

Hitachi Appliances Environmental Report 2013



In Home Appliances, Air Conditioning Systems and New Environmental Technologies, we produce innovative products that enhance the enjoyment of life while leaving a smaller imprint on the environment.

At Hitachi Appliances we take great pride in our work to improve quality of life. We develop, manufacture, and market state-of-the-art products for homes and businesses worldwide. We term our goods premium— not as a simple designation for luxury, but to describe their combination of life-enriching convenience and low-impact environmental performance.

In each of our business domains, we are at the forefront of product innovation. This is especially true in regard to the environment. We continue to find new ways to conserve resources, reduce energy consumption, and minimize environmental impact at each stage of the product lifecycle.

In Japan, we are one of the leading manufacturers of environmentally friendly home appliances,

including refrigerators, washing machines and other premium electrical goods. Our extensive range of air conditioners, which are as renowned for energy savings as life comfort, serves homes, businesses and numerous industries. And with an eye toward market leadership, we develop solar power generation systems, LED lighting equipment, and other innovative new environmental products.

Our outlook is global. Through our Japan-based research and development, we develop core technologies that serve as platforms for local manufacture of superior-quality products worldwide. We conduct manufacturing and sales in China, Taiwan area, India, Brazil, Europe, and Southeast Asia. By building strong bonds in local



markets, we ensure that our products are in touch with local needs.

Striving to make life more comfortable for ourselves and generations to come is a fundamental human desire. Realizing it requires as much focus on protecting the environment as on bringing greater convenience to life. With the innovative technologies Hitachi Appliances is producing, we indeed have reason to be enthusiastic about the future.

President and Director

Takanori Ninomiya

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Energy-saving technologies and features that realize both large capacity and energy conservation

Refrigerator

This refrigerator boosts energy performance by efficiently combining Frost Recycling Cooling Technology, which uses temperature and humidity sensors installed in various locations to detect ambient conditions, patterns of use, and ordinary cooling operation and by finely regulating the compressor and the valve that controls refrigerant flow. It incorporates a new mechanism that inhibits over-cooling or uneven cooling by automatically switching the flow path of chilled air inside the refrigerator.



R-C6700 (XT)

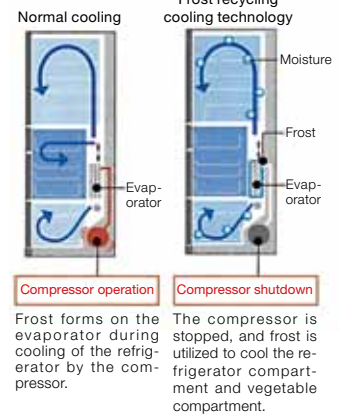
Energy-Saving Technologies

Frost Recycling Cooling Technology

Frost builds up on the evaporator during compressor operation to cool the refrigerator. Since the formation of frost on the evaporator reduces cooling efficiency, frost is melted using a heater. Frost Recycling Cooling is a technology that stops the compressor cooling operation and uses air cooled by frost adhering to the evaporator to cool the refrigerator compartment and vegetable compartment. Since frost is consumed in the chilling process, frost removal using the heater and power consumption are reduced.



*Concept photo



*Illustrations

Flexible Vacuum Insulation Panel

The flexible vacuum insulation panel is an insulation material with increased insulation efficiency achieved by reducing heat transfer by convection or conduction through the creation of an airless vacuum around the panel core. A key characteristic of flexible vacuum insulation panels is that they can be molded three-dimensionally to conform to the inside of complexly shaped insulated walls. Since



these panels can be used even for uneven areas, they help reduce power consumption.

HFC-Free

A hard urethane insulation material made using a HFC-Free insulation foam gas (cyclopentane) is used for areas other than vacuum insulation panels. In addition, it utilizes R600a (isobutane), a HFC-Free refrigerant that has a lower impact on global warming than the CFC alternative R134a.

Power-Saving Features

Power-Saving Mode

When the refrigerator shifts to Power Saving Mode, it reduces cooling power to an extent that doesn't affect food storage and lowers compressor RPMs. Other power-saving measures are shortening of the time until door alarm activation from the usual sixty seconds to thirty and quick dimming of the LED light inside the refrigerator to promote rapid opening and closing of the doors.



from the opening and closing of doors. To minimize internal temperature increase, the defrost heater is used when the inside temperature is comparatively stable, such as at night or when the family is away, times when the doors are infrequently opened and closed.

ECO Operation Sign

The ECO sign is illuminated when compressor operation is comparatively stable and is extinguished when refrigerator load is high, such as when the doors are frequently opened and closed or during quick freezing.



Lifestyle Learning Function

The refrigerator learns the household's patterns of refrigerator use

High water efficiency from the Eco Beat washing system

Washer-Dryer

This washer-dryer is equipped with the Eco Beat washing system, which thoroughly cleans clothes with a small amount of water. S-shaped beat wings lift up the clothes, a water-saving circulation pump constantly circulates the water, and a wide-angle circulating shower sprays detergent liquid across a wide area, ensuring thorough penetration into the clothes. The Water Sensor system supports water and energy conservation by using seven sensors to intelligently adjust the detergent quantity indicator, water volume, and washing time.

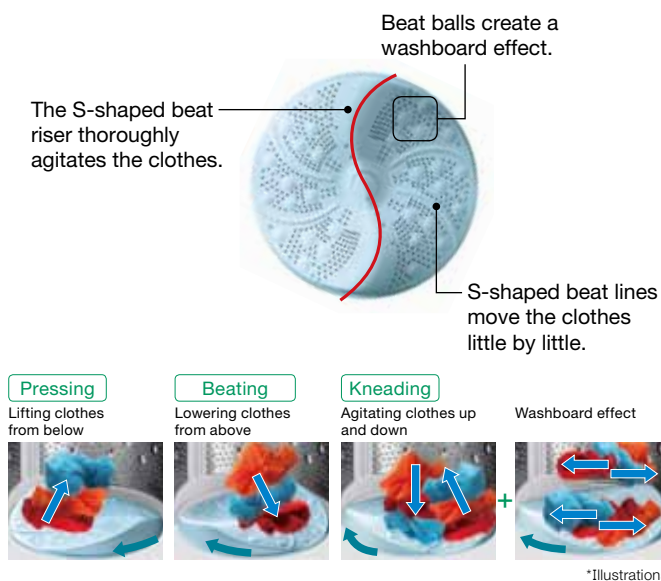


BW-D10SV (N)

Water-Saving Technologies

Wide-Angle Circulating Shower / S-shaped Beat Wings

A wide-angle circulating shower sprays detergent liquid over a wide area. S-shaped beat wings with an S-shaped riser move the clothes up and down and side to side, reducing uneven washing and rapidly washing clothes to a brilliant white.



Water-Saving Circulation Pump

This is the only top-loading washer-dryer equipped with a water-saving circulation pump. It employs a laundry method that saves water by circulating the wash water, unlike the conventional method of washing in a tub filled with water.



Power-Saving Features

Water Sensor System

This system measures water hardness, water temperature, detergent level, laundry characteristics, laundry quantity, rinse condition and spin condition, and smartly sets the detergent quantity indicator, water volume and washing time.

Sensor 1 Water hardness

This sensor detects water hardness. When the water is soft, a reduced detergent quantity is indicated. Detergent foaming varies depending on water hardness.



Hardness 30ppm Hardness 120ppm

Sensor 2 Water temperature

The sensor detects water temperature. When the temperature is high, a reduced detergent quantity is indicated, and wash time is reduced.



Sensor 3 Detergent

NEW

When detergent is dissolved, the sensor detects how easy it is to rinse the detergent out*1. When rinsing conditions are favorable*2, the number of rinse cycles is reduced from two to one.

*1 Ease or rinsing varies according to the detergent components and load.
*2 Such as when concentrated liquid detergent is used.

Sensor 4 Laundry characteristics

This sensor detects laundry characteristics. When the load includes lots of chemical fibers, water volume is reduced.

Sensor 5 Laundry quantity

This sensor detects laundry quantity and ensures an appropriate wash water level.



Sensor 6 Rinse condition

The sensor detects residual detergent in the rinse water of the second rinse cycle. When the load has been thoroughly rinsed, rinse time is reduced.

Sensor 7 Spin condition

This sensor detects the amount of water released from the laundry. When the laundry has been thoroughly wrung out, spin time is reduced.

Energy-saving and powerful performance combined with Kurashi camera operation for greater energy efficiency*¹ and comfort

Room Air Conditioner S series

CV-PAM* control and other energy-saving technologies reduce power consumption. The Kurashi camera detects people entering and exiting the room, the number of people in the room and their locations, the amount of activity in the room, the room layout*², and sunlit areas, making possible operation that takes into account both energy efficiency*¹ and comfort by controlling temperature and the volume and direction of air flow.

*CV-PAM: Cascade Vector-Pulse Amplitude Modulation



Outdoor unit: RAC-S40C2

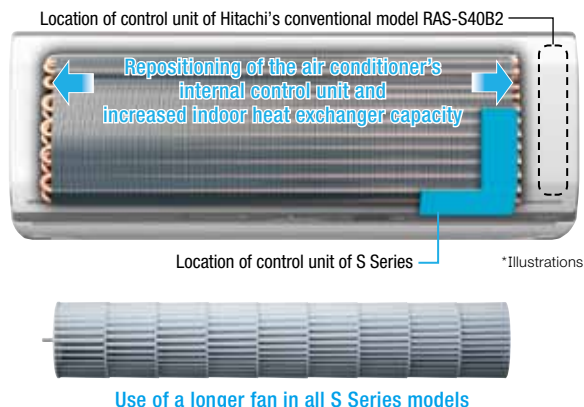


RAS-S40C2 (W)

Energy-Saving Technologies

Indoor Unit Structure

A review of the position of the control unit on the indoor unit made it possible to increase the width of the indoor heat exchanger and cross-flow fan, resulting in a higher volume of air flow and greater efficiency in heat exchange.



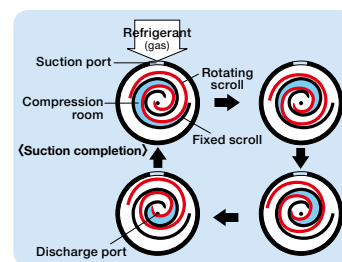
CV-PAM Control

The inverter that drives the compressor is equipped with CV-PAM control, which ensures stable control of the motor from the low-rotation range, in which operating time is long, to the high-rotation range, which requires power. SJ-MOS* transistors, which entail little circuit loss, are used for 4.0 kW-class S Series models to further increase efficiency.

*SJ-MOS: Super Junction Metal Oxide Semiconductor Field Effect Transistor

Scroll Compressor

Two spiral blades gently perform suction, compression and discharge, delivering powerful and efficient operation.



Power-Saving Features

Kurashi Camera

The Kurashi Camera detects people entering and exiting the room, the number of people in the room and their locations, the amount of activity in the room, the room layout*², and sunlit areas. Pressing the Kurashi Camera Eco Korekkiri button activates an operation

mode that delivers both energy efficiency*¹ and comfort by taking into account room temperature and humidity and the amount of clothing worn by the occupants*³ in addition to information captured by the Kurashi camera.



Convenient Features

During heating or cooling, pressing the Power Cut button automatically sets the temperature to 28°C during cooling and 20°C during heating for maximum power saving. Similarly, pressing the Fan Only button puts the air conditioner in Fan Only mode to circulate air.

*1 Evaluation of the RAS-S40C2 under conditions independently established by Hitachi Appliances

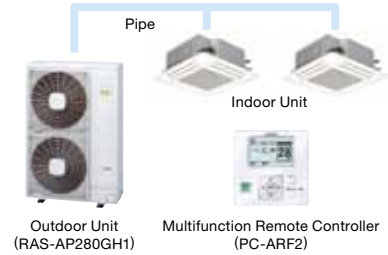
*2 Assumption of use in a kitchen or dining room use in view of the characteristics of human movement

*3 Assumptions about the ordinary amount of clothing for each season prepared by Hitachi Appliances

More convenient, smarter energy conservation

Packaged Air Conditioning System for Stores and Offices

This system makes power saving simple and convenient thanks to the energy-saving features of the equipment coupled with greater energy conservation control made possible by individual operation of indoor units, the indoor unit motion sensor, and the multifunction remote controller.



Energy-Saving Technologies

Scroll Compressor

Modifications to the compressor structure, including the release valve and scroll gear shape, and the use of a concentrated winding DC brushless motor have increased compressor efficiency.

New Compressor Mechanism
Improvement in intermediate pressure performance

New DC motor (concentrated winding)
Improvement in low-speed pressure performance

Scroll compressor

Heat Exchanger, Fan with Three-Dimensional Blades

Power consumption is reduced thanks to increased heat exchange efficiency made possible by newly developed fins and densely arranged small-diameter heat transfer tubes and greater fan efficiency from the use of three-dimensional twisted blades.

Conventional $\phi 7$ fin

Old and new fin

New $\phi 5$ fin

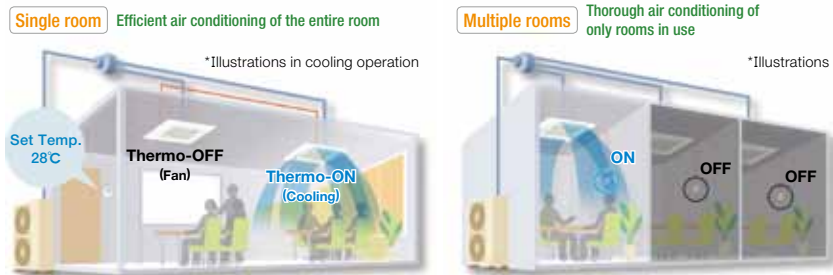
Three-dimensional blade fan

Power-Saving Features

Individual Operation

With this air conditioning system, multiple indoor units*1 can be connected to a single outdoor unit, and the operation of each indoor unit can be separately controlled. This makes it possible to adjust air conditioner settings according to the circumstances of use and environment.

*1 Up to 8 units can be connected. The number of indoor units that can be connected varies according to outdoor unit capacity.



Multifunction Remote Controller

The easy-to-operate remote controller provides a variety of power-saving settings and visualization features that facilitate air conditioner control.

Power-saving function: The following power-saving settings can be easily selected using the Power-Saving button.

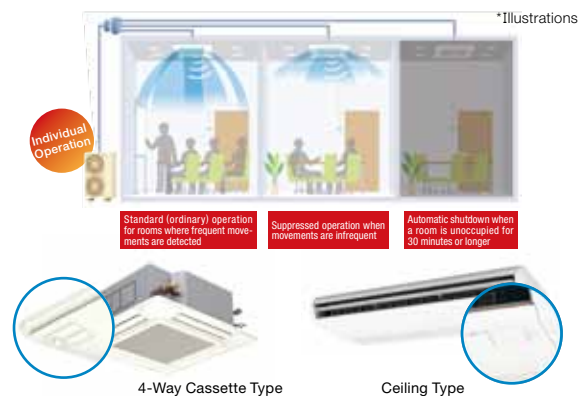
- Indoor unit capacity control:** Contribute to power saving by simply selecting Peak Cut mode, which reduces power consumption exceeding a predetermined power setting, or Reduced Capacity mode, which slightly reduces air conditioning capacity.
- Indoor unit rotation control:** When operating multiple indoor units, reduce air conditioning operation by sequentially switching units to air circulation operation (thermostat off).
- Intermittent operation control:** Switch between cooling operation and air circulation operation (thermostat off) at fixed intervals by switching the indoor unit thermostat on and off (intermittent operation).

Scheduling function: It is possible a weekly operating schedule and specify detailed power-saving settings.

Visualization function: Data for power consumption and CO₂ emissions, may be displayed in graph and/or list form on the remote controller.

Motion Sensor

Combined use of a motion sensor installed on indoor units*2 and Individual Operation, a standard feature on all outdoor unit models, reduces power consumption below the level during ordinary operation by automatically suppressing air conditioning operation in response to the movements of room occupants.



*2 Comes as standard equipment on 4-Way Cassette Type. A motion sensor kit is available as an option for 1-Way Cassette Type and Ceiling Type.

A diverse product line for every application from home use to facilities lighting

LED Lighting

We apply the high-quality technologies and stable production system developed in the home appliances business to LED products, focusing the capabilities of laboratories that create leading-edge technologies on advanced LED product development.

LED Ceiling Light



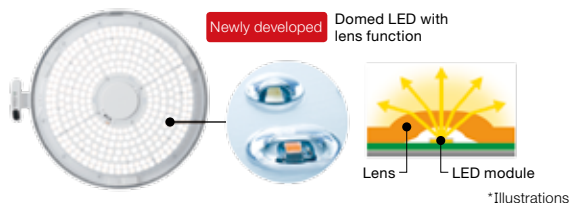
LEC-AHS1410A

The use of newly developed domed LED units with a lens function realizes the maximum brightness within the brightness standard^{*1} and high energy performance with intrinsic energy consumption efficiency^{*2} of 85.8 lm/W.

^{*1} Housing Catalog Applicable Tatami Units Labeling Standards (Guide 121: 2011) established by the Japan Luminaires Association
^{*2} The intrinsic energy consumption efficiency (lm/W) of an LED light fixture is calculated by dividing the rated luminous flux (lm) by the rated power consumption (W).

Energy Performance

A newly developed lens function efficiently gathers and diffuses light from LEDs. Efficiently dissipating heat from the LEDs by optimizing the number and arrangement of domed LED units equipped with this lens ensures high efficiency with no loss of brightness, realizing both a large amount of light and high energy performance.



Power-Saving Features

The ceiling light features a Power Saving mode for dimming the light and reducing energy consumption at a single touch while maintaining the brightness standard for the room size. Lighting fixtures equipped with sensors also have an Eco Korekkiri function for automatically dimming or extinguishing the light and reducing power consumption when the room is sufficiently bright as a result of outside light or another light source.

The brightness sensor maintains illumination at a comfortable preset level.

Brightness from outdoor light and other source	Night time and other times of no outdoor light	Cloudy or rainy days	Times of sufficient outdoor light	Automatic switch-off when ambient light is sufficient	Maintain illumination at a comfortable preset level
Illustrations of automatic dimming, switching on, and switching off					
Lighting brightness (index)	100% ^{*3}	50%	15%	0%	
Power consumption (index)	100%	60%	25%	0%	

^{*3} When there is no external light, energy conservation may not be possible.

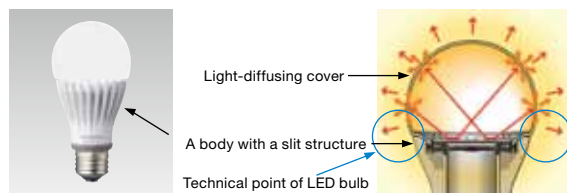
Functional image of ECO Korekkiri

LED Bulbs

A body with a slit structure that effectively dissipates heat emitted from the module and a light-diffusing cover that diffuses the LED light over a wide area realize maximum brightness equivalent to a 100-watt bulb and widely dispersed light similar to that of an incandescent light bulb from a module nearly the same size.

Since power consumption is approximately one-fourth^{*4} and the rated life is 40 times that of an incandescent bulb, saving energy is as simple as replacing incandescent bulbs with LED bulbs.

^{*4} Comparison of an LED bulb (LDA17L-G: rated power consumption of 16.7 W and rated life of 40,000 hours) with a Hitachi 100-watt incandescent bulb (LW100V90W: rated power consumption of 90 W and rated life of 1,000 hours). The rated life of the LED bulb is the design life calculated based on the temperature design specified for the LED unit. Product life varies depending on the use environment and method of use.



LDA17L-G

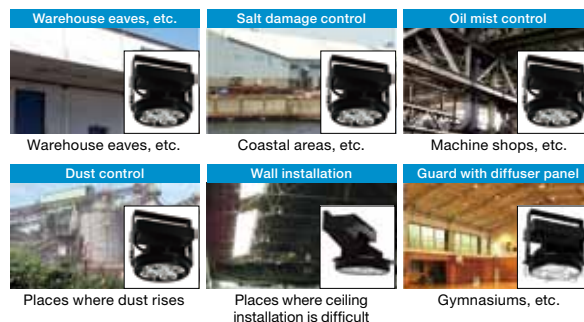
*Illustrations

LED Lighting Equipment for Facilities

We are also focusing effort on LED lighting for facilities, such as straight-tube LED lighting fixtures, and are expanding and upgrading a product line that offers substantial energy savings when used to replace conventional light sources. In particular, LED fixtures for high ceilings can save energy in a wide range of installation environments thanks to special environmental response technologies that enable their use even under eaves exposed to water and in plants where dust rises.

Special Environmental Response Technologies

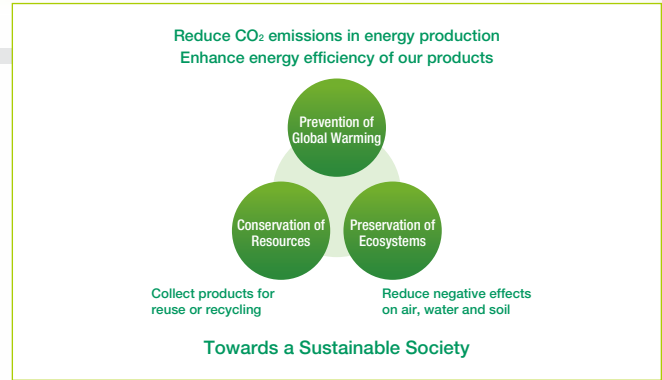
To prevent penetration by water, oil mist, or dust, LED fixtures for high ceilings have seamless cylindrical bodies, reinforced glass all around, and silicon packing that ensure sealing performance. Furthermore, the power circuit is housed in a dedicated enclosed case.



Applications for special environmental response technologies for LED fixtures for high ceilings

The Hitachi Group's Environmental Vision

The Hitachi Group has established an environmental vision that focuses primarily on the prevention of global warming, the conservation of resources and the preservation of ecosystems as its basic policy for environmental activities to contribute to the realization of a sustainable society. As a member of the Hitachi Group, Hitachi Appliances engages in environmental conservation activities to realize the environmental vision, including the development of eco-products and environmental impact reduction in production activities.



Action Guidelines for Environmental Conservation

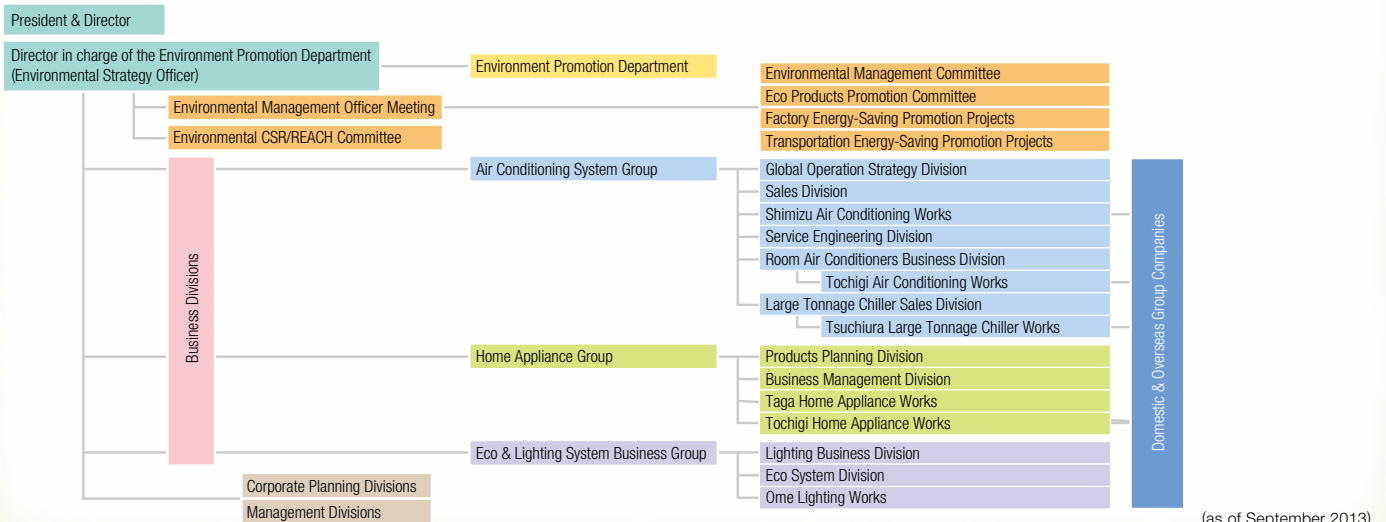
Hitachi Appliances has established groupwide guidelines that set forth actions for environmental conservation in business activities based on the Hitachi Appliances Group Standards of Corporate Conduct.

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	<ul style="list-style-type: none"> ① 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. ② 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. ③ 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. ④ 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. ⑤ 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. ⑥ 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. ⑦ 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. ⑧ 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. ⑨ 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. ⑩ 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. <p style="text-align: right;">(Revised on July 2010)</p>

Environmental Management Structure

Hitachi Appliances has established the Environmental Management Board Meeting as a forum for deliberations and decisions concerning Group-level policies and targets. This committee consists of the Environmental Strategy Officer, who coordinates environmental policy for the entire Group, and environmental officers representing

business sites and key domestic subsidiaries. Environmental protection activities are implemented by the Environmental Promotion Department, in cooperation with Business Divisions, Corporate Planning Divisions and Management Divisions, on the basis of decisions made by the Environmental Management Board Meeting.



Internal Environmental Auditing

In our aim to raise the level of environment activities across the whole group, we are conducting internal environmental audits at manufacturing sites that could have relatively large environmental impact. The audit teams are put together by the environmental representatives at business sites other than the Environment Promotion Department and sites covered by audits. Their role is to assess compliance with environmental laws and regulations and the implement status of various measures to meet Group targets.

In FY2012, an environmental audit conducted at Taiwan Hitachi Co., Ltd, confirmed that there were no major problems.

Building Environmental Management System

In order to make positive progress on environmental conservation activities, with a focus on Japanese and overseas manufacturing sites, the construction of an environmental management system based on ISO 14001 is proceeding and the Group is moving ahead on obtaining certification by outside organizations.

● ISO14001 Certification of Manufacturing Sites

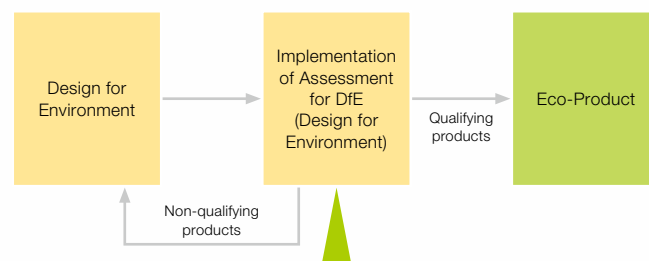
Site	Certification date
Tochigi Works	29 January, 1997
Taga Works	22 July, 1996
Shimizu Works	28 October, 1997
Tsuchiura Works	25 March, 1997
Ome Works	30 September, 1997
Hitachi Taga Technology, Ltd.	22 July, 1996
Hitachi Reftechno, Inc.	29 January, 1997
Hitachi-kucho SE, Ltd.	28 October, 1997
Hitachi Air-conditioning & Refrigerating Products (Guangzhou) Co., Ltd.	28 June, 2004
Hitachi Compressor Products (Guangzhou) Co., Ltd.	30 April, 2006
Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd.	19 December, 2005
Shanghai Hitachi Household Appliances Co., Ltd.	23 November, 2000
Hitachi Household Appliances (Wuhu) Co., Ltd.	10 October, 2003
Hitachi Home & Life Solutions (India) Ltd.	14 February, 2006
Hitachi Air Conditioning Products (Malaysia) Sdn. Bhd.	22 April, 1997
Taiwan Hitachi Co., Ltd.	28 August, 1997
Hitachi Consumer Products (Thailand), Ltd.	20 December, 1999
Hitachi Compressor (Thailand), Ltd.	4 November, 1999
Hitachi Air Conditioning Products Europe, S.A.	4 May, 1999

Development of Eco-Products

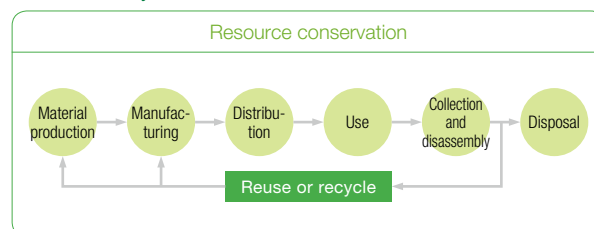
To reduce as far as possible environmental burden at every stage of the product life cycle from resource mining to disposal and recycling, Hitachi Appliance conducts assessments at the time of product development and design using Assessment for DfE (Design for Environment), an assessment system that sets forth specific environmental criteria. The system assesses eight criteria, including mass and volume reduction, long-term usability, recyclability and ease of dismantling and treatment using five levels (Levels 1 to 5). Products for which the assessment results of all eight criteria are at least Level 2, equivalent to the model before a major specifications change, and the average score for all eight criteria is Level 3 or higher are designated as Eco-Products.

In addition, Eco-Products that meet standards of an especially high level are designated as "Eco-Products Select." These products must satisfy one of the following four requirements: 1) having environmental efficiency of 10 times or more compared to equivalent products sold in FY2005, with environmental efficiency indicating reduction in greenhouse gas emissions and resource consumption and improvement in product value; 2) being an industry leader in terms of environmental performance; 3) being award-winning or publicly certified; and 4) achieving CO₂ emissions reduction of 50% or more compared with equivalent products sold in FY2005. In FY2012, fifteen models of refrigerators, washer-dryers, rice cookers and packaged air conditioning systems were designated as Eco-Products Select.

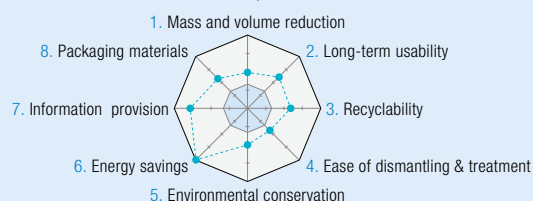
● How Assessment for DfE is Performed



Product Life Cycle



Eight Assessment Criteria (example)



Increase of Eco-Products

Hitachi Appliances is promoting the registration of Eco-Products, not only in Japan, but outside Japan, as well. The Company uses the local language to enable assessments of environmental conformance designs at outside Japan business sites and phrases the contents of these assessments to conform to the state of local laws and regulations and the social infrastructure.

In FY2012, 61 outside Japan models (series) of 6 products groups were registered as Eco-Products.

● Outside Japan Examples of Eco-Products

Refrigerators

Key features

- CFC & HFC Free
- Inverter Control
- Dual Fan Cooling
- Automatic Ice Maker
- LED Light

R-V600PWX (Sales region: Thailand)



Room air conditioner

RAU518HSD (Sales region: India)

Key features

- Auto Climate Technology
- Auto Restart
- 4-Way Air Swing



Recycling of Home Appliances

To comply with the Home Appliance Recycling Act (Act on Recycling of Specified Kinds of Home Appliances), Hitachi Appliances established the Kantou Eco Recycle Co., Ltd. home recycling plant within the Tochigi Works in 1999, where it recycles four types of used appliances (room air conditioners, refrigerators & freezers, washers & dryers and televisions). As a recycling plant integrated with a production works, Kantou Eco Recycle improves ease of product dismantling and sorting and promotes the use of recycled materials.

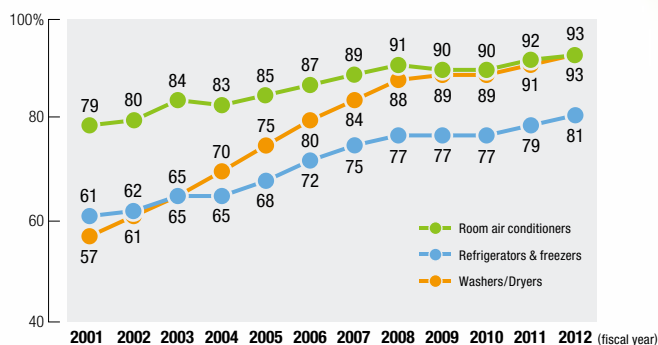
Hitachi Taga Technology, Ltd., based at the Taga Works, has established facilities to modify and recondition plastic collected from used appliances at the recycling plant. The recycled plastic is reused in products manufactured by Hitachi Appliances.

In FY2012, a total of approximately 1.389 million units of home appliances (room air conditioners, refrigerators & freezers and washers & dryers) were recycled as products. The recycling rate exceeds the legal standard for all products.

● FY2012 recycling for three end-of-life home appliance products

Item	Room air conditioners	Refrigerators & freezers	Washers / Dryers	Total
Number of units recycled (thousand units)	251	432	706	1,389
Processing weight of recycled units (tons)	10,324	27,351	24,704	62,379
Weight of recycled material (tons)	9,696	22,272	22,998	54,966
Recycling rate (%)	93	81	93	—
Legal recycling rate (%)	70	60	65	—

● Trends in the recycling rate of three end-of-life home appliances



Management of Chemical Substance Contained in Products

The Regulations for Environmental CSR-Compliant Monozukuri were established in 2005 for the Management of Chemical Substance Contained in Products in every stage from product development and design to procurement to manufacturing. In April 2013, the lists of prohibited substances*2 and controlled substances*3 were revised for compliance with various standards including the REACH regulations in EU.*1

When collecting information on chemical substance content, we conduct surveys with the assistance of our suppliers on the presence and volume of chemical substance content related to components included in our products, and of all purchased materials related to production including materials that could be included in our products. The content information obtained in this survey is tracked uniformly in a database shared by all departments.

*1 REACH regulations: EU regulation on Registration, Evaluation, Authorization and Restriction of Chemicals.

*2 Prohibited substances (17 groups)

(1) Cadmium and its compounds, (2) hexavalent chromium compounds, (3) lead and its compounds, (4) mercury and its compounds (5) polybrominated biphenyls (PBBs), (6) polybrominated diphenyl ethers (PBDEs), (7) tri-substituted organostannic compounds, (8) polychlorinated biphenyls (PCBs), (9) polychlorinated terphenyls (PCTs), (10) polychlorinated naphthalenes (with 3 or more chlorines), (11) short-chain chlorinated paraffins, (12) asbestos, (13) ozone-layer-depleting substances (Class I), (14) PFOS and its analogous compounds, (15) 2-(2H-1,2,3-benzotriazole-2-yl)-4,6-di-tert-butylphenol, (16) hexachlorobenzene, (17) dimethyl fumarate (DMF)

*3 Controlled substances (20 groups)

(1) Antimony and its compounds, (2) arsenic and its compounds, (3) beryllium and its compounds, (4) nickel and its compounds, (5) selenium and its compounds, (6) un-specific brominated flame retardants, (7) polyvinyl chlorides (PVCs) and its mixture, its copolymer, (8) phthalate esters, (9) ozone-layer-depleting substances (Class II: HCFCs), (10) radioactive substances, (11) di-substituted organostannic compounds, (12) cobalt and its compounds, (13) azodyes and azocolourants which form specific amines, (14) formaldehyde, (15) benzene, (16) fluorine-based greenhouse gases, (17) REACH/restriction substances, (18) REACH/authorization substances, (19) RECAH/SVHC, (20) JAMP (Joint Article Management Promotion-consortium) declarable substances



Green Procurement Guideline

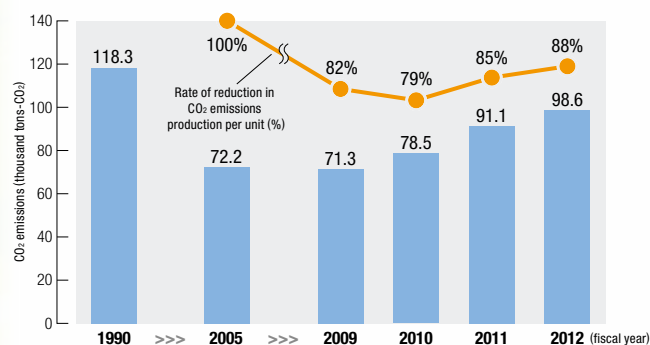
http://www.hitachi.co.jp/environment/library/pdf/green_en.pdf

Global Warming Prevention

To reduce greenhouse gas emissions and contribute to global warming prevention, Hitachi Appliances has continuously worked to reduce CO₂ emissions from energy use accompanying production activities.

A move to bring parts production in-house and adding new plant and facilities caused FY2012 electric power usage to rise. In addition, the worsening of the CO₂ emissions factor at electric utilities in the aftermath of the Great East Japan Earthquake, CO₂ emissions at Japanese factories increased by 7,500 tons over FY2011 to 98,600 tons. As a result, the reduction rate for CO₂ emissions per unit of production compared to the FY2005 level is now 12%.

Trends in CO₂ emissions and the rate of reduction in production per unit in Japan



Data gathered: Tochigi Works; Taga Works*1; Shimizu Works; Ome Works*1 and Hitachi Reftechno, Inc.

*1 Includes affiliate companies working with the above companies.

The CO₂ emissions coefficient in electricity was calculated using CO₂ emissions intensity, Federation of Electric Power Companies of Japan index for FY1990 and FY2005 and actual emission coefficients for electric power companies as published by the Ministry of the Environment for FY2009 and subsequent years. However, since the actual emission coefficient for electric power companies for FY2011 is unpublished, the FY2010 actual figure was used.

Effective Utilization of Resources

Hitachi Appliances is working to reduce the amount of waste materials and valuable materials, such as resources with market value, generated in production and the amount of final disposal in landfills.

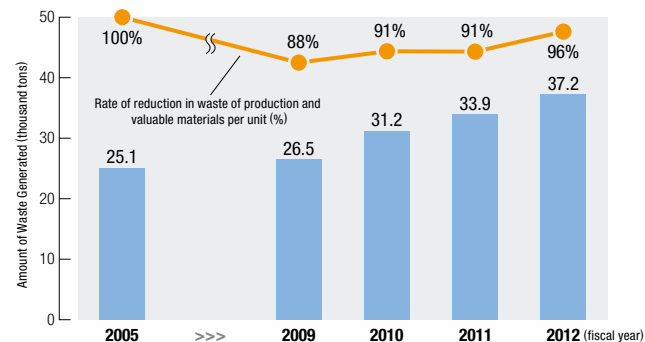
In FY2012, a move to bring parts production in-house and an increase in overseas parts procurement led to a 3,300-ton increase in the volume of waste and valuable materials generated at Japanese factories to approximately 37,200 tons.

On the other hand, the amount of final disposal of wastes was reduced by 1.4 tons from FY2011 to approximately 7.0 tons due to steady recycling efforts. Continuing its success from last year, the company achieved the zero-emissions*2 goal at its five factories in Japan by bringing the final disposal amount in landfills to an infinitesimal amount.

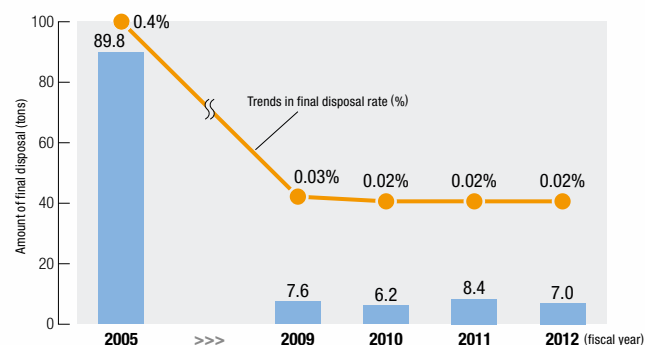
*2 Zero emissions: This approach aims to reduce final disposals at landfills to zero by using waste as raw materials for other industries. The Hitachi definition of this approach states that landfill disposal ratio (landfill disposals/total waste, etc.) in a given year must not exceed 0.5%, and that evaluate for each works.

*3 Final disposal rate: The amount of disposal in landfill / waste and valuable materials generated.

Trends in waste and valuable materials generated and the rate of reduction in production per unit in Japan



Trends in final disposal and the final disposal rate in Japan



Data gathered: Tochigi Works; Taga Works*4; Shimizu Works; Ome Works*4 and Hitachi Reftechno, Inc.

*4 Includes affiliate companies working with the above companies.

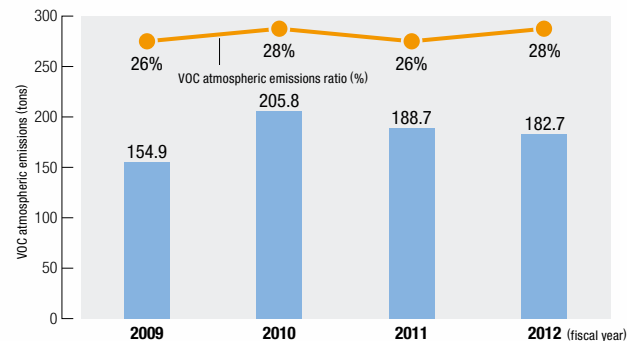
Management of Chemical Substances

Hitachi Appliances is working to reduce emissions from its factories of 41 volatile organic compounds (VOCs)*5 independently determined by the Hitachi Group.

In FY2012, VOC emissions decreased by approximately 6 tons from FY2011 to approximately 182.7 tons due to factors including modification of coating parts to coated sheets in Tochigi Works.

*5 Volatile organic compounds such as toluene, xylene and ethanol.

Trends in VOC atmospheric emissions and the VOC atmospheric emission ratio*6



Date gathered: Tochigi Works; Taga Works*7; Shimizu Works; Ome Works*7 and Hitachi Reftechno Inc.

*6 VOC atmospheric emission ratio: VOC atmospheric emissions / amount of handled VOC.

*7 Including affiliate companies working with the above companies.

Environmental Topics

To create a sustainable society together with our customers, the local community, suppliers, employees and all other stakeholders, Hitachi Appliances pursues information disclosure and dialog in a variety of forms

Japan Hitachi Appliances, Inc.

Two products receive Energy Conservation Grand Prizes at the 2012 award ceremony.

At the 2012 Energy Conservation Awards hosted by the Energy Conservation Center, Japan (ECCJ), Hitachi Appliances took grand prizes. In the "Sinku-Chilled SL" series of large-capacity refrigerators, 11 of 14 models including the R-C6700 received the Director General Prize of Agency of Natural Resources and Energy in the Product/Business Model category. Also, among the FLEXMULTI multi-air-conditioner units for buildings, 17 high-efficiency models including the RAS-AP280DG1 took the Chairman Prize of ECCJ.



Multi-air-conditioner RAS-AP280DG1 Refrigerator R-C6700


Japan Hitachi Appliances, Inc.

Exhibition at Eco-Products 2012

In December 2012, the Hitachi Group sponsored a booth at Eco-Products 2012, Japan's largest environmental exhibition, held at the Tokyo Big Sight convention center.

Under the theme "Towards a sustainable society—Create a more prosperous future by efficient energy use," Hitachi's display featured eco-products such as electric power generation systems and other equipment that saves on energy use.

The many visitors to our booth got to see the latest in refrigerators, induction heating rice cookers, room air conditioners, LED lighting, and residential solar power systems.




Japan Hitachi Appliances, Inc.

Taking part in the Light-Down Campaign

Hitachi Appliances took part in the Ministry of the Environment's Light-Down Campaign to reduce CO₂. On the designated days of June 21 (summer solstice) and July 7 (Cool Earth Day) lights were turned off on such installations as billboards and test facilities at each business sites

The Hitachi Group promotes various power-saving measures as part of the Hitachi Group Summer Energy Conservation Campaign, lasting from May through October. One such measure is to save energy by keeping billboard lights off continuously.




Billboard lighting at Ome Works (lighted → not lighted)

Japan Hitachi Appliances, Inc.

Green Curtain Project

As one measure to save on electric power in the summer, we have initiated the Green Curtain Project in which plants like goya, a bitter melon, and Japanese morning glories are grown along the windows and walls of buildings at our business sites.

Through their transpiration effects and by blocking sunlight, these climbing vines form a "green curtain" that keeps the temperature from rising inside buildings. In so doing, they reduce the need to use the air conditioning system and lead to energy savings.




Japan Hitachi Appliances, Inc. Shimizu Works

Holding an environmental forum with college students

In October 2012, an environmental forum was held at Shimizu Works with local graduate students majoring in environmental studies. This exchange of views was mainly sponsored by the Shizuoka Industrial Waste Association, a non-profit organization. This forum was undertaken with the goal of forming a proper recognition and understanding of industrial waste treatment.

On the day of the forum, descriptions were given of the environmental initiatives at Shimizu Works followed by a tour of the environmental and waste treatment facilities. The forum after the tour attracted numerous questions about environmental issues studied regularly by students and led to a lively exchange of views.



Japan Hitachi Appliances, Inc. Tochigi Works

Environmental lectures for grade school students

Environmental education for local grade school students was conducted at Tochigi Works as part of Hitachi Appliances' social contribution activities.

In FY2012, this educational opportunity was offered to 59 fourth graders under the themes of home appliance recycling and the water recirculation. Through our support of videos and experiments, the students learned about how used home appliances are treated and recycled and how water used at a factory is treated and then released into the river as clean water.





Japan

Hitachi Appliances, Inc.

Clean-up activities around business sites

As an environmental social contribution activity, the Company runs a clean-up program for the roads and coastlines around its business sites.

As part of an annual fire prevention program, we carry out a cleanup event in which items like cigarette wrappers and trash were removed from the roads near Ome Works. Our Taga Works also holds an annual clean-up event before the start of the summer season at Kawarago Beach in Hitachi City, Ibaraki Prefecture.



Japan

Hitachi Appliances, Inc.

Disseminating information on saving power

Hitachi Appliances distributes information in booklets and on its websites on how energy can be saved using our commercial air conditioning systems.

Topics covered include electric power savings techniques that can be applied immediately, support functions for power savings in commercial air conditioning systems, and the latest top-rated equipment with superb energy-savings features, among other information related to energy savings in cooling systems.



Information on saving power for our commercial air conditioning systems
<http://www.hitachi-ap.co.jp/important/setuden/>
 [Japanese version only]



China

Planting Tree for a Green and Beautiful Village Program in China (Guangzhou)

Hitachi Air-conditioning Systems & Refrigerating Products (Guangzhou) Co., Ltd.
 Hitachi Compressor Products (Guangzhou) Co., Ltd.

Hitachi Air-conditioning Systems & Refrigerating Products (Guangzhou) Co., Ltd. and Hitachi Compressor Products (Guangzhou) Co., Ltd. are implementing the "Planting trees for a green and beautiful village" program.

As part of these activities, the two companies co-sponsored a tree-planting event for Lin Chuan and Sanjiashui Townships outside of the city of Conghua. On the day of the event, a total of 30 employees and their family members planted 50 trees in an event to foster parent-child relationships.

Also, 25 employees assisted in town beautification efforts through a clean-up program of the streets and community district at Conghua Wen-quan (Hot Springs) District, Nan Zing (Southern Star) Village.



Taiwan

Taiwan Hitachi Co., Ltd.

Taiwan Tree-Planting Program

Taiwan Hitachi Co., Ltd. is working to preserve the earth's environment and to create an environment kind to children through its company philosophy of "Treasure the community and cultivate Taiwan."

One part is the tree-planting program under the slogan of "Plant a tree, protect the land" in Thirteen Pali District, New Taipei City Cultural Park. These activities are now in their third year since starting in 2011. On the day of the event, approximately 1,000 volunteers, including employees, their families, and cooperating manufacturers planted 1,500 trees.



Malaysia

Hitachi Air Conditioning Products (M) Sdn. Bhd.

Mangrove Planting Program

Hitachi Air Conditioning Products (M) Sdn. Bhd., under guidance from government agencies in the state of Negeri Sembilan, sponsored the planting of mangrove trees in Port Dickson.

The 40 participating employees planted 500 mangrove seedlings and 60 coconut trees in two days. This program has enabled study of the mangrove forest's effectiveness as a protective breakwater and its role in preserving biodiversity.



Brazil

Hitachi Air Conditioning Products Brazil, Ltd.

Holding a Factory Excursion in Brazil

Hitachi Air Conditioning Products Brazil, Ltd. held a factory excursion as an environmental activity. An exceptionally large number of participants, 1,030 in total including employees and their families, joined the event.

Attendees spent meaningful time learning about environmental initiatives at the manufacturing site and raising their awareness of environmental activities at this forum for employees and their families.



Corporate Overview

Company name	Hitachi Appliances, Inc.
Main business	Development, manufacture, and sales of home appliances and comprehensive air conditioning systems
President & Director	Takanori Ninomiya

Capital Stock	20 billion yen (Hitachi, Ltd. 100%)
Date established	1 April, 2006 (Registration of establishment: 26 Nov. 1998)
Number of employees (consolidated)	About 18,200 (as of the end of March, 2013)
Website	http://www.hitachi-ap.com/

Atago Office (Head Office), Takeshiba Office

Atago Office (Head Office)
(Home Appliance Group)

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

Takeshiba Office
(Air Conditioning System Group)

New Pier Takeshiba South Tower, 16-1, Kaigan 1-chome,
Minato-ku, Tokyo, Japan

Affiliated Companies in Outside Japan

ASIA

Qingdao Hisense
Hitachi Air-conditioning
Systems Co., Ltd.
■ Manufacturing & Sales
[Packaged air conditioners]

TEL: +86-532-8087-5901
Hisense Information Industry Park 218.
Qianwangang Road,
Qingdao Economic Development Zone, 266510, China

Shanghai Hitachi Electrical
Appliances Co., Ltd.
■ Manufacturing & Sales
[Rotary compressors]

TEL: +86-21-5055-4560
1051, Yunqiao Road, Pudong Jinqiao Shanghai,
201206, China

Shanghai Hitachi Household
Appliances Co., Ltd.
■ Manufacturing & Sales
[Room air conditioners and
Washing machines]

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

Hitachi Air-conditioning
Systems (Shanghai) Co., Ltd.
■ Sales
[Chillers, Absorption & centrifugal chillers
and Packaged air conditioners]

TEL: +86-21-5178-2111
29F, Tower B, City Center of Shanghai, No.100 Zunyi Road,
Shanghai 200051, China

Hitachi Air Conditioning
Technology (Suzhou) Co., Ltd.
■ Manufacturing & Sales
[Small chillers and others]

TEL: +86-512-6283-3131
14.D.E., Suchun Industrial Square,
#428 Xinglong Street Suzhou Industrial Park, Jiangsu, China

Hitachi Household
Appliances (Wuhu) Co., Ltd.
■ Manufacturing & Sales
[Room air conditioners]

TEL: +86-553-5846669
No.2 Qiluoshan Road Wuhu City,
Anhui Province 241009, China

Hitachi Air-conditioning &
Refrigerating Products
(Guangzhou) Co., Ltd.
■ Manufacturing & Sales
[Chillers, Absorption & centrifugal chillers
and Packaged air conditioners]

TEL: +86-20-8786-2838
Aotou Town Qigan, Conghua City,
Guangzhou 510935, China

Hitachi Compressor
Products (Guangzhou) Co., Ltd.
■ Manufacturing & Sales
[Scroll compressors]

TEL: +86-20-8786-1360
Aotou Town Qigan, Conghua City,
Guangzhou 510935, China

Hitachi Air-conditioning
Systems (Hong Kong) Co., Ltd.
■ Sales
[Chillers, Packaged air conditioners
and others]

TEL: +852-3620-2138
Rm. 702-3, 7/F., Wharf T & T Centre, Harbour City,
Canton Road, Tsimshatsui, Kowloon, Hong Kong

Taiwan Hitachi Co., Ltd.
■ Manufacturing & Sales
[Room air conditioners,
Packaged air conditioners,
Chillers and others]

TEL: +886-2-2508-3311
63, Nanking East Road, Sec. 3 Taipei, Taiwan

Hitachi Air Conditioning
Products (Phils), Inc.
■ Manufacturing & Sales
[Packaged air conditioners and
Room air conditioners]

TEL: +63-47-252-1533
No.1a, binictican Drive, Subic Bay Industrial Park phase II
Subic Bay Freeport Zone, Philippines

Hitachi Industrial Machinery
Philippines Corp.
■ Manufacturing
[Absorption & centrifugal chillers]

TEL: +63-46-402-1112
PEZA Drive, Phase II Special Export Processing Zone First
Cavite Industrial Estate Dasmariñas, Cavite, Philippines

Hitachi Compressor
(Thailand), Ltd.
■ Manufacturing & Sales
[Compressors]

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.
■ Manufacturing & Sales
[Washing machines, Refrigerators
and others]

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

Hitachi Tochigi Electronics
(Thailand) Co., Ltd.
■ Manufacturing & Sales
[Electronic control boards]

TEL: +66-0-3895-4372~5
Eastern Seaboard Industrial Estate,
64/39 Moo 4 T. Pluakdaeng, A. Pluakdaeng,
Rayong 21140, Thailand

Hitachi Air Conditioning
Products (Malaysia) Sdn. Bhd.
■ Manufacturing & Sales
[Room air conditioners and
Rotary compressors]

TEL: +60-3-8925-6611
Lot 10, Jalan Kemajuan, Bangi Industrial Estate,
43650 Bandar Baru Bangi, Selangor Darul Ehsan, Malaysia

Hitachi Home &
Life Solutions (India) Ltd.
■ Manufacturing & Sales
[Room air conditioners, Packaged
air conditioners, Chillers and others]

TEL: +91-2764-277571
Hitachi Complex, Karan Nagar, Kadi,
Dist. Mehsana-382727 Gujarat, India

Europe

Hitachi Air Conditioning
Europe SAS
■ Sales
[Packaged air conditioners,
Room air conditioners, Chillers,
Hot-water heaters and others]

TEL: +33-1-34-63-05-00
18, Rue Grange Dame Rose 78140 Velizy, France

Hitachi Air Conditioning
Products Europe, S.A.
■ Manufacturing
[Packaged air conditioners and Chillers]

TEL: +34-93-828-0808
Ronda Shimizu 1 Poligono Industrial Can Torrella 08233
Vacarisses, Barcelona, Spain

South America

Hitachi Air Conditioning
Products Brazil, Ltd.
■ Manufacturing & Sales
[Packaged air conditioners,
Room air conditioners,
Chillers and others]

TEL: +55-11-3549-2722
Av. Paulista 854-7 Andar, Bela Vista,
CEP. 01310-913, São Paulo-S.P., Brazil

Factories in Japan

Tochigi Works	800, Tomita, Ohira-machi, Tochigi City, Tochigi 329-4493 Japan	Taga Works	1-1, Higashitaga-cho 1-chome, Hitachi City, Ibaraki 316-8502 Japan
Shimizu Works	390, Muramatsu, Shimizu-ku, Shizuoka City, Shizuoka 424-0926 Japan	Tsuchiura Works	603, Kandatsu-machi, Tsuchiura City, Ibaraki 300-0013 Japan
Ome Works	16-2, Shinmachi 6-chome, Ome City, Tokyo 198-8611 Japan		

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

Hokkaido Marketing Branch	Kitanohon Branch Office
Fukushima Marketing Branch	Kantou 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 & Lighting System Business Group)

Metropolitan area Marketing Branch	Kitanohon Marketing Group
Kansai & Chubu Marketing Branch	Kyushu Marketing Branch

Affiliated Companies in Japan

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

Scope of Report

- Reporting Period: FY2012 (1 April, 2012 to 31 March, 2013)
- Scope of Reporting: Hitachi Appliances Group consolidated companies
Where the scope is different from the above, describe it is so indicated.
- Referenced Guidelines: “Environmental Reporting Guidelines (FY2012 Version)” (Ministry of the Environment, Japan), “Environmental Performance Indicators Guideline for Organizations (FY2002 Version)” (Ministry of the Environment, Japan), “Environmental Reporting Guidelines 2001—With Focus on Stakeholders” (Ministry of Economy, Trade and Industry, Japan)
- Next Issue: Around August 2014
- Website: (Japanese version only) <http://www.hitachi-ap.co.jp/company/environment/kankyo/>

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