

# 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)

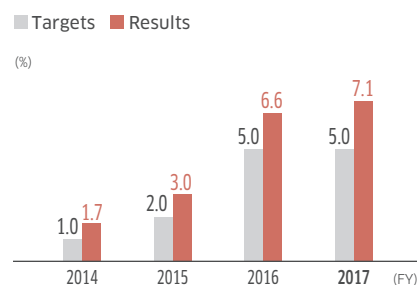


Figure 3: Target and Results of Energy Cost Reduction Effect

## 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>

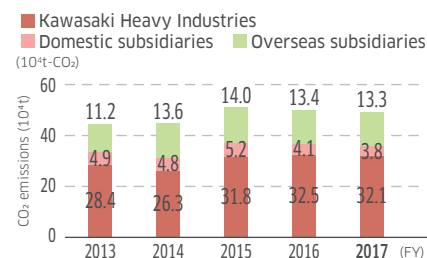


Figure 6: CO<sub>2</sub> Emissions from Production Activities

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

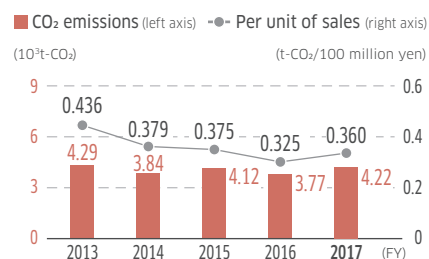
**Table 2: Fiscal 2017—Kawasaki's Scope 3 Calculation Results**

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 <sup>*1</sup>
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 <sup>*1</sup>
⑬ Leased assets (downstream)	Emissions associated with operation of assets leased to other companies	Excluded <sup>*2</sup>
⑭ Franchises	Emissions by franchisees	Excluded <sup>*2</sup>
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.

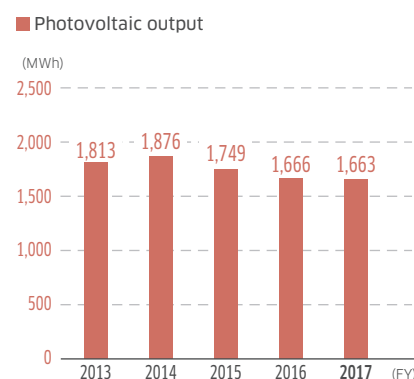
\*2 FIT: Feed-in tariff; a program where renewable energy is bought back at a fixed rate



**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.

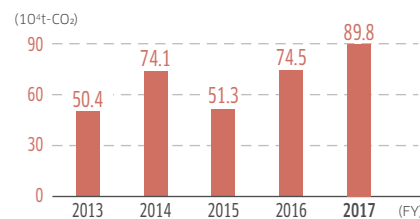
An analysis of CO<sub>2</sub> emissions along our supply chain reveals that most of the CO<sub>2</sub> emissions are released during product use, so our goal is to contribute to lower CO<sub>2</sub> emissions through delivery of highly energy efficient products.

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

■ CO<sub>2</sub> emission reduction effect through product-based contributions



**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.