

# Republic of Korea

## Case Study : Efficiency Management of Energy-Using Appliances

### 1. Introduction

Household appliances, office equipment, lighting appliances, heating apparatus and automobiles that we are using in our daily lives spend certain amounts of energy. However, products differ in their energy consumption.

There may be many ways to raise energy efficiency nationwide, but one way is to pursue energy saving from the source by inducing manufacturers to supply more energy-efficient products.

#### <Energy Efficiency Program>

Energy Efficiency Standards & Labeling Program	Certification of High efficiency Energy-using Appliances Program	e-Standby Program
<ul style="list-style-type: none"><li>- Implemented since August 1992</li><li>- Promote energy efficiency</li></ul>	<ul style="list-style-type: none"><li>- Implemented since December 1996</li><li>- Promote high efficiency equipment</li></ul>	<ul style="list-style-type: none"><li>- Implemented since January 1999</li></ul>



improvement and minimum efficiency applied	and appliances	- Save standby power
- Energy efficiency grade label used	- Certificate and label issued for highly efficient equipment and appliance	- Attach Energy Saving Label
- 17 items including refrigerators	- 33 items including ballast	- 18 items including computers and TVs
- Mandatory labeling	- Voluntary Agreement (VA)	- Voluntary Agreement (VA)

Currently, the Ministry of Commerce, Industry and Energy (MOCIE) and Korea Energy Management Corporation (KEMCO) are operating 3 energy efficiency programs. They are the Energy Efficiency Standards & Labeling Program, Certification of High efficiency Energy-using Appliances Program, and e-Standby Program.

#### < List of Energy Efficiency Program Items >

Category	Purpose	Items
Energy Efficiency Standards & Labeling Program	Increase energy efficiency, apply minimum efficiency	Refrigerators, air conditioners, washing machines, drum type washing machine, electric fans, domestic gas boilers, incandescent light bulbs, fluorescent lamps, Ballasts for Fluorescent Lamps, compact fluorescent lamps, electric water dispensers, dishwashers, kimchi refrigerators, electric rice cookers, freezers, vacuum cleaners, motor vehicles (17 items)
Certification of high	Supply high-	High efficiency induction motors, 26 ? 32W fluorescent



efficiency energy-using appliance program	efficiency equipment and appliances	lamps, ballast for 26 ? 32W fluorescent lamps, compact fluorescent lamps, reflectors for fluorescent lamps, sensor lighting equipment, heat recovery ventilator, airtight window frames, gas boilers for industrial buildings, domestic gas boilers, high-efficiency pumps, centrifugal water chillers, uninterruptible power supply system, vending machines, transformers, T-5 fluorescent lamps, electronic ballasts for metal halide lamps, electronic ballasts for sodium lamps, high efficiency inverter, LED traffic lights, single-phase induction motor, ballast for 16mm fluorescent lamps, metal halide lamps, reflectors for HID lamps, oil-burning boilers, etc (33 items)
e-standby program (Energy Saving Label)	Reducing standby power	Computers, monitors, printers, facsimiles, photocopiers, scanners, multifunction devices, TVs VCRs, audios, DVD players, microwave ovens, mobile phone battery chargers, set-top boxes, DC power supply, cordless and fixed-line telephones, etc (18 items)

Improve energy efficiency and apply minimum efficiency standards

17 items including refrigerators, air conditioners, and motor vehicles

Mandatory

Energy Efficiency

Standards & High-efficiency

Labeling Program equipment and appliance labeling

Supply highly efficient devices





Efficiency  
Management  
Systems to  
Expand Supply  
of  
Energy-  
efficiency

Equipment and  
Appliances

Certification of  
High efficiency  
Energy-using  
Appliances  
Program

33 items including  
induction motors,  
boilers, pumps,  
lighting equipment, etc



VA  
High-efficiency  
equipment and  
appliance labeling and  
certification

Standby power cut  
18 items including  
computers, printers,  
photocopiers, TVs,  
VCRs



e-Standby Program  
(Energy Saving  
Label)

VA  
- Recognizes self-  
testing by  
manufacturers  
Energy Saving Label



## **A. Energy Efficiency Standards & Labeling Program**

The Energy Efficiency Labeling program is a mandatory system for all manufacturers and importers that involves indicating the energy efficiency grade from the 1st to 5th grade on products that consume much energy and has high market penetration according to the products' energy efficiency and energy consumption. Generally speaking, the 1st grade products can save up to 30% to 40% of energy than the fifth grade products. The Energy Efficiency Labeling Program and minimum efficiency standards are applied on household appliances, lighting equipment and motor vehicles.



## **B. Certification of High Efficiency Energy-using Appliances Program**

The High Efficiency Energy-using Appliances Program is an efficiency guarantee system for products above certain standards, paving the way to increase the supply of high efficiency energy equipment. For the certified products, the High Efficiency Equipment Label is attached and Certification issued for High Efficiency Energy Equipment. Specifically, the system is applied to items such as induction motors, boilers and lighting appliances, etc.

## **C. e-Standby Program**

The e-Standby Program has the purpose of facilitating the supply of energy-saving products that decrease electric consumption while in standby, based on voluntary participation by manufacturers. An Energy-Saving Label is attached to products that meet energy-saving standards suggested by the Korean government. The Program is focused on electronic appliances including those for office/household use.

## **2. Energy Efficiency Standards & Labeling Program**



## **A. Implementation of Energy Efficiency Labeling Program**

Before the current Energy Efficiency & Standards Labeling Program was implemented, energy efficiency was “marked” rather than “graded”. The energy efficiency of energy-using appliances was made public to consumers to elicit the purchase of energy-saving products. In line with that, the energy efficiency system had been in place since the 1st Oil Shock to facilitate the development of energy-saving products by manufacturers.

In particular it became mandatory to display heat efficiency when approving heat-using equipment such as boilers in compliance with a law on managing heat that was legislated in 1974. With the legislation of the Rational Energy Utilization Act in December 1979, displaying energy efficiency in advertisements as well as on the product itself was required. Moreover, products subject to energy efficiency labeling continued to be expanded, leading to 16 heat-using items such as boilers, oil heaters and gas cookers being subject to the stipulations.

Electric appliances such as electric heaters were required to mark the energy efficiency figure on the surfaces and got approval under 1974 Electric Appliances



Safety Control Act. The items subject to them were about 210 products such as electric heaters, televisions and air conditioners.

From January 1981, the above law required 5 items including refrigerators to have their monthly energy consumption measured by an approved testing institute and marked them on the products. From January 1985, monthly energy consumption was required to be displayed even in product advertisements, thereby allowing consumers to select energy-saving products.

With the above Energy Efficiency Labeling Program implementation, competition among manufacturers resulted in the active development and spread of superior energy-saving appliances and consumers were encouraged to choose the energy-saving products, which led to firm establishment of the program in Korea.

However, consumers lacked detailed knowledge of energy efficiency and had to take trouble to research on energy efficiency figures by themselves when choosing the product, thus it was not widely recognized among consumers.



To solve this issue fundamentally, a new Energy Efficiency Labeling Program was implemented. Under the new program, a certain standard was set for each product and a corresponding grade was issued according to its energy efficiency or energy consumption.

## **B. Energy Efficiency Grade Labeling Program**

The Energy Efficiency Grade Labeling Program involves an energy efficiency grade labeling from Grade 1 (high efficiency) to Grade 5 (low efficiency) on products according to the energy efficiency of a product, thereby enabling the consumer to easily select energy-saving appliances. Introduced on December 14, 1991 following the revision of the Rational Energy Utilization Act, it was implemented full-scale from September 1, 1992 through revision of relevant regulations.





The revised "Rational Energy Utilization Act" required the setting of energy efficiency standards and grade labeling for energy-using equipment that consume considerable amount of energy and are widely used in the market. Items such as refrigerators, air conditioners, passenger cars, lighting equipment and other products were designated as subject appliances.

An efficiency grade was applied and issued to refrigerators and passenger cars from September 1, 1992. Items subject to the program were expanded to include incandescent light bulbs and fluorescent lamps from October 1, 1992. As of May 2005, 17 items including motor vehicles are included.



Under the early scheme of program, a manufacturer had to take a efficiency test of its product by a government-approved testing institutes and submitted the test report to KEMCO and then KEMCO reviewed it and issued the grade. From June 1, 1993 the scheme was changed to a simpler one in which the manufacturers submit the test report to KEMCO just for reference and attach the label on their products themselves.

KEMCO implements follow-up measures such as annual product/factory/store inspections to check if the performance of each product matches the reported grade and if the manufacturer keeps labeling requirements to protect the consumer.

The current labeling program is obligating manufacturers or importers to attach labels on their products before they are shipped from the warehouse or cleared customs after taking the efficiency test by authorized institutes such as Korean Agency for Technology and Standards and Korea Testing Laboratory.



Since its first implementation for refrigerators and lighting equipment in 1992, the subject item was expanded to: air conditioners in 1993; ballasts for fluorescent lamps in 1994; compact fluorescent lamps, linear 32W, circular 32W, 40W fluorescent lamps, ballasts for linear 32W, circular 40W fluorescent lamps in 1999; domestic gas boilers in 2000; dishwashers and electric water dispensers in 2002; electric rice cookers, compact fluorescent lamps, kimchi refrigerators in 2004. The subject items will be expanded continuously in the future.

Also, to expand the items and enhance the effectiveness of the program, the efficiency improvement trends of subject items were analyzed and efficiency/grading standards were adjusted in 1995. The revised Rational Energy Utilization Act in 1997 required the products failed to meet minimum efficiency standards or maximum energy use to improve their efficiency or energy use within 6 months. For products that failed to improve without a reasonable cause, their production or sale was prohibited. If the ban was violated, the product was subject to a fine of up to 20 million Korean Won.



< Status of Efficiency Grade Labeling >

(As of December 31, 2002)

Category	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total
Refrigerators	846 (60.6%)	269 (19.3%)	164 (11.8%)	43 (3.1%)	73 (5.2%)	1,395 (100%)
Air Conditioners	1,110 (64.1%)	463 (26.7%)	120 (6.9%)	30 (1.7%)	8 (0.5%)	1,731 (100%)
Washing Machines	320 (97.0%)	6 (1.8%)	2 (0.6%)	1 (0.3%)	1 (0.3%)	330 (100%)
Incandescent Light Bulbs	2 (1.1%)	54 (28.6%)	109 (57.7%)	24 (12.7%)	-	189 (100%)
Fluorescent Lamps	43 (12.5%)	90 (26.1%)	81 (23.5%)	64 (18.6%)	67 (19.4%)	345 (100%)
Ballasts for Fluorescent Lamps	1 (0.1%)	533 (45.7%)	239 (20.5%)	212 (18.2%)	182 (15.6%)	1,167 (100%)
Compact Fluorescent Lamps	291 (44.6%)	302 (46.3%)	38 (5.8%)	14 (2.1%)	7 (1.1%)	652 (100%)
Domestic Gas Boilers	1,296 (99.7%)	3 (0.2%)	1 (0.1%)	-	-	1,300 (100%)



Dishwashers	160 (93.6%)	10 (5.8%)	1 (0.6%)	-	-	171 (100%)
Electric Water Dispensers	40 (30.3%)	46 (34.8%)	44 (33.3%)	2 (1.5%)	-	132 (100%)
Total	4,109	1,776	799	390	338	7,412
Ratio (%)	55.4	24.0	10.8	5.3	4.6	100

### C. Energy Efficiency Standards Program

Based on MOCIE Notification 1993-13(Regulation on setting energy efficiency standards and labeling energy efficiency grade), minimum and target efficiency standards were assigned for appliances such as refrigerators and air conditioners to be met within a certain period of time. It was implemented with the Efficiency Grade Labeling Program but currently was integrated into the MOCIE Notification "Regulation on the operation of equipment and appliances "



# Republic of Korea

## 3. Certification of High Efficiency Energy-using Appliances Program

Increased use of high-efficiency equipment is essential for energy conservation in public sector. To the end, appliances with much energy saving and high economical efficiency have been designated as High Efficiency Energy-using Appliances and their use by public sector was made mandatory through the Certification of High Efficiency Energy-using Appliances Program.

The Korean government in December 1996 legislated the Regulation on the Promotion of High-Efficiency Energy Equipment and Appliance Supply in December 1996. Starting with the fluorescent lamp and ballasts, among 6 items as of May 2005, 33 items have been designated as high efficiency equipment. Central and local governments as well as government-invested institutions and other public institutions are required to use such items.



< Certificate Application Procedure >



Authorized Test Institute	?? Test Requested	Applicant	? Certificate Application?	Korea Energy Management Corporation
	? Test Report?		?? Certificate Issued	

< Status of Certification Item Expansion >

	No. of Items	Items
MOTIE  Notification  1996-462  Dec. 28, 1996	6	High-efficiency induction motors, 26mm32W fluorescent lamps, ballasts for 26mm32W fluorescent lamps, compact fluorescent lamps, etc
MOCIE  Notification  1998-63  Jul. 7, 1998	2	Heat recovery ventilators, airtight window frames
MOCIE  Notification  1999-84  Aug. 7, 1999	6	High-efficiency pumps, centrifugal water chillers, uninterruptible power supply system, gas boilers for industrial buildings, domestic gas boilers
MOCIE  Notification	5	Transformers, vending machines, T-5 fluorescent lamps, electronic ballasts for metal halide lamps, electronic ballasts for sodium lamps



2000-103		
Sept. 28, 2000		
MOCIE		
Notification		
2001-153	3	Inverters, thermostats, LED traffic lights
Dec. 31, 2001		
MOCIE		
Notification		
2002-86	1	Multi-function Type Switchgear System
Sept. 16, 2002		
MOCIE		
Notification		
2003-28	5	Direct-fired Absorption water Chillers-Heaters, single-phase induction motors, ventilators, centrifugal blowers, ballasts for 16mm fluorescent lamps
Mar. 12, 2003		
MOCIE		
Notification		
2004-6	3	Underwater pump for aeration, metal halide lamps, reflectors for HID lamps
Jan. 20, 2004		
MOICE		
Notification		
2004-69	1	Ballast for FPL 32W compact fluorescent lamps
Jun. 30, 2004		



MOCIE		
Notification	2	Ballast for FPL 32W compact fluorescent lamps,
2005-29		oil-burning boilers
Mar. 11, 2005		
Total	33	

< Status of certification for each item >

Category	No. of certified companies				No. of certified models			
	1999	2000	2001	2002	1999	2000	2001	2002
High-efficiency induction Motors	3	2	5	4	75	73	120	153
26mm32W fluorescent lamps	8	9	9	8	18	27	42	37
Ballasts for fluorescent lamps	30	34	35	47	69	102	114	176
Compact fluorescent lamps	2	1	4	5	2	2	7	13
Reflectors	18	25	25	27	56	97	121	133
Sensor Lighting equipment	11	19	24	22	17	29	33	34
Heat recovery ventilators	2	3	3	2	2	3	4	4
Airtight ventilators	6	7	12	11	25	29	54	58
Energy-saving devices for monitors	1	2	2	2	1	5	5	4
Gas boilers for industrial buildings	3	5	6	8	4	19	75	85
Domestic gas boilers	-	6	11	11	-	76	257	313
High-efficiency pumps	-	1	5	5	-	1	8	8
Uninterruptible power supply system	-	2	6	7	-	6	18	22
Transformers	-	1	3	8	-	13	35	88
Thermostats	-	-	-	4	-	-	-	5
High-efficiency inverters	-	-	-	6	-	-	-	150
Vending machines	-	-	-	1	-	-	-	2
T-5(16mm) fluorescent lamps	-	-	-	1	-	-	-	2
LED traffic lights	-	-	-	2	-	-	-	14
Total	84	117	150		269	482	893	



To facilitate the wider use of certified products, the government provides manufacturers with installation loan of up to 20 billion Korean Won and operation loan of up to 1 billion Korean Won. The terms are 3-year grace period, 5-year repayment with annual interest rate of 2.75% (floating rate). Purchasers of the certified products are also qualified for the same loan.

Moreover, all public institutions are required to use high-efficiency products when constructing or renovating their buildings under the 'Energy saving Guide for Public Institutions' (Prime Minister's Order 2005-5, February 28, 2005). The new buildings of over a certain scale in private sector is required to use highly efficient lighting equipment in by the 'Design standards for energy saving in buildings' (Ministry of Construction and Transportation Notification 2003-314). To promote the wider use of such highly efficient items, the Public Procurement Service (PPS) revised its regulation on energy equipment procurement to award bonus points to highly efficient energy equipment in May 31, 2001. As a result, the use of highly efficient equipment has been gradually expanding with rise of awareness for high-efficiency equipment among public institutions.



To promote the use of high efficient equipment, the equipment list has been distributed among public institutions. The government is planning to continuously pursue the spread of high-efficiency equipment policy through expanding the mandatory use of high efficiency equipment.



## Republic of Korea

### 4. e-Standby Program

Office equipment and home appliances are often turned on all day with much shorter time of actual use, thus consuming much electricity in standby mode. Since April 1 1999, 17 products that are widely used in Korea such as computers, monitors, printers, facsimiles, photocopiers, televisions, VCRs are subject to the Energy Saving Label Program which recommends them to be switched to energy-saving mode during standby status.

The Energy Saving Label Program was initiated to popularize energy-saving products that can save standby power under the Article 13 of the Rational Energy Utilization Act and MOCIE Notification "Regulation on Energy-saving Office Equipment & Home Electronics Program" since April 1, 1999. The program intends to save electricity from the source through voluntary production and supply of energy saving products that meet government standards by the manufacturers. In particular, this program is based on Voluntary Agreement between manufacturers and government in which scheme the government recognizes the manufacturers' self test result and manufacturers guarantee the



energy saving of their products. The Energy-saving Label is used as a guarantee to show that the labeled product saves energy. The number of subjected items is 18 including computers, monitors, printers, facsimiles, photocopiers, scanners, multifunction devices, energy-saving and control devices, televisions, audios, DVD players, microwave ovens, mobile phone battery chargers, set top boxes, DC power supply, cordless and fixed-line telephones.

Products with the Energy-Saving Label can save energy up to 30-50% compared to other products. The Korean government is facilitating its widespread use through incentives for energy-saving products such as preferential purchase by the PPS and mandatory use in public institutions.

As of 2003, 92 businesses including Samsung Electronics and LG Electronics have participated in the Energy-Saving Label Program, with 2,973 models registered as energy-saving products and awarded the Label. Details on such products can be found on the Energy Efficiency Program Internet network (<http://www.kemco.or.kr/efficiency>) operated by the KEMCO.



<Status of energy-saving office equipment/home appliance registered items>

As of 2003

Items		Total	
		No. Companies	No. Models
Office Equipment	Computers	22	339
	Monitors	36	786
	Printers	26	437
	Facsimiles	9	56
	Photocopiers	6	63
	Scanners	3	35
	Multifunction devices	11	107
	Energy-saving and Control Devices	9	13
Home Appliances	TV	6	655
	Videos	4	214
	Audios	1	2
	DVD Players	3	10
	Microwave Ovens	3	205
	Mobile Phone Rechargers	8	37
	Set Top Boxes	4	14
Total			2,973

During the first five years of the Energy-Saving Label Program (1999~2003), a total of 59 million units of energy-saving office equipment and home appliances were supplied, contributing to energy savings of 3,891GWh (430 billion Korean Won) and power demand reduction of 1.5 million kW and CO2 emissions



reduction of 510,000 TC. The market share of the products was also very high, reaching 50%.

< Supply Status of the Energy Saving Label Products>

1999	2000	2001	2002	2003	Total (1999~2003)
4.15 million (43%)	8.28 million (66%)	12.53 million (65%)	15.78 million (56%)	18.11 million (56%)	58.8 million

Moreover, with the implementation of the program, standby power consumption was greatly reduced. For example, standby power consumption of TV and videos dropped to 2-3W level in 2003 from 7~10W level in 1999).



< Results of the Energy Saving Label Program (1999~ 2003) >

Unit: Korean Won

Category	Energy		2003				Aggregate Energy Saving (1999~2003)		
	Saving/unit		Energy Saving (C=A×B)				Aggregate Market Supply	Aggregate Savings	Aggregate Savings (Won)
	Saving (A)	%	Market Supply (B)	Market Share	Annual Savings	Annual Savings (Won)			
Computer	81kWh	47%	774,855	30%	62GWh	6.9 billion	5,595,893	453GWh	49.9 billion
Monitor	163kWh	64%	1,503,246	50%	245GWh	27 billion	9,424,439	1,536GWh	169 billion
Printer	113kWh	30%	752,828	40%	85GWh	9.4 billion	4,791,444	541GWh	59.6 billion
Facsimile	181kWh	50%	164,784	40%	30GWh	3.3 billion	670,060	121GWh	13.3 billion
Photo-copier	484kWh	61%	20,382	25%	10GWh	1.1 billion	159,016	77GWh	8.5 billion
Scanner	30kWh	54%	26,072	21%	1GWh	0.1 billion	98,611	3GWh	0.3 billion
Multi-function Devices	1424kWh	60%	301,335	35%	429GWh	47.2 billion	365,271	520GWh	57.2 billion
Energy-saving and Control Device	195kWh	23%	24,316	-	5GWh	0.5 billion	1,097,551	214GWh	23.5 billion
TV	25kWh	10%	2,313,603	85%	57GWh	6.3 billion	8,836,987	221GWh	24.3 billion
Video	37kWh	60%	352,945	87%	13GWh	1.4 billion	2,691,432	100GWh	11 billion
Audio	36kWh	17%	-	-	-	-	-	-	-
DVD Player	37kWh	57%	50,061	10%	2GWh	0.2 billion	55,061	2GWh	0.2 billion



Microwave Oven	15kWh	24%	830,244	93%	12GWh	1.3 billion	2,238,507	34GWh	3.7 billion
Mobile Phone Battery Charger	3kWh	24%	10,948,856	61%	28GWh	3 billion	22,742,357	68GWh	7.5 billion
Set-top Box	63kWh	22%	42,350	6%	3GWh	0.3 billion	42,350	3GWh	0.3 billion
Total			18,105,877	56%	982GWh	108 billion	58,808,979	3,891GWh	428 billion

N.B. power rate : 110 Korean Won/kWh

## 5. The Energy-Saving Label

The Energy-Saving Label was proposed by ? The National Energy-Saving Promotion Committee? on May 27, 1998 and the design was finalized through a contest to promote the widespread use of energy saving products and to publicize the rational use of energy project. The Energy-Saving Label can be used by certified products, companies or organizations, and its use is limited to those with authority in energy saving.

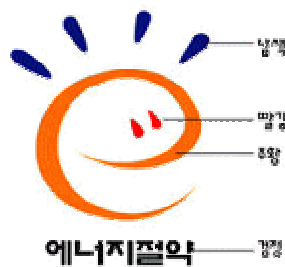
< Explanation of the Energy-Saving Label >





The Energy Saving Label is nicknamed as 'Energy Boy' with which all the people, from children to seniors are familiar and can be aware of the necessity of the energy saving. It is a graphic depiction of the letter 'e' for energy and expression of realization, delivering the idea of 'Ah! Energy Saving!' A product bearing the label demonstrates that it is an 'energy saving product' and workplace with it means 'the site makes efforts to save energy'.

#### < Label Colors >



Category	Korea Standard Colors	Munsell Signal	4 Primary Colors
Orange	KS 0187	2.5YR 6/14	Magenta 50%, Yellow 100%
Red	KS 0106	7.5R 5/16	Magenta 90%, Yellow 100%
Deep Blue	KS 1102	5PB 3/10	Cyan 100%, Magenta 70%
Black		N1	Black 100%



## **Republic of Korea**

### **6. Energy Saving Circuit Exhibition**

The Energy-Saving Circuit Exhibition Tour was first held at the Seoul Lotte Department Jamsil Store in April 2000 to raise public awareness of energy saving and popularize high efficiency equipment as an effort to respond to high oil prices and climate change issue. The Exhibition gave an opportunity for visitors to compare with their own eyes the difference in energy consumption between high-efficiency products and others and experience energy saving effect and amount in figures using energy-using equipment and appliances by themselves.

The Exhibition, which has been held around the major cities of Korea every year since 2000, consists of 'Comprehensive Information on Energy Saving', 'New and Renewable Energies', 'Standby Power', 'High-efficiency Lighting Equipment', 'Economic Industry Facilities', and 'Cooking Appliances and Insulation, Miscellaneous' booths. All exhibits have panels, models and comparison exhibits of actual energy saving of products. KEMCO experts provide energy-saving advice and information to the



audience, making the event an opportunity to experience and learn comprehensive energy saving.

Unlike other exhibitions, it is held in connection with other events like Korea Science Festival, International Exhibition on Precision Engineering, Machine Tools and Metalworking Technology, and actively seeks the visitors by choosing venues with much traffic such as department stores and subway stations. Through the Exhibition, the visitors can learn a wide range of energy saving habits that can be applied in daily life and tips on choosing efficient products. Thus it is hoped that the Exhibition will be an opportunity to renew awareness of the importance of energy saving.

In particular, the waste of electricity caused by the so-called “power vampire”, that is, standby power is demonstrated in quantified figures and tips to save an average 10% of electricity per household are also informed. Furthermore, specific application cases of new and renewable energy in daily life are displayed in the exhibition.



# Republic of Korea

## 7. Standby Power 1W Program

Energy is often wasted even in times when the appliances are not in use. The most prominent example is standby power, which consumes valuable energy.

Standby power, dubbed as "Power Vampire," is much greater than it seems. The TV, VCR, audio, DVD player, set-top box, microwave oven, mobile phone battery charger, etc is more often just plugged in even when they are not in use, thus resulting in waste of energy. Just figuring out how many times we use the microwave oven during 24 hours will make clear the loss of energy from standby energy. In case of VCR, standby power takes up to 80% of total electricity consumption.

### < Types of Standby Power >

Category	Concept	Power Status	Machinery	Remarks
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No Load	Power consumed while appliance is plugged in	-	Mobile phone battery chargers, DC power supply	<b>Main Targets of 1W Program</b>
Off	Power consumed after appliance is turned off using the "Power" Button (0~ 3W)	Turn-Off	TVs, videos, audios, DVD players, microwave ovens, PC monitors, printers, photocopiers	
Passive Standby	Power consumed after appliance is turned off using the remote control. Korean energy saving label standards are on the 3W level	Turn-Off	TVs, videos, audios, DVD players	
Active Standby	Digital equipment connected by a network uses 20-30W of standby power as they are not turned off even after the power button has been pressed (The consumer assumes they are turned off)	Turn-Off	Digital TVs, set top boxes, home network appliances	Expected to emerge as a large issue in standby power
Sleep	Power consumed during standby while the equipment is turned on	Turn-On	PC, monitors, printers, facsimiles, photocopiers, scanners, multifunction devices	When in power-saving mode (17" CRT monitor: 85W? 4W)



According to the IEA, 5 euros of social costs is spent for every 1W of standby power. Even now, 300 million units of electrical appliances are wasting energy as standby power, which clearly illustrates the gravity of the standby power issue.

The average standby power used by electrical appliances in Korea is 3.66W, or 306kWh annually per household (11% of household electricity use). This accounts for 1.7% of total national power consumption (4,600GWh), or a waste of 500 billion Korean Won, or 1 atomic power plant in the 1 million kW range in operation for idle appliances.

The Korean government and KEMCO launched the ambitious "Standby Power 1W Program," a long-term national initiative to lower the standby power of electronic appliances sold in Korea to below 1W until 2010 as a fundamental energy saving measure. Standby Korea 2010, a roadmap for cutting standby power will be established by the end of 2005. And the achievement target for each equipment and each stage will be reflected in the master plan taking into consideration the technological level and policy adaptation period of relevant industries. 22 institutes including consumer groups, electronic appliance



manufacturers and policymakers are participating in the "Standby Power 1W Program Implementation Committee," to provide advice on the roadmap.



The regulation of standby power in household appliances is emerging as a new trade barrier as major developed countries like the U.S. and Europe are requiring power saving function as essential part of household appliances. Therefore, the "Standby Power 1W Program" is expected to contribute greatly to improve the competitiveness of Korean industry by the development of energy saving technologies.