

# LG ELECTRONICS ENERGY SAVING PRODUCTS

*When using LG Electronics' products that provide energy savings, the reduction in greenhouse gas could potentially have effects similar to the planting of trees.*



## ● Tree Conversion Standard

1. Compared energy consumption between models (Based on LG Electronics' lab test)
2. Converted the amount of energy saving into greenhouse gas (Based on World Resource Institute 2007, 0.573kgCO<sub>2e</sub>/kWh)
3. Converted the amount of greenhouse gas into the number of trees (Based on EPA tree planting effect, 3.86kgCO<sub>2</sub>/1 coniferous tree)



**2,042 Trees**

Air Conditioner, ARUB100TL2  
(Compared with ARUB100BT1)



**39 Trees**

Refrigerator, R-T686UHLW  
(Compared with 2007 RT691GH)



**7 Trees**

Washing Machine, FR3228WA  
(FR3228WA when using steam)



**8 Trees**

Notebook, XNOTE S210  
(Compared with 2007 XNOTE Z1)



**5 Trees**

LCD Monitor, W2252TE  
(Compared with 2006 L226WU)



LG Electronics tries to make not only mobile phones with green features, but also phone accessories.

Since being the first in the world to introduce the CDMA mobile phone in 1996, LG Electronics has continuously offered high-tech mobile communications technology. This has enabled LG Electronics to establish itself as a leading mobile device provider in the mobile industry. Equipped with refined designs and superior technology, our mobile phones have caught the attention of the world by creating new trends through careful research into customer needs. These trends include not only cutting-edge technology but eco-friendly features as well. Such eco-friendly features include reducing the amount of environmentally unfriendly substances in the products, limiting the use of the Earth's resources by developing super lightweight products, increasing the use of recyclable materials, and developing battery chargers that consume less standby power to help reduce energy use. In order to allow consumers to easily recycle their old mobile phones, we established 392 recycle drop sites in forty-five countries. New eco-friendly technologies that are either currently being applied to mobile phones or are being developed are listed below.



**1996**  
 First in the World to Introduce CDMA Mobile Phones  
 [LDP-200]

**2004**  
 First in Korea to Receive the Mobile Phone Environmental Performance Labeling Certificate  
 [LG-SD230]

**2006**  
 All Products Shipped Satisfied RoHS (beginning in July 2006),  
 First in Korea to Receive RoHS Certifications (TÜV) for a Mobile Phone  
 [Chocolate(KG800)]

**2007**  
 Voluntarily Completed Establishment of Take-back Systems in 45 Countries World-wide  
 [Shine(KE970)]

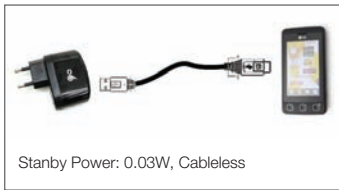
**2009**  
 Introduced a Greener Mobile Phone at the Mobile World Congress  
 [Watch phone(GD910)]

● **Reducing Hazardous Substances**

Since July 2006, all of our mobile phones and accessories marketed around the world have met the EU RoHS requirements. We are also trying to reduce the use of halogens (i.e., bromine, chlorine), PVCs, BFRs, and CFRs, all of which are believed to negatively impact humans. We plan to steadily expand these efforts to other components. Additionally, we have established a schedule for eliminating the use of phthalates, which are mainly used in outer layers of electrical cables as a plasticizer, and antimony, which is a nonflammable material. We are currently developing substitutes for these substances.

**Anticipated Phase-Out Schedule for Certain Hazardous Substances other than the 6 Major RoHS Substances**

Hazardous Substance		New Models (Year)	All Models (Year)
Halogen	PVC	2010~	2012~
(Bromine, Chlorine)	BFR, CFR		
Phthalate		2012~	TBD
Antimony			
Oxidized Beryllium		-	2002~



Standby Power: 0.03W, Cableless

• Low Power Charger

● **Saving Energy**

To reduce the energy consumption of mobile phones, we are continuously developing chargers that have less standby power consumption. We intend to reduce the standby power consumption from 0.3W to 0.25W, and finally to 0.15W. We have also introduced a mobile phone with a charger reminder function to help reduce unnecessary energy consumption. The charger has an audible alert that informs the customer when the mobile phone is fully charged so that the customer can disconnect the mobile phone from the charger. LG Electronics is also developing a charger that uses the world's lowest standby power of 0.03W. This new charger will use a data cable as opposed to the standard charger cable.

● **Manual & Box**

We have found substitutes for paper and oil ink, items that are used in manuals and product packaging. Paper was replaced with recycled paper and the oil ink was replaced with soy ink. By using recycled paper, we were able to save resources and reduce energy use, thereby potentially reducing greenhouse gas emissions. In addition to changes in the composition of the packaging material, we made significant changes to the package structure, helping to enhance transportation efficiency.



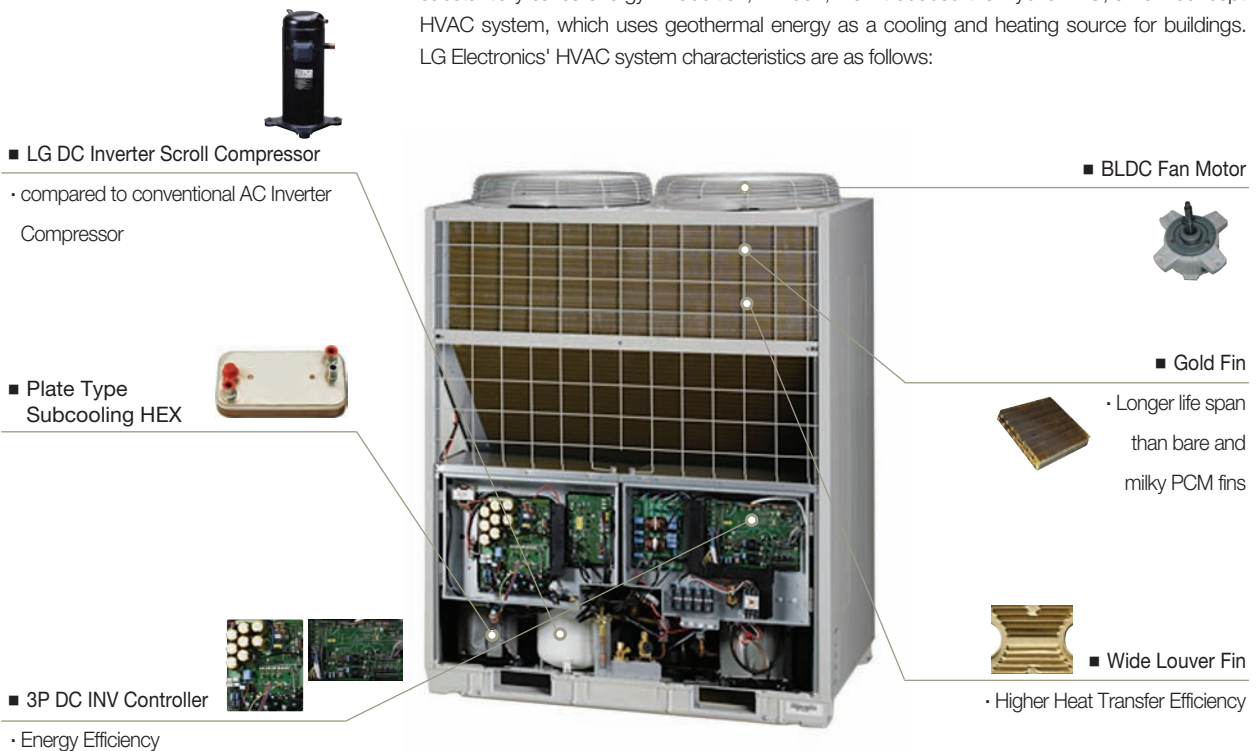
• Manual & Box (LX260, KV990)

# Air Conditioner

LG Electronics' air conditioner has green features that maximizes energy efficiencies and provides a refreshing living environment

Our designs and competitive core technologies have helped us capture the number one position in terms of sales for nine consecutive years. Indeed, since we first manufactured window air conditioners in 1968, we have achieved accumulated sales of 100 million units as of 2008. This is similar to having a customer select approximately 4.8 units of our air conditioners every minute for forty years. These sales attest to LG Electronics' true global leadership. Our air conditioners are not just simple air conditioners, but represent the "Life Conditioner" concept. Based on this concept, our air conditioners provide not only cooling functions, but also heat, air purification, and dehumidification. By automatically adjusting the indoor temperature, our air conditioners ultimately reduce power consumption.

As a system air conditioner, the Multi V, a next generation HVAC system, can have a diverse number and type of indoor units hooked up to a high performance exterior unit depending on the type and characteristics of the building. The Multi V collects the discarded heat from an indoor unit and reutilizes it as cooling / heating energy, making it a greener product that substantially saves energy. In addition, in 2007, we introduced the Hybrid XEO, a new concept HVAC system, which uses geothermal energy as a cooling and heating source for buildings. LG Electronics' HVAC system characteristics are as follows:



**1968** First in Korea to manufacture window air conditioners (GA-111)

**1979** First in Korea to manufacture separable-type air conditioners (GA-100SP)

**1998** First in Korea to manufacture system air conditioners

**2007** Introduced the new concept thermal energy solution, Hybrid XEO  
National Environmental Management Presidential Grand Prize (Korea)

**2008** Achieved an accumulated 100 million unit sales  
Number 1 in sales, globally, for 9 consecutive years  
Energy Winner Awards



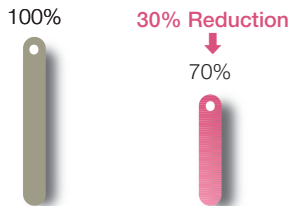
• 2008 Energy Winner Award



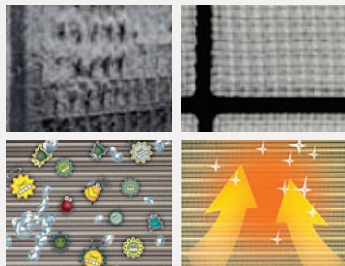
• MULTI V SYNC

**Power Consumption**

Unit : %



Existing System (5HPx2EA)      MULTI V.SYNC (10HP)



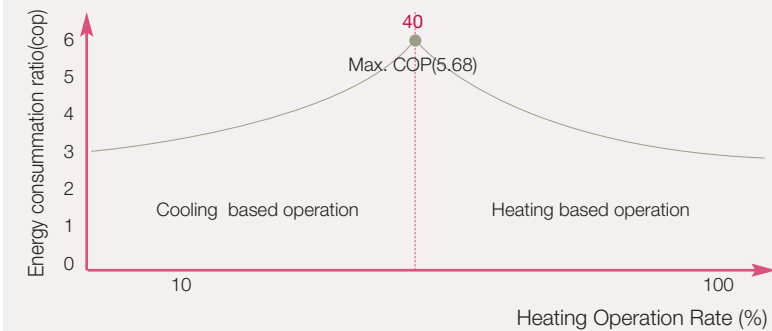
[Existing Air Conditioners]      [Automatic Disinfection Heat Drying]

● **Enhanced Energy Efficiencies**

LG Electronics received the 2008 “Energy Winner Award” from the Korean government for its high energy efficiency. At the same time, LG Electronics received an official certificate from the Korean Government as the top leader in the environmental sector for its renewable energy and high efficiency appliances.

**Heating & Cooling Synchronous operation**

High COP up to 5.68 - When, Cooling(40%)+Heating(60%)



\* Outdoor temperature 7°C DB / 6°C WB

\* Indoor temperature 20°C DB / 15°C WB

● **Refrigerants**

LG Electronics was one of the first companies in Korea to use a refrigerant, HFC-410A. Our air conditioner division is converting the use of HCFC-22 to HFC-410A refrigerant in all of our models. In addition, we continue to concentrate our efforts on developing natural refrigerants.

■ **Robot Cleaning**

The robot cleaning function cleans the air conditioner when needed while the automatic brush cleans the filter, helping keep the interior clean. This cleaning function ultimately enhances the powerful cooling capabilities of the air conditioner.

# Washing Machine

LG Electronics' Steam Direct Drive washing machine has green features that efficiently utilize resources and reduce energy consumption.

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• Korea LOHAS Certification

These features include a reduction in the amount of hazardous heavy metals that are used and an increased resource utilization that is achieved through the reduction in product size and weight. In addition, LG Electronics Steam washing machine received Korean LOHAS Certification for its high energy efficiency, water saving features, increased recyclability. In addition, all front loading washing machine models received the RoHS certification from the European certification institution, TÜV.

### ■ RoHS Compliant

- Pb, Cd, Hg, Cr+6, PBB, PBDE

### ■ RoHS Certification

- Front loading washing machine, TÜV(Germany)

### ■ High Energy Efficiency

- DD Motor, Steam



### ■ Allergy Care

- Allergy care certificate:  
BAF(U.K.), KAF(Korea), ITEA(Japan), AAFA(U.S.)

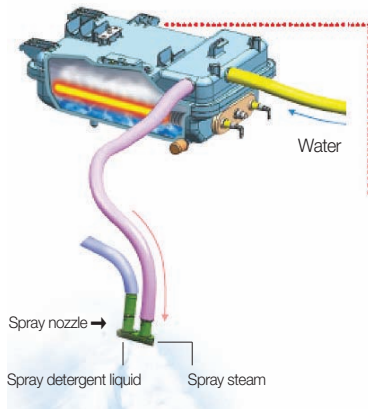
### ■ Confronting Climate Change

- Carbon Footprint Labeling / Korea LOHAS Certification



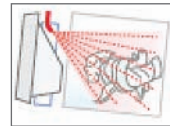
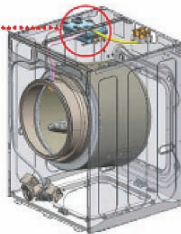
● **Enhancing Energy Efficiencies**

Most LG Electronics' front-loading washing machines use a DD (Direct Drive) motor, which can be more energy efficient than traditional motors.



**Front Loading Washing Machine's Steam**

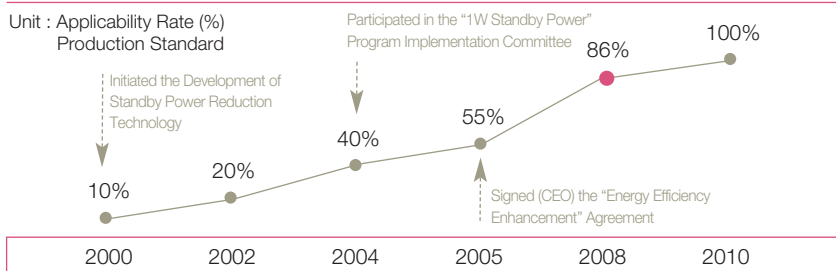
By continuously heating a separate water storage tank through a direct heating method, pure steam is powerfully sprayed.



Continuous spray system

- Steam Temperature 98°C
- No additional water heating heater is necessary
- Steam is sprayed for approximately 40 minutes by is a steam spraying nozzle

**Front Loading Washing Machine Standby Power Status**



● Fully Automatic ——— ● Drum —————>

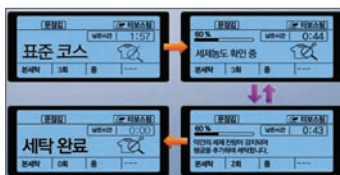
● **Reduction of Hazardous Substances**

LG Electronics washing machines use PCBs, screws, cabinet cases and power cables, which meet the EU's RoHS Directive. In addition, the main body cabinet was reduced in weight and size, making it easier to recycle.

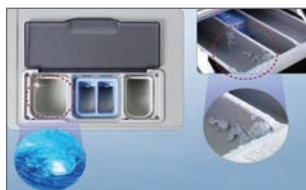


- BAF(British Allergy Foundation)(Left)
- KAF(Korea Allergy Foundation)(Right)

| Allergy Care | Allergy-causing substances, such as pet dander, can irritate asthma symptoms and other allergy-related diseases. These substances, which may be located on blankets and other household accessories, cannot be detected by the eye. LG Electronics' Allergy Care, which can reduce these allergy-causing substances, received certifications from allergy associations in the U.K., U.S., and Korea.



• Front Loading Washing Machine' Standby Power Status



▲Front Loading Washing Machine Detergent Tray    ▲General Detergent Tray

| Wash Rinse Optimizer | LG Electronics' washing machines control the washing time based on the status of the laundry, while a sensor senses the concentration level of detergents and adjusts the frequency of the rinse, resulting in a clean wash.

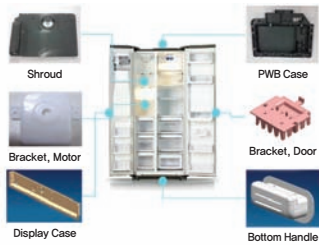
# Refrigerator

Among the electronic appliances used in everyday life, the refrigerator usually consumes the most electricity. As the refrigerator is in operation 24 hours a day, assessing and monitoring electricity consumption is possible. As a result, the refrigerator has been approved as a carbon business (CDM: Clean Development Mechanism) target item by the UN. LG Electronics' refrigerators are integrated products utilizing sophisticated technological expertise from various fields, including appliances, electronics, food engineering, and design.

After LG Electronics manufactured Korea's first household refrigerator in 1965, it introduced the world's first LCD TV refrigerator. LG Electronics has established itself as a true leader in the global refrigerator market.

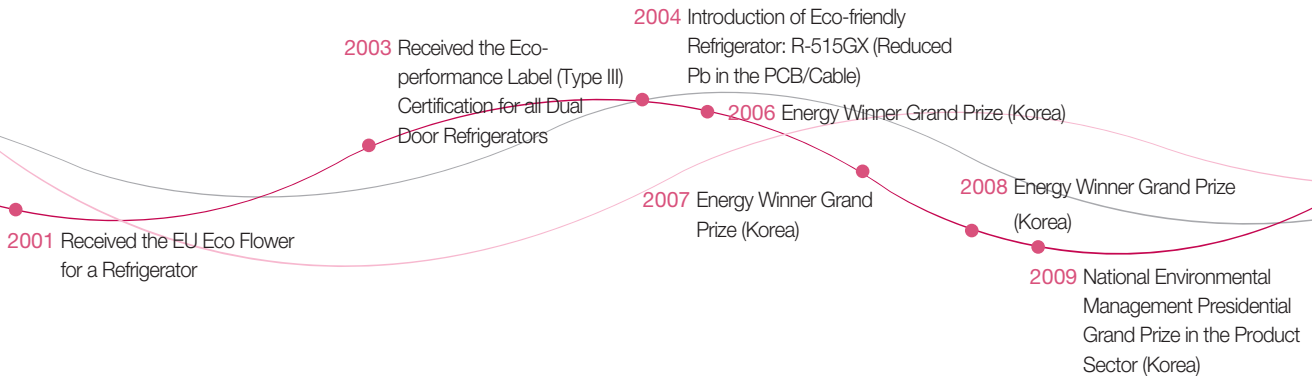
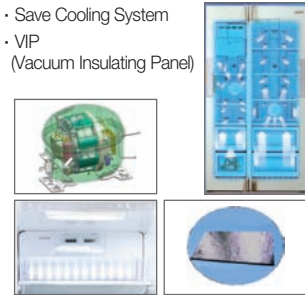
### ■ Recycled Plastics

- Shroud
- Bracket, Motor
- Display Case
- PWB Case
- Bracket, Door
- Bottom Handle



### ■ High Energy Efficiency Technology

- Linear Compressor
- Save Cooling System
- VIP (Vacuum Insulating Panel)





• The application of Anti-bacterial agent on Bioshield-gasket

● **High Energy Efficiency and Low Noise**

The LG Electronics refrigerator has a green feature that helps reduce power consumption and noise levels compared to existing LG products. LG Electronics achieved these results by i) applying LG proprietary “Linear Technology,” a high efficiency cooling system that connects the cold storage and freeze storage compressors through a linear method, ii) using energy efficient LED technology, and iii) utilizing a highly efficient vacuum insulation technology. These efforts enabled LG Electronics to receive the “Energy Winner” Grand Prize for three consecutive years from 2006 to 2008.



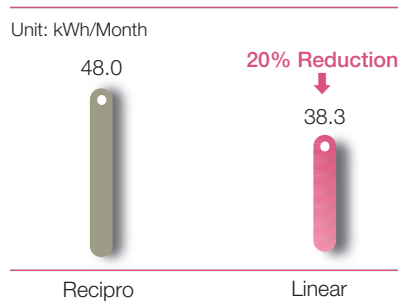
- Energy Winner Grand Award for 3 Consecutive Years
- Energy Grand Prize & Ministry of Knowledge & Economy Minister Award: LG Electronics' Linear Dios Refrigerator
- Energy Grand Prize & Ministry of Environment's Ministers Award for applying Solar Cell non-electrode Street Lamps

North America	<b>Consumer Reports</b>	1place (2005,2008)
U.K.	<b>Which</b>	1place (2007)
France	<b>QUE</b>	1place (2008)
Australia	<b>CHOICE</b>	1place (2008)

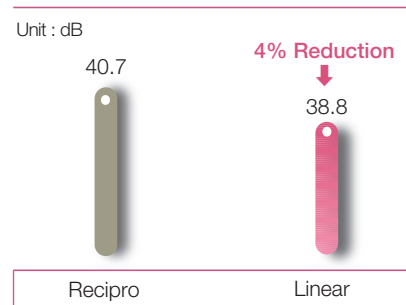
● **Material**

LG Electronics is committed to voluntarily employing more eco-friendly materials in its refrigerators. We established a mid- to long-term plan to improve materials that may contain hazardous substances. At the same time, we started using refrigerant, R600a and cyclopentanone.

**Power Consumption**  
(Tested on GW-P227Y)



**Noise**  
(PWL (Tested on GW-P227Y))



# Vacuum Cleaner

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• VK8800SHAFY



• Example of Optimizing Components

## Improved Noise Level of Vacuum Cleaners

Unit : dB

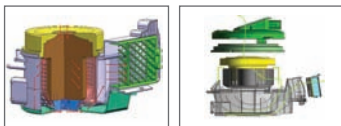
67dB



64dB



Existing Model    VK8800SHAFY



[Muffler Chamber]

[Delta Air Flow]

- 2008 Trial Operations for a Korean-type Integrated Product Policy (IPP) (2008 ~ 2009) (Korea)
- SLG 5 Star Certification (Germany)
- BAF Certification (U.K)

The LG steam vacuum cleaner sucks in dust and steam cleans simultaneously. Its motorized dust compressor technology helps prevent dust from spreading, ultimately providing convenience to customers.

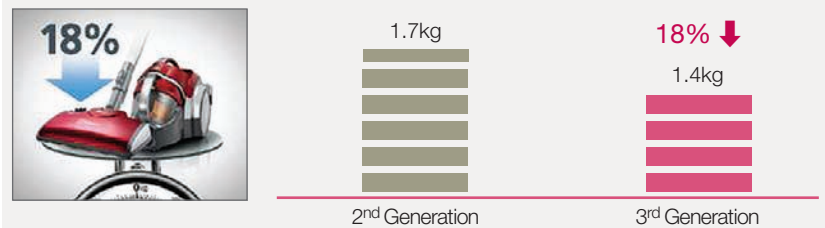
### • Energy Efficiency

Compared to previous models, the LG steam vacuum cleaner (VK8800SHAFY) reduced preheating time for steam function to 2 minutes 30 seconds from 4 minutes 30 seconds, a 44.4% reduction that constitutes a significant drop in energy consumption for preheating time for steam function.

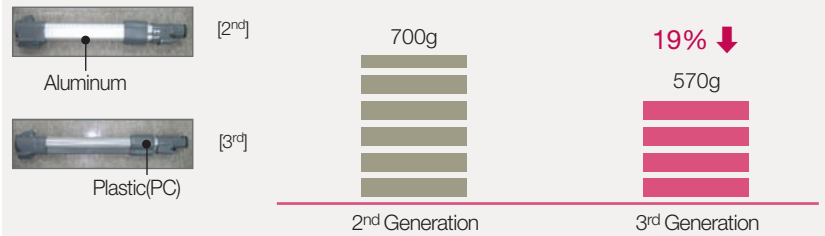
### • Reduction of Resources

By substituting materials used in the pipe to reduce the pipe weight, we decreased the use of resources and increased user convenience. Weight reduction was also accomplished through component optimization.

### Examples of Reducing the Weight of the Entire Suction Pipe through Component Optimization



### Examples of Improving the Weight of the Pipe through Substitution of Materials Used



### • Noise

We continuously focus our research and development efforts on ways to reduce the noise level and provide a pleasant cleaning experience for our customers. Through structural changes, we were able to reduce the noise level from 67dB to 63dB, compared to the previous model. (V-KS830MJA)

### | HEPA Filters |

LG Electronics is striving to provide customers with products that promote a cleaner living environment. By utilizing 3-step HEPA filters, we developed a product that can compress dust and provide washable functions, which make it easier for consumers to empty their filters.



# Air Cleaner

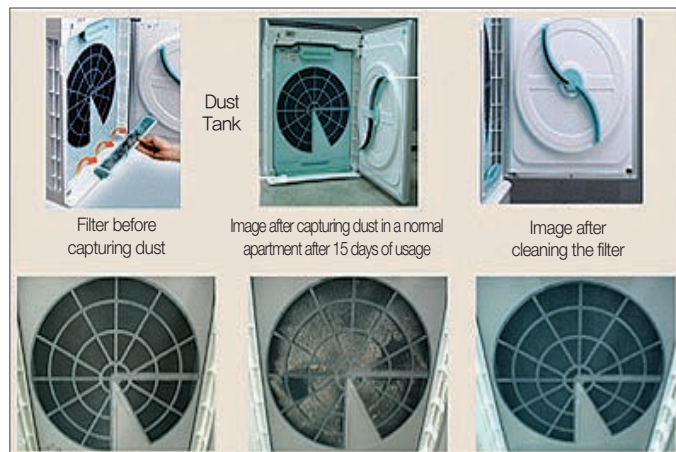
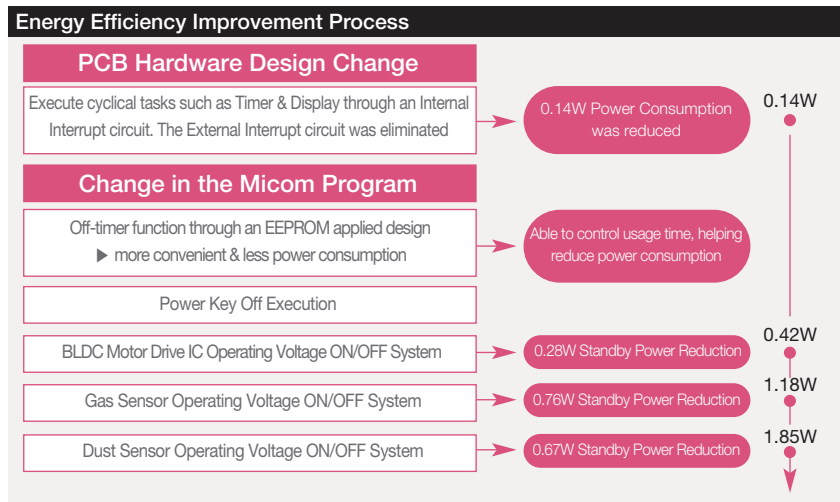
The Air Cleaner (LA-P210DG) is a greener product that received the Energy Winners Award in 2008 in the energy efficiency sector.



• Air Cleaner LA-P210DG

## • Energy Efficiency

By minimizing the standby power consumption to below 1W, we can reduce maintenance costs and greenhouse gas emissions. For example, by changing the product's circuits and program, we were able to reduce the standby power when compared to previous LG products. Further, by developing the automatic filter cleaning system, we were able to further reduce power consumption.



• Automatic Cleaning System

## • Home Environment

The washable filter and automatic filter cleaning functions offer economic benefits because there is no need to change filters. An all-purpose free filter and allergen specialized filter were also adopted.

| Noise | A high efficient fan and low noise piping system were developed. In addition, any abnormal noise in the piping system was reduced.

• Green Mark

• CA (Korea Air Cleaning Association) Certified

• BAF (British Allergy Foundation) Certified

• FITI Disinfection SF Certified





# Monitor

LG Electronics' LCD Monitors have green features that can reduce both overall power consumption and standby power consumption.



• W2252TE

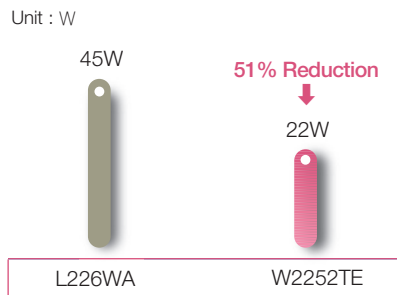
- **Best Power Saving Monitor**

LG Electronics' monitor (W2252TE) is one of the most energy efficient LCD monitors. By decreasing the number of lamps by half through increased prism efficiency and improved circuitry designs, standby and overall power consumption dropped compared to existing monitors.

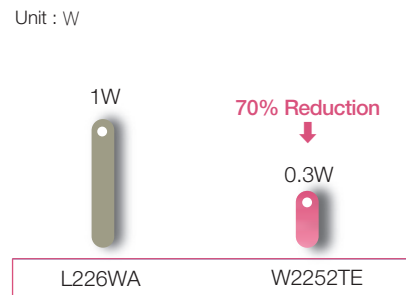
- **Received Eco mark Certifications**

Our product received the Eco Mark (Korea) and meets Energy Star compliance requirements in the U.S.

### On-mode



### Standby mode



1999 First in the world to Receive the EU Eco Flower

2000 First in Korea to Receive the Eco mark in the Monitor Category (Korea)

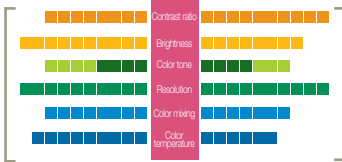
2007 Received the EPEAT Certification (U.S.), Silver Class (13 Models)

LG Electronics' TV has a green feature that attempts to maximize energy savings through Smart Energy Saving Technologies.

**Intelligent Sensor**



Attached a 3D light sensor that senses the brightness and color.  
By analyzing the brightness and color tones of the external environment, the sensor automatically adjusts the picture.



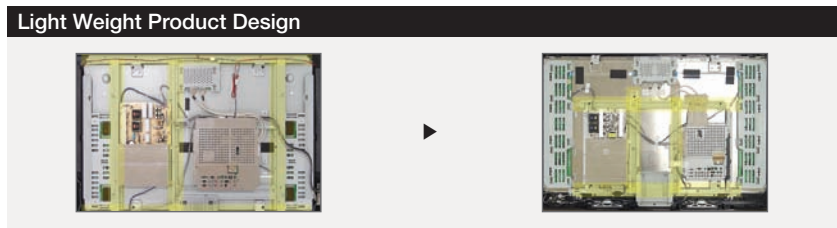
By creating an optimal picture quality based on the brightness and color, the eye is protected, while power consumption is substantially reduced.  
4096 step minute adjustments through the high quality multi-light sensor.

● **Enhancing Energy Efficiency**

LG Electronics continues to make every effort to reduce power consumption in its TV products. Through continuous development and incorporation of power saving panels and technology to optimize the lighting source and circuitry, unnecessary loss of power is minimized. For example, the intelligent sensor automatically controls the screen's brightness through a micro sensor that detects the changes in the surrounding lighting environment, which can help save energy and money.

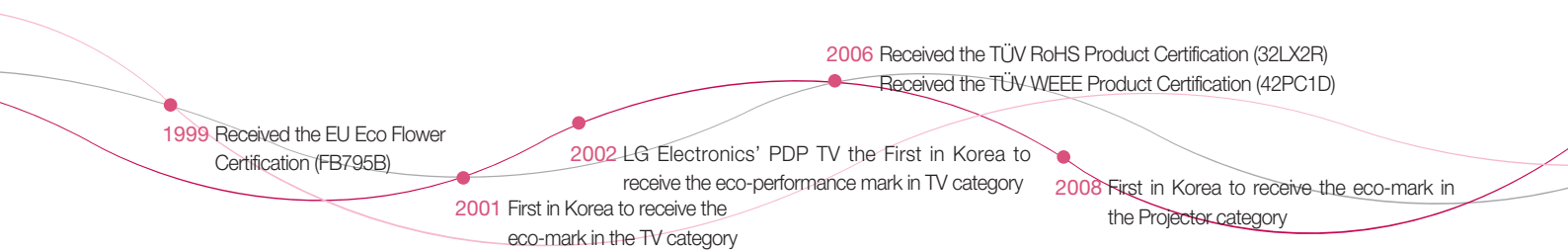
● **Reduction of Resources and Improvement in Recyclability**

From the perspective of utilizing resources, improvement efforts continue to be carried out on various parts of the product. By improving the framework structure of our products and modifying the speaker system, we decreased the weight and volume of the TV. Further, we standardized components such as screws and adopted a frame assembly frequency reduction design that decreases the number of frame assembly holes. This reduction in holes helps to reduce resources and makes it easier to disassemble discarded products. We also optimized the packaging and decreased the box size, helping reduce packaging material.



● **Hazardous Substance Reduction and More Eco-friendly Material**

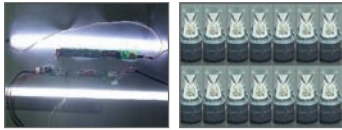
LG Electronics strives to go beyond the EU RoHS and other applicable environmental regulations. For example, LG Electronics is committed to reducing heavy metals and bromine-type nonflammable materials, which are not addressed in the EU RoHS. We are actively considering the use of natural materials and more eco-friendly materials that help reduce the use of resources and decrease greenhouse gas emissions. As such, in 2007, we introduced a TV cabinet made of wood, a natural material. We will continue our research to be able to apply more eco-friendly material, such as bio-plastic, to our products.



## LCD TV

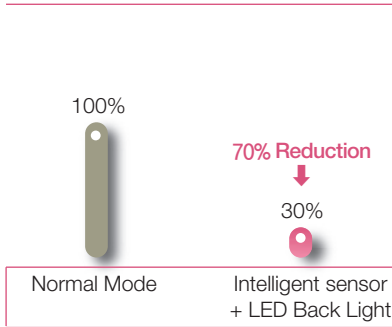
- **Mercury Substitution and Energy Reduction**

For our LED LCD TVs, we substituted the CCFL backlight with the Aurora LED which is better in energy efficiency. By redesigning the product frame structure, we were able to reduce the weight of the product. The product packaging size was optimized, creating a reduction in packaging volume.

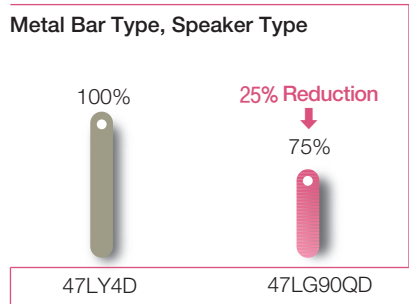


[CCFL(Existing)] ▶ [LED]

### Power Consumption Comparisons (Tested on 47LG90QD)



### Product Weight Reduction



## Plasma TV

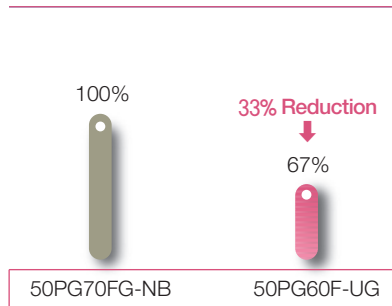
- **Reduction in Energy Consumption**

Through the development of a low dielectric substance and high efficiency drive circuit, we were able to create a lower power consumption, optimal lighting TV.

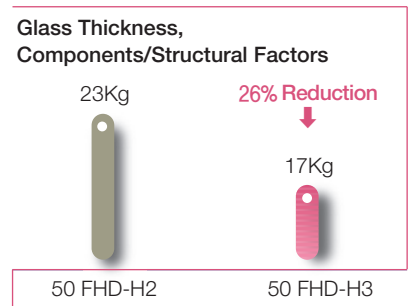
- **Reduction in Resources and Improvement in Recyclability**

Compared to existing LG products, we were able to reduce the product weight by reducing the thickness of the glass and decreasing the number of components. By reducing the frame structure through redesigning the existing framework structure, we were able to reduce resources and enhance product recyclability.

### Energy Consumption Reduction



### Product Weight Reduction



Through the development of renewable energy technologies, LG Electronics is striving to minimize greenhouse gas emissions from its facilities and products. Renewable energy is energy generated from natural resources - such as sunlight, wind, rain, tides, and geothermal heat - which are naturally replenished (i.e., "renewable").

- **Solar Cell**

Starting in 2005, the LG Group started the solar cell business as a new growth engine. The new business is being carried out by vertically affiliated companies including LG Electronics, LG Chemical, LG Solar Energy, LG Siltron, and LG CNS. LG Electronics is playing a pivotal role in the production of cells and modules, continuously carrying out research and development on solar cell as a next generation growth engine. For example, in 2008, we decided to construct solar cell production lines in Kumi, North Kyongsan Province and to invest KRW 220 billion by 2010.

- **LED Business**

As greater emphasis is placed on product energy efficiency, LEDs (Light Emitted Diode) are gaining substantial attention in the lighting and display areas. LEDs are used in diverse areas such as TVs, mobile phones, and lighting. We expect that LEDs will be used in broader areas and more products in the future. With the development of the LCD with Full LED backlighting, LG Electronics is aggressively pursuing the LED business. Beyond this "LED TV", we intend to provide better value to customers by incorporating LED technology into various products, such as mobile phones, home appliances, aesthetic lighting, etc.



● Hybrid XEO : Cooling/Heating System Utilizing Geo-thermal Energy

LG Electronics developed a new concept cooling/heating system called the Hybrid XEO that utilizes geo-thermal energy. The Hybrid XEO adopted an Air-to-Water heat pump technology and improves performance by using DC inverter compressors.

