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Rigorous Pursuit of Energy Saving and Delivery of Genuine Value by Hitachi's Lighting Business

With the idea of energy saving permeating rapidly through the lighting industry, where incandescent and fluorescent lights are giving way to LEDs, Hitachi is utilizing technology it has built up through its long involvement in the field of home appliances to develop new products. In doing so, its aim is to supplement the "eco" objective of energy saving with the delivery of the genuine value demanded by the modern marketplace. In this article, the key points and future outlook for this industry are explored with participants involved in the creation of products based on new concepts.

Takehisa Kobayashi (left), Senior Manager, Lighting Products Design Department; Haruki Komatsu (middle), Senior Manager, Lighting Business Planning Department; Yasuo Nakazawa (right), Senior Engineer, Household Products Design Department V, Hitachi Appliances, Inc.

Application of Original Technology to Lighting Developed through Home Appliances

Hitachi's lighting business embarked on a fresh start in October 2010 with the acquisition by Hitachi Appliances, Inc. of Hitachi Lighting, Ltd. Along with work on product development taking advantage of original technologies and utilizing technologies built up in the field of home appliances, the lighting business is also actively involved in the field of light-emitting diode (LED) lighting, which has attracted increasing interest in recent years for its power-saving characteristics.

In undertaking this product development, Hitachi's aims are to combine the rigorous pursuit of energy saving with the incorporation into each of its products of added value that satisfies customers. The new products developed based on these new concepts and original technology are an LED ceiling light, a multi-ring fluorescent ceiling light, and an LED light bulb (a wide-angle light with a conventional bulb shape).

New Concept Combining Brightness and Energy Saving

A feature of the LED ceiling light is that it saves energy by incorporating an LED light in the standard type of directly attached ceiling light commonly fitted in Japanese homes. To provide customers with brighter lighting, the LED ceiling light delivers a high level of light output by using Hitachi's unique technology to orient the LED light in the direction being illuminated. The light also provides attractive lighting by arranging original domed LED units in a donut shape and optimizing the distance between them and the cover so that the light-emitting part of the light source does not stand out.

The multi-ring fluorescent ceiling light is a new product that features a high level of energy saving and a rated lamp life of 21,000 hours. As the brightness and light generation efficiency of fluorescent lights improve the longer the fluorescent tube, Hitachi developed a quadruple-ring fluorescent tube that is approximately 1.2 times longer than a standard double ring. To make the light-emitting tube of the fluorescent lamp longer, Hitachi developed a fluorescent lamp with a new multi-ring design, using a jointing technique to link the glass rings together in concentric circles. Although the new light involves particularly difficult production methods, including the ability to join multiple glass rings together with a high degree of precision, product development was completed successfully thanks to the combined capabilities of the research department, production site, and others involved in the work.

These products also incorporate a new energy saving function that measures room brightness and keeps it at a comfortable predefined level. This reduces power consumption by automatically turning down the light when the room is illuminated by external or other light sources.

The features of the LED light bulb (wide-angle light with a conventional bulb shape) are a high light output and the ability to produce the same sort of broadly dispersed light as a conventional light bulb. While previous LED light bulbs, which tended to concentrate light in the downward direction, were unsuitable for pendant and other light fittings that require a wide spread of light, the new light bulb can produce widely dispersed light similar to a conventional light bulb with an output of 830 lm (total light flux), equivalent in brightness to a 60-W incandescent light bulb. This was achieved by spreading the LED light over a broad area, and by developing a light diffusing cover that minimizes the irregularities in the light caused by the cover itself, and also a new body with a slit structure in which the light reflected back toward the light bulb cap by the slit material is able to get out.

Rollout of LED Lights with even Higher Light Output

With LED lighting likely to attract greater attention in the future given the growing awareness of energy saving and the environment, Hitachi intends to operate a lighting business that enriches people's lives by developing a wide range of new products that satisfy increasingly diverse customer needs, not only for domestic use, but also for other users of lighting such as shops and offices.

Large-capacity Refrigerator with Intelligent Vacuum Compartment

Hitachi has released a large-capacity refrigerator equipped with an intelligent "Vacuum Compartment," a technology*1 that detects whether there are vegetables present and automatically sets temperature zones accordingly, regulating the cooling speed to suit the amount of food stored. This functionality is used for Hitachi's unique Vacuum Compartment that controls oxidation to keep food fresh. The main features of this product are as follows:

(1) Detects the presence of carbon dioxide (CO_2) from vegetable respiration in the Vacuum*2 Compartment and automatically sets temperature zones accordingly, and regulates cooling speed to suit the amount of food stored.*1

(2) Hitachi's "Frost Recycle Cooling," a unique energy saving technology, utilizes cold air from the frost on the evaporator to cool the refrigerator compartment. Hitachi has also developed a refrigerant valve control technology that reduces heat from entering the compartment.

(3) At 825 mm wide, this product is 75 mm wider than the 2010 model R-A6200*3, the largest model of refrigerator previously released by Hitachi, and has a volume of 670 L (measurement based on "JIS"), the number one in volume*4. Since each of the compartments in the refrigerator can be used fully, large items of food that could not be stored previously can now be preserved whole, and there is sufficient space for food bought in bulk on the weekend, or delivered by courier, to be stored with ease.

(Hitachi Appliances, Inc.)

Vacuum Compartment (image)

Large-capacity refrigerator with Vacuum Compartment (R-B6700*3)

*1 Only operates when the Vacuum Compartment is set to "Auto" mode.
*2 Indicates a state when atmospheric pressure is low, with the Vacuum Compartment deemed to be in a "vacuum" when it is at 0.8 atmospheric pressures.
*3 Japan domestic model number.
*4 For domestic-use refrigerators in Japan, as at October 2011. R-B6700*3.

Big-drum Washer-dryers and Big-drum Slim Washer-dryers Featuring Heat Recycling and Air Iron

Hitachi has released a big-drum washer-dryer featuring heat recycling and air iron that is equipped with heater-less power-saving drying*, which utilize unique Hitachi energy-saving technology to allow drying without using a heater, and are equipped with an "auto-clean" function that washes away substances such as detergent sediment and skin oils adhering to the interior of the washing machine when washing. At the same time, Hitachi also released a big-drum slim washer-dryer featuring heat recycling and air iron, which at 60 cm wide, is easier to install. The main features of these products are as follows:

(1) During the final rinse cycle, tap-water is showered from above while the internal drum rotates at high speed, and the drum spins at high speed to force the water to the base of the external tub, cleaning the underside of the washing machine as an auto-clean function.

(2) An air iron function that removes wrinkles in clothing by blowing air at high velocity, combined with heat recycling drying that collects the heat generated while the machine is running to reuse when blowing warm air for drying, providing a power-saving heater-less drying function.

(Hitachi Appliances, Inc.)

Big-drum washer-dryer (left) and big-drum slim washer dryer (right) featuring heat recycling and air iron

* Running time is longer than the standard. The heater may sometimes be used when the room temperature is low.

Two-stage Boost Cyclonic Cleaner

Hitachi has released the two-stage boost cyclonic cleaners, which incorporate carbon materials and are thus lightweight, making them easier to use. The main features of these products are as follows:

(1) The head and the extension pipe feature plastic that has been strengthened with carbon fiber. It allows the thickness of the walls to be reduced while maintaining their strength, reducing mass by approximately 13% over previous models*1, and then easily operated grip also makes it easy to change direction or lift the cleaner over cords, doorsills, and stairs, as well as improving usability.

(2) A low-noise design that minimizes fan-noise and vibration from the fan motor and wind noise from inside the cyclone chamber, producing a powerful 460 W of suction power with an operating noise level of only 53 dB.

(3) A unique Hitachi clean ventilation construction that combines a well sealed motor-case encasing the area around the fan motor, with a high-performance dust collection filter, resulting in clean exhaust that has been filtered at a high collection rate measured at 99.999%*2.

(Hitachi Appliances, Inc.)

Two-stage boost cyclonic cleaner

*1 Comparison between Hitachi's previous 2010 model (approximately 940 g) and the new model (approximately 820 g). For the total mass of the head and the extension pipe.

*2 Results from tests based on the International Electrotechnical Commission (IEC) 60312-1, conducted on Hitachi's behalf by the third-party organization SLG Pruf- und Zertifizierungs GmbH. Collection rate (average) of 99.99989% for particles with a diameter of 0.3–10 µm.

Stainless/Clean Room Air Conditioner

Hitachi has released the stainless/clean room air conditioner, which can be set to run in an energy-saving mode just by pressing the "Eco Korekkiri" button ("One button for all" in Japanese). The main features of this product are as follows:

(1) Simply pressing the "Eco Korekkiri" button activates sensors that detect solar radiation, living noises and the movement of people, providing energy-saving operation matched to both the room and its occupants, taking comfort and energy-saving performance into account. Also, this air conditioner is equipped with a "Power cut" button. A single press of this button during operation will let the air conditioner save maximum power consumption, automatically change the set temperature to 20°C when heating and 28°C when cooling, and directly flow the air toward the area where the remote control is placed.

Similarly, the "Fan only" button lowers the perceived temperature by directing airflow toward the remote control to achieve a wind-chill effect.

(2) Stainless steel, which offers effective antibacterial and dirt resistance, has been used in the air outlet and the louver (lower side). The stainless steel surface area is 1.4 times larger than on the 2011 model.

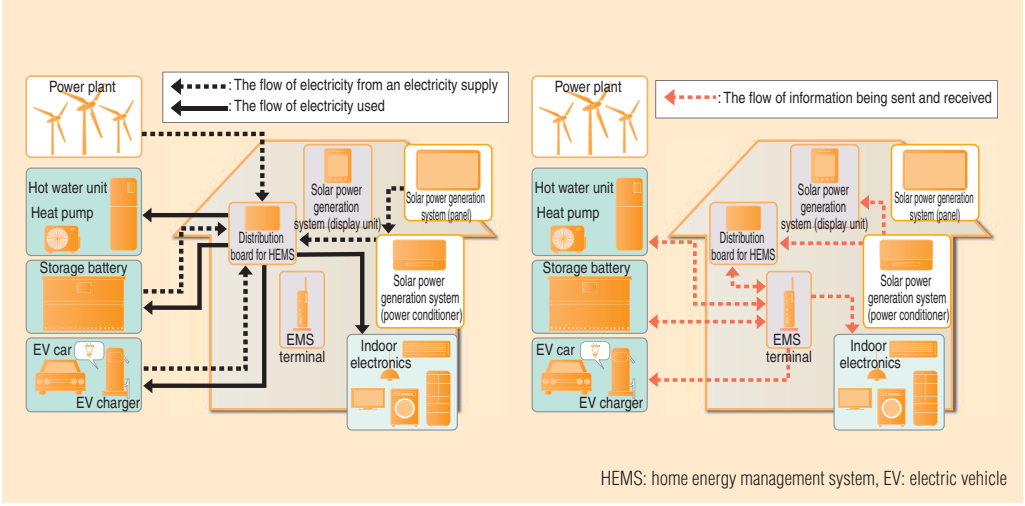
(3) An improved inverter and compressor have improved heating performance. A "Warm air plus" button provides warm air at approximately 55°C* (4.0-kW class) with a single press.

(Hitachi Appliances, Inc.)

Stainless/clean room air conditioner

*Measured in the Hitachi environmental testing facility. This is the maximum temperature measured near the air outlet when "warm air plus" operation has been invoked under the following conditions: External temperature 2°C, room temperature 20°C, and airflow approximately 38% below rated flow during heating mode. Depending on the conditions in which the air conditioning is being used, the actual temperature may not reach 55°C (40-kW class).

EMS for the Home that Utilizes the Energy Saving Support System



Electricity flow (left) and information flow (right) in the home

The passing of the revised Act on the Rational Use of Energy in April 2010 and the ensuing initiatives toward conserving energy that a broad range of businesses were obliged to undertake saw a concomitant rise in the need for energy management systems (EMS). In the aftermath of the Great East Japan Earthquake that occurred in March 2011, power supplies were insufficient and directives to limit the use of electricity were put in place, provoking a raised awareness of environmentally-oriented activities in both businesses and the general public.

Against this background, Hitachi launched the energy saving support system, which is aimed at businesses with facilities in a range of locations, in July 2011.

As the phrase "energy saving" states, to date, environmental activities in the home have centered on limiting the amount of energy, such as electricity or gas, that is used. However, faced with the fact of planned power outages brought on by a shortage of electricity, new needs arose among general consumers, not just to reduce energy consumption, but also to generate their own power using solar panel installations (energy creation) and to store the energy generated in their own home storage batteries (energy storage). It could be said that, for the general consumer, energy saving is shifting from reducing energy consumption to a new stage of creating and storing energy.

In such circumstances, there is an emerging need for home-oriented energy management to make the creation and use of energy in the home more efficient.

In order to respond to the need for energy management for the home, Hitachi is currently working on products that use energy saving support system, and aims to make existing levels of power consumption, humidity, gas and water consumption, solar power generated, and energy stored in batteries visible in daily life. Furthermore, Hitachi intends to utilize the support of energy saving activities functions that have earned it acclaim, working to develop systems that allow energy to be managed without specialist knowledge, and bringing these systems to the home environment.

(Hitachi Consumer Electronics Co., Ltd.)

Ultimate Interactive Short Throw LCD Projector CP-AW2519N

Hitachi has released the CP-AW2519N, a projector equipped with interactive features that allow the interactive pen provided with the product to draw images and letters directly by hand and operate a personal computer on top of the image projected, and then save the altered images (December 2011). Utilizing interactive software from Hitachi Solutions, Ltd., that is intended to be easy to use, this product offers an interactive white board that is simple but keeps cost down. Presentations that feature movement in projected images may increase viewer concentration during meetings or classes, making the presentation easier to understand. Additionally, the CP-AW2519N can be combined with a separately-sold tabletop projection stand to project an image on tabletop surfaces. This facilitates discussion while viewing the image from a variety of angles, offering more freedom in meeting styles. Terminals such as smartphones with new functionality are gaining popularity, and the use of touch-based operations on-screen is becoming a familiar sight in both the business and educational fields. In these circumstances, Hitachi is proposing a category for projectors equipped with interactive functions that it will develop further in the future.

(Hitachi Consumer Electronics Co., Ltd.)

CP-AW2519N