



The Vision and Achievements of 22 years of Energy Efficiency Management Programs

KOREA ENERGY EFFICIENCY POLICIES

Korea's Energy Standards & Labeling



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Energy Conditions and Energy Efficiency Management Policies



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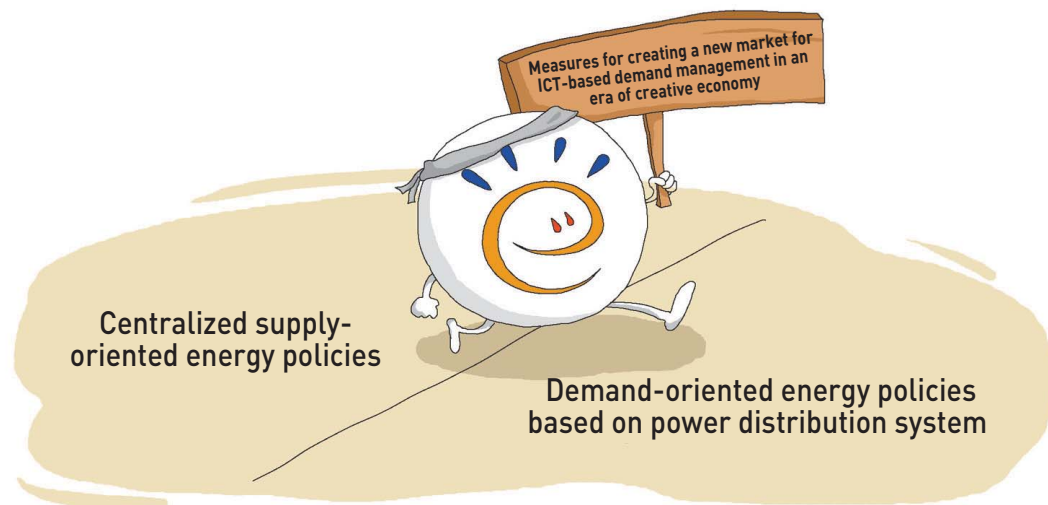
Energy Conditions and Energy Efficiency Management Policies

Energy efficiency improvements and energy demand management have grown in importance, even as the conditions for electricity supply and GHG mitigation have been deteriorating. These deteriorating conditions have resulted from factors such as: a decrease in the acceptance of nuclear energy after the malfunctioning of nuclear power plants during the Fukushima Nuclear Disaster; conflicts over the construction of transmission towers in Milyang; and disputes over the building of thermal power plants near metropolitan areas.

In this context, the Korean government changed the paradigm to demand-oriented energy policies based on power distribution system from Centralized supply-oriented energy policies. As one of the polices, the Korean government laid out "The Measures for Creating New Markets in Energy Demand Management Based on Information and Communications Technology (ICT) in the Era of Creative Economy."

According to these measures, along with energy efficiency improvements in each type of energy using equipment, energy consumption would be further reduced by system-centered management using ICT applications. In addition, an enabling environment would be created where energy can be consumed in an efficient manner by shifting the electricity load from peak to off-peak times.

Creating a market through the creative convergence of ICT, energy, and electricity, would support the realization of the creative economy by contributing to job creation in services specialized in energy demand management.

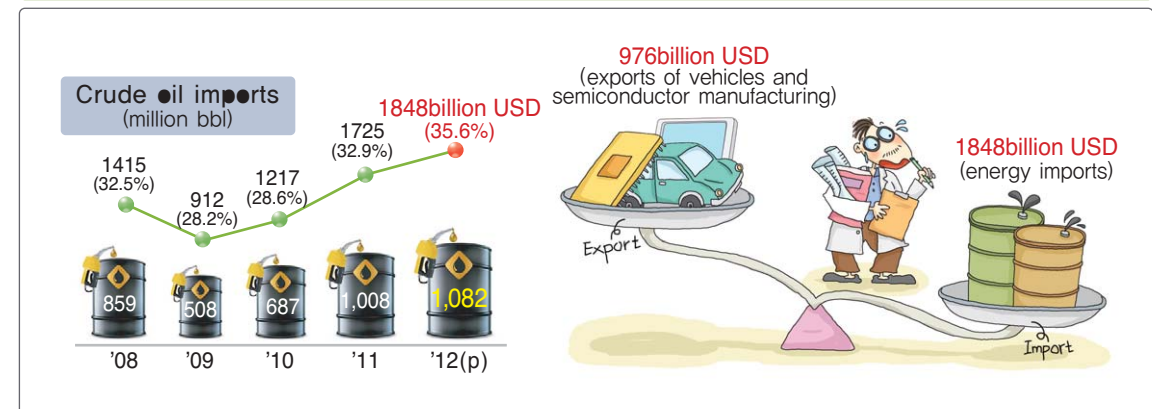


1 - Status of Energy Consumption

Korea was ranked the 8th largest energy-consuming nation. Energy imports accounted for 35.6 percent of the total national imports in 2012, totalling \$184.8 billion USD (\$108.3 billion for crude oil, \$27.4 billion for LNG, \$16 billion for coal). This scale of energy imports exceeded Korea's major exports of vehicles and semiconductors.

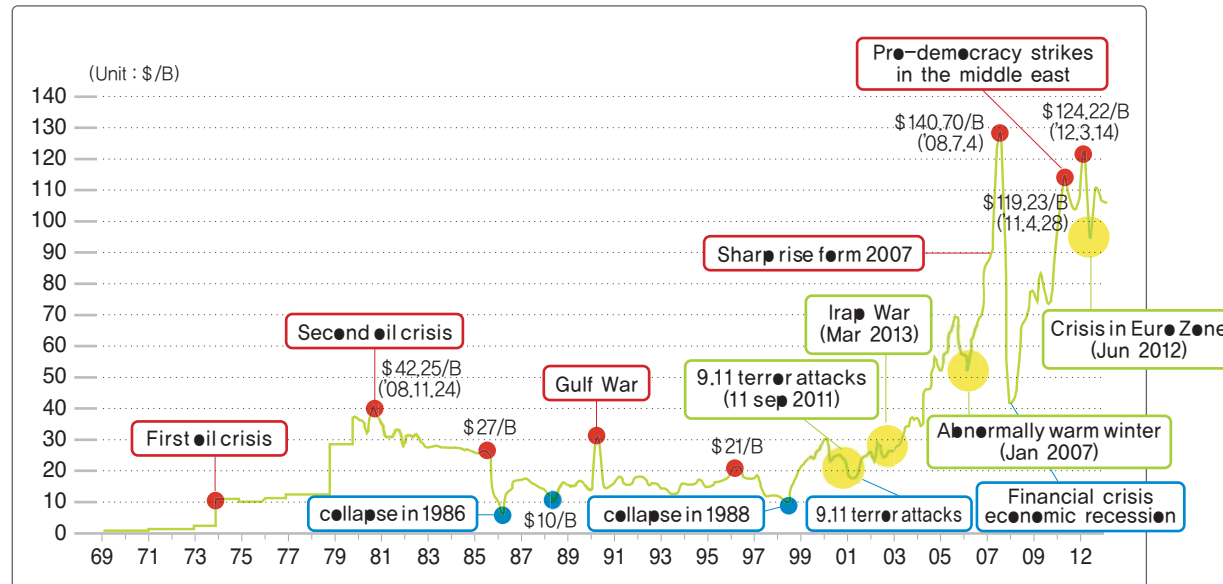
Category	'08	'09	'10	'11	'12
Total energy imports (\$ billion USD)	1,414.8	911.6	1,216.5	1,724.8	1,848.0
Share of total imports (%)	32.5	28.2	28.6	32.9	35.6
Crude oil imports	859	508	687	1,008	1,082

III Status of Energy Imports (compared to total imports)



Even though the recent trend is toward decreasing energy prices (due to economic recession), Korea's rate of overseas energy dependency remains at 96 percent. Therefore, there is a need, to reduce energy consumption by continually improving energy efficiency.

Trend in long-term crude oil price (Dubai)



Source : Energy Statistics Monthly (Korea Energy Economics Institute), Korea International Trade Association (kita.net), PETRONET of Korea National Oil Corporation (www.petronet.co.kr)

Status of Energy Consumption

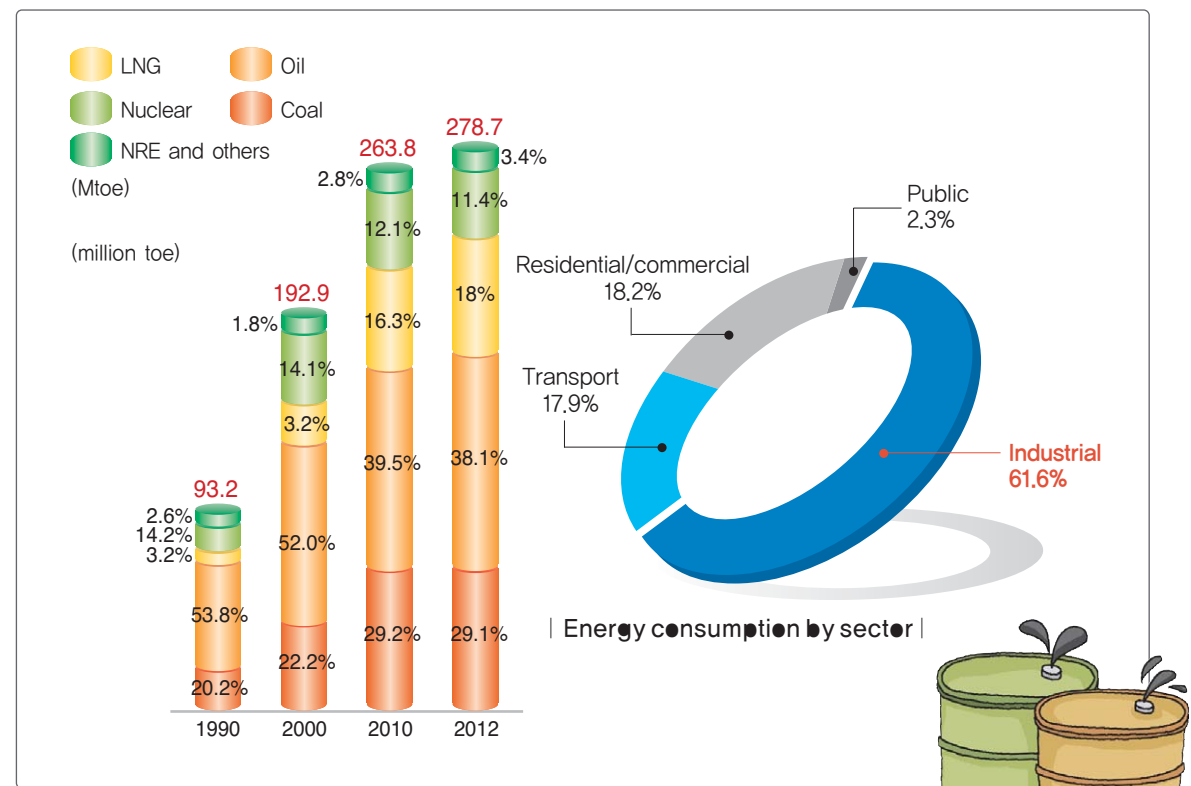
Energy is consumed in a series of stages - supply (primary energy) - transformation loss - final energy. Among these, primary and final energy consumption are closely linked with energy efficiency improvements.

Primary energy consumption can be broken down into 38.1 percent for oil, 29.1 for coal, 18 for LNG, 11.4 for nuclear energy, and 2.9 for others. It has been shown that the share for oil has been reduced through proactive efforts to diversify energy sources. However, if the share for LNG is included we see that expensive energy imports have expanded. A lowering operating rate of nuclear power plants, and an increase in individual incomes, may account for this expansion.

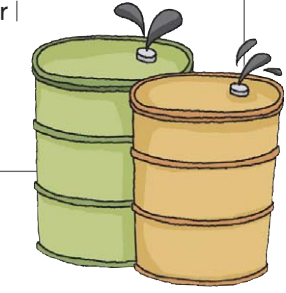
When it comes to final energy consumption, the industrial sector consumed 61.6 percent, 18.2 percent was consumed by the residential and commercial sector, and 2.3 percent by the public sector.

The share for industrial energy consumption was greater than the average of OECD member countries. This was due to Korea's energy-intensive industrial structure which is focused on steel, petrochemicals, cement and others.

Primary energy and final energy



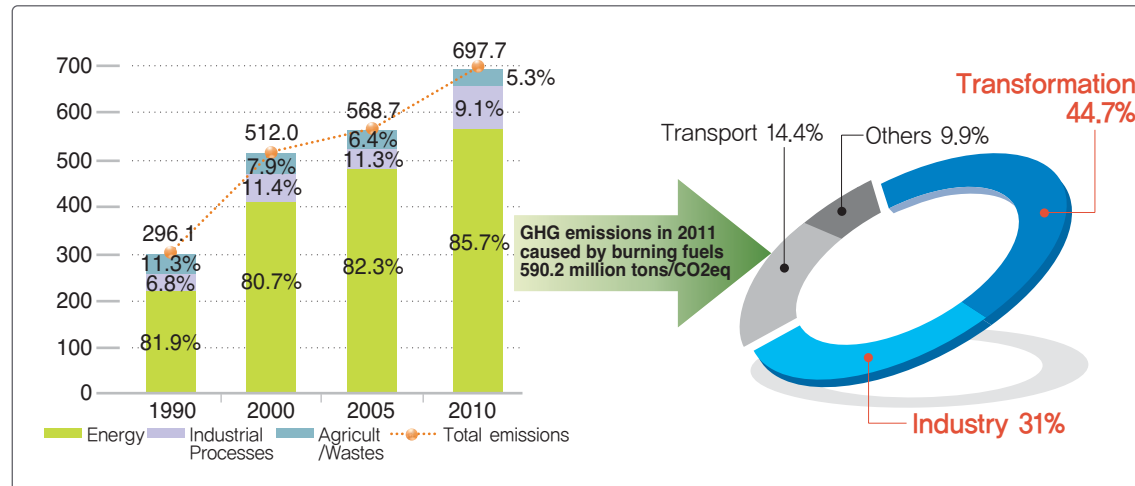
Source : Energy Statistics Monthly (Korea Energy Economics Institute, 2013)



2 - Greenhouse Gas Mitigation and Energy Saving

Total national GHG emissions in 2011, amounting to 697.7 million tons/CO2 eq, increased by 31.5 percent over those of 2001 (530.7 million tons/CO2 eq). Emissions from burning fuels accounted for 85.7 percent of total national GHG emissions, and were composed of 44.7 percent for energy transformation, 31 percent for industry, 14.4 percent for transport and 9.9 percent for other sectors including the residential, commercial and public sectors.

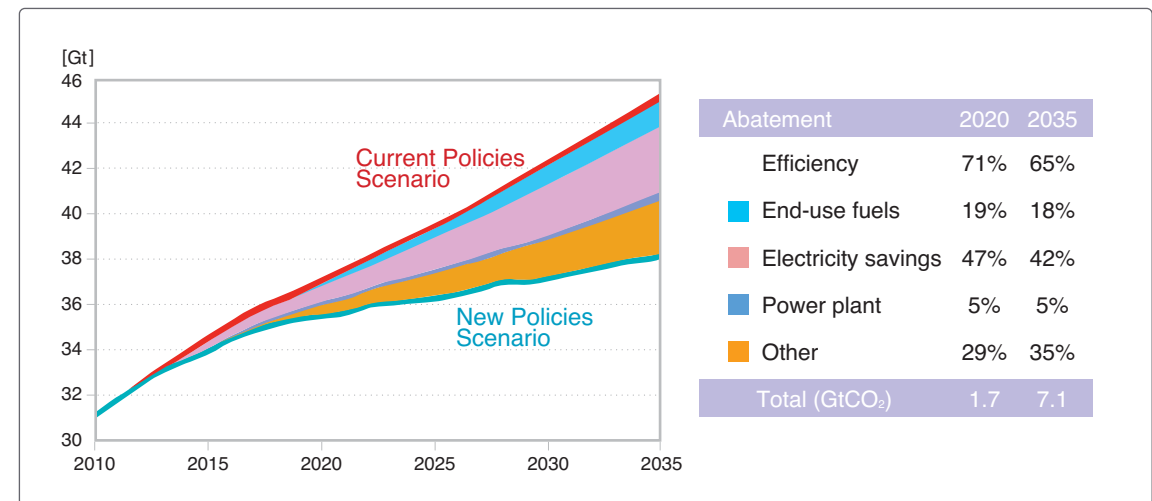
III Status of total GHG emissions and emissions by sector



Source : Greenhouse Gas Inventory & Research Center of Korea

According to projections of the International Energy Agency (IEA), improving energy efficiency can contribute 52 percent in achieving the target of the IEA's new policies scenario by 2030. In terms of GHG mitigation, energy efficiency improvements are the most practical and economical tool.

III CO2 mitigation contribution in the new policies scenario compared to the current policies scenario

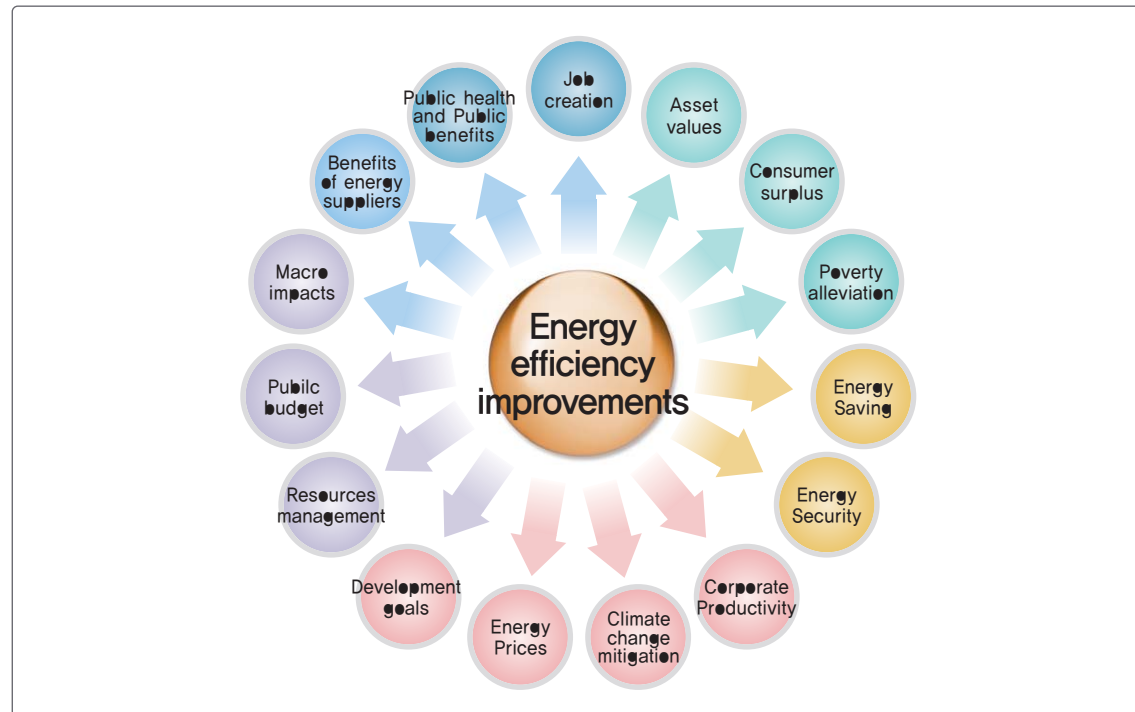


Source : World Energy Outlook (IEA, 2012)

Energy efficiency improvements can result in various benefits across sectors - not only GHG reductions, but also economic and social benefits.



||| Various benefits from energy efficiency



Source : IEA, Spreading the Net: The multiple benefits of energy efficiency improvements, 2012

• Category of energy efficiency benefits and the benefits by level

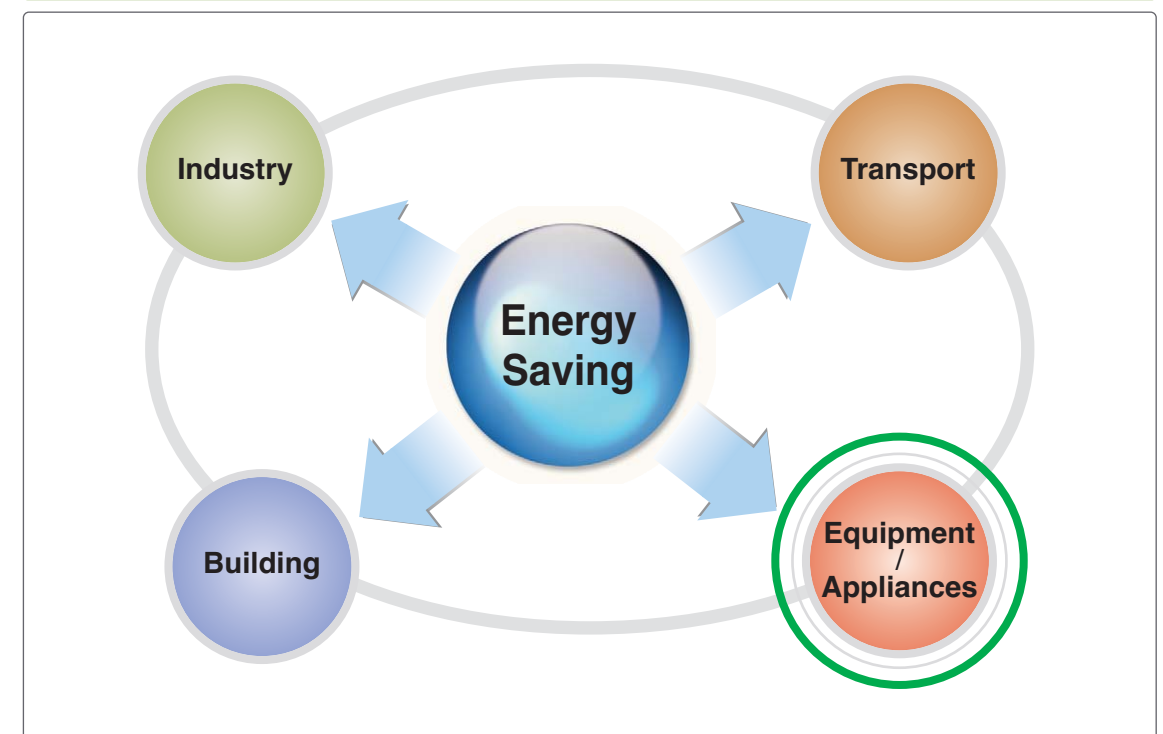
International	<ul style="list-style-type: none"> GHG emission reduction Natural resources management 	<ul style="list-style-type: none"> Energy price stabilization Achievement of development goals
National	<ul style="list-style-type: none"> Job creation Macroeconomic effects 	<ul style="list-style-type: none"> Energy security Public spending reduction related to energy
Sector	<ul style="list-style-type: none"> Increase in industrial productivity and competitiveness 	<ul style="list-style-type: none"> Increase in assets
Individual	<ul style="list-style-type: none"> Enhancement of quality of life 	<ul style="list-style-type: none"> Increase in disposable incomes

3 Energy Saving in Four Sectors

It is necessary that energy efficiency in the four sectors of industry, transport, buildings, and appliances be improved for national energy saving. Improving energy efficiency in appliances is considered especially critical as it can bring about energy savings at the source. Although various means are available to increase energy efficiency, energy saving from disseminating energy-saving products is highly effective.

The IEA has been recommending that governments prioritize the establishment of policies for increasing energy efficiency in appliances as the most critical and core energy saving policy. Accordingly, the Korean government is implementing energy efficiency standards and energy labeling programs as core energy efficiency policies for appliances (the Energy Standards and Labeling program, the High-efficiency Equipment Certification program, and the e-Standby program).

||| The four sectors for energy saving



4 Demand Management Focused Energy Efficiency Policies

Unlike major developed countries, the pattern of energy consumption in Korea continues to grow. In order to change this pattern, Korea is transforming from supply oriented energy policies toward systemic energy demand management by means of ICT and technologies.

It is understood that verified demand resources can be treated as equivalent to the resources of supply and power. Accordingly, the Korean government is moving toward building demand management systems which can replace supply capacity. Furthermore, by linking IT technologies and distributed energy systems, means are being devised to efficiently respond to fluctuations in energy demand and supply.

The Korean government has been undertaking a transformation into a low-carbon economic structure by raising energy efficiency standards for industry, buildings, and transport to the levels of those in developed countries by 2020. To curb the rising pattern in energy consumption, energy efficiency management in electricity has been strengthened, and the use of other energy resources including gas and heat have also been expanded.

When it comes to the appliances sector, with increased incomes, enhanced quality of life, and sophisticated IT services leading to increased dissemination of appliances and more usage time, the efficiency of energy usage has been promoted by taking account of efficiency improvements, standby power in networks, smart-appliances and others. The scope of energy efficiency management has also been extended from energy using products to energy related products (ErP) including construction materials and ICT applications.

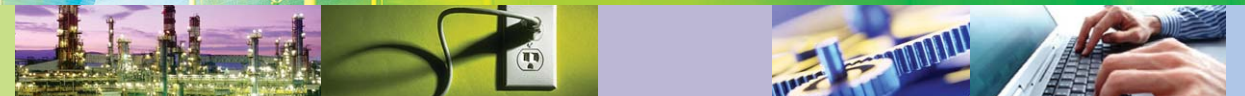


II

Korea's Energy Standards & Labeling

www.kemco.or.kr

Three Energy Efficiency Management Programs



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Three Energy Efficiency Management Programs

The Korean government has undertaken three energy efficiency management programs to increase the energy efficiency of appliances - energy standards and labeling, high-efficiency equipment certification, and e-Standby.

Having been implemented since 1992, the energy standards and labeling program mandates all manufacturers to attach an energy efficiency label with a rank from 1st to 5th class to their energy-intensive and highly disseminated appliances. Appliances failing to meet minimum energy performance standards (MEPS) shall be terminated from production and sales. The program targets 37 appliances including home appliances, lighting products, vehicles and tires.

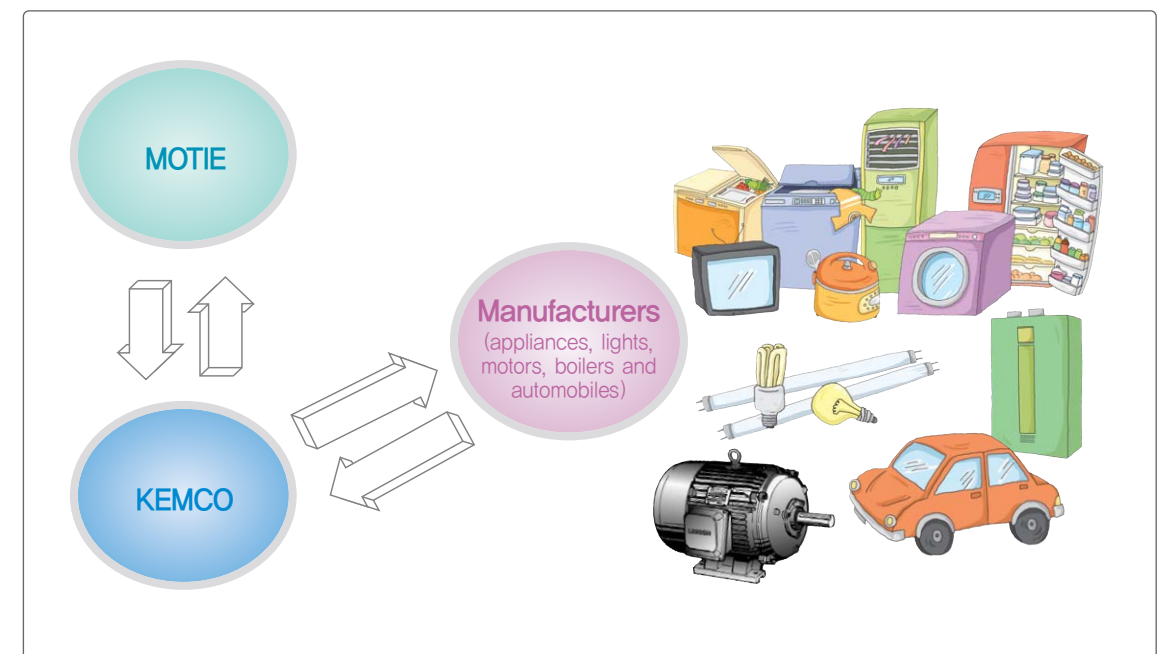
The high-efficiency equipment certification program recognizes the energy efficiency of the products meeting a certain level of efficiency requirement, and promotes the dissemination of high-efficiency equipment in the market. Launched in 1996, the program issues a certificate for high-efficiency equipment, and allows the manufacturers of certified equipment to attach a mark indicating its high efficiency. The coverage of this program includes 45 items including pumps, boilers and LED lights.

The e-Standby program was launched in 1999 to disseminate energy saving products which consume low standby power. Appliances meeting the e-Standby power requirement laid out by the government are eligible to have an energy saving mark attached, and those failing to meet the requirement are mandated to indicate a warning mark. Twenty-two items, including office equipment, are covered by this program.

Three energy efficiency management programs

The Ministry of Industry, Trade and Energy (MOTIE) and the Korea Energy Agency (KEA) are responsible for mandating efficiency standards and implementing energy saving policies in Korea. While MOTIE establishes and revises efficiency standards and energy saving policies, KEA implements and operates such programs. In brief, based upon the Energy Use Rationalization Act, MOTIE issues notification of regulations related to the three efficiency management programs (energy standards and labeling, high-efficiency equipment certification, and e-Standby), and KEA, which is commissioned by MOTIE, implements the programs.

Organizations operating the three energy efficiency management programs



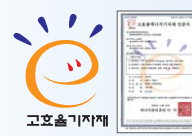
Energy standards and labeling program



- launched in 1992
- covers 37 items including refrigerators, TVs, and air-conditioners
- mandates attaching a label with an energy efficiency rating
- terminates production and sales for appliances failing to meet the requirement of MEPS

Three energy efficiency programs

High-efficiency equipment certification program

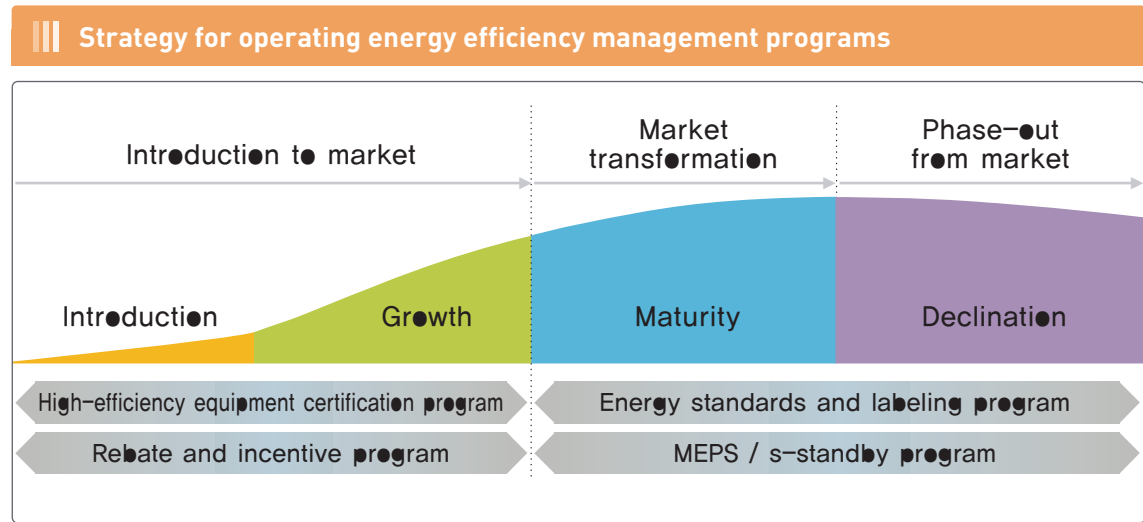


- launched in 1996
- covers 45 items including pumps and LED lamps
- voluntary, manufacturers can apply for certification

e-Standby program



- launched in 1999
- covers 22 items including computers and monitors
- a mandatory reporting scheme



As described in the following, the Korean government has been operating three programs in order to accelerate market transformation towards high-efficiency equipment. Items with an emerging need for managing its energy efficiency are to be included among the targets of the high-efficiency equipment certification program so that their efficiency can be managed. Once an item is disseminated with improved efficiency at a certain level, it will be put under the control of the energy standards and labeling or e-standby program so that its efficiency can be managed in a systemic manner. Such items include three-phase induction motors, window sets, electric transformers, TVs, and others.

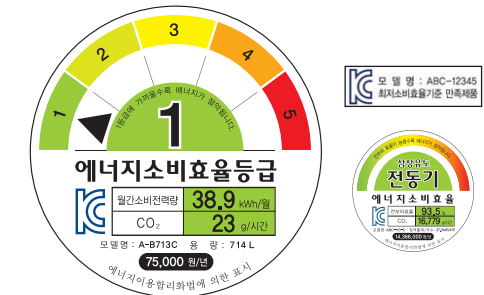
In addition to promoting the dissemination of high-efficiency products, KEA has been operating two web sites - 'Energy efficiency management programs' and 'Ocean of efficiency' - to consolidate its function of providing consumer information. By comparing the efficiency of products which consumers wish to buy, consumers are able to make more informed purchases. Consumers can check whether the product is registered, and how its efficiency is rated, on the web sites of the energy efficiency management programs.



1 - Energy Standards and Labeling Program

Overview

As a core part of Korea's efficiency management system, the energy standards and labeling program mandates manufacturers (and importers) to produce and sell energy saving products from the very beginning of the production (import) phase.



To enable consumers to find energy saving products relatively easily, the energy standards and labeling program mandates manufactures (and importers) ① to attach an energy rating label in a range from the 1st to 5th grade, ② to report the energy efficiency, and ③ to apply MEPS to their product.

- ① Manufacturers or importers indicate an energy rating from the 1st to 5th grade according to the energy efficiency or energy usage of their product (It is mandatory to attach the label rating for energy efficiency.)
- ② Manufacturers or importers report the energy efficiency.
- ③ Under MEPS, products failing to meet the requirement of the 5th rating will be terminated from production and/or sales.

What are Minimum Energy Performance Standards (MEPS)?

MEPS are mandatory energy efficiency standards that promote national energy saving from the very beginning by limiting the production and/or sales of low-efficiency products that fail to meet certain required levels of efficiency or power consumption. A fine of up to 20 million KRW may be imposed for violations.

Characteristics

The energy standards and labeling program operates as a mandatory reporting scheme.

Legal grounds

Article 15, Energy Use Rationalization Act.

- Operational regulation on equipment for efficiency management (Official announcement of the Ministry of Industry, Trade and Energy).
- Regulation on energy standards and labeling for vehicles (Official announcement of the Ministry of Industry, Trade and Energy).
- Regulation on measurement, standards and labeling of energy efficiency for car tires (Official announcement of the Ministry of Industry, Trade and Energy).

Target products

Thirty seven products are targeted, including refrigerators, freezers, kimchi refrigerators, air-conditioners, general washing machines, drum washing machines, dish washers, dish dryers, electric cold-hot water suppliers, electric rice cookers, electric vacuum cleaners, electric fans, air purifiers, incandescent lamps, fluorescent lamps, ballasts for fluorescent lamps, self-ballasted lamps, three-phase induction motors, domestic gas-fired boilers, adapters and rechargers, electric chillers and heaters, commercial refrigerators, gas water heaters, electric transformers, window sets, TVs, electric fan heaters, electric stoves, electric heat pumps (EHP), dehumidifiers, electric heating pads, electric hot water mats, electric heating boards, electric beds, radiators, vehicles, and tires.

Responsible organization

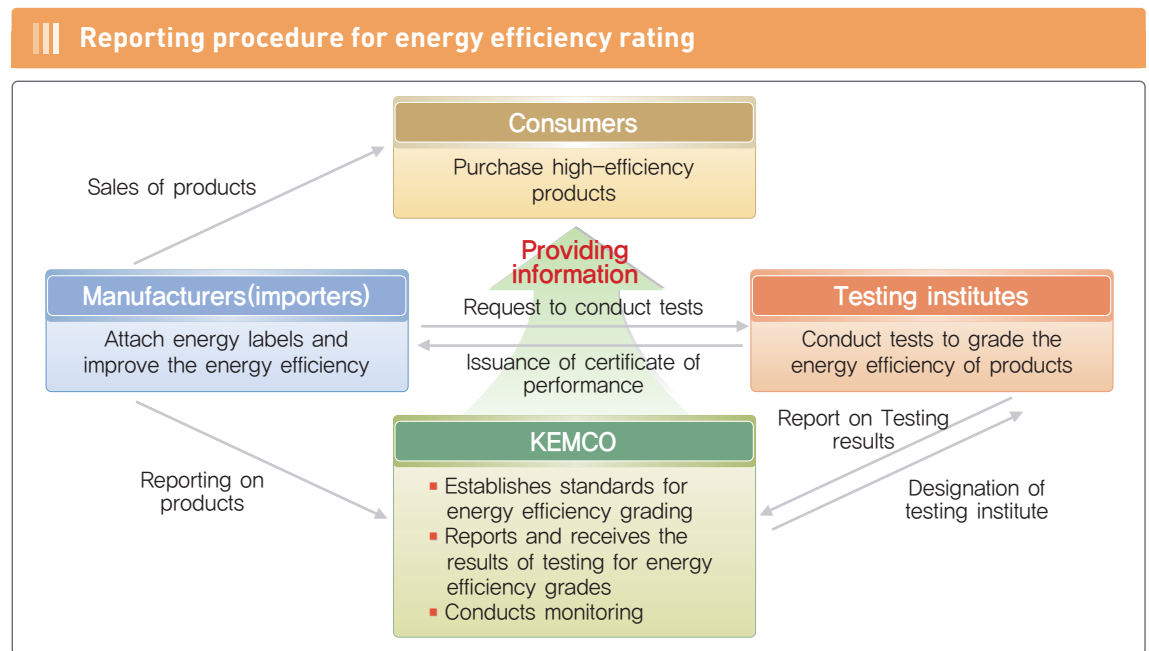
Commissioned by the MOTIE, KEA implements the program in partnership with 1400 manufactures in such area as appliances, lighting, motor vehicles, and tires. 35,000 models from 31 items have been targeted under the program.

Energy saving potential

Products with a 1st grade energy efficiency rating can lead to 30 to 40 percent energy savings over those with a 5th grade rating.

Reporting procedure for energy efficiency rating

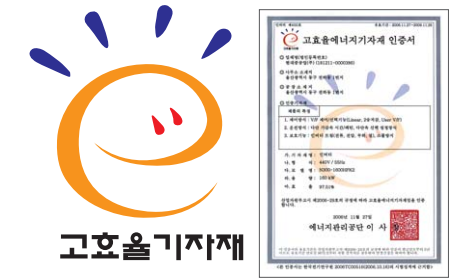
Manufacturers or importers apply to a nationally designated testing institute to conduct tests on their products that they submit for their energy efficiency rating. After manufactures or importers receive a statement of the tests issued by a testing institute, they report the results to KEA via an online system(http://bpms.KEA.or.kr/efficiency_system/).



2 High-efficiency Equipment Certification Program

Overview

The program aims to achieve national energy saving by certifying equipment with significant potential impact on energy saving as high-efficient, and by raising the technical standards for small and medium sized companies. As a result, early markets for high efficiency equipment can be created and promoted. Commercial and buildings sector equipment which has efficiency and quality test results meeting the energy efficiency requirements laid out by the government are eligible to receive a certificate for high-efficiency equipment.



What is high-efficiency equipment?

An equipment can be certified if it is highly efficient and has a substantial energy saving impact. This equipment is certified by the KEA if it meets certain requirements of energy efficiency after its tests on energy efficiency and quality are performed by a designated testing laboratory.

Characteristics

This program is operated as a voluntary scheme by application.

Legal grounds

- Article 22, Energy Use Rationalization Act (Certification on high-efficiency equipment and others)
- Regulation on promoting the dissemination of high-efficiency equipment (Official announcement of the Ministry of Industry, Trade and Energy)

Target products

Forty-five products including lighting systems with automatic luminous intensity, energy recovery ventilators, gas-fired boilers for industry and buildings, pumps, centrifugal and screw chillers, uninterruptible power supplies, metal-halide lamp stabilizers, sodium lamp stabilizers, inverters, automatic temperature controllers for heating, LED traffic signals, electrical power transmission and distribution systems with complex functions, direct-fired absorption cold and hot water dispensers, single-phase induction motors, ventilators, centrifugal fans, submersible aerators, metal-halide lamps, high illumination reflectors for high-intensity discharge (HID) lamps, oil-fired hot water boilers, oil-fired boilers for commercial buildings, heat accumulation type burners, turbo blowers, LED leading lights, thermo-hygrostats, external convertor LED lamps,

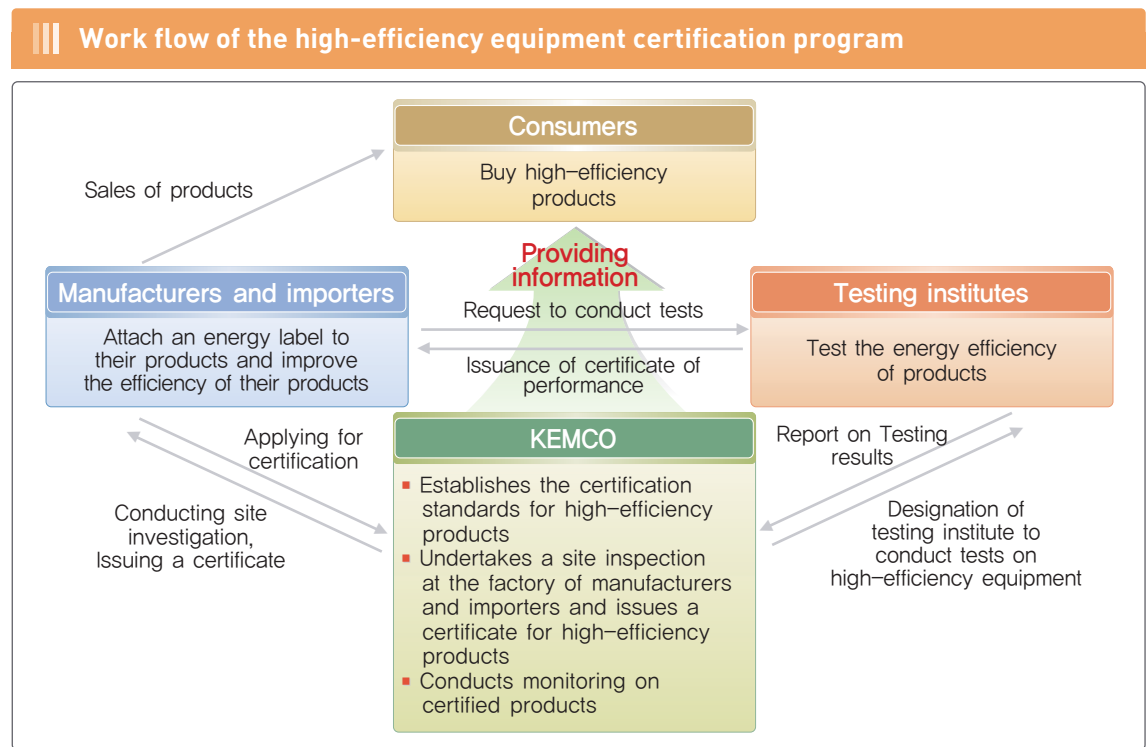
internal converter type LED lamps, recessed LED luminaires and fixed LED luminaires, LED safety luminaires, LED luminaires with sensors, LED moduled converters for power supply, plasma lighting system (PLS) luminaires, insulation doors with high air-tightness, luminaires adapting ultra constant discharge (UCL) lamps, LED street luminaires, LED flood luminaires, tunnel LED luminaires, tubular LED lamps (external converter type), gas-fired heat pumps, energy storage systems (ESS), maximum demand controllers, LED sign modules, window insulation films, gas-fired vacuum hot water boilers, and LED lamps for replacing fluorescent lamps (internal converter type).

❖ Implementing organization

Commissioned by the MOTIE, Korea Energy Agency has been implementing the high-efficiency equipment certification program for 45 items including boilers for commercial buildings, pumps, and LED lights.

❖ Procedure to get a certification for high-efficiency equipment

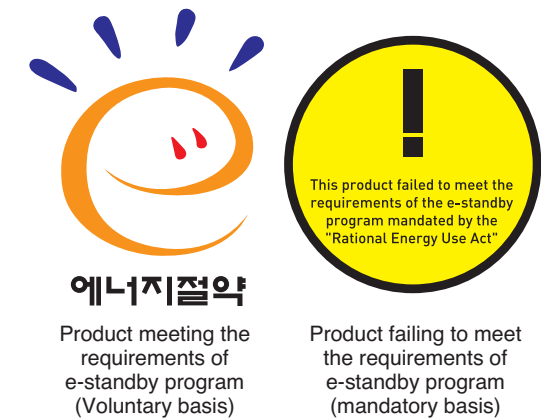
Manufacturers or importers wishing to get their products certified as high-efficient should apply to KEA by submitting an application form accompanied by documents related to maintaining certification and a report on testing performance issued by a designated testing institute. When it seems appropriate, after reviewing the documents, KEA will conduct a site inspection at the manufacturers or importers' factory. A certificate will be issued once all the requirements are met.



3 e-Standby Program

❖ Overview

The e-Standby program aims to induce the minimization of standby power and the adoption of an energy saving mode during standby periods that do not require the operation of a product. The program allows producers (importers) to voluntarily attach an energy saving mark to products meeting requirements mandated by the e-Standby program, and mandates them to attach a warning mark for products failing to meet the requirements.



Products targeted under the standby power warning label program in particular must report their standby power to KEA and attach a warning label.

⦿ What is standby power?

Standby power means the electricity consumed during standby periods when appliances such as computers and monitors are not in use. In addition to an off-mode, standby power includes no load, passive standby, active standby and sleep mode.

❖ Characteristics

This program is implemented on a voluntary and mandatory reporting basis.

❖ Legal grounds

Regulation on promoting the e-Standby program (Official announcement of the Ministry of Industry, Trade and Energy) based on the Article 18 (Designation of target products for the e-Standby program), Article 19 (Designation of target products to attach a warning label), Article 20 (Indication of products with lowest standby power), and Article 21 (Monitoring on products targeted under the e-Standby program).

❖ Target products

Twenty-two products are targeted computers, monitors, printers, facsimiles, copiers, scanners, all-in-one printers, automatic energy saving control systems, audio system, DVD players, microwaves, set-top boxes, door phones, wired and wireless phones, radio players, bidets, modems, home gateway systems, servers, hand dryers, digital converters, and wire and wireless routers.

❖ Implementing organization

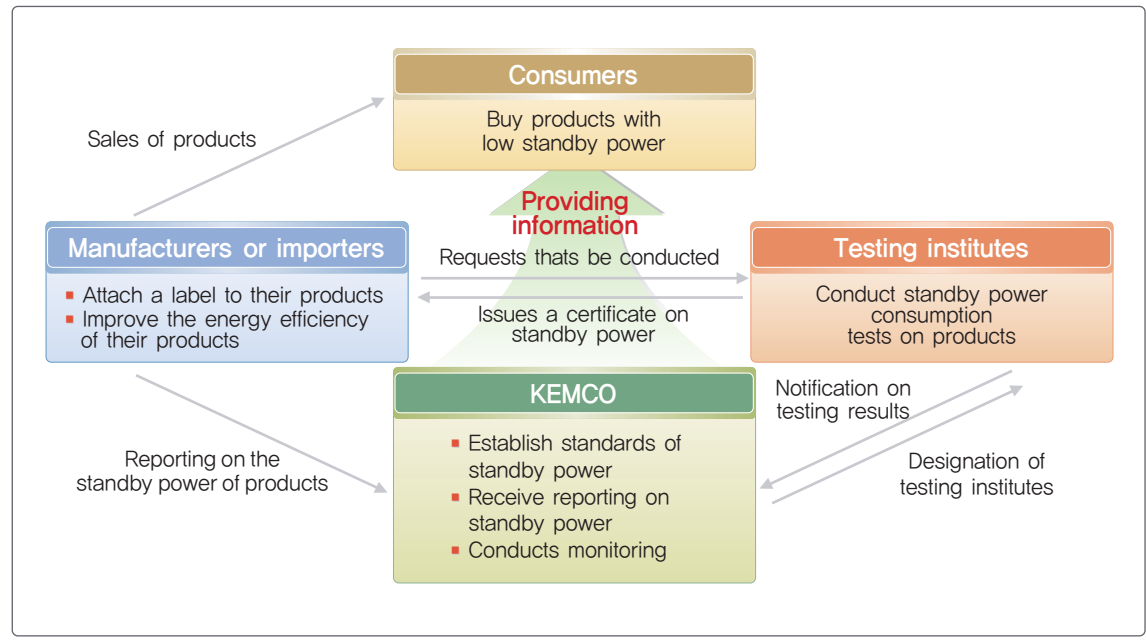
Commissioned by the MOTIE, KEA has been implementing the e-Standby program targeting 22 items and 9,000 models in partnership with 450 appliances companies.

❖ Reporting procedure

By reporting on the level of standby power of their products to KEA, manufacturers identify whether their products can be categorized as excellent in terms of standby power, or whether they require a warning label. Reporting on the level of standby power consumed by a product should be based upon a model. Documents necessary for reporting include a reporting form, a report of test results, and a photo of the product or a pamphlet. Notably, it is mandatory that the products targeted by the standby power warning labeling program have their level of standby power reported to KEA.

When it comes to the report on test results, manufacturers or importers may employ a designated testing institute or they may use test results issued by their own testing laboratory if it has been given accreditation by KEA. Confirmation can be found at <http://www.KEA.or.kr>.

Work flow of reporting procedures for the e-Standby Program



❖ Implementation of the Standby Power Warning Labeling Program

Korea became the first country to adopt a standby power warning program in 2008. Out of 20 items falling under the e-Standby program, TVs became the first product targeted by the standby power warning labeling program as of 28 August 2008. Later, the program extended its scope to cover 19 products as of 1 July 2010.

Once their products are identified as falling under the standby power warning labeling program, manufacturers or importers are required to take two steps: submit a mandatory report on the standby power consumption of their products; and attach a mandatory warning label to products which fail to meet the minimum requirement of the e-Standby program. A fine equivalent to 5 million KRW may be imposed for a violation.



- Relevant regulations: Article 14 (Regulation on e-Standby program) of the implementing rules for the “Rational Energy Use Act”, and Article 19 of the “Rational Energy Use Act” (MOTIE)

• Products targeted under the standby power warning labeling program


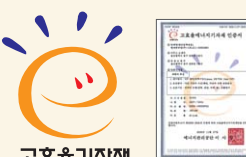

Effective date	Target products (total 19 items)
28 Aug 2008	• TVs (one item)
1 July 2009	• Computers, monitors, printers, all-in-one scanners, set-top boxes, microwaves (6 items)
1 July 2010	• facsimiles, copiers, scanners, video-tape recorders, stereos, DVD players, radio cassette players, door phones, wire and wireless phones, bidets, modems, home gateways (12 items)

* TVs have been reclassified as targets of the energy efficiency standards and labeling program as of 2012.

A study found that at the end of 2012 the sales of the 18 products targeted under the standby power warning labeling program accounted for just 0.5 percent of market share, while products with excellent standby power accounted for 99.5 percent.

4 Summary of Three Energy Efficiency Management Programs

5 Assistance to Promote Dissemination of High-efficiency Products

Program	Overview	Target products
Energy standards and labeling program (37 products)	 <ul style="list-style-type: none"> Aims to improve energy efficiency in appliances – regulates operational efficiency Mandatory labeling of an energy rating Termination of production and sales of products failing to meet MEPS 	<ul style="list-style-type: none"> Refrigerators (MEPS+energy labeling) Freezers (MEPS+energy labeling) Kimchi refrigerators (MEPS+energy labeling) Air-conditioners (MEPS+energy labeling) Washing machines (MEPS+energy labeling) Drum washing machines (MEPS+energy labeling) Dish washers (MEPS+energy labeling) Dish dryers (MEPS+energy labeling) Electric cold-hot water suppliers (MEPS+energy labeling) Electric rice cookers (MEPS+energy labeling) Electric vacuum cleaners (MEPS+energy labeling) Electric fans (MEPS+energy labeling) Air purifiers (MEPS+energy labeling) Incandescent lamps (MEPS+energy labeling) Fluorescent lamps (MEPS+energy labeling) Ballasts for fluorescent lamps (MEPS) Self-ballasted lamps (MEPS+energy labeling) Three-phase induction motors (MEPS) Domestic gas-fired boilers (MEPS+energy labeling) Adapters and rechargers (MEPS) Electric chillers and heaters (MEPS+energy labeling) Commercial refrigerators (MEPS+energy labeling) Gas water heaters (MEPS+energy labeling) TVs (MEPS+energy labeling) Window sets (MEPS+energy labeling) Electric transformers (MEPS) Electric fan heaters (MEPS) Electric stoves (MEPS) Multi electric heat pump (EHP) systems (MEPS + energy labeling) Dehumidifiers (MEPS+energy labeling) Electric heating pads (MEPS) Electric hot water mats (MEPS) Electric heating boards (MEPS) Electric beds (MEPS) Radiators (MEPS) Vehicles (energy labeling) Tires (energy labeling)
High-efficiency certification program (45 products)	 <ul style="list-style-type: none"> Dissemination of high-efficiency equipment for industry and buildings Voluntary Application for certification – Subsidies to be provided for certain products Voluntary attachment of a high-efficiency equipment mark, and issuance of a certificate 	<ul style="list-style-type: none"> Lighting systems with automatic luminous intensity Energy recovery ventilators Gas-fired boilers for industry and buildings Pumps Centrifugal and screw chillers Uninterruptible power supplies Metal-halide lamp stabilizers Sodium lamp stabilizers Inverters Automatic temperature controllers for heating LED traffic signals Electric power transmission and distribution systems with complex functions Direct fired absorption cold and hot water dispensers Single-phase induction motors Ventilators Centrifugal fans Submersible aerators Metal-halide lamps High illumination reflectors for high-intensity discharge (HID) lamps Oil-fired hot water boilers Oil-fired boilers for commercial buildings Heat accumulation type burners Turbo blowers LED leading lights Thermo-hygrostats External converter type LED lamps Internal converter type LED lamps Recessed LED luminaires and fixed LED luminaires LED safety luminaires LED luminaires with sensors LED moduled converters for power supply DC or AC supplied electronic control gears for LED modules Plasma lighting system (PLS) luminaires Insulation doors with high air-tightness Luminaires adapting ultra constant discharge (UCL) lamps LED street luminaires LED flood luminaires Tunnel LED luminaires Tubular LED lamps (external converter type) Gas-fired heat pumps Energy storage systems (ESS) Maximum demand controllers LED sign modules Window insulation films Gas-fired vacuum hot water boilers LED lamps for replacing fluorescent lamps (internal converter type)
e-Standby program (22 products)	 <ul style="list-style-type: none"> Regulation on standby power consumption Mandatory reporting – applies to the targets under the standby power warning program Mandatory scheme for standby power warning labeling Voluntary scheme for attaching an energy saving mark 	<ul style="list-style-type: none"> Computers (standby power warning labeling) Monitors (standby power warning labeling) Printers (standby power warning labeling) Facsimiles (standby power warning labeling) Copiers (standby power warning labeling) Scanners (standby power warning labeling) All-in-one printers (standby power warning labeling) Automatic energy saving control systems (standby power warning labeling) Stereos (standby power warning labeling) DVD players (standby power warning labeling) Microwaves (standby power warning labeling) Set-top boxes (standby power warning labeling) Door phones (standby power warning labeling) Wire and wireless phones (standby power warning labeling) Radios (standby power warning labeling) Bidets (standby power warning labeling) Modems (standby power warning labeling) Home gateway systems (standby power warning labeling) Servers Hand dryers Digital converters Wire and wireless routers

The Korean government has been undertaking a variety of policies in order to facilitate market transformation into a high-efficiency products market. The types of assistance available vary depending on the target products, but such assistance includes: rebates, priority purchasing of high-efficiency products through the Public Procurement Service (PPS), designation of best procured products, mandatory use of high efficiency equipment by public organizations, mandatory or recommendatory use of standards for energy saving designs in buildings, tax breaks on energy saving investments, loans through the Energy Use Rationalization Fund, and testing fee waivers.

‘High-efficiency products’ in this context refers to products which acquired the first energy efficiency rating, a certificate of high-efficiency equipment, and operate with excellent standby power usage (labeled with an energy saving mark).

Assistance programs to Promote Dissemination of High-efficiency Equipment

Types of assistance	Target recipients (or complying parties)	High-efficiency equipment eligible for assistance
Rebates	Installers	5 products certified as high-efficiency equipment
Priority purchasing of high-efficiency products through the Public Procurement Service (PPS)	PPS	1st energy efficiency rated products Certified high-efficiency equipment Products with excellent standby power
Designation of best procured products	PPS	Certified high-efficiency equipment
Mandatory use of high efficiency equipment by public organizations	Public organizations	1st energy efficiency rated products Certified high-efficiency equipment Products with excellent standby power
Mandatory or recommendatory use of energy saving design standards for buildings	Buildings	1st energy efficiency rated products Certified high-efficiency equipment Products with excellent standby power
Mandatory use of energy performance and construction standards for green housing	Multi-unit housing	1st energy efficiency rated products Certified high-efficiency equipment Products with excellent standby power
Tax breaks on energy saving investments	Installers	12 products certified as high-efficiency equipment 1 product with excellent standby power
Loans through the Energy Use Rationalization Fund	Installers Small-medium manufacturers	Certified high-efficiency equipment 1st energy efficiency rated products (some parts)
Testing fee waivers	Small-medium manufacturers	Certified high-efficiency equipment

1 Rebates

Overview

Rebates are provided for installing four certified high-efficiency products, including inverters, in order to promote market transformation toward high-efficiency products.

Target products

Certified high-efficiency products include inverters, freezers, internal converter type LED lamps, and external converter type LED lamps.

Target products and rebate amounts by item

Category	Target products	Amount of rebates
Inverters	Certified high-efficiency products	Calculated by multiplying uni price of rebates by capacity with the number of installation
Freezers	Certified high-efficiency products	Calculated by multiplying uni price of rebates by capacity with the number of installation
External converter type LED lamps	Certified high-efficiency products	Calculated by multiplying uni price of rebates by capacity with the number of installation
Internal converter type LED lamps	Certified high-efficiency products	Calculated by multiplying uni price of rebates by capacity with the number of installation
LED lighting lights	Certified high-efficiency products	Calculated by multiplying uni price of rebates by capacity with the number of installation

Legal grounds

- Article 47 (“Establishment and Implementation of Electric Utilities Infrastructure Enabling Plan” of the “Electric Utilities Act”
- Article 24 (Establishment of Implementation Plan and Others) of the “Enforcement Ordinance on Electric Utilities Act”
- Operational Rules on Electric Utilities Industry Infrastructure Enabling Business (MOTIE)
- Management Guideline on Electric Efficiency Improvement Business (MOTIE)

2 Priority Purchasing through the Public Procurement Service

Overview

When purchasing products through the Public Procurement Service (PPS), priority should be given to certified high-efficiency products, products with excellent standby power, and the 1st energy efficiency rated products. The PPS is operating the “Korea On-line E-Procurement System” (<http://shopping.g2b.go.kr/>)

Legal grounds

PPS Directive (Operational Guideline on the Purchase of Energy Using Products)

3 Designation of Good Procured Products

Overview

When making purchases through the PPS, high-efficiency certified products are designated as the good procured products.

Legal grounds

PPS Notification, “Regulation on the Designation of Good Procured Products”

4 Priority Purchasing of Energy Efficiency Products by Public Organizations

Overview

Priority purchasing of high-efficiency equipment

In accordance with the “Regulation on promotion and dissemination of high energy efficiency equipment” (MOTIE notification), all public organizations, if there are no compelling reasons to do otherwise, shall procure high-efficiency certified equipment when making new purchases or replacing existing products. All public organizations must replace all of their lighting equipment with LED lights by 2020. However, public organizations with relocation plans in accordance with government policy are exempt from this mandatory rule. Elementary-, middle-, and high schools, and libraries can determine the timing of lighting replacement to LED lights according to decisions made by their own committees for energy saving.

Priority purchasing of product meeting the requirement of e-Standby Program

In accordance with the “Operational Rules on e-Standby Program” (MOTIE notification), it is mandatory for all public organizations to adopt office equipment and appliances such as computers and others with ‘Energy Boy’ labels when making new purchases or replacing existing appliances. Appliances with standby power usage below 1W will get the first priority when making purchase decisions. In addition, devices for blocking standby power (automatic energy saving multiple taps, automatic standby power blocking power outlets, automatic standby power blocking switches) should be installed in public buildings. Public organizations must also install software that automatically saves power when PCs are not in operation.

Mandatory use of 1st energy efficiency rated appliances

In accordance with the “Operational Rules on Machinery and Materials Subject to Energy Efficiency Management” (MOTIE notification), it is mandatory for all public organizations to purchase 1st grade energy efficiency rated products when they are making new purchases or replacing such items as refrigerators, fluorescent lamps, and other appliances. If there are no products with the 1st energy efficiency grade within in the purchasing criteria, then products with next highest level of efficiency should be purchased.

Legal grounds

MOTIE Notification, “Regulation on Implementation of Energy Use Rationalization for Public Organizations”

5 Energy saving design standards for buildings

Overview

Mandates and recommendations have been laid out for the adoption of high efficiency equipment in new construction of certain types of buildings, including requirements to submit energy saving plans. Notably, it is mandatory to install energy efficient electric transformers and lighting equipment (1st energy efficiency graded products and others).

Target building

Buildings with floor space of more than 500m² applying to get a construction approval

Legal grounds

“Energy saving design standards for buildings”
(Ministry of Land, Transport and Maritime Affairs Notification)



Mandatory and recommendatory considerations for energy saving design standards for buildings

Type	High efficiency products
Requirements (mandatory application for building designs)	<ul style="list-style-type: none"> Electric transformers (higher than standard energy efficiency level) Self-ballasted lamps (1st grade energy efficiency products) Fluorescent lamps (1st grade energy efficiency products) Ballasts for fluorescent lamps (higher than standard energy efficiency level) Automatic standby power blocking outlets, and automatic standby power blocking switches (product meeting the requirement of e-Standby Program, automatic energy saving control apparatus) Automatic illumination control apparatus (high-efficiency certified equipment)
Recommendatory considerations (selective applications for building designs)	<ul style="list-style-type: none"> LED lights (High-efficiency certified products) Domestic gas boilers (1st grade energy efficiency products) Gas boilers for industry and buildings (High-efficiency certified products) Centrifugal freezers (High-efficiency certified products) Heat recovery ventilators (High-efficiency certified products) Three phase electric motors (MEPS) Door phones ('Energy Boy' labeled products) Home gateways ('Energy Boy' labeled products) Maximum demand controllers (High-efficiency certified products)

6 Building Codes and Performance of Eco-friendly Housing

Overview

This is a mandatory regulation for the construction of eco-friendly housing.

Target building

Multi-unit housing with more than 20 units

Legal grounds

Building Codes and Performance of Eco-friendly Housing (Ministry of Land, Transport and Maritime Affairs Notification)

Mandatory requirements of standards and performance of eco-friendly houses

Category	High-efficiency equipment
Requirements (Mandatory application for the design of multi-unit housing)	<ul style="list-style-type: none"> ◦ Domestic boilers (1st grade energy efficiency appliances) ◦ Electric transformers (higher than MEPS and high-efficiency certified products) ◦ Pumps for heating, hot water and water supply (high-efficiency certified products) ◦ Lighting equipment (1st grade energy efficiency appliances and high-efficiency certified products) ◦ Automatic standby power blocking outlets and automatic standby power blocking switches ('Energy Boy' labeled products and automatic energy saving control devices)

7 Tax Breaks on Investment in Energy Saving Facilities

Overview

As designated by the President's executive order, Korean residents seeking to invest in energy saving facilities (excluding investments on second hand or leased equipment) can apply for a tax waiver equivalent to 3% of the total amount of the investment (5% and 10% of total investment cost for medium-sized companies and small- and medium-sized enterprises respectively) from income or corporate tax until 31 December 2016.

Target products

Lighting systems with automatic luminous intensity, heat recovery ventilators, LED lights (lamps and light fixtures), lighting equipment with automatic luminous intensity, high-efficiency certified boilers, metal-halide lamps, uninterruptible power supplies, direct fired absorption cold and hot water dispensers, centrifugal fans, thermo-hygrostats, insulated doors with high air-tightness, automatic temperature controllers for heating, energy storage systems, high-efficiency certified electric transformers, premium(IE3) three-phase induction motors, and automatic energy-saving control apparatus.

Legal grounds

Article 25, paragraph 2 of the Special Tax Treatment Control Law

8 Loans through the Energy Use Rationalization Fund

Overview

Financial supports are available in the form of loans to fund the installation of high-efficiency certified equipment at facilities, and to fund projects to construct production facilities for the manufacture of high-efficiency products.

Legal grounds

"Directive on Financial Support for Rational Energy Use" (MOTIE notification)

9 Testing fee waivers

Overview

In order to vitalize the high-efficiency equipment certification program, KEA provides, within its budget, financial support to small and medium sized manufacturers which have previously acquired high-efficiency certification for one or more of their products.

Target companies

Small and medium sized manufacturers which have acquired high-efficiency certification for their equipment in accordance with the Article 2 of the “Basic Law on Small and Medium sized Enterprises”

Legal grounds

“Regulation on promotion and dissemination of high-efficiency machinery and equipment” (MOTIE)



III

Korea's Energy Standards & Labeling

www.kemco.or.kr

Achievements over the 22 Years of Implementing Energy Efficiency Management Programs











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Achievements over the 22 Years of Implementing Energy Efficiency Management Programs

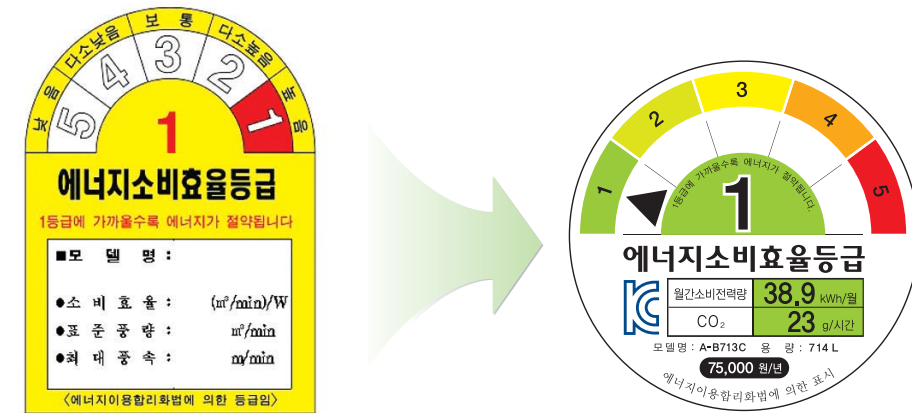
Through the implementation of the Energy Efficiency Label and Standards Program (1992), High-efficiency Equipment Certification Program (1996) and e-Standby Program (1999), significant energy efficiency improvements have been achieved.

Along with the application of MEPS for three-phase induction motors (accounting for 40 percent of national electricity consumption in a single equipment type), the dissemination of gas-fired condensing boilers has been vitalized through the harmonization of energy efficiency standards and labeling. In addition, incandescent lamps which are known to have poor energy efficiency have been phased out, and market transformation has been undertaken to move towards high efficiency lighting equipment such as self-ballasted lamps and LED lamps. Other efforts have also been made such as the implementation of a mandatory 1W policy, the introduction of energy-frontier standards which are 30 to 50 percent more efficient than the level of the present 1st grade, and the expansion of the scope of the efficiency management program for energy intensive equipment.

Market transformation policies promoting high-efficiency products

Category	Market transformation policy	Past	Present
Three-phase induction motors (motors)	Mandatory production and sales of high-efficiency electric motors	Standard electric motors (IE1) 	High-efficiency electric motors (IE2) 
Domestic gas boilers	Harmonization of energy efficiency standards	General gas boilers 	Condensing gas boilers 
Lighting equipment	Phase-out of incandescent lamps	Incandescent lamps 	Self-ballasted lamps and LED lamps 
Appliances	Adoption of energy frontier standards	General appliances 	Super high efficient appliances 
Standby power	1W policies (standby power consuming less than 1W)	>1W 	≤1W 

Moreover, improvements in the core indicators and label designs are enabling consumers to better understand the contents of energy efficiency standards and labeling. Through modified labels, consumers can purchase low-carbon and eco-friendly products by identifying how much cost can be saved by using a product, and by checking the amount of greenhouse gases generated by the use of the products.

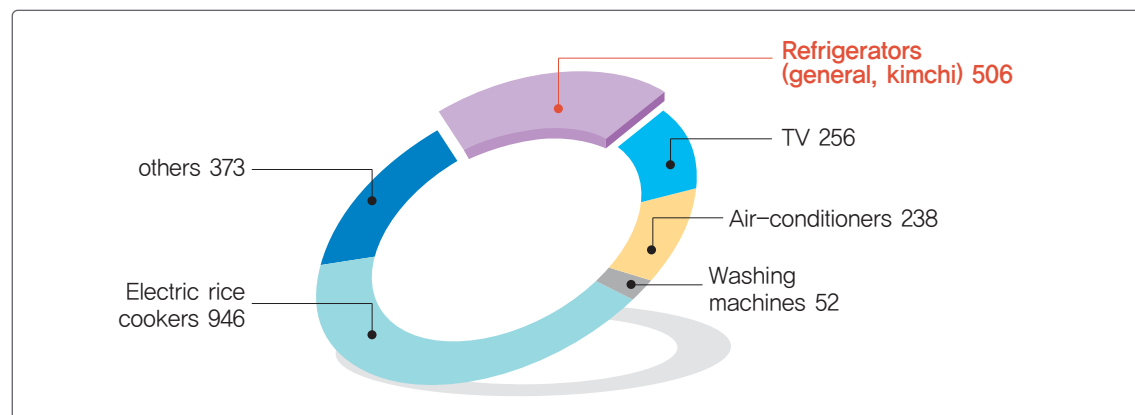


KEA annually expands the list of target products under energy efficiency management. Between 2002 and 2012 the number of target products doubled and the energy saving impacts tripled. The scope of target products ranges from household appliances to industrial and commercial equipment, including three-phase induction motors, electric transformers, pumps and EHP. With efforts in continuously raising energy efficiency standards and expanding the scope of target products, KEA has been playing a pivotal role in improving the efficiency of appliances and equipment in Korea.

1 Refrigerators

Refrigerators are one of the most significant household appliances as they are in use year-round in most homes. Refrigerators are also one of the appliances most in need of efficiency management as they consume the second largest amount of electricity among household appliances. The efficiency of refrigerators has been managed, and new items have been added to KEA's the energy efficiency standards and labeling program, since the first operating year of the program in 1992.

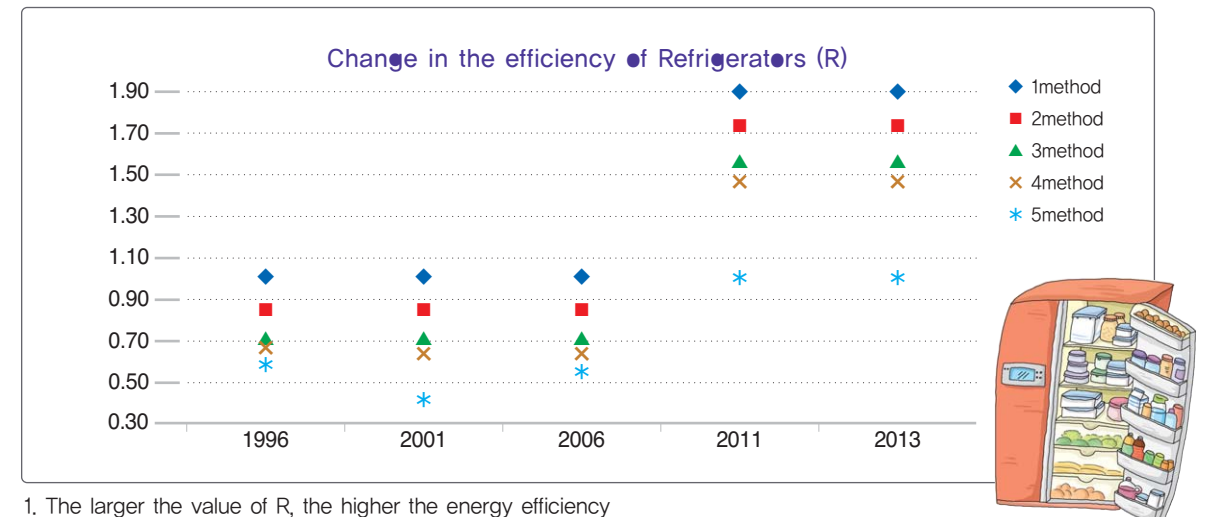
Annual power consumption of home appliances (kWh, 2013)



※ This data was based on the specifications of products which were reviewed in the "Study on the Status of Dissemination of Household Appliances" conducted by the Korean Power Exchange (December 2014).

The efficiency of refrigerators (R: efficiency rating index) improved 90 percent by 2013 compared with that of 1996 when it was first added as a target product of the energy efficiency standards and labeling program.

Trend of refrigerator efficiency



1. The larger the value of R, the higher the energy efficiency
2. Source: Operational Rules on Machinery and Materials Subject to Efficiency Management (KEA)
3. R = Monthly power consumption/Target power consumption (from 1992 to 2006), R = Maximum power consumption/Monthly power consumption (from 2007 to 2013)

With power consumption improvements, the energy efficiency of refrigerators has improved significantly, decreasing 27.7 percent per liter of annual power consumption. However, the average capacity of refrigerators was 12.6 percent larger in 2013 than in 2008.

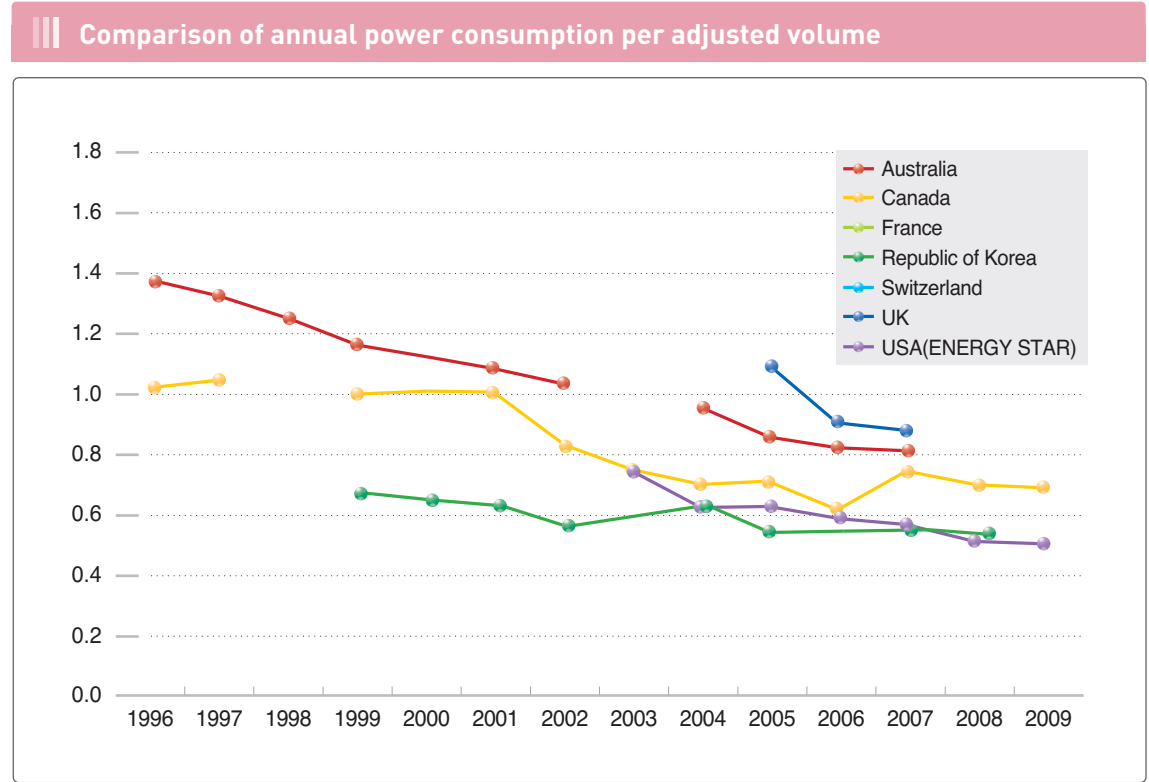
Product	Year	Capacity (liter)	Annual power consumption (kWh/year)	Annual power consumption (kWh/liter)
Electric refrigerators	2008년	507.93	475.27	0.94
	2013년	571.88	390.94	0.68
	Variation(%)	12.6	-17.7	-27.7

International comparison of the energy efficiencies of refrigerators

For the first time in the world, the seven IEA member countries (USA, Canada, UK, France, Switzerland, Australia and Korea) participating in the IEA 4E Mapping & Benchmarking Annex (leading country: UK, international energy efficiency comparison project) conducted an international comparison of the energy efficiency of refrigerators. This international project was conducted by adjusting measuring differences of energy efficiencies between countries so that a harmonized measuring standard could be applied.

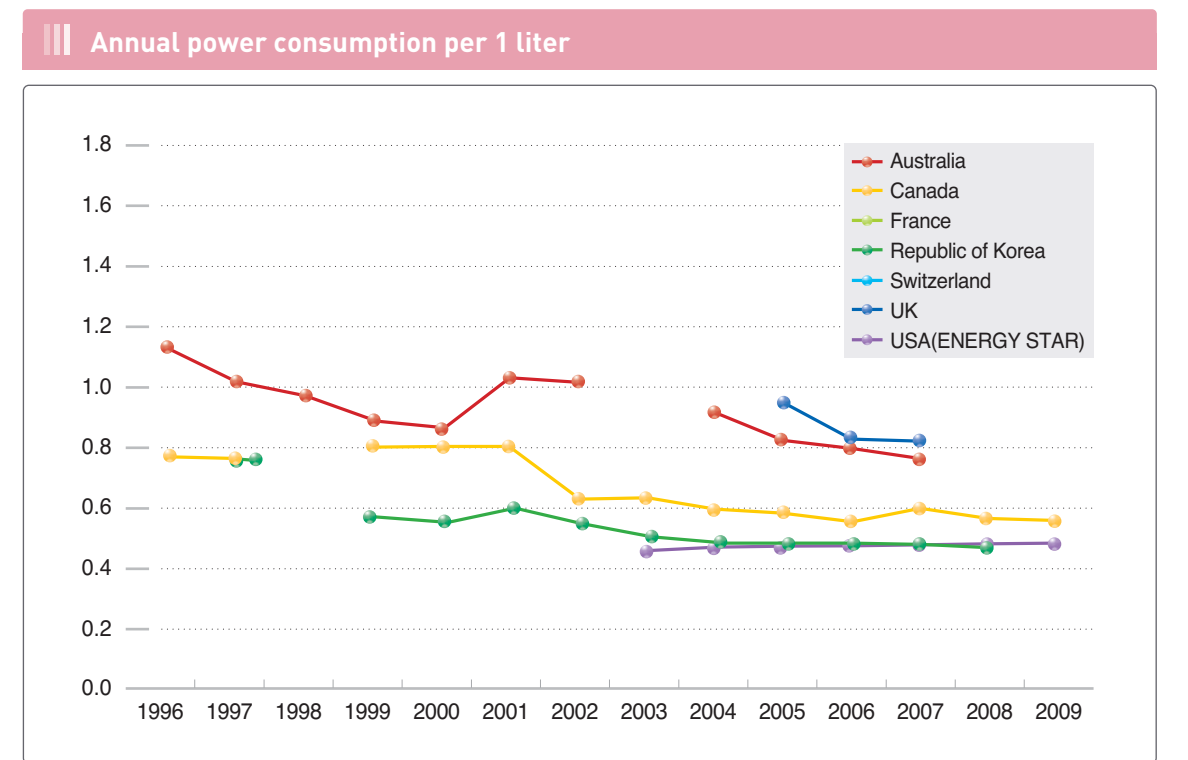
The results of annual power consumption per adjusted volume showed the USA (ENERGY STAR) as the leading country with the least power consumption for refrigerators, followed by Korea, Canada, Australia and European countries. However, unlike other countries, the USA provided only data on ENERGY STAR labeled refrigerators which were within the top 25%

energy efficiency range. Given the fact that Korea's data covered the entire range of refrigerator efficiency grades, from 1st to 5th, it is reasonable to conclude that the energy efficiency of Korean refrigerators ranked the highest in the world.



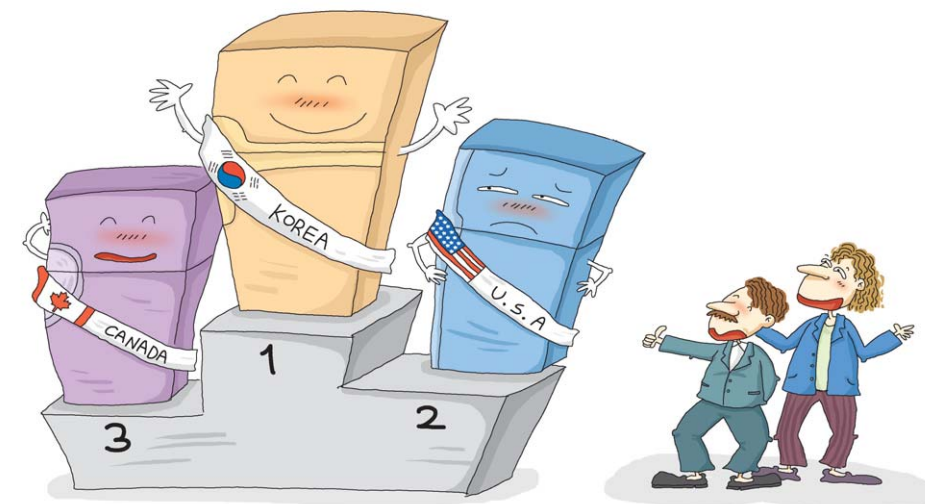
1. IEA 4E, Mapping & Benchmarking Annex
 2. The lower the number, the better the energy efficiency.

In the comparison of power consumption per liter, Korean refrigerators' energy efficiency topped the list, followed by USA (ENERGY STAR), Canada, Australia and European countries.



1. IEA 4E, Mapping & Benchmarking Annex
 2. The lower the number, the better the energy efficiency.

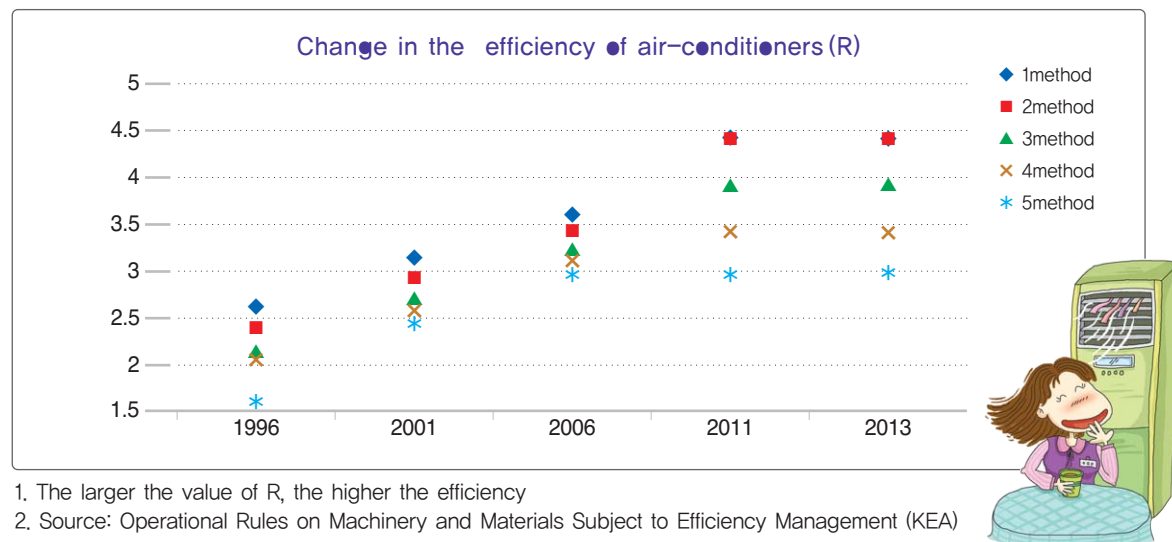
Currently the 1st grade energy efficiency level of Korean refrigerators is equivalent to the EU's A++ level which is a very high energy efficiency level.



2 Air-conditioners

Along with refrigerators, air-conditioners have also been assessed as 'best performers' in terms of energy efficiency impact, especially with their increasing sales due to continuing hot and humid weather. The energy efficiency ratio of air-conditioners, from 2.63 (1996) to 4.4 (2013), amounting to a 67 percent efficiency improvement.

Trend of air conditioners' EER

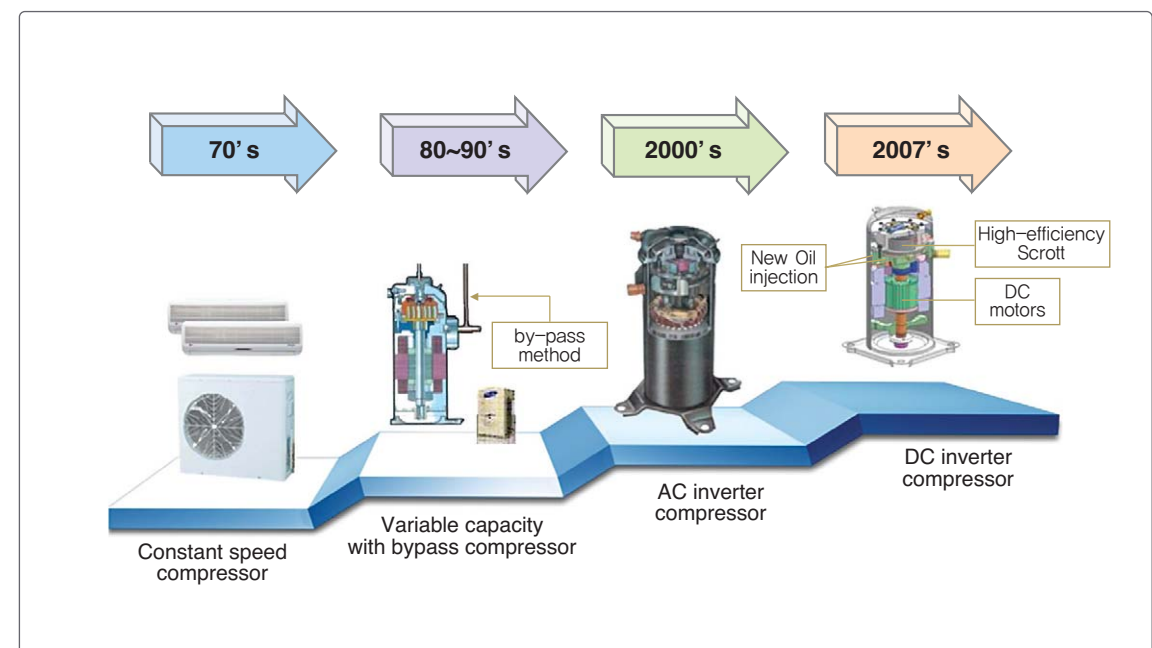


When it comes to the energy efficiency of air-conditioners, the rated cooling capacity increased by 48.6 percent, but annual power consumption against rated cooling capacity decreased by 29.7 percent when comparing 2013 levels to those of 2008.

Product	Year	Rated cooling capacity (kW)	Annual power consumption (kWh/year)	Annual power consumption / Rated cooling capacity (kWh/kW)
air-conditioners	2008년	5.18	661.83	127.77
	2013년	7.70	691.25	89.77
	Variation (%)	48.6	4.4	-29.7

The energy efficiency improvements in air-conditioners were closely linked to compressor technology, a core component of air-conditioners. While a simple controlling technology was applied for on-off operation in the period of the 1980s and the 1990s (directly connecting a power supply to motors), substantial improvement in the energy efficiency of air-conditioners was achieved by controlling the operational speed of compressors through applying AC inverters to motors in the 2000s. More recently, new technology has enabled efficiency maximization controlling DC motors with loads.

The evolution of air-conditioner compressor technology

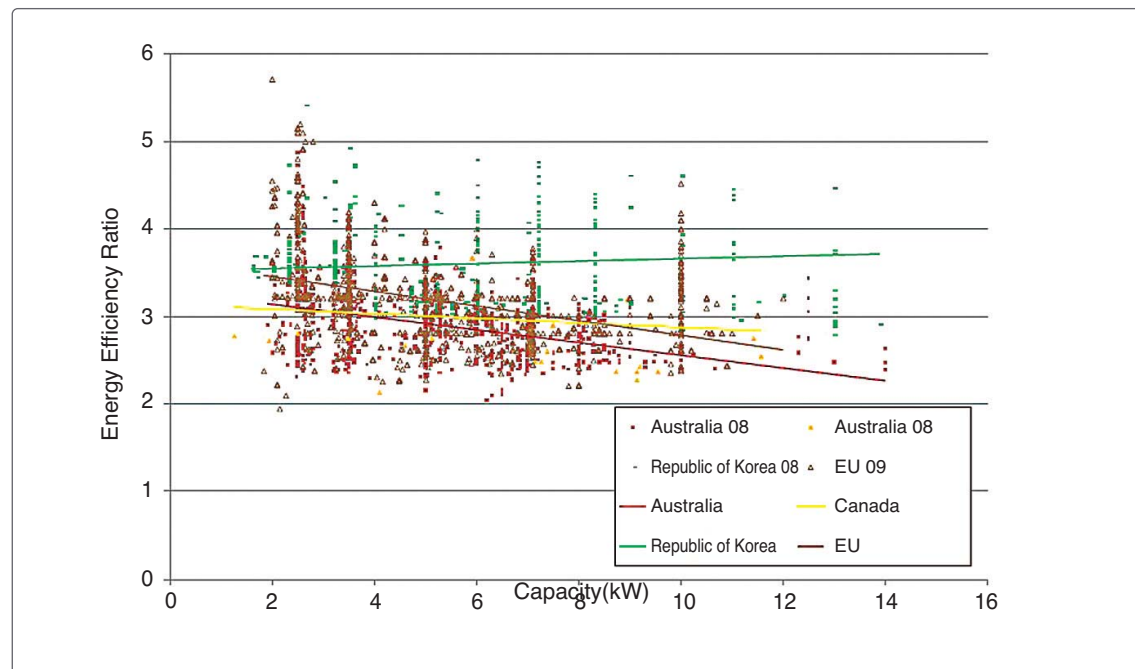


Results of IEA 4E comparison of the energy efficiency of air conditioners

The 10 IEA member countries (USA, Canada, UK, France, Switzerland, Austria, Denmark, Netherlands, Australia, and Korea) participating in the IEA 4E Mapping & Benchmarking Annex (leading country: UK, international energy efficiency comparison project) conducted an international comparison of the energy efficiency of air conditioners (EER: Energy Efficiency Ratio).

The results concluded that Korea was the leading country with the best energy efficiency (EER) followed by Canada, the EU, and Australia.

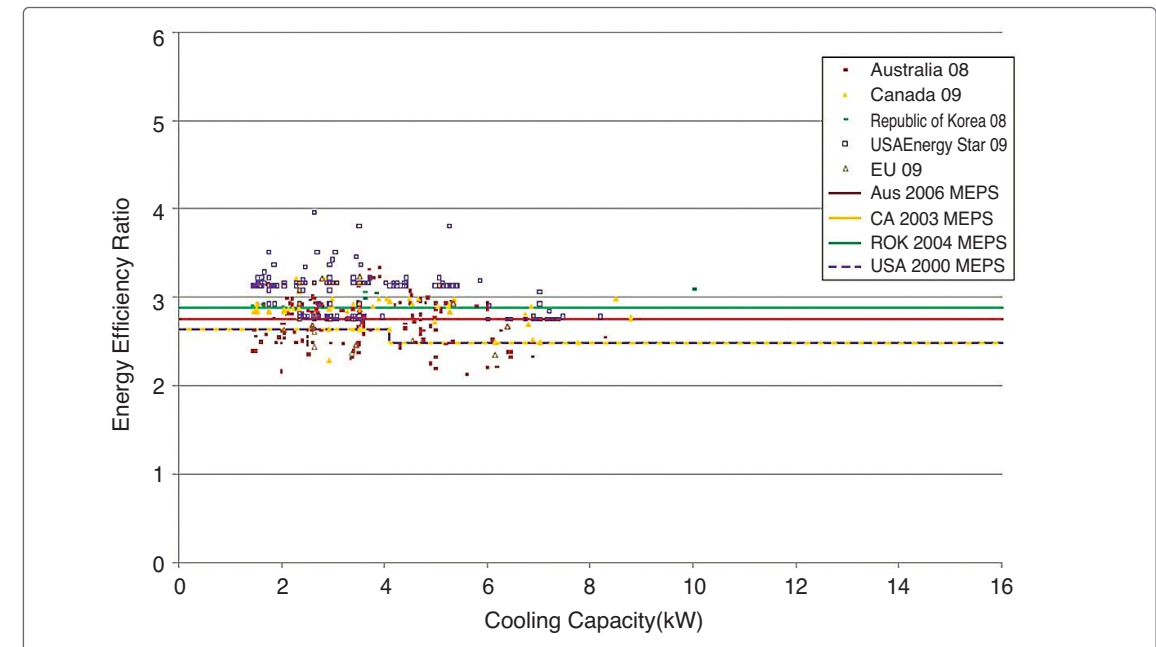
IEA 4E report, comparison of EER of air conditioners



1. The larger the number, the higher the efficiency
2. Source: IEA 4E Mapping and Benchmarking Annex

The comparison results of MEPS among countries showed Korea as the leading country with the best MEPS followed by Australia, the USA and Canada.

IEA 4E report, International comparison of MEPS of air-conditioners

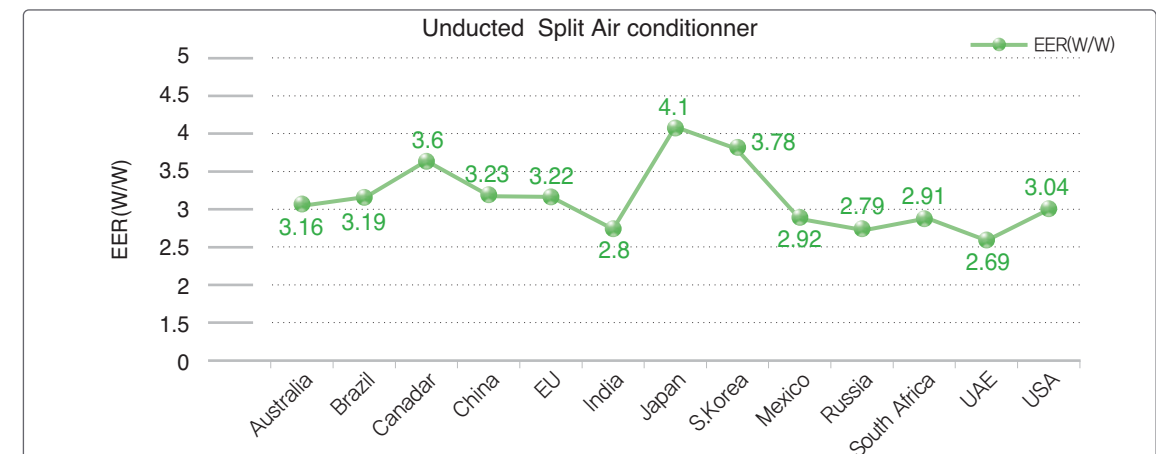


1. The larger the number, the higher the efficiency
2. Source: IEA 4E Mapping and Benchmarking Annex

Results of international comparison of the EER of air-conditioners by SEAD

Joint research by the Super-efficient Equipment and Appliance Deployment (SEAD) initiative, conducted in April in partnership with the Lawrence Berkeley National Laboratory (LBNL), and Navigant Consulting Inc., showed that the average energy efficiency of Korean air-conditioners ranked second highest (after Japanese ones) in terms of the EER of non-ducted split air-conditioners in Australia, Brazil, Canada, EU, China, Japan and others.

Results of international comparison of the EER of air-conditioners by the SEAD initiative



1. CLASP web site: www.clasponline.org
2. Catalog searches, IEA 4E Mapping and Benchmarking Annex (2010), Baillargeon, 2011ESIS web site(www.apec-esis.org)

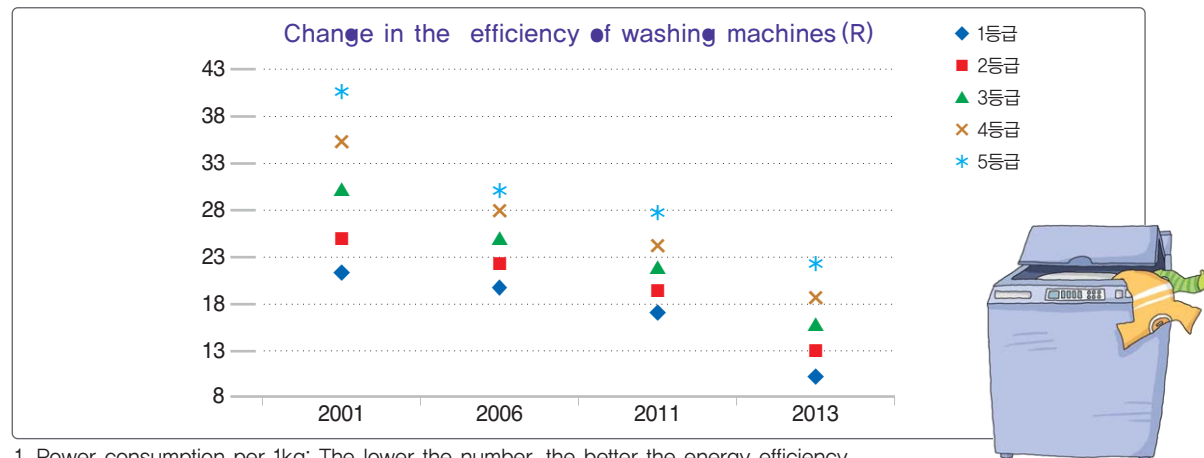
3 Washing Machines

There are two types of washing machines - vertical (top-loading) and horizontal (front-loading) type. In general, horizontal (front-loading) type washing machines consume 4 to 5 times more power than vertical (top-loading) type washing machines.

Vertical (top-loading) type washing machines

Power consumption of 1st grade vertical (top-loading) type washing machines per 1 kg standard washing load decreased from 16 Wh/kg (2001) to 10 Wh/kg (2013), a 37% improvement in the twelve years since the implementation of the Energy Efficiency Standards and Labeling Program.

Trend of power consumption of vertical (top-loading) type washing machines per 1kg washing load (Wh/kg)



1. Power consumption per 1kg: The lower the number, the better the energy efficiency
2. Enforcement date of the program: 1 January 2001
3. Source: Operational Rules on Machinery and Materials Subject to Efficiency Management (KEA)

The rated washing capacity of vertical (top-loading) type washing machines dropped slightly by 2.5 percent in 2013 compared to that of 2008, but annual power consumption of vertical (top-loading) type washing machines decreased by approximately 12 percent in the same period.

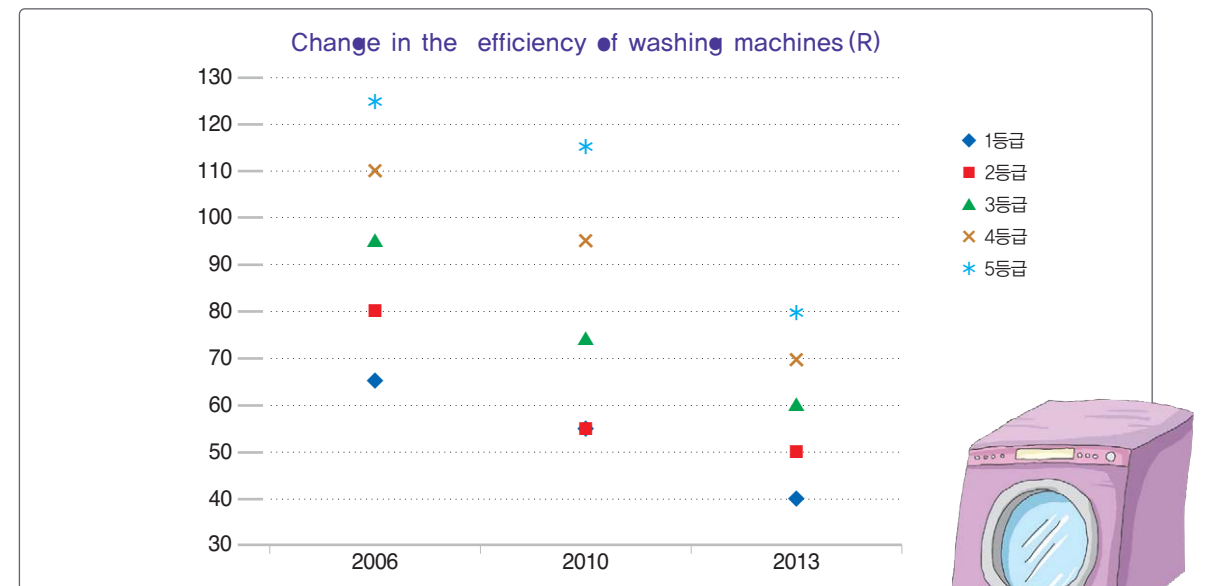
Product	Year	Capacity (kg)	Annual power consumption (kWh/year)	Annual power consumption / Capacity (kWh/kg)
Washing machines	2008년	10.69	27.89	2.61
	2013년	10.42	23.98	2.30
	Variation (%)	-2.5	-14.0	-11.9

1. Based upon the capacity, power consumption, production and sales of washing machines reported to the energy efficiency standards and labeling program.

Horizontal (front-loading) type washing machines

Power consumption of 1st grade drum washing machines per 1 kg standard washing load decreased from 65 Wh/kg (2006) to 40 Wh/kg (2013), a 38% improvement in the five years since the implementation of Energy Efficiency Standards and Labeling Program.

Trend of energy consumption of horizontal (front-loading) type washing machines per 1 kg washing load (Wh/kg)



1. Power consumption per 1kg: The lower the number, the better the energy efficiency
2. Enforcement date of the program: 1 January 2006
3. Source: Operational Rules on Machinery and Materials Subject to Efficiency Management (KEA)

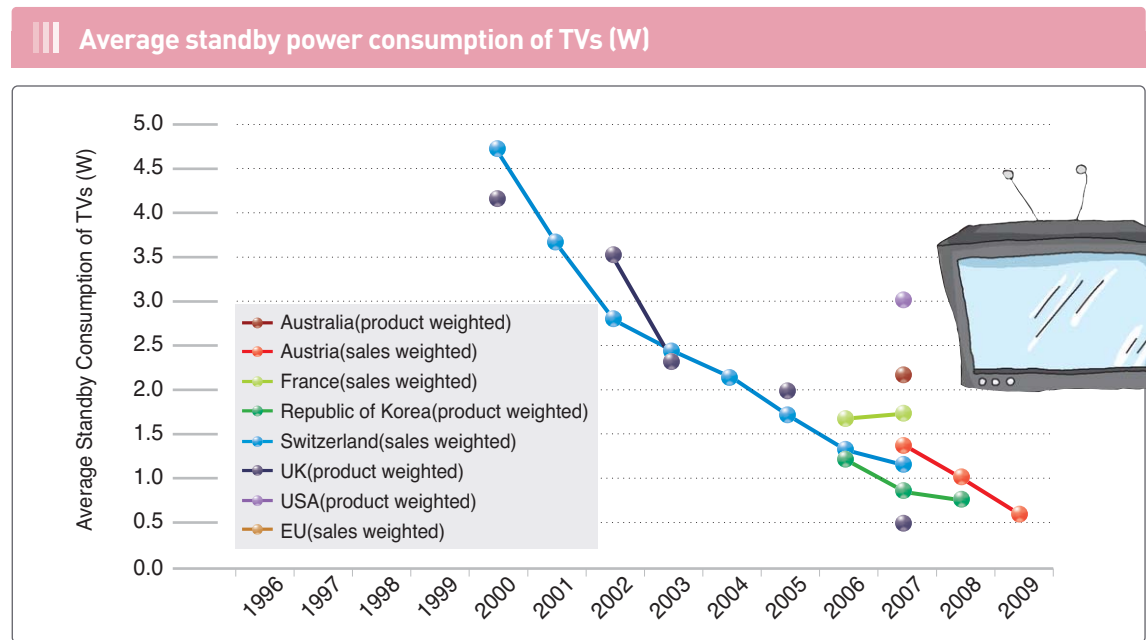
The efficiency standards of horizontal (front-loading) type washing machines have been significantly strengthened as of 2011. In particular, in addition to power consumption per 1kg washing load, horizontal (front-loading) type washing machines should simultaneously meet water consumption (L/kg), washing performance, and standby power requirements in order to qualify for the 1st grade efficiency level.



4 TVs

The adoption of a warning labeling program for TVs in 2008 was a success. An analysis on the production and sales of TVs, conducted at the end of 2010, showed that the share of TVs with good standby power performance accounted for nearly 100 percent with sales of 2,958,525 out of a total of 2,958,531.

Furthermore, the implementation of 1W standby power policy contributed to reaching about 0.3W by 2011, a world class level of standby power for TVs.



Effective from 1 July 2012, MEPS and the energy efficiency standards and labeling program (1st to 5th grade) extended its scope to TVs with various types of display such as CRT, PDP, LCD and LED. Testing standards are compliant with KS C IEC 62087, an international standard for measuring methods.

An efficiency target for TVs is set every three years which is 30 to 50 percent higher than the current 1st grade level. By introducing the 'Energy Frontier Program', which helps manufacturers achieve these efficiency targets, the energy efficiency of TVs along with the development of national TV technology are continuously being upgraded to world class levels.



SEAD Award

Super-efficient Equipment and Appliance Deployment (SEAD) is a voluntary multilateral initiative to help create an international market for super-efficient equipment and appliances. The SEAD award is one of the efforts to encourage countries participating in SEAD to put various efforts into strengthening the international market for super-efficient products. Products given the SEAD award are entitled to receive the SEAD Global Efficiency Medal, which is the only international mark certifying the best performance in energy efficiency. This award contributes to substantial energy saving by spurring manufacturers to produce more innovative TVs.

Korean companies swept the TV categories of the 2012 SEAD Awards

Korean companies won the SEAD Global Efficiency Medal in 2012 recognizing that the efficiencies of their TVs were 33 to 44 percent higher than similar models made by other companies.

Korean companies also swept the monitor categories of the 2013 SEAD Awards.

Samsung Electronics Co., Ltd and LG Electronics were honored with a SEAD Award in 13 out of 16 monitor categories. Samsung Electronics Co., Ltd, in particular, ranked at the top in the area of 'Global Emerging Technology Winner' with its 23.6 inch LED monitors. The award is given to the best performer in energy efficiency to be on the market in the next two years.

KEA organized two briefing sessions for Korean companies to help them get better results at the SEAD awards, while also encouraging the active participation of Korean makers in international workshops aimed at improving energy efficiency.

5 e-Standby Program

In July 2005, the Ministry of Commerce, Industry and Energy (MOCIE) (now the Ministry of Trade, Industry and Energy (MOTIE)) and Korea Energy Agency (KEA) established 'Standby Korea 2010', a national roadmap to achieve standby power consumption of lower than 1W by 2010. The 'Standby Korea 2010' had three phases: phase one (2005 to 2007) allowed manufacturers to voluntarily adopt the 1W policy; phase two (2008 to 2009) was the preparatory period before undertaking the 1W policy as mandatory regulation; and in phase three (as of 2010), all electronics distributed in the Korean market must comply with the 1W policy.

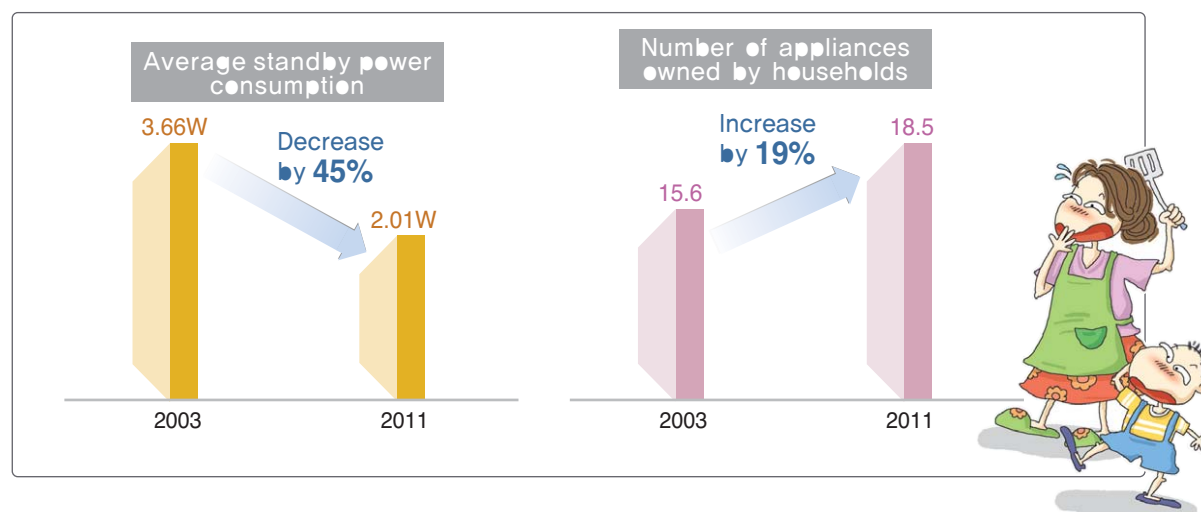
Standby power per household appliance decreased by 45 percent

In order to verify the performance of the 1W policy, MOTIE and KEA commissioned the Korea Electrotechnology Research Institute (KERI) to conduct an on-the-ground survey of the standby power consumption of household appliances used in 109 households nationwide.

The results showed that standby power per household appliance had decreased by 45 percent in 2011 compared to that of 2003. This improvement resulted from the combination of the 1W policy implemented from 2005, and manufacturers' efforts to make appliances more efficient.



Trend of standby power in household appliances since the implementation of the 1W policy.



Annual standby power consumption nationwide decreased by 25 percent (1,130GWh/year) from 4,600GWh/year in 2003 to 3,470GWh/year in 2011. This energy saving can be translated into electricity prices equivalent to 135.6 billion KRW annually in 2011. Annual standby power consumption per household also decreased by 32 percent from 306kWh/year in 2003 to 209kWh/year in 2011.

Performance of 'Standby Korea 2010'

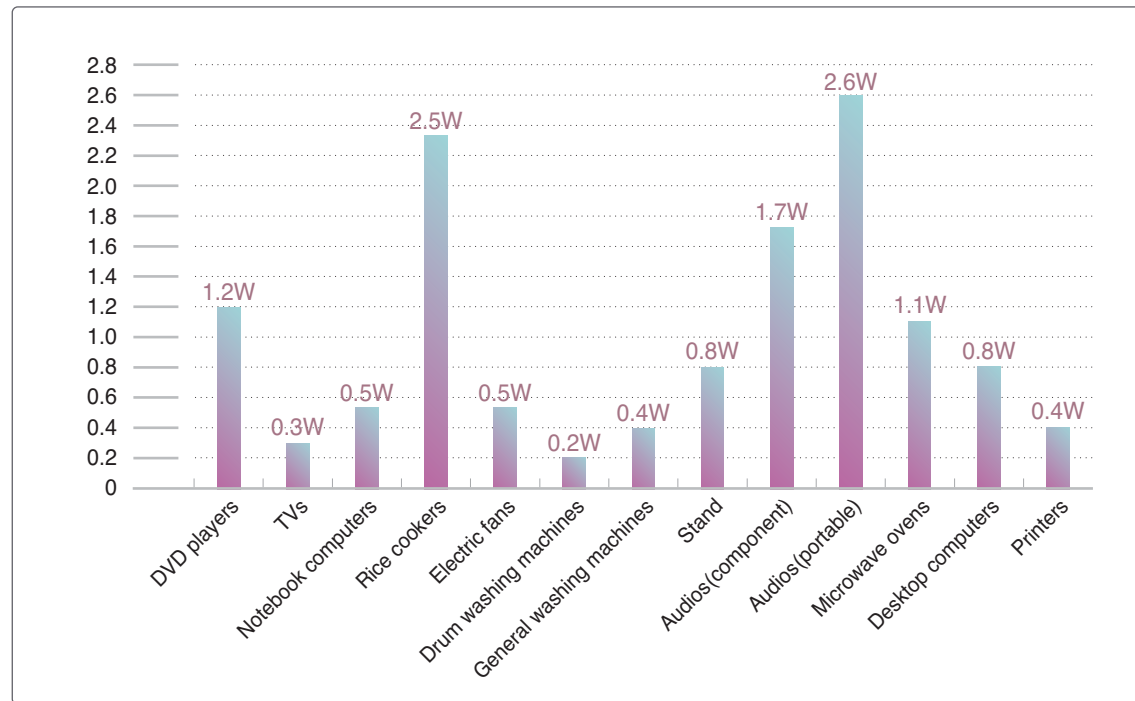
Category	2005(Base year)	2010	
		Target	Performance
Annual national standby power consumption	4,600GWh/year (550 billion KRW)	3,500GWh/year	3,470GWh/year (416.4 billion KRW)
Annual standby power consumption per household	306kWh	-	209kWh
Number of target products subject to e-Standby program	18	30	31개
Average standby power per appliance owned by households	3.66W	2.5W	2.01W
Ratio of deployment of appliances consuming lower than 1W of standby power	22%	40%	53%
Annual standby power saving impact	-	1,100GWh/year	1,130GWh/year (135.6 billion KRW)

Comparison of standby power consumption

Category	2003	2011	Variation
Annual national standby power consumption * annual cost	4,600GWh (550 billion KRW)	3,470GWh (416.4 billion KRW)	-25% (-135.6 billion KRW)
Annual standby power consumption per household * share	306kWh(11.0%)	209kWh(6.1%)	-97kWh(-32%)
Average standby power per appliance	3.66W	2.01W	-45
Number of appliances owned by households	15.6	18.5	19%

* Based on a survey of 109 households nationwide from April to September 2011 conducted by KERI.

Standby power consumption per appliance on the market in 2011



6 Establishment of 'Standby Korea 2015'

'Standby Korea 2015' is the national roadmap to reduce standby power by 2015. 'Standby Korea 2010' provided the basis for adopting the standby power 1W policy and the standby warning labeling scheme. 'Standby Korea 2015' aims to reduce standby power mainly for the off-mode to below 0.5W, and to regulate network standby power for the active mode.

The 'Standby Korea 2015' roadmap suggests comprehensive management combining the energy efficiency standards and labeling program and e-Standby power program. Previously, these two energy saving policy instruments were undertaken separately: energy efficiency standards and labeling for the active mode, and standby power programs for the off-mode. The first attempt at integration was successful, requiring 1W standby power consumption as the precondition for the 1st grade of energy efficiency. This policy targeted washing machines, electric rice cookers and others. For the future, the roadmap recommends implementing a comprehensive program combining the efficiency standards and labeling program for active mode with the standby power programs for the off-mode (TEC: Typical Energy Consumption etc).



Standby power and power factor

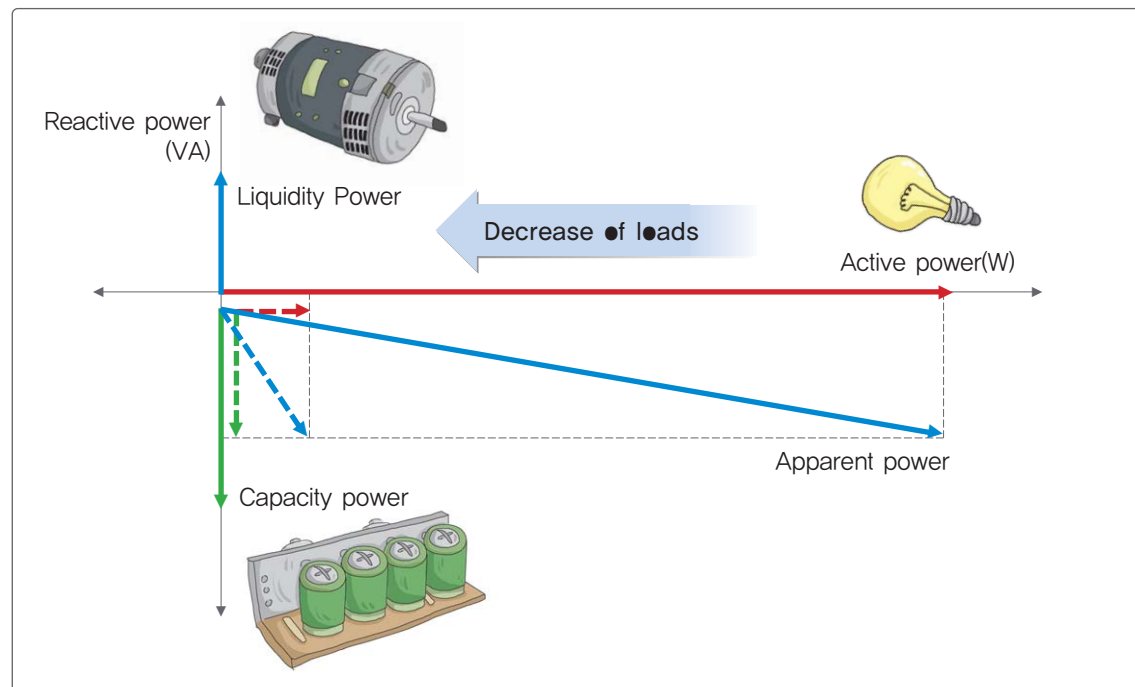
The standby power 1W policy has been a tremendous success. However, there is still room for improvement. Current analysis suggests that applying both the standby warning labeling scheme under the e-Standby Program, and the standby power 1W policy as the requirement for 1st grade energy efficiency of the Energy Efficiency Standards and Labeling Program, contributed to the policy goal of reducing a significant amount of standby power.

$$\text{Power factor} = \text{active pow} \div (\sqrt{\text{active power}^2 + \text{reactive power}^2})$$

However, there were cases in which a significant number of standby power related appliances' power factor was low because th power factor was not considered in applying standby power reduction standards.

During standby mode, it may appear that the power factor decreases since reactive power becomes relatively larger than active power. This does not necessarily mean that reactive power increases. Therefore, even if the power factor decreases due to a reduction in standby power, it will not impose an extra burden on power facilities or result in energy waste. Eventually, standby power reduction facilitates energy savings which can be enjoyed at the national and individual level. Therefore, no specific provisions on power factor in relation to standby power will be included in 'Standby Korea 2015'.

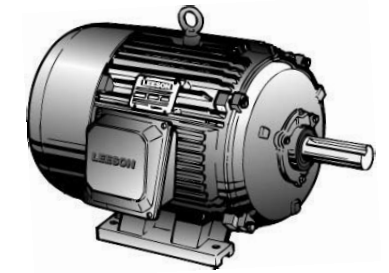
Power relations through change in loads



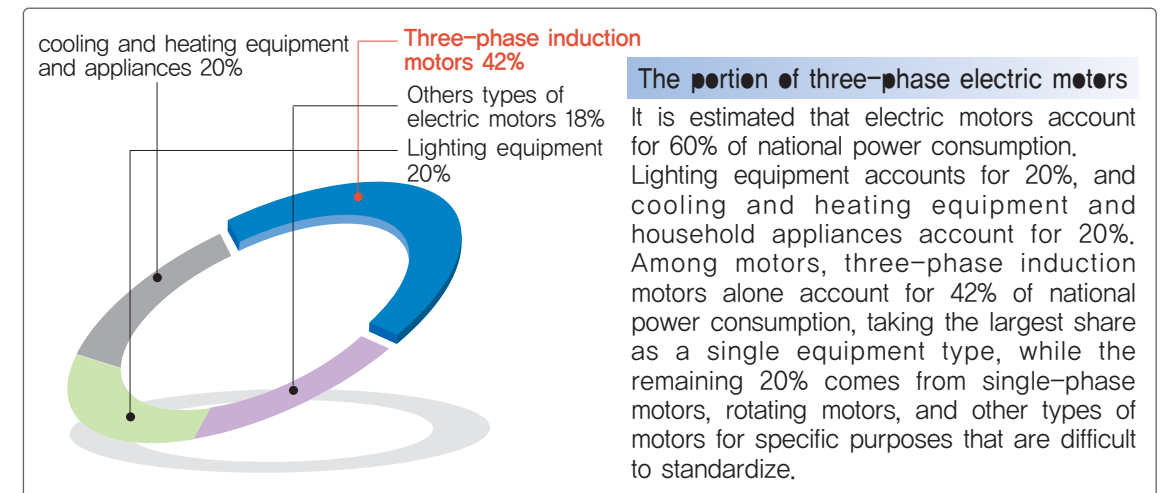
7- Three-Phase Induction Motors, Mandatory Shift to Premium Motors (IE3)

The importance of three-phase induction motors

As a single unit of machinery, the three-phase induction motor accounts for 42% of national power consumption. Therefore, the market transformation policy for three-phase induction motors to a high efficiency market is the most crucial national energy saving policy.



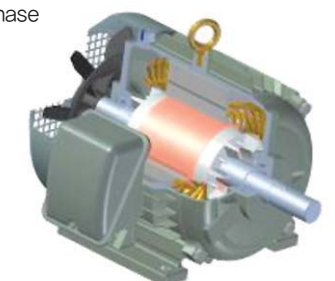
The importance of three-phase induction motors in national energy saving



Power consumption by three-phase induction motors

Category	Energy	Amount	Notes
Power generated by the Korea Electric Power Corporation(KEPCO)	4,600GWh (466.5 billion kWh)	46.18 trillion KRW	100%
Power consumption by three-phase induction motors for industry	1,959GWh (195.9 billion kWh)	19.39 trillion KRW	42%

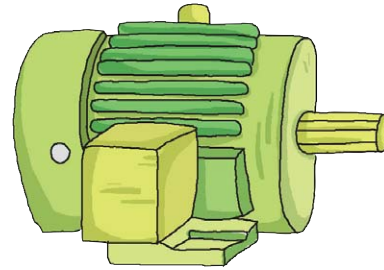
※ Revisions of "Minium Energy Performance Standards (MEPS) for three-phase induction motors" notification (KERI, 2012)



Development stages of three phase electric motors

Depending on the level of energy efficiency, three-phase induction motors are categorized in the order of standard electric motors (IE1) → high efficiency electric motors (IE2) → premium efficiency electric motors (IE3) → super premium efficiency electric motors (IE4).

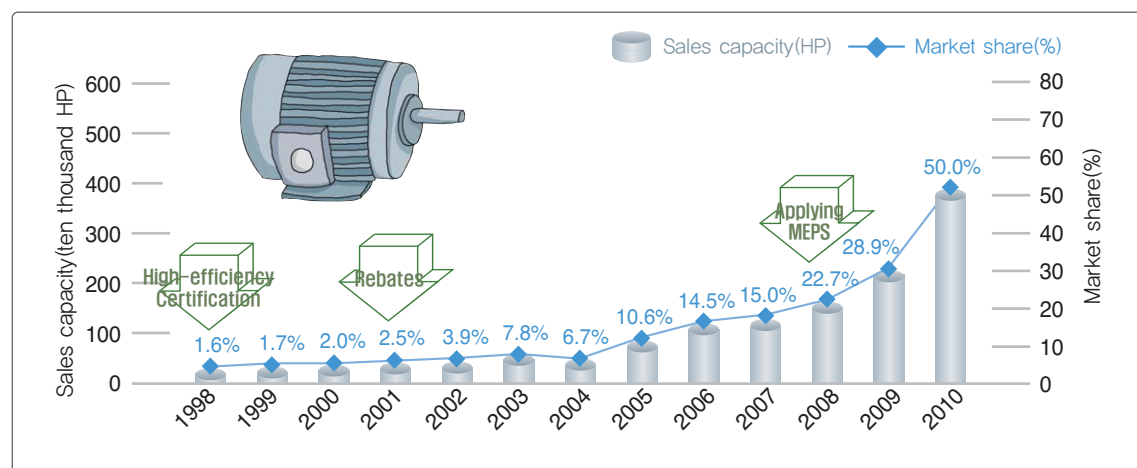
The majority of electric motors on the market are standard efficiency electric motors (IE1) or non-standard motors as defined in KS C 4202. High efficiency electric motors (IE2) have 4 to 5 percent higher efficiency than standard efficiency motors, and premium efficiency electric motors (IE3) have 2 to 3 percent higher efficiency than high efficiency motors. Super premium efficiency electric motors (IE4) have 1 to 2 percent higher efficiency than premium electric motors.



• Generation shift of three-phase induction motors

Category	Types of three-phase induction motors	Efficiency level	Share of domestic market	Notes
1st generation	standard electric motors (IE1)	-	50%	-
2nd generation	high efficiency electric motors (IE2)	4 to 5 percent higher efficiency than the standard motors	50%	<ul style="list-style-type: none"> • Korea implemented MEPS for IE2 from 2008. • EU mandated an EcoDesign directive on IE2 from 2011. • China implemented MEPS for IE2 from 2011.
3rd generation	premium efficiency electric motors (IE3)	2 to 3 percent higher efficiency than the high efficiency motors	0%	<ul style="list-style-type: none"> • US and Canada implemented MEPS at the level of IE3 from 2011. • EU is scheduled to mandate an EcoDesign directive on IE3 between 2015 and 2017.
4th generation	super premium efficiency electric motors (IE4)	1 to 2 percent higher efficiency than premium electric motors.	0%	<ul style="list-style-type: none"> • No technology development in Korea

Deployment status of high efficiency electric motors (IE2)

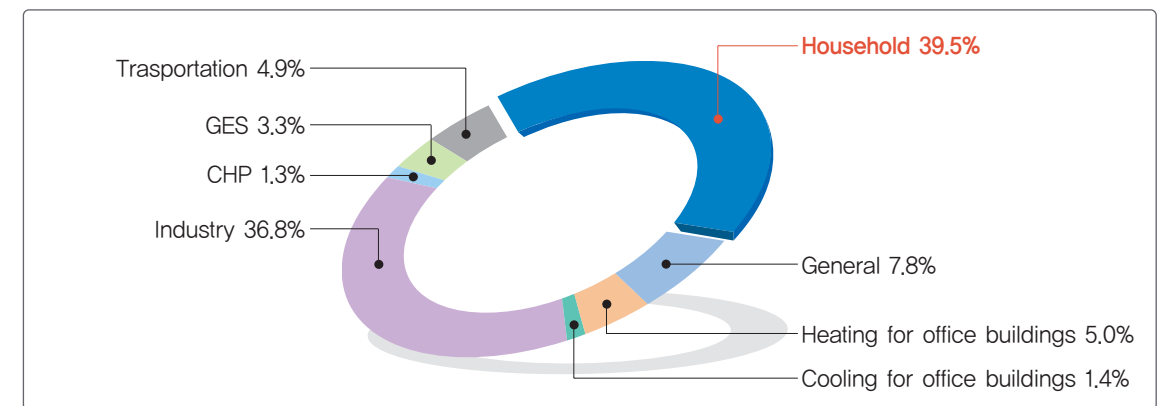


※ Source : KEA

8 Deployment of Condensing Gas Boilers

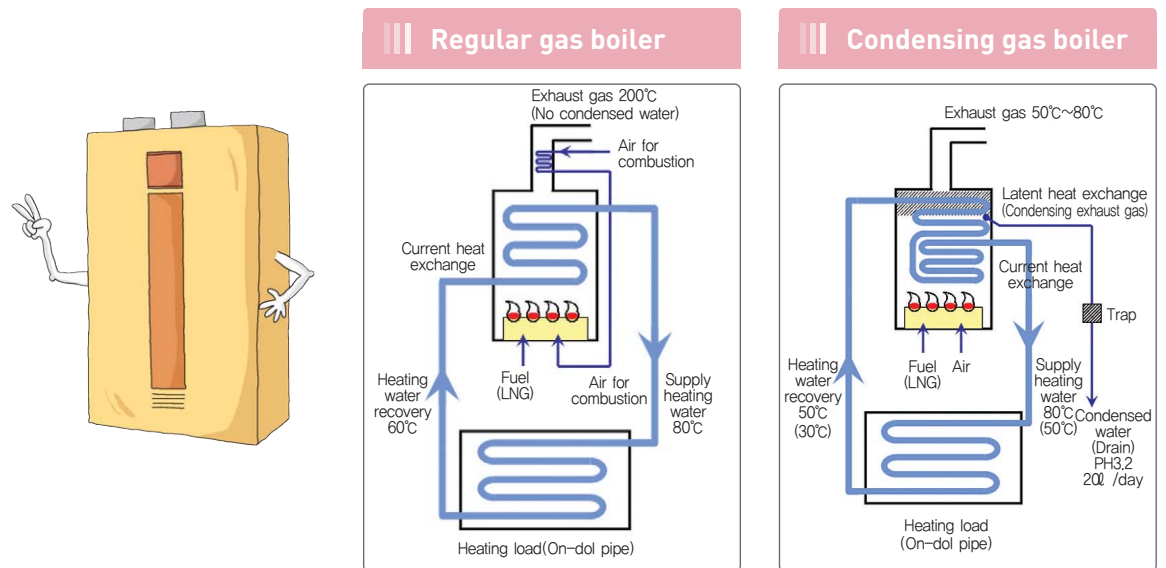
The importance of domestic gas boilers

Domestic gas boilers are energy intensive pieces of equipment which account for 40% of city gas consumption.



※ Source: Korea City Gas Corporation (2012)

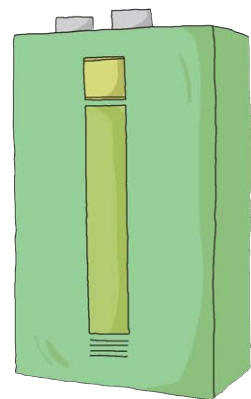
In general, the heating efficiency of condensing gas boilers is 6 to 9% higher than regular gas boilers. This is because condensing gas boilers recover the heat in the water vapor and use it to heat up the water that passes through the heat exchanger, while regular gas boilers emit the heat in the water vapor in exhaust gases.



Harmonization of standards for the efficiency rating of condensing gas boilers

Standards for the energy efficiency rating of household gas boilers have been harmonized since 2010 so that condensing gas boilers with the highest energy efficiency grade, both in real use and testing lab conditions, can be selected by consumers.

Measuring methods have been improved by the adoption of the EU's EN standards as of January 2013. These standards were adopted in place of the KS standards so that household gas boilers can be adapted to the real operating conditions of consumers. The current efficiency standards only allow condensing gas boilers to be eligible for 1st and 2nd efficiency rating. With the help of wide deployment of condensing gas boilers, the market share of condensing gas boilers, which was 10 percent in 2010, increased to 15 percent in 2012.



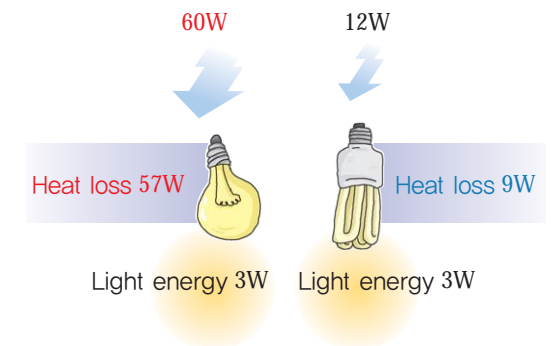
Only Condensing Gas boilers for 1st & 2nd grade



9 Phase-out of Incandescent Lamps and Their Replacement with 32W Compact Fluorescent Lamps and LED lights

Comparison of Incandescent lamps with self-ballasted compact fluorescent lamps and LED lights

Incandescent lamps are a classic example of low efficiency lighting equipment as they emit 95% of their energy through heat and only utilize 5% of their energy producing light. While incandescent lamps typically consume 30 to 100W, self-ballasted compact fluorescent lamps consume just 15 to 20W, and LED lamps only 5 to 15W.



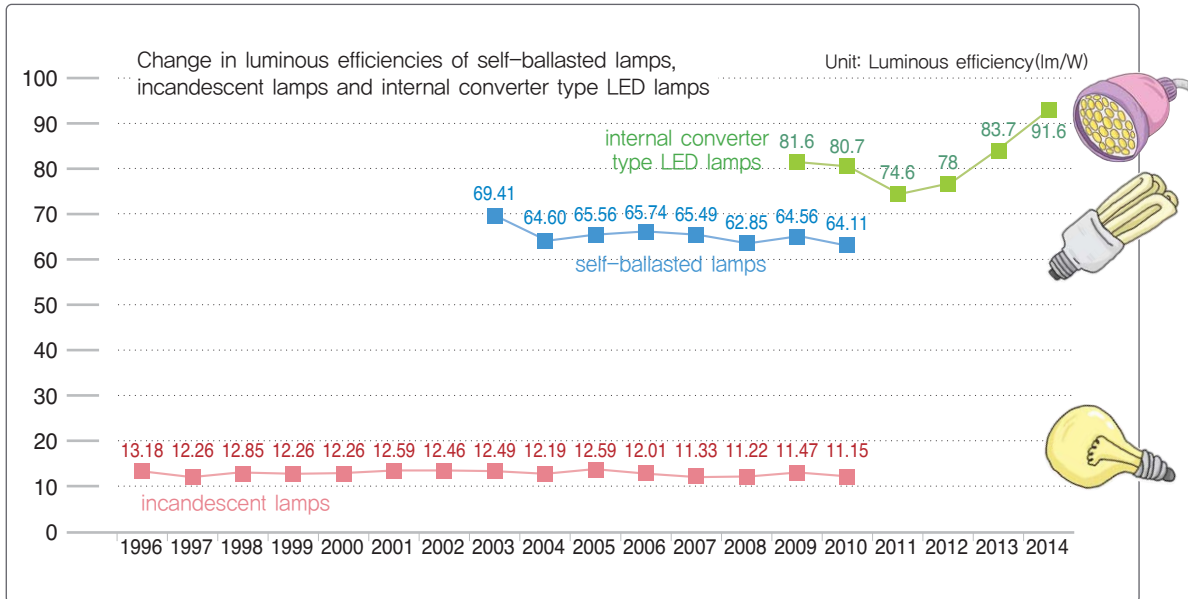
Comparison of incandescent lamps, self-ballasted compact fluorescent lamps, and LED lights

Category	Incandescent lamps	self-ballasted compact fluorescent lamps	LED lights
Luminous efficiency	Very low (10-15lm/W)	moderate (50-80lm/W)	relatively high (60-80lm/W)
Product life	1,000 hr	5,000 to 15,000 hr	25,000 hr
Product price (estimated)	approx. 1,000 KRW	approx. 3,000 to 5000 KRW	approx. 10,000 to 20,000 KRW

Trend of the luminous efficiencies of incandescent lamps and self-ballasted compact fluorescent lamps

According to an analysis conducted by KEA on the energy efficiency of new lighting equipment registered under the Energy Efficiency Standards and Labeling Program, the luminous efficiency (lm/W) of incandescent lamps and self-ballasted compact fluorescent lamps has not improved substantially over the decade. However, the energy efficiency in this sector is improving steadily by replacing low efficiency lighting equipment such as incandescent lamps (10 to 15 lm/W) with high efficiency lighting equipment such as self-ballasted compact fluorescent lamps (50 to 80lm/W).

III Trend of luminous efficiencies of incandescent lamps, self-ballasted compact fluorescent lamps, and internal converter type LED lights



※ Source : KEA

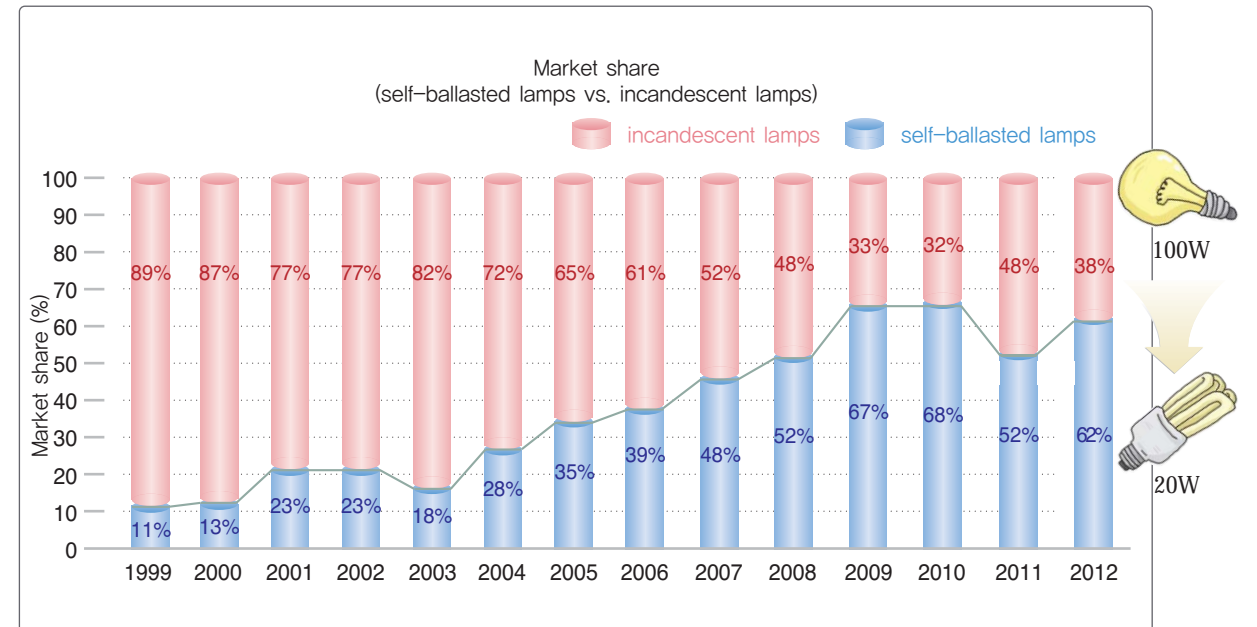


III Status of deployment of self-ballasted compact fluorescent lamps

The government has been making efforts to transform the market by replacing low efficiency lighting equipment such as incandescent lamps with high efficiency lighting equipment such as self-ballasted compact fluorescent lamps. Public campaigns were conducted to promote the good energy efficiency performance of self-ballasted compact fluorescent lamps.

As a result, the market share of self-ballasted compact fluorescent lamps rose from 11% in 1999 to 62% in 2012. However, despite their high efficiency, self-ballasted compact fluorescent lamps are not able to completely replace incandescent lamps.

III Replacement of incandescent lamps with self-ballasted compact fluorescent lamps

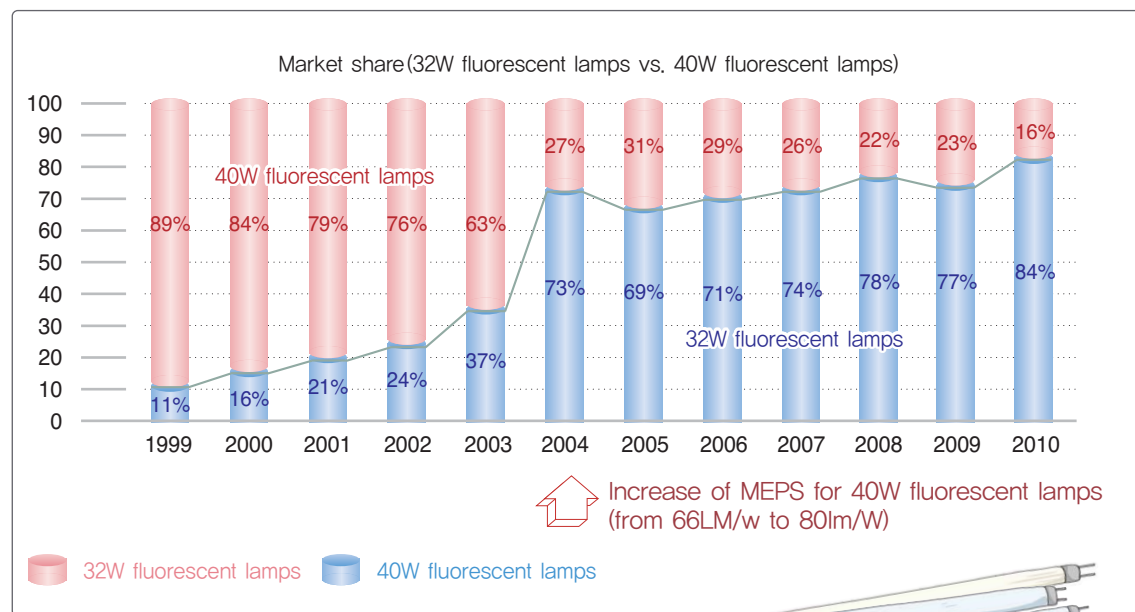


32W fluorescent lamps replacing 40W fluorescent lamps

The replacement of 40W fluorescent lamps with 32W fluorescent lamps, which have 20% more energy saving potential, is a successful example of transforming the lighting equipment market.

The increase of the MEPS standard from 66lm/W to 80lm/W for 40W fluorescent lamps in January 2004 accelerated the replacement of 40W fluorescent lamps with 32W fluorescent lamps. As shown in the table below, the market share of 32W fluorescent lamps (previously 10 to 30%) drastically increased to 70% in 2004. With the exception of compact fluorescent lamps, the stricter MEPS standards virtually ended the production (import) and sales of 40W fluorescent lamps, thereby transforming the market.

Status of the replacement of 40W fluorescent lamps with 32W fluorescent lamps



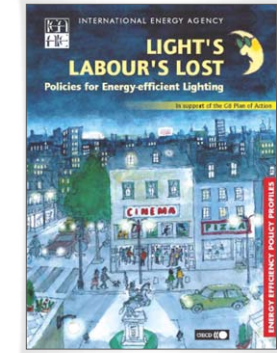
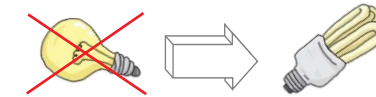
* Source : KEA

International movement to phase-out incandescent lamps

In recent years, the need for an aggressive policy to phase-out incandescent lamps from the market in order to facilitate transformation to self-ballasted compact fluorescent lamps has emerged as an international issue. Early on, the Australian federal government (AGO) declared its plan to phase out all incandescent lamps from the Australian market by 2010. The IEA also strongly recommended that all incandescent lamps be phased out from the lighting market. The IEA's recommendation is that all governments phase out incandescent lamps, the lowest energy efficiency lighting equipment, in accordance with their own commercial and economic situation.

Australian policy for phasing out incandescent lamps

Australia announced that MEPS for incandescent lamps would be applied at 20lm/W. Given that the current luminous efficiency of incandescent lamps is 10 to 15 lm/W, incandescent lamps will be phased out of the market, as the current incandescent technology will most likely not meet the MEPS.



Phase out of incandescent lamps from the market by 2013

In spite of government efforts to promote self-ballasted compact fluorescent lamps and LED lamps, sales still lagged because of the relatively cheap price of incandescent lamps compared to that of the self-ballasted compact fluorescent lamps and LED lamps. This showed the limits of market transformation when it is undertaken as a voluntary scheme.

On 15 December 2008, the National Energy Saving Implementation Committee (Chair: Prime Minister) decided to phase-out low efficiency incandescent lamps from the market. MEPS was applied as a policy tool to phase out incandescent lamps. In other words, incandescent lamps would be phased out by raising the standard of MEPS to the level of 20 lm/W so that incandescent lamps with a normal luminous efficiency of 10 to 15 lm/W could no longer be manufactured or sold in the market. In the first phase, incandescent lamps of 70W to 150W (mainly 100W which accounted for 26% of all incandescent lamps) were phased out of the market from 1 January 2012. In the second phase, incandescent lamps of 25W to 70W (mainly 60W and 30W which account for 74% of all incandescent lamps) were phased out of the market from 1 January 2014.

MEPS of incandescent lamps (standards for phasing-out, 20 lm/W)

Power consumption	MEPS		
	By 31 December 2011	From 1 January 2012	From 1 January 2014
24W to 40W	8.3	8.3	20.0 (Phase-out)
40W to 70W	11.4	11.4	20.0 (Phase-out)
70W to 150W	13.20	20.0 (Phase-out)	20.0 (Phase-out)

10 Deployment of LED lights

Need for deployment and expansion of LED lights

LED lights can save up to 90% of the energy consumed by regular lighting equipment. LED lights are also drawing attention as a new source of lighting for their eco-friendliness and durability.

LEDs, or luminous diodes, are a type of semiconductor that emits light when sending electric signals. They are often used in traffic lights, general lighting, vehicles, medical lighting equipment, back lights for small LCDs, and other applications. LED lights are more environmentally-friendly and safer than general lights as they do not use gas filaments or mercury.

Characteristics of LED lights compared to general lighting

- Due to their high efficiency in producing light, LED lights consume less power (energy saving up to 90%).
- The lifetime of LED lights can be up to 100,000 hours (100 times longer than incandescent lamps).
- The speed of turning on-and-off is much faster than general lights.
- LED lights are durable and safe from external shocks since they do not have filaments.
- LED lights are eco-friendly since, unlike incandescent and fluorescent lamps, they do not use mercury.

Major achievements in the deployment of LED lights

KEA has been managing the efficiency of LED lights under the high-efficiency certification program so as to nurture LED lighting technology and accelerate the deployment of high-efficiency products. Starting with the adoption of the high-efficiency certification program for LED traffic signals in 2001, the scope of the certification program was extended to include 14 types of LED lights by 2013.

Types of LED light deployment



Extension of the scope of the high-efficiency certification program

The Korean government has been striving to widen the dissemination of LED lights by pursuing various policies and assistance programs. Although publicity campaigns on the advantages of LED lights, including their eco-friendliness and large saving potentials, have been promoted through the media, consumers seem only to have a vague understanding of LED lights and remain unsure of which lighting applications they can replace.

To address this issue, KEA included the replacement of fluorescent lamps by LED lamps as a target of the high-efficiency certification program so that consumers can now more easily install LED lights. LED lamps that are compatible with ballasts for fluorescent lamps have been installed in households and office buildings to replace tubular fluorescent lamps. The design enables consumers to easily install the LED lamps as they only need to change lamps. In response to changing market demands, the high-efficiency certification program has been extending its target products, and the scope and selection of lamps, in order to maximize consumers' benefits.

Beginning in 2001 with the relatively easy deployment of LED traffic signals, KEA has since extended the scope of the high-efficiency certification program to include LED leading lights, internal converter type LED lamps (for replacing incandescent lamps), external converter type LED lamps (for replacing halogen lamps), and recessed and fixed LED luminaires. More recently, the inclusion of external lighting such as LED safety luminaires, LED street luminaires, and tunnel LED luminaires within the scope of high-efficiency certification program has enabled even wider replacement of existing low-efficiency lamps.

● Enforcement dates of the high-efficiency certification program for LED lamps

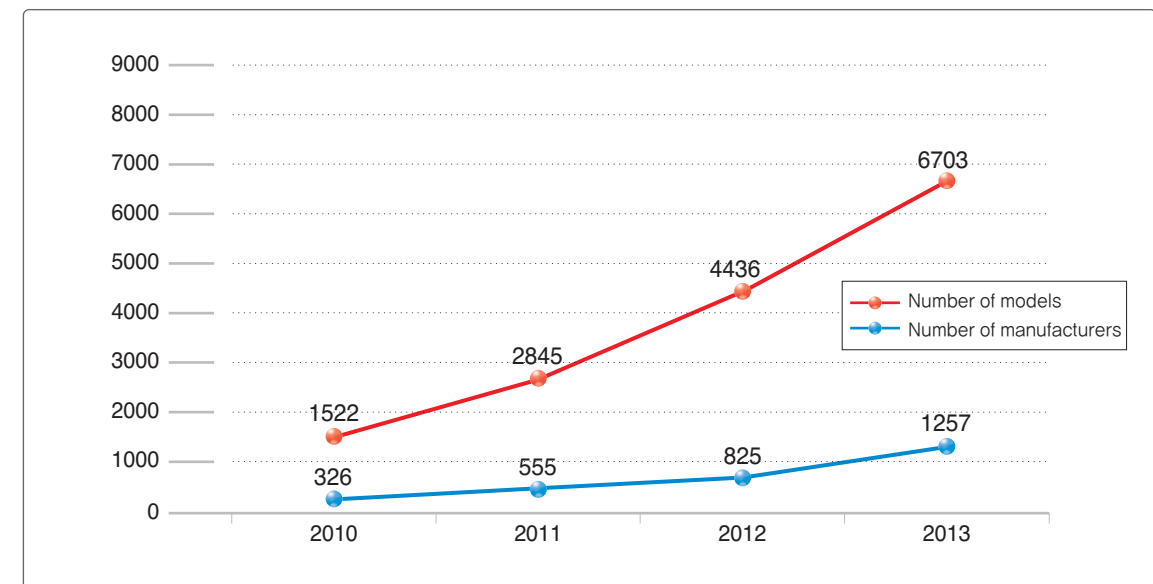
No.	Target products	Enforcement date
1	LED traffic signals	31 December 2001
2	LED guiding luminaires	23 July 2007
3	External converter type LED lamps	2 April 2008
4	Internal converter type LED lamps	2 April 2008
5	Recessed and fixed LED luminaires	2 September 2009
6	LED safety luminaires	2 September 2009
7	LED sensor lights	2 September 2009
8	LED luminaires with sensors	2 September 2009
9	LED moduled converters for power supply	2 September 2009
10	LED street luminaires	30 April 2012
11	Tunnel LED luminaires	30 April 2012
12	Tubular LED lamps (external converter type)	30 April 2012
13	LED modules for signs	1 April 2013
14	LED lamps replacing fluorescent lamps (internal converter type)	25 November 2013

■ Status of high-efficiency certified LED lights

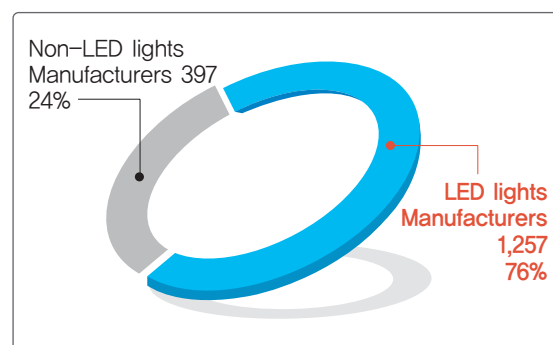
The high-efficiency certification program granted certificates for 45 target products produced by 1,654 manufacturers totalling 9,549 models as of 2013. Of these, 6,703 models were LED lights produced by 1,257 manufacturers. LED lights thus accounted for 70 percent of the models certified by the program way more than other target products such as power and insulation equipment.

The number of LED light certifications increased by 92 percent in 2010, 87 percent in 2011, 56 percent in 2012 and 51 percent in 2013. These increases resulted from extending the range of target products of the high efficiency certification program to include external converter type LED lamps for replacing LED leading lights (2007) and halogen lamps (2008), internal converter type LED lamps for replacing incandescent lamps, and recessed and fixed LED luminaires which can be installed in office buildings and other types of buildings.

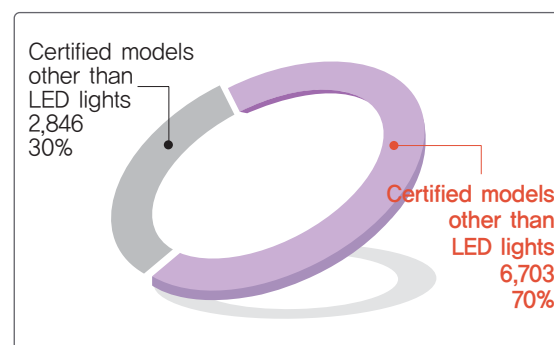
||| Yearly results of certifying LED lights



||| Portion of certified LED manufacturers in 2013

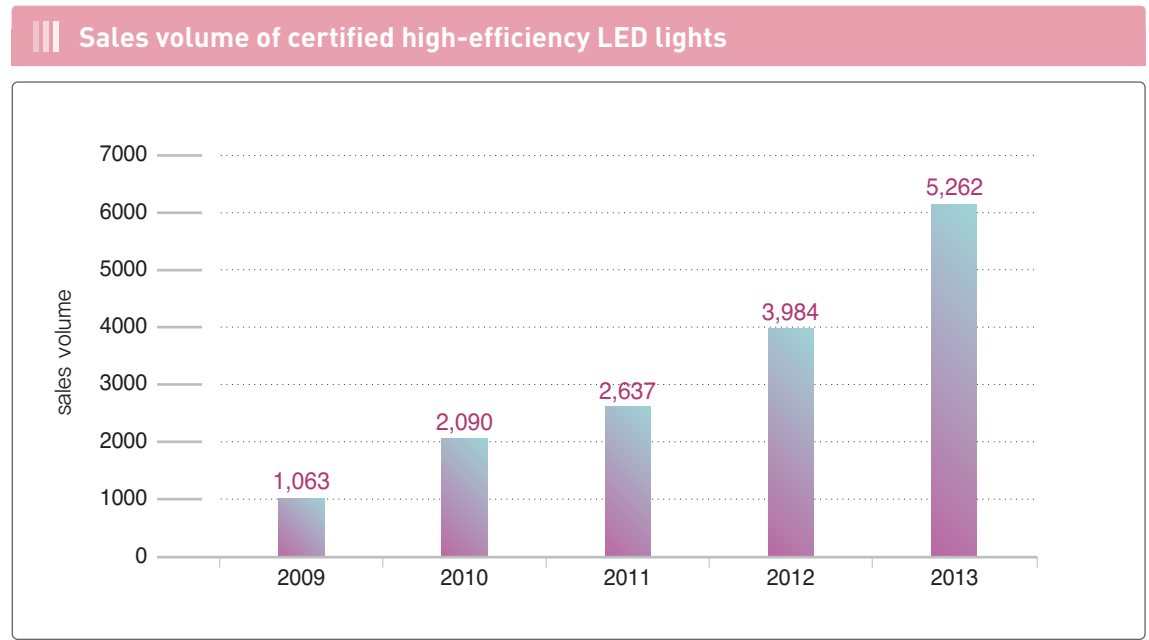


||| Portion of certified models of LED lights in 2013



■ Sales results of high-efficiency certified LED lights

The high-efficiency certification program is not mandatory, but rather a voluntary scheme for manufacturers or importers. Despite this fact, both the number of certifications and volume of sales are substantially increasing.

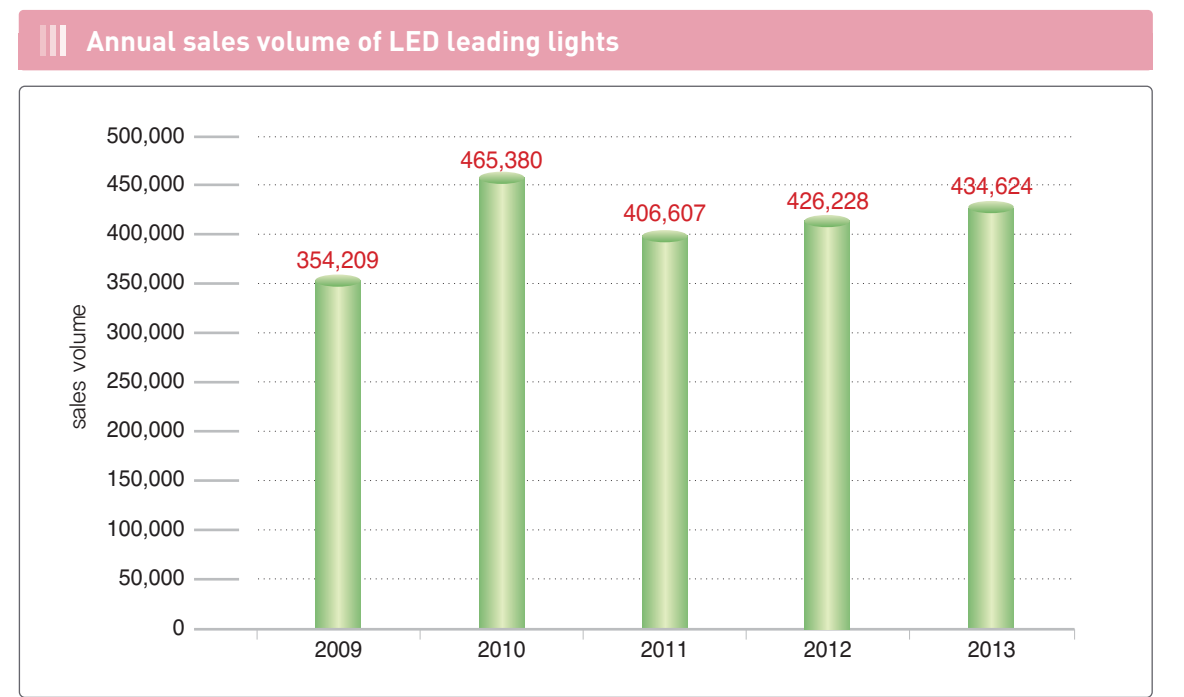


The sales volume of LED lamps has been on a steep rise year on year. This trend has been encouraged by a variety of incentives that have been given to vitalize LED deployment, as well as the excellent energy saving performance of the LED lamps themselves.

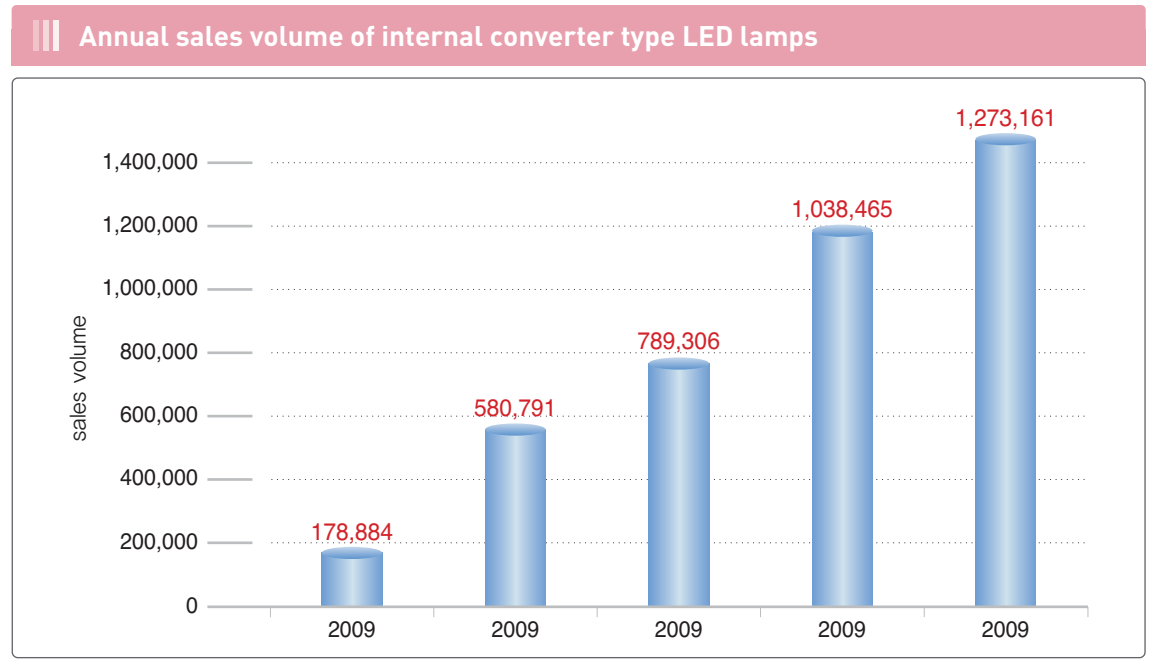
Major incentives include rebates, tax breaks, requirements for energy saving building designs, and mandatory installation by public organizations. In the requirement for energy saving building designs, for example, the use of high-efficiency LED lights is strongly recommended. Notably, the installation of LED leading lights has been mandated as recommendation, and this has contributed to an annual increase in the deployment of LED lights.

According to the “Regulation on the implementation of energy use rationalization in public organizations”, public organizations are also replacing energy-using equipment with high-efficiency products. An annual deployment target for LED lights was specified in order to increase the installation of LED lights.

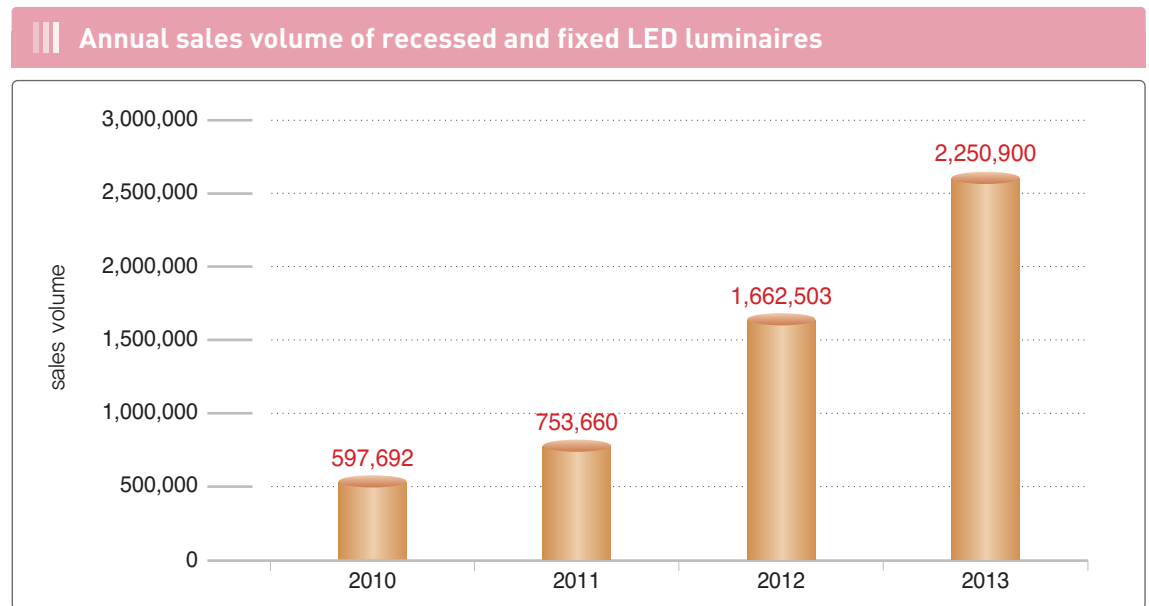
Since their certification as high efficiency products, the sales volume of LED leading lights has risen over tenfold, from 40,000 in 2008 to 450,000 in 2010, and their sales volume continues to rise steadily.



Since internal converter type LED lamps which can replace low-efficiency incandescent lamps were included as target products under the high-efficiency certification program in 2008, the sales volume of internal converter type LED lamps upsurged from 180,000 in 2009 to 1,040,000 in 2012. It shows that market transformation to LED lights has been achieved relatively quickly, in part because the inefficiency of incandescent lamps is well recognised among consumers, and in part because the high-efficiency of LED lamps has been well promoted.



Since their inclusion within the scope of the high-efficiency certification program, recessed and fixed LED luminaires which can be installed in offices and buildings have been the most popular type of lighting equipment. Its sales volume increased from 600,000 in 2010 to 2,250,000 in 2013.



Upgrading to higher-efficiency LED lights

The high-efficiency certification program guarantees the energy performance of products by certifying their higher energy performance compared with regular ones. However, even the products certified as high-efficiency can become relatively inefficient products as time goes by. This has particularly been the case in the semiconductor industry (including LEDs) where technology changes occur rapidly.

Hence, it is crucial to regularly update standards for the high-efficiency certification program to take account of new technology trends and the status of markets. In this context, KEA raised the standards for the efficiency level of LED lights under the certification program through the revision of relevant notifications on 30 April 2012.

• Revisions in standards for the efficiency level for the high-efficiency certification program

Types of LED lamps	Modified and added testing items	New efficiency standards for certification compared to the existing standards
External converter type LED lamps	<ul style="list-style-type: none"> Initial light velocity Luminous efficiency Color rendering 	<ul style="list-style-type: none"> Over 90% → Over 95% Raised 10lm/W by capacity 70이상 → 75이상
Internal converter type LED lamps	<ul style="list-style-type: none"> Initial light velocity Luminous efficiency Color rendering 	<ul style="list-style-type: none"> Over 90% → Over 95% Raised 101m/W by capacity Over 70 → Over 75
Recessed and fixed LED luminaires	<ul style="list-style-type: none"> Luminous efficiency 	<ul style="list-style-type: none"> Raised 101m/W by capacity
LED safety luminaires	<ul style="list-style-type: none"> Luminous efficiency Color rendering 	<ul style="list-style-type: none"> Raised 5lm/W by capacity Over 70 → Over 75

❖ Energy performance labeling of LED lights

Consumers who are unfamiliar with LED lights may be hesitant to buy them on the market. Although the media has often reported on the good energy performance of LED lights compared to that of incandescent or fluorescent lamps, some consumers may still be reluctant to purchase them. To address this problem, KEA adopted the “Energy performance labeling scheme for high-efficiency certified LED lights”.

Manufacturers shall indicate the following items so that consumers can easily identify major factors to be considered when retrofitting existing lighting equipment.

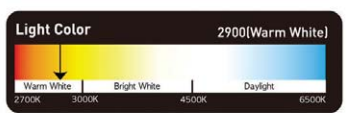
- ① Substitute light source: existing alternative lighting equipment
- ② Luminous flux rating: the amount of a light emitted from lighting equipment
- ③ Power consumption: power consumed by lighting equipment
- ④ Color rendering: level of a light source’s ability to show object colors naturally
- ⑤ Color temperature: numeration of a light source as temperature. The lower the color temperature, the more red the light source, and the higher the color temperature, the more blue the light source.

||| Labels for LED lights

performance indicators of high-efficiency certified LED light

Substitute light source:

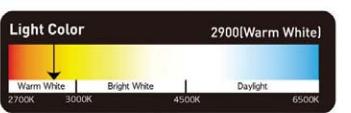
1. Luminous efficiency(lm/W)
2. Luminous flux rating(lm)
3. Power consumption(W)
4. Color rendering(closeness of a light source to natural light)
5. Color temperature (K)



performance indicators of high-efficiency certified LED light

Substitute light source: replacing 31W incandescent lamps

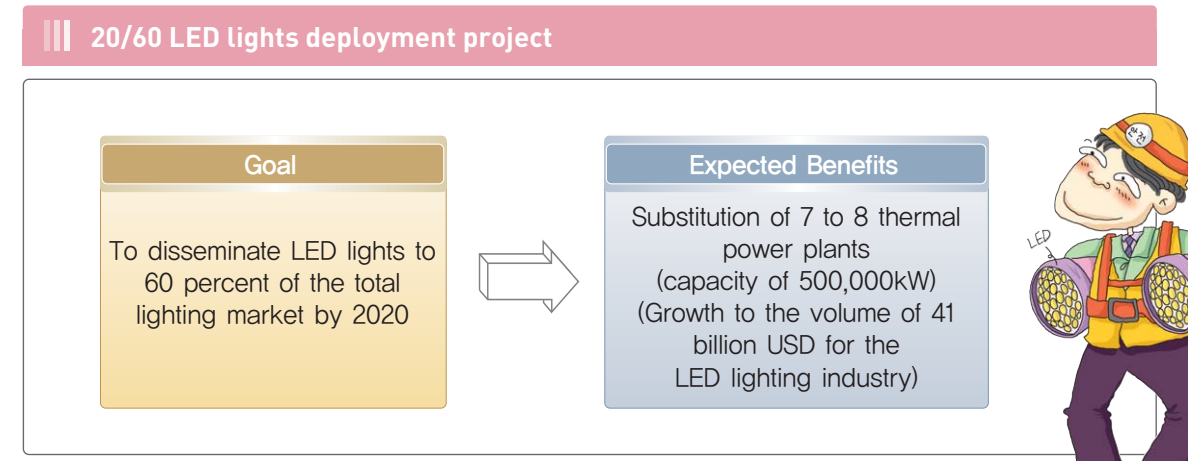
1. Luminous efficiency(lm/W): 75
2. Luminous flux rating(lm): 375
3. Power consumption(W): 5
4. Color rendering(closeness of a light source to natural light): 75
5. Color temperature (K): 2,900K



❖ Vitalization of LED lights deployment

🔗 Policy goal: achieve a 60 percent share for LED lights in the lighting market by 2020

As part of “Measures for vitalizing the deployment of green LED lights”, MOTIE announced the “20/60 LED lights deployment project” in June 2011. This plan aims to scale up the LED lighting industry to the volume of the semiconductor industry (41 billion USD) by increasing the share of LED lights to 60 percent of the total lighting market by 2020.



11 Global Standardization of Measuring Methods

The importance of global standardization

The requirements of the energy efficiency standards and energy labeling schemes can largely be divided into three categories: the scope of application, the energy efficiency standards, and the measuring methods.



Global Standard

In Korea, KS standards have been adopted as the measuring methods for energy efficiency standards and energy labeling schemes (the energy efficiency standards and labeling program, the high-efficiency equipment certification program, and the e-Standby program). In cases which no applicable KS standards existed, MOTIE has regulated measurement standards through its notifications. However, strictly speaking, both KS standards and government regulations are only national in scope, and they may not be equal to other international standards.

It seems that the international trend is for countries to translate IEC or ISO standards into their own languages, and establish these as the measuring methods in their national regulations.

International standardization of measuring methods for energy efficiency

Standards	Contents	Energy efficiency standards and energy labeling scheme	Target products
IEC 62301	Measuring method for standby power of household appliances	<ul style="list-style-type: none"> e-Standby power program Energy efficiency standards and labeling program 	Computers, monitors, printers, copiers, scanners, all-in-one printers, TVs, video players, stereos, DVD players, radio cassette players, set-top boxes, bidets, modems, general washing machines, dish washers, drum washing machines, electric rice cookers, air purifiers, fans
IEC 62552	characteristics and testing methods for coolers	Energy efficiency standards and labeling program	Refrigerators, freezers, commercial refrigerators
IEC 60034-2-1	How to determine loss and energy efficiency of three-phase induction motors	Energy efficiency standards and labeling program	Three-phase induction motors
IEC 62087	Measuring methods for power consumption of stereos, video players, and relevant equipment	<ul style="list-style-type: none"> Energy efficiency standards and labeling program e-Standby power program 	TVs, video players, stereos, set-top boxes, monitors and others
EN Standard	Measuring method for gas boilers	Energy efficiency standards and labeling program	Gas boilers

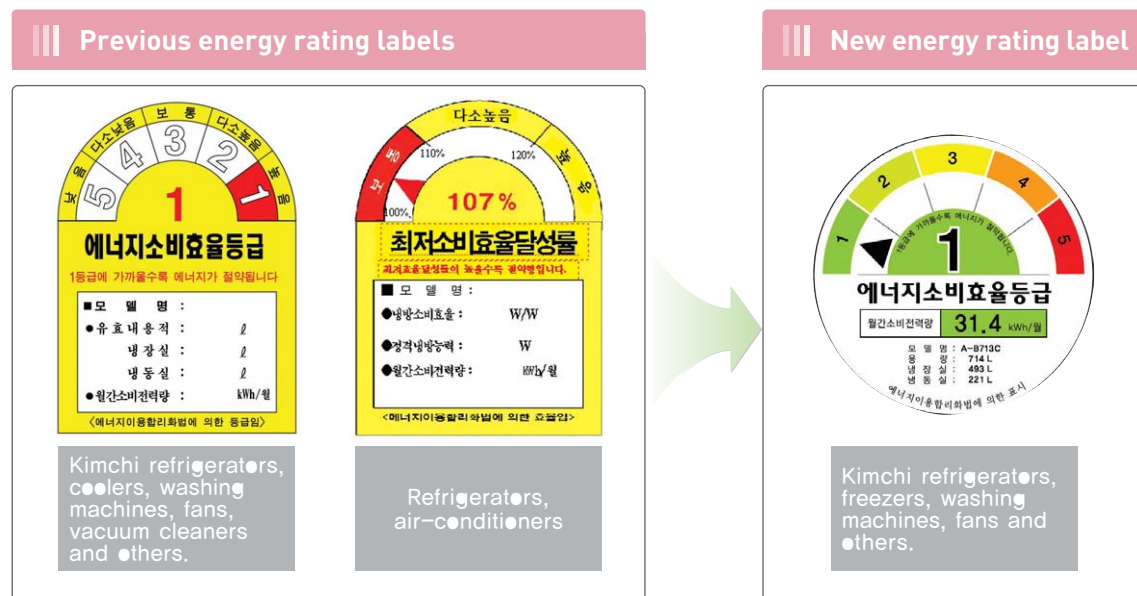
Compliance of measuring methods for energy efficiencies of major products with global standards (IEC/ISO)

Category	Global standards (IEC/ISO)	USA (Energy Guide Label/ MEPS/ ENERGY STAR Program)	EU (Energy Label EuP Directive)	Japan (Top Runner Program)	Korea (Energy Efficiency Standards and Labeling/ e-Standby Program)	Notes (Compliance of Korean Measuring methods to Global standards)
Refrigerators	IEC 62552	ANSI/AHAM HRF-1	EN 153 (=IEC 62552)	JIS C 9801	KS C IEC 62552	Complies with global standards
Air-conditioners	ISO 5151 ISO 13253 ISO-FDIS 15042	ANSI / ASHRAE 16 (RA99) 10 CFR Part 430 Subpart B App M 10 CFR Part 430 Subpart B App F	ISO 5151 ISO 13253 ISO-FDIS 15042	JIS B 8615-1 JIS B 8615-2	KS C 9306	Korean Standards
Drum washing machines	IEC 60456	10.CFR 430. Appendix. j1	EN 60456 (=IEC 60456)	N/A	KS C IEC 60456	Complies with global standards
TVs	IEC 62087	10 CFR Part 430 Subpart B App H	IEC 62087	Top Runner Program JIS C 6101	KS C IEC 62087	Complies with global standards
Three-phase induction motors	IEC 60034-2-1	IEEE Std. 112 Method B	IEC 60034-2-1	N/A	KS C IEC 60034-2-1	Complies with global standards
Household gas boilers	EN 483 EN 677	AFUE: BSR/ASHRAE Standard 103-1993R	EN 483/EN 677 BED (92/42/EEC)	N/A	KS B 8109 KS B 8127	Korean Standards
Fluorescent lamps	IEC 60081 IEC 60901	ANSI	EN 60081 (=IEC 60081) EN 60901 (=IEC 60901)	JIS C 7601 JIS C 8105	KS C 7601	Korean Standards
Standby power	IEC 62031	IEC 62301	IEC 62301	Top Runner Program	KS C IEC 62301	Complies with global standards

12 Enhancement of Consumer Benefits including Improvements in Energy Labeling

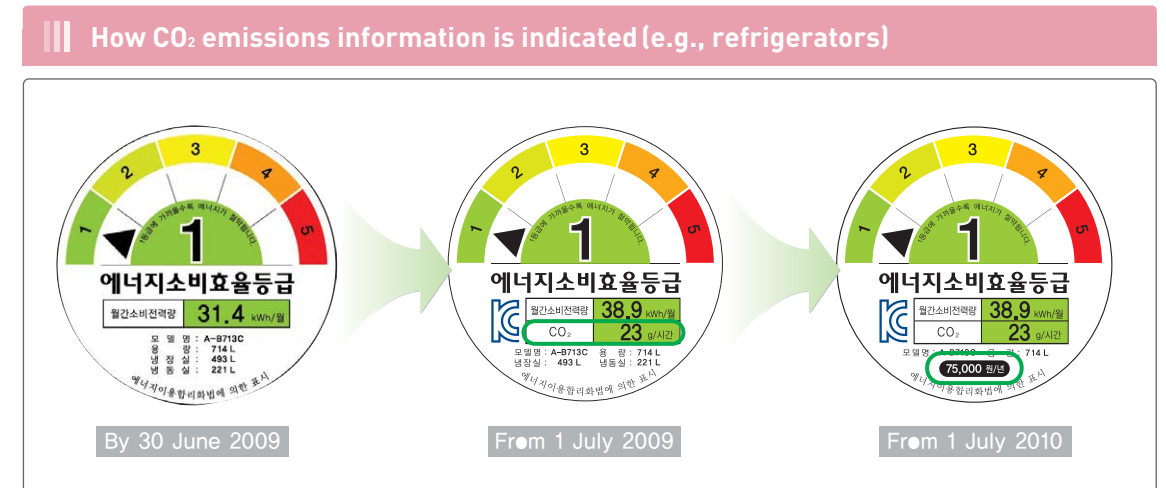
Consumer oriented evolution of energy efficiency rating labels

Energy rating labels were redesigned in 2007 (for the first time since the enforcement of energy efficiency standards and labeling program in 1992) in order to help consumers easily identify energy efficient products. Consumers had complained that they found it difficult to identify high-efficiency products from the previous forms of energy labels. As a result, new design work for energy labels was undertaken, and the newly designed labels started to be attached on products circulated in the market as of 2008.



World's first inclusion of information about CO2 emissions in the energy rating label of electric and electronic appliances

It became mandatory for new models of electric appliances entering the market as of 1 July 2009, including refrigerators, air-conditioners, washing machines, lighting equipment, and three-phase induction motors, to include information about CO₂ emissions on the energy label according to its energy efficiency rating (1st to 5th grade). The adoption of this scheme was a part of the efforts to diffuse a culture of production and consumption consistent with green growth. Coming after the August 2008 reform of the energy label for vehicles which simultaneously indicates both fuel efficiency and CO₂ emissions, it was the world's first attempt to include CO₂ emissions information on the energy rating labels of electric and electronic appliances. Twenty product types, representing sales of 160 million units annually, now include CO₂ emissions information.



In addition to such efforts, it became mandatory to indicate annual energy cost information on the energy rating labels of refrigerators, air-conditioners, and other appliances. The energy cost information was added so as to induce consumers to voluntarily select energy saving products.

As energy-using equipment emits CO₂ when it is in use, providing information about CO₂ can trigger consumers' adoption of low-carbon appliances. The experience of energy efficiency labels for vehicles seemed to indicate that providing both CO₂ and energy performance information was becoming an international trend. The same practices have been undertaken for vehicles in Australia, 27 EU countries, and some other countries. It is believed that giving such information will provide benefits for both consumers and manufacturers.

Beyond the existing energy efficiency rating (1st to 5th grade), consumers are now getting acquainted with a new purchasing index - 'CO₂ emission per hour of use' calculated from 'power consumption per hour'. Consumers can now easily identify low-carbon and high-efficiency products by getting further information about CO₂. For example, drum washing machines emit 5 to 10 times more CO₂ than general washing machines, air-conditioners emit 30 times more CO₂ than fans, and incandescent lamps emit 4 to 5 times more CO₂ than self-ballasted fluorescent lamps.

❑ Indication of information about annual energy costs

Energy efficiency was the core index for labeling the energy efficiency grade (1st to 5th grade), however it seems not to have been an effective policy tool for encouraging consumers to adopt smaller household appliances consuming the least absolute energy.

Indicating annual energy costs derived from absolute power consumption can supplement the existing energy efficiency rating labels. By informing consumers of cost savings available from selecting appliances with low absolute energy consumption, consumers have access to useful information which the energy rating index alone did not provide. Annual energy costs are expressed by applying the unit price of 160 KRW to expected annual power consumption (kWh) for one year of use.

Inclusion of annual energy cost information on energy rating labels has been extended to most household appliances including TVs, and its scope will be further extended in planned phases.

❑ Opening of the "Ocean of Energy Efficiency", online site providing energy efficiency information

An web site called the "Ocean of Energy Efficiency" was established on 30 January 2012 to provide energy efficiency information for energy using equipment. It is a web-site where consumers can compare the energy efficiencies of household appliances, and select better energy performing products for purchase. Various kinds of useful information, such as energy efficiency ratings, energy costs, and monthly power consumption can be found for major household appliances such as refrigerators, washing machines, air-conditioners, and TVs. Vehicles can also be researched by their type on this web site.

In addition, comparisons of several household appliances and their energy costs are provided on the web site to help consumers make better informed choices. Information available at the Ocean of Energy Efficiency has also been linked with online shopping malls so that consumers can find energy information on household appliances at the time of shopping.

By enabling consumers to easily search and compare the energy efficiencies and energy costs of appliances, the Ocean of Energy Efficiency serves to guide consumers toward making smarter choices in favor of low-carbon household appliances.



Partnership with distributors of household appliances

The Memorandum of Understanding (MOU) among MOTIE, KEA and 12 household appliance distributors, including ET Land Co, Ltd., was signed in 2013 to establish a cooperation framework with major distributors for the purpose of a wider deployment of high-efficiency appliances nationwide. On- and off-line distributors of household appliances participated in various schemes according to their capability, such as the operation of 'special zones' for high-efficiency appliances, and promotional sales for energy saving products.

It is meaningful that the partnership with distributors of household appliances became a starting point for distributors to engage in the deployment policy of high-efficiency equipment which used to be implemented by focusing on manufacturers (through regulations and assistance programs) and consumers (by promotional activities).

The MOTIE and KEA plan to keep consolidating the partnership with the distributors by providing energy efficiency information and data, awarding best distributors and designating them as men of national merits.



IV

Korea's Energy Standards & Labeling

www.kemco.or.kr

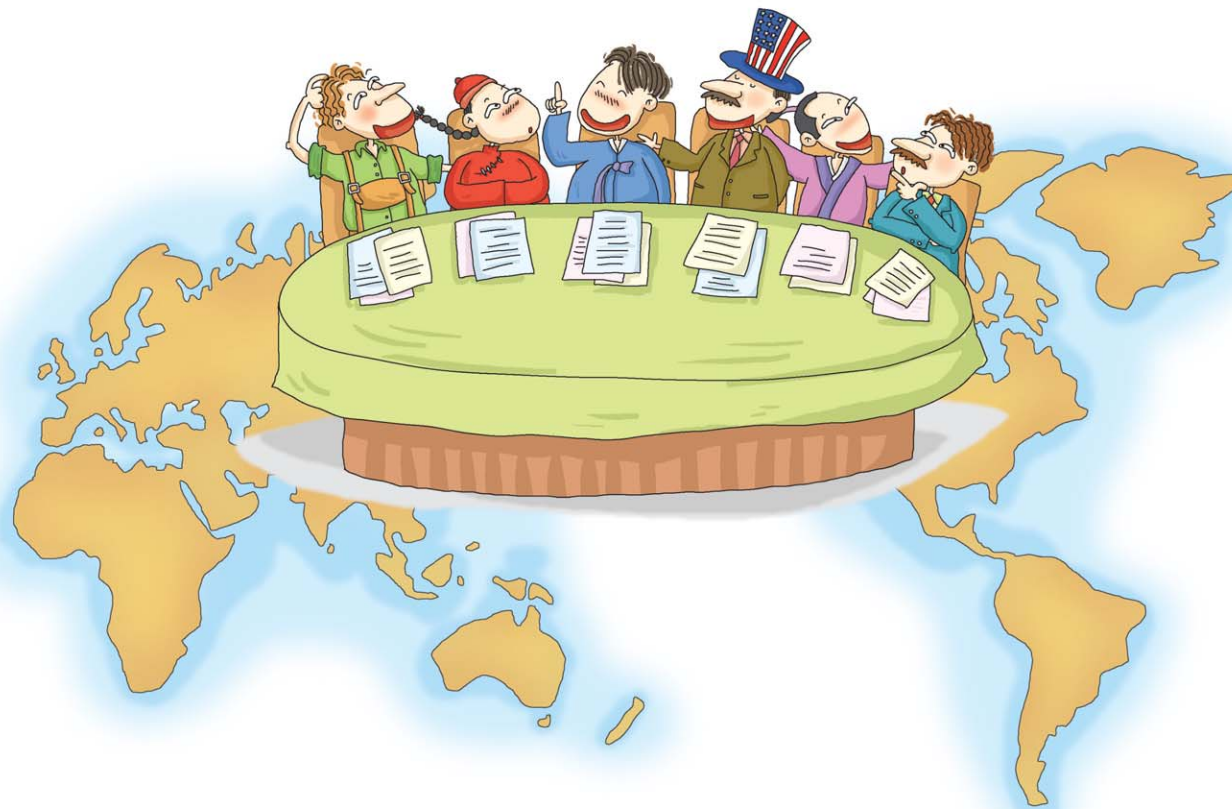
International Cooperation in Energy Efficiency Management and International Energy Efficiency Programs

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• Japan	96
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• Australia	101

International Cooperation in Energy Efficiency Management and International Energy Efficiency Programs

It is estimated that 70 to 80 percent of all international cooperation related to energy saving in industry, transport, buildings, and appliances, is focused on energy standards and labeling schemes covering equipment and appliances. This is due to the fact that most international cooperation in energy saving relates to electric motors, lighting equipment, and standby power.

Regular international meetings associated with energy saving include meetings under the International Energy Agency (IEA), the International Partnership for Energy Efficiency Cooperation (IPEEC), and the Asia-Pacific Economic Cooperation (APEC).



1 Comparison of how to implement domestic and international energy standards and labeling programs

Status of implementation of MEPS and energy labeling programs by country

Characteristics of program	Country	Implementing organization	Label	Status of implementation of the energy labeling program
MEPS	USA	Department of Energy	—	<ul style="list-style-type: none"> MEPS – motors, refrigerators and others (31 products)
	EU (27 countries)	EU commission	—	<ul style="list-style-type: none"> MEPS – refrigerators and others (16 products)
	Japan	Ministry of Economy, Trade and Industry (METI)	—	<ul style="list-style-type: none"> Top Runner Program – refrigerators, transformers and others (26 products)
	China	China National Institute of Standardization (CNIS)	—	<ul style="list-style-type: none"> MEPS – refrigerators, air-conditioners and others (14 products)
Energy labeling	USA	Federal Trade Commission (FTC)		<ul style="list-style-type: none"> Energy labeling – refrigerators, air-conditioners, boilers and others (12 products)
	EU (27 countries)	EU commission		<ul style="list-style-type: none"> Energy labeling – refrigerators, washing machines and others (11 products)
	Japan	METI		<ul style="list-style-type: none"> Harmonized energy saving labeling – refrigerators, air-conditioners and others (5 products)
	China	CNIS		<ul style="list-style-type: none"> Energy standards and labeling – refrigerators, air-conditioners and others (22 products)

Scope of MEPS of other countries for the target products of MEPS in Korea

Category	USA	EU	Japan	China	Canada	Australia
Refrigerators	•	•	•	•	•	•
Freezers	•		•	•	•	•
Kimchi refrigerators						
air-conditioners	•	•	•	•	•	•
General washing machines	•	•		•	•	
Drum washing machines	•			•	•	
Dish washers	•	•			•	
Dish dryers						
Hot and cold water suppliers	•	•	•			
Electric rice cookers			•	•		
Electric vacuum cleaners		•				
Fans				•		
Air purifiers						
Incandescent lamps	•			•	•	•
Fluorescent lamps	•	•	•	•	•	•
Ballasts for fluorescent lamps	•			•	•	•
Self-ballasted lamps				•	•	•
Three-phase induction motors	•	•	•	•	•	•
Domestic gas-fired boilers	•	•		•	•	
Adapters and rechargers	•	•		•		•
Electric chillers and heaters	•					
Commercial refrigerators	•				•	•
Gas water heaters	•	•	•		•	
Electric transformers	•		•	•	•	•
Window sets						
TVs		•	•	•		•
Electric fan heaters						
Electric stoves			•			
Multi function electric heat pump systems	•				•	
Dehumidifiers	•				•	
Electric heating pads						
Electric hot water mats						
Electric heating boards						
Electric beds						
Electric radiators						

※ Japan's scope is based on Top Runner Program. National categorisation of target products may be different as the EU and U.S.A implement MEPS by designating products in groups.

2 International cooperation in energy efficiency management

1 IEA 4E

Overview of the IEA

As an international organization supporting energy policies for OECD countries, the International Energy Agency (IEA) undertakes comprehensive programs relating to energy cooperation including improving energy efficiency among 27 OECD member countries.



Considering energy efficiency improvement for equipment and appliances is the most basic and desirable policy direction for energy saving, the IEA recommends that OECD countries disseminate high-efficiency equipment and phase out low-efficiency equipment from the market.

Homepage : www.iea.org



IEA 4E

IEA Efficient Electrical End-use Equipment (4E) is an implementing agreement (IA) launched in 2008 aiming to undertake International Annexes related to energy efficiency and labeling schemes for equipment and appliances.

Homepage : www.iea-4e.org

The 40 existing IAs under the IEA were technology-oriented with participation of experts from research institutes. However, it should be pointed out that IEA 4E is the first IA that undertakes policy-oriented International Annexes for energy saving by engaging OECD governments and/or public organizations to respond to the United Nations Framework on Climate Change (UNFCCC).

The 12 OECD member countries participating as parties to IEA 4E include USA, Canada, Australia, UK, France, Netherlands, Denmark, Switzerland, Austria, Sweden, Japan and Korea.



• Participating parties and organizations in IEA 4E

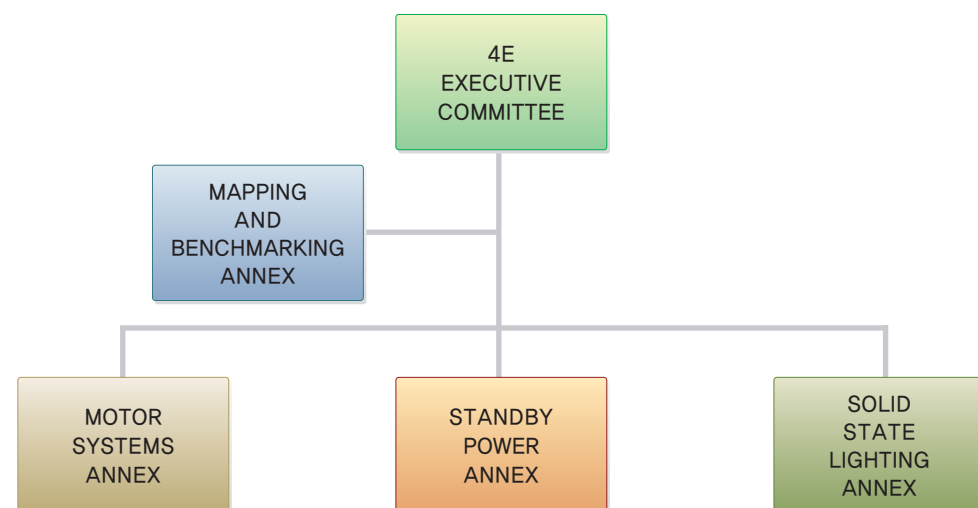
Participating parties	Participating organizations	Nature of participating organization
USA	Department of Energy	Government
Canada	Natural Resource Canada	Government
Australia	Department of Resources, Energy and Tourism	Government
UK	Department for Environment, Food & Rural Affairs (DEFRA)	Government
France	Agence de l'environnement et de la maîtrise de l'énergie (ADEME)	Public organization
Netherlands	NL Agency	Government
Denmark	Danish Energy Agency	Government
Switzerland	Swiss Federal Office of Energy	Government
Austria	Austrian Federal Ministry of Transport, Innovation and Technology	Government
Sweden	Swedish Energy Agency	Government
Japan	New Energy and Industrial Technology Development Organization	Public organization
Korea	MOTIE, KEA	Government/ Public organization

IEA 4E is implementing 4 Annexes including: mapping and benchmarking, motor system, standby power, and solid state lighting (SSL). Among these, it is mandatory for IEA 4E participating parties to join the Mapping and Benchmarking Annex.

• IEA 4E Annex

Annex	Leading country	Participating parties	Notes
Mapping and benchmarking	UK	USA, Canada, Australia, France, Netherlands, Denmark, Switzerland, Austria, Japan, Sweden, Korea and UK	Korea joined
Standby power	Australia	UK, Netherlands, Switzerland, Canada, Austria, Denmark, Sweden, Korea, Australia and USA	Korea joined
Electric motor systems	Switzerland	Denmark, Australia, Netherlands, Austria, USA and Switzerland	
Solid state lighting	Sweden	UK, Netherlands, Sweden, Denmark, Australia, Japan, Korea, USA, France and China	Korea joined

* The Mapping and Benchmarking Annex and the Electronic Devices and Networks Annex were completed in the first half of 2014 and the Electronic Devices and Networks Annex has been launched.



2 The International Partnership for Energy Efficiency Cooperation (IPEEC)

The International Partnership for Energy Efficiency Cooperation (IPEEC) is an international partnership for promoting energy efficiency consisting of the G8 (USA, UK, France, Germany, Italy, Canada, Japan and Russia) and six other countries (China, India, Brazil, South Africa, Mexico and Korea).

Home page : www.ipeec.org

Nine international tasks have been undertaken by IPEEC including the Super-efficient Equipment and Appliance Deployment Initiative (SEAD).



• IPEEC Tasks

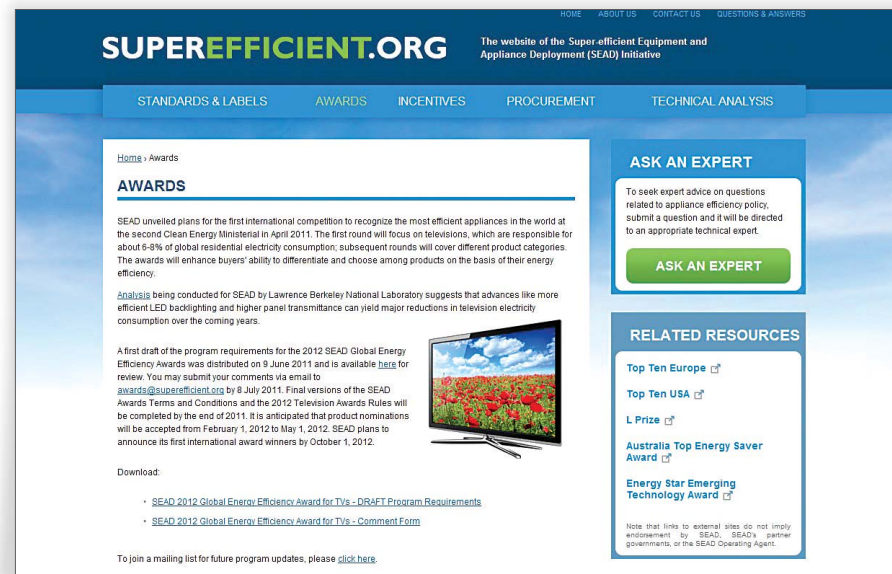
TASK	리더국
Super-efficient Equipment and Appliance Deployment (SEAD)	USA
Energy Management Action Network for Industrial Efficiency (EMAK)	Japan
Assessment of EE Financing Mechanisms(AEEFM)	India
Policies for Energy Provider Delivery of Energy Efficiency (PEPDEE)	UK
Global Superior Energy Performance Partnership (GSEP)	USA, Japan, etc.
Improving Policies through Energy Efficiency Indicators (IPEEI)	France
Worldwide Energy Efficiency Action through Capacity Building and Training (WEACT)	Italy
Building Energy Efficiency Task Group (BEET)	Australia
National and International Action Plans	-



IPEEC's SEAD

The Super-efficient Equipment and Appliance Deployment (SEAD) is a government led international initiative. It was proposed by the USA as task under IPEEC to transform the global market for super-efficient equipment and appliances.

Homepage: www.superefficient.org



Participating countries in the SEAD initiative include the USA, Australia, Canada, EU Commission, France, Germany, India, Japan, Mexico, South Africa, Sweden, UK and Korea. They are undertaking various activities including: the harmonization of testing procedures for commercial refrigerators, computers, transformers, LED lights, electric motors, standby power of networks, and TVs; the establishment of a global award for high-efficiency performers; providing incentives; and conducting public procurement and technology analysis. The Lawrence Berkeley National Laboratory (LBNL) and CLASP are supporting the efforts of the Department of Energy by serving as the Secretariat of SEAD.

SEAD has announced winners of its Global Efficiency Medals since 2012. Korean manufacturers won the award for TVs in 2012 and for monitors in 2013.

3 Asia-Pacific Economic Cooperation (APEC)

Overview of APEC

APEC is an international economic cooperation community comprised of 21 member countries. APEC has an Energy Working Group (EWG) to facilitate energy activities in APEC countries. There are four expert groups under the EWG, and the APEC Expert Group on Energy Efficiency and Conservation (EGEE&C) is undertaking energy efficiency activities. APEC also provides funds to support energy related projects.



Asia-Pacific Economic Cooperation

EGEE&C of APEC

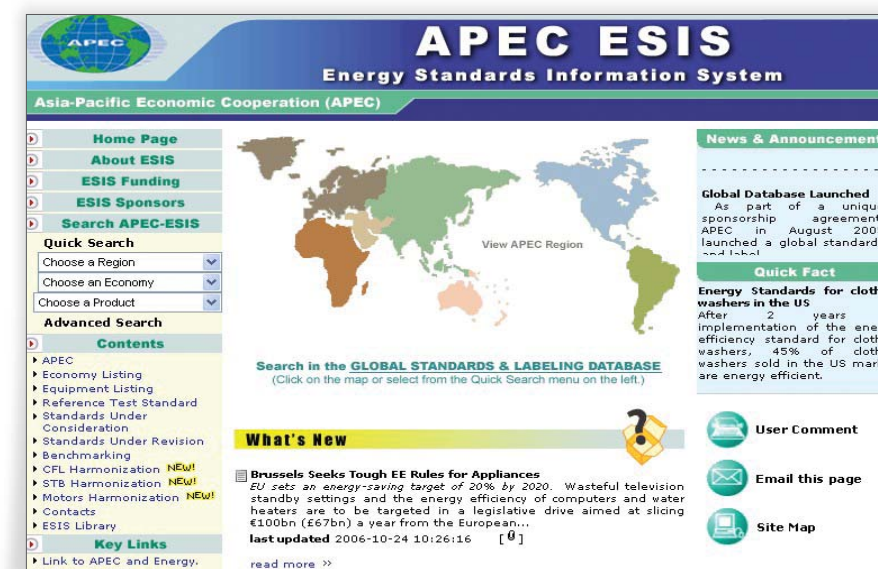
APEC EGEE&C is an energy efficiency expert group. About 70% of EGEE&C's international energy efficiency projects are focused on improvements of the energy efficiency of appliances and equipment.

Web site : www.egec.apec.org



APEC EGEE&C's flagship project is the APEC Energy Standard Information System (ESIS). APEC ESIS was launched in 2002 with financial support from APEC from 2001. The project was initiated after the Ministers' decision in 1998 to exchange information on member countries' energy efficiency standards and labeling programs.

Web site : www.apec-esis.org (maintained by CLASP)



3 International Energy Efficiency Programs



Countries around the world are operating energy standards and labeling schemes to promote the wider deployment of energy saving products and to protect the environment. Energy efficiency promotional measures can be categorized into mandatory (energy efficiency standards and labeling and MEPS) and voluntary programs.

The USA and Australia are two countries which are phasing out low-efficiency appliances from the market by implementing mandatory MEPS. The EU's EuP directive also falls within this category. The USA's Energy Guide, the EU's Energy Label, and Australia's Energy Rating Label are examples of mandatory labeling programs. In addition, Japan's Top Runner Program is a mandatory program as well.

Voluntary programs which provide incentives for manufacturing more energy efficient products have also been revitalized. The Energy Star Program implemented in partnership between the US EPA and DOE is one example.

International energy standards and labels

Category	Labeling	Nature	International energy standards and labels
Energy Label	Mandatory	Mandatory	
	Voluntary	Voluntary	
MEPS	N/A	Mandatory	Korea, USA, Australia, EU
Target efficiency standards	N/A	Mandatory	Top Runner Program (Japan)
Voluntary agreements	N/A	Voluntary	Code of Conduct (EU Commission)
Deployment programs	N/A	Voluntary	Market Transformation program (UK)
Requirement for public procurement	N/A	Voluntary	Federal Energy Management Program(USA), Green Procurement Ac (Japan), China
Standby power 1W policy	-	Mandatory	IEA, US (Procurement), Australia, Korea

1 USA

A brief introduction to the US federal government's Energy Guide Label, MEPS, Energy Star Program, Federal Energy Management Program and procurement system is given here.



1 MEPS operated by the Federal Government

Overview

The program bans the production and sales of products failing to meet MEPS which target 30 kinds of household and commercial appliances and equipment.

Web site: www.eere.energy.gov/buildings/appliance_standards

Characteristics Mandatory scheme

Target products

Central air-conditioning units and heat pumps for households, household clothes dryers, washing machines, battery chargers, dehumidifiers, direct heating devices, household dish washers, commercial washing machines, commercial air-conditioning units, electric motors, vending machines, commercial refrigerators, single package air-conditioners and heat pumps, unit heaters, coolers and air-conditioners, etc. (30 products).

Implementing organization DOE



2 Energy Guide Label

Overview

The Energy Guide label provides information about energy costs and the efficiency of appliances and equipment.

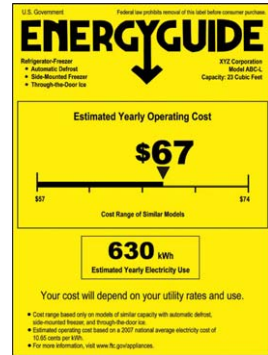
Web site: www.ftc.gov/bcp/online/edcams/eande

Characteristics Mandatory scheme

Target products

Refrigerators, washing machines, household air-conditioners, hot water suppliers, air-conditioning (HVAC) systems, lighting equipment, boilers, TVs, dish washers, etc. (11 products).

Implementing organization The Federal Trade Commission



3 ENERGY STAR Program

Overview

The ENERGY STAR program was launched in 1992 as an initiative to protect the environment through certifying high-efficiency appliances and equipment. It is undertaken in a partnership between the Environmental Protection Agency(EPA) and the Department of Energy(DOE). The ENERGY STAR program provides incentives to manufacturers(voluntarily participants) whose products satisfy high-efficiency standards.

Website: www.energystar.gov



Characteristics Voluntary scheme

Target products

Air purifiers, washing machines, commercial washing machines, dehumidifiers, dish washers, refrigerators, freezers, battery chargers, stereos, video players, set-top boxes, TVs, boilers, ventilators, furnaces, ceiling fans, lighting equipment. waterproofing products, roof products, ovens, steaming devices, displays, wireless telephones, household LED lights, gas fired condensing water heaters, solar water heaters, etc. (61 products).

Major incentives Tax reduction, tax exemption, or rebates up to a certain amount for each product will be given to high-efficiency product buyers.

Implementing organization US EPA & DOE

4 International Partnership on the ENERGY STAR Program

Overview

The product standards of the ENERGY STAR Program have been adopted in Australia, Canada, EU, Japan, New Zealand, Taiwan.

Products under Energy Star Program by country

Mode	One year after the enforcement
Australia	Computers, printers, fax machines, copiers, TVs, and DVD players
Canada	Washing machines, refrigerators, air-conditioners, LED lamps, ventilators, boilers, and pumps
EU	Computers, copiers, monitors, printers, scanners, and fax machines
Japan	Computers, monitors, printers, fax machines, copiers, all-in-one printers, and computer servers
New Zealand	Washing machines, refrigerators, dish washers, heat pumps, home theater systems, TVs, DVD players, air-conditioners, gas heaters, CFL lamps, LED lamps, LED lighting fixtures, printers, copiers, all-in-one printers, scanners, fax machines, monitors, computers, notebook computers, and PV panels
Taiwan	Computers, laptop computers, copiers, all-in-one printers, printers, fax machines, and scanners



2 European Union (EU)

The EU, comprised of 27 member countries, is a unified economic community. Each member state applies the EuP Directive, or the Energy Label and MEPS, to comply with the directive or regulation mandated by the EU Commission. In addition, each member state undertakes its own energy efficiency programs.



Along with the regulation (Ecodesign of Energy-using Products) and the EU directive (Energy Label and Eco-Label) which are implemented across the EU countries, voluntary labeling schemes are implemented independently by some member states and manufacturers. Notable among EU-wide schemes are the Eco-design of Energy-using Products under EU regulations, and Energy Labels and MEPS under EU directives, which are mandatory schemes for manufacturers.

1 Eco-Design of Energy Using Products (EuP) Directive

Overview

The EuP Directive mandates the design of energy using products (EuP) to reflect energy saving designs, and it lays out requirements such as minimum energy performance. Only those energy using products that satisfy the requirements and conforming to the standards of Ecodesign (as indicated on a CE mark) will be allowed to enter the EU market. (Those that fail to meet the requirements will be terminated from sales.)

Website: ec.europa.eu/enterprise/eco_design/index_en.htm

Characteristics Mandatory scheme

Target products

Vacuum cleaners, clothes dryers, household dish washers, household washing machines, household refrigerators, ventilators, electric motors, household air-conditioners, lighting equipment, adapters and chargers, TVs, computers, etc. (11 products).

Implementing organization EU Commission

2 Energy Label

Overview

The Energy Label is a mandatory scheme showing the level (A to G) of energy efficiency so that consumers can identify the energy performance of products when they make purchasing decisions. Manufacturers shall submit relevant documents including the specifications of their products, and test reports to prove the accuracy of the information on the energy label. If the accuracy of the energy information on an energy label were in question, then the manufacturer must provide grounds for the contents included on the label to the EU Commission.

Website: europa.eu/legislation_summaries/consumers/product_labelling_and_packaging/132004_en.htm

Energie		Waschmaschine
Hersteller Modell		ABC 123
Niedriger Energieverbrauch	A	A
Hoher Energieverbrauch	G	
Energieverbrauch kWh/Waschprogramm		0.95
Wasserverbrauch l/Waschprogramm		49
Geräusch dB(A) bei 1m		49

Characteristics Mandatory scheme

Target products

Lighting equipment, vacuum cleaners, clothes dryers, household dish washers, household washing machines, household refrigerators, household air-conditioners, hot water suppliers, boilers, TVs, and wine storage devices (11 products).

Implementing organization EU Commission

3 Japan

The Japanese government is operating the Top Runner Program which mandates products to meet a target energy efficiency within a certain period specified by the government. The Top Runner Program is the flagship energy efficiency program of the Japanese government and is widely recognized by the international community.



1 Top Runner Program

Overview

The program sets target energy efficiency equivalent to the highest efficiency products and then regulates products to meet the target efficiency within a specified period. Measures are taken against manufacturers that fail to achieve the target efficiency including advisory measures, public announcements of violations, and fines.

Website: www.eccj.or.jp/top_runner

Characteristics

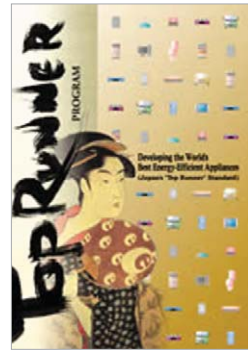
Mandatory scheme

Target products

Air-conditioners, refrigerators, freezers, electric rice cookers, microwaves, lighting equipment, bidets, computers, copiers, gas fired hot water suppliers, vending machines, transformers, etc. (28 products)

Implementing organization

Ministry of Economy, Trade and Industry



2 Uniform Energy Saving Label

Overview

The energy saving performance is displayed from one to five stars. More stars indicates more energy efficient products. Labeling standards are associated with the Top Runner Program.

Website: www.eccj.or.jp/labeling_program

Characteristics

Voluntary scheme

Target products

Air conditioners, refrigerators, lighting equipment, bidets, and TVs (5 products).

Implementing organization

Ministry of Economy, Trade and Industry



3 Energy Saving Label

Overview

Out of the 28 products targeted by the Top Runner Program, 18 are subject to the Energy Saving Label. The Energy Saving Label indicates the degree to which products have satisfied the target efficiency set by the government.

Website: www.eccj.or.jp/labeling



Characteristics

Voluntary scheme

Target products

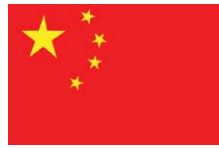
Air conditioners, refrigerators, freezers, lighting equipment, bidets, TVs, stoves, gas cooking equipment, electric rice cookers, etc. (18 products).

Implementing organization

JIS

4 China

China, one of the world's most industrious countries, is implementing and rapidly strengthening its energy standards and labeling program. China has an important role to play in the lighting sector, for example, since it supplies most of world's lighting equipment.



1

Minimum Energy Performance Standards

Overview

The program aims to prohibit the production and sales of low efficiency products in order to phase out low efficiency products from the market.

Website: www.cnis.gov.cn

Characteristics Mandatory scheme

Target products Refrigerators, air-conditioners, fluorescent lamps, three-phase induction motors, etc. (14 products).

Implementing organization CNIS



2

Energy Standards and Labeling Program

Overview

The program mandates manufacturers and importers to indicate the efficiency of their products on a label within a range from 1st grade to 5th grade. The 1st grade indicates the highest energy efficiency products. In case of violations, public announcements of the violation are issued, and correction orders and other administrative measures shall be taken accordingly. A fine up to one million CNY may be imposed for a violation.

Website: www.cnis.gov.cn

Characteristics Mandatory scheme



Target products

Refrigerators, room air-conditioners, household washing machines, single package air-conditioners, self-ballasted fluorescent lamps, coolers, heat pumps, electric hot water suppliers, ovens, monitors, copiers, rice cookers, AC pans, AC electric motors, transformers, ventilators, flat TVs, microwaves, printers, fax machines, and digital TV signal receivers (28 products).

Implementing organization China National Institute of Standardization(CNIS)

5

Canada

Canada has one of the best efficiency standards and energy labeling schemes in the world. Due to its cold climate, Canada's efficiency management of heating appliances is well developed compared to other countries. In many cases, Canada's energy labeling schemes are very similar, in terms of measurement methods and standards, to the ones of the USA, its closest neighboring country.



1

Minimum Energy Performance Standards (MEPS)

Overview

The MEPS program aims to ban the production and sales of low efficiency products in order to phase-out low efficiency products from the market.

Website: <http://www.nrcan.gc.ca/energy/regulations-codes-standards/6859>

Characteristics Mandatory scheme

Target products

Clothes dryers, washing machines, dehumidifiers, dishwashers, microwaves, freezers, gas ranges, dryers, refrigerators, wine storage devices, electric water heaters, gas water heaters, oil-fired water heaters, electric boilers, gas furnaces, gas stoves, gas boilers, air-conditioners, ceiling fans, self-ballasted fluorescent lamps, ballasts for fluorescent lamps, audios, adapters, external power suppliers, video players, TVs, ice makers, freezers, transformers, electric motors, vending machines, commercial refrigerators, commercial freezers, etc. (45 products).

Implementing organization Natural Resources Canada

2

EnerGuide Label

Overview

The program is implemented as a mandatory scheme requiring manufacturers and importers to display the power consumption of energy-using products. The aim is to promote the adoption of energy-saving products by enabling consumers to easily compare energy efficiencies. Imported products and products destined for the domestic market must obtain an EnergyGuide label issued by the certification institute that is designated by the Standards Council of Canada.

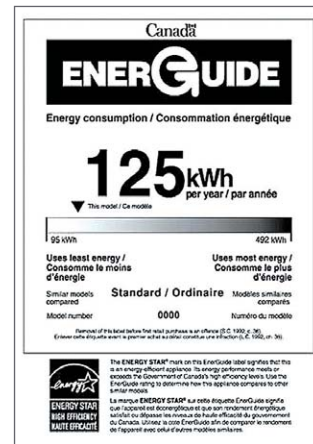
Website: <http://www.nrcan.gc.ca/energy/regulations-codes-standards/6859>

Characteristics Mandatory scheme

Target products

Refrigerators, air-conditioners, washing machines, clothes dryers, microwaves, dish washers, etc. (12 products).

Implementing organization Natural Resources Canada



6

Australia

With its high dependence in imports goods, Australia operates one of the strictest and most exemplary energy standards and labeling programs. Australia's standards and labeling programs can be regarded one of the best programs in the world.



1

MEPS

Overview

The MEPS program aims to ban the production and sales of low efficiency products in order to phase-out low efficiency products from the market.

Website: www.energyrating.gov.au

Characteristics Mandatory scheme

Target products

Refrigerators, air-conditioners, showcases, transformers, three-phase induction motors, electric water heaters, gas water heaters, external power suppliers, set-top boxes, TVs, ballasts for fluorescent lamps, self-ballasted fluorescent lamps, incandescent lamps, clothes dryers, washing machines, dish washers, refrigerators, freezers, computers, monitors, EHP, etc. (23 products).

Implementing organization

Department of Climate Change and Energy Efficiency (DCCEE)

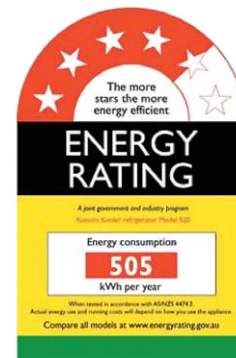
2

The Energy Rating Label

Overview

The Energy Rating Label indicates the power consumption and energy efficiency level of products so that consumers can compare efficiencies and buy energy saving products. More stars indicates higher energy efficiency.

Website: www.energyrating.gov.au

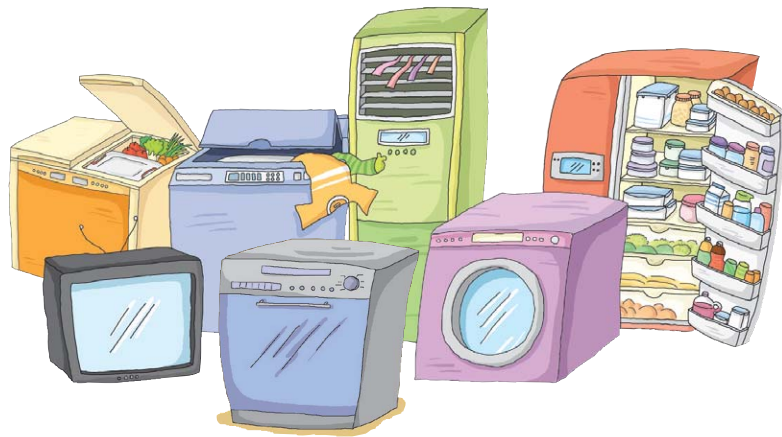


Characteristics Mandatory scheme

Target products

Refrigerators, freezers, air-conditioners, washing machines, clothes dryers, dish washers, TVs (7 products).

Implementing organization AGO



International Energy Labels & Standards

