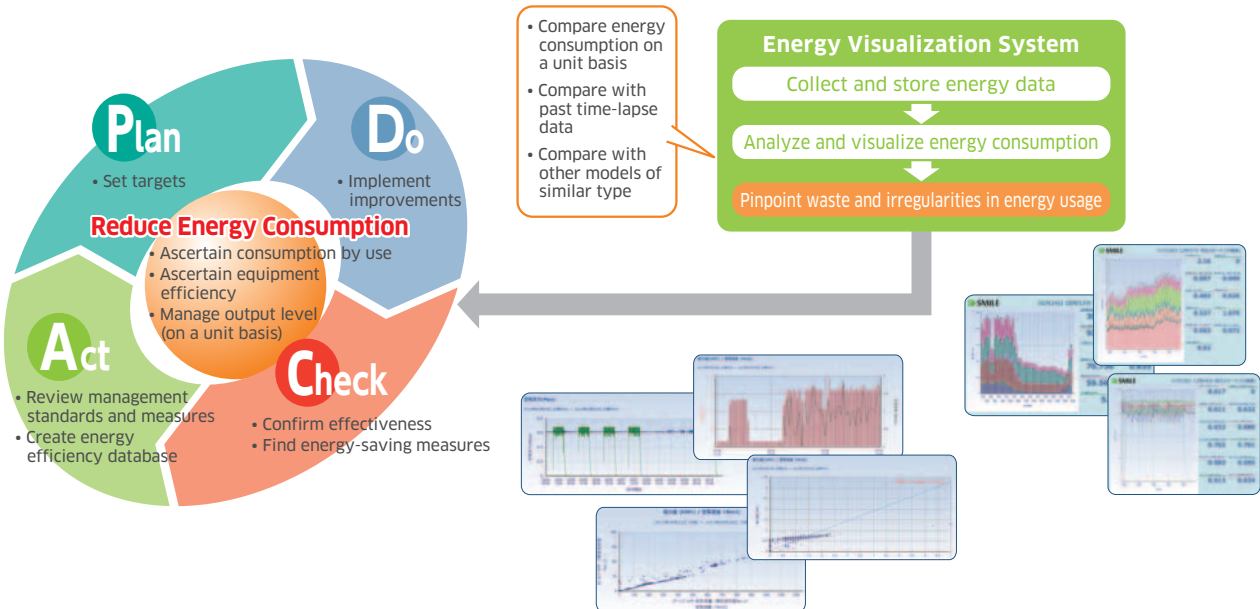
Production equipment accounts for between 70% and 80% of Company-wide energy consumption. Each factory has between several hundred and several thousand pieces of equipment, presenting an extremely varied assortment of features and many different methods of use. A limited number of energy managers cannot possibly deal with all of the energy-efficiency issues associated with such a vast array of equipment. That is why we rely on the people at each facility within a factory—those who typically use the equipment—to track energy consumption. It is these efforts by individuals that underpin greater energy savings overall. And for this reason, it is important to be able to see possible waste at a glance. The energy visualization system meets this need.

In fiscal 2013, we installed an energy visualization system at the Kakokawa Works, ahead of other factories. The system allowed us to compare and analyze the amount of energy used by similar types of machines and equipment, in operation and in standby mode, which led to the identification of discrepancies in settings and conditions and facilitated adjustments to achieve optimal performance. In addition, we were able to discover air leaks and other problems through continuous data confirmation on the amount of compressed air used. Over a one-year period, such energy-saving measures had an energy consumption reduction effect of about 10%.

In fiscal 2014, an energy visualization system was installed in test areas (see next page) at key factories in Japan. In addition to energy measurements, the system was used to track the flow volume of water, for example, and at factories emphasizing water conservation, the system led to a huge reduction in usage because leaks were found and fixed and a more appropriate level of water consumption was achieved. We will be promoting similar approaches at other factories.

In fiscal 2015, we will begin the process of extending measurement areas throughout our factories.

### PDCA Cycle for Energy-Saving Improvement Activities



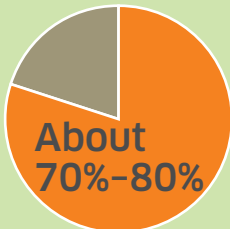


# Rolling out energy visualization system

Toward realization of a low-carbon society, we aim to reduce CO<sub>2</sub> emissions and energy consumption through energy-saving approaches. To achieve this end, we are rolling out the energy visualization system to factories throughout the KHI Group and have launched energy-saving activities that have the participation of all employees.

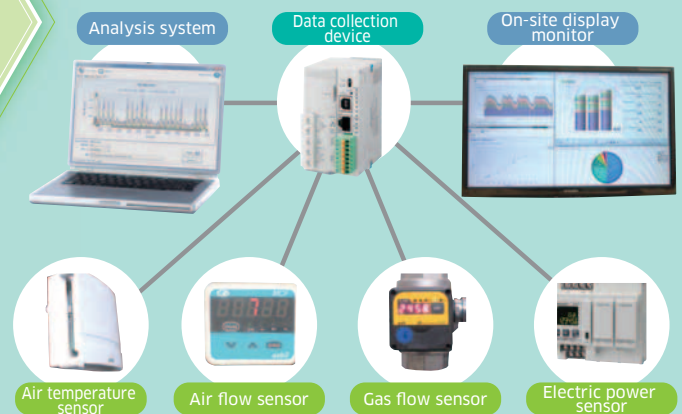
## Why are energy visualization systems necessary?

We had already made considerable progress through energy-saving improvements at factories, supported by the efforts of energy-management departments to monitor utility equipment, such as power receiving-and-distribution and transformer facilities, pneumatic compressors, air conditioning equipment and lighting. In fact, due to such progress, we reached a point where it became difficult to achieve further reduction in energy consumption. Production facilities consume somewhere between 70%–80% of total corporate energy applications, and over and above the fact that each location has several hundred to several thousand electric power-drawing units, there is an extremely wide variety of equipment and the features and methods of use are very different. To promote energy savings, it was important to know where energy was being wasted.



## K-SMILE the KHI Group's energy visualization system

The energy visualization system “sees” utilization conditions for the different types of energy used at factories and pinpoints in real time such information as where, when, and how much energy is being consumed. The system reveals energy waste and irregularities and contributes to the reduction of energy consumption.



K-SMILE is a registered trademark of Kawasaki Technology Co., Ltd.

## Development of K-SMILE Energy Visualization System

K-SMILE is being developed as an energy visualization system for the KHI Group. Development began with configuration of a system that could tally demand for electricity at each factory in response to the tight supply-and-demand situation that arose in the wake of the Great East Japan Earthquake in March 2011. Today, it is being extended as a corporate system providing at-a-glance measurement data from major factories in Japan and utilizing it as a factory system for detailed analysis of energy savings achieved at each location.

K-SMILE is one strategy that will help us reach our goal to reduce CO<sub>2</sub> emissions and energy consumption by more than 5% annually. In conjunction with measures to promote energy-saving improvements at factories, we will create a visualization system with greater sophistication.



- 1 Roll out energy visualization system to all operating facilities
- 2 Create database with standardized cases on energy savings and share access to information
- 3 Promote energy-saving activities with participation from all employees

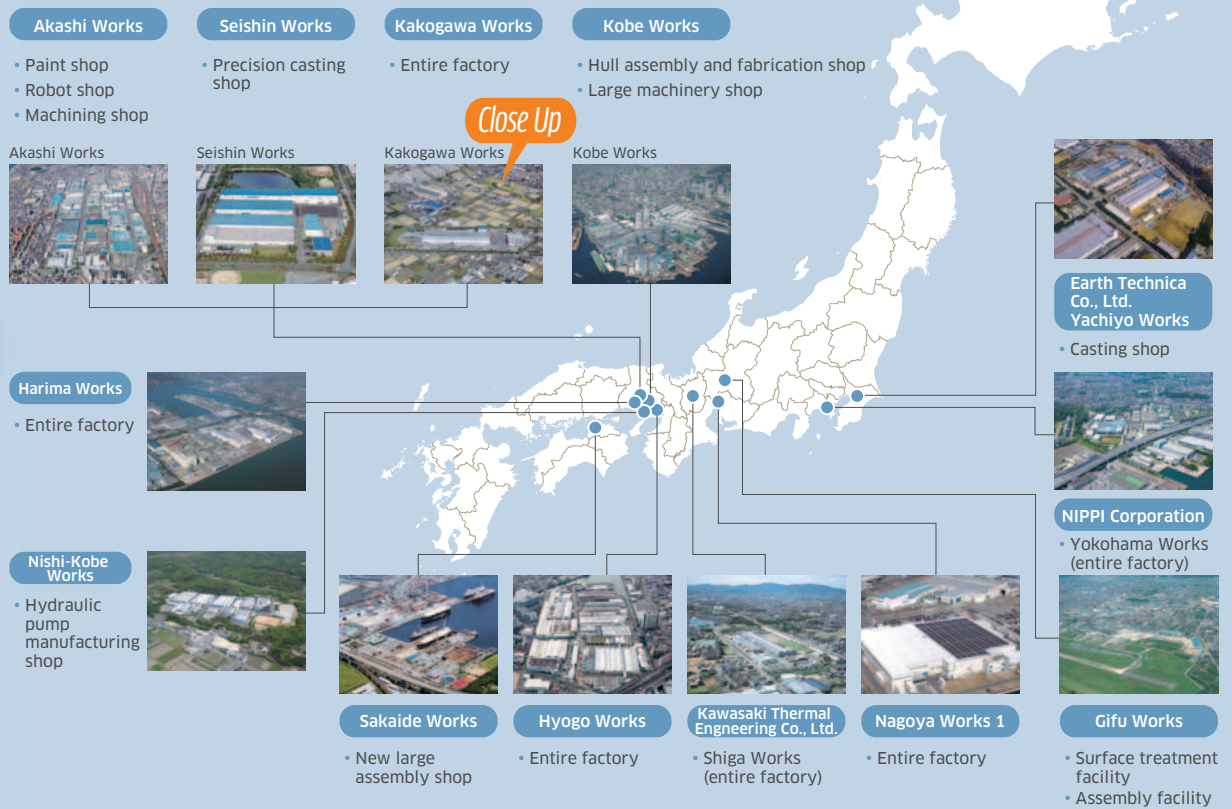
Energy-saving activities using K-SMILE

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Promote environmental contribution

In conjunction with energy visualization system development, we put corporate activity know-how into an energy-savings database. We will encourage the use of the system and database in energy-saving activities involving all employees, especially those in manufacturing, energy, and administrative divisions.

## System Introduced at Major Factories in the KHI Group

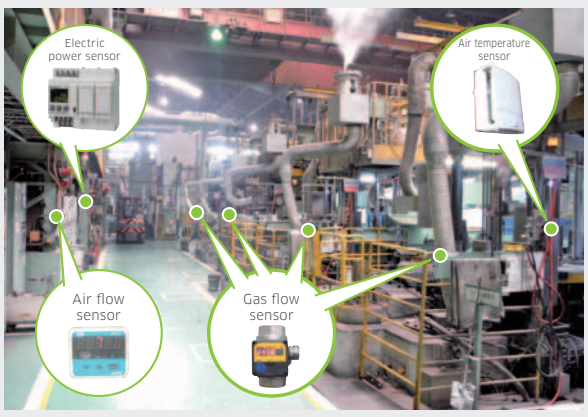


**Close Up** System Verification at Kakogawa Works Leads to Full Corporate Roll-out

In fiscal 2011, we installed the energy visualization system at the Kakogawa Works to evaluate its potential in enhancing energy savings.

Through regular data checks on the amount of compressed air used, we discovered waste—air leaks—and through a comparison of energy consumed by similar equipment and facilities and subsequent analysis, we found additional waste, which we were able to address with appropriate responses. As a result, total energy consumption over one year dropped by about 10%, validating system potential for energy savings. Given this proof of improvement, a decision was made to install the system at all of KHI's principal facilities to expand the range of measurement data.

Measurement sensor placement (● dots) at Kakogawa Works



# Realization of Recycling-Oriented Society

## Waste Reduction

### Promoting Resource Saving and the 3Rs

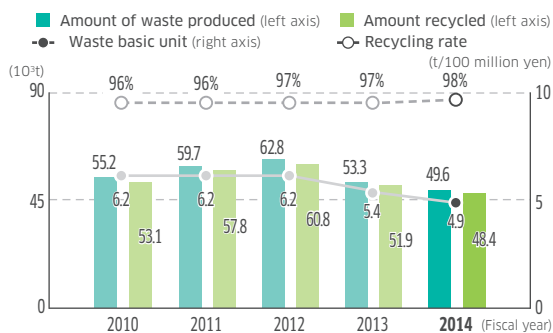
We use wisely and repurpose the limited resources that are needed to make our products and facilitate the manufacturing process so that these materials are consumed without waste. We emphasize designs that use resources effectively, and we seek to create products that are more lightweight, durable and recyclable. In addition, we advocate the 3Rs—reduce, reuse and recycle—in our manufacturing activities and seek zero emission status at all factories.

### Zero Emission Activity and Higher Recycling Rate

At KHI, we define zero emissions as a final disposal ratio of 1% or less. In fiscal 2014, all key factories achieved zero emission status and the recycling ratio edged up one point, to 98%.

In fiscal 2014, total waste decreased about 7% year on year, to 49,600 tons, and we reached our Company-wide target for reduction per unit of sales, with a 0.52 point improvement over fiscal 2013.

Waste Produced, Recycling Rate and Basic Unit



## Appropriate Treatment of PCB Waste

In accordance with the Law concerning Special Measures for Promotion of Proper Treatment of PCB Wastes, KHI reports to the appropriate prefectural governor by June 30 each year any polychloride biphenyl (PCB) wastes located at its operating sites. Also, in accordance with the Waste Management and Public Cleansing Law and related Cabinet and ministerial ordinances, we appoint an industrial waste manager at each relevant business location and store waste with the utmost care in line with applicable storage standards.

### High-Concentration PCB Waste

In fiscal 2012, KHI began outsourcing treatment and disposal of high-concentration PCB waste to the Japan Environmental Safety Corporation (JESCO) in accordance with regulations. To date, about 1,100 condensers have been processed. We will continue with appropriate treatment in the years ahead.

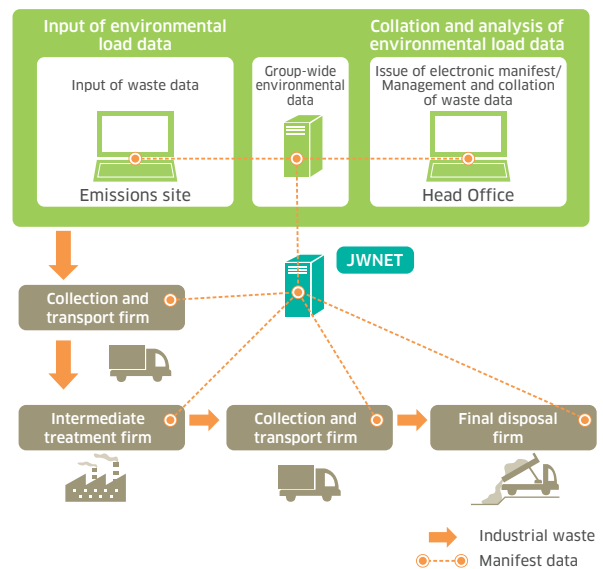
### Low-Concentration PCB Waste

For low-concentration PCB waste, as well, treatment has commenced and so far about 180 transformers have been processed. This came after we had calculated treatment costs and secured an appropriate budget, confirmed that the provider is certified to treat low-concentration PCB and tracked treatment trends, and verified through on-site observation that the certified provider executes treatment in an appropriate manner. We will continue to promote appropriate treatment of low-concentration PCB waste.

## Installing an Electronic Manifest System

To ensure the appropriate treatment of waste, KHI uses an environmental data management system (ECOKEEP), linked to the electronic manifest system operated by the Japan Industrial Waste Information Center, to self-determine the flow of industrial waste treatment outsourced to the companies that collect and transport waste and treat it. We began Company-wide use of this system in fiscal 2013, with all factories covered by the system as of fiscal 2014.

Environmental Data Management System (ECOKEEP)



# Realization of a Society Coexisting with Nature

## Chemical Substance Reduction

It is KHI's stated goal to contribute to reduced environment impact and conservation of the ecosystem through manufacturing that is in harmony with the global environment. KHI undertakes activities to achieve this goal. To reduce chemical substances, we have set targets for major VOCs (toluene, xylene and ethylbenzene), dichloromethane and hazardous heavy metals in each business segment, and progress is being made in reducing these substances.

We present data on the 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)

### Major VOCs

With regard to major VOCs, KHI promoted the switch to low-VOC paints, such as water-based paint, and improved coating efficiency through electrostatic coating, while reducing its use of cleaning solvents by installing solvent recovery equipment. We achieved a slight reduction in emissions from the fiscal 2013 level. In the future, however, we will strive to curb emissions through such measures as the wider application of alternative products, including water-based paints and high-solid paints.

### Dichloromethane

Dichloromethane is often found in the paint strippers that KHI uses in its operations. Emissions were reduced compared to fiscal 2013. Going forward, KHI will strive to further reduce emissions, especially through replacement of paint strippers and enhancement of dichloromethane recovery methods.

### Hexavalent Chromium Compounds

Hexavalent chromium is employed in special surface treatments, but we are working to introduce technology that makes it possible to avoid its use. Although the amount handled was on a par with the previous fiscal year, we will implement planned reductions.

### Lead

Lead is often found in paint, so KHI's efforts have focused on switching to lead-free paint. The amount handled was higher than the level recorded in the previous fiscal year, owing to an increase in the volume of products that require special paint.

Amounts of Chemicals Subject to Reduction Handled and Emitted (t/year)

Substance		Fiscal 2014	Increase or decrease from fiscal 2013
Major VOCs	Toluene	324	-19%
	Xylene	430	-20%
	Ethylbenzene	188	-8%
	Total	942	-18%
Dichloromethane		42	-13%
Hazardous heavy metals	Hexavalent chromium compounds	15	0%
	Lead	2	42%
	Cadmium	0.02	-78%

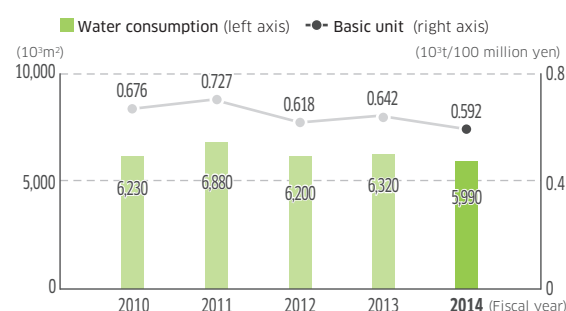
Release and Transfer of Chemical Substances Designated under the PRTR Law



## Conserving Water

Concern over risk to water sources is growing worldwide. KHI places a priority on appropriate use of water and reduced consumption in the course of its business pursuits. Currently, we target a 1% reduction in water usage per unit of sales each year and verify the status of consumption restrictions. Going forward, we will pinpoint water consumption on a Group-wide basis and consider activities that assume the existence of risk to water sources in all regions.

Water Consumption and Basic Unit



## Biodiversity-Friendly Society

A short-term target in Japan's national biodiversity strategy, which was revised in 2010, is to analyze the state of biodiversity to get a clearer picture of conditions and, based on this knowledge, to promote activities that protect biodiversity. We will support efforts to achieve this objective by implementing the activities listed below at all business sites with biodiversity protection in mind.

We also undertake activities such as greening programs on corporate premises that take into account location or other characteristics specific to each operating site.

### Efforts to Reduce the Environmental Load from Business Activities

- 1 Promote measures to cut greenhouse gas emissions
- 2 Reduce the amount of industrial waste for final disposal
- 3 Decrease the environmental load from wastewater and chemical substances

### Non-Business Activity

- 1 Promote cleanup events around business sites
- 2 Implement greening programs and other activities based on analysis of and insight into biodiversity conditions on corporate premises and the surrounding area
- 3 Embrace collaborative opportunities to protect biodiversity with local groups, such as creating corporate forests

## Responding to the ELV Directive\*1, the RoHS Directive\*2, and the REACH Regulation\*3

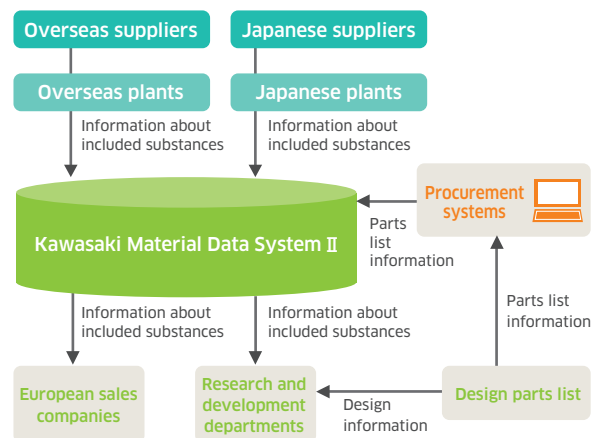
Since 2000, laws and regulations related to chemical substances have been strengthened in the European Union (EU) by the establishment of such controls as the ELV Directive, the RoHS Directive, and the REACH Regulation. The ELV Directive focuses on automobiles, and while motorcycles are not subject to 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 within the KHI structure, 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 KHI 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.

KHI 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\*4 to collect data about chemical substances and respond to REACH and other applicable chemical substance regulations.

## 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, Authorisation 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 Europe, the United States, Japan and South Korea which enables suppliers to identify the composition of materials in respective parts delivered to the automotive industry)



CSR Procurement Guidelines

<http://www.khi.co.jp/english/csr/procurement/guideline.html>

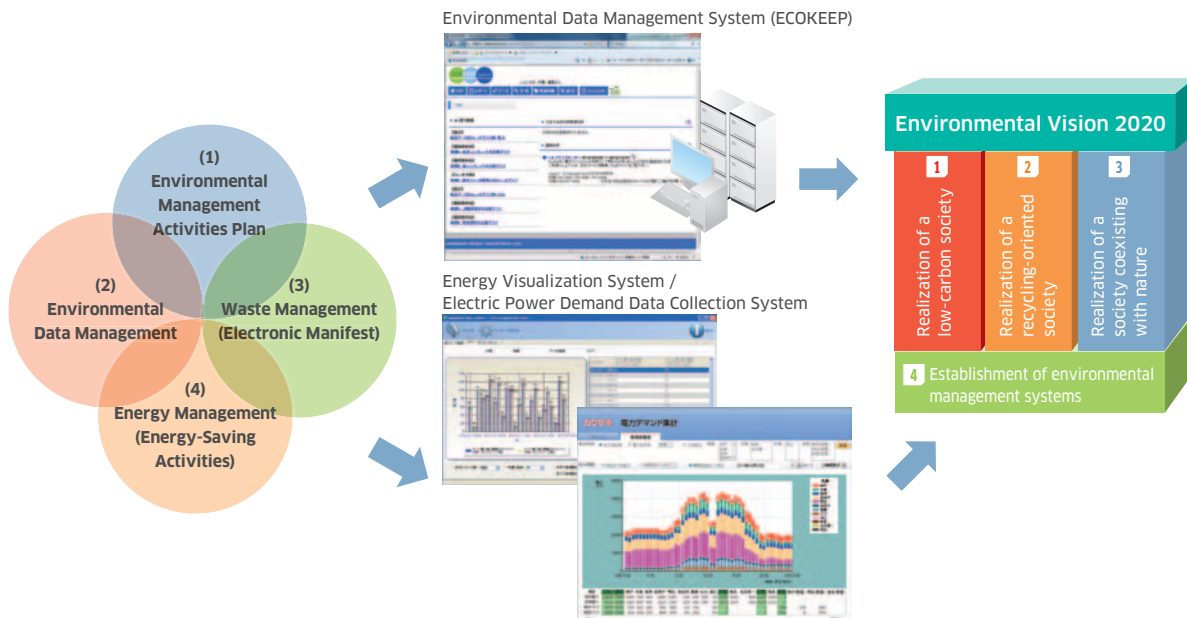


# Establishment of Environmental management System

## Using IT Systems

KHI uses the Environmental Data Management System, also known as ECOKEEP, to manage target values for its environmental management activities plan. The system manages environmental data through an electronic manifest. We also use an energy visualization system,

designated K-SMILE, which is designed to reduce energy consumption mainly through energy-saving approaches. Because environmental management activities are an important element of business operations, we strive to fully realize Environmental Vision 2020 while undertaking quantitative assessments based on cooperative IT systems.



## KHI Group EMS

All of KHI's consolidated domestic production sites have acquired ISO 14001 status.

Of the Company's 39 consolidated subsidiaries in Japan, a certain number were required to establish EMS, have either obtained ISO 14001 certification or simplified EMS certification from other standards organizations, such as Kobe Environmental Management System (KEMS), or else established EMS through self-declaration. Companies that have completed the establishment of EMS will now collect environmental data through the in-house ECOKEEP system and set reduction targets.

Of our 25 overseas consolidated subsidiaries required to establish EMS, 24 have done so through acquisition of ISO 14001 or through self-declaration. The one remaining company is working to establish EMS.

### Current Situations for Acquiring ISO 14001 (JIS Q 14001) Certification for KHI Production Bases

Internal companies		Date acquired	Registration
Ship & Offshore Structure Company	Kobe Works	Aug. 2002	DNV GL
	Sakaide Works	Aug. 2000	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 Kyokai (Defences Structure Improvement Foundation), DNV GL: DNV GL Group.

### Status of EMS Establishment at Consolidated Subsidiaries

(Number of companies)

Number of sites	Domestic (39 companies)		Overseas (25 companies)	
	Manufacturing sites	Non-manufacturing sites	Manufacturing sites	Non-manufacturing sites
	14 companies	25 companies	14 companies	11 companies
ISO14001	10	11	9	1
Simplified EMS	3	7	-	-
Self-declared	1	7	4	10
Implementation in progress	0	0	1	0
Establishment rate	100%		96%	



## Compliance with Laws and Regulations

### Legal Compliance Status in Japan

In fiscal 2014, there were no incidents that incurred administrative penalties for the KHI Group. However, some construction work at a factory led to the outflow of wastewater exceeding the allowable pH level for wastewater whenever rain added to wastewater discharge. An administrative warning was issued by the authorities. We gave this situation additional attention and endeavored to prevent recurrence of the problem through several approaches, including a tougher allowable pH level for wastewater prior to discharge.

### Risk Management

In addition to approaches based on Company-wide risk management structures, we hold liaison conferences at appropriate intervals for environmental management officers from within the Group, who work with the secretariat—the Environmental Affairs Department—to ensure that environmental laws and regulations are obeyed and that legal revisions are widely known and understood, and to enhance the abilities of managers with environmental responsibilities. These conferences emphasize compliance with environmental laws and regulations to preempt environmental accidents.

In fiscal 2014, we gathered environmental management officers together to discuss such topics as thorough compliance and risks that manifest when compliance status is broken, partial revisions to the Water Pollution Prevention Law and subsequent trends, the status of PCB waste treatment and associated responses, and measures to mitigate environmental risk.

## Promoting Environmental Communication

### Raising Environmental Awareness

The KHI Group runs publicity campaigns designed to raise the environmental awareness of each and every employee. We undertake these campaigns continually to promote environmentally conscious conduct not only in the workplace but also in the community and at home.



"Eco Mind," featured in the Group magazine *Kawasaki*



Message from the President concerning 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. This ongoing process is aimed not only at new employees at KHI but also those at domestic consolidated subsidiaries. In fiscal 2014, approximately 1,650 people participated in the environmental e-learning courses. The attendance rate was 97%.

### 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. In addition, as an internal qualification, we offer training for internal ISO 14001 auditors, through which 114 employees qualified as internal auditors in fiscal 2014.

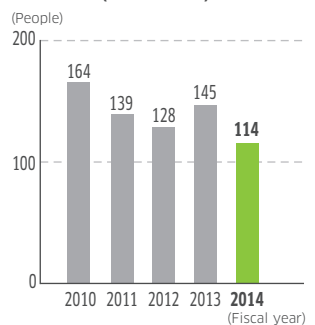
#### Number of Qualified Pollution Control Managers

Air	76
Water	75
Noise, vibration	44
Others	83
Total	278

#### Number of Qualified Energy Managers

Energy managers	60
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#### Number of Completed Training of Internal Environmental Auditors (ISO 14001)



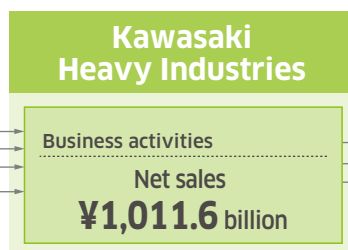
### External Information Disclosure

At KHI, we are committed to information disclosure as indicated by our cooperation with many external evaluation organizations conducting surveys, such as the CDP investors' information request "CDP Japan 500," published by the CDP (Carbon Disclosure Project), the Nikkei Environmental Management Survey, conducted by Nikkei Research, Inc., the Toyo Keizai CSR Survey, the Dow Jones Sustainability Index Asia Pacific category, and the environmental survey by Sampo Japan Nipponkoa Risk Management Inc.

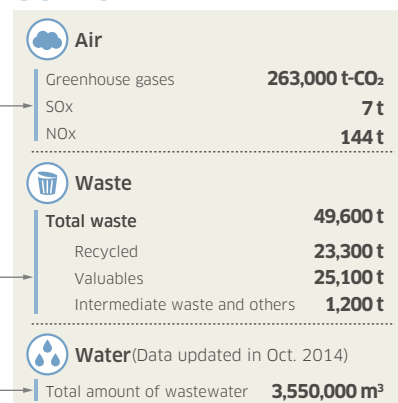
## Material Balance of Business Activities for Fiscal 2014 (Overall Picture of the Environmental Impact)

KHI has drawn up a summary of the impact of our business activities on the environment during fiscal 2014. We undertake activities to reduce the amounts of raw materials, energy and water used in the manufacturing of our many products, and we strive to curb the emission of substances that adversely affect the environment.

### INPUT



### OUTPUT



## Environmental Accounting Calculations for Fiscal 2014

In compiling the statistics, reference was made to the Japanese Ministry of the Environment's Environmental Accounting Guidelines (2005 edition).

Item		(Millions of yen)			
		Environmental investments	Environmental costs	Economic effects	
Business area costs	Global warming prevention (Save energy, reduce greenhouse gas emissions, stop ozone layer destruction, etc.)	1,055	3,332	Energy-saving cost reduction 266	
	Efficient use of raw materials, water, and other resources	49	137	Resource-saving cost reduction 33	
	Resource-recycling activities	Resource-recycling activities	152	513	Income from recycling 460
		Waste disposal costs	9	391	Waste disposal cost reduction 4
	Environmental risk control	206	652	0	
	<b>Subtotal</b>	<b>1,470</b>	<b>5,025</b>	<b>764</b>	
Year-on-year comparisons		80%	85%	87%	
Upstream/downstream costs		36	2,801	0	
Management activity costs		3	421	0	
R&D costs		108	9,152	0	
Social activity costs		56	178	0	
Environmental remediation costs		0	27	0	
<b>Total</b>		<b>1,673</b>	<b>17,603</b>	<b>764</b>	
Year-on-year comparisons		81%	100%	87%	

		(Millions of yen)
Item	Total	
Total investments	62,497	
Total R&D costs	39,124	

Item	Proportion
Percentage of investments (environmental investments 1,673 / Total investments 62,497)	3%
Percentage of R&D costs (environmental R&D costs 9,152 / Total R&D costs 39,124)	23%

# Kawasaki Green Product Promotion Activity

## Kawasaki Green Product Conformity Assessment

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 KHI 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.

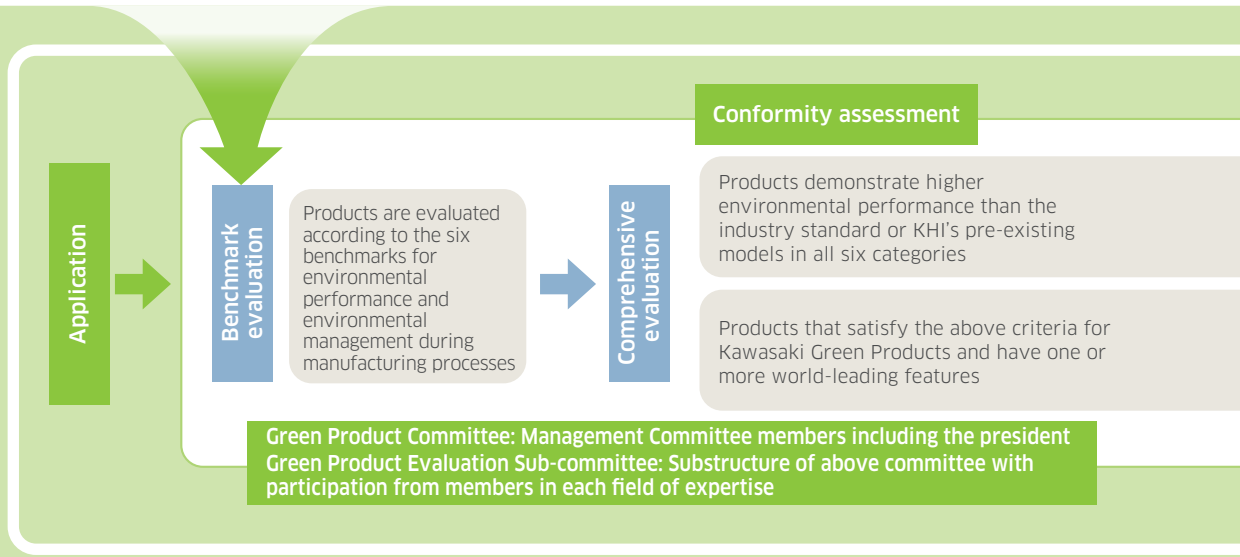
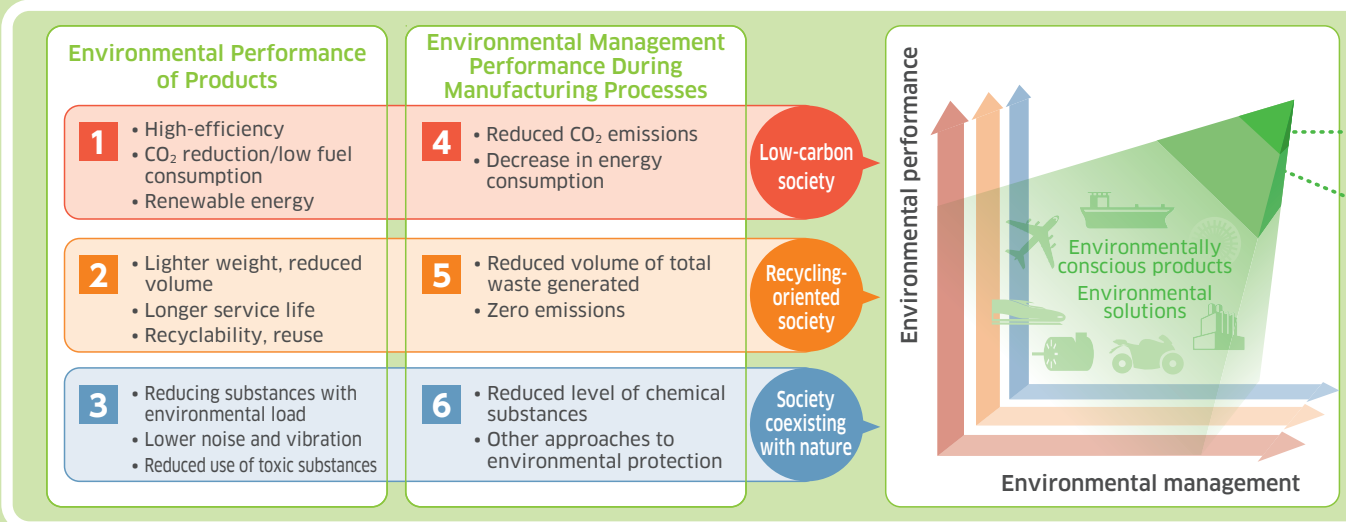
\* Please refer to page 15-18 of the Kawasaki Report 2014 digest and full report.

## Product Applications, Overall Evaluation Criteria

Of KHI's environmentally conscious products and environmental solutions, those boasting particularly outstanding performance from the perspective of contribution to a low-carbon society, a recycling-oriented society and a society coexisting with nature may be submitted by any division within the Company for consideration in the Kawasaki Green Products program.

Products undergo comprehensive evaluation to ensure that they meet all criteria established by KHI for environmental performance as well as environmental management during manufacturing processes, in each of three key areas crucial to global environmental sustainability—a low-carbon society, a recycling-oriented society and a society coexisting with nature.

### Six Evaluation Benchmarks



The program logo embodies KHI'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.



Program logo

## Product Application, Overall Evaluation Standard

After careful evaluation by the team, comprising members in each field of expertise, the Green Product Committee, with participation from members of the Management Committee including the president, determines the conformity assessment level of the products according to ISO 14021.

Products are placed into two categories: Kawasaki Green Product, which exceeds either the industry standard for environmental performance or the level reached by pre-existing models of KHI products; and Kawasaki Super Green Product, which has some of the most outstanding environmentally conscious features in the industry today.

## Environmental Label

To promote compliance with ISO 14021, two labels—designated as either a Kawasaki Green Product label or a Kawasaki Super Green Product label, indicating levels of environmental performance—are given to products based on their conformity assessment level.

The label shows the registration year. Content is reconfirmed every three years, and labels are renewed accordingly.

### Kawasaki Super Green Product

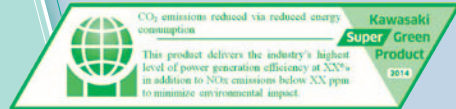
Products with some of the most outstanding environmental features in the industry

### Kawasaki Green Product

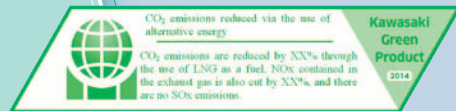
Products with environmental features that exceed either the industry standard for environmental performance or the level reached by pre-existing models of KHI products

Sample labels

#### Kawasaki Super Green Product



#### Kawasaki Green Product



Kawasaki Green Product



Kawasaki Super Green Product



Registration

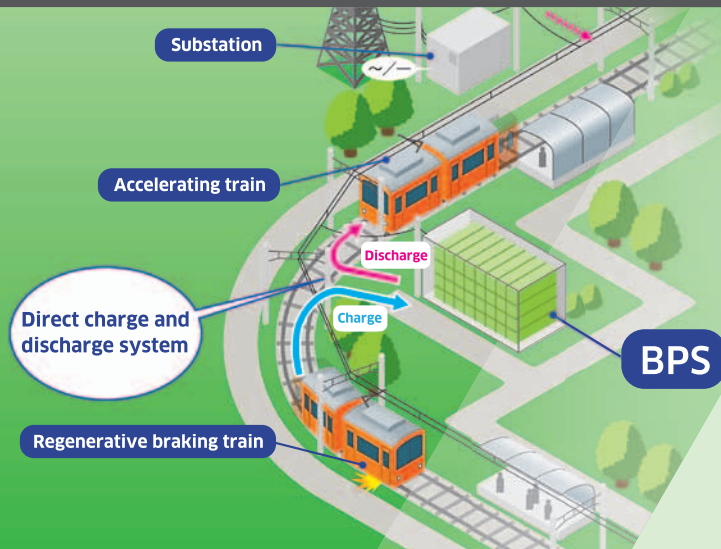
## What is ISO 14021?

ISO 14021 is an international standard developed by the International Organization of Standardization for "Environmental labels and declarations—Self-declared environmental claims (Type II environmental labeling)." This standard enables companies to set their own standards and label products that meet these standards. The environmental claims are therefore self-declared by the company that makes said products. Environmental labels that comply with ISO 14021 are called Type II environmental labels.

## Battery Power System (BPS)

Super

Kawasaki  
Green Product



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

Kawasaki's wayside battery power system (BPS) utilizing GIGACELL® contributes to CO<sub>2</sub> emissions reduction. The fact that the BPS does not generate electrical noise emissions, it can be used for application in railway operations as an environment-friendly solution.



GIGACELL® unit

### Product Description

The BPS consists of Kawasaki's nickel metal hydride GIGACELL®, which connects directly to the main DC power line (i.e., an overhead catenary line or third rail) without any inverters or converters, and as a result, it has the advantage of high response time during power load fluctuations in the railway system, as well as ensuring safety during operation.

### Special Features

- **Benefits of installation**  
Energy savings, peak demand reduction, regenerative energy use, line voltage drop prevention, substitution for substations, and provides emergency power to move trains when main power fails
- **System features**  
Direct connection to the main power line without inverters or converters, facilitating good cost performance, high energy conversion efficiency, high charging and discharging efficiency, and no noise

## BK117 C-2 Helicopter

Super

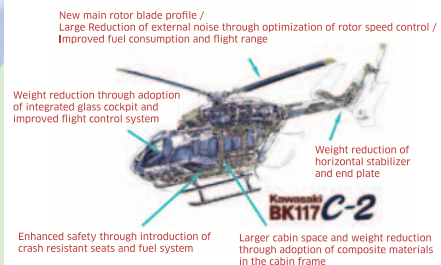
Kawasaki  
Green Product



### World's Most Quiet Helicopter

The C-2 achieves a large margin (6.7 EPNdB: approx. 50% reduction) from the external noise regulation standard set by Japan's Civil Aeronautics Act, making it one of the quietest helicopters in its class.

#### Main Features of the BK117 C-2



### Product Description

The BK 117 is a twin-engine, multi-purpose, high-performance helicopter, jointly developed with Airbus Helicopters Deutschland (AHD) of Germany. It was certified in 1982 by JCAB as the first domestically manufactured helicopter in Japan. As the latest model, the C-2 features improved performance, owing to composite materials and a one-piece cabin frame, among others.

### Special Features

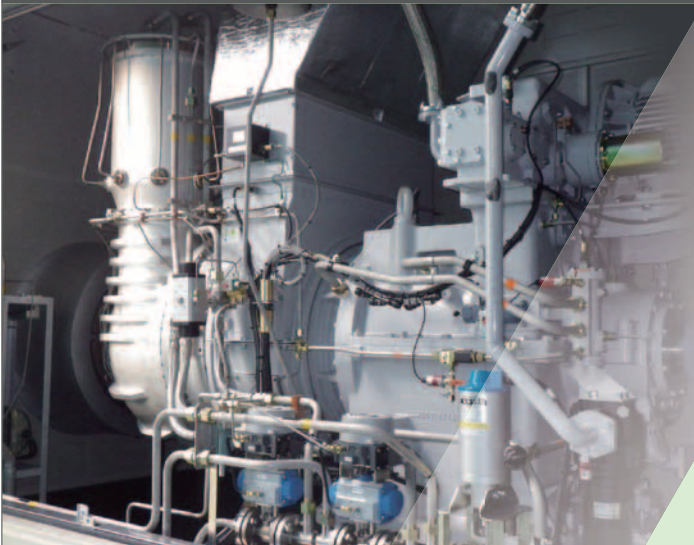
- The quietest helicopter in the world. 3.8EPNdB external noise reduction compared with C-1 model
- Weight reduction through introduction of composite materials and one-piece cabin frame. 25% weight reduction per unit area compared with C-1 model
- 3% improved fuel consumption compared with C-1 model
- Reduced environmental impact through introduction of chrome-free primer and sealant



# M1A-17D Gas Turbine

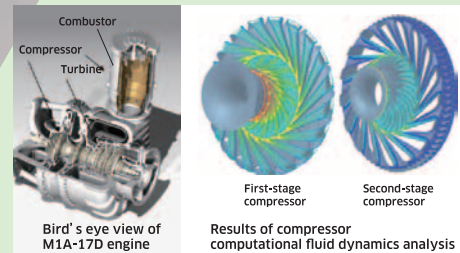
Super

Kawasaki  
Green Product



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

With improved generating efficiency (2.4% higher than the previous model), the M1A-17D is among the most efficient gas turbines in its power class and has the industry's lowest level of NOx emissions, at 35 ppm (converted at 0% O<sub>2</sub>).



## Product Description

Power generation gas turbine boasting higher efficiency, thanks to a change in the flow passage geometry of the compressor and turbine as well as structural improvements along with a DLE (Dry Low Emission) combustion system, which ensures low-NOx emissions

## Special Features

- Highest performance in its class, thanks to enhanced efficiency through aerodynamically optimized design for compressor and turbine
- Among the industry's highest levels of environmental performance, thanks to low NOx achieved through improvements to combustor burner and passage shape
- Highly reliable, thanks to adoption of previous model's basic structure

# Green Gas Engine

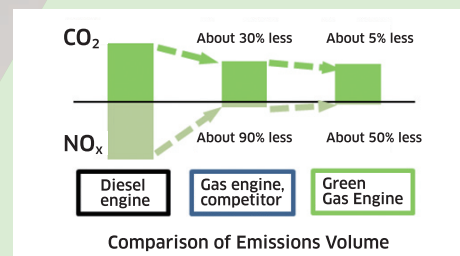
Super

Kawasaki  
Green Product



The world's highest power generation efficiency in its class

The Green Gas Engine boasts the world's highest power generation efficiency at 49.0%, with a variable turbine nozzle area (VTA) turbocharger in addition to optimized combustion performance.



## Product Description

Using clean natural gas, the Green Gas Engine achieves the world's highest level of power generation efficiency in its class and low NOx emissions, owing to resourceful efforts to optimize the shape of the combustion chamber, achieve a leaner burn and optimize the control system.

## Special Features

- The world's best in terms of power generation efficiency—49.0%—in its class, as of April 1, 2014
- Top level in environmental performance, with NOx emissions at less than 200 ppm
- Wide continuous operation range at 30%–100% and maintains high power generation efficiency, even at partial loads



# MAG Turbo

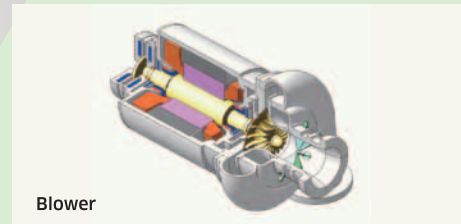
Super

Kawasaki  
Green Product



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

Featuring a high-speed motor with magnetic bearings, the MAG Turbo outperforms overall efficiency of existing sewage aeration blowers in all air volume ranges domestically. Furthermore, the MAG Turbo does not require the use of lubricant, minimizing environmental impact.



Blower

## Product Description

This new type of sewage aeration blower has an impeller attached directly to the rotor shaft of an inverter-driven, high-speed motor. The rotor levitates by magnetic bearings. This mechanism allows high-speed rotation without mechanical loss.

## Special Features

The following features are possible because of the blower's inverter-driven, high-speed motor with magnetic bearings.

- High efficiency (a maximum of about four points higher than existing models, according to Japan Sewage Works Agency specifications)
- No lubricant or cooling water necessary
- Low noise, low vibration

# Centrifugal Chiller Using Water as Refrigerant

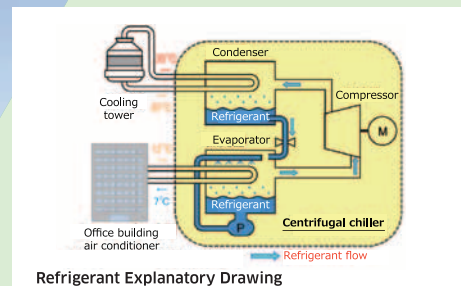
Super

Kawasaki  
Green Product



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

This HFC-free chiller, using water as a refrigerant, delivers efficiency comparable to existing chiller models. Its compact design makes it a viable alternative to existing chillers.



## Product Description

This centrifugal chiller uses water as the refrigerant and is therefore free of hydrofluorocarbons. This choice of refrigerant can contribute to protection of the ozone layer while preventing global warming. The chiller features a new type of compressor as well as key components developed in-house. Its compact design facilitates its use as a replacement model for existing equipment.

## Special Features

- Water refrigerant  
Selected for potential to protect the ozone layer and prevent global warming
- High efficiency  
Developed new type of compressor, boasting high performance and high pressure ratio
- Compact design  
Key components developed in-house and compact size, excellent as a replacement model for existing equipment

# CKK System

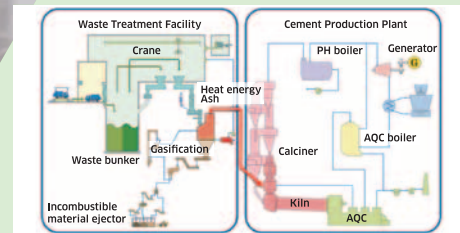
Super

Kawasaki  
Green Product



## Conserving energy and resources through effective use of waste

“The CKK System—Conch Kawasaki Kiln System—” integrates a waste incinerator into existing cement plants, requiring 70% fewer components than the installation of a waste incinerator alone would require. It effectively uses heat energy and ash generated from waste incineration to reduce CO<sub>2</sub> emissions.



## Product Description

The CKK System integrates a waste incinerator into an existing cement plant, thereby combining cement manufacturing with waste processing, and effectively utilizes the heat energy and ashes resulting from the incineration of waste as fuel and raw materials, respectively, for cement-making operations.

## Special Features

- **Lower fuel costs**  
By effectively utilizing the heat energy generated during gasification of waste as a power source for cement production, fuel costs for cement calcination have gone down 5%.
- **Reduced volume**  
Since a cement plant can process exhaust gas and ashes at existing facilities, this combined structure requires far less in the way of equipment than a stand-alone waste incineration facility would need.

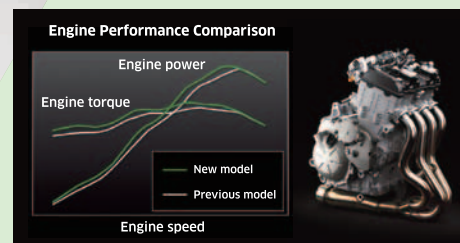
# Ninja ZX-6R

Kawasaki  
Green Product



## New model revamped for lower CO<sub>2</sub> emissions and enhanced recyclability

Starting with the 2009 model, the Ninja ZX-6R's displacement was increased by 37cm<sup>3</sup> for greater output while fuel consumption was trimmed by 3%. The model was also designed for better environmental performance, particularly enhanced recyclability.



## Product Description

This motorcycle features an engine that combines both improved performance in the low- to mid-speed range and better fuel efficiency, thanks to extra engine displacement over the previous model, which scored successes on the racetrack as well as the road. The Ninja ZX-6R also boasts advanced suspension, electronic traction control and a low environmental impact exterior, while allowing riders to enjoy high performance with greater confidence.

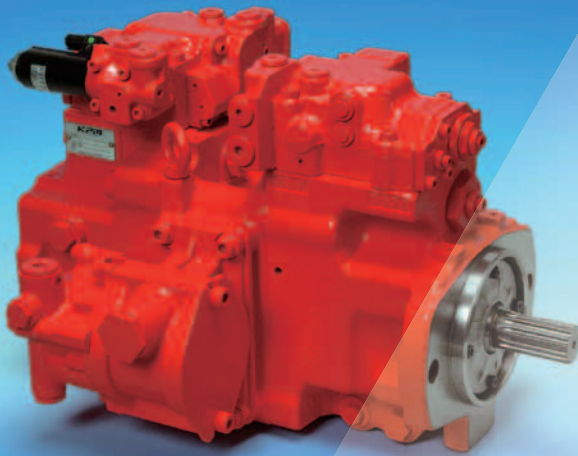
## Special Features

- **Lower fuel consumption**  
Good balance of improved performance and better fuel efficiency  
Lower CO<sub>2</sub> emissions
- **Less environmental impact**  
Better recyclability  
Less paint used following review of surface treatment
- **Improved safety**  
Traction control, motorsport-responsive ABS

## Hydraulic Pump for Excavators (K7V)

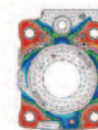
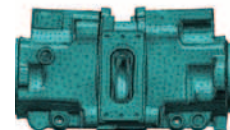
Super

Kawasaki  
Green Product



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

The K7V's pump efficiency is improved by 1.5 points and its noise level reduced by 3 dB (A) compared with the K3V series, its widely popular predecessor, to make it one of the world's top environmental performers on both counts.



Surface pressure  
High  
Low

Deformation volume

Surface pressure distribution

Pump Casing Deformation Analysis

### Product Description

Used widely in construction machinery, particularly hydraulic excavators, the K7V series of hydraulic pumps meets recent market requirements for high efficiency, low noise, compact size and high reliability.

### Special Features

- Improved efficiency, because leakage from sliding parts and torque loss are reduced
- Lower noise and vibration, thanks to suppression of surge pressure and higher casing rigidity
- Complete review of dimensional data resulted in shorter total length
- Longer service life achieved through use of thicker shaft and large-capacity bearings

## Spot Welding Robot (BX200LS)

Super

Kawasaki  
Green Product



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

The BX200LS has a smaller footprint and is more lightweight than any comparable model in the industry. Since cables and hoses can be stored in the robot's arm and wrist, interference with adjacent robots or peripheral devices is minimized. This allows for installation in higher-density applications compared with earlier models.



### Product Description

This energy- and resource-saving spot welding robot facilitates higher density installation and boosts production efficiency, which leads to lower production equipment costs. It is high-speed, compact and lightweight, and its cables are internally routed between the robot's wrist and base.

### Special Features

- **Internally routed cables**  
Hollow arm and wrist of robot reduces area of interference where exposed cables and hoses would get in the way
- **Compact**  
Installation area is less than 60% of same-class products in the industry
- **Lightweight**  
Optimized design and reduced number of components make this the industry's most lightweight spot welding robot in its class



## Other activities

### Product Assessment

For newly developed and designed products, as well as for particularly important products, KHI 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

Focus

## 2 Approach by the Motorcycle & Engine Company

### Cleaner Exhaust Gas

In fiscal 2014, we continued to tackle technologies that make exhaust from motorcycles cleaner, from a world standard perspective, and launched sales of the Ninja 1000 (Z1000SX), matching the appeal of a supersport model with practical features. The Ninja 1000 (Z1000SX) conforms to European emission standards, thanks to improvements in the air intake and exhaust systems, and demonstrates high environmental performance. Within the air intake system, the electronic fuel injection system is equipped with dual throttle valves<sup>1</sup> for precise fuel control, matching all types of riding conditions. This ensures superior engine performance while producing cleaner exhaust gas.



Ninja1000 (Z1000SX)

<sup>1</sup> Dual throttle valve: a device that achieves optimal control of air intake volume through coordination between an electronically operated throttle and a manually operated throttle.

### 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 2014, we achieved a recycling rate of 97.1%. 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.

### Source: Japan Automobile Manufacturers Association, Reduction Targets for Environmental Substances of Concern for New Vehicles

Substance	Reduction target
Lead <sup>*2</sup>	Use 60 g or less in and after January 2006 (for 210-kg weight vehicle)
Mercury	Use prohibited in and after October 2004 (Exception for the use of minute quantities in parts that are necessary for traffic safety <sup>*3</sup> )
Hexavalent chromium	Use prohibited in and after January 2008
Cadmium	Use prohibited in and after January 2007

<sup>\*2</sup> Used batteries are already recycled and excluded from the target values

<sup>\*3</sup> Combination lamps, discharge headlamps, etc.

# Environmental Data

## KHI Environmental Load Data (Fiscal 2014)

			Unit	Whole group	Change from previous fiscal year
INPUT		Total energy consumption (crude oil conversion)	kl	152,496	102%
		Purchased electricity	MWh	352,866	113%
		Fuel	TJ	2,492	91%
		Renewable energy	MWh	1,887	106%
		Materials	10,000 t	11	79%
		Water	1,000 m <sup>3</sup>	5,991	95%
OUTPUT	Air	CO <sub>2</sub> emissions volume from energy sources	t-CO <sub>2</sub>	262,599	92%
		SOx	t	7	85%
		NOx	t	144	85%
		Soot and dust	t	2	110%
		PRTR regulated substance	t	864	82%
	Water	Wastewater	1,000 m <sup>3</sup>	5,119	131%
		COD	t	9	88%
		Nitrogen	t	20	69%
		Phosphorus	t	0.1	136%
		PRTR regulated substance	t	1	120%
	Waste	Total emitted	t	49,578	93%
		Recycled	t	48,410	93%
		Intermediate waste	t	1,032	89%
		Final disposal volume	t	136	70%
		Specially controlled industrial waste in above total	t	1,461	78%
		PRTR regulated substance in above total	t	231	101%
	Others	CO <sub>2</sub> emissions during transport	t-CO <sub>2</sub>	3,837	89%

## Waste and Other Emissions Volume and Recycling Volume (Fiscal 2014)

(t)

Type of waste	Total emissions volume	Recycling (material recycling)	Recycling (thermal recycling)	Recycling rate	Intermediate treatment	Final disposal
<b>General waste</b>						
Paper scrap	2,421	1,843	578	100%	0	0
Wood scrap	656	402	254	100%	0	0
Others	308	289	19	100%	0	0
<b>Subtotal</b>	<b>3,384</b>	<b>2,533</b>	<b>851</b>	<b>100%</b>	<b>0</b>	<b>0</b>
<b>Industrial waste</b>						
Sludge	2,114	1,753	189	93%	93	78
Waste oil	6,432	2,402	4,024	100%	7	0
Waste acid	203	190	13	100%	0	0
Waste alkali	469	440	29	100%	0	0
Waste plastics	3,122	643	1,589	71%	889	0
Wood scrap	3,221	1,620	1,601	100%	0	0
Fiber scrap	179	0	179	100%	0	0
Metal scrap	1,001	1,001	0	100%	0	0
Glass, concrete debris and ceramics	256	256	0	100%	0	0
Slag	2,591	2,438	96	98%	0	57
Rubble (waste construction materials)	40	40	0	100%	0	0
Soot and dust	0	0	0	100%	0	0
Others	10	10	0	97%	0	0
<b>Subtotal</b>	<b>19,637</b>	<b>10,792</b>	<b>7,719</b>	<b>94%</b>	<b>989</b>	<b>135</b>
<b>Specially controlled industrial waste</b>						
Waste oil	572	431	141	100%	0	0
Waste acid	520	498	16	99%	9	0
Waste alkali	211	180	31	100%	0	0
Infectious waste	0.5	0.1	0	20%	0	0.4
Hazardous industrial waste	158	117	7	100%	35	0
<b>Subtotal</b>	<b>1,461</b>	<b>1,226</b>	<b>195</b>	<b>97%</b>	<b>43</b>	<b>0.4</b>
<b>Valuables (metal scrap, etc.)</b>	<b>25,094</b>					
<b>Total</b>	<b>49,578</b>	<b>39,645</b>	<b>8,765</b>	<b>98%</b>	<b>1,032</b>	<b>136</b>



## Release and Transfer Volume of Chemical Substances (Fiscal 2014)

(t)

Government ordinance no.	Name of substance	Volume released				Volume transferred	
		Air	Water	Soil	Subtotal	Sewer	Waste
<b>Class I designated chemical substances: annual volume handled 1t or above</b>							
053	Ethylbenzene	188	0	0	188	0	10
080	Xylene	430	0	0	430	0	68
086	Cresol	0	0.14	0	0.14	0	1
087	Chromium and chromium (III) compounds	0	0.02	0	0.02	0	10
144	Inorganic cyanide compounds	0	Under 0.01	0	Under 0.01	0	1
186	Dichloromethane	42	0	0	42	0	2
238	Hydrogenated terphenyl	0	0	0	0	0	0.8
240	Styrene	0.2	0	0	0.2	0	0.3
296	1,2,4-trimethylbenzene	11	0	0	11	0	0.4
297	1,3,5-trimethylbenzene	4	0	0	4	0	0.3
300	Toluene	324	0	0	324	0	71
349	Phenol	0	0	0	0	0	1
374	Hydrogen fluoride and its water-soluble salts	0.3	0	0	0.3	0	13
412	Manganese and its compounds	1	0	0	1	0	13
<b>Special Class I designated chemical substances: annual volume handled 0.5t or above</b>							
088	Chromium (VI) compounds	Under 0.01	Under 0.01	0	Under 0.01	0	4
309	Nickel compounds	0	Under 0.01	0	0.5	0	7

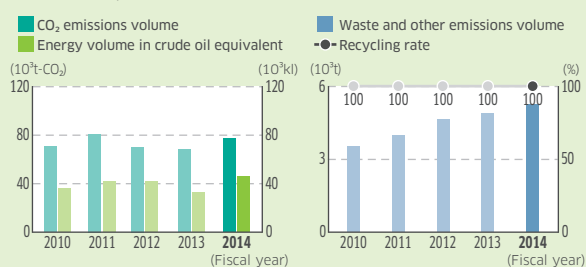
## Environmental Load Data by Business Site (Fiscal 2014) 1/2

		Unit	Gifu Works	Nagoya Works 1	Kobe Works	Hyogo Works	Nishi-Kobe Works	
INPUT	Total energy consumption (crude oil conversion)	kl	35,435	10,855	11,911	5,834	16,635	
	Purchased electricity	MWh	71,242	41,733	32,332	18,341	59,903	
	Fuel	TJ	678	16	148	46	62	
	Renewable energy	MWh	0	998	28	30	588	
	Water	1,000 m <sup>3</sup>	3,984	46	326	98	148	
OUTPUT	Air	CO <sub>2</sub> emissions volume from energy sources	t-CO <sub>2</sub>	61,596	16,628	23,438	11,213	31,604
		SOx	t	1	Under 0.1	6	0	0
		NOx	t	52	0.5	80	0.5	1
		Soot and dust	t	0.6	Under 0.1	2	Under 0.1	Under 0.1
		PRTR regulated substance	t	133	4	88	127	47
	Water	Wastewater	1,000 m <sup>3</sup>	3,909	9	120	98	45
		COD	t	7	0.2	Under 0.1	Under 0.1	0.3
		Nitrogen	t	17	Under 0.1	Under 0.1	Under 0.1	0.7
		Phosphorus	t	Under 0.1	Under 0.1	Under 0.1	Under 0.1	Under 0.1
		PRTR regulated substance	t	1	0	0	0	0
	Waste	Total emitted	t	4,794	536	8,530	4,310	4,967
		Recycled	t	4,794	536	8,465	4,310	4,967
		Intermediate waste	t	0	0	0	0	0
		Final disposal volume	t	0	0	58	0	0
		Specially controlled industrial waste in above total	t	132	15	215	128	44
PRTR regulated substance in above total	t	57	2	22	44	29		

### Gifu Works (Including Nagoya Works 1)

**Location** 1, Kawasaki-cho, Kakamigahara, Gifu 504-8710, Japan

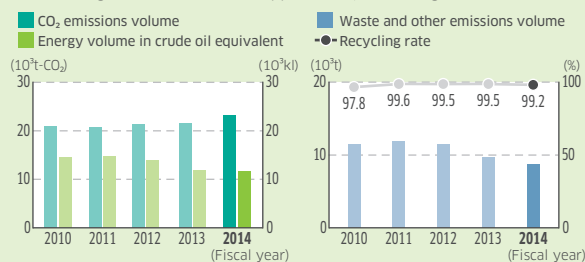
**Main products** Transport airplanes, helicopters, spacecraft, component parts for airplanes



### Kobe Works

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

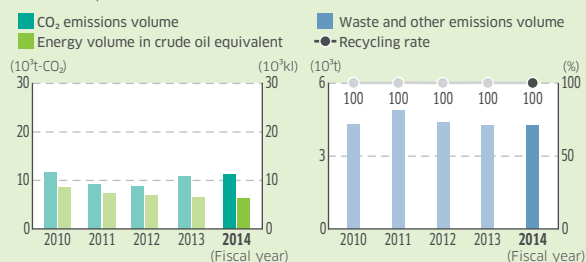
**Main products** Ships & maritime application equipment, steam turbines for ground and maritime applications, diesel engines



### Hyogo Works

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

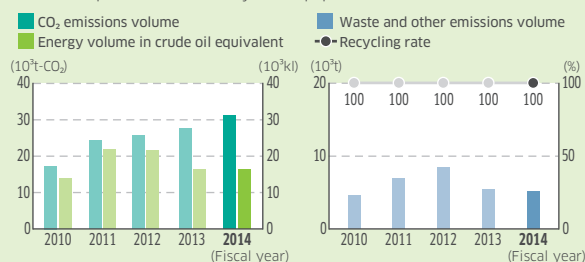
**Main products** Rolling stock, automated guideway transit systems, platform screen doors



### 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



Note: CO<sub>2</sub> emissions are impacted by the electricity emission factor.

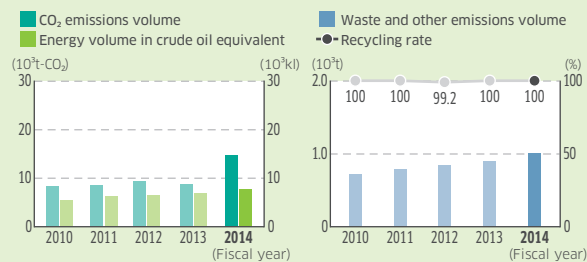
## Environmental Load Data by Business Site (Fiscal 2014) 2/2

		Unit	Seishin Works	Akashi Works	Kakogawa Works	Harima Works	Sakaide Works	
INPUT	Total energy consumption (crude oil conversion)	kl	7,809	47,559	3,894	4,292	7,541	
	Purchased electricity	MWh	24,602	52,549	7,402	13,575	27,113	
	Fuel	TJ	64	1,334	79	33	27	
	Renewable energy	MWh	0	170	0	5	68	
	Water	1,000 m <sup>3</sup>	83	901	11	76	318	
OUTPUT	Air	CO <sub>2</sub> emissions volume from energy sources	t-CO <sub>2</sub>	14,949	97,588	7,544	8,229	19,350
		SOx	t	0	0	0	0	0
		NOx	t	1	9	0	0.2	Under 0.1
		Soot and dust	t	Under 0.1	Under 0.1	0	Under 0.1	Under 0.1
		PRTR regulated substance	t	8	98	0	42	317
	Water	Wastewater	1,000 m <sup>3</sup>	63	561	5	41	268
		COD	t	0.5	1	Under 0.1	Under 0.1	0.3
		Nitrogen	t	0.6	1	Under 0.1	Under 0.1	0.3
		Phosphorus	t	Under 0.1	Under 0.1	Under 0.1	Under 0.1	Under 0.1
		PRTR regulated substance	t	0	0.2	0	0	0
	Waste	Total emitted	t	1,000	9,053	1,934	3,984	10,433
		Recycled	t	1,000	9,047	1,929	3,984	9,328
		Intermediate waste	t	0	0	0	0	1,032
		Final disposal volume	t	0	6	0	0	73
		Specially controlled industrial waste in above total	t	124	717	0	0	43
		PRTR regulated substance in above total	t	2	61	0	3	11

### Seishin Works

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

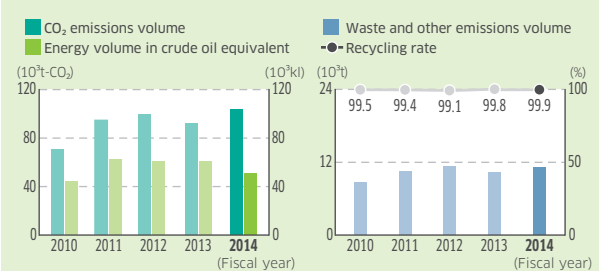
**Main products** Component parts for jet engines and gas turbines



### Akashi Works (Including Kakogawa Works)

**Location** 1-1, Kawasaki-cho, Akashi, Hyogo 673-8666, Japan

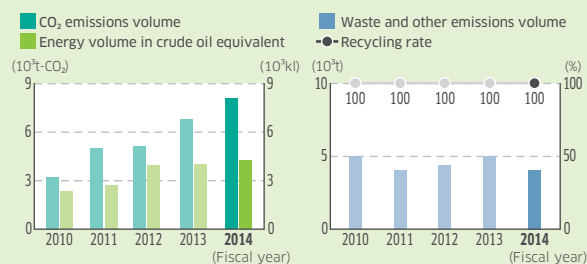
**Main products** Motorcycles, General-purpose gasoline engines, industrial robots, jet engines, industrial gas turbines



### Harima Works

**Location** 8, Nijijima, Harima-cho, Kako-gun, Hyogo 675-0155, Japan

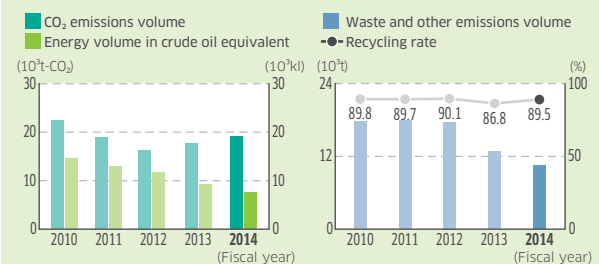
**Main products** Industrial & environmental plants, boilers, construction machinery, rolling stock



### Sakaide Works

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

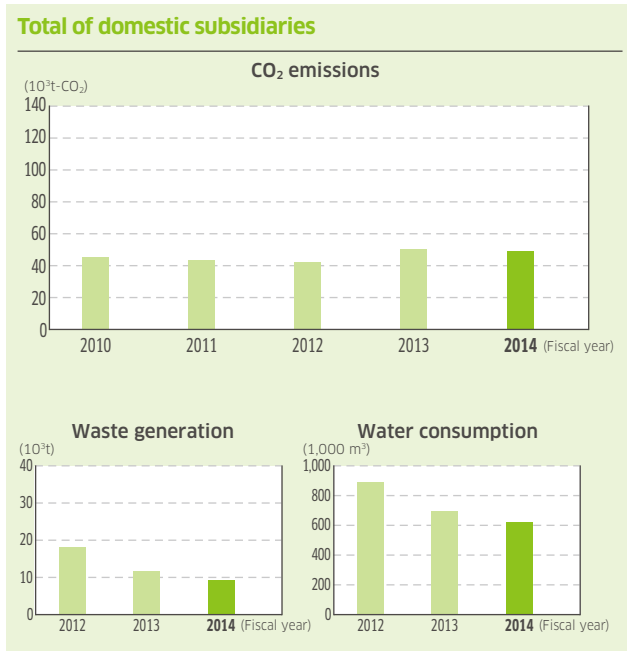
**Main products** Ships & maritime application equipment (LNG carriers, LPG carriers, container ships, etc.)



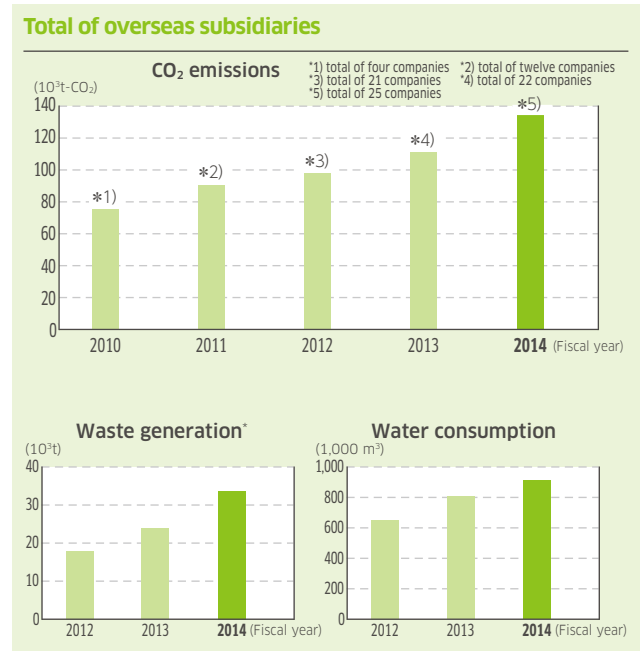
Note: CO<sub>2</sub> emissions are impacted by the electricity emission factor.

# Environmental data of Consolidated Subsidiaries

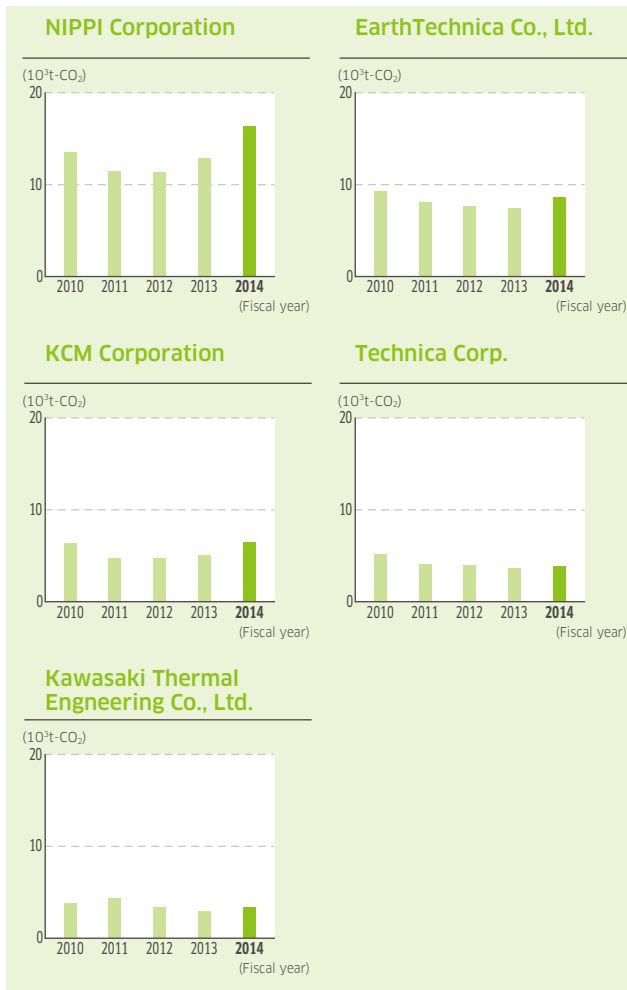
## Domestic



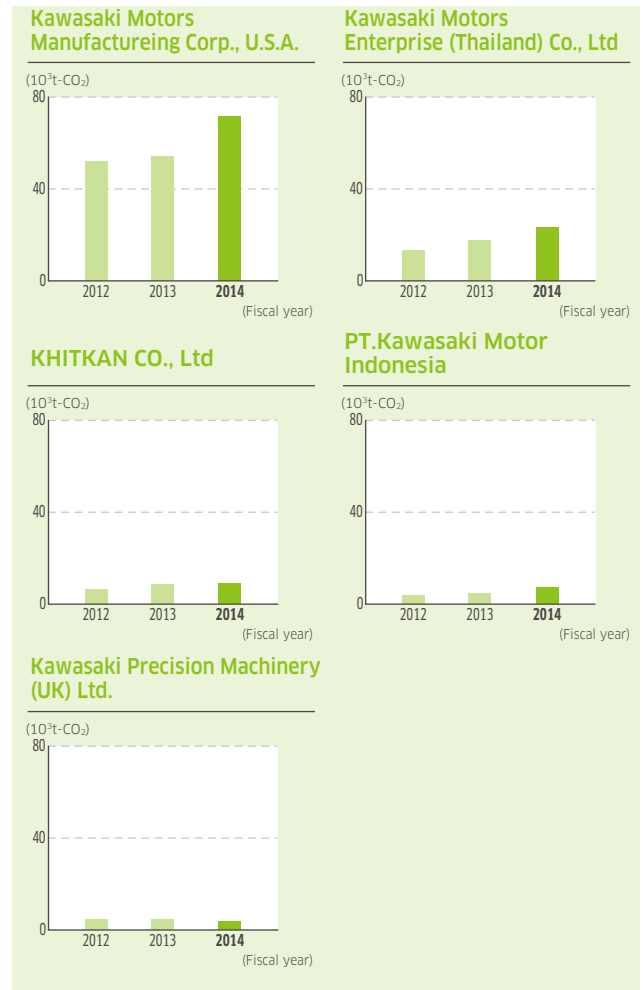
## Overseas



### CO<sub>2</sub> emission of domestic major subsidiaries



### CO<sub>2</sub> emission of overseas major subsidiaries



Note: the CO<sub>2</sub> emissions coefficients used in graphs are in principle those indicated below.

● Japanese Ministry of the Environment website: press releases: publication of emissions coefficients for each fiscal year.

● For CO<sub>2</sub> emissions volume through overseas electricity consumption, the figures published by the Greenhouse Gas Protocol are used.

\*Data updated in Oct. 2014