

Achieving a Low-Carbon Society

Hitachi's Approach

Achieving a low-carbon society is an urgent challenge shared widely around the world. Among the Sustainable Development Goals (SDGs) adopted by the United Nations are “Goal 13: Take urgent action to combat climate change and its impacts” and “Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all.”

Hitachi helps to achieve a low-carbon society in a great number of ways, both through its own operations and also by developing energy-saving products and services. We manufacture a diverse range of products, from power generation systems to railway carriages and industrial equipment. We also advance technological innovations in building infrastructure worldwide by combining our operational technology (OT) and IT. In order to achieve our long-term targets contained in Hitachi Environmental Innovation 2050 and the Environmental Action Plan for 2018, we will promote medium- to long-term efforts to reduce greenhouse gas emissions from our factories and offices, as well as from our products and services.

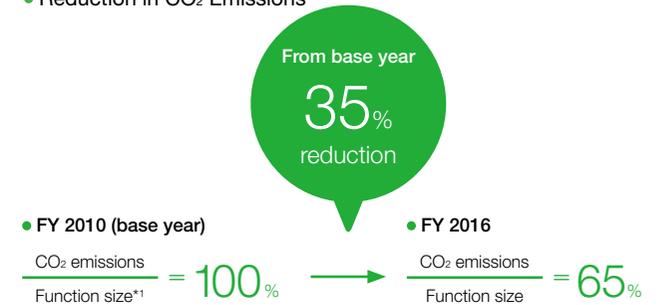
Global Warming Prevention from Products and Services

Improved Environmental Performance in Products and Services

Hitachi is improving the environmental performance of its products and services with the hope of contributing to the resolution of environmental challenges through the development and popularization of products and services with high environmental value. We strike a balance between improving functionality and reducing the environmental burden by using, as our index, the reduction rate per product and service function of CO₂ emissions during usage and of the volume of resources used during the life cycle. The group of products that demonstrate a high level of potential in solving environmental issues are the targets of a plan to achieve a 40% reduction in CO₂ emissions by fiscal 2018 (compared to fiscal 2010 products). In fiscal 2016, we attained a 35% CO₂ emissions reduction rate by promoting environmentally conscious designs and expanding sales of products and services with high energy-saving functions.

Key Indicators

- Reduction in CO₂ Emissions



*1 Major functions of products correlated to CO₂ emissions.

Improvements in Environmental Performance

► RS90 Series of Information and Control Servers (Hitachi, Ltd.)

The RS90 series of information and control servers are real-time, high-reliability information and control system platforms that play an integral role in maintaining smooth operations of society's basic infrastructure. These servers are used in such fields as power generation, water and sewer services, and rail transport. The use of high-performance processors has increased the MIPS*1 value—a computer performance indicator—to twice that of our product launched in fiscal 2010. The servers also save energy due to their smaller size, fewer components, and low-power-consuming parts, reducing annual energy consumption by 10,404 kWh. As a result, CO₂ emissions per control server MIPS value have declined by 72.9%.

*1 Million instructions per second: A value showing how many million instructions can be made in one second.



A rack-mountable RS90 series of information and control server.

► 3100 Clinical Analyzer (Hitachi High-Technologies Corporation)

The 3100 clinical analyzer is an automated chemical analyzer for the healthcare field used by hospitals to test patient specimens. With a footprint of just 0.59 m², it requires very little space and is suitable either as a main analyzer in clinics and small hospitals or a backup analyzer in large hospitals. The

demand for fast test results has been increasing in recent years, and the 3100 was developed with the aim of achieving 400 tests per hour, twice the throughput of a model we launched in 1995.

The performance of our earlier products was examined, and a thoroughgoing review of the operating program of each mechanism was conducted. At the same time, the motor and other parts were optimized to ensure high performance even under short operating times. As a result, we achieved both the targeted throughput of 400 tests per hour and high analytical performance. Power consumption associated with higher speeds and an increase in the number of component parts was reduced both during operation and while in standby by lowering the isolation transformer load through a rethinking of the AC power supply configuration and by switching to a DC power source with good conversion efficiency. As a result, annual energy consumption was reduced by 169 kWh compared to the previous model. With these improvements, the automatic analyzer achieved a CO₂ emissions reduction rate of 54.4% per hour of processing capacity.



3100 clinical analyzer.

► Disc Brake Pad (Hitachi Chemical Co., Ltd.)

Disc brake pads are built into the brakes of automobiles and motorcycles and bring vehicles to a stop by sandwiching the discs that rotate with the wheels from both sides. Generally speaking, disc brake pads contain copper to increase abrasion resistance and maintain the level of performance over long periods. Copper-containing dust powder is produced when braking, however, which is thought to cause water pollution as the powder runs off the pavement into nearby streams and rivers. To prevent this, a law to limit the copper content in disc brake pads will be implemented in the United States from 2021.

By augmenting copper's performance with various materials, Hitachi Chemical has developed an environmentally responsive disc brake pad*1 that maintains abrasion resistance while minimizing copper content. Consequently, we have been able to achieve both low environmental impact and high performance, reducing the average copper usage volume per disc brake pad by 75.9% compared to fiscal 2010.

*1 Environmentally responsive disc brake pads are either copper-free or copper-less.



Disc brake pads.

Addressing Our Carbon Footprint

The carbon footprint of products (CFP) is the CO₂ equivalent of the total amount of greenhouse gases (GHGs) emitted over the entire life cycle of a product or service—from procurement of materials through to disposal and recycling. Making the GHG emission amount visible in this way encourages efforts to reduce the amount of carbon emitted by products over their whole life cycle. A number of countries around the world use the CFP approach.

Hitachi launched CFP assessment in 2009. We participate in the Carbon Footprint Communication Program of the Japan Environmental Management Association for Industry (JEMAI) and are working to expand the number of Approved CFP Products.*1 In fiscal 2016, our midrange storage system, Hitachi Virtual Storage Platform G800, was verified and approved by the JEMAI CFP Program. In addition to visualizing CO₂ emissions, we quantified the rate of CO₂ emission reductions per function*2 from previous models, publishing the quantitative effect of their energy efficiency in our catalogs and on both in-house and external websites. We are also working with JEMAI to raise the recognition of the CFP label and to promote Approved CFP Products.

*1 Approved CFP Product: A product subjected to testing according to the CFP quantification rules of the Carbon Footprint Communication Program, is verified as conforming to those rules, and for which an application is made for registration and public announcement.

*2 Specifically, the "life cycle GHG emissions per unit function size," calculated by dividing the "life cycle GHG emissions per sales unit" by "function size of applicable product" as specified by performance (or performance characteristic) and/or use period.

Products authorized to display the CFP label in fiscal 2016

Product	Midrange Storage
Model	Hitachi Virtual Storage Platform G800
Product appearance	
[Previous model]	Hitachi Unified Storage VM
Rate of reduction in CO₂ emissions (compared to previous model)	-55%

Working with European Environmental Footprint Initiatives

Europe's Environmental Footprint initiatives develop methodologies for measuring the entire life cycle environmental burden of products and organizations in up to 16 areas. Pilot studies were launched in November 2013 to establish assessment methods in multiple product and organization fields.

Hitachi, drawing on experience with Japan's Carbon Footprint Communication Program and the knowledge gained from calculating and visualizing CO₂ emissions in the IT product life cycle, is participating in a European Environmental Footprint pilot study in the IT equipment field, for which it serves as the technical secretariat.

In fiscal 2016, we evaluated the environmental burden of IT products in accordance with the methods approved by the European Commission, using the Hitachi storage platform actually sold on the European market. We also disclosed and communicated the evaluation results to our customers. In conjunction, we held a consultation forum to hear the opinions of stakeholders on evaluation and communication methodologies. These were, in turn, subsequently reflected in actual methods.

Next Steps in Products and Services

Hitachi will ensure the environmental consciousness of its products and services by conducting Environmentally Conscious Design Assessments and implementing life cycle assessments (LCAs). In addition, by linking environmental values to the creation and expansion of business opportunities, we will continue to develop products and services with high environmental performance that will prove to be an added value to our customers.

Global Warming Countermeasures at Factories and Offices

Promoting Global Warming Countermeasures

We are promoting ways to use energy more efficiently and reduce GHG emissions during production and transportation, in both the manufacturing and nonmanufacturing divisions, to contribute to the prevention of global warming.

Actions and Achievements

We are working to reduce energy use per unit—an indicator of energy efficiency—by systematically improving efficiency, such as by installing high-efficiency equipment and devices, from LED lighting to inverter air conditioners, at each facility. In fiscal 2016, we achieved an improvement of 12% (from a base year of fiscal 2005), against a target of 15%. Part of the reason for not hitting the target was because of a decline in sales in energy intensive business divisions, which contracted the denominator in calculating energy use per unit.

The increase in the total volume of CO₂ emissions was due to the fact that a materials company in the Americas newly became a member of the consolidated Hitachi Group in fiscal 2016. There was a general decline in regions other than the Americas.

We will continue to harness our expertise in control and IT technologies to actively pursue energy conservation measures at our factories and offices and promote the efficient use of energy.

Key Indicators

● Reduction in Energy Use per Unit



● FY 2005 (base year)

$$\frac{\text{Energy used } 1.75 \text{ GL}^{*1}}{\text{Activity amount}^{*2}} = 100\%$$

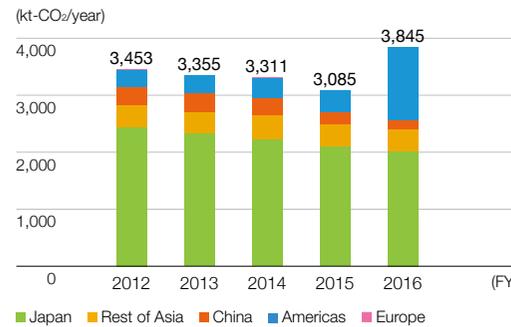
● FY 2016

$$\frac{\text{Energy used } 1.95 \text{ GL}}{\text{Activity amount}} = 88\%$$

*1 Energy volume used both in and outside the organization (SCOPE 1 and 2).

*2 A value closely related to the emission factor numerators (environmental burden) of energy use from business activities (for example, production quantity, output, building floor space, and number of employees).

● CO₂ Emissions ✓



Breakdown by Region (kt-CO₂/year) ✓

	(FY)				
	2012	2013	2014	2015	2016
Europe	4	4	8	7	11
Americas	316	321	358	375	1,273 ^{*1}
China	315	332	305	211	166
Rest of Asia	381	375	423	402	384
Japan	2,437	2,323	2,217	2,090	2,011
Total	3,453	3,355	3,311	3,085	3,845

*1 Includes 958 kt-CO₂/year emitted by a materials company that became a consolidated member of the Hitachi Group in fiscal 2016.

Notes:

- The CO₂ electrical power conversion factor uses the 2005 emission coefficients for individual countries published by the International Energy Agency (IEA) in the 2010 edition of *CO₂ Emissions from Fuel Combustion*.
- Energy-related CO₂ emissions were 1,296 kt-CO₂ (SCOPE 1) and 2,549 kt-CO₂ (SCOPE 2).

Introducing Renewable Energy

We are promoting the use of solar, wind, and other forms of renewable energy. During the 2016 fiscal year, Hitachi produced 2,925 MWh of renewable energy for its own use. Hitachi Computer Products (America) proactively uses renewable energy to power its factory, purchasing 8,769 MWh during fiscal 2016. In Japan, we contracted for 1,000 MWh/year of Green Power through Japan Natural Energy Co., Ltd. to provide power for offices, showrooms, and exhibitions.



Green Power logo for the Green Power Certification scheme.

