

# ASSESSING THE EFFECTS OF ECO-LABELING PROGRAMS



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Environmental Certification Department  
Environmental Standard Management Office



**01 | Analysis on the Environmental and Economic Benefits of Eco-Friendly Products**

**02 | Voluntary Agreement for Green Purchasing in the Industrial World**

**03 | The Example of Galleria Department Store**

**01** |

# Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Research Background

Promoting public purchase of eco-friendly products and revitalizing civil demand

Objectified analysis and providing information on the benefits of eco-friendly products are necessary

Verifying the objective effects of a mandatory purchase system

- Data on the policy effects of a mandatory purchase system
- Purchase by public bodies : 787billion won('05)→1.584trillion won('08)

Shortage in voluntary purchasing power of consumers

- Upward trend of awareness : 21.3%('05) → 62.6%('07)
- Actual experience of purchase : 21.3%('05) → 35.4% ('07)

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Analysis Project

## Analysis Project

**<the Environmental and Economic Benefits  
When an Office Purchases Eco-friendly Products>**

### The Period

2009.2~2009.12

### Method

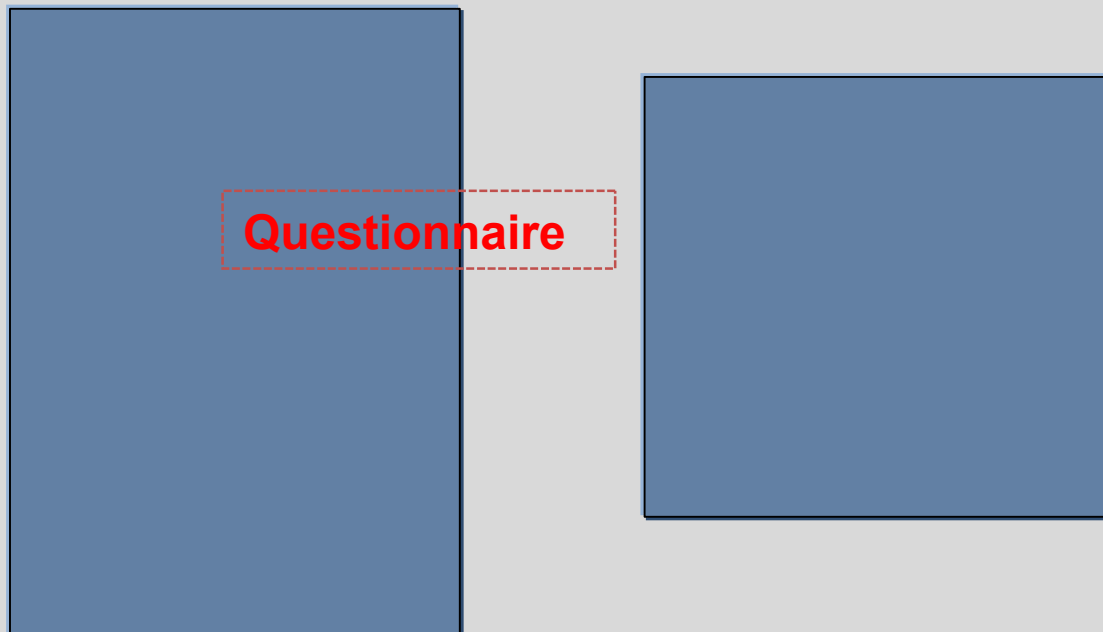
- Survey 100 enterprises about office equipment and supplies.
- Set up a model office through the survey.
- Calculate the benefits through environmental influence analysis(LCA) and alternative cost approach.

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Survey

## Survey

- Target : Offices from 100 enterprises
- Questions
  - Space area including details and the number of meeting rooms.
  - the number of staffs
  - the number and kind of office equipment, furniture and etc.
  - the amount of office supplies used(copying papers, tissues and etc.)



# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Survey

## Survey Example



Target Office	S F&B Purchasing Team
Space	198m <sup>2</sup>
Number of Staffs	16
Paint Coating	Paint Coating
The Number of Window Side	1
The Area of Wall Surfaces (h=2.8m, Window Side not Calculated)	39.312 * 3 = 117.93m <sup>2</sup>
Multifunctional Devices	1
Desktop computer	10
Fax Machine	1
Laptop	6
Air Conditioner	3
Vacuum Cleaner	1
The Number of Desks	18
The Number of Book Shelves	16
The Number of Dressers	16
The Number of Tables	2
The Number of Partitions	10
Fluorescent Lamp, Light Bulb	27, 5
Newspapers Subscription	2
The Average Copy-paper Use (a month)	16 bunches
The Average Tissues Use (a month)	40 Boxes

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

## Average Office Size and Products

◆ Size : 438m<sup>2</sup> 47 staffs

◆ Office Product and Chemicals List

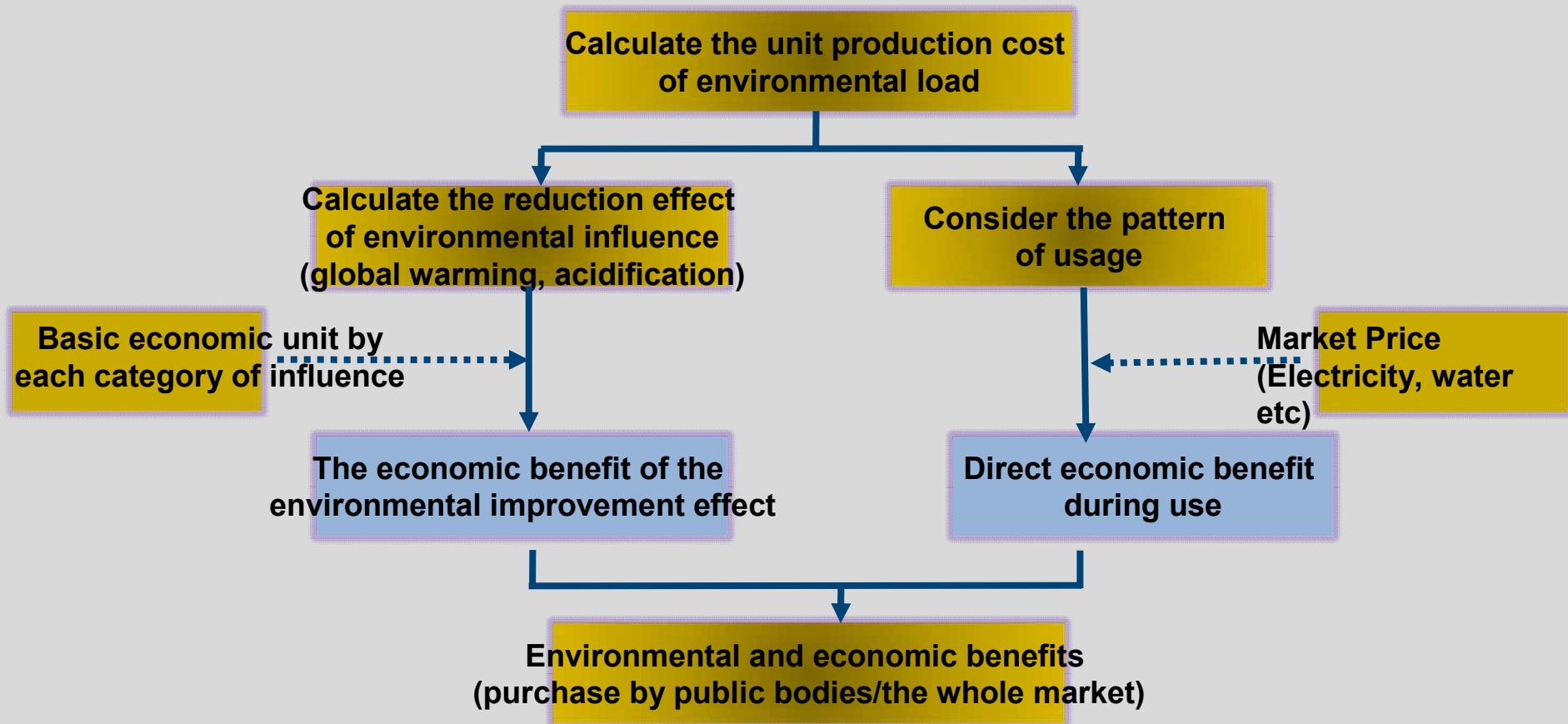
List	Products	No.	List	Products	No.
1	Copier (item)	2	14	Television CRT (item)	0
2	Multi-functional copier (item)	2	15	Television LCD (item)	1
3	Laser printer (item)	3	16	Television PDP (item)	0
4	Laser fax (item)	1	17	Paint (L)	100
5	Desktop computer (item)	28	18	Desk (item)	47
6	Computer monitor (item)	27	19	Bookshelf (item)	32
7	Laptop (item)	23	20	Drawer (item)	32
8	Electric water chiller and heater	2	21	Table (item)	6
9	Air conditioner (item)	3	22	OA partition (item)	30
10	Refrigerator (item)	1	23	Fluorescent lamp (item)	109
11	Vacuum cleaner (item)	0	24	Newspaper subscription (item)	7
12	Electric kettle (item)	1	25	Copying paper (box)	22
13	Electric coffee maker (item)	1	26	Tissue (item)	38



# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Method of Analysis

## Methodology of Analysis

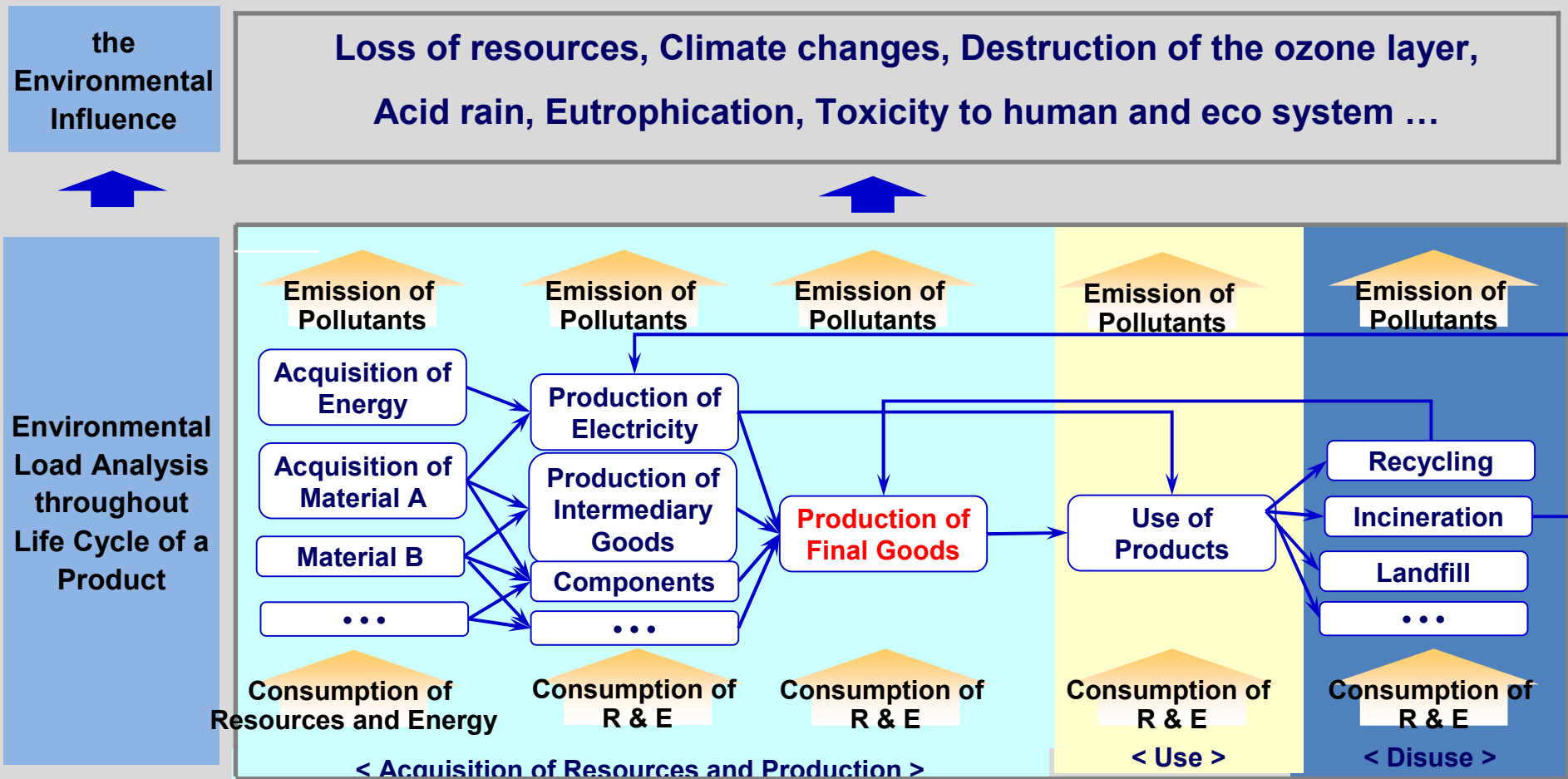


# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| The Application of LCA

## the Calculation of Environmental Influence by LCA

- By utilizing national LCI DB, overseas DB, and related papers



# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Basic Economic Unit

## Basic Economic Unit by Each Category of Influence

- By utilizing national LCI DB, overseas DB, and related papers

Influence Categories		Unit	Won (the Korean Monetary Unit)
6 Categories on LCA Methods	Resource Consumption	kg Sb	5,140
	Global Warming	kg CO <sub>2</sub>	15.13
	Destruction of the Ozone	kg CFC11	85,025
	Acidification	kg SO <sub>2</sub>	11,571
	Eutrophication	kg PO <sub>4</sub> <sup>3-</sup>	35,599
	Photochemical Oxidants	kg C <sub>2</sub> H <sub>4</sub>	7,449

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Basic Economic Unit

## Materials Used to Calculate Each Category of Influence

### Global Warming(kg CO<sub>2</sub>-eq)

- **Average price from CDM(Clean Development Mechanism) market in 2008**  
: **15.57 US\$/t CO<sub>2</sub>**  
- The World Bank, *State and Trends of the Carbon Market 2009*, 2009.

### Eutrophication(kg PO<sub>4</sub><sup>3-</sup>-eq)

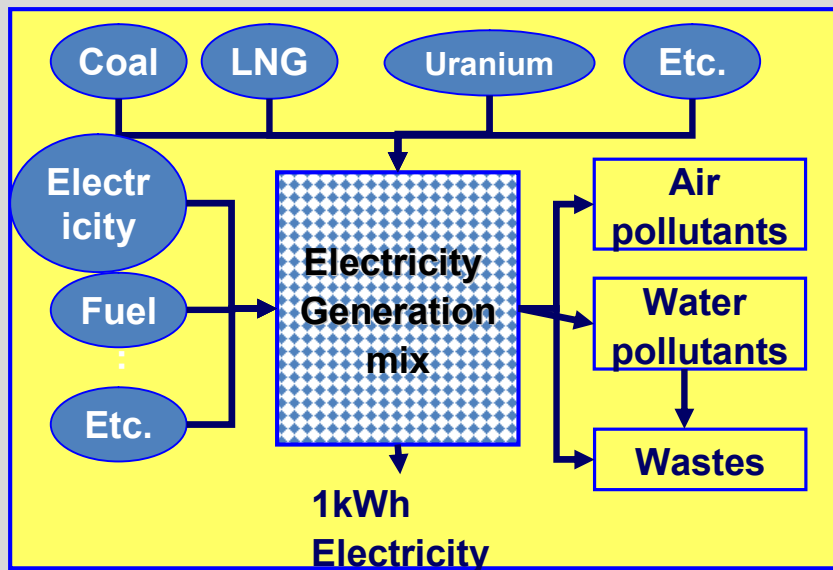
- **Clean-up costs of phosphate : 35,599KRW/kg PO<sub>4</sub><sup>3-</sup>**
- **Clean-up costs of phosphorus : 109,093KRW/kg P**  
- Ministry of Environment, 「Research on the Actual Conditions about Operation of Public Sewage Plant in 2007」, 2008.
- **Conversion clean-up costs of phosphate from the costs of phosphorus**  
- Mass ratio of phosphate(PO<sub>4</sub><sup>3-</sup>) to phosphorus(P) : 31/95

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

Calculation of Influence

## Electricity and Environmental Influence

- **Assumption and scenario** : the application of electric consumption difference between eco-friendly products and ordinary products by reflecting pattern of usage
- **Environmental influence of 1kWh electricity by each category**
  - the weighted average result of domestic production ratio of electricity from gas, water power, nuclear power and etc.
  - National LCI DB, Ministry of Knowledge Economy, 2000



Influence Categories	Results	
Loss of resources	$3.21 \times 10^{-3}$	kg Sb-eq/kWh
Global warming	$4.95 \times 10^{-1}$	kg CO <sub>2</sub> -eq/kWh
Influence to the ozone layer	$1.37 \times 10^{-11}$	kg CFC11-eq/kWh
Acidification	$8.37 \times 10^{-4}$	kg SO <sub>2</sub> -eq/kWh
Eutrophication	$1.56 \times 10^{-4}$	kg PO <sub>4</sub> <sup>3-</sup> -eq/kWh
Photochemical Oxides	$3.83 \times 10^{-4}$	kg C <sub>2</sub> H <sub>4</sub> -eq/kWh

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

## Calculation of Indirect Benefits

### The Reduction of Electricity Consumption and Environmental Influence by using of an Eco-friendly Desktop Computer

(1 item for 1 year)

	Environmental Influence	Economic Benefits(KRW)
Electricity Reduction (kWh)	7.6	
Loss of Resources (kg Sb-eq)	2.44X10 <sup>-2</sup> , 7.6 X (3.21X10 <sup>-3</sup> )	125 (2.44X10 <sup>-2</sup> )X5,140
Global Warming (kg CO <sub>2</sub> -eq)	3.76X10 <sup>0</sup> , 7.6 X (4.95X10 <sup>-1</sup> )	56.9
Influence to the Ozone Layer (kg CFC11-eq)	1.04X10 <sup>-10</sup> , 7.6 X (1.37X10 <sup>-11</sup> )	0
Acidification (kg SO <sub>2</sub> -eq)	6.36X10 <sup>-3</sup> , 7.6 X (8.37X10 <sup>-4</sup> )	73.6
Eutrophication (kg PO <sub>4</sub> <sup>3-</sup> -eq)	1.19X10 <sup>-3</sup> , 7.6 X (1.56X10 <sup>-4</sup> )	42.2
Occurrence of Photochemical Oxides(kg C <sub>2</sub> H <sub>4</sub> -eq)	2.91X10 <sup>-3</sup> , 7.6 X (3.83X10 <sup>-4</sup> )	21.6
<b>Indirect Economic Benefits</b>		<b>320 (0.3 US\$)</b>

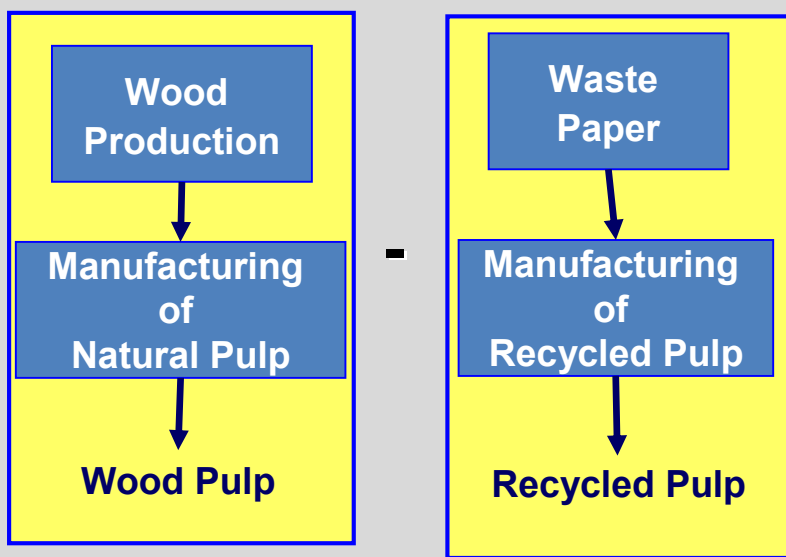


# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Calculation of Influence

## The Use of Recycled Pulp

- **Assumption and scenario**
  - Ordinary printing and copying paper is made from wood / Eco-friendly paper is made from recycled pulp.
  - Recycled pulp is considered as resource and assumed that the production process is same as wood pulp
- **Environmental merit when recycled pulp is used rather than wood pulp**
  - National LCI DB, Ministry of Knowledge Economy, 2000 & Habersatter et al., 1998.



Influence Categories	Results	
Loss of resources	$1.87 \times 10^{-3}$	kg Sb-eq/kg
Global warming	$9.84 \times 10^{-2}$	kg CO <sub>2</sub> -eq/kg
Influence to the ozone layer	$4.81 \times 10^{-8}$	kg CFC11-eq/kg
Acidification	$5.22 \times 10^{-3}$	kg SO <sub>2</sub> -eq/kg
Eutrophication	$6.20 \times 10^{-4}$	kg PO <sub>4</sub> <sup>3-</sup> -eq/kg
Photochemical Oxides	$4.74 \times 10^{-4}$	kg C <sub>2</sub> H <sub>4</sub> -eq/kg

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

## Calculation of Indirect Benefits

### The Reduction of Environmental Influence by using of Copying Paper Made from Recycled Pulp

1 Box\*

	Environmental Influence	Economic Benefits(KRW)
Reduction of wood pulp (kg)	9.94	
Loss of Resources (kg Sb-eq)	2.00X10 <sup>-2</sup> , 9.94 X (1.87X10 <sup>-3</sup> )	1.03X10 <sup>2</sup> 5,140 X (2.00X10 <sup>-2</sup> )
Global Warming (kg CO <sub>2</sub> -eq)	1.06X10 <sup>0</sup> , 9.94 X (9.84X10 <sup>-2</sup> )	1.60X10 <sup>1</sup>
Influence to the Ozone Layer (kg CFC11-eq)	5.16X10 <sup>-7</sup> , 9.94 X (4.81X10 <sup>-8</sup> )	4.39X10 <sup>B-2</sup>
Acidification (kg SO <sub>2</sub> -eq)	5.59X10 <sup>-2</sup> , 9.94 X (5.22X10 <sup>-3</sup> )	6.47X10 <sup>2</sup>
Eutrophication (kg PO <sub>4</sub> <sup>3-</sup> -eq)	6.65X10 <sup>-3</sup> , 9.94 X (6.20X10 <sup>-4</sup> )	2.37X10 <sup>2</sup>
Occurrence of Photochemical Oxides (kg C <sub>2</sub> H <sub>4</sub> -eq)	5.08X10 <sup>-3</sup> , 9.94 X (4.74X10 <sup>-4</sup> )	3.78X10 <sup>1</sup>
<b>Indirect Economic Benefits</b>		<b>1,040 (0.9 US\$)</b>

1 Box = 1 Bunch of A4(500sheets) X 5





# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Direct Economic Benefits

## Direct Economic Benefits

- **Calculated by Electric Rates in 2008**
  - Economic benefits by product price are not considered
  - Electric Rates 97.68KRW/ kWh

# 01. Analysis on the Environmental and Economic Benefits of Eco-Friendly Products

| Results

## The Benefits of Green Purchasing (at Model Office : 438m<sup>2</sup>, 47 staffs, 1 Year)

Products	Indirect Benefits (KRW)	Direct Benefits (KRW)	Products	Indirect Benefits (KRW)	Direct Benefits (KRW)
Copier	294	3,415	Television LCD	3	79
Multi-functional copier	210	2,438	Paint	5,528	
Laser printer	331	3,839	Desk	23,139	
Laser fax	340	3,942	Bookshelf	18,479	
Desktop computer	8,955	103,932	Drawer	56,128	
Computer monitor	18,398	213,521	Table	3,729	
Laptop	1,417	16,445	OA partition	172	
Electric water chiller and heater	3,023	35,083	Fluorescent lamp	33,998	78,789
Air conditioner	71	1,647	Newspaper subscription	4,095	
Refrigerator	48	1115	Copying paper	22,886	
Electric kettle	1	32	Tissue	22,912	
Electric coffee maker	5	116			

- Indirect Benefits : 465,507 KRW (423 US\$)
- Direct Benefits : 252,737 KRW (230 US\$)

**02** |

# **Voluntary Agreement for Green Purchasing in the Industrial World**

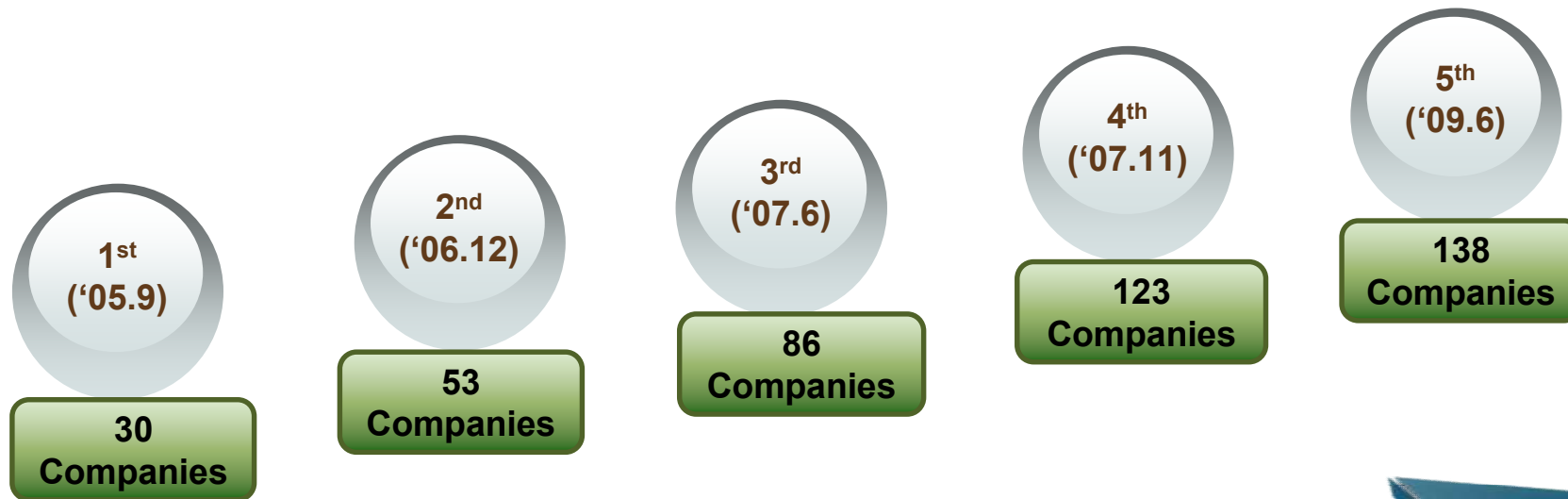
### Developing a Voluntary Agreement in the Industrial World

- **The role of the industrial world, which is the main force behind civil sector production and consumption, is important in order to spread an eco-friendly culture of production and consumption**
- **Managing and concluding a voluntary agreement between the government and the industrial world in order to induce green purchasing throughout the industrial world and also to promote the autonomous production and purchase of eco-friendly products by companies**

## 02. Voluntary Agreement for GP in the Industrial World

| Companies in Agreement

### Companies in Voluntary Agreement for GP



- Re-negotiating the agreement on a 3 year basis



## 02. Voluntary Agreement for GP in the Industrial World

| Green Purchasing Guidelines

### Establishing a Green Purchasing Guidelines

- Developing and supplying a regulation recommendation plan in the industrial world : includes the stage for carrying out green purchasing and its cases
- Defining the definition and application range of green purchasing and its roles by department
- 74 companies including KIA motors, POSCO enacted the agreement('11.12.31)



<Regulation Recommendation Plan for Green Purchasing in the Industrial World>

**03** |

# The Example of Galleria Department Store

# 03. The Example of Galleria Department Store

## ◆ Galleria Time Land



- Installed 1300 LED lamps
- Reduced electricity by 193kW each day



- Installed water saving shower heads
- Saves about 40 tons of water a day



- Installed ceiling insulation
- Prevents rise in water temperature
- Saves about 5 tons of water a day



# 03. The Example of Galleria Department Store

## ◆ Galleria Central City



- 270 employees use the company shuttle bus for commuting
- Reduced 1,914kg of  $CO_2$  a day
- Has the same effect of planting 13 trees



- Night work is conducted only twice a week
- Reduced the amount of electricity used



- Operating the ice thermal turbo refrigeration machine late at night
- Producing ice by using late at night electricity which is cheaper than daytime.

# THANK YOU FOR YOUR ATTENTION



Eco-labeling : Realizing Green Growth, Green Consumption & Green Society

Environmental Certification Department  
Environmental Standard Management Office

Tel. : +82-2-380-0415

<http://el.keiti.re.kr/eng/index.do>