Market Transformation for Energy-efficient Appliances

- Motors, Lighting Equipment and Standby Power -

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1. Overview

Energy Efficiency Label and Standard Program (including MEPS)

- Mandatory
- 5-grade labeling & MEPS
- Refrigerators, Air conditioners, Automobiles, etc (18 items)

Energy Labels & Standards

High-efficiency Appliance Certification Program

- Voluntary
- LED traffic lights, Motors, Pumps, etc (34 items)

e-Standby Program

에너지절약

- Voluntary
- TVs, STBs, PCs, Printers, etc (21 items)

2. Korea Energy Label & Standard(1)

◆ Energy Efficiency Label and Standard Program (including MEPS)

- Mandatory indication of energy efficiency grade from 1 to 5

  1 grade is best in Korea

- MEPS below 5 grade
- Target products

Now

New Label from 2008

Refrigerators, Freezers, Kimchi refrigerators, Air Conditioners, Washing machines, Drum washing machines, Dish washers, Dish driers, Coolers, Rice cookers, Vacuum cleaner, Electric fans, Gas boilers, Incandescent lamps, Fluorescent lamps, CFLs, Ballasts, Automobiles

Korea Energy Label & Standard(2)

◆ High-efficiency Appliance Certification Program

- Certification by KEMCO
- Voluntary
- High efficiency certificate
- Government purchase
- Target products

3-phase Induction motors, Pumps, UPS,
Transformers, Vending machines, Windows,
Industrial gas boilers, Oil burning water boilers,
T-5 fluorescent lamps, LED traffic lights,
26mm32W fluorescent lamps, Ballasts for 26mm32W

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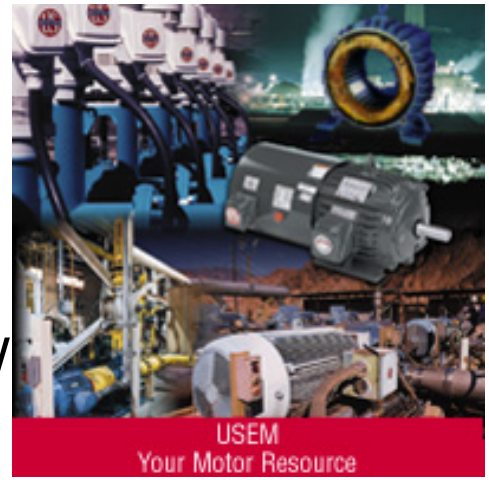

Korea Energy Label & Standard(3)

◆ e-Standby Program

- Core program to reduce standby power <1W
- Voluntary (Mandatory from 2010)
- “Energy Boy” label (or Warning label from 2010)
- Government purchase
- Target products

TVs, VCRs, Audios, DVD players, Set top boxes,
Microwave ovens, External power supplies,
Computers, Monitors, Printers, Fax machines,
Copiers, Scanners, Multifunction devices,
Bidets, Energy saving & controlling devices,
Door phones, Cordless phones, Radios, Modems

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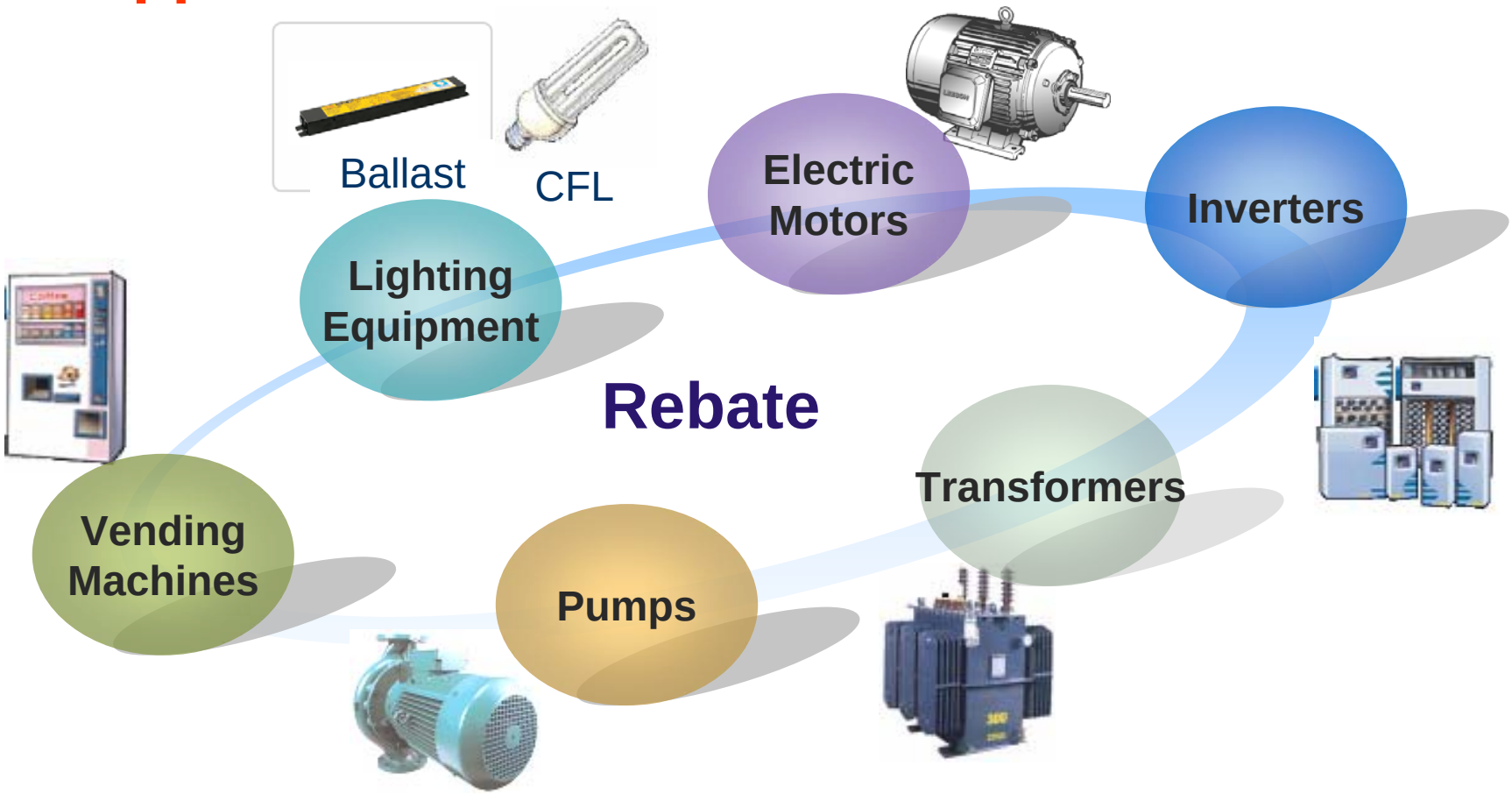
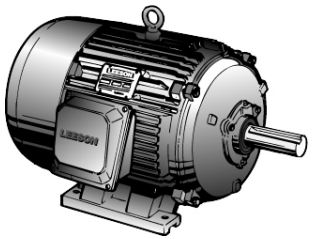
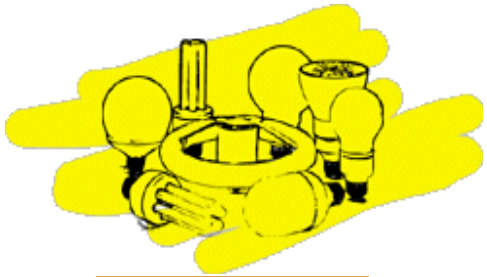
Appliances Supporting Rebate

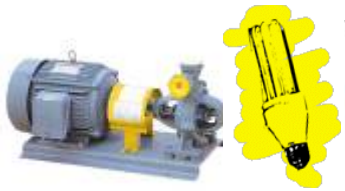
- **Support consumers and installers**



3. Strategy for Efficient Appliances

Category		Low energy efficient appliances	High energy efficient appliances
Electric motors (3-phase)		General motors	Energy-efficiency motors
Lighting Equipment		Incandescent lamps Fluorescent lamps (40W) General lights	CFLs Fluorescent lamps (32W) LED lights
Standby Power		>1W products	<1W products

Policy Tools



Phase-out policy	Supplying policy
MEPS (Minimum Energy Performance Standard) (Mandatory)	 High-efficiency Appliance Certification & Rebate (Voluntary)
 5 Grade label (Mandatory)	 1 Grade label (Mandatory)
 Warning label (Mandatory)	 Energy Boy label (Voluntary)

4. Importance of Electric Motor

- **Electric motors (3-phase) 40% of Power Consumption in Korea**

Category	Power	Value	Proportion
Total power Generation in Korea	332,413 GWh	$US 20.94 billion	100%
Consumption by electric motor (3-phase)	132,965 GWh	$US 8.38 billion	40%

The importance of 3-phase motors in energy conservation
Motors, lightings and the others including electric heating equipments Accounts for 60%, 20%, 20% of total domestic power consumption respectively. 70% of total induction motors are 3-phase and consume 40% of total power consumption.

Development of Electric Motors

◆ General → High efficiency → Premium motors

Induction motors	Efficiency criteria	Market Share	Status
General motors	-	90%	- Korea : main induction motors - USA, Canada : Phase out
High efficiency motors	More efficient than standard motor by 4 to 5%	10%	- Korea : application of certification and Rebate - USA(1997), Canada(1995) : application of MEPS
Premium motors	More efficient than high efficiency motors by 5 to 6%	0%	- Korea : supporting the development of technology (since 2005) - USA : application of rebate

MEPS Effect, High Efficiency Motor

- **Energy saving effect of 1 billon US dollars**
  - 70% of electric motors are replaced to high efficiency

category	contests
Total sales of power in 2005	332,413 GWh
Power Consumed in 3-phase induction motors (assumed to be 40%)	132,965 GWh
Rate of reduction of loss	31 %
Rate of raise of price	29 %
Total profit of 100% replacement	$US 1.95 billion
Total cost of 100% replacement	$US 0.58 billion
Net profit of 100% replacement	$US 1.37 billion
Total profit of 70% replacement	$US 1.37 billion
Total cost of 70% replacement	$US 0.41 billion
Net profit of 70% replacement	$US 0.96 billion

Past Accomplishment for MEPS

- **2004.8.25 : Committee for National Energy Conservation adopts the implementation of MEPS to motors**
  : applying MEPS to motors in 2008
- **2005.5.31 : Committee for Implementation of MEPS for High Efficiency Motors was organized**
  : 20 persons including representatives of government, NGOs, manufacturing companies, academic world, institutes, test laboratories
- **2006.5. : Conference for preparing Agreement**
  : Officers of manufacturing companies attended
- **2006.6~2007.6 : Public Hearing for MEPS**
  : manufacturing companies, test laboratories attended
- **2006.7.3 : Agreement on Improving Energy Efficiency of Motors**
  : Minister of MOCIE, CEOs of 10 manufacture
- **2008. 7.1 : Enforcement of MEPS for high efficiency motors (scheduled)**

Market Transformation

High Efficiency Motor

Certification

Rebate

Agreement

MEPS

1.6% 1.7% 2.0% 2.5% 3.9% 7.8% 6.7% 10.0% 20.0% 30.0% 40.0% 70.0% 70.0%

Sum of capacity (million HP)

Dissemination (%)

1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

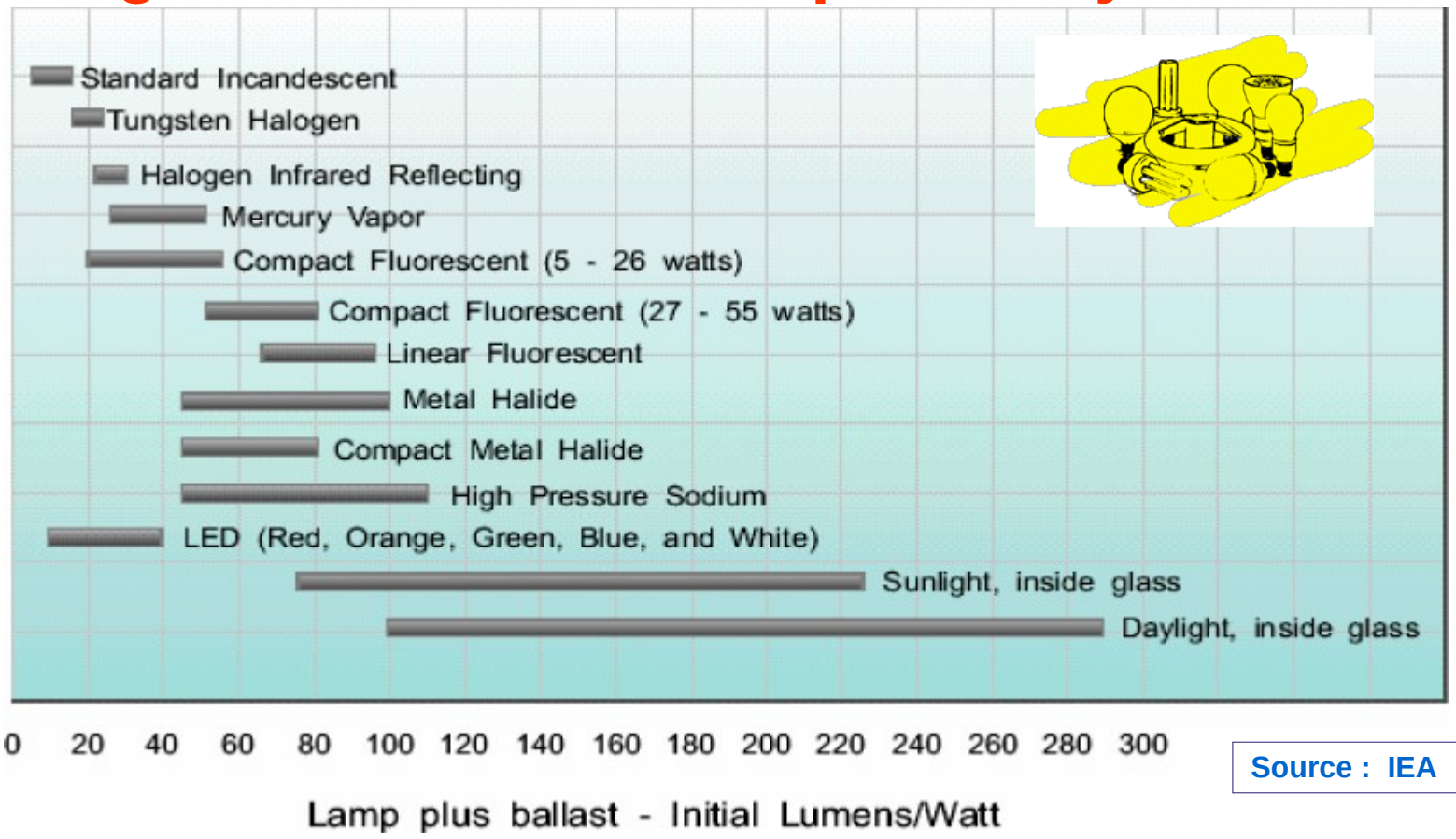
year

sum of capacity (million HP)

Dissemination (%)

5. Strategy for Efficient Lighting

- **Large differences in lamp efficacy**



Source : IEA

Replace from Incandescent to CFL

- **Phase out for Incandescent lamps**
  - MEPS and high efficiency label specification

    Energy Efficiency Label and Standard Program

MEPS

Heat 95%
Light 5%

60-100W

- **Rebate for CFLs**
  - Target product

    Certified CFLs(15W, 17W, 20W) by KEMCO
  - for consumers
  - USD $2 per CFL

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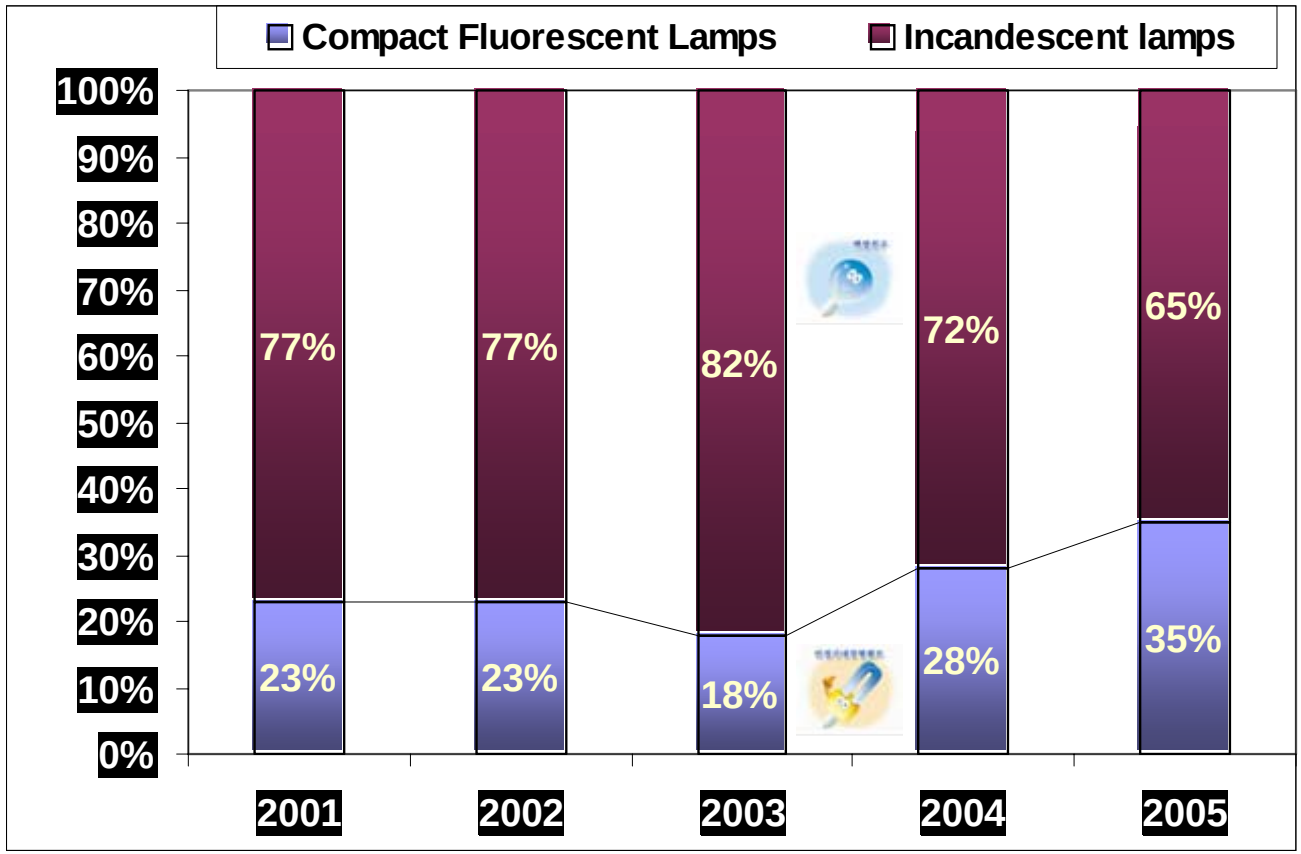
Heat 75%
Light 25%

15-20W

Market Transformation to CFLs

- **CFLs as a substitute of Incandescent lamp**

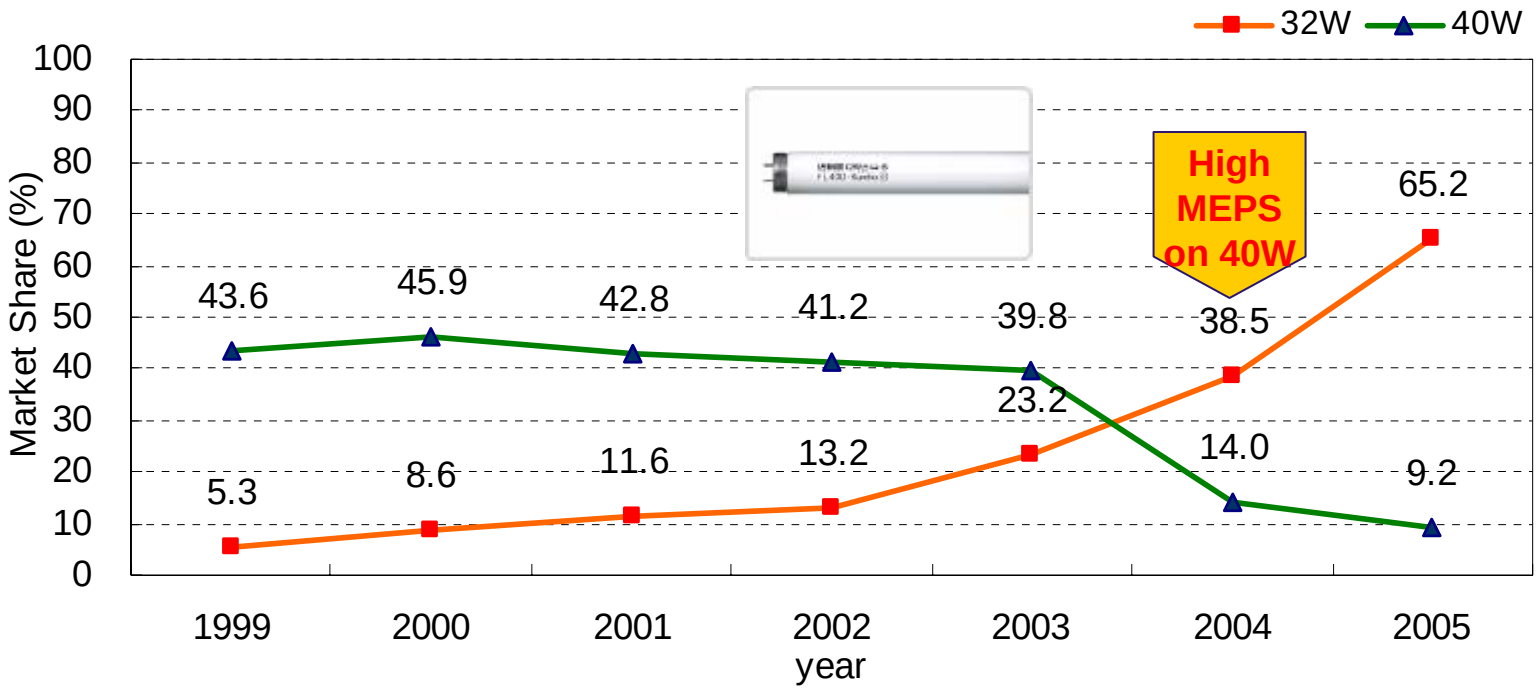


Market Transformation to 32W

◆ Effect of applying high MEPS

- MEPS on 40W fluorescent lamp

: 66 lm/W → 80 lm/W (from 2004.1.1)



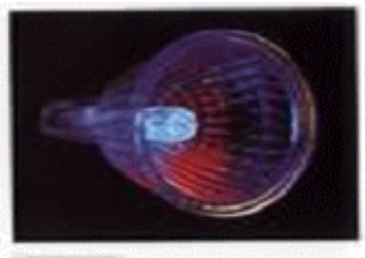
15/30 LED Project

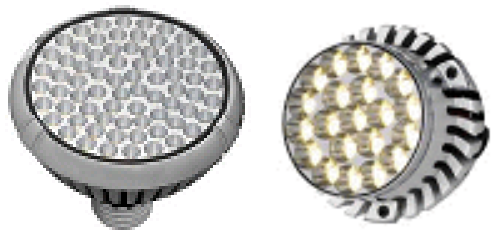
- **Increase dissemination of LED to 30% by 2015**

  - 4 million TOE of energy saving

    Advancement in R&D and market environment will be reflected in promotion policy for LED

  - High-efficiency Appliance Certification & Rebate





6. 1-watt Plan on Standby Power

◆ Standby power is wasted energy

- Korea $US66.7 billion on energy import in 2005
- 300 million electronic devices
  : Average Standby Power is 3.66W
- Annual loss of $US 476 million
  : 1.7% of national power consumption
  : 850 thousand kW power plant
- 306kWh/year per home
  : 11% of Korean home energy

Standby power consumption of a middle class household

No.	Product	Average Standby Power(W)
1	TV	4.33W
2	VCR	5.45W
3	Audio	9.12W
4	DVD player	12.20W
5	Microwave Oven	2.77W
6	Cassette radio	1.11W
7	Cord/cordless phone	2.15W
8	Set top box	7.85W
9	Cellular phone battery charger	1.72W(0.86W×2)
10	Computer	3.26W
11	Monitor	2.53W
12	Printer	3.07W
13	Video phone	1.23W
14	Washing machine	1.90W
15	External modem	6.43W
16	Bidet	3.39W

Standby Korea 2010

All products <1W by 2010

- **Declare of 1W, Prime Minister**

: ”the government will offer full assistances----by 2010, the standby power of all electronic product shall be reduced to below 1W” (Energy Saving Promotion Rally, 2004.11.12)

- **Korea is 3th country with 1W Policy**

- after USA(2001), Australia(2002)
- Korea comply IEA’s “1W Initiative”

Main Target Product of Standby

◆ External power supplies

- Adaptors or Chargers etc
- 100 million external power supplies in Korea
- 1 billion new power supplies supplied globally
- Need from linear(2-3W) to SMPS(0.3-0.5W)

◆ Set top boxes

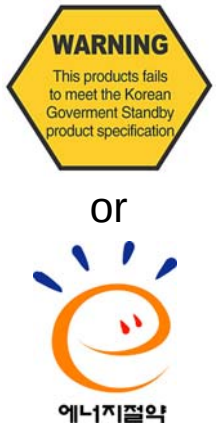
- 20-40W on active standby
- 15 million will be supplied by 2010

◆ Home networked appliances

- Home gateways, Appliances etc

Korea's Scenario for <1W by 2010

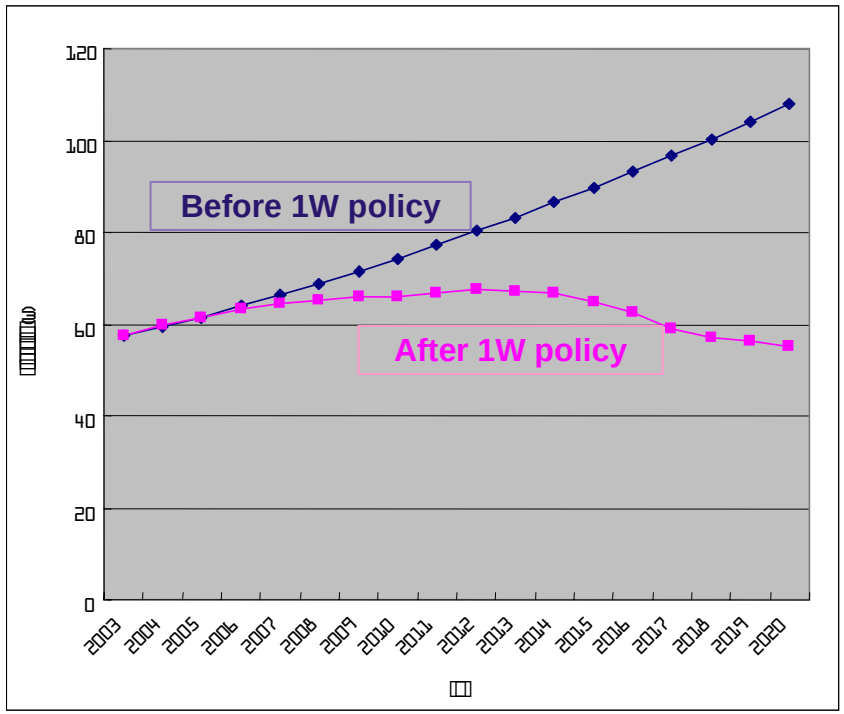
◆ Mandatory Policy to reduce Standby Power

Policy Tools for <1W		Standby	Products
MEPS		<0.5W (No load)	External power supplies
Warning label (e-Standby Program)	 or	<1W (Off or Passive standby)	TVs, VCRs, Audios, DVD players, Bidets, Sep top boxes, Microwave ovens, Cordless phones, Door phones, Modems, Computers, Monitors, Printers, Fax machines, Copiers, Scanners, Multifunction devices, Home gateways, Energy saving & controlling devices
1 Grade label (Energy Efficiency Label and Standard Program)		<1W (Off or Passive standby)	Washing machines, Dish washers, Drum washing machines, Air Cleaners, Rice cookers, Air conditioners, Electric Fans, Home networked appliances(<3W)

Effect of 1W Policy

◆ Standby power reduction effect per household

Category	2003	2010	2020
Numbers - Off line product - Network product	15.6 (15.0) (0.6)	21.9 (20.0) (1.9)	35.7 (25.7) (10.0)
Rate of <1W products	22%	40%	80%
Standby power per product	3.66W	3.02W	1.54W
Standby power per household	57.5W	66.1W	55.0W



Standby power per household

Thank you

If you have any question,

please e-mail to yrkim@kemco.or.kr