

Hitachi Appliances Environmental Report 2016



We at Hitachi Appliances are striving to become a global company that contributes to a better environment through our excellent products and services based on our persistent technological innovation.

The 21st Session of the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) was held in December 2015, and the adoption of the Paris Agreement as an international framework after 2020 will ensure that fair rules on climate change issues are to be applied to all 197 countries and regions of the world.

Prior to COP21, Japan devised a new Strategic Energy Plan in 2014, and then submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC Secretariat in 2015. As declared in the INDC, Japan shall reduce its greenhouse gas emissions by 26.0% by FY2030 as compared to the level in FY2013 (25.4% reduction compared to FY2005, approx. 1.042 billion t-CO₂ eq. as 2030 emissions), based on the amount of domestic emission reductions and removals assumed to be obtained. To achieve the greenhouse gas reduction target, various measures such as improving the energy-saving performance of equipment under the Top Runner Program, etc. are assumed.

In addition to climate change, however, there are various international issues relevant to the global environment, such as preservation of the marine environment, the handling of chemicals and waste, and biodiversity. In fact, wide-ranging issues including the "2030 Agenda for Sustainable Development" were discussed at the second session of the UN environment meeting held by the United Nations Environment Programme (UNEP) in May of this year.

The Hitachi Group is now working to expand "social innovation business" that will bring about change to human society, under Hitachi's corporate philosophy of "contributing to society through the development of superior, original technology and products." And as a member of the Hitachi Group, Hitachi Appliances intends to promote the reform and innovation of customers' lives through our home appliances and air-conditioning products and services.

One of our challenges is to support efforts toward achieving the INDC of each country and region, including that of Japan, by supplying equipment with high energy-saving performance and services of sufficient quality made possible by taking advantage of technological capabilities that have been cultivated for many years.

And with respect to the many other environmental issues related to chemical substances and waste, we intend to make further efforts toward innovation.

We hope to make people's lives more sustainable, comfortable, convenient, and fulfilling through environmentally friendly products and services that meet customer demands.

Through such corporate activities, we are striving to become a company that contributes to protecting the global environment.



Takanori Ninomiya
President and Director

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Refrigerator

Large capacity refrigerator, “Vacuum Chilled”

Energy saving through Hitachi’s unique energy saving technology

The refrigerator is installed with “Multi-valve control”, an energy saving technology and first in the industry to control five refrigerant ports with one valve.¹ The technology secures cooling power and achieves energy saving at the same time, and is an indispensable technology for large capacity refrigerators.

● Energy-Saving Technologies

Multi-valve control

The newly developed multi-valve control regulates the flow of refrigerant. The two refrigerant paths—one for cooling power and one for energy saving—are switched based on operational status. Depending on ambient temperature and humidity outside the refrigerator, a high-temperature refrigerant to prevent dew condensation is bypassed in order to prevent rises in temperature. The path and direction of refrigerant flow is switched via multi-valve control depending on the situation, thereby enabling efficient cooling.

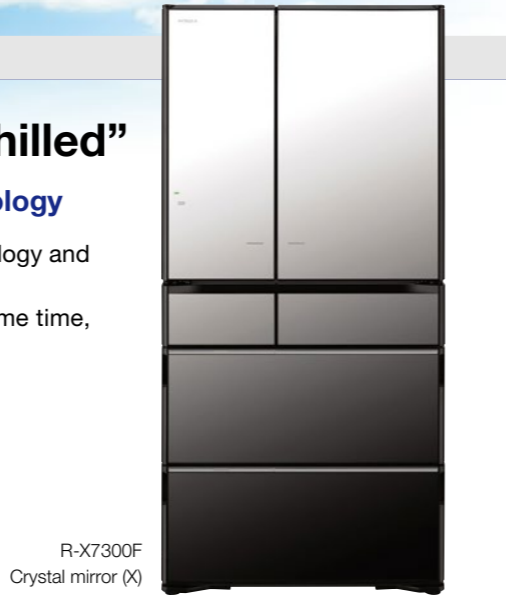
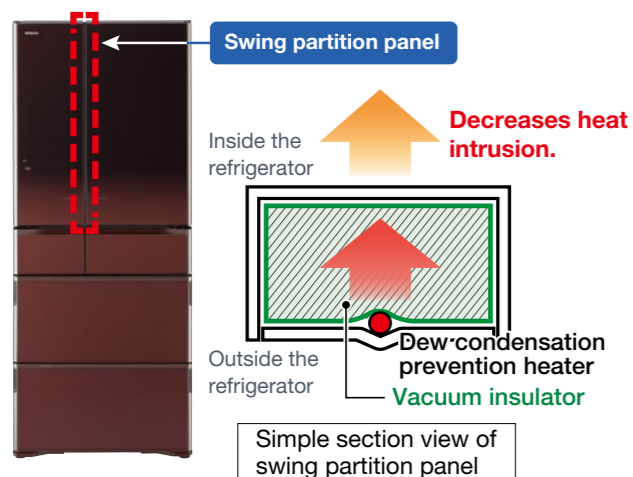


Multi-valve

Vacuum insulator

The combination of urethane foam, a conventional insulator, and the Vacuum Insulation Panel with higher insulation have realized a large volume refrigerator with high energy saving capacities.²

And by changing the inner insulating material in the swing partition panel from styrene foam to a vacuum insulator with smaller thermal conductivity, the intrusion of heat into the refrigerator has been more efficiently prevented as compared with conventional models.



● Power-Saving Features

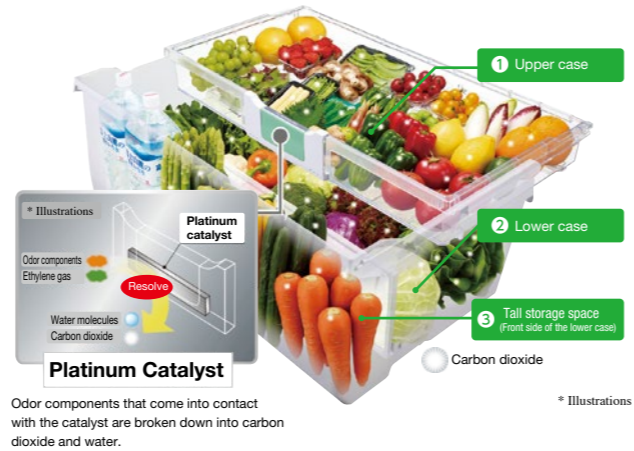
Learning about life patterns

The refrigerator learns the pattern of refrigerator use at each household based on the time and frequency of opening the door. During the time period when the door remains closed while the family is out, or when the door is not frequently opened at night, the heater of the refrigerator performs defrosting and minimizes rises in temperature inside the refrigerator.

● Distinctive Hitachi Technologies

The platinum catalyst enables the entire vegetable compartment to store vegetables in a sleep-like state.³

The platinum catalyst developed by Hokkaido University works efficiently at low temperatures. Hitachi is engaged in joint research with Hokkaido University, and adopted the platinum catalyst for the first time for a home refrigerator. The catalyst increases the generation of carbon dioxide relative to the photo catalyst used in the previous year’s model,⁴ thereby enabling the entire vegetable compartment to store vegetables in a sleep-like state.³



¹ Released to the market sequentially from August 13, 2015. Used for domestic HFC-free refrigerators in Japan. Internal research.

² The location, shape, and quantity of vacuum insulators vary based on the model.

³ Carbon dioxide is generated from vegetables when they breathe, and increases when the platinum catalyst decomposes ethylene gas and odor components, increasing the concentration of carbon dioxide in the vegetable compartment. The high concentration of carbon dioxide causes vegetables to close their stomas, decrease breathing activity, and reduce the consumption of nutrients, thereby keeping the vegetables fresh.

⁴ FY2014 Model R-X6700E

Rice cooker

Thick thermal sprayed iron pot, “Ohitsu Gozen”

The rice cooker can cook deliciously even a small portion of rice, and can be served on the table as it is.

Exclusively made to cook a small portion of delicious rice. The rice cooker has a small inner pot and consumes much less electric power than a conventional 1.0 L (5.5 cups) rice cooker when used for a small portion.¹ When the pot is detached from the heat source after the rice is cooked, the cooker retains heat and the rice is kept warm.



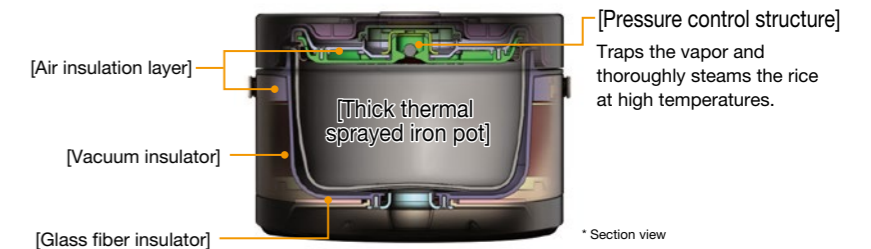
¹ Internal research. Comparison of electric power consumed when cooking 0.36 L (2 cups) of rice between RZ-WS2M that consumes 134 Wh/each time and 1.0 L (5.5 cups) cooking IH jar rice cooker RZ-WV 100M that consumes 144 Wh/each time.

● Energy-Saving Technologies

Whole circumference insulation structure/pressure control structure

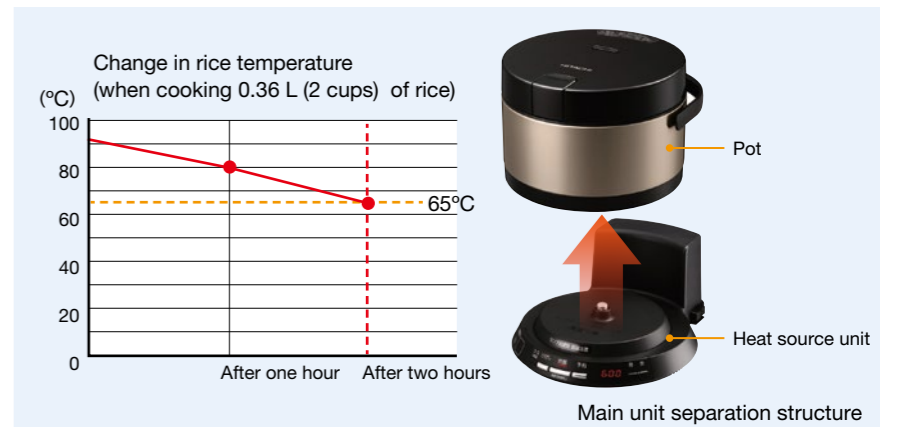
The whole circumference insulation structure, in which the hammered iron inner pot is coated with a vacuum insulator that features technology originally developed as the energy saving technology for refrigerators. The pressure control structure minimizes pressure leakage. These structures enable the cooker to trap heat and steam the rice at high temperatures. The technology makes the rice delicious. And when cooking rice, this compact cooker with its inner pot of small heat capacity also reduces electric power consumption.¹

[Whole circumference insulation structure]



Main unit separation structure

The pot can be separated from the heat source unit, which is made of IH coil, etc. This main unit separation structure and the whole circumference insulation structure keep the rice warm at 65°C for about two hours without using electricity when the pot is served on a table.²



² Internal research. The temperature of rice in the inner pot was measured after 0.36 L (2 cups) of rice was cooked and stirred (at initial temperature of approx. 90°C), and then the lid was closed. The room temperature was 23°C. The time varies according to the amount of rice and ambient temperature.

● Resource Conservation

With less parts that need washing, a compact size cooker enables energy saving.

Instead of using a heater to heat from above, as is the case in conventional rice cookers, this cooker adopts an air insulation layer in the inner lid. Only three parts—the inner pot, inner lid, and steam port—require washing. The compact size has been achieved as the rice cooker is designed exclusively to cook small portions of rice.



Washable inner lid and steam port

Inverter pump

For a shallow well, pressurized water supply, "Smart Tsuyoshi-kun"

Achieves the highest energy saving¹ and the lowest noise².

¹ As of August 31, 2016. Measurement in compliance with JIS B 8314. Electric power consumption of 350 W with a 250-W class electric pump for a shallow well.
² As of August 31, 2016. Measurement in compliance with JIS B 8310. Operation noise of 40 dB at suction height of eight meters with a 250-W class electric pump for a shallow well.

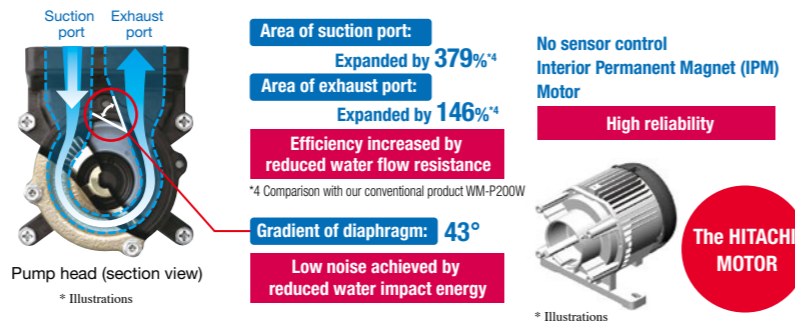


To save energy and minimize noise, the "high efficient pump head" and "high performance IPM³ motor" are installed, achieving the highest energy saving¹ and the lowest noise².

Energy-Saving Technologies

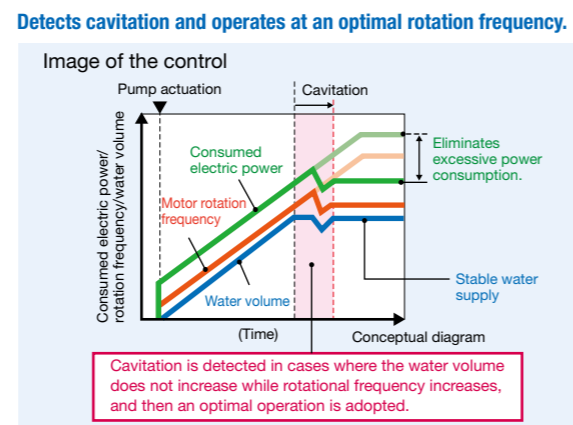
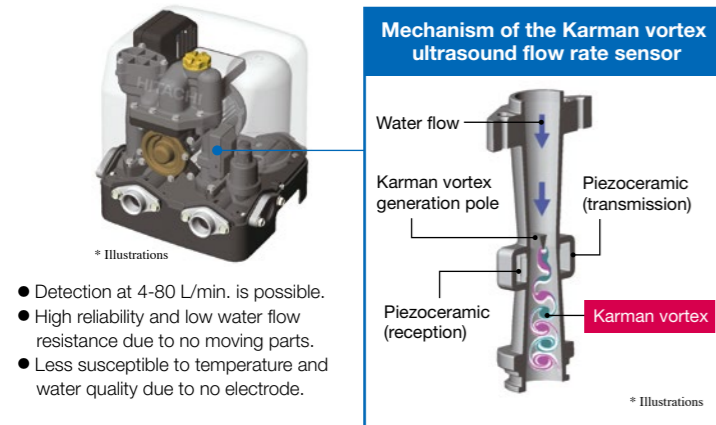
High efficiency pump head/high performance IPM³ motor

The inverter pump is installed with the high efficiency pump head featuring a new flow design based on fluid analysis to optimize the flow route area and configuration so as to reduce water flow resistance, and with the high performance IPM³ motor designed exclusively for pumps. This enables the lowest electric power consumption of 350 W¹ in the 250-W class of motor output, and the lowest operation noise of 40 dB.²



Karman vortex ultrasound flow rate sensor

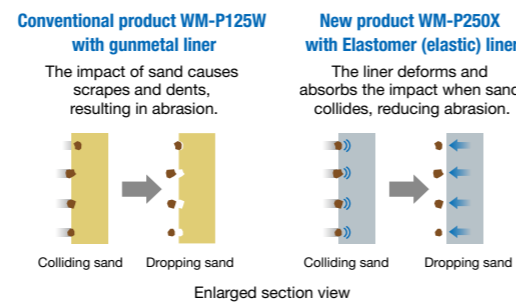
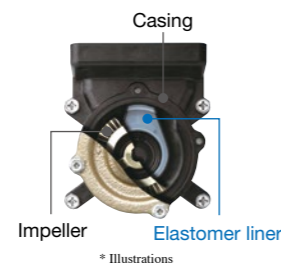
Hitachi's original "Karman vortex ultrasound flow rate sensor" that monitors water flow in the pump flow route is installed. The sensor detects cavitation⁵ that adversely affects efficiency and makes the water supply unstable. Smart Control is newly adopted for optimal operation. This eliminates excessive power consumption and achieves a stable water supply.



Distinctive Hitachi Technologies

Abrasion resistant, elastic casing

The "abrasion resistant, elastic casing" adopts a new elastic material (Elastomer) with high abrasion resistance in the high pressure part of the pump head casing. This dramatically reduces abrasion during use and maintains pressure for a long time.



³ IPM: Interior Permanent Magnet
⁵ Air bubbles are generated in the suction duct and suction flow route in case of high water flow resistance and a fast flow. This decreases the water supply, and also causes oscillation and noise in the pump.

Natural Refrigerant Heat Pump Water Heater for industrial use

High Efficiency Heat Pump Water Heater for industrial use

(ED/EDK/EJ/EJK series)

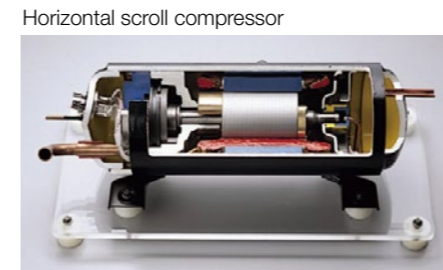
Heat pump unit RHK-15ED



Energy-Saving Technologies

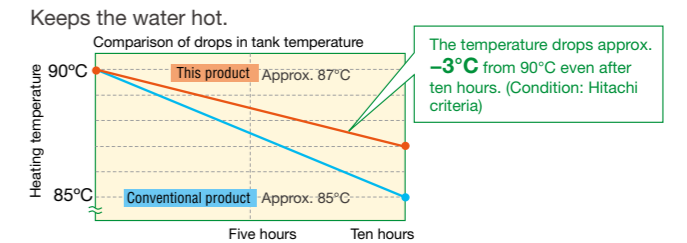
Horizontal scroll compressor

The newly designed "horizontal scroll compressor" improves intermediate period heating efficiency from 4.3 to 4.4 in comparison with our conventional RHK-15CD (Annual heating efficiency: 4.2¹). Energy saving capacity has thus been further improved.



Uretank

The hot water tank [Uretank] with a urethane foam-filled insulation structure prevents drops in temperature during its heat retaining operation. Urethane foam is applied on all surfaces and spaces of the tank, thereby improving the rigidity of the hot water storage unit. Up to six anchor bolts can be used for fixation that secures earthquake-resistance strength of 1.0 G.²



¹ The annual heating efficiency is a measure of average performance in a year as calculated under conditions similar to those of actual use, based on the Japan Refrigeration and Air Conditioning Industry Association Standard (JRA 4060: 2014).
² 1.0 G when fixed with six anchor bolts. Corresponds to 2.0 G by using the upper fix metal.

* Approx. -2.5°C with the conventional model was improved to approx. -1.5°C according to the method (65°C after ten hours) specified by the Japan Refrigeration and Air Conditioning Industry Association Standard (JRA 4060: 2014).

Maintenance service for refrigerating and air conditioning products

Full maintenance lineup that satisfies all kinds of facilities ranging from small to large-scale facilities and ranging from air conditioning to refrigeration facilities.

The Act on the Rational Use and Proper Management of Fluorocarbons was enacted in April 2015. Hitachi offers various maintenance plans that accommodate the requirements of the Act.

Preventive maintenance

Hitachi offers various maintenance plans that satisfy users' needs, such as preventing air conditioner defects and failure, reducing power consumption through continuous normal operation, and extending the durability of facilities and instruments through periodic maintenance.

Maintenance service

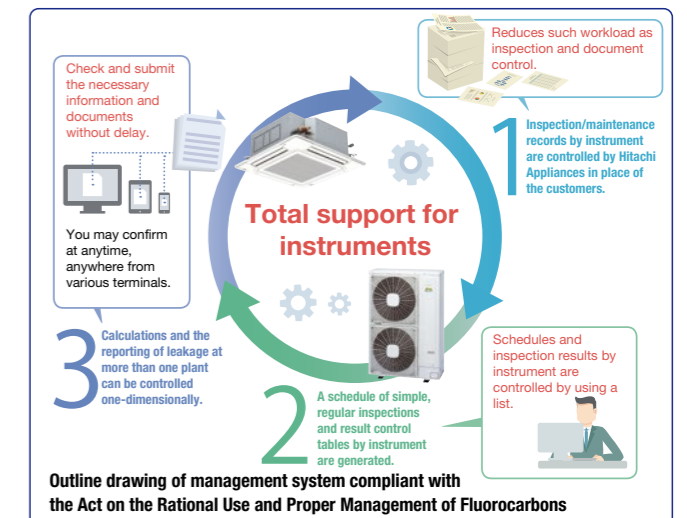
Hitachi offers various maintenance services for preventive maintenance, improving comfortability, maintaining energy saving functions, and extending durability that include overhauling a screw compressor, cleaning heat exchanger and filters, and tuning up the facility system instruments (e.g. pumps, fans, measuring/controlling instruments).

Remote monitoring system

The system monitors the operation of air conditioners and cooling facilities, notifies the timing of preventive maintenance based on the signs of alarms, automatically issues requests to service engineers for repair work in response to alarms, and automatically records a daily report (distribution of operation record data to users via the internet) to back up preventive maintenance and for emergency measures.

Control system compliant with the Act on the Rational Use and Proper Management of Fluorocarbons

Equipment managers need to record and store the history of instrument inspection/maintenance, and calculate and report fluorocarbons leakage in compliance with the Act on the Rational Use and Proper Management of Fluorocarbons. The system is a web-based control system that supports these control operations. We also inspect equipment and fill and recover refrigerants in compliance with the Act.



Hitachi's Environmental Vision

As global warming, resource depletion, ecosystem destruction, and other environmental issues grow more serious, there are growing demands and expectations that corporations must do more to reduce environmental impact. From an environmental-management perspective, Hitachi has established the Environmental Vision and defined the kind of society we envision in the long term in contributing to the resolution of global environmental issues.

Environmental Vision

Hitachi will resolve environmental issues and achieve both a higher quality of life and sustainable society through its Social Innovation Business in collaborative with its stakeholder.

Our Environmental Vision envisions a low-carbon society; a resource efficiency; a harmonized society with nature. To achieve such a sustainable society, we have newly established a set of long-term

environmental targets called Hitachi Environmental Innovation 2050.

Environmental Innovation 2050

- Low-Carbon Society**
 - Achieve 50% reductions in CO₂ emissions by FY2030 and 80% reductions by FY2050 across the value chain (compared to FY2010).
- Resource Efficient Society**
 - Build a society that uses water and other resources efficiently.
 - Achieve 50% improvement in usage efficiency of water and other resources by FY2050 (compared to FY2010 in the Hitachi Group).
- Harmonized Society with Nature**
 - Minimize the impact on natural capital.

Hitachi Appliances, as a member of the Hitachi Group, seeks to realize the Environmental Vision through the development of eco-friendly products and environmental conscious manufacturing.

Action Guidelines for Environmental Conservation

Hitachi Appliances has established the Hitachi Appliances Action Guidelines for Environmental Conservation, prescribing the actions for environmental conservation in business activities.

Purpose

In order to realize an environmentally harmonious and sustainable society through products and services, Hitachi Appliances is committed to meeting its social responsibilities by promoting globally-applicable "MONOZUKURI" (designing, manufacturing or repairing of products), which is aimed at reducing environmental burdens of products throughout their entire life cycles, ensuring global environmental conservation.

Action Guidelines

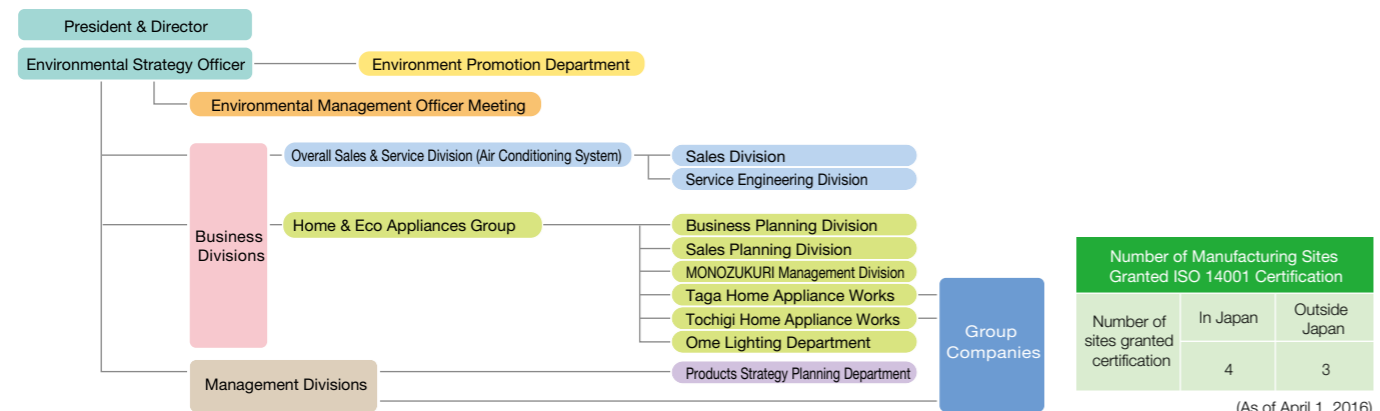
- Global environmental conservation is a critical challenge shared by all humans. Hitachi Appliances is committed, therefore, to fulfilling its responsibilities by assisting in the realization of an environmentally harmonious and sustainable society as one of its management priorities.
- Hitachi Appliances will make efforts to contribute to society by developing highly reliable technologies and production processes, while identifying needs considering concerns related to the prevention of global warming, conservation of resources, and preservation of ecosystem.
- Members of the board in charge of environmental conservation are responsible for facilitating appropriate environmental conservation activities. Departments responsible for environmental conservation should endeavor to promote and ensure environmental conservation activities, including improving environment-related rules and regulations and setting goals for environmental burden reduction. These departments should also confirm that their environmental conservation activities are conducted in a proper manner and ensure that these activities are maintained and improved.
- Hitachi Appliances will promote globally-applicable "MONOZUKURI" with the aim of understanding and reducing environmental burdens at every stage, including product research and development, design, production, distribution, sales, usage, and final disposal.
- Hitachi Appliances will investigate and review the environmental impact caused in the course of its "MONOZUKURI" processes. Hitachi Appliances will also introduce excellent technologies and materials useful to safeguard the environment, in other words, to reduce environmental burdens through energy and resource saving, recycling, chemical substance management, consideration of ecosystem, and other measures.
- Hitachi Appliances' environmental conservation efforts are not only to be focused on observing international environmental regulations and those of national and local governments, but also on conserving the environment by implementing voluntary environmental standards when necessary.
- Regarding globally-applicable "MONOZUKURI" activities, impact on the local environment and community are to be considered. In addition, measures that meet local communities' requests should be implemented.
- Hitachi Appliances will educate its employees to take action in order to obey environment-related laws, raise their global environmental awareness, and encourage their interest in environmental conservation having wide-view about society activities.
- Hitachi Appliances will evaluate potential environmental problems and prevent them from occurring. In the event that any environmental problem occurs, Hitachi Appliances will take appropriate measures to minimize the environmental burden.
- Hitachi Appliances will make efforts to disclose information on its environmental conservation activities to its relevant stakeholders. Hitachi Appliances will also actively communicate with these stakeholders so as to strengthen mutual understanding and forge cooperative relationships with them.

(Revised in July 2010)

Environmental Management Structure

Hitachi Appliances has Group-level policies and targets that are discussed and determined by the Environmental Management Board consisting of the Environmental Strategy Officer, who coordinates environmental policy for the entire Group, and environmental officers representing major Japanese offices and their key subsidiaries.

We are building an environmental management system based on ISO 14001, particularly at manufacturing sites with large environmental impact, and working to obtain certification by outside organizations to facilitate our environmental protection activities.



Development of Eco-Products

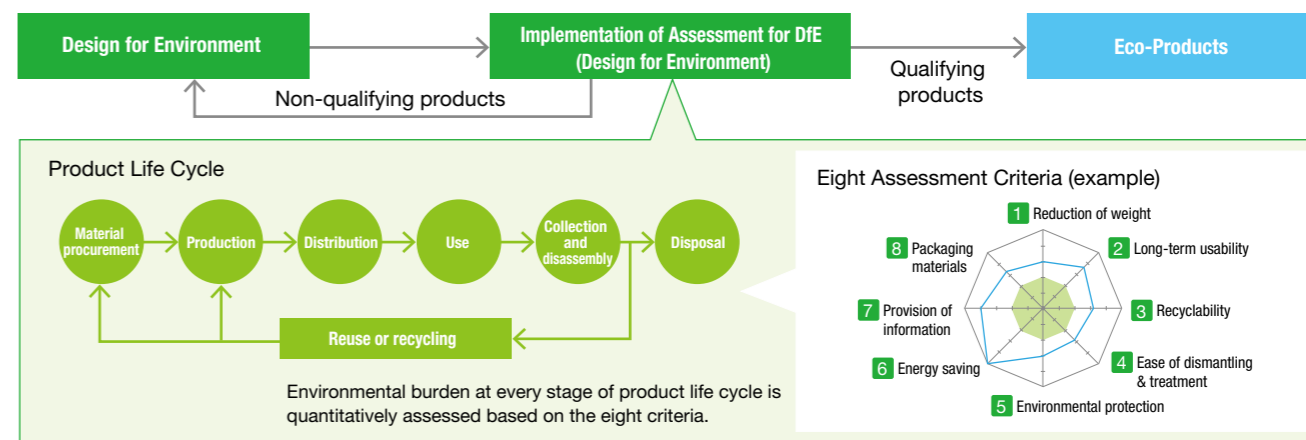
We conduct the Assessment for DfE (Design for Environment) at product development and design to minimize the environmental impact at every stage of the product life cycle.

The Assessment for DfE evaluates the environmental burden that occurs in the life cycle of products, from the procurement of raw materials to proper disposal or reuse, based on eight criteria that include reduction of weight, long-term usability, and recyclability, and comparing the models before a major specification change. Consequently, the models that satisfy certain criteria are designated as Eco-Products. In addition, Eco-Products that meet particularly

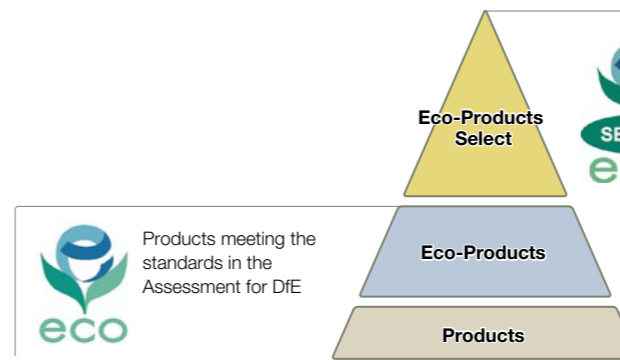
high standards are designated as "Eco-Products Select," which are promoted for increased production and sales.

In order to promote the development of Eco-Products, we are striving to increase the ratio of Eco-Product sales to total sales. As a result, the ratio of Eco-Product sales reached 99.9% in FY2015. Eco-Products Select increased by 31 models relative to the previous year, for a total of 234 models.

How the Assessment for DfE is performed



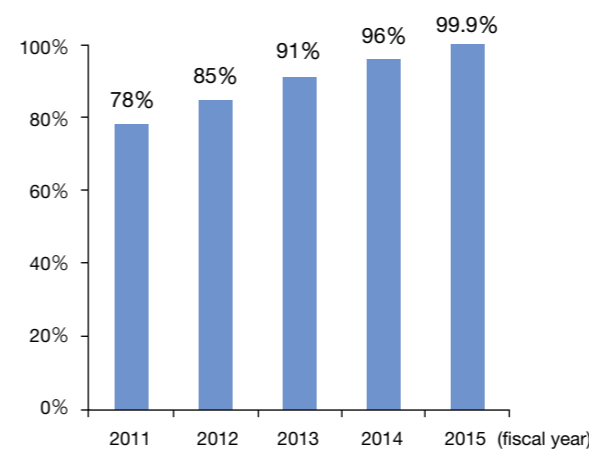
Environmentally-friendly Product Composition



Products meeting at least one of the following conditions:

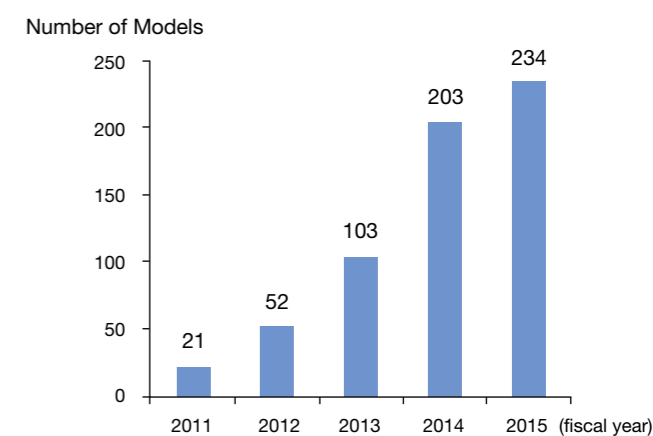
- Having environmental efficiency—an indicator of reduced greenhouse gas emissions and resource consumption and higher product value—of 10 times or more compared to equivalent products sold in FY2005, with environmental efficiency indicating:
- being an industry leader in terms of environmental performance such as the energy efficiency standard achievement rate,
- having won an external award or been publicly certified for excellence in environmental protection, and
- having reduced CO₂ emissions by 50% or more from equivalent products sold in FY2005.

Ratio of Eco-Product Sales to Total Sales¹



¹ The percentage of Eco-Product sales to total sales that excludes products whose environmental factors (e.g., patent fees) cannot be controlled or affected by Hitachi Appliances

Number of Eco-Products Select Models²



² The total number of models since FY2011

Recycling of Home Appliances

To comply with the Home-Appliance Recycling Law (Law for Recycling Specified Kinds of Home Appliances), Hitachi Appliances established Kantou Eco Recycle Co., Ltd. in 1999 within its Tochigi Works, which has been recycling four kinds of used home appliances.^{*1} As a recycling plant integrated into a production facility, information obtained from the plant is fed to product designs and utilized to improve the recycling rate of the products. Five companies^{*1} in the same industry that includes Hitachi cooperatively established and currently operate an efficient recycling system nationwide.

FY2015 saw a total of approximately 1,301,000 units of three products, with a total weight of approx. 50,000 tons, being recycled as products. Since April 2015, the legal recycling rates have been raised. The recycling rates of all products exceeded the legal standards.

*1 Room air conditioners, refrigerators & freezers, washers & dryers, and TVs (Cathode-ray tube, liquid-crystal, and plasma types)

*2 Hitachi Appliances, Inc., Sharp Corporation, Sony Corporation, Fujitsu General Limited and Mitsubishi Electric Corporation

FY2015 recycling for three end-of-life home appliance products

Item	Room air conditioners	Refrigerators & freezers	Washers & dryers	Total
Number of units recycled (thousand units)	225	379	697	1,301
Processing weight of recycled units (tons)	9,248	23,233	25,615	58,096
Weight of recycled material (tons)	8,825	19,119	24,129	52,073
Recycling rate (%)	95	82	94	—
Legal recycling rate (%)	80	70	82	—

*3 Period targeting room air conditioners: April 1 to September 30, 2015

*4 As of October 1, 2015, our room air conditioner production business was transferred to Johnson Controls – Hitachi Air Conditioning, Inc. Since October 1, 2015, Johnson Controls – Hitachi Air Conditioning has recycled room air conditioners.

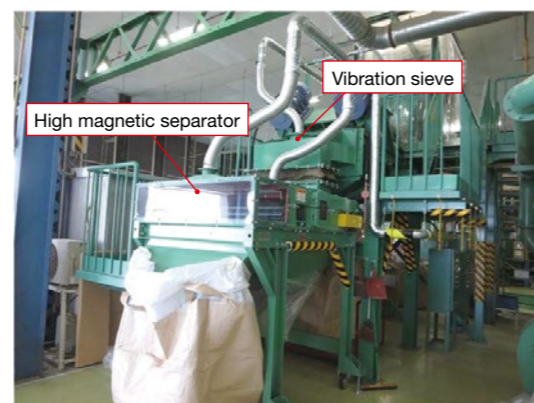
Management of Chemical Substances Contained in Products

The move to tighten the regulations on chemical substances led by the European Union (EU) is gradually spreading to the rest of the world including Asia. In the EU, the addition of prohibited substances and the abolition of the exemption are being discussed under the RoHS Directive (enforced in January 2013). Under REACH (enforced in June 2007), substances were added to the Substances of Very High Concern (SVHC)^{*1} about every six months, reaching a total of 169 as of June 2016. The China RoHS was also revised in China and applicable products were increased. Moreover, laws comparable to RoHS have been established in other Asian nations. In response to tightening of the laws and regulations in various countries, we have to handle this matter carefully from the standpoint of compliance and corporate social responsibility.

In response, we have established the Environmental CSR-compliant Monozukuri Standards for managing chemical substances contained in products at every stage from product development, design, and procurement to manufacturing. The Hitachi Group designate 18 prohibited substances and 27 controlled substances as the chemical substances regulated by Hitachi Group, which are published in the Green Procurement Guidelines.

Development of recycle technologies

For the heat insulator of refrigerators, the Vacuum Insulation Panel (VIP), which achieves more efficient heat insulation, is combined with the conventional urethane heat insulator. In association with the use of VIP, an increasing number of refrigerators that use vacuum heat insulators are being collected. However, in the process of recycling, urethane heat insulators collected after the products are crushed are recycled into solid fuel. The glass wool from a vacuum heat insulator may contaminate and degrade the recycled solid fuel. To solve this problem, we are developing recycling technologies to eliminate the glass wool from urethane heat insulators. More specifically, by utilizing the characteristic that iron powder generated when products are crushed is caught up in glass wool, an instrument for a demonstration experiment that efficiently separates glass wool from a urethane heat insulator by using a vibration sieve and high magnetic power is installed at Kanto Eco Recycle Co., Ltd., targeting practical use.



Glass wool elimination demonstration apparatus (appearance)

Hitachi Group Guideline for chemical substances contained in products

Guideline	Outline of revision
Hitachi Group Green Procurement Guidelines	Prohibited substances (Level 1) from 17 to 18; controlled substances (Level 2) from 20 to 27. Ver. 8.2 (Revised in October 2015)
Hitachi Group Guideline for analysis of response to RoHS Directive	By coordinating with ICE62321, ^{*2} technical issues necessary for operation are added. Ver. 3.0 (Revised in April 2016)

*1 SVHC: Substances of Very High Concern

*2 IEC62321: Determination of certain substances in electrotechnical products (International standard for testing/measurement of RoHS analysis). International standard of concentration of RoHS-targeted substances

Global Warming Prevention

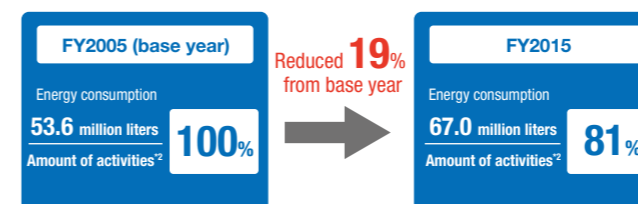
Hitachi Appliances has continuously striven to save energy in its production activities so as to help prevent global warming and reduce greenhouse gases. Specifically, we have been working to reduce them by using the energy consumption per unit^{*1} as an indicator since FY2013 in line with the Hitachi Group's activities.

The energy consumption per unit was reduced by 19% in FY2015 from that in FY2005. As improvement activities, we have been working systematically toward the installation of high-efficiency equipment such as LED lighting and the elimination of wasted energy by visualizing the electric power and other efforts.

*1 Energy consumption per unit: The indicator obtained by dividing the energy consumption (crude oil equivalent) by the amount of activities^{*2}

*2 Amount of activities: Values closely related to energy consumption (e.g., production output, production quantities)

Energy consumption per unit



Effective Utilization of Resources

Hitachi Appliances is reducing the amount of waste and valuable materials^{*1} generated in production activities, in order to make effective use of finite resources. As an indicator, we have been working to reduce the amount of waste and valuable materials generated per unit,^{*2} from the viewpoint of improving the efficiency of procurement and production processes.

The amount of waste and valuable materials generated per unit was reduced by 11% in FY2015 from that in FY2005 because of our various measures. Moreover, three of our business sites^{*3} have achieved zero emissions^{*4} in an attempt to reduce the amount of final disposals at landfills to zero.

*1 Valuable materials: Marketable materials as resource among those no longer used in production activities

*2 Amount of waste and valuable materials generated per unit: The indicator obtained by dividing the amount of waste and valuable materials generated by the amount of activities^{*3}

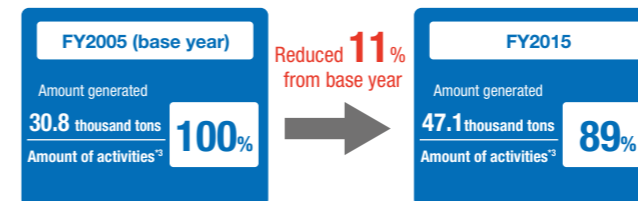
*3 Amount of activities: Values closely related to the amount of waste and valuable materials generated (e.g., production output and quantity)

*4 Zero emissions: This approach aims to reduce final disposals at landfills to zero by using waste as raw materials for other industries.

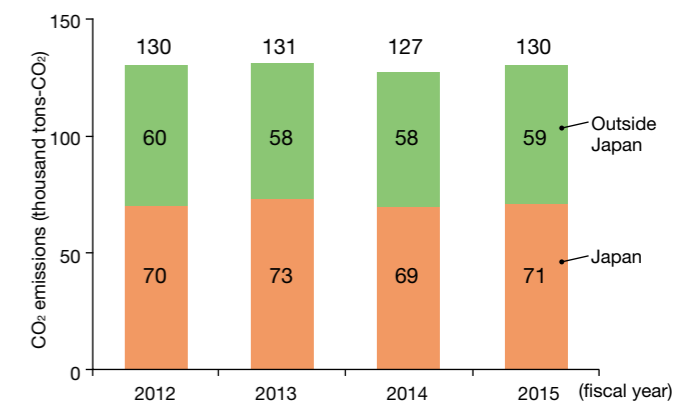
The Hitachi definition of this approach states that final disposal ratio^{*5} in a given year must not exceed 0.5%, and that evaluate for each works.

*5 Final disposal ratio: The amount of disposal in landfill ÷ waste and valuable materials generated.

Amount of waste and valuable materials generated per unit



Trends in CO₂ emissions

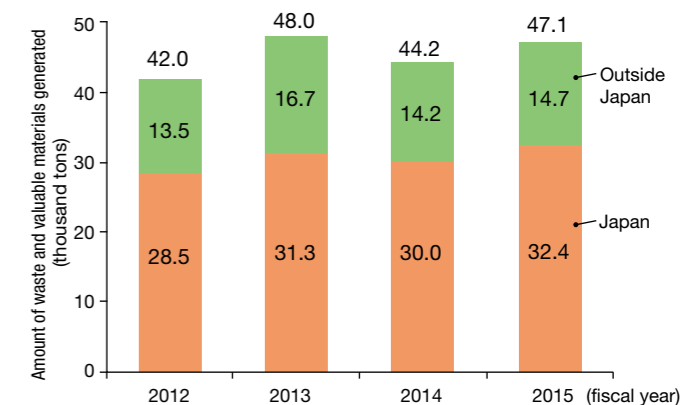


Data gathered: Taga Works^{*3}, Tochigi Works^{*3}, Ome Works, Hitachi Consumer Products (Thailand), Ltd., Hitachi Compressor (Thailand), Ltd., and Shanghai Hitachi Household Appliances Co., Ltd.

*3 Includes affiliate companies working with the above companies.

The CO₂ conversion coefficient used for the calculation of CO₂ emissions is the conversion coefficient by country in CO₂ Emissions from Fuel Combustion (2010: International Energy Agency (IEA) in 2005.

Trends in the amount of waste and valuable materials generated



Data gathered: Taga Works^{*6}, Tochigi Works^{*6}, Ome Works, Hitachi Consumer Products (Thailand), Ltd., Hitachi Compressor (Thailand), Ltd., and Shanghai Hitachi Household Appliances Co., Ltd.

*6 Includes affiliate companies working with the above companies.

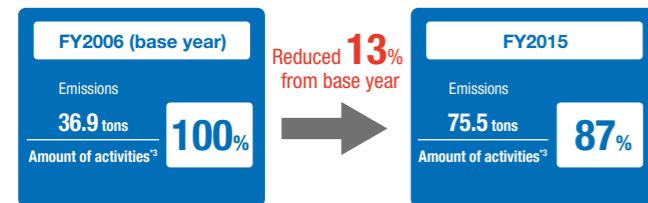
Management of Chemical Substances

Hitachi Appliances is reducing the atmospheric emissions of 41 volatile organic compounds (VOCs)¹ determined independently by the Hitachi Group, in order to help prevent air pollution. Specifically, we have been working to reduce VOC atmospheric emissions per unit² since FY2013 in line with the Hitachi Group's activities.

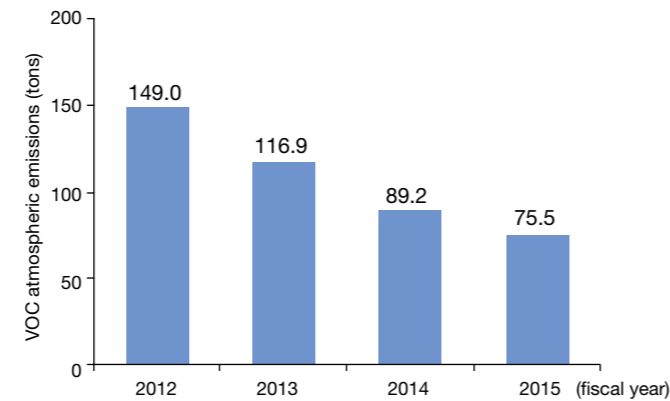
We achieved an improvement ratio of 13% regarding VOC atmospheric emissions per unit in FY2015 from that in FY2006 as a result of our efforts for reducing the consumption of paints and thinners.

*1 VOC: Volatile organic compounds such as toluene, xylene and ethanol.
 *2 VOC atmospheric emissions per unit: The value obtained by dividing the VOC atmospheric emissions by the amount of activities³
 *3 Amount of activities: Values closely related to VOC atmospheric emissions (e.g., production output, amount of VOCs handled)

VOC atmospheric emissions per unit (in Japan)



Trends in VOC atmospheric emissions (in Japan)



Data gathered: Taga Works⁴, Tochigi Works⁴, and Ome Works

*4 Includes affiliate companies working with the above companies.

Appropriate control of instruments in which polychlorinated biphenyl (PCB)¹ is used

We properly retain and control transformers, condensers, and fluorescent light stabilizers in which PCB is used, in compliance with the Waste Management and Public Cleansing Act and the Act on Special Measures concerning Promotion of Proper Treatment of PCB Wastes (PCB).

For waste that contains highly concentrated PCB, we have entrusted its disposal to Japan Environmental Storage & Safety Corporation (JESCO) in order to systematically dispose of PCB waste. For waste that contains PCB in low concentrations, we have entrusted its disposal to a business operator authorized by the Ministry of the Environment to dispose it appropriately. Through our efforts, the amount of PCB waste stored by our sites is steadily decreasing. We will continuously promote disposal systematically and complete full disposal by 2027, the deadline designated by the Act.

*1 Polychlorinated biphenyl (PCB): With excellent insulation and incombustibility, PCB was widely used for transformers, condensers, and electric appliances. Focus was placed on its toxicity following the Kanemi rice oil poisoning incident in 1968, and production has been discontinued since 1972.

PCB waste being taken out



PCB waste is packed into a drum and it is tightly sealed for storage and transportation.

Environmental Communication Activity

1 Our rice cooker, refrigerator and pump win the 2015 Energy Conservation Grand Prize

In the product and business model categories of the 2015 Energy Conservation Grand Prize for excellent energy conservation equipment awarded by the Energy Conservation Center Japan (ECCJ) and sponsored by the Ministry of Economy, Trade and Industry (METI), Hitachi's IH rice cooker Ohitsu Gozen series (of two models that include RZ-WS2M) received the Director General Prize of Agency of Natural Resources and Energy, while the large capacity refrigerator Vacuum Chilled series (of eight models that include R-X7300F) and the inverter pump Smart Tsuyoshi-kun series (of four models that include WM-P250X) received the Chairman Prize of ECCJ.

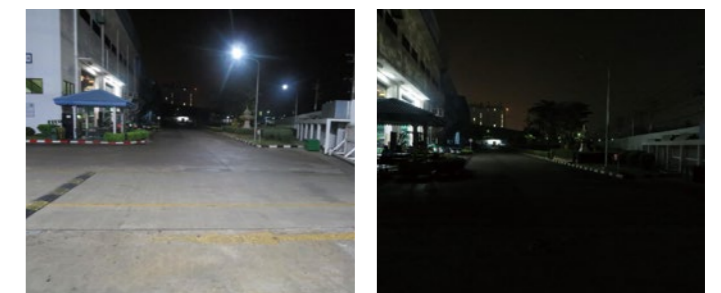
Three of our products have received the Energy Conservation Grand Prize for excellent energy conservation equipment for three consecutive years.



2 Hitachi Joins Global Lights-off Campaign

On March 19, 2016, the Hitachi Group participated in Earth Hour¹ organized by the World Wide Fund for Nature (WWF). The outdoor illuminations, office lights, and street lamps on the premises of all Hitachi companies around the world were turned off and remained off for an hour between 20:30 and 21:30 local time. We also turned off the lights for five days immediately before March 19 as an extended period of Earth Hour. A total of 250 Hitachi Group offices in 23 countries participated in the event, resulting in a reduction of approx. 37,000 kWh² of electric power during the six days.

Outside lights (Hitachi Compressor (Thailand), Ltd.)



Before lights off

After lights off

*1 An international event to share the goal of preventing global warming and saving the global environment as people around the world turn off electricity for an hour at the same time on the same day.

*2 Approx. 37,000 kWh of electric power is equivalent to approx. 20 t of CO₂.

3 Education of visitors to the company: Head Office

The head office of Hitachi Appliances offers study tours for visitors, mainly junior high and high school students who want to study about the company as part of their school trip itinerary in cooperation with the School Support Center, a specified nonprofit corporation.

In FY2015, 18 students from three schools visited us and learned about our company profile, as well as our efforts toward production and environmental protection. Regarding our efforts for the environment, the students were given explanations about global warming and other environmental issues, our eco products and related technology, and technological progress as part of our history. Through education, we promote a deeper understanding of environmental issues and our efforts for the environment, while raising environmental awareness.



4 Dispatching lecturers to technological seminars on proper disposal of industrial waste: Tochigi Works

In November 2015, a technological seminar was hosted by Environment Technology Association Tochigi. The Tochigi Works dispatched a lecturer in response to a request from the host.

This seminar targeted companies in Tochigi prefecture under the theme of proper disposal of industrial waste. The lecturer from the Tochigi Works explained their efforts regarding the proper disposal of industrial waste, recycling of polyethylene sheets, handling of waste generated in the production process and collected in garbage bags, and the thorough sorting of waste. Most of the participants were company employees in charge of industrial waste, and many exchanged opinions and ideas that included their tasks and efforts to reduce waste.



5 Cleaning the area around the office: Taga Works

The Taga Works of Hitachi Appliances cleans inside the company premises and the surrounding roads every month as part of a social environmental contribution activity. In FY2015, the cleaning activity near the office at Kawarago Beach, Hitachi city, which has continued since 1965, was canceled due to bad weather. We will continue cleaning the area around the office in order to protect the natural environment and raise environmental awareness among our employees.



6 National Fire Prevention Campaign: Ome Works

In November 2015 and March 2016, employees at the Ome Works of Hitachi Appliances cleaned the area around the Works. This activity is done every year for the purpose of collecting combustible materials and cigarette butts which may cause a fire, as part of the nationwide Fire Prevention Campaign. About 40 employees joined the event and collected a small truckload of combustible materials dumped around the Works including cigarette butts, plastic bottles and fallen leaves.



7 Participation in tree planting campaign: Hitachi Compressor (Thailand), Ltd. Thailand

On August 22, 2015, Hitachi Compressor (Thailand), Ltd. participated in a project to increase the areas of greenery, hosted by Rojana Industrial Park Public Co., Ltd., as part of an activity to prevent global warming. Rojana Industrial Park Public Co.,Ltd. has enhanced its relationship with other companies through volunteer work. As many as 15 companies participated in the event, and planted a total of 600 trees.



In order to encourage the employees to get involved in local society and boost awareness of the environment, we plan a tree planting activity every year.

8 World Environment Day 2015: Hitachi Consumer Products (Thailand), Ltd. Thailand

In June 2015, Hitachi Consumer Products (Thailand), Ltd. held World Environment Day 2015. The event is intended to increase environmental awareness of employees, and is organized internally by the company's Energy Conservation Committee.

Many employees participated in the event and planted trees on the company premises. Through the opportunity to think about environmental conservation and energy saving, employees found new ideas about the environment and energy saving, and boosted their environmental awareness.

We will continue to help our employees raise their environmental awareness through such internal events.



9 Participation in Appliance & Electronics World Expo (AWE): Shanghai Hitachi Household Appliances Co., Ltd. China

In March 2016, Shanghai Hitachi Household Appliances Co., Ltd. participated in Appliance & Electronics World Expo 2016 (AWE), the largest event of its kind in the area, held at the Shanghai New International Expo Center by the Appliance & Electronics Association of China.

Hitachi exhibited such Japanese eco-products as refrigerators, drum-type washer/dryers, microwave ovens, and IH rice cookers at our booth, where we welcomed many visitors.



● Company name	Hitachi Appliances, Inc.
● Main business	Development, manufacture and sales of kitchen and home appliances, lighting and housing equipment, and sales and services of refrigerating and air conditioning products
● President & Director	Takanori Ninomiya
● Capital Stock	20 billion yen (Hitachi, Ltd. 100%)
● Established	April 1, 2006 (Registered establishment date: November 26, 1998)
● Consolidated revenues	560.5 billion yen (for the fiscal year ended March 31, 2016)
● Consolidated number of employees	8,700 (as of the end of March, 2016)
● Website	http://www.hitachi-ap.com/

Atago Office (Head Office)

Atago Office (Head Office)

Hitachi Atago Bldg., 15-12, Nishi Shimbashi 2-chome, Minato-ku, Tokyo 105-8410, Japan

Overseas Network [Home appliances]

Shanghai Hitachi Household Appliances Co., Ltd.

TEL:+86-21-5178-2188
29F, Tower B, City Center of Shanghai, No.100 Zunyi Road, Shanghai 200051, China

Hitachi Compressor (Thailand), Ltd.

TEL:+66-35-330819~32
1/65 Moo 5, Rojana Industrial Park, Tambol Kanham Amphur U-Thai, Ayutthaya 13210, Thailand

Hitachi Consumer Products (Thailand), Ltd.

TEL:+66-3728-4000
610/1 Moo 9 Tambol Nongki Amphur Kabinburi, Prachinburi 25110, Thailand

Overseas Network [Refrigerating and Air conditioning products]

Hitachi-Johnson Controls Air Conditioning, Inc.

TEL:+81-3-6721-5567
New Pier Takeshiba South Tower, 16-1, Kaigan 1-chome, Minato-ku, Tokyo 105-0022, Japan

Factories in Japan

Tochigi Works	Tochigi City, Tochigi Prefecture
Taga Works	Hitachi City, Ibaraki Prefecture
Ome Works	Ome City, Tokyo

Sales Divisions, Branches, and Marketing Offices in Japan (Air Conditioning System)

Hokkaido Marketing Branch	Kitanihon Branch Office
Fukushima Marketing Branch	Kanto & Overall Sales Branch Office
Hokuriku Branch Office	Chubu Branch Office
Kansai Branch Office	Chushikoku Branch Office
Shikoku Marketing Branch	Kyushu Branch Office

Sales Divisions, Branches, and Marketing Offices in Japan (Eco & Appliances)

Kitanihon Marketing Branch	Kanto Marketing Branch
Chubu Marketing Branch	Kansai Marketing Branch
Chushikoku Marketing Branch	Kyushu Marketing Branch

Group Companies in Japan

- Hitachi Taga Technology, Ltd.
- Hitachi Air Conditioning Kanto Co., Ltd.
- Niigata Hitachi Co., Ltd.
- Hitachi Air Conditioning Kansai Co., Ltd.
- Hitachi Air Conditioning Kyushu Co., Ltd.
- Kanagawa Hitachi Air Conditioning Co., Ltd.
- Shizuoka Hitachi Air Conditioning and Refrigeration Co., Ltd.
- Kanto Eco Recycle Co., Ltd.
- Hitachi Softec Co., Ltd.

Scope of Report

- Reporting Period: FY2015 (1 April, 2015 to 31 March, 2016)
- Scope of Reporting: Hitachi Appliances, Inc. and its consolidated subsidiaries
(Where the scope is different from the above, describe it is so indicated.)
- How to set the base year data: JIS Q 14064-1:2010 "Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals" is referred.
- Reporting cycle: Issued annually as an annual report
- Website: (Japanese version only) <http://www.hitachi-ap.co.jp/corporate/environment/kankyo/>
- Guidelines referred: "Environmental Reporting Guidelines 2012" (Ministry of the Environment)
"Environmental Performance Indicators Guidelines for Businesses 2002" (Ministry of the Environment)
"Environmental Reporting Guidelines 2001 -With Focus on Stakeholders" (Ministry of Economy, Trade and Industry)

Photo on the front page

Japanese grouse. Birds in the alpine zone of the Chubu region of Honshu. Its body length is approx. 37 cm. Special Natural Monument designated by the government. Designated as the prefectural bird by Toyama, Nagano, and Gifu prefectures. The Japanese grouse is classified under Endangered Species Category IB (EN) on the red list of Japan's Ministry of the Environment.

Contact Address

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