March 11, 2005 ,NIES, Tsukuba, Japan

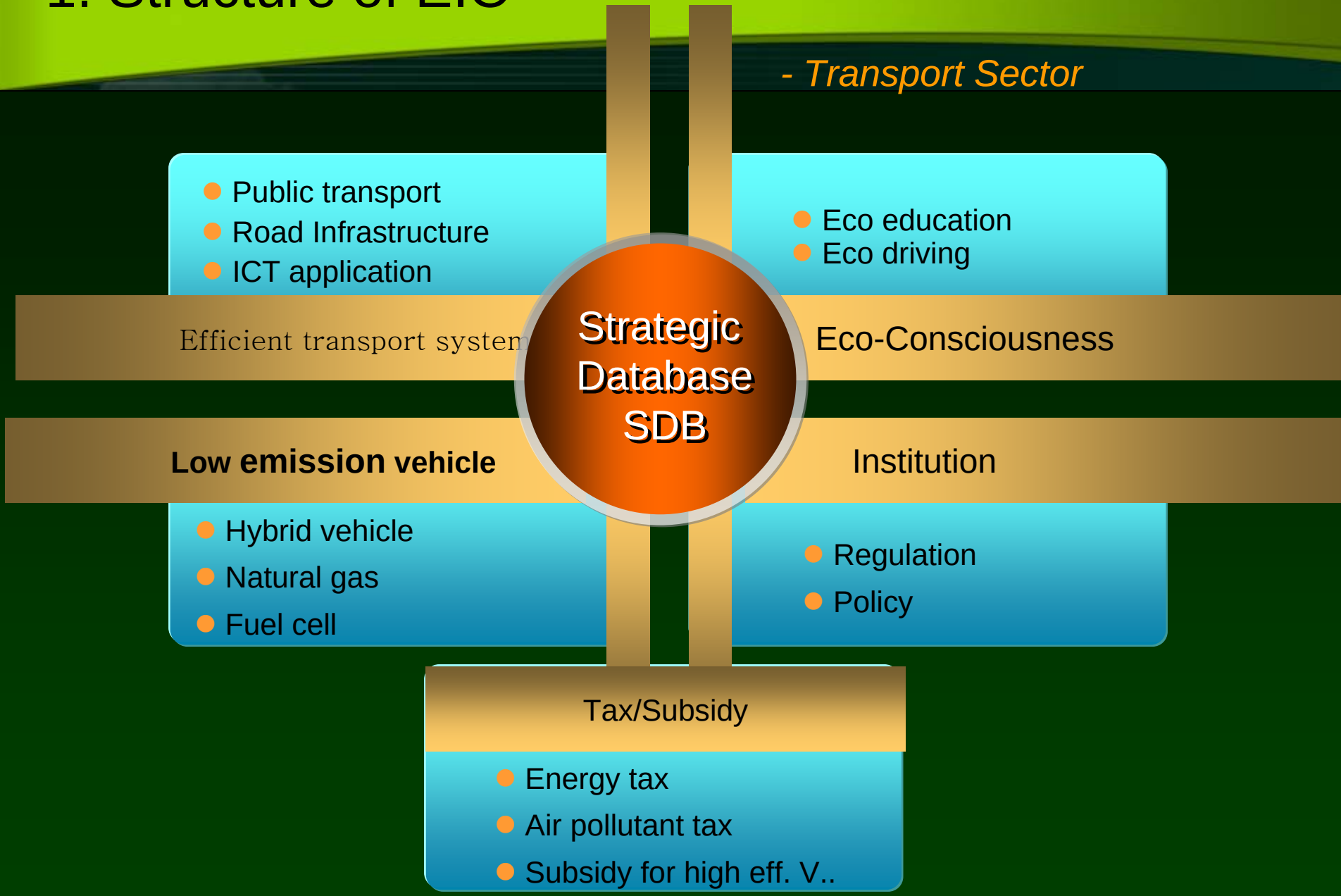
RCC meeting of APEIS-SDB

So Won Yoon
Seoul National University, Korea
Tae Yong Jung
IGES, Japan
Dong Kun Lee
Seoul National University, Korea

Table of Contents

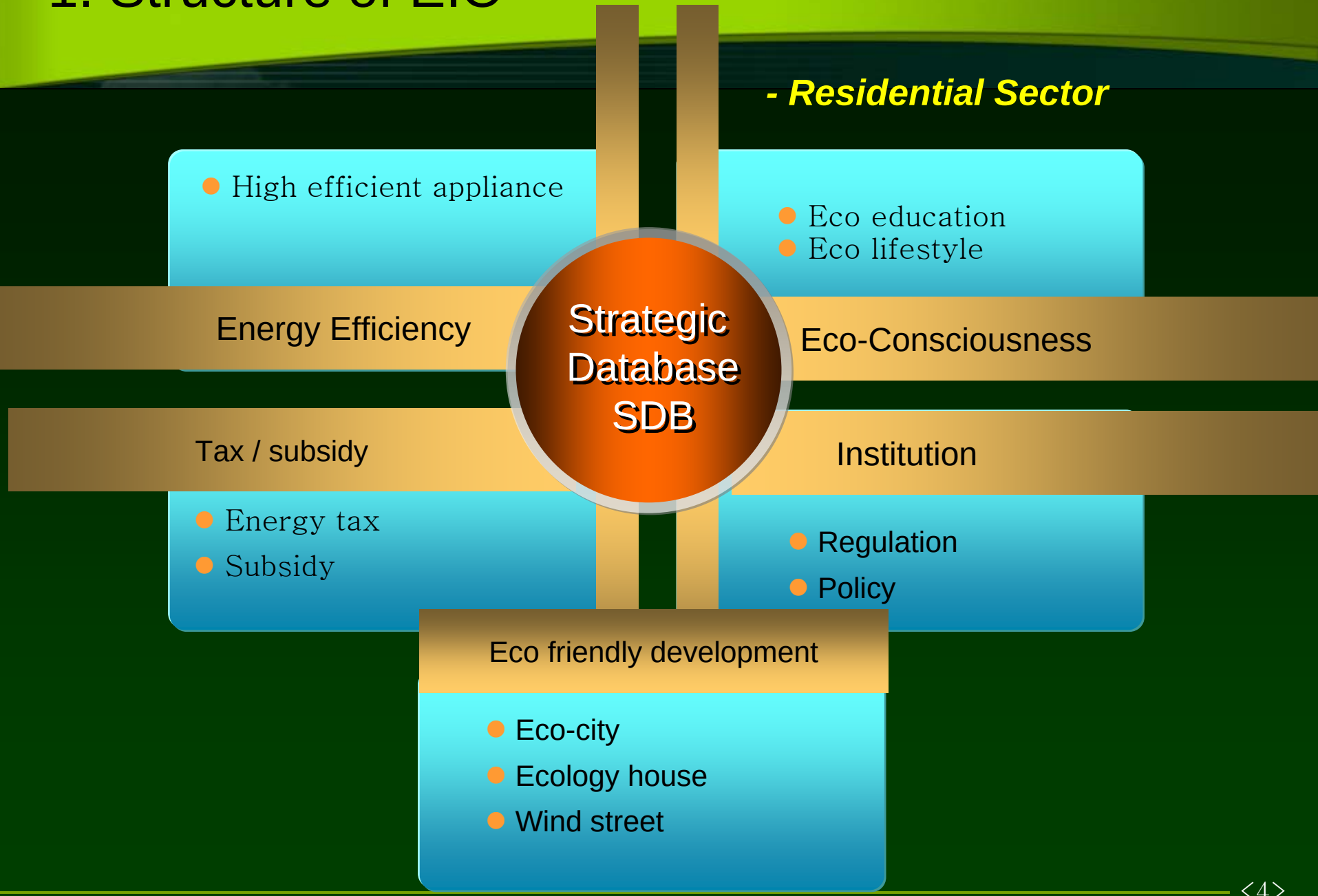
1. Structure of EIO

- Transport Sector



1. Structure of EIO

- Residential Sector



2. List of EIO

- Transport Sector

Institution	Metropolitan area air quality improvement special law
Eco consciousness	Understanding destination before departure
	Don't do that unnecessary idling
	Don't load unnecessary luggage
	Economy speed observance
	Don't do sudden starting, braking and accelerating
	Tire pressure maintenance
	Walking short distance
	Buying high energy efficiency car
	Using compact car
	Car account book
	Using public transportation

2. List of EIO

- Transport Sector

Low emission vehicle	CNG Vehicle Program
	Electronic car & Hybrid electronic car
	Diesel Particulate Filter
	Lighting the Weight of Vehicle
	Fuel cell
Efficient transport system	Bus-only Central Lane in Seoul
	Highway Traffic Management System
	National Highway Traffic Management System
	Bicycle road
	ITS (Intelligent Transportation System)
	Improvement of Traffic Charge System
	Traffic Congestion Charge
	Bus Rapid Transit (BRT)
	Electronic Toll Collection System: ETCS

2. List of EIO

- Residential Sector

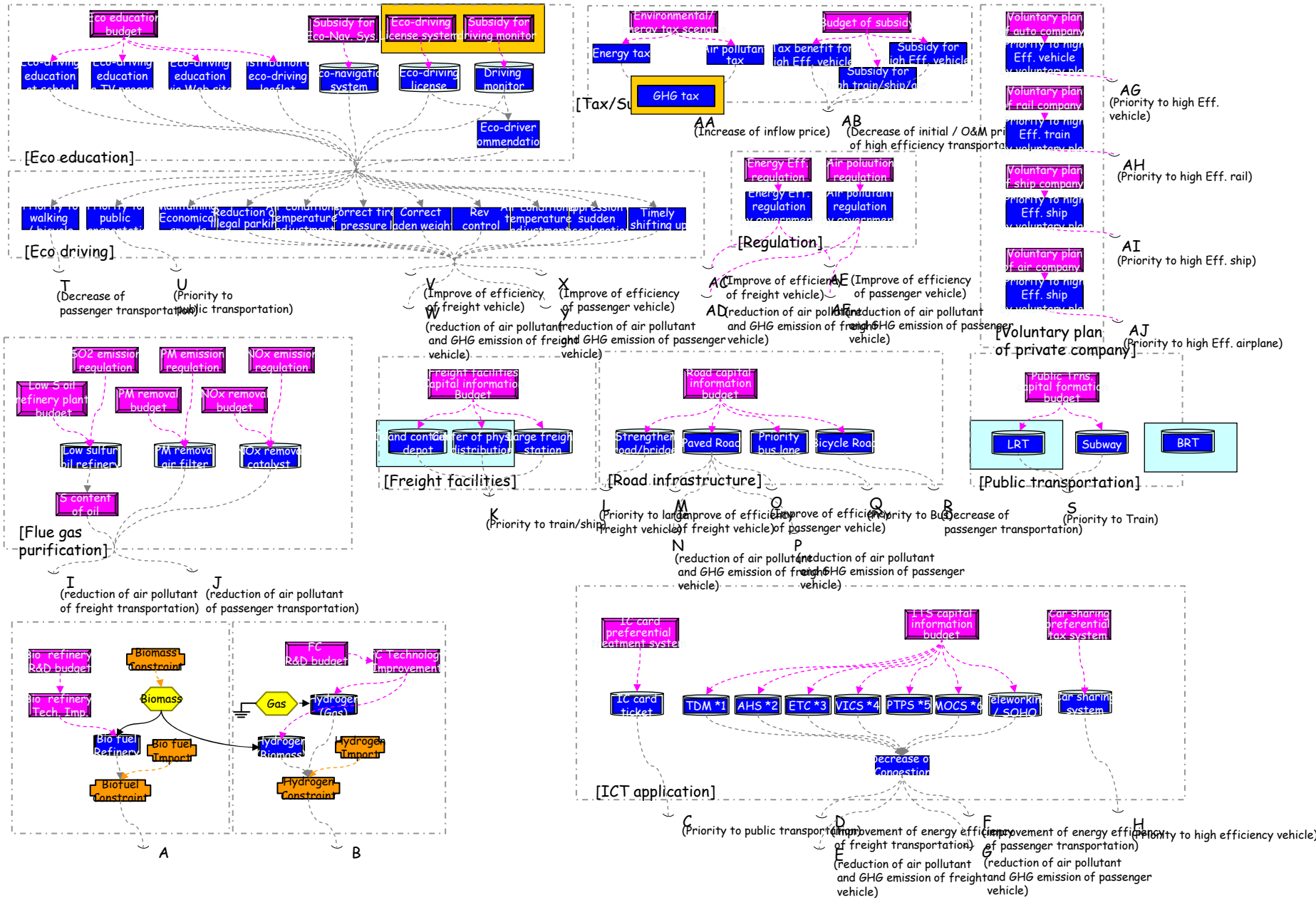
Economic method	energy tax
	Subsidy
Institution/policy	Promotion of Eco-Product Purchase Law
	The promotion of Rainfall usage: facilities & Policy
Ecology house	Sun-flooded house
	Drafty house
	Green roof system
	Air tight and insulated house
	artificial ground greening system
Urban development	community garden
	Eco friendly house town design
	Wind corridor
Eco consciousness (Eco education)	Eco education at school
	Eco education via TV program
	Eco education via web site
	Holding environmental events
	Establishment of earth day
	Establishment of eco incentive system
	Promotion of environmental appliance store
	Promotion of eco label

2. List of EIO

- Residential Sector

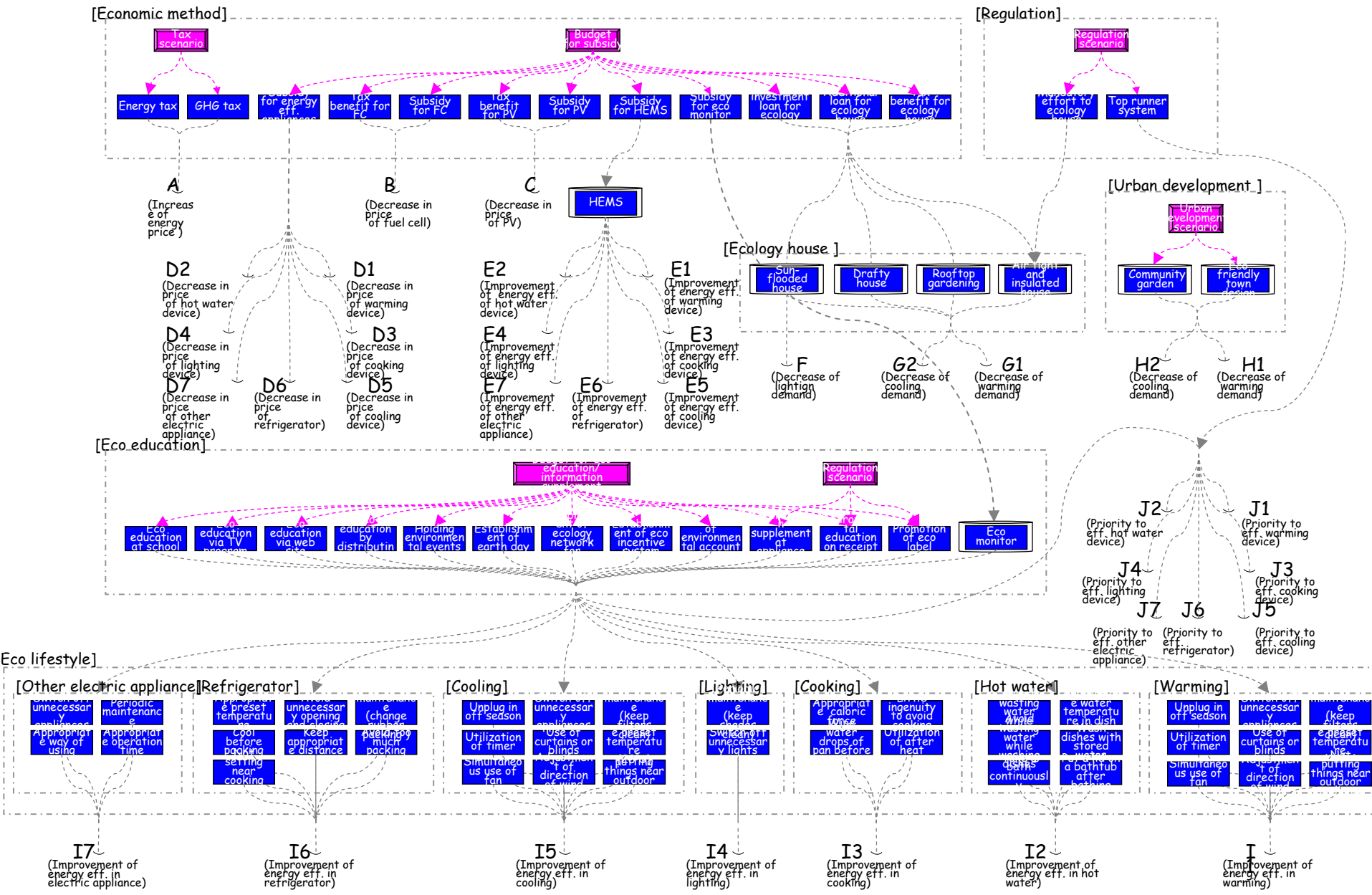
Eco consciousness (Ecolife style)	Wearing thick underwear in the winter
	Lighting & shading
	Lighting follow with the size of area
	Plug off no use electronic machinery
	Buying high energy consumption efficiency product
	Making a double window
Efficient appliance	Negative ion bulb
	PSL : Power Saving & Safety Lamp
	Garbage Bag Charge System
	Condensing Boiler
	Air condition (economy cooling system)
	High efficiency refrigerator
	High efficiency device
	Adiabatic house
	Changing the electronic bulb to the fluorescent lamp
	5kW class polymer fuel cell system for residence
	Photovoltaic power generation technology
	Building automation system

3. Diagram & Illustration *- Transport Sector*



3. Diagram & Illustration

- Residential Sector



4. Example of EIO

- Transport Sector

- Institution / Policy

- **Metropolitan area air quality improvement special law**

- Descriptions
  * The Ministry of Environment (MOE) of Republic of Korea (ROK) develop a 10-year framework plan for the air quality control in the metropolitan area of Seoul
  - Based on this framework plan, the local governments will establish 5-year implementation plans and selected special agencies will coordinate the air quality control plans.
  * The Total Air Pollution Load (TAPL) management system entails a calculation of the environmental carrying capacity, and a policy to 'cap' the amount of pollution discharge in the region.
  * the MOE is encouraging the consumers to make environmentally sound choices.

4. Example of EIO

- Transport Sector

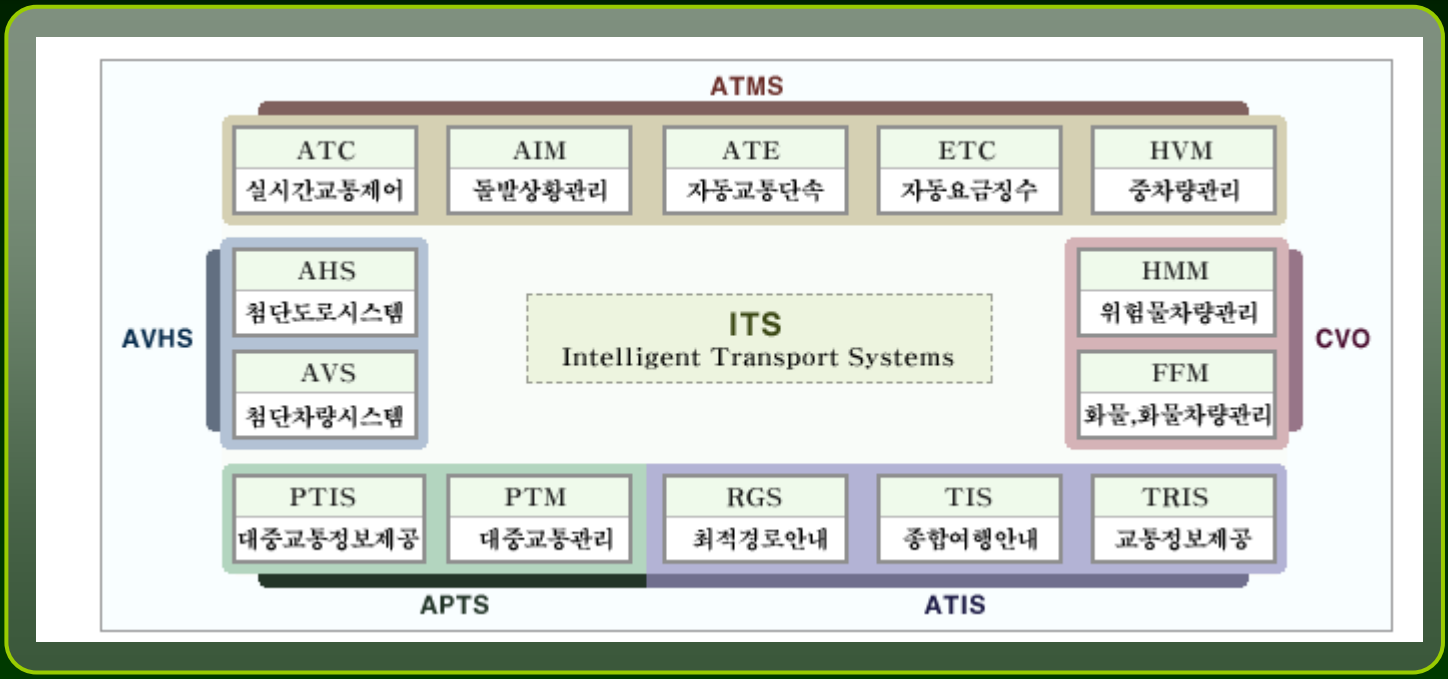
- Institution / Policy

- **ITS (Intelligent Transportation System)**

- Descriptions
  - ITS master plan 21 was finalized in March 2001.
  - Background : The demand for new transportation policy due to the heavy traffics
  - Strategy step
    -Step 1(2001~2005) Make a base for New service application & verification
    -Step 2(2006~2010) Expansion of the verified new service
    -Step 3(2011~2020) Improvement & Reform of new service
  - Main project : Highway Traffic Management System, National Highway Traffic Management System

4. Example of EIO

- Transport Sector



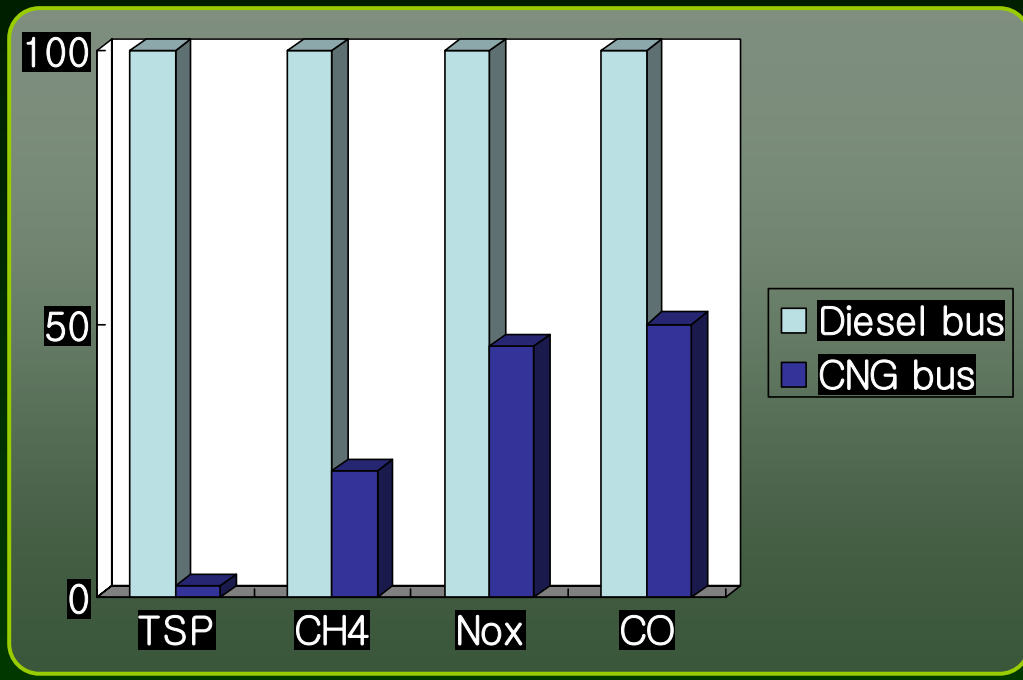
4. Example of EIO

- Transport Sector

- Policy / Efficient technology
- **CNG Vehicle Program**
- Descriptions
  *CNG Local Bus
  -Substituting CNG for 20,000 diesel buses until 2007 in the whole cities
  -Subsidy : government & local government 22.5million won, fuel 8.5million won, deduction of tax 460,000won, environmental improvement responsibility fee 1,660,000won
  -83 gas stations operating, a plan to build 17 gas stations and 17 moving gas stations operating now
- GHG emission : comparing with diesel bus, exhaust fumes 0%, HC 16%, Nox 37%, CO 41%

4. Example of EIO

- Transport Sector



4. Example of EIO

- Transport Sector

- Low emission vehicle

- **Electronic car & Hybrid electronic car**

- Descriptions
  * improved performance due to the development of high efficient motor & battery
  *Now New technology to charge within 30 minutes is under development.
  *A parallel circuit type of hybrid car is under development.
  *Hyundai - Tucson Hybrid car(FCHEV) has been doing showing race in America. RV car (Santafe) has been doing showing race in Jeju island.(2003.11~2005.10)

- GHG emissions
  *No exhaust emission
  *Hybrid electronic car reduce pollution
  *Hybrid electronic car 30km/L , normal car 10km/L - 3 times fuel economy

4. Example of EIO

- Transport Sector

4. Example of EIO

- Residential Sector

- Policy/ Eco friendly facilities

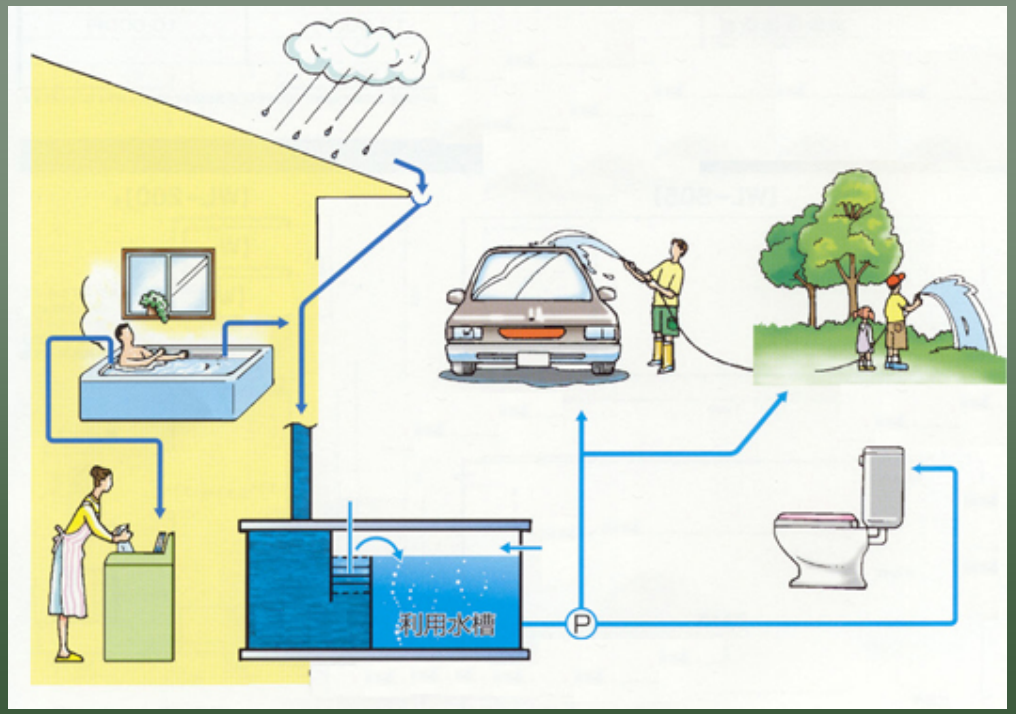
- **The promotion of Rainfall usage: facilities & Policy**

- Descriptions
  - •Capital law(2001.3. reform)
    -A duty to establish facility for the use of rainfall where stadium, indoor gym and so on have roof (more than 2,400m²), visitor capacity (more than 1,400 seats)
    -Government and local government supply construction costs and local government can reduce water rate.
    -A fine is under 10 million won, when the requirement is not met.

- Social barrier
  - *The two-third of yearly precipitation concentrates in taiphoon season from June to August.
    *The one-fifth of yearly precipitation concentrate in the dry season from November to April.
    *The outflow of rainy season is copious. On the other hands, the outflow of dry season is short.

4. Example of EIO

- Residential Sector



4. Example of EIO

- Residential Sector

- Policy

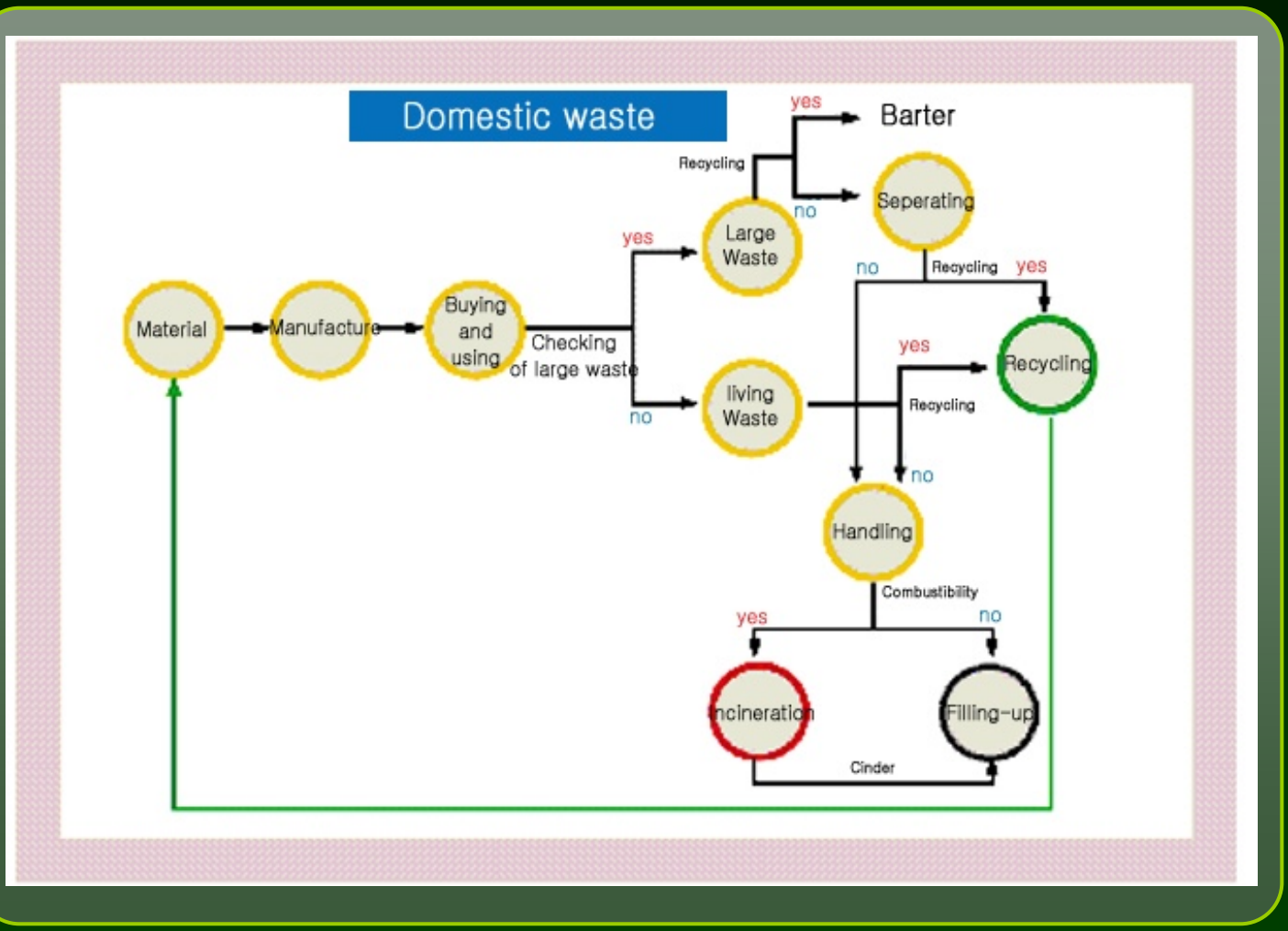
- **Garbage Bag Charge System**

- Description
  * Garbage Bag Charge system is applied to general garbage management area on 1 of article13 of RCRA (Resource Conservation and Recovery Act)
  * Application target is general garbage & some of business general garbage that can apply to standard of general garbage.
  * The fee of collection, movement and management, residents pay the money that is dumping amount of garbage.
  *Town unit garbage bag charge system for small rural place

- Secondly effect
  *Annual garbage quantity - Quantity of recycled garbage has increased 145.9% than 1994. In other words, quantity of dumping garbage has decreased 43.2%. *Annual garbage bag sale quantity - Sale quantity was 941 million sheets in 2003 decreased 40.8% than 1,590 million sheets in 1995.

4. Example of EIO

- Residential Sector



5. Analysis (samples)

- Transport Sector

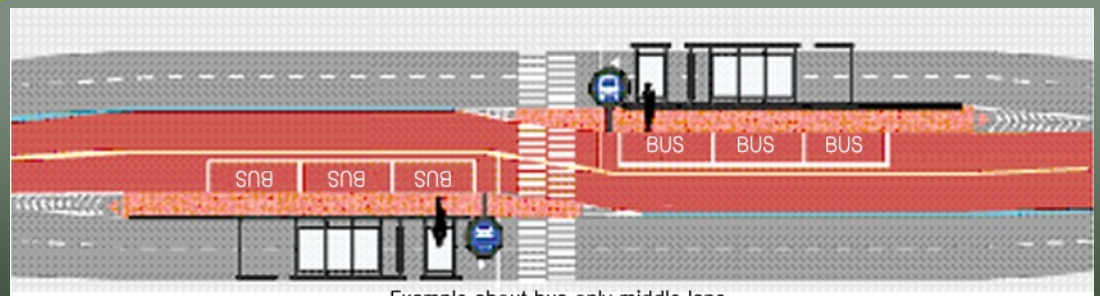
- Institution / Policy

- Bus-only Central Lane in Seoul

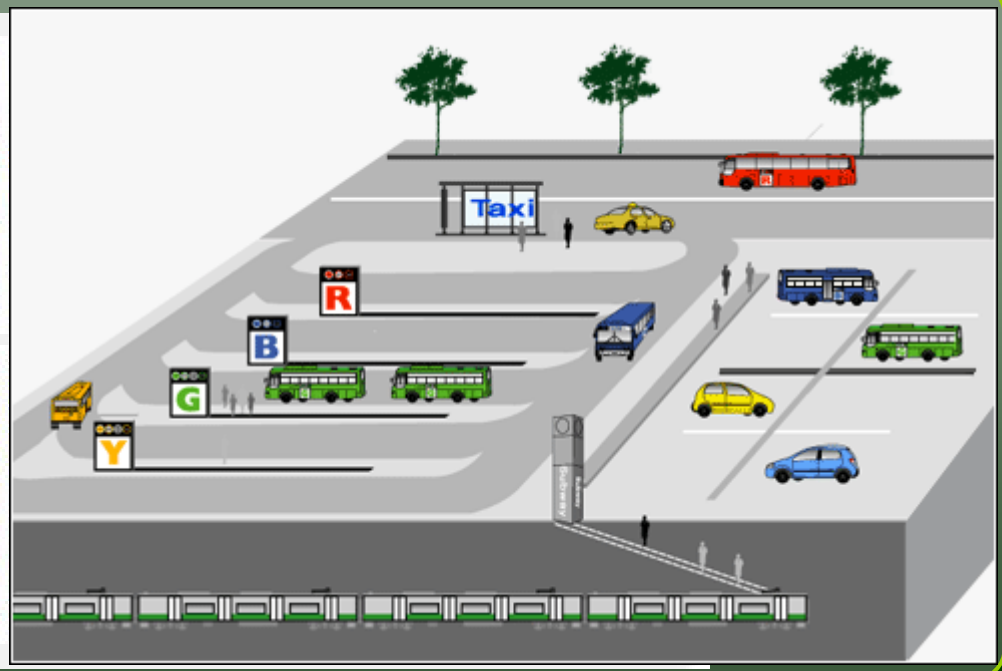
- Descriptions
  - Changing bus lane : Blue(town)bus, Green(local)bus, Yellow (circulating)bus, Red(metro)bus
  - Expansion of bus lane : bus only use the central lane, also bus station is relocated at the center of the road, ordinary vehicles are not allowed to use this lane.
  - Advanced Bus operating management : control the bus system by satellite, providing the information on the arrival time of bus at the station.
  - Upgrading bus : new large capacity refractive bus
  - Convenient transfer equipment : reorganize transfer system
  - Intelligent traffic card : multi-service card & discounting traffic fare
  - Reasonable fare system : transfer free when moving distance is short(within10km) and 100won each 5km

5. Analysis (samples)

- Transport Sector



Example about bus only middle lane

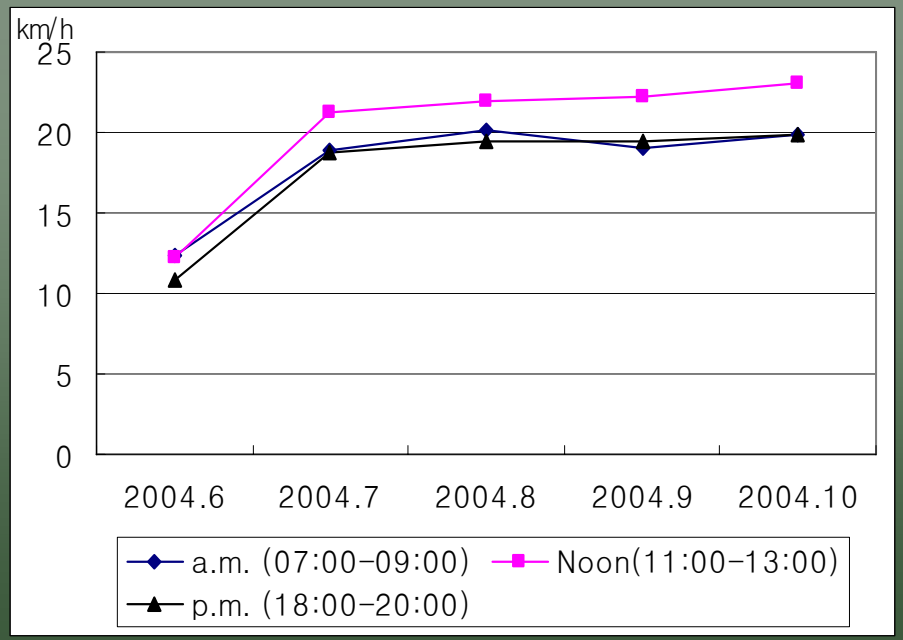


5. Analysis (samples)

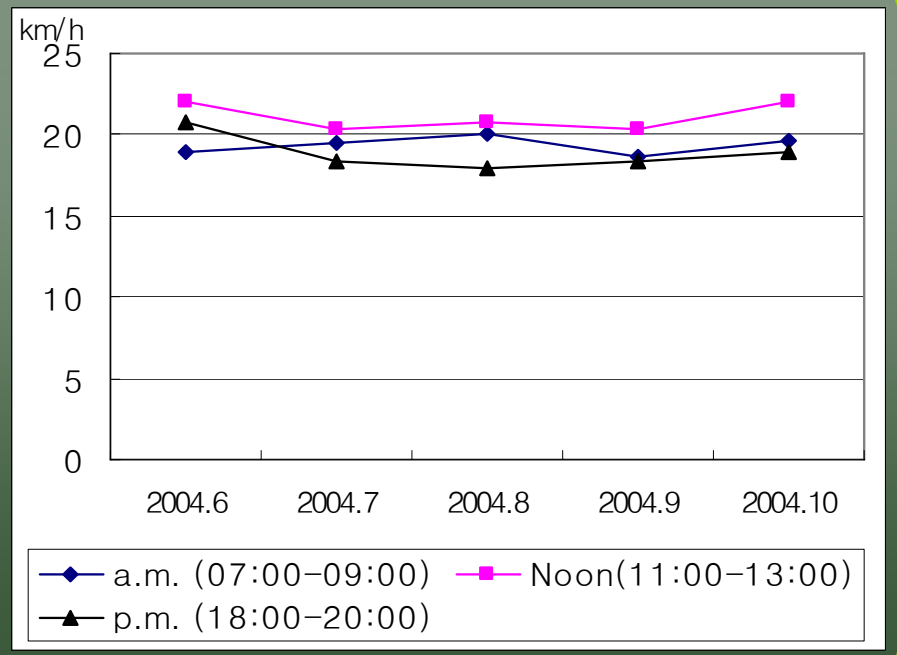
- Transport Sector

Trends of speed change

Bus



Passenger car



5. Analysis (samples)

- Residential Sector

- Ecology house
- Green roof system
- Descriptions

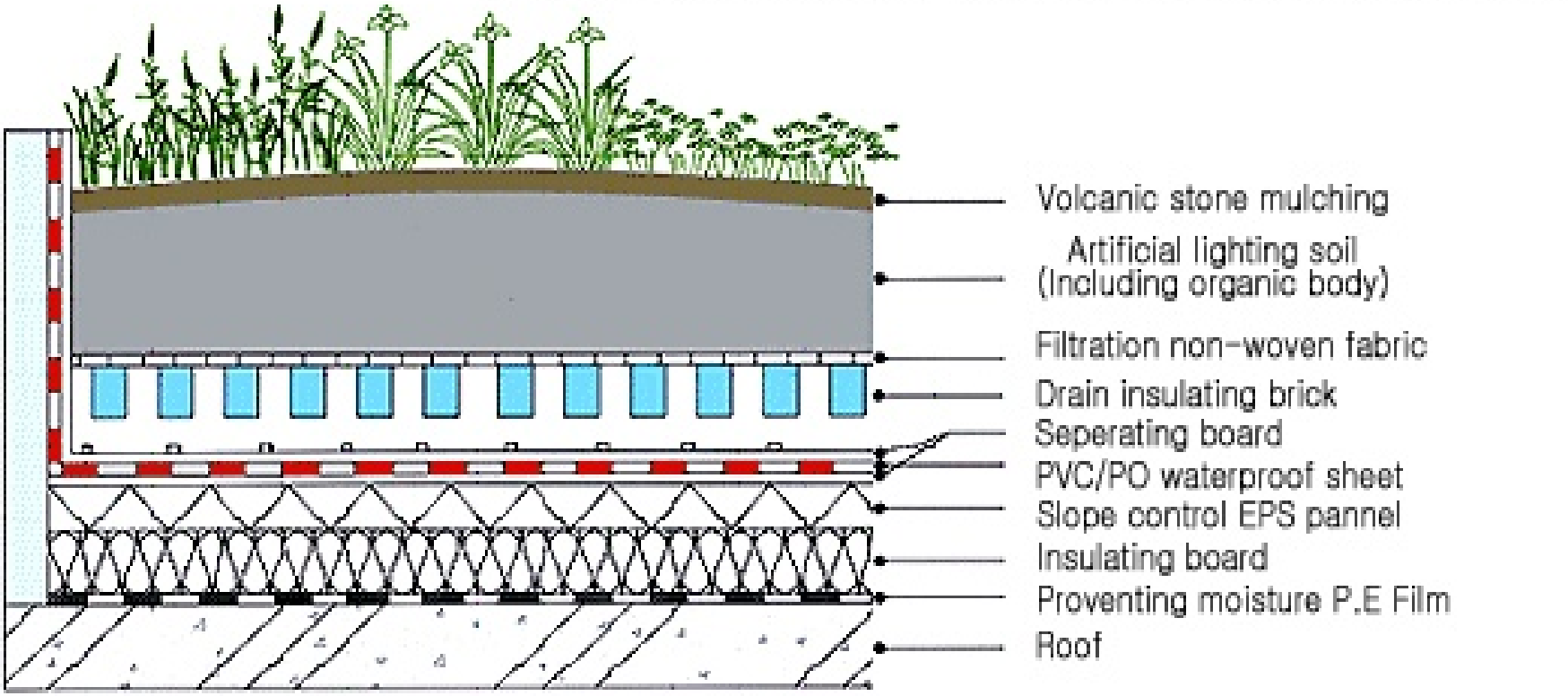
  *Light weight roof garden
  *Possibility of application, any artificial ground
  *Possibility of construction, any basic material (concrete, metal, wood and etc)
  *Possibility of planting on the lowest soil depth(10㎝)

- Secondly effect

  *Rain is used for supplying water.
  *Improvement: keeping warm efficiency because of construction reservoir and drainage adiabatic board
  *Mulching of volcanic sand to protect from flying away and heavy rain

5. Analysis (samples)

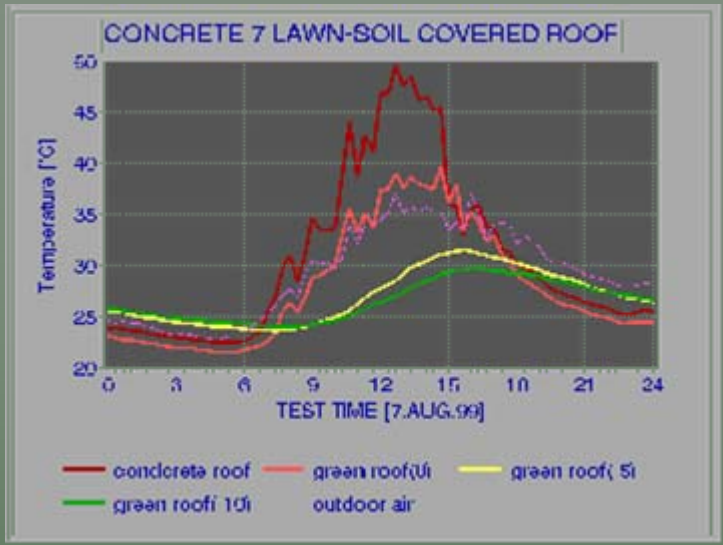
- Residential Sector



5. Analysis (samples)

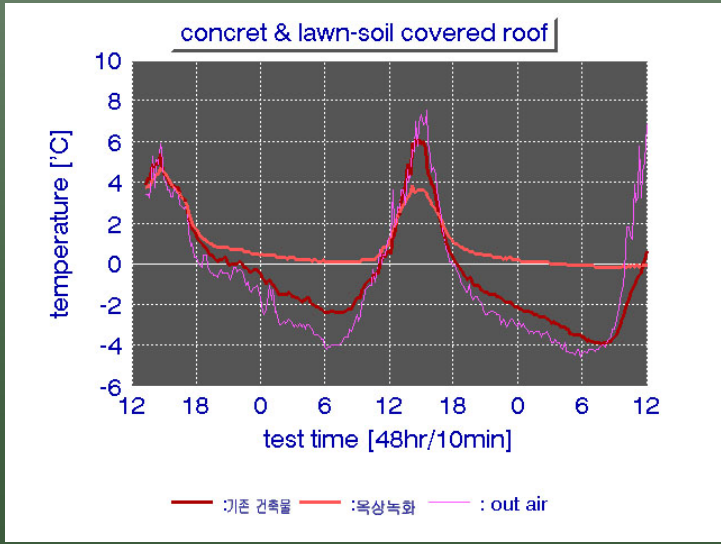
- Residential Sector

Summer



Division		Average T.	Lowest T.	Highest T.	Differences of T.
Tem. Of outside		29.5	23	36	13
concrete		36.5	23	50	27
Green roof	ground	30.0	22	38	15
	0.5㎝	27.5	23	32	9
	10㎝	27.0	24	30	6

Winter

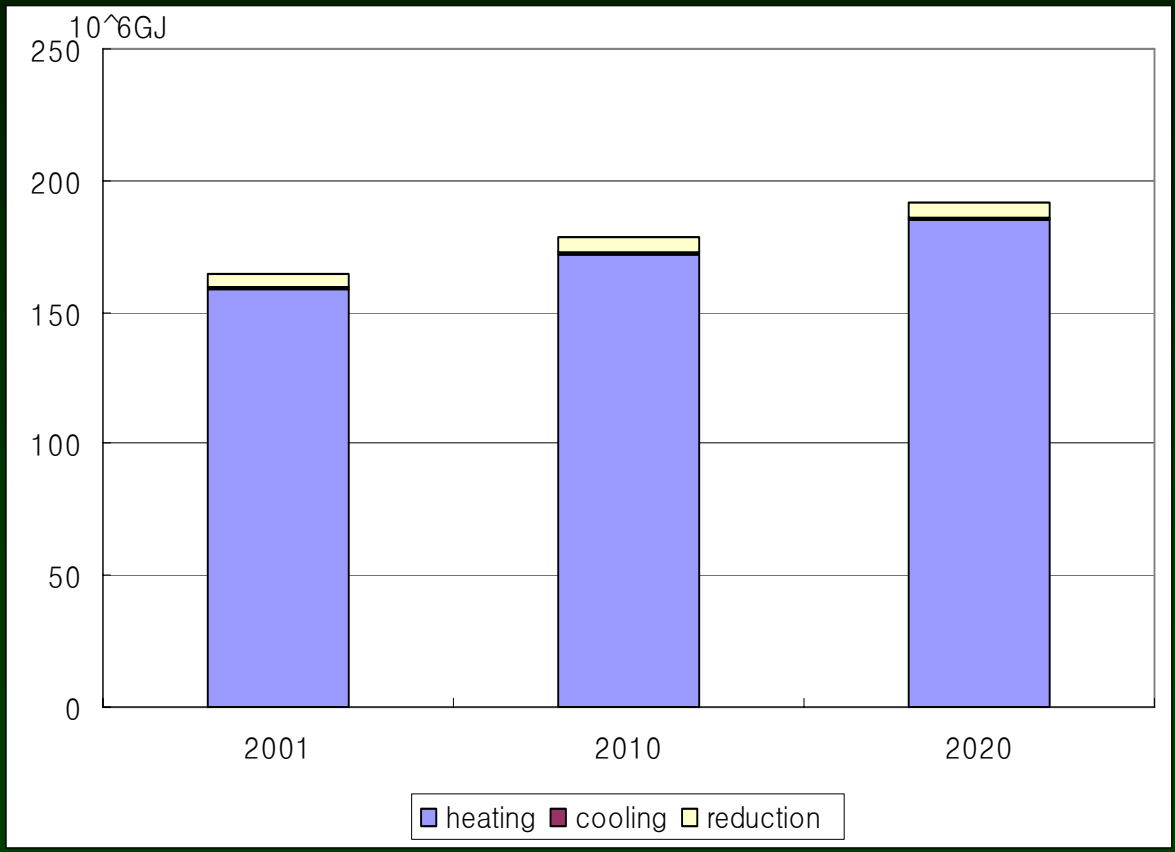


Division	Average T.	Lowest T.	Highest T.	Differences of T.
Tem. Of outside	1.5	-4	7	11
concrete	1	-3	7	10
Green roof	2	0	4	4

5. Analysis (samples)

- Residential Sector

Effect of green roof



- baseline : AIM bau scenario (residential sector)
- 30% housing with this option
- Green roof option: 9.8% energy saving (KCTI, 2001)
- Energy savings :
  - 2001 : 2.45%,
  - 2010 : 2.5%,
  - 2020 : 2.52%