

Standby Power and How to Limit it

Korea's 1-Watt Plan

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MEPS

1. Korea's Energy Situation

◆ World's 10th largest energy consumer

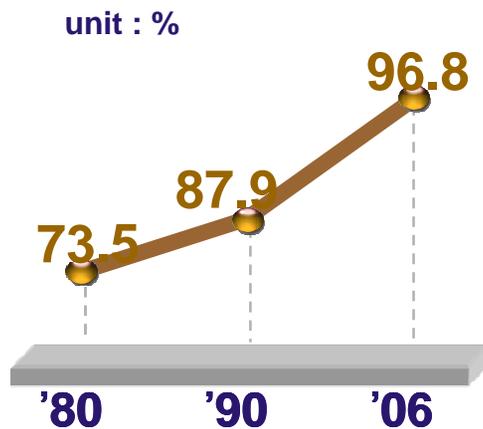
- 7th oil consumer

Korea import 97% of energy

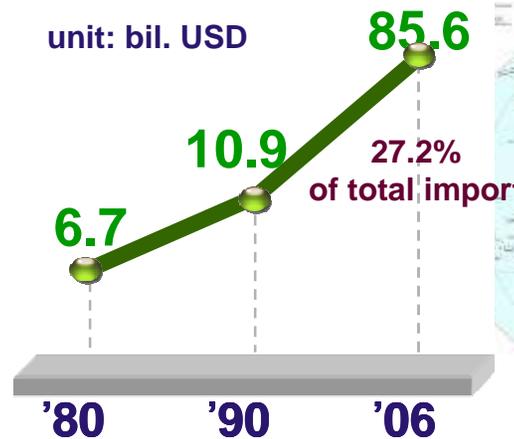
- Korea \$US85.6 billion on energy import in 2006



< Energy Dependence on Imports >



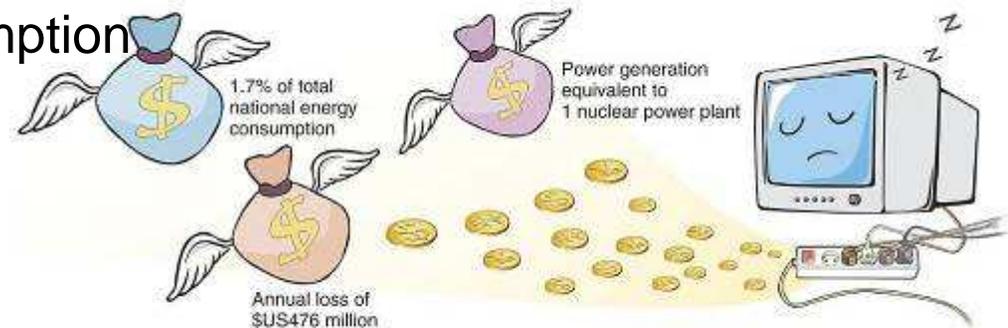
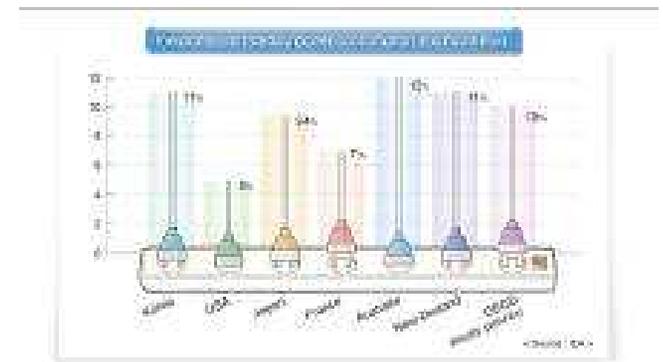
< Energy Import Cost >



Status on Standby Power

◆ Standby power is “Power Vampire”

- Standby is wasted energy
- 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



Standby Power per Korean Home

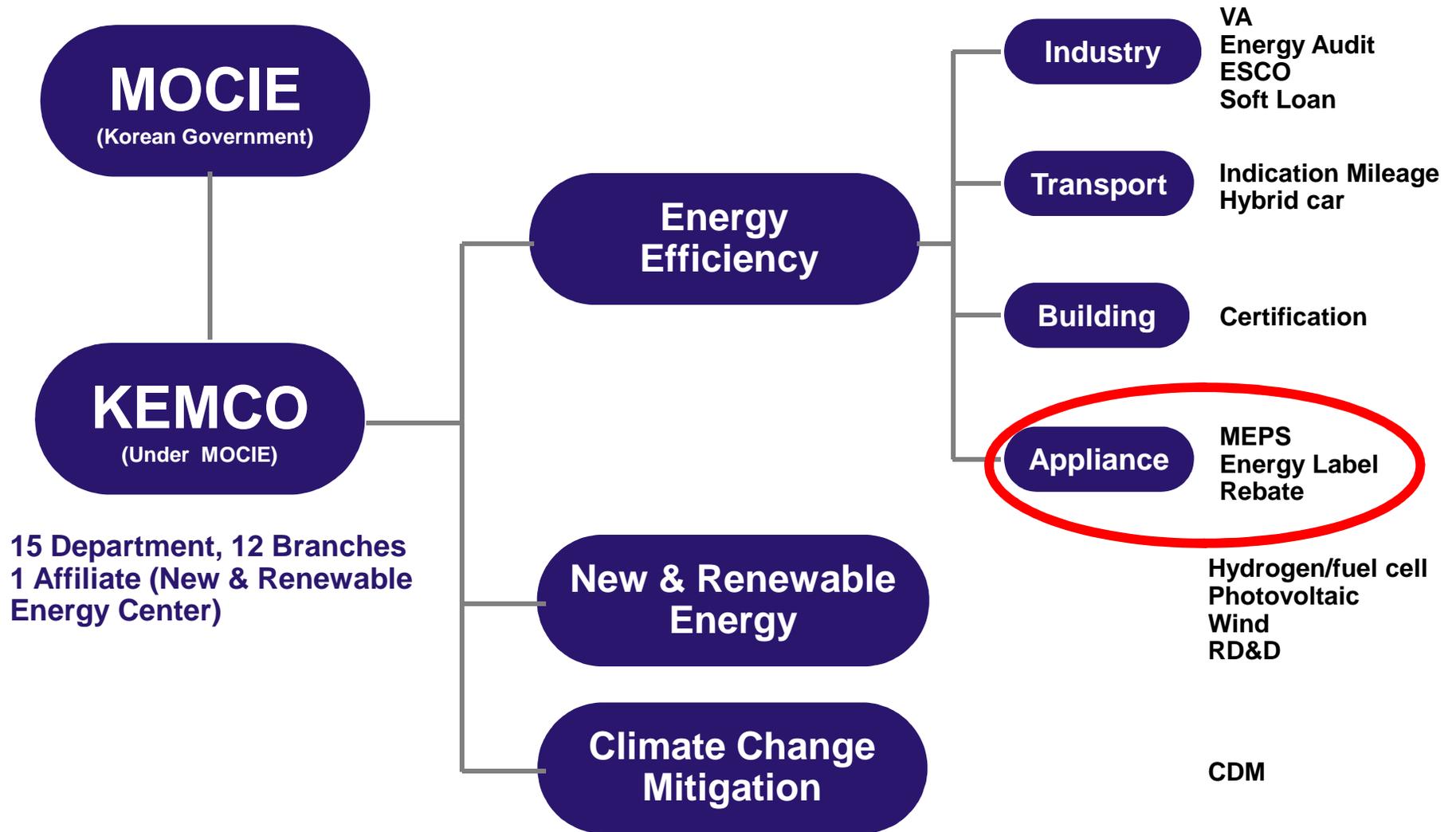
No	Product	Average Standby
1	TVs	4.33W
2	VCRs	5.45W
3	Audios	9.12W
4	DVD Players	12.20W
5	Microwave Ovens	2.77W
6	Cassette radios	1.11W
7	Cord/cordless phones	2.15W
8	Washing machines	1.90W

No	Product	Average Standby
9	Set top boxes	7.85W
10	Mobile phone chargers	1.72W (0.86W*2)
11	Computers	3.26W
12	Monitors	2.53W
13	Printers	3.07W
14	Modems	6.43W
15	Video phones	1.23W
16	Bidets	3.39W



Total	57W (average 3.66W) 306kWh/year
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2. Korea's Energy Efficiency Policy



Korea's Energy Labels & Standards

Energy Efficiency Label and Standard Program (including MEPS)



- **Mandatory** (since 1992)
- **MEPS & 5-grade labeling**
- **Refrigerators, Automobiles, etc (20 items)**

Programs Related Standby

Energy Standards & Labeling

High-efficiency Appliance Certification Program



- **Voluntary** (since 1996)
- **LED traffic lights, Pumps, etc (37 items)**

e-Standby Program



- **Voluntary** (since 1999)
- **Mandatory** (from 2010)
- **TVs, STBs (21 items)**

Korea Energy Label & Standard(1)

◆ Energy Efficiency Label and Standard Program (Including Minimum Energy Performance Standard)

- **Mandatory** indication of energy efficiency grade from 1 to 5
Number one is the best in Korea
- **MEPS** below 5 grade
- **Target products**



Mandatory
Including MEPS

Refrigerators, Freezers, Kimchi refrigerators,
Air Conditioners, Washing machines, Drum washing machines,
Dish washers, Dish driers, Coolers, Rice cookers, Vacuum cleaner,
Electric fans, Air Cleaners, Incandescent lamps, Fluorescent lamps,
CFLs, Ballasts, 3 Phase Electric Motors, Gas Boilers, Automobiles

Korea Energy Label & Standard(2)

◆ e-Standby Program

- Core program to reduce standby power <1W
- **Voluntary** (Mandatory from 2009)
- “Energy Boy” label (or Warning label from 2009)
- Government purchase

- Target products

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



에너지절약

Voluntary (Now)
Products satisfying standby
specification



3. Why Standby is Important?

◆ Most cost-effective way to save energy

- Standby : \$US 1-3
 - : 3-4W → <1W (from 0.03W-1W)
 - : Reducing standby power 75%-90%
 - : only if you change semiconductor is good



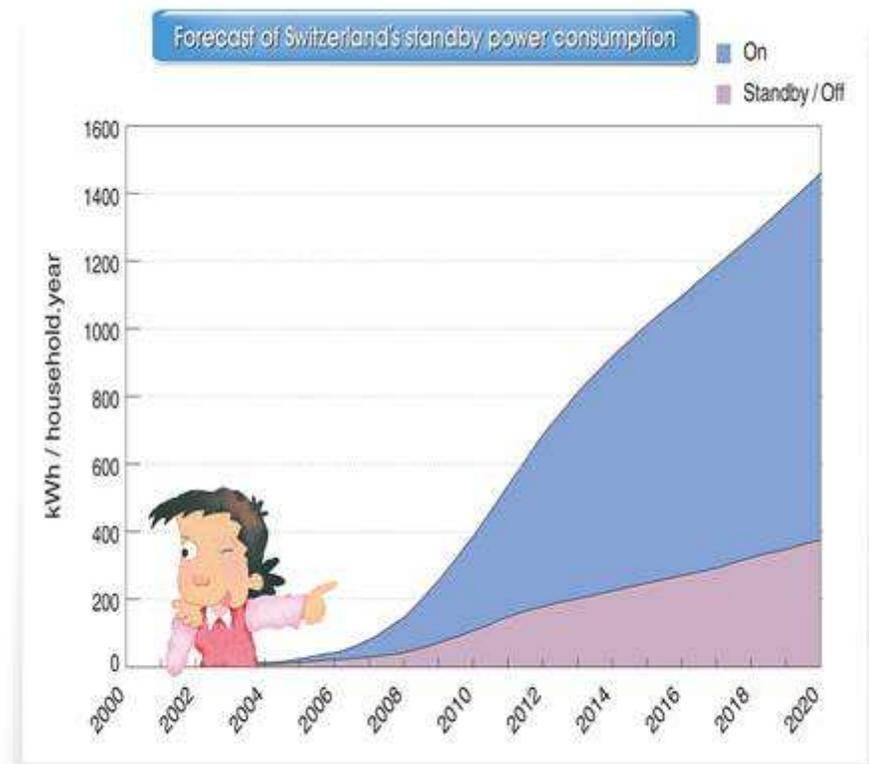
- Air conditioners : \$US 150-200
- Gas boilers : \$US 200



Active Standby, Serious Issue

◆ Standby power of networked devices

- Set top box : 20-40W
- Home network : 70-80W
- : Equivalent to adding 700L refrigerator that take up 20% of total home energy
- Standby power will be 25% of home energy because of home network by 2020
- : Korea will construct 10 million digital home



Type of Waste Standby

Mode	Description	Power	Products	Remark
No load	State of the power supply when no power is being provided to the rest of the appliances	-	External power supplies(<0.5W), Rice cookers	Main Target of <1W Policy
Off	The appliances is switched off and has no capacity	Switched Off	TVs, VCRs, Audios, DVD Players, PCs, Monitors, Printers, Scanners, Copiers, Washing machines	
Passive Standby	The appliance is off, but can be powered up remotely	Switched Off	TVs, VCRs, Audios, DVD Players	
Active Standby	The appliances in on, but is not providing a primary function	Switched Off	Set top boxes, Home network systems	Networked Standby
Sleep	Mode entered after a period inactivity	On and Standby	PCs, Monitors, Printers, Fax machines, Copiers, Scanners, Multifunction Devices	

4. How Can Limit Standby?

◆ Necessity of new mandatory policy tool

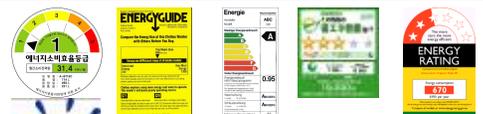
- Voluntary policy have limit
 - : Most of manufacturers ignore voluntary policy
- Minimum Energy Performance Standard is good, but....
 - : MEPS is excessive policy tool only for standby
 - : IT Technology change so fast
 - : Government worry about wrong standard

MEPS



Current Policy Tools

◆ Policy tools for market transformation

Policy Tool	Label	Characteristic	Related Programs
Energy Label	Yes	Mandatory	
MEPS	Yes	Voluntary	
Target	-	Mandatory	Korea, USA, EU, Australia, China
Voluntary Agreement	-	Voluntary	Code of Conduct (EU)
Benchmarking	-	Voluntary	Market Transformation Program (UK)
Procurement	-	Mandatory	FEMP(USA), Green Purchase Law (Japan), China

Thank You! Australia

- ◆ Australia is grandfather of warning label idea



Korea's Warning Label Plan

◆ Korean National Assembly approved to amend “Rational Energy Utilization Act” on November

- Mandatory reporting on standby
: US\$ 5 thousands per model with penalty
- **Mandatory indication warning label** for products failing standby standard
: US\$ 5 thousands per model with penalty



Benefits of Warning Label

◆ Similar MEPS effect, but free for government

- All manufacturers do not like warning label
- It is free for government
 - : IT technology change fast
- **Warning** concept is good for standby
 - : Standby wasted energy = Tobacco



- All kinds of standby can be controlled
 - : No load, off, passive standby, active standby, sleep mode



Policy Tools Comparison

Policy Power : MEPS > **WARNING LABEL** > 1st Energy Efficiency Label > Energy Boy Label

Category	Label	Merits	Demerits	<1W Possibility
MEPS (Mandatory)		Very strong	Sometimes MEPS can prohibit technology development	100%
WARNING LABEL (Mandatory)		Strong. It is some free for government than MEPS.	If product is not famous brand, sometimes manufacturer do not care (ex : external power supplies)	90%
1 st Energy Efficiency Label (Mandatory)		Strong. It is free for government.	It can not cover all category of product	70%
Energy Boy Label (Voluntary)		It is very free for government.	It have limit for <1W	50%

5. Declaration of Standby Power 1W

All products <1W by 2010

◆ Declare of Standby Power to 1W

- Prime Minister, the 26th Energy Saving Promotion Rally (2004.11.12)

: "the government will offer full assistances----by 2010, the standby power of all electronic product shall be reduced to below 1W"

◆ Korea is the 3th country with 1W Policy

- after USA(2001), Australia(2002)
- Korea comply IEA's "1W Initiative"



Products Subject to 1W Policy

◆ Standby Power Consuming Products

- Consumer Electronics

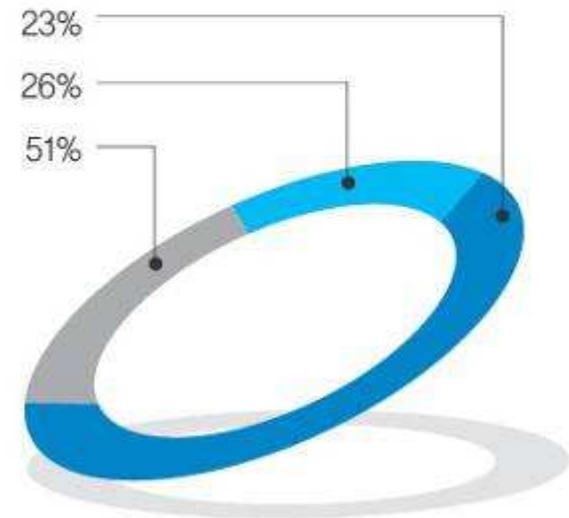
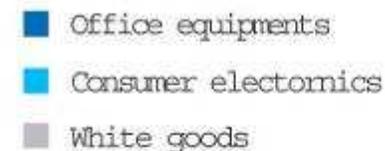
: TVs, VCRs, Audios, DVD Players,
Set top boxes, Microwave Ovens,
Cordless phones

- Office Equipments

: Computers, Monitors, Printers,
Fax machines, Copiers, Scanners,
Multifunction devices, Modems,
External power supplies

- White Goods

: Washing machines, Dish washers, Fans, Rice cookers



Source : Lawrence Berkeley Laboratory

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)



Linear Adapter



Switching Adapter

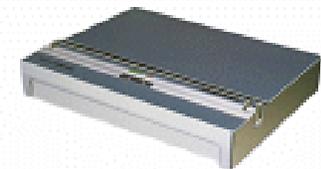
◆ Set top boxes

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



◆ Home networked appliances

- Home gateways, Appliances etc



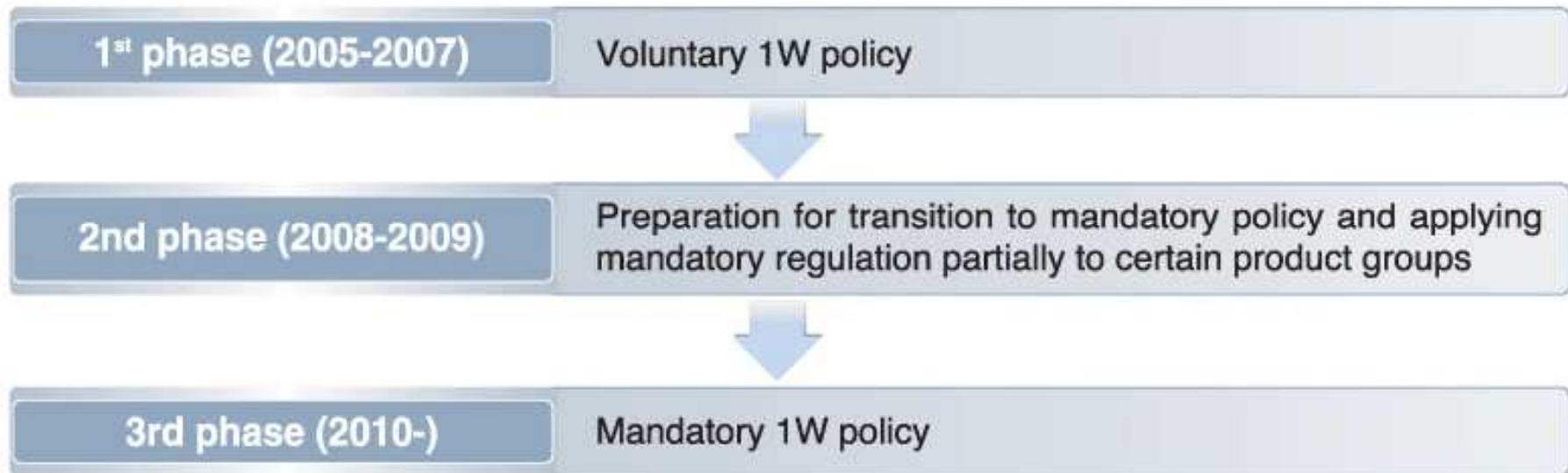
Standby Korea 2010 Objectives

◆ Standby Korea 2010 objectives at each stage

Category	2005	Objective		
		2007	2010	2020
Number of target appliances	18	22	30	30+1Y
(e-Standby Program)	(18)	(20)	(24)	(30+1Y)
(Energy Efficiency Label and Standard Program)	(0)	(2)	(6)	(6)
Average standby power of equipment sold in the market	-	3.0W	2.0W	1.5W
Average standby power of equipment owned by household	3.66W	3.3W	2.5W	2.0W
Standby power 1W diffusion rate	22%	30%	40%	80%
Annual standby power reduction effect	-	-	1,100GWh	6,800GWh
Annual CO ₂ emission reduction effect	-	-	53million ton	329million ton

6. Korea's 1W Policy

◆ Korea's 1-watt plan, Standby Korea 2010



※ Mandatory 1W policy tools : MEPS, Warning label & Energy efficiency 1st grade label



Stage 1 (2005-2007)

1st phase (2005-2007)

Voluntary 1W policy

◆ <1W Standard for Energy Boy

- <1W standard on standby & off mode
 - : <0.5W-0.75W for external supplies
- Office equipment : Sleep mode + <1W off mode

◆ <1W Standard for 1st grade

- 1st grade : Best efficiency + <1W off mode

◆ Government procurement

◆ KS C IEC 62301

- Test procedure of standby power



Implementation <1W Standard

1st phase (2005-2007)

Voluntary 1W policy

Category		Date of enforcement	Target products
Energy Boy Label  에너지절약	2006	TVs, external power adaptors, battery chargers for mobile phone, copiers, cord/cordless phones, energy saving & controlling devices	
	2007.1.1	Monitors, printers, scanners, radios	
	2007.7.1	VCRs, audios, DVD players, microwave ovens, set-top boxes	
	2008.1.1	Modems, bidets, door phones	
	2009.1.1	Computers, multifunction devices	
Energy efficiency 1st grade 	2007.1.1	Washing machines, dish washers	
	2008.1.1	Rice coolers, air cleaners	
	2009.1.1	Drum washing machines, electric fans	

Stage 2 (2008-2009)

2nd phase (2008-2009)

Preparation for transition to mandatory policy and applying mandatory regulation partially to certain product groups

◆ Amending “Rational Energy Utilization Act”

- Mandatory warning label from 2009
- e-Standby Program : Voluntary → Mandatory



◆ Applying MEPS for external power supplies

- Standby(No Load) : $< 0.5W$ (for Adaptors & Chargers)
- On-mode : $> 0.09 * \ln(P_{no}) + 0.5$ (only for Adaptors)
- from 2009



Products of Warning Label

2nd phase (2008-2009)

Preparation for transition to mandatory policy and applying mandatory regulation partially to certain product groups

◆ 20 products will be applied Warning Label

- On the nameplate of failing products standby specification
- Target products : e-Standby Program

From 2009 : TVs, Set-top boxes, microwave ovens, computers, monitors

From 2010 : VCRs, Audios, DVD Players, Bidets, Printers,

Fax machines, Scanners, Modems, Copiers, Multifunction Devices,
Home gateways, Door Phones, Cordless phones, etc



Mandatory

Products failing
standby
specification



Voluntary

Products satisfying
standby
specification

Stage 3 (from 2010)

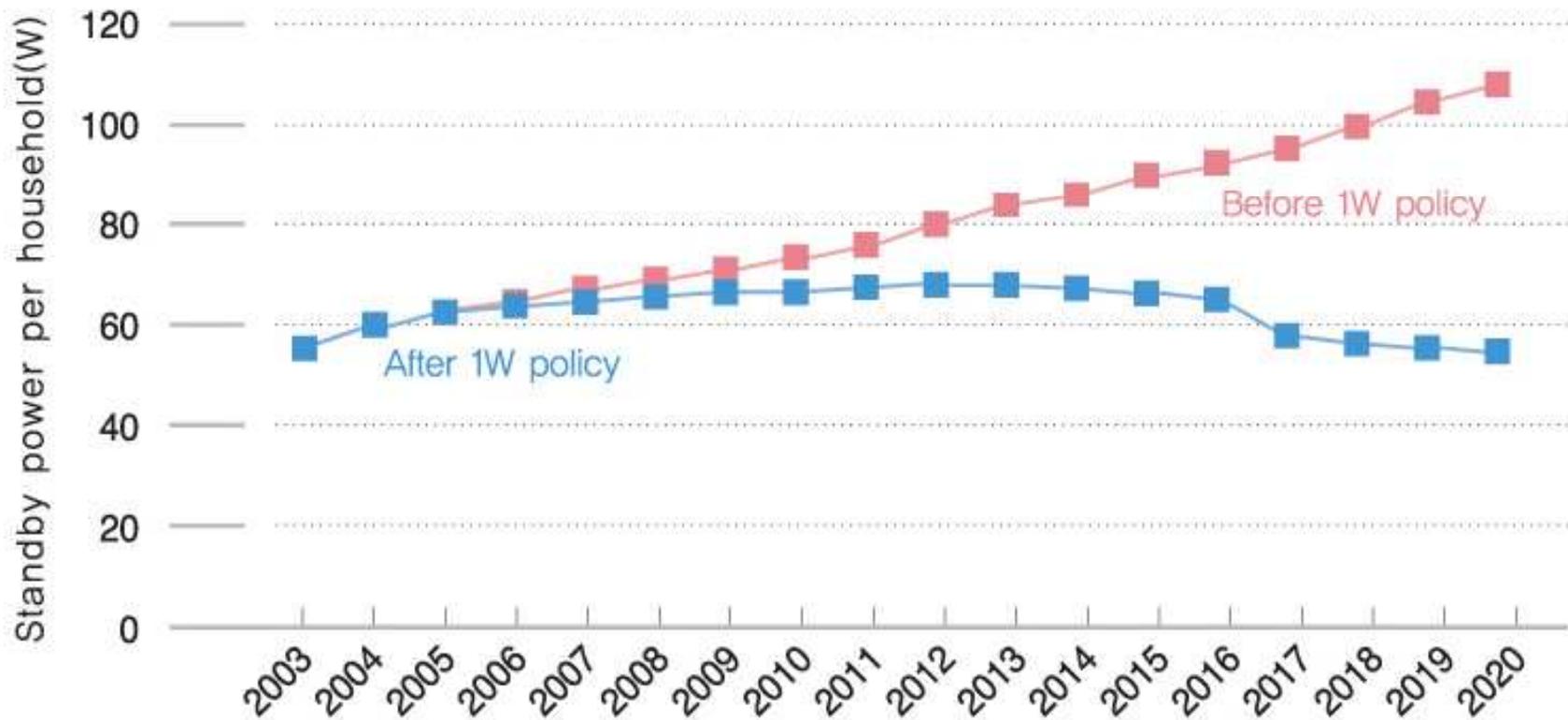
3rd phase (2010-)

Mandatory 1W policy

Policy Tools for <1W		Standby	Products
MEPS (minimum Energy Performance Standard)		<0.5W (No load)	External power supplies
WARNING LABEL (e-Standby Program)	 or  에너지절약	<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
1st Energy Efficiency 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)

The Effect of 1W Policy

◆ Standby power reduction effect per household



Energy Saving Effect

◆ 2010

- 1,100GWh (\$US 11.5 million)/year
Accumulation of 2,550GWh(\$US 26.7 million) by 2010
- 530 thousand ton of CO₂/year

◆ 2020

- 6,800GWh (\$US 71.2 million)/year
Accumulation of 42,000GWh(\$US 4.4 billion) by 2020
- 3.29 million ton of CO₂/year



Thank you

If you have any question,

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