

Featured Articles

# Global Deployment of Home Appliances to International Markets

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*OVERVIEW: Both Asian and Middle Eastern regions are experiencing a high level of sustained economic growth, and are promising consumer markets. The need for energy conservation is growing as environmental consciousness increases. Consumer priorities have also been shifting from cheap, good-quality products to products with specific added values as desired by each consumer. Hitachi mainly sells home appliances on these markets that have been either produced at its Thailand base or Made in Japan, all based on a premium strategy pillar. By locally developing products with unique functions suited to the changing markets and high added value, featuring high energy-saving performance thanks to inverter technology along with the good-quality design one expects from a Japanese manufacturer, Hitachi is deploying products that are helping it establish a position of superiority in global markets.*

## INTRODUCTION

AS Hitachi improves its global brand value, business expansion through the international deployment of home appliances is occupying an increasingly important position. It is based on this background that Hitachi has been moving forward with the global

deployment of home appliances with a focus on the rapidly growing Asian and Middle Eastern markets, while mainly targeting both the upper and middle classes in each country. This global business includes products chiefly manufactured at Hitachi’s largest international production base of Hitachi Consumer Products (Thailand), Ltd. (hereinafter HCPT), as well

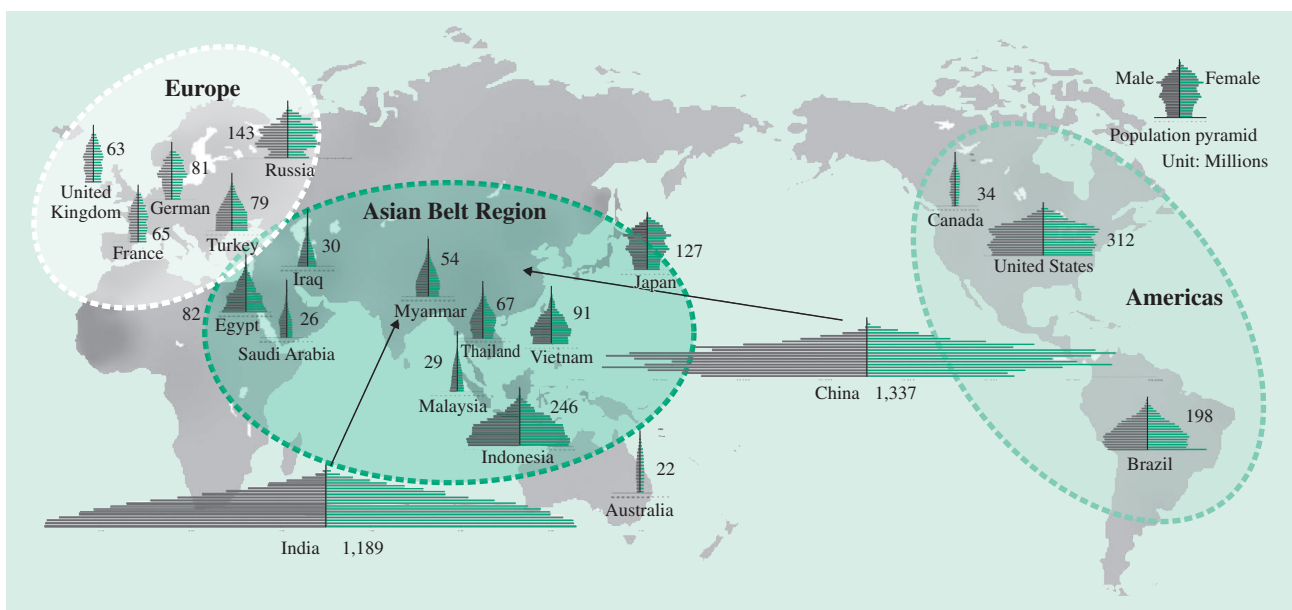


Fig. 1—Population Pyramids for Various Countries and Regions. Countries in the Asian Belt Region have large populations and high young generation population ratios.

as Made in Japan products that are manufactured in Japan for export.

The Asian and Middle Eastern regions are experiencing sustained high economic growth and a growing middle-income class, and are seen as consumer markets that will continue to hold promise into the future. At the same time, product energy and resource saving performance have been drawing more attention globally than before in recent years from the perspective of protecting the global environment.

HCPT takes elemental technologies in fields such as energy-saving and noise reduction from Japan, develops products that add unique Hitachi values suited to local needs, and introduces items to the market, including a highly innovative side-by-side refrigerator, and a 16 kg (load size) large-capacity fully automatic washing machine.

This article describes a Made in Japan export strategy based on the aforementioned market conditions, and introduces examples of refrigerators, washing machines, and vacuum cleaners that have been developed at HCPT.

## MARKET TRENDS AND BUSINESS STRATEGIES

### The Asian Belt Region's Expanding Upper and Middle Classes

The main markets comprising this global business are part of an Asian Belt Region that includes China, Southeast Asia, India, and the Middle East. Although parts of the Middle East are suffering from economic stagnation due to political unrest, demand in countries such as the United Arab Emirates (UAE), Saudi Arabia, and others remains strong. In Asia, India, Indonesia, and the other economies in the Association of Southeast Asian Nations (ASEAN) are experiencing sustained high economic growth.

As each of these national economies has grown, their middle classes have been expanding as well, and consumer priorities have been shifting from “cheap, good-quality products” to “products I want” (products in which added value can be found). Also, since these regions have large young population segments, their populations are expected to continue growing in the future. Furthermore, since home appliance penetration rates are low, and the trend towards comparatively new products is extremely strong, further market expansion can be expected (see Fig. 1).

As environmental consciousness grows stronger and energy prices rise sharply in these regions,

not only is the need for lower energy consumption growing, each country's government is also leading the way from the perspective of global environmental protection by conserving energy (including electric energy and water) while also strengthening regulations related to the conservation of resources.

### Hitachi's Premium Strategy

Added values that are in demand include unique functions that satisfy market needs, energy-saving performance based on a high level of basic performance, and the high-quality design one expects from a Japanese manufacturer based on the concept of the Simple & Stylish/Usability & Universal/Basic & Belief (SUB) design. New products with a high level of added value are developed together by HCPT and its mother factory, Taga Works, in Japan along with Tochigi Works and research laboratories and others who work together to continuously introduce new products to the market every year. This is referred to as the premium strategy (see Fig. 2).

## PREMIUM STRATEGY THAT TAKES ADVANTAGE OF STRENGTHS

### The Made in Japan Strategy

In the past, home appliances that were made in Japan had an international reputation for being highly dependable, high quality, and high performance (including energy-saving performance), but they were expensive and did not necessarily satisfy local needs. As upper and middle classes expand rapidly in the Asian Belt Region amidst remarkable growth, however, markets for Japanese products are set to grow.

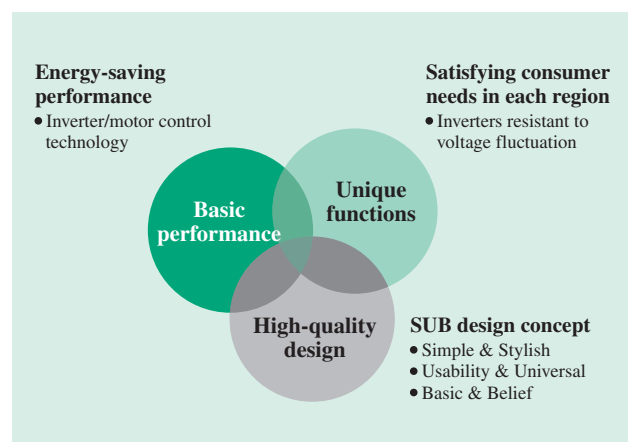


Fig. 2—Premium Strategy Concept.

The premium products of this concept are deployed to each region to build the brand.



Fig. 3—Made in Japan Export Product Lineup. The Made in Japan aspect is aggressively promoted to improve Hitachi’s image as a premium brand image.

Based on this background, Hitachi began aggressively exporting the Japanese products that enjoyed a top-class share in the highly competitive Japanese market approximately 10 years ago as part of a premium strategy. At first, Hitachi focused its exports on Taiwan, where Japanese products are well accepted, starting with refrigerators but also including washing machines, vacuum cleaners, and cooking appliances, offering not only the aforementioned high dependability, high quality, and high performance, but also making image-conscious sales promotion. Also, by working to release products on the Taiwanese market simultaneously with domestic releases, Hitachi recorded sales that greatly exceeded expectations, and is still enjoying solid growth today.

Next, Hitachi expanded its exports to countries and regions other than Taiwan, starting with the Chinese region of China and Hong Kong, followed by Southeast Asia, the Middle East, and Russia (see Fig. 3). Also,

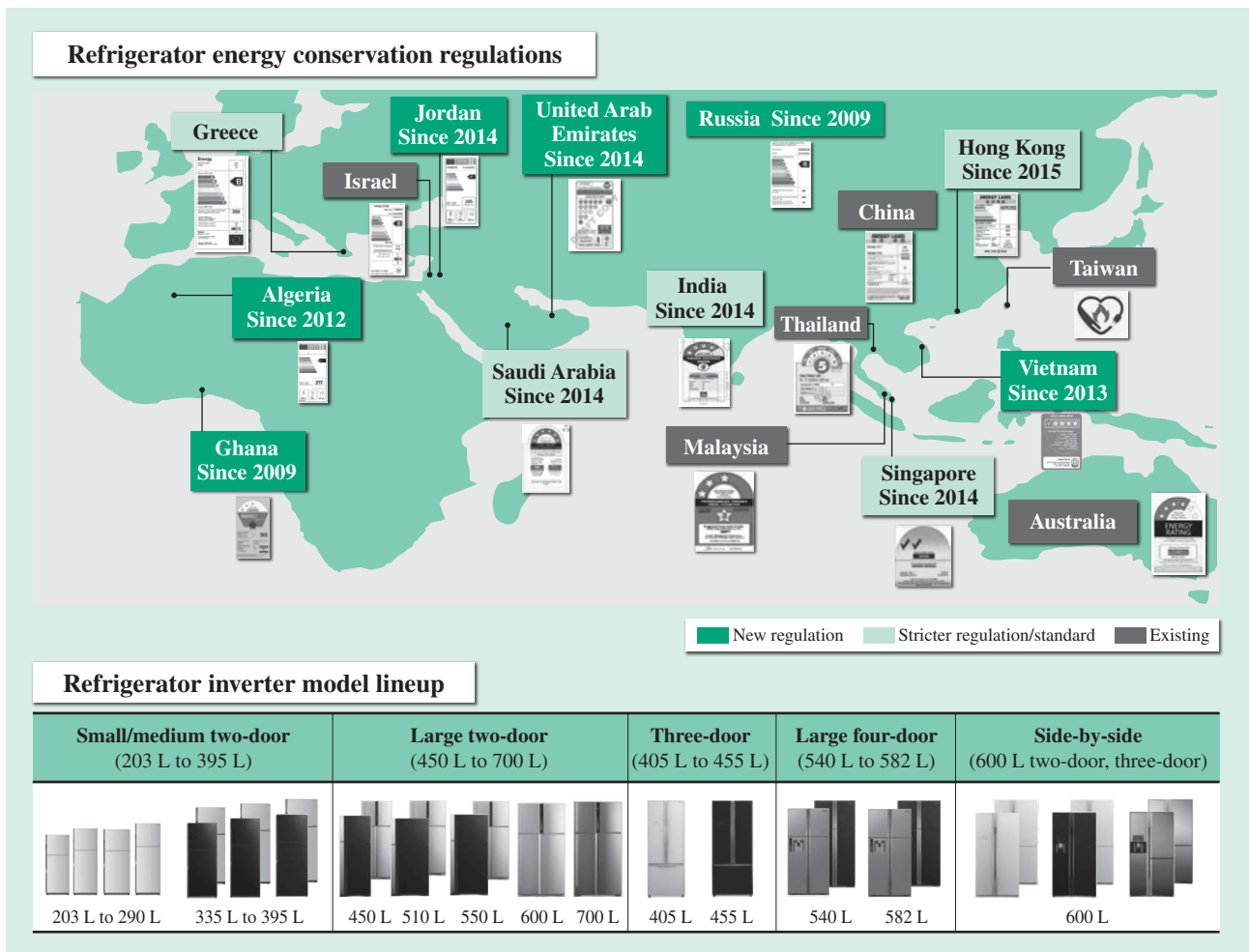


Fig. 4—Refrigerator Energy Conservation Regulation Trends in each Country and Region and Expanding Inverter Lineup. All refrigerators now, whether small or large, use inverters and meet the energy conservation needs, regulations, and standards of each country and region.

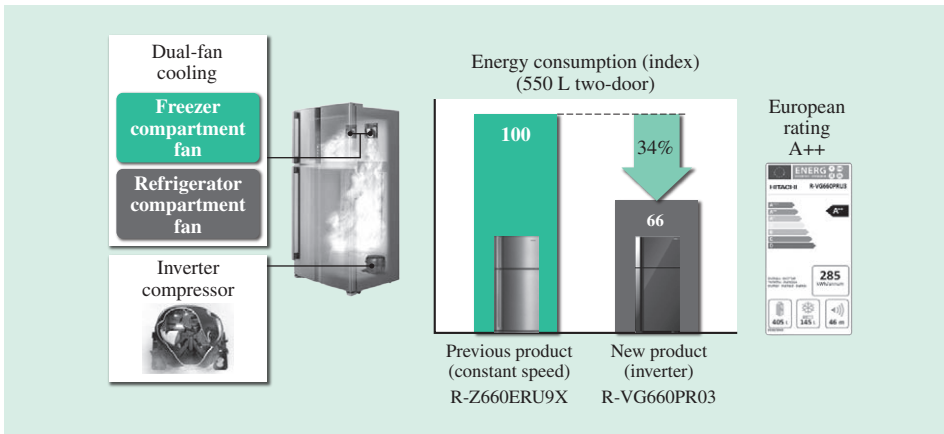


Fig. 5—Hitachi’s Unique Inverter and Dual-fan Cooling. Although the compressors used in previous models operated at a constant speed, models with the new type of inverter reduce energy consumption by 34% and have achieved an A++ rating in Europe.

as health consciousness has been growing in recent years, and atmospheric pollution has been worsening, air purifiers made in Japan were introduced to various countries three years ago and have been well accepted.

**Deploying Inverter Refrigerators Made by HCPT Supporting Each Country’s Energy Conservation Needs**

As has already happened in Japan, international refrigerator demand has shifted from one door to two and three doors, with larger refrigerators and a trend towards increased energy consumption. On the other hand, as environmental consciousness has also grown and energy costs have soared, the demand for energy-saving performance is also increasing. Energy conservation regulations are also growing stricter in each country, and the introduction of new regulations is accelerating as well.

Based on this market environment, Hitachi has been deploying the inverter technologies it cultivated in Japan to international markets as well, and started switching its HCPT-made lineup of refrigerators to inverters starting in 2012 (see Fig. 4).

Refrigerators that use inverter technology were rare in the international markets of 2012, and this is when Hitachi used its unique technology to develop dual-fan cooling, a feature that achieves high-efficiency cooling by applying a unique cooling fan system to both freezer and refrigerator compartments.

This system, when combined with inverter technology, successfully achieved top-class energy-saving performance, earning a A++ grade under the strict European standards (see Fig. 5).

**Customizing Inverter Technology for International Refrigerators**

Internationally, the installation environments (air temperature, etc.) and the usage conditions of each refrigerator compartment vary greatly depending on the destination.

The refrigerators that use this type of inverter along with dual-fan cooling can change the compressor’s rotating speed from slow to fast to efficiently cool using fans in both freezer and refrigerator compartments, thereby achieving stable cooling performance over a wide range of ambient temperatures (room temperatures) both high and low. For instance, these refrigerators provide powerful and stable cooling

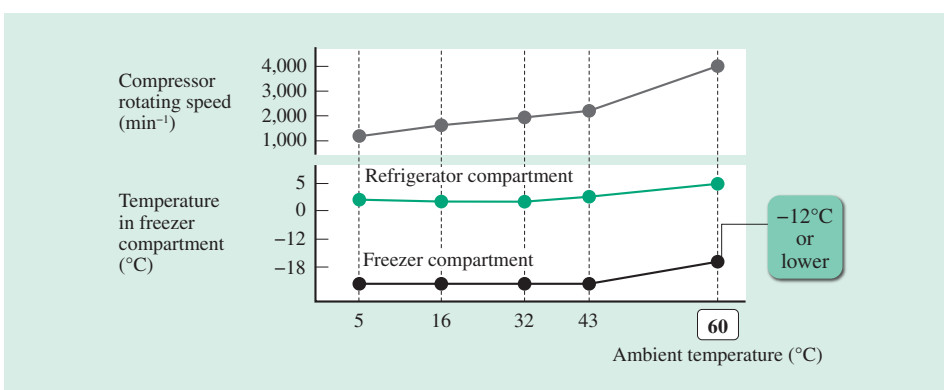


Fig. 6—Powerful Cooling Performance. Powerful cooling performance is provided that maintains a freezer compartment temperature of -12°C or lower under an ambient temperature of 60°C.

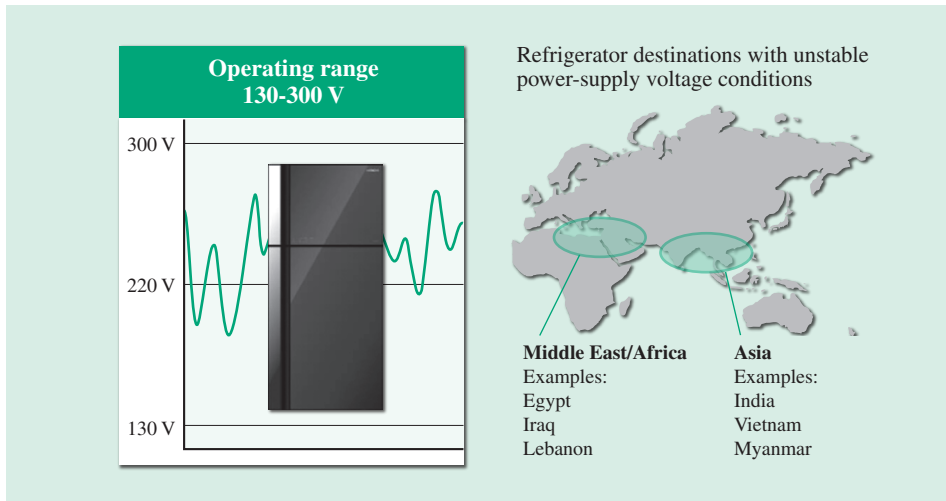


Fig. 7—Stable Operation is Possible even without a Power Stabilization Device. Cooling operation continues even if the voltage fluctuates over a wide range between 130 V and 300 V.

performance in the Middle East and other high-temperature environments, and offer the appeal of having achieved two-star freezing performance even under a 60°C environment\* (see Fig. 6).

Inverter circuits can also handle the unstable power-supply voltage conditions that are occasionally seen in Asia, the Middle East, Africa, and other regions, and Hitachi deals with major power fluctuations through methods such as developing software to change compressor startup control and optimizing the power supply (see Fig. 7).

**Hitachi’s Unique Style in French Bottom Freezer Refrigerators**

In addition to the aforementioned functions, Hitachi also develops premium products that satisfy the diverse needs of each country while providing both good design and ease-of-use. A representative example of this is the French Bottom Freezer Refrigerator, which was first introduced in 2013 (hereinafter French Bottom).

This French Bottom model uses a french style door on top for the refrigerator compartment, and a drawer style freezer compartment on the bottom, and features a large vegetable case inside the refrigerator compartment (see Fig. 8).

This unique design with its easy-to-use upper refrigerator compartment is accepted not just in Asia, but in the Middle East as well. The market for this refrigerator is expected to grow tremendously, and the appeal of the large vegetable case is expected to be strong in the Indian market as well due to the large amount of vegetables in the Indian diet.

**Introduction of Fully Automatic Washing Machines with New Inverters (Made by HCPT)**

**Background and Aim of Development**

As global momentum toward energy and water conservation and the need for larger capacities grows, each country has been steadily strengthening its regulations with regard to energy conservation labels (see Fig. 9).

Although all companies are focusing on the development of products that emphasize energy-saving performance, some competitors have been early adopters of inverter models. Not only has Hitachi introduced the unique automatic tub-cleaning function that has been highly praised in the Japanese market to the international market, it has also developed a new high-efficiency inverter drive system that offers

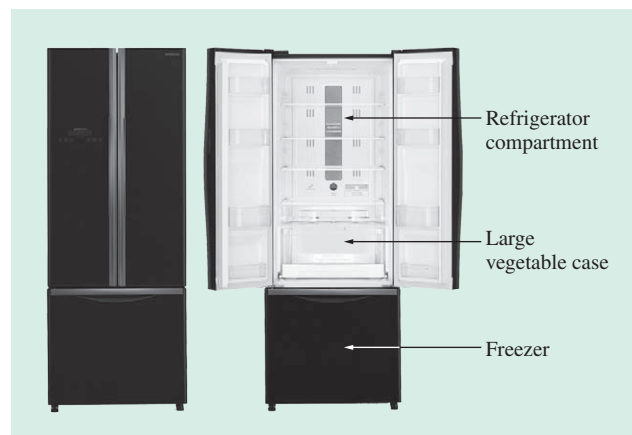


Fig. 8—French Bottom Freezer Refrigerator. Lineup includes two different net capacities (405 L and 455 L). The signature design and ease-of-use have earned this product praise.

\* Freezing performance guideline that indicates the ability to store frozen food for approximately one month while maintaining a temperature of -12°C or lower.



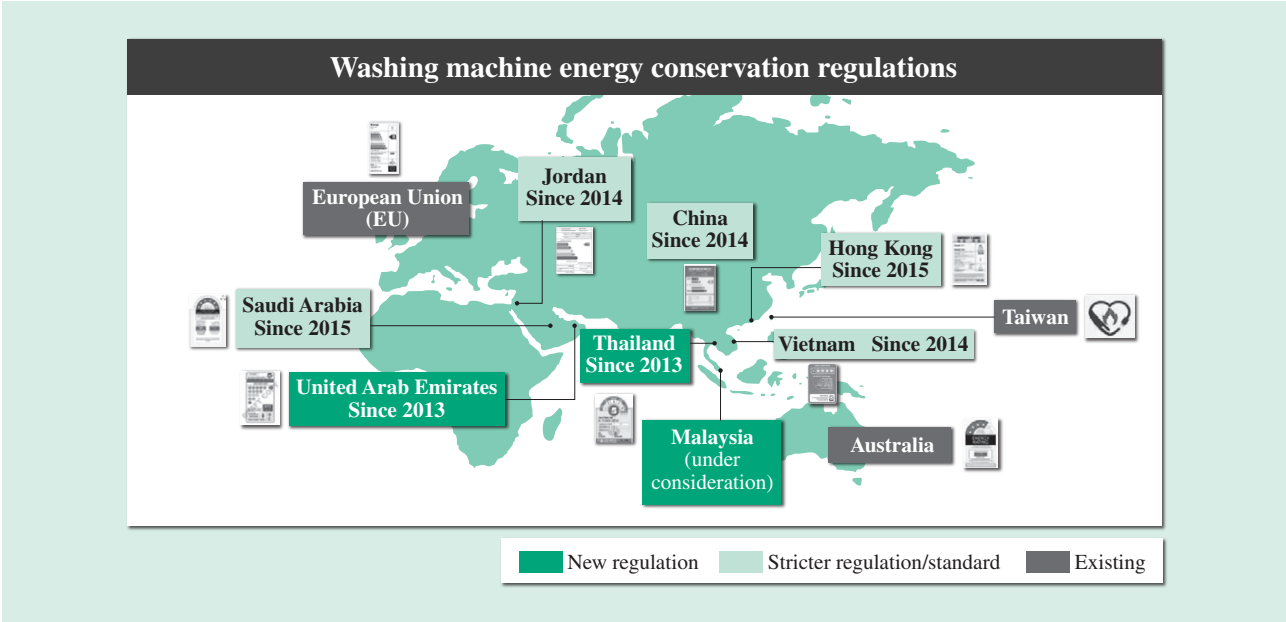


Fig. 9—Trends in Washing Machine Energy Conservation Regulations in Different Countries and Regions. Regulations were launched in 2008 in the EU, Taiwan, China, Hong Kong, and Australia. Existing standards were made stricter in 2013, and new energy conservation regulations came into effect.

advantages for energy-saving performance. Starting in October 2014, Hitachi released four new inverter models (with loading capacities between 13 and 16 kg) with the goal of expanding market share in the high-end/large-capacity market segment.

**Development Policy and Product Concept**

(1) New high-efficiency inverter drive system

Energy consumption was greatly reduced through the development of a new inverter motor with a belt-

type drive. By reducing the speed of the belts and gears, it is possible to achieve the low motor torque required to wash clothes inside the washing tub, which has enabled the use of smaller motors. Development of this new inverter motor required the cooperation of related works and research laboratories, and a reduction of 25% in weight over previous motors was achieved through its compact and high-efficiency design (see Fig. 10).

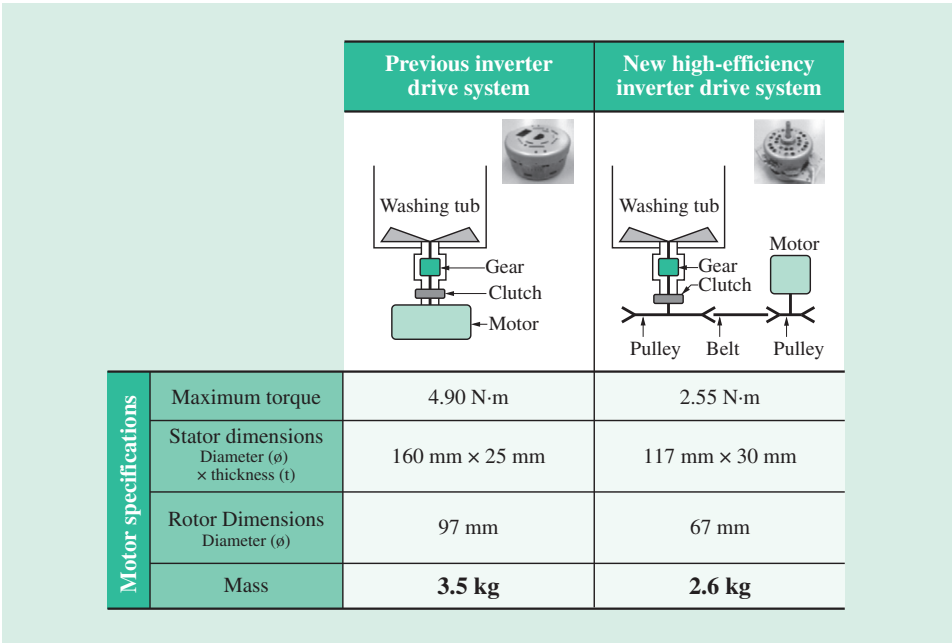


Fig. 10—Comparison between New and Previous Inverter Drive System. A new inverter drive system was developed that offers both washing ability and energy-saving performance at the same time.

Based on this inverter drive system, Hitachi pursued washing ability, water usage, ability consumption, and other basic washing machine performance levels that made it top class in the labeling schemes of each country (see Fig. 11).

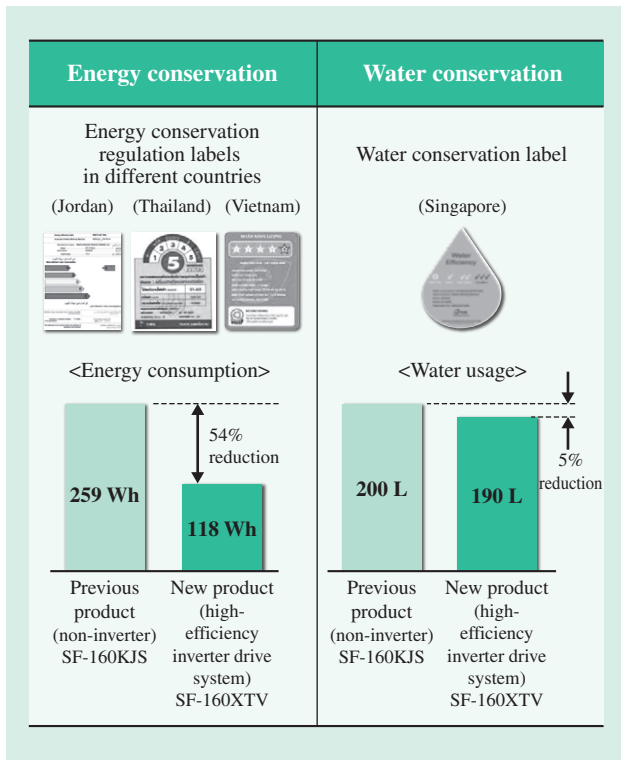


Fig. 11—Inverter Drive System’s Energy and Water Conservation. Both energy consumption and water usage have been greatly reduced compared to the previous product.

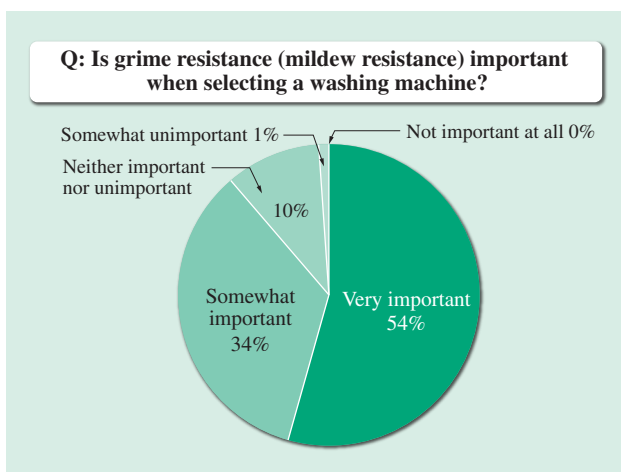


Fig. 12—Washing Tub Grime Resistance (Mold Resistance) in Washing Tub Priority Level when Purchasing in Thailand, Malaysia, and Vietnam (Hitachi Survey from December 2012: n=664). Approximately 90% of consumers prioritized grime resistance when purchasing a washing machine.

(2) Inclusion of unique automatic tub-cleaning function and pursuit of ease of use

Market surveys conducted in Thailand, Malaysia, and Vietnam, have shown that approximately 90% of consumers are concerned about the washing tub getting dirty, just like in Japan (see Fig. 12), so the unique Hitachi automatic tub-cleaning function was included. In addition, a user-friendly new loading opening, a push-open glass lid, and easy-to-operate buttons were also adopted. Another unique function was also added that provides the ability to adjust water flow as desired with a single button during operation.

(3) Adoption of a high-quality external appearance

A high-quality design was adopted that features a simple unified glass lid, a glossy metallic coating, and a sheet insert molding panel for the control interface (see Fig. 13).

### Development of Vacuum Cleaners for the Middle Eastern and African Markets (Made by HCPT)

#### Background of Development of Cylinder-type Vacuum Cleaners

The key value-added points sought by consumers in the Middle East region for a vacuum cleaner are high power and large dust-collecting capacity. For the Saudi Arabian vacuum cleaner market, which has continued to grow in demand recently, Hitachi has been expanding its sales on a yearly basis by providing a full lineup of barrel-type vacuum cleaners that are characterized by high power, large capacity, and a steel can structure (see Fig. 14).



Fig. 13—External Appearance of the Fully Automatic Washing Machine with New Inverter (SF-160XTV). The newly developed design achieves both a high-quality external appearance as well as excellent ease of use.



Fig. 14—Barrel-Type Vacuum Cleaner (CV-975YR).  
This vacuum cleaner satisfies the needs of the Middle Eastern market for both high power and large capacity.

To expand sales in the African market, however, the important market of Egypt must be addressed with its large total demand. The need for cylinder-type vacuum cleaners is strong in Egypt, and so the sale of such products was needed. In addition, now that air purifiers that can collect sand are on sale in this desert region, support for products that can handle sand is also needed.

For this reason, Hitachi included its unique automatic dust removal function in a high-power motor with powerful and continuous suction and a large dust-collecting capacity that is top in its class, thereby launching a cylinder-type model that can handle sand on the vacuum cleaner market (see Fig. 15).

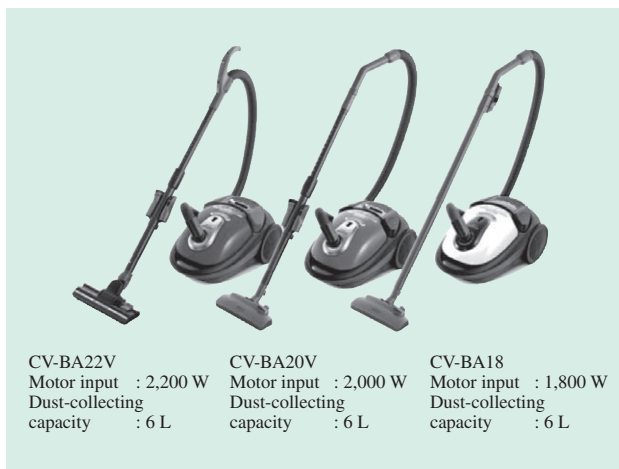


Fig. 15—New Cylinder-Type Vacuum Cleaners.  
(CV-BA22V [Left], CV-BA20V [Middle], and CV-BA18 [Right])  
Hitachi developed new high-power, large dust-collecting capacity cylinder-type vacuum cleaners in 2014.

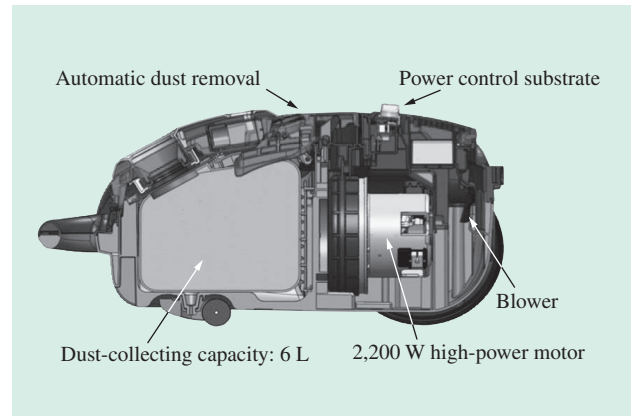


Fig. 16—Structure of New Cylinder-Type Vacuum Cleaner (CV-BA22V).  
(Three-dimensional [3D] cross-section diagram)  
Large capacity is achieved while maintaining high density in the arrangement of motor and other electric parts.

### Combining High Power with Compactness

To improve a vacuum cleaner's ease of use, the key is to make the body compact while providing high power and large dust-collecting capacity. Hitachi used a high-density 3D computer-aided design (CAD) system to develop a new cylinder-type vacuum cleaner. Specifically, it has a dust collection capacity of 6 L, a high-power 2,200 W motor, a power cord winding mechanism, a power control substrate, and a blower, all of which are arranged in the rear of the main unit with a high density (see Fig. 16).

The automatic dust removal function was also newly developed and included to ensure that suction power and large capacity are maintained even after dust and sand particles are suctioned up.

In general, when a vacuum cleaner is used continuously, dust fills the vacuum bag and blocks the flow of air, thus reducing suction power (flow rate). The automatic dust removal function of this new cylinder-type vacuum cleaner automatically removes any dust that is blocking the flow of air whenever the cord is pulled, thereby alleviating the reduced flow rate and maintaining suction power (see Fig. 17).

Starting in the second half of 2014, the new cylinder-type vacuum cleaner described above was released on markets centered in the UAE, Saudi Arabia, and Egypt.

### Environmental Consciousness of Future Vacuum Cleaners

Different energy conservation standards are being formulated in Europe for each product, and gradual introduction of standards for vacuum cleaners



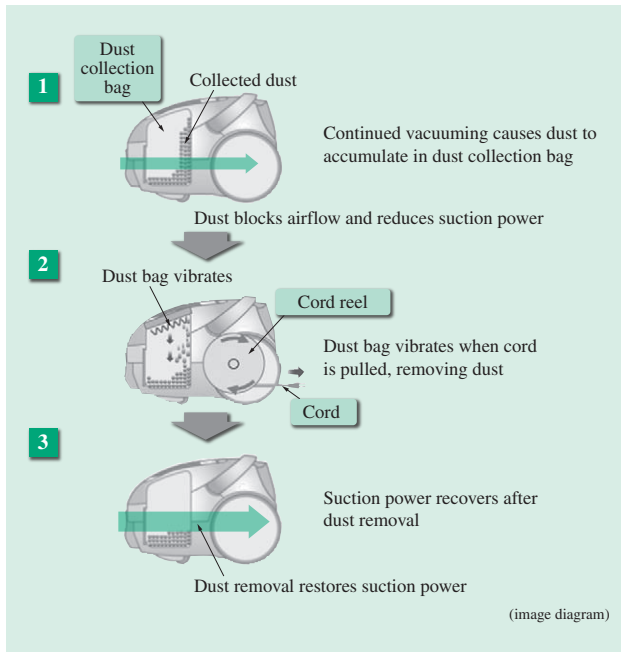


Fig. 17—Automatic Dust Removal Principle. Suction power is recovered every time the cord is pulled.

started in September 2014. Energy consumption, input power, dust pick-up ratio, and other ratings are being established as energy conservation standards, and Hitachi has already begun shipping vacuum cleaners with energy labels to Europe as well. As part of the next step, standards will become even stricter in September 2017 as regulations for dust re-emission ratios, noise, and others are also added to the standards, and Hitachi plans to respond in part by developing new motors.

Since environmental consciousness has grown stronger and energy conservation regulations have been introduced in Europe, this trend is expected to influence Asia and the Middle East as well. Hitachi will continue planning and developing products suited for each market by meeting a variety of different needs, including those stemming from product specifications and energy conservation regulations.

**CONSTRUCTION OF A FLEXIBLE MANUFACTURING SYSTEM AT HCPT**

HCPT uses cell production in its assembly process. Starting in 2008 with vacuum cleaners and followed by expansion to all products in 2013, this Hitachi-style cell production method enables flexible production of many different models in small batches (see Fig. 18).

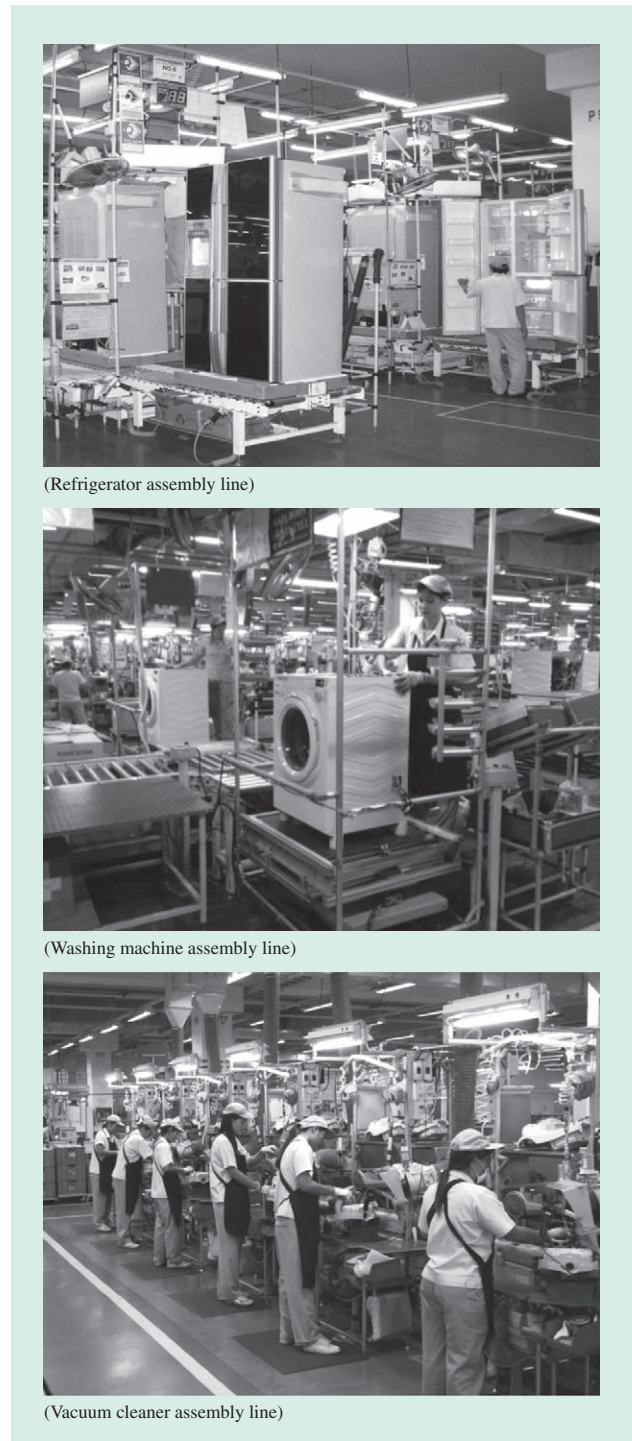


Fig. 18—Cell Assembly Lines for Refrigerators, Washing Machines, and Vacuum Cleaners. A cell production system was adopted that is suited to amount fluctuations and small-lot production.

**CONCLUSIONS**

This article described the global deployment of Hitachi’s home appliances with a focus on the Asian and Middle Eastern markets, including both export strategies and development case examples featuring

refrigerators, washing machines, and vacuum cleaners made by HCPT.

Although expanding business in a highly competitive international environment requires strong basic performance, the prior development of unique functions that consumers see as having value is also

key. For this reason, Hitachi will continue engaging in even closer cooperation between international bases, and mother factories and research laboratories in Japan, while also strengthening local product planning, design, and development.

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