

Promoting the Environmental Action Plan (Metrics and Targets)

Environmental Action Plan for 2018 (2016–2018)

Hitachi is pressing forward with activities in accordance with its Action Guidelines for Environmental Conservation in order to achieve its Environmental Vision and the Hitachi Environmental Innovation 2050 long-term environmental targets. Toward this end, the Environmental Action Plan is drawn up every three years. The Environmental Action Plan for 2018—formulated in fiscal 2016—stipulates detailed activities and targets to tackle by fiscal 2018.

Environmental Action Plan for 2018: Results and Targets

For our performance under the Environmental Action Plan for 2018, marking fiscal 2017 as its second year, we missed targets for two items, but for every other category, we were able to reach our goals. We will continue to make improvements in each activity aimed for fiscal 2018—our final year—and achieve our targets.

The indicators used in the Environmental Action Plan for 2018 are the main ones in Hitachi’s environmental activities overall, and our endeavors in these areas are introduced in the following pages.

Management

Items	Indicators	Fiscal 2017 targets	Fiscal 2017 results	Achievement level	Final fiscal year (2018) targets
Strengthen global environmental management	Voluntary implementation of environmental monitoring by business units and Group companies at overseas business sites (implementing sites/total targeted)	50%	83%	◆◆◆	80% or higher (cumulative total)
Raise the level of environmental activities	Green points (GPs) under the GREEN21-2018 environmental activity index	360 GPs	369 GPs	◆◆◆	480 GPs

Products and Services

Item	Indicator	Fiscal 2017 target	Fiscal 2017 result	Achievement level	Final fiscal year (2018) target
Improve environmental performance	Rate of reduction in CO ₂ emissions from use of products and services (base: FY 2010)	35%	33%	◆◆	40%

Factories and Offices: Climate Change Response

Item	Indicator	Fiscal 2017 target	Fiscal 2017 result	Achievement level	Final fiscal year (2018) target
Reduce energy use	Reduction in energy use per unit (base: FY 2005)	16%	14%	◆◆	17%

Factories and Offices: Enhance Efficiency of Water Usage

Item	Indicator	Fiscal 2017 target	Fiscal 2017 result	Achievement level	Final fiscal year (2018) target
Enhance efficiency of water usage	Reduction in water use per unit (base: FY 2005)	25%	32%	◆◆◆	27%

Factories and Offices: Use Resources Efficiently

Item	Indicator	Fiscal 2017 target	Fiscal 2017 result	Achievement level	Final fiscal year (2018) target
Reduce waste generation	Reduction in waste and valuables generation per unit (base: FY 2005)	13%	15%	◆◆◆	14%

Factories and Offices: Manage Chemical Substances

Item	Indicator	Fiscal 2017 target	Fiscal 2017 result	Achievement level	Final fiscal year (2018) target
Reduce emissions of chemical substances	Reduction in atmospheric emissions of chemical substances per unit (base: FY 2006)	35%	37%	◆◆◆	36%

Ecosystem Preservation

Item	Indicator	Fiscal 2017 target	Fiscal 2017 result	Achievement level	Final fiscal year (2018) target
Contribute to ecosystem preservation	New ecosystem preservation activities implemented	150	301	◆◆◆	600

Partnership with Stakeholders

Item	Indicator	Fiscal 2017 target	Fiscal 2017 result	Achievement level	Final fiscal year (2018) target
Make social contributions through environmental activities	Activities implemented in such areas as environmental education, information exchange, ecosystem preservation through afforestation, etc., community contribution through cleanup projects, etc., campaigns to turn off lighting, and community energy-saving activities	1,600 (cumulative total)	1,720 (cumulative total)	◆◆◆	2,400 (cumulative total)

◆◆◆ : Achieved ◆◆ : Partially achieved

The Hitachi Action Guidelines for Environmental Conservation

The Action Guidelines for Environmental Conservation were drawn up to show the direction of our business management initiatives for environmental protection as we set out to realize our Environmental Vision.



The Hitachi Action Guidelines for Environmental Conservation

Responding to Climate Change with Products and Services

Improved Environmental Performance in Products and Services

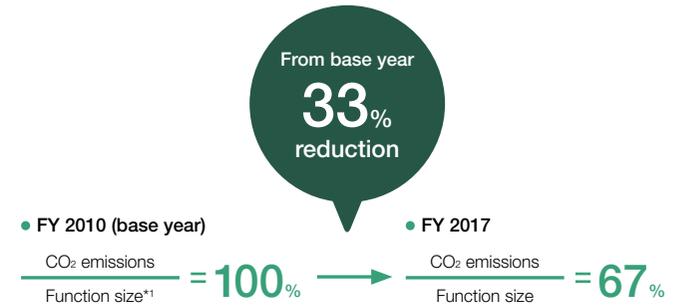
Hitachi is improving the environmental performance of its products and services with the hope of contributing to the resolution of environmental challenges through the development and popularization of products and services with high environmental value. We strike a balance between improving functionality 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 2017, we reduced CO₂ emissions by 33% against a target of 35% over the base year of fiscal 2010. The failure to reach the target is due to changes in the product lineup, as contributions made by products and services featuring high environmental performance were not fully reflected in the new lineup.

We will strive to reduce the rate of CO₂ emissions by expanding sales of high energy-saving products and services as well as by continuing with our efforts to promote environmentally conscious design during the development stage.

Key Indicators

- Reduction in CO₂ Emissions (Hitachi Group)



*1 Major functions of products correlated to CO₂ emissions.

Reducing CO₂ Emissions Throughout the Value Chain

Reducing CO₂ Emissions with Renewable Energy (Power Business Unit, Hitachi, Ltd.)

Hitachi has a lineup of 5 MW-, 2.5 MW-, and 2 MW-class wind turbines and has established a system that allows it to handle all processes from development to design, manufacturing, and maintenance of the turbines. Among all wind turbines that started operation in Japan in 2016, Hitachi had the largest share.*¹ The company has received orders for a cumulative total of 325 turbines, of which 198 are currently in commercial operation.*² The amount of CO₂ emissions reduced with the use of wind turbines delivered by Hitachi is 360 kt-CO₂/year.*³

Hitachi's original down-wind system adopts a configuration with the rotor on the downwind side of the tower. This system enables turbines to switch to the free-yaw operation mode during storm blackout conditions, reducing the dangers posed by cross-winds. These turbines are thus suitable even for regions hit by frequent typhoons. Hitachi aims to contribute to creating a low-carbon society through superior wind power generation systems in Japan and other Asian regions, such as Taiwan and Southeast Asia.

In April 2018, Hitachi signed a contract for twenty-one 5.2 MW wind turbine systems (109.2 MW) in Taiwan. The work, to be done

in collaboration with partner companies includes manufacturing, assembly, and installation of all equipment, as well as operation and maintenance for a period of five years.

Hitachi will contribute to expanding renewable energy by combining the high-quality maintenance technologies and expertise related to wind turbines that it has cultivated in the Japanese market.

*¹ According to 2017 Hitachi, Ltd. findings.

*² As of June 30, 2018.

*³ Amount for 198 wind turbines delivered by Hitachi. Comparable to that when covered by thermal or other types of power generation. The amount of CO₂ generated by wind power generation was calculated from the Comprehensive Assessment of Life Cycle CO₂ Emissions from Power Generation Technologies in Japan (July 2016), by the Central Research Institute of Electric Power Industry.



The Shin-Aoyama Kogen Wind Farm (photo by Toru Nagao, courtesy of Aoyama-Kogen Wind Farm Co.)



Wind Turbine

Oil-Free Scroll Compressor Directly Driven by an Amorphous Motor (Hitachi Industrial Equipment Systems Co., Ltd.)

Oil-free scroll compressors are known for their low-noise and low-vibration features. They do not use lubricating oil, which enables them to provide clean, oil-free compressed air. For these reasons they are widely used in the food and healthcare sectors, as well as in conducting scientific research and experiments.

Hitachi Industrial Equipment Systems uses an amorphous motor featuring top-level efficiency standards (equivalent to IE5*¹) in the air compressor body. And even higher energy savings are provided with the use of an inverter. The use of an inverter drive makes power supply frequency control unnecessary. This means that the discharge pressure can be maintained at a constant level even when the amount of air used changes, achieving constant pressure control with no more compression operation than is necessary. This results in high energy savings. By integrating the amorphous motor with an axial gap structure*² in the air compressor as a single unit, the product volume ratio has been reduced by as much as 37% from earlier models (with the same capacity). Thus, it can be installed even in places with space restrictions, or installed independently. This makes greater energy

savings possible by reducing pressure loss through such means as shortening the length of piping in a plant.

*¹ The highest efficiency class in the motor energy efficiency guidelines formulated in IEC 60034-30-2 of the International Electrotechnical Commission (IEC).

*² Motor with a thin structure using a disk-shaped rotor.



Oil-free scroll compressor directly driven by an amorphous motor.

Smart IoT Service Reduces CO₂ Emissions Throughout the Value Chain (Systems & Services Business, Hitachi, Ltd.)

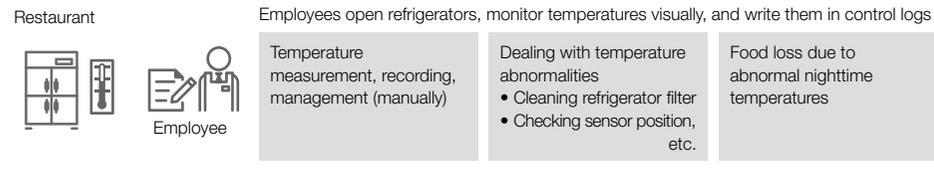
The Smart IoT Service is a solution provided by Hitachi's Lumada IoT platform. It automatically collects such environmental data as shop or building temperature, humidity, electric power, and CO₂ levels, in addition to data on the operational status of industrial machinery. The information is then managed and shared in the cloud. This service helps to reduce running costs and enables the immediate detection and response to abnormalities while also contributing to a reduction of the environmental burden. This solution is used in industries and businesses of all types and sizes, including in the manufacturing, transport,

and restaurant sectors.

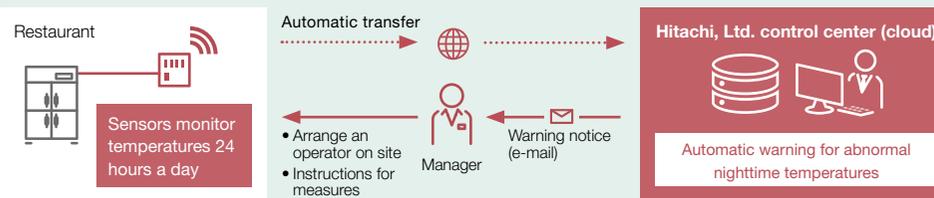
In restaurants, it monitors and measures temperatures in refrigerators and automatically transfers the data on a 24-hour basis using IoT and manages the data in the cloud. It can also help to shorten the time required to monitor temperature and reduce food loss while contributing to lowering CO₂ emissions during monitoring operation and over the life cycle of food. In calculations modeled on 1,200 shops in a major restaurant chain in Japan (with temperature monitoring at 12 locations in each restaurant), use of this service reduced CO₂ emissions by 47%.

Refrigerator Temperature Management for Restaurants

Previous temperature monitoring



Temperature monitoring with Smart IoT Service



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. Countries and regions 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 2017, products verified and approved by the JEMAI CFP Program included the business phone Hitachi Multi Communication System S-integral, the enterprise storage Hitachi Virtual Storage Platform G1500, and the Hitachi IP-PBX NETTOWER CX-01 V2. 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 2017

Product	Business phone	Enterprise storage	IP-PBX
Series and model	Hitachi Multi Communication System S-integral	Hitachi Virtual Storage Platform G1500	Hitachi IP-PBX NETTOWER CX-01 V2
Product appearance			
Previous series and model	Hitachi Multi Communication System integral-F	Hitachi Virtual Storage Platform G1000	Hitachi IP-PBX NETTOWER CX-01
Rate of reduction in CO ₂ emissions (compared to previous model)	-6.5% to -23%	-33%	-11% to -20%

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 2017, we adjusted our methods of evaluating the environmental burden of IT products and submitted our final assessment methods to the European Commission. This was in response to a revision of the environmental footprint assessment rules by the European Commission and its provision of datasets to be used in calculating the environmental footprint.

Climate Change Measures in Factories and Offices

Promoting Climate Change Measures

We are promoting ways to use energy more efficiently and reduce CO₂ emissions during production and transportation, in both the manufacturing and nonmanufacturing divisions, with the aim of responding to climate change by building a low-carbon society.

Actions and Achievements

We are advancing efforts 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 our manufacturing divisions, we are advancing the visualization of energy use and production status and analyzing a broad array of data to promote further efficiencies in energy use.

In fiscal 2017, we achieved an improvement of 16% (from a base year of fiscal 2005), against a target of 14%. 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. Because Hitachi's operations cover many different areas, reductions in energy use per unit are assessed using a value closely related to energy use (activity amount) at each business site as the denominator. As for total CO₂ emissions, we added the CO₂ emitted by power plants that sell electricity, although this is not included in the figures for energy use per unit.

In the future, 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 around the world.

Key Indicators

- Reduction in Energy Use per Unit (Hitachi Group) ✓



● FY 2005 (base year)

$$\frac{\text{Energy used 2.06 GL}^{*1}}{\text{Activity amount}^{*2}} = 100\%$$

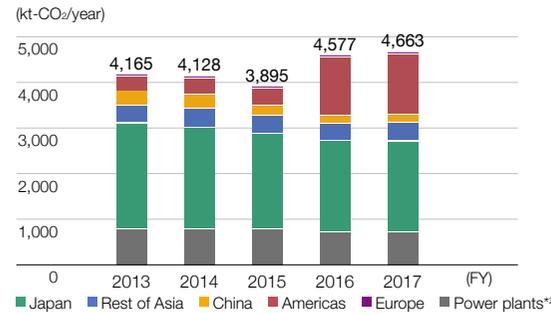
● FY 2017

$$\frac{\text{Energy used 2.00 GL}}{\text{Activity amount}} = 86\%$$

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

*2 A value closely related to energy use at each business site (for example, production quantity, output, building floor space, and number of employees).

- CO₂ Emissions (Hitachi Group) ✓



Breakdown by Region (kt-CO₂/year) ✓

	(FY)				
	2013	2014	2015	2016	2017
Europe	4	8	7	11	16
Americas	321	358	375	1,273 ^{*1}	1,332 ^{*1}
China	332	305	211	166	175
Rest of Asia	375	423	402	384	407
Japan	2,323	2,217	2,090	2,011	1,994
Power plants ^{*2}	810	817	810	732	739
Total	4,165	4,128	3,895	4,577	4,663

*1 Includes 958 kt-CO₂ (fiscal 2016) and 1,036 kt-CO₂ (fiscal 2017) emitted by a materials company that became a consolidated member of the Hitachi Group in fiscal 2016.

*2 Emissions by power plants selling electricity were retroactively added in fiscal 2017.

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 2,062 kt-CO₂ (Scope 1) and 2,601 kt-CO₂ (Scope 2).

Introducing Renewable Energy

We are promoting the use of solar, wind, and other forms of renewable energy. During fiscal 2017, Hitachi produced 3,168 MWh of renewable energy for its own use. Hitachi Computer Products (America) proactively uses renewable energy to power its factory, purchasing 9,525 MWh during fiscal 2017. 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.

Reducing Transportation Energy Consumption

Hitachi is working toward the reduction of energy output during transportation as well as at business sites, and we have established targets for the reduction of energy use per unit for each business unit and Group company. Business sites are promoting a modal shift to highly efficient transportation methods, improving truck loading ratios and taking other measures to reduce transportation energy consumption, and switching to the use of eco-cars. CO₂ emissions from transportation inside Japan for the Hitachi Group in fiscal 2017 were 102.8 kt-CO₂. ✓ Hitachi-Omron Terminal Solutions, for example, is promoting reductions in CO₂ emissions through a modal shift in the transportation of automated teller machines, and as a result of these efforts it was designated by the Ministry of Land, Infrastructure, Transport, and Tourism as an Eco Rail Mark company.*1

*1 A mark conferred on companies using railways for more than 15% of its freight land transportation covering 500 km or more; for 15,000 metric tons or more in volume per year; or for more than 15 million ton-kilometers in volume × distance per year.



About the Eco Rail Mark

Energy Savings in Eco-Factories & Offices

Next-Generation Factory Using IoT (Omika Works, Hitachi, Ltd.)

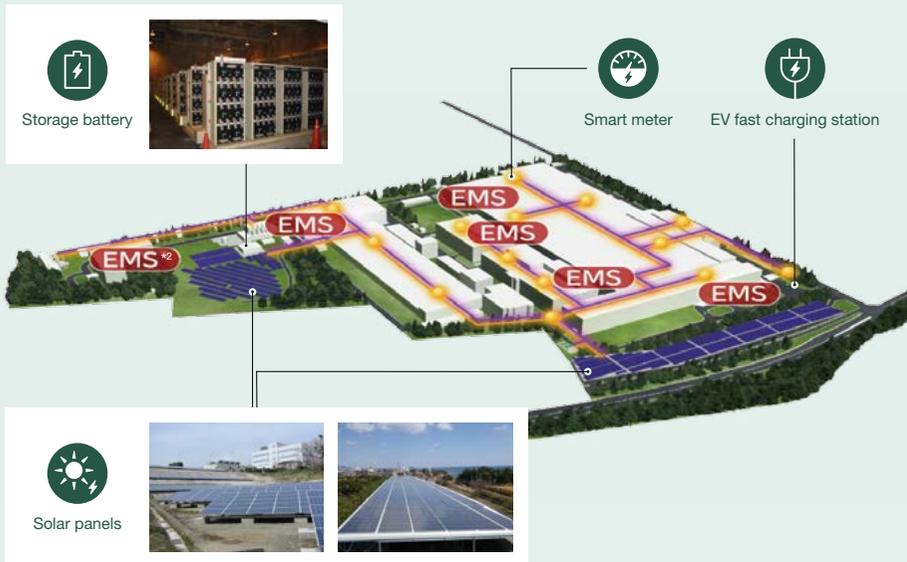
The Hitachi, Ltd. Omika Works produces control systems used in electric power generation, railroads, waterworks, and other social infrastructure. It has installed solar panels (940 kW capacity) to promote renewable energy use and is working to level the electrical load by controlling the charging and discharging functions of storage batteries (4.2 MWh storage capacity). Smart meters have been installed (in about 900 locations) in an effort to conserve energy through the utilization of IoT. In these and other ways, the business site

pursues higher production efficiency and reduced environmental impact, contributing to achieving a low-carbon society as a next-generation smart factory.

Energy efficiency during the production process is achieved with a progress and operation monitoring system that uses Radio Frequency Identification (RFID).^{*1} As a result, annual energy consumption for lighting and air conditioning in fiscal 2017 was 8 MWh lower than in fiscal 2012.

^{*1} Non-contact automatic identification technology that uses radio frequency to read information from tags or other card-shaped media with an embedded IC and antenna.

Omika Works



^{*2} EMS: Energy management system.

Offices That Balance Energy Efficiency and Comfort (Yokohama Office, Hitachi, Ltd.)

To create a work environment conducive to workstyle reforms, the Hitachi, Ltd. Yokohama Office is creating office spaces that balance energy efficiency and comfort. Room environments are monitored and analyzed with temperature and humidity sensors and other equipment to provide energy savings while maintaining comfort. Atria and light wells that let in natural light to create bright spaces and rooftop solar panels (500 kW) help to reduce energy use in the entire building.

At the Yokohama Office, air conditioning and electric equipment are managed with a

building management system. This system measures and compiles energy consumed for each use, workplace temperature and humidity, air conditioning operating information, and CO₂ level data, which are then integrated and put in a visual format. Aggregating and displaying these data on a single screen makes it possible for monitoring personnel to respond quickly when a problem occurs. Energy use for air conditioning has been reduced 563 MWh annually by visualizing and analyzing correlations among data from each facility with this system.



Natural light enters through atrium spaces and light wells, producing bright, comfortable spaces.



Renewable energy from solar panels is used for some of the energy consumed in offices.

Reducing Transport Energy Consumption

A Modal Shift in Transporting ATMs (Hitachi-Omron Terminal Solutions, Corp.)

Hitachi-Omron Terminal Solutions is taking steps to reduce CO₂ emissions by implementing a modal shift from truck to rail transport for automated teller machines (ATMs).

Since ATMs are precision machines, they must be transported with care to prevent damage. Repeated tests were thus conducted, subjecting them to vibrations greater than those experienced during rail transport, to confirm that the machines would be unaffected. Complicated production plans for ATMs, which are high-mix and small-lot products, were made according to rail transport schedules. Transport pallets and stacking methods were also improved. Thanks to such efforts to achieve efficient transport, the company was designated by the Ministry of Land, Infrastructure, Transport, and Tourism as an Eco Rail Mark company. It is also actively using rail transport for products other than ATMs, including teller cash recyclers and cash deposit machines. As a result, CO₂ emissions were reduced by 82 t-CO₂ in fiscal 2017, compared to levels when only trucks were used as a mode of transport.



A rail container carrying ATMs heads out of the manufacturing facility to the train station for loading.

Enhancing Efficiency of Water Usage

Water Conservation

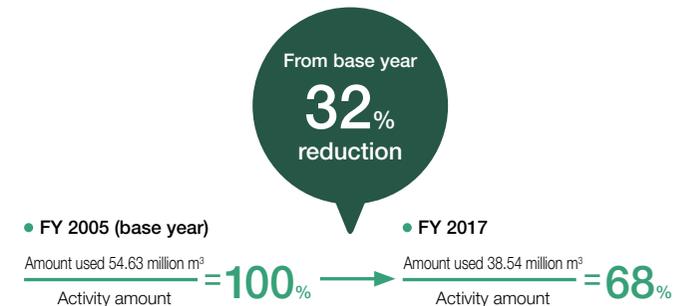
Hitachi is implementing Group-wide measures to reduce water usage through greater efficiency. For example, we are enhancing our level of water management by installing flow meters at more locations, introducing wastewater treatment devices to increase the use of recycled water, and upgrading water supply facilities at our business sites to prevent water leakage.

Actions and Achievements

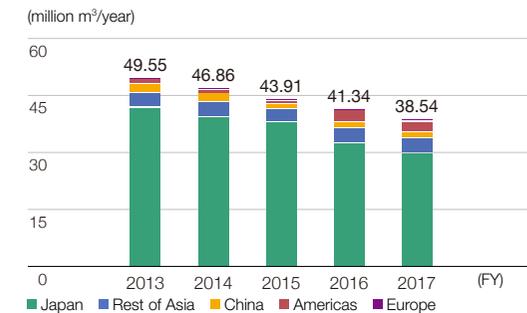
In fiscal 2017, we set a target of a 25% reduction (over the base year of fiscal 2005) for water usage per unit at our 207 global sites and achieved a 32% reduction. The volume of water used declined by 16.09 million cubic meters, or 29%.

Key Indicators

- Reduction in Water Usage per Unit (Hitachi Group)



- Water Usage (Hitachi Group)



Breakdown by Region (million m³/year)

	(FY)				
	2013	2014	2015	2016	2017
Europe	0.02	0.02	0.01	0.02	0.04
Americas	1.20	0.98	0.89	3.09 ^{*1}	2.78 ^{*1}
China	2.50	2.32	1.22	1.51	1.51
Rest of Asia	3.65	3.85	3.56	4.00	4.04
Japan	42.18	39.69	38.23	32.72	30.17
Total	49.55	46.86	43.91	41.34	38.54

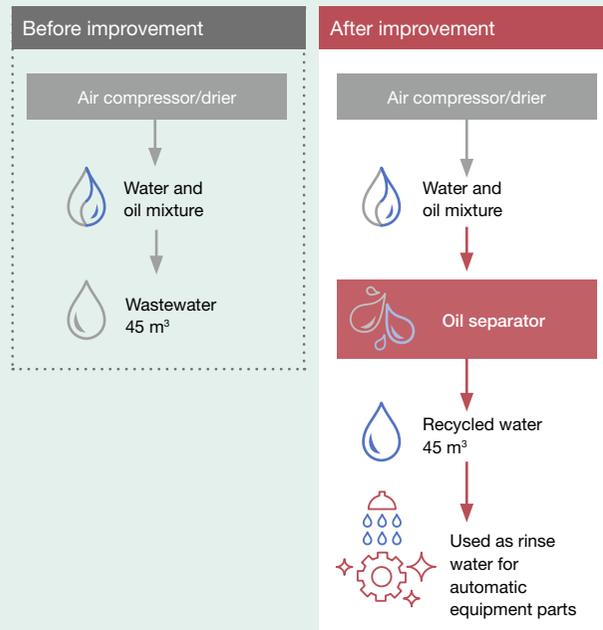
*1 Includes water used by a materials company that became a consolidated member of the Hitachi Group in fiscal 2016 (2.12 million m³/year in fiscal 2016 and 1.91 million m³/year in fiscal 2017).

Improving Water Use Efficiency

Reducing Water Intake by Reusing Compressor Wastewater (Dongguan Clarion Orient Electronics Co., Ltd.)

Dongguan Clarion Orient Electronics manufactures 4.5 million car navigation and car audio units per year. Air compressors and driers are used on production lines, and about 45 m³ of wastewater with a small amount of oil had been released annually. The company reduced the amount of water intake by installing dedicated equipment that separates the water and oil and improving the process to reuse 45 m³ of recycled water annually to rinse automatic equipment parts.

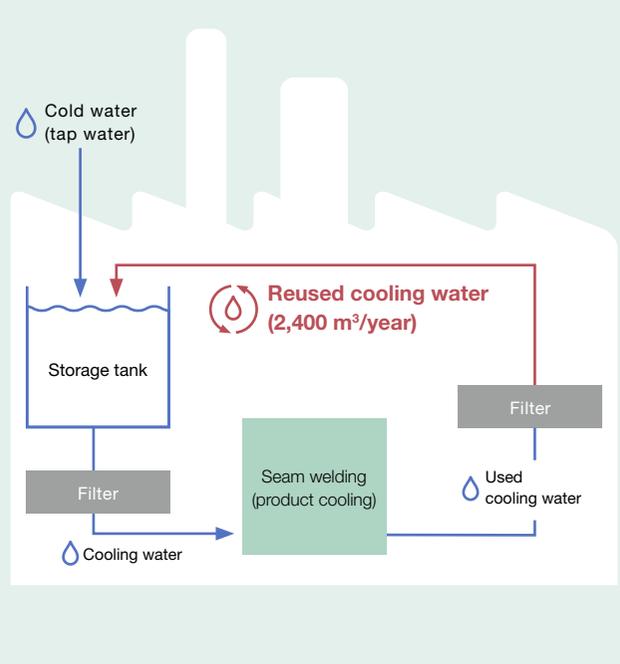
Improvements in the Rinsing Process



Reducing Intake Water by Reusing Welding Process Cooling Water (Hitachi Automotive Systems Czech, s.r.o.)

Hitachi Automotive Systems Czech produces automobile suspension systems. At its plant, the company built a recirculating water cooling system to reduce the amount of tap water intake. Water used to cool products on the seam welding line is collected in storage tanks. Cold water is then added to lower the temperature and used repeatedly to cool products. The company used this method to reduce its amount of intake water, reusing about 2,400 m³ of cooling water per year.

Recirculating Water Cooling System



Improving Efficiency in the Use of Resources

Promoting Product Collection and Recycling and the Efficient Use of Resources

In response to the 2001 Home Appliance Recycling Law, Hitachi is taking part in a cooperative effort among five companies*¹ in the same industry to recycle air conditioners, television sets, refrigerators, and washing machines at 19 recycling plants nationwide. In fiscal 2017, we recycled around 51 kt of the roughly 59 kt of end-of-life home appliances we collected.

Hitachi has built its own recycling network providing services near our customers to collect and recycle such end-of-life products as supercomputers, mainframes, and other computing machines; communication equipment like network devices and telephone switchboards; and information equipment like ATMs.

We are also promoting the refurbishing*² and remanufacturing*³ of collected used products. In the United States, when a customer replaces a large-capacity storage unit with a new model, part of the end-of-use device is cleaned and inspected and refurbished as a certified Hitachi product. After collecting automobile electric components from dealers and repair shops, we disassemble, check, clean and restore, reassemble, and inspect them, remanufacturing them as equipment featuring the same performance as new products. Used construction machinery like large hydraulic excavators and dump trucks are similarly remanufactured so they function like new and offered as high-function, reasonably priced products. We are also promoting activities to collect and reuse as resources medical equipment and such industrial equipment as pumps, motors, distribution boards, transformers, refrigeration equipment, and air conditioners.

In an effort to use resources more efficiently, we are also promoting the use of recycled materials. In fiscal 2017, recycled materials accounted for 1,826 kt (48%) of our total raw materials input of 3,797 kt.

*1 Hitachi Appliances, Inc.; Sharp Corp.; Sony Corp.; Fujitsu General Ltd.; and Mitsubishi Electric Corp.

*2 Refurbishing: To service end-of-use products to a condition conforming to new-product standards.

*3 Remanufacturing: To restore end-of-use products through disassembly, washing, component replacement, and other work to a condition equivalent to new products.

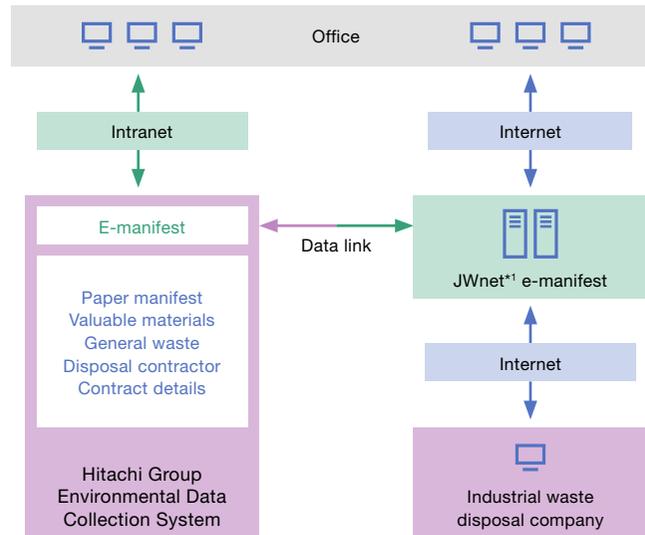
Using IT to Manage Waste

Hitachi has developed and operates a waste management system aimed at efficient management and reduced compliance risk.

Specifically, we visualize the generation and disposal of waste produced at our factories, offices, and contract operations and manage data on waste contractors so that we can keep accurate track of our progress in waste recycling. In fiscal 2017, entries were made to the system regarding waste generated at approximately 1,900 contract locations in Japan and at Hitachi manufacturing sites in 65 countries. This information is being put to use in measures to reduce waste volume and improve recycling rates. The system also manages information regarding hazardous waste materials. We have established a target of raising the e-manifest*1 system registration rate to at least 90% by fiscal 2015. This was achieved in fiscal 2014, and we continued with our efforts in fiscal 2017.

*1 The e-manifest is a document that waste generators must issue when commissioning a disposal company to handle waste disposal.

Waste Management System



*1 JWnet: The Japan Waste Network is an electronic manifest system operated by the Japan Industrial Waste Information Center under the auspices of Japan's Ministry of the Environment.

Reducing Waste Volume

For fiscal 2017, we set a target of a 13% reduction (from a base year of fiscal 2005) for waste and valuables generated per unit, bettering this by achieving a 15% reduction.

We endeavored to reduce waste through closed-loop recycling, whereby the byproducts and scrap from the production process are reused as resources by other business sites, and through the repeated use of packing and cushioning materials during transport. Under the Zero Emission initiative, which seeks to minimize landfill disposal, 97 business sites achieved their zero emission goal*1 as of fiscal 2017.

*1 Defined as a final disposal rate (landfill disposal/waste and valuables) of less than 0.5% in any given fiscal year.

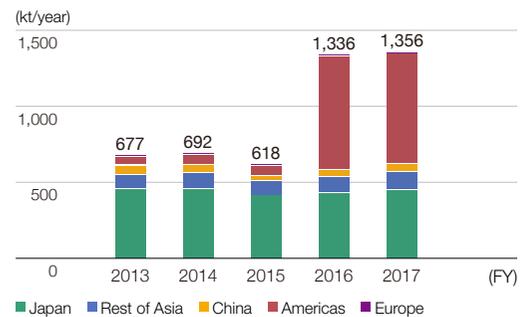


Key Indicators

- Reduction in Waste and Valuables Generation per Unit (Hitachi Group)



Waste and Valuables Generation (Hitachi Group)



Breakdown by Region (kt/year)

	(FY)				
	2013	2014	2015	2016	2017
Europe	1	2	1	2	4
Americas	56	67	63	744 ^{*1}	725 ^{*1}
China	62	54	36	48	55
Rest of Asia	93	106	98	107	117
Japan	465	463	420	435	455
Total	677	692	618	1,336	1,356

*1 Includes 675 kt (in both fiscal 2016 and 2017) of a materials company that became a consolidated member of the Hitachi Group in fiscal 2016.

Efficient Use of Resources

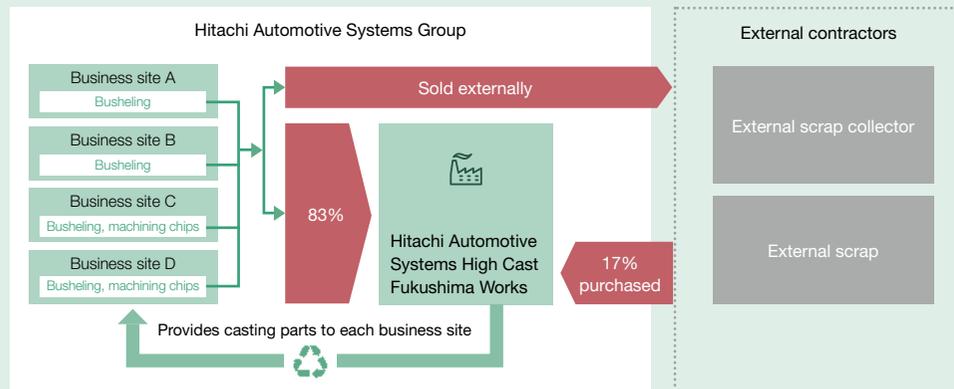
Creating a Closed-Loop Recycling Scheme for Scrap Iron (Fukushima Works, Hitachi Automotive Systems High Cast, Ltd.)

Hitachi Automotive Systems High Cast manufactures casting parts for automotive engine and cruise control and steering systems. At the company's Fukushima Works, busheling (steel press punching waste) of various compositions and shapes, machining chips (long, spiral chips from castings or steel materials), and other scrap iron produced at the business sites of the Hitachi Automotive Systems Group are recycled. To do this, the company began investing in crushing and centrifugal separation equipment and changing existing processes in fiscal 2010 to build an efficient,

closed-loop recycling scheme.

With this scheme, the recycling rate in the Group improved from 44% to 83%, and in fiscal 2016 the amount of waste and discarded valuables was reduced by 25,000 metric tons annually in the Hitachi Automotive Systems Group overall. These long efforts have contributed greatly to the efficient use of resources and the building of a sustainable society, and were recognized with the Chairman's Award by the Japan Environmental Management Association for Industry in the FY 2017 Awards for Resources Recirculation Technologies and Systems.

Closed-Loop Recycling Scheme for Scrap Iron



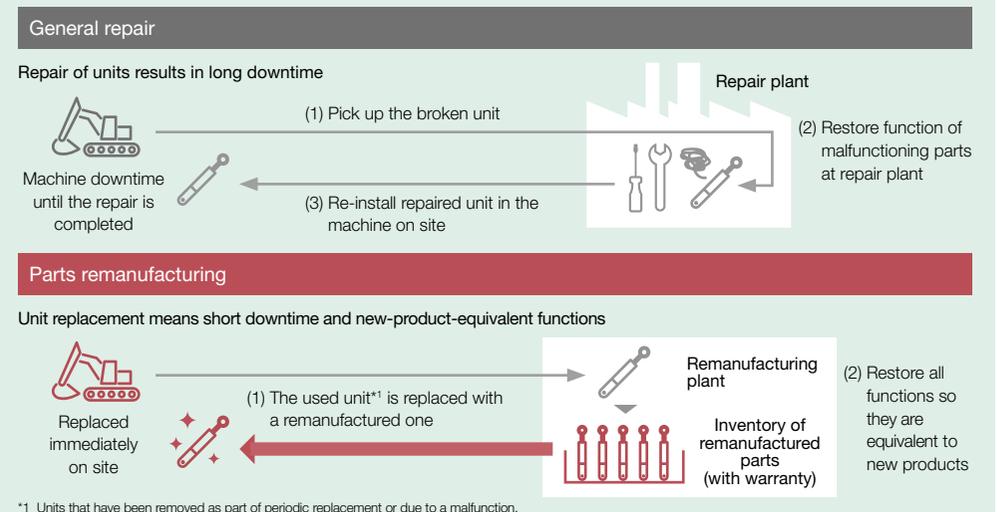
Remanufacturing Construction Machinery Parts (Hitachi Construction Machinery Co., Ltd.)

The Hitachi Construction Machinery Group manufactures and sells large hydraulic excavators, dump trucks, and other construction machinery. In 1998 it began a parts remanufacturing business to shorten the repair time for broken machinery units.

Construction machinery is utilized in harsh environments, and used units are thus often in poor condition. As a result, the downtime for repairs tends to be long. Used units are restored to function like new at remanufacturing plants and are sold with a functional

guarantee. This has made it possible to both shorten the time the machine is down and to provide high-functional units at reasonable prices. This business has spread to nine countries: Japan, China, India, Indonesia, Australia, the Netherlands, Zambia, Canada, and the United States. Because many used units were remanufactured instead of being discarded, the volume of waste generated by the Hitachi Construction Machinery Group decreased by 2,853 metric tons in fiscal 2017.

Comparison of General Repair and Parts Remanufacturing



The Management and Reduction of Chemical Substances

Managing Chemical Substances

In fiscal 2005, Hitachi formulated the Regulations for Environmental CSR-Compliant Monozukuri to manage the chemical substances contained in its products at all stages—from development and design, procurement, and production to quality assurance and sales. With regard to chemical substances used in our business operations, we manage risk by assigning three ranks to the use of such substances: prohibition, reduction, and control. We also reduce risk by educating chemical substance handlers and managers on laws and regulations and on proper risk assessment.

Managing Chemical Substances in Our Products

To ensure compliance with Europe's REACH*¹ and other regulations, we continuously revise the list of chemical substances in our products that are to be managed. In October 2015, we modified the list of Voluntarily Controlled Chemical Substances so that 18 prohibited substances (Level 1) and 27 controlled substances (Level 2) are now listed.

Four types of phthalic esters will be added to the list of restricted substances in Europe's RoHS directive*² in July 2019. Hitachi, too, will designate them as prohibited substances in January 2019, and each Group company is now undertaking an examination of phthalic esters and advancing their substitution by alternative substances.

*1 REACH: The European Union regulation on Registration, Evaluation, Authorization, and Restriction of Chemicals.

*2 Europe's RoHS directive: The European Union's Restriction of the Use of the Certain Hazardous Substances in Electrical and Electronic Equipment, such as computers, communication devices, and home appliances.



Hitachi Group's Voluntarily Controlled Chemical Substances

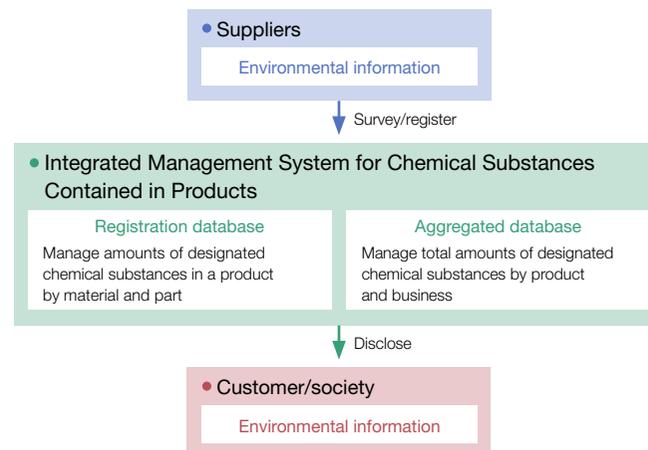
▶ Working with the Supply Chain to Manage Chemical Substances

Working closely with suppliers and customers, we gather and make available information on chemical substances across the supply chain via the Integrated Management System for Chemical Substances Contained in Products, which has been in operation since fiscal 2005. As of March 31, 2018, chemical substance information for more than 1.37 million parts and products was registered under this integrated management system.

The Integrated Management System for Chemical Substances Contained in Products was upgraded in April 2017 to incorporate the chemSHERPA format.*¹ Between December 2017 and February 2018, four briefings for suppliers were held on our system and chemSHERPA at Omika Works, Mito Works, and Hitachi IE Systems. The briefings were attended by approximately 600 persons and helped to deepen understanding of these tools.

*1 chemSHERPA: A standard developed by the Japanese Ministry of Economy, Trade, and Industry to facilitate the management of chemical substances in products by creating a shared transmission scheme throughout the supply chain.

Integrated Management System for Chemical Substances Contained in Products



Managing Chemical Substances in Our Business Operations

We have been cutting emissions of chemical substances from our factories and other sites through stricter management, such as by expanding the number and scope of controlled chemical substances. Initiatives in fiscal 2017 to reduce emissions of volatile organic compounds (VOCs) included switching from VOC-containing paints to water-soluble and powder paints as well as expanding their use and altering the painting and washing processes. These efforts enabled us to successfully achieve our targets. Information on our efforts has been translated into English and Chinese and shared globally with Hitachi Group members. We also monitor and manage emissions of sulfur oxides (SOx) and nitrogen oxides (NOx),*¹ which are required to be measured under the laws and regulations applicable at our business locations.

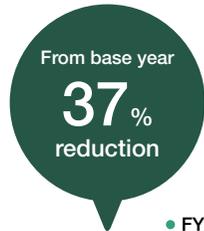
We comply with Japan's Pollutant Release and Transfer Register (PRTR) Law*² through Group-wide monitoring of chemical substances released into the atmosphere or into public waters, removed outside our plants as waste, or discharged into sewage systems, reporting the results to local governments for each office or plant. Although some substances are exempt from reporting due to their small quantities, our policy is to keep data on the handling, emission, and transfer of all PRTR substances totaling 10 kilograms or more per year, recognizing the need to control these substances as well.

*1 Emissions of SOx and NOx: Calculated by multiplying their concentration and exhaust volume.

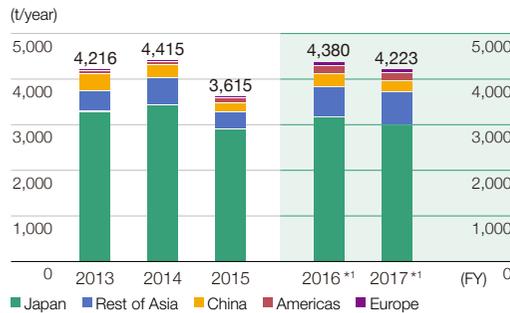
*2 PRTR Law: Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof.

Key Indicators

- Reduction in Atmospheric Emissions of Chemical Substances per Unit (Hitachi Group)



- Reducing Atmospheric Emissions of Chemical Substances (Hitachi Group)



Breakdown by Region (t/year)

	(FY)				
	2013	2014	2015	2016**	2017**
Europe	8	12	9	57	58
Americas	76	66	113	187	178
China	372	281	199	291	246
Rest of Asia	447	604	373	662	731
Japan	3,313	3,452	2,921	3,183	3,010
Total	4,216	4,415	3,615	4,380	4,223

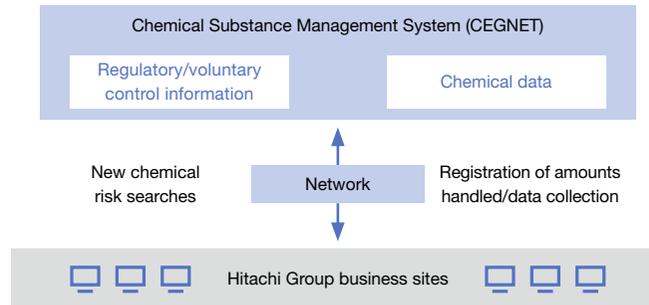
**1 Since fiscal 2016, the scope of controlled chemical substances has been expanded from 41 to 50 substances.

Note: Atmospheric emissions of VOCs and other chemical substances are calculated from the content rate included in the ingredients.

The CEGNET Chemical Substance Management System

To ensure the proper management of chemical substances used in its business operations, Hitachi has operated a database for chemical substance management called CEGNET since 1998 to keep track of the latest laws and regulations and the company's own voluntary regulations.

CEGNET also collects and aggregates data on the amount of chemical substances handled, emitted, and transferred in our operations, helping to reduce the volume of chemicals that we handle.



Managing Storage of Equipment Containing PCBs

Equipment that uses polychlorinated biphenyls (PCBs) and PCB waste materials are systematically disposed of within the time limit established by the national government of Japan. The storage and disposal of PCBs within the Group are monitored every year to promote efficient disposal. In fiscal 2017, disposal was completed for PCB waste materials stored at 36 business sites.

Reducing Chemical Substances in Our Business Activities

Reducing VOC Emissions (Hitachi Construction Machinery Co., Ltd.)

The Hitachi Construction Machinery Group manufactures and sells construction machinery. In fiscal 2006 it began introducing high solid paint that emits fewer volatile organic compounds (VOCs) in painting its products, and by fiscal 2017 it had expanded its use to 10 major plants around the world. At the Tsuchiura Works, the company's mother plant, more than 60% of the paint used has been switched to high solids, while at Hitachi Construction Machinery (China) the high solid usage rate has more than doubled since fiscal 2016. In addition to switching to high solids, plants in Japan are pushing to reduce VOC emissions by introducing painting technologies matched to each product, such as powder coatings and single coats.

VOC regulations in China have become more stringent in recent years, so in addition to shifting to high solids, Hitachi Construction Machinery (China) has built a high-efficiency VOC processing facility and is implementing a plan for a 90% reduction in VOC emissions. The VOC processing facility was completed in December 2017 and underwent trial operations. Full-scale operations will begin in fiscal 2018 and should contribute to further reducing VOC emissions.



A high-efficiency VOC processing facility.

Preserving Ecosystems

Corporate Relationship with Ecosystems

Corporations depend on “ecosystem services” for supplies of natural materials like wood and minerals and adjustments in the quality and quantity of air, water, and soil. Hitachi seeks to contribute both through its business and social contribution activities to protect nature so we may continue to receive these ecosystem and biodiversity benefits into the future.

Through its business activities, Hitachi is promoting designs and production methods that reduce the impact on the ecosystem throughout the product life cycle. We also offer products and services that directly contribute to ecosystem preservation, such as water purification measures. We view chemical substance management as part of ecosystem preservation and continually ensure that it is carried out correctly. As for social contribution activities to protect nature, we encourage employee volunteer programs, such as tree planting, ecological surveys of rare plants and animals, and other programs to preserve ecosystems.

Initiatives to Preserve Ecosystems

At Hitachi, we seek to reduce the burden (negative impact) on natural capital caused by business activities and to promote the positive impact, such as by undertaking social contribution activities to protect nature and providing products and services that help preserve the ecosystem, thereby minimizing our impact on natural capital by fiscal 2050 and realizing a harmonized society with nature. We are conducting deliberations and making estimates within the Group to quantify such impact in advancing these activities.

In fiscal 2016 Hitachi created an Ecosystem Preservation Activities Menu citing the specific activities to be undertaken to promote the preservation of the ecosystem, including activities that are difficult to quantify but are nonetheless important, such as the protection of rare species, and efforts to make biodiversity a criterion when making investment decisions. We are encouraging each business site to advance their own initiatives. This menu was created by adding the pioneering activities of other corporations and organizations to the list of items that had already been subject to assessment since fiscal 2010.

It consists of 116 items covering all aspects of our business operations, including the value chain. Each business site selects those activities it will undertake from the menu, and the total number of initiatives becomes the Group’s target for ecosystem preservation. Our goal for new initiatives in fiscal 2017 was 150, and 301 were actually launched.

Our goal for fiscal 2018 is to launch 600 new initiatives from the Ecosystem Preservation Activities Menu, and we will further promote ecosystem preservation activities on a Group-wide basis.

Ecosystem Preservation Activities Menu

Category		Activities taken	Number of items
Business sites	Production	Reducing use of resources that cannot be reused	4
	Transportation	Using packaging that takes ecosystem into consideration	7
	Collection, disposal, and recycling	Reducing hazardous materials in products	2
	Product planning, development, and design	During R&D, estimating impact on biodiversity during a product’s life cycle and implementing, if needed, mitigation measures	3
	Site management	Using native species, setting up biotopes	17
	Water use	Using rainwater	1
Value chain	Investment and acquisition	Confirming impact on biodiversity when investing in or acquiring a business, and implementing measures to minimize such impact	1
	Market entry and expansion	Including biodiversity as an investment criterion	1
	Business development	Developing products and services to purify water, air, and soil and expanding such businesses	1
	Procurement	Preferentially procuring paper and other office supplies that take biodiversity into consideration	17
	Transportation	Implementing ballast water measures during marine transportation	2
	Sales	Implementing sales expansion of products that take biodiversity into consideration	9
	Collection, disposal, and recycling	Reusing and recycling components	7
Entire value chain	Promoting the use of renewable energy	1	
Community	Engagement	Promoting employee activities outside the company	3
	Social contribution	Implementing desert greening and afforestation activities	12
Water use that takes watershed ecosystem into consideration	Water intake	Observing and collecting biota information (impact on ecosystem depending on intake volume)	14
	Water discharge	Setting up biota management indicators and making observations (species and numbers of inhabiting organisms)	14

Promoting Ecosystem Preservation

Hitachi IT Eco Experimental Village Preserves Ecosystems Through Collaborative Creation (Systems & Services Business, Hitachi, Ltd.)

The Systems & Services Business of Hitachi, Ltd. opened the Hitachi IT Eco Experimental Village in the city of Hadano, Kanagawa Prefecture, Japan, in April 2011. Since that time it has been conducting activities to preserve *satoyama* landscapes and ecosystems. With the cooperation of local residents, volunteer organizations, the local government, schools, research institutions, and others, it has been collecting environmental information with sensors and other IT devices and visualizing the data to analyze and provide empirical evidence to show how IT can contribute to ecosystem preservation.

These preservation activities, coordinated with many stakeholders, were among the twelfth group of certified partnership programs selected in March 2018 by the Japan Committee for the United Nations Decade on Biodiversity (UNDB-J).

The aim of these and other activities of the Social Innovation Business is to help communities resolve issues through collaborative creation and leave the blessings of the *satoyama* landscape to future generations.



The Hitachi IT Eco Experimental Village was certified as a project recommended by the Japan Committee for the UNDB-J.



IT devices and creatures observed during an experiment, from left, the agricultural IoT system e-kakashii, a new bird-and-animal repelling solution, and a Japanese squirrel.



A field trip to observe living organisms.

Desert Greening with the Dual Aims of Restoring Forests and Revitalizing Communities (Hitachi Construction Machinery Co., Ltd.)

Hitachi Construction Machinery (Shanghai) and Hitachi Construction Machinery (China) have partnered with the nonprofit Green Network since 2004 to plant trees in the Horqin Desert in China's Inner Mongolia Autonomous Region. With the start of the second 10-year plan in 2015, suppliers and dealers have also joined these efforts, which have so far resulted in the greening of 330,000 m² of the Horqin Desert. These activities contribute not only to protecting against wind and sand but also to CO₂ absorption, resource recycling, and biodiversity. This reforestation initiative also contributes to community employment by having much of the greening work done by local people.

The Hitachi Construction Machinery Group has been recognized for the content and continuity of its reforestation activities, receiving commendations in both China and

Japan. In fiscal 2017 it was conferred the Judges' Honorable Mention Award in the Sixth Contest for Corporate Activities on Biodiversity, supported by Japan's Ministry of the Environment and Ministry of Agriculture, Forestry, and Fisheries. The initiative was also certified as a partnership program by the Japan Committee for the United Nations Decade on Biodiversity (UNDB-J).



A certificate of Judges' Honorable Mention Award at the Sixth Contest for Corporate Activities on Biodiversity.



The reforestation initiative was certified as a project recommended by the Japan Committee for the UNDB-J.



Supplying water with a bucket relay.

AA+ Rank Acquired in the JHEP Certification System of the Ecosystem Conservation Society-Japan (Hitachi High-Technologies Corporation)

Hitachi High-Tech Science, a subsidiary of Hitachi High-Technologies, is making ongoing efforts in the approximately 44,000 m² Woodlands of the Hitachi High-Tech Science surrounding the research and development facility of its Oyama Works to create a broadleaf forest with native plant species, restoring fields of Japanese silver grass where a variety of native wild grasses grow, and eradicating nonnative species.

These efforts to preserve and restore biodiversity in the Woodlands of the Hitachi High-Tech Science obtained the second highest ranking of AA+ in the JHEP Certification System*¹ of the Ecosystem Conservation Society-Japan.

*¹ JHEP Certification System: A certification system in which biodiversity values before and after a project are compared, and the difference assessed and ranked.



Woodlands of the Hitachi High-Tech Science.