March 10-12, 2005 ,NIES, Tsukuba, Japan

Activities in the Fiscal Year 2005 in Korea

The 10th AIM International Workshop

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

Table of Contents

I. AIM/Korea local Model: Transport Sector in Seoul
- Introduction
- Input data projection
- Scenario (setting/Results)
- Policy Implication

II. AIM/Enduse (MAC) Model
- Introduction
- Analysis Results
- Policy Implication

I

AIM/Korea local Model

1. Introduction
2. Input data projection
3. Scenario (setting/Results)
4. Policy Implication

1. Introduction

- The Ministry of Environment (MoE) of Republic of Korea (ROK) enacted the Special Act on Metropolitan Air Quality Improvement in December 2003

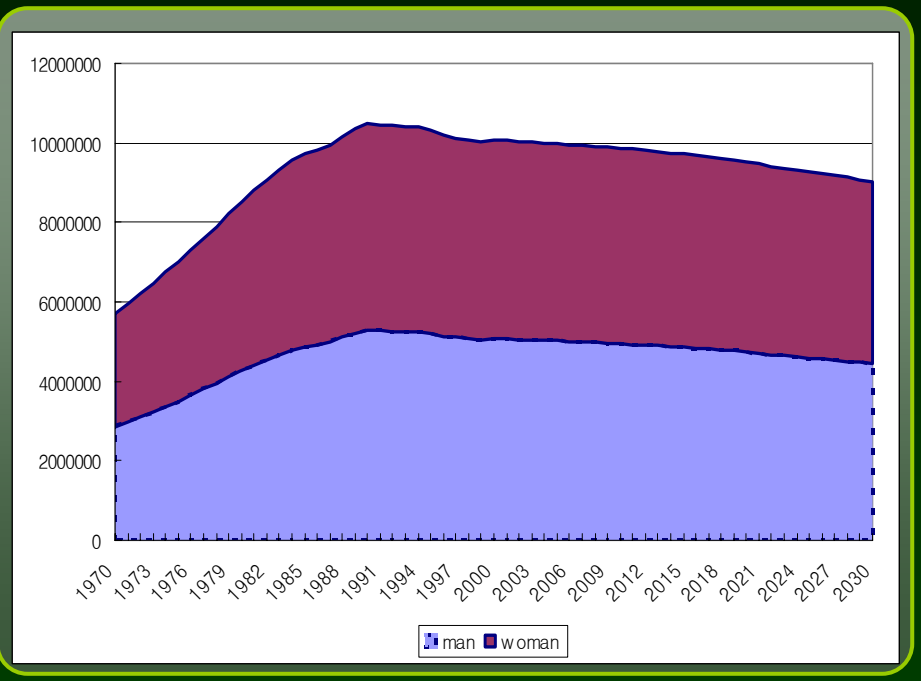
- The new legislation of the Special Act on Metropolitan Air Quality Improvement is expected to affect the whole emission profiles of air pollutants in this area with the introduction of diesel passenger cars.

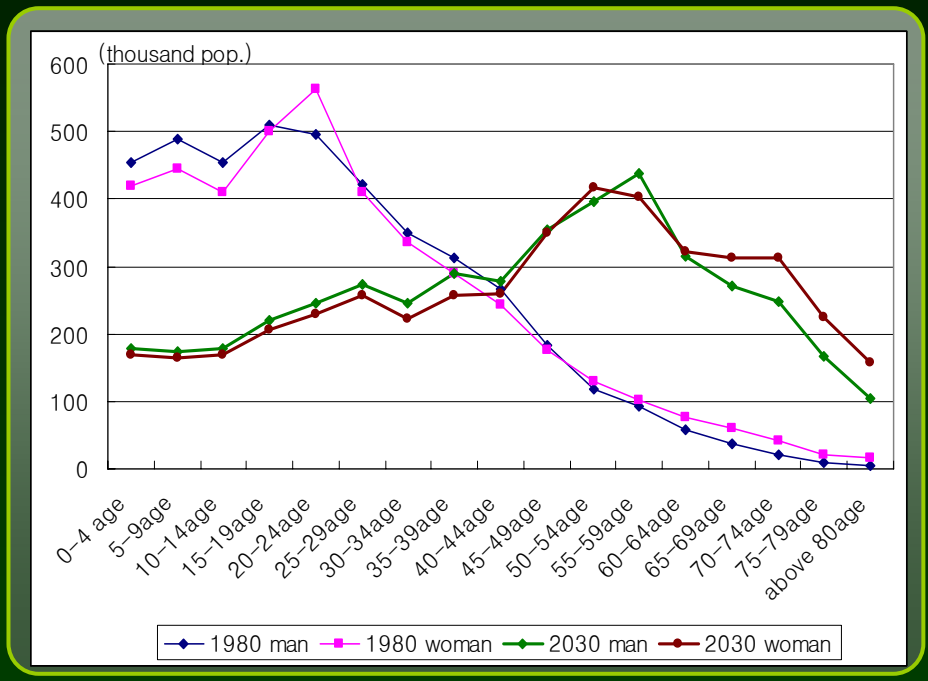
- To discuss the possible impact of this Special Act on emissions of sulfur-dioxide (SO2), nitrogen-oxide (NOx), carbon monoxide (CO), particulate matter (PM), and carbon dioxide (CO2) from the transport sector in Seoul.

- To analyzes the various policy scenarios along with projections of key determinants in the transport sector in this area.

2. Input Data Projection

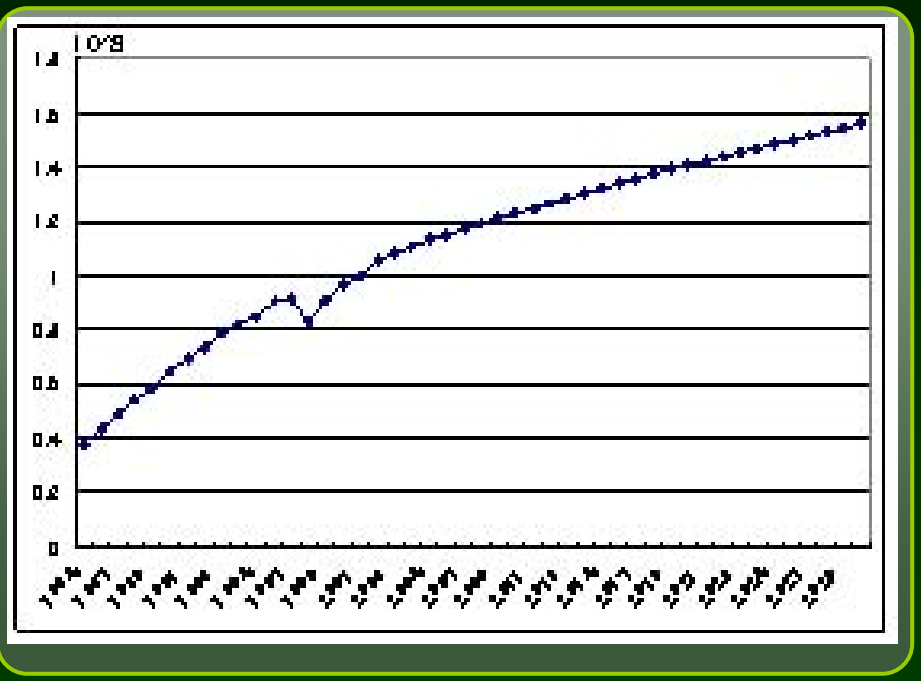
Population



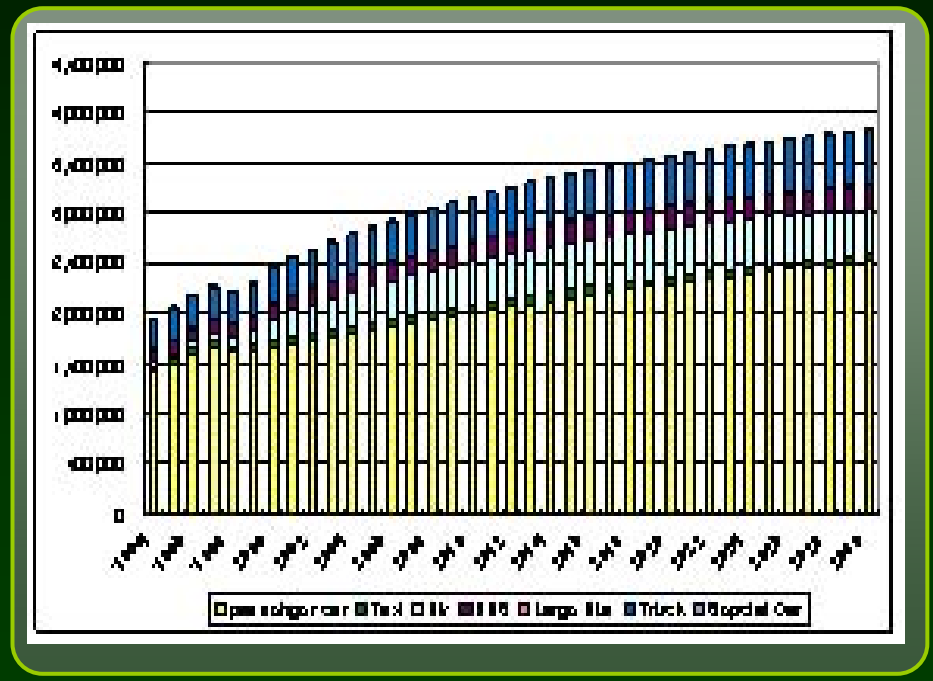


2. Input Data Projection

GRDP

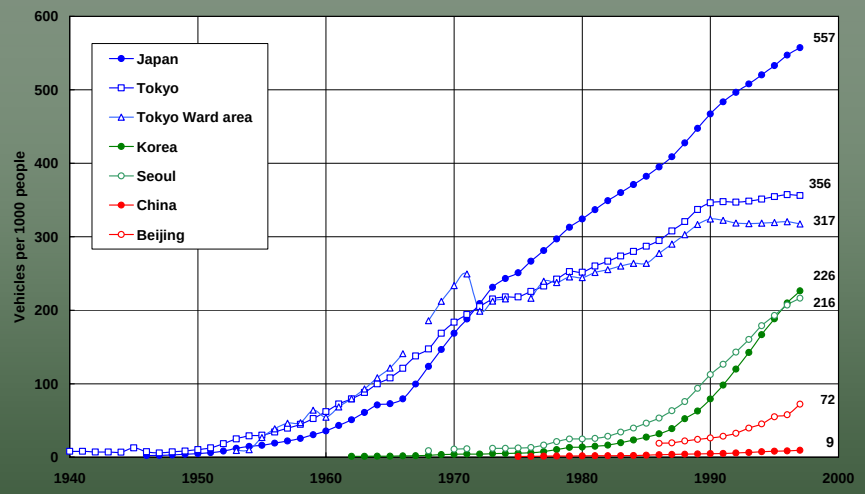


Vehicle

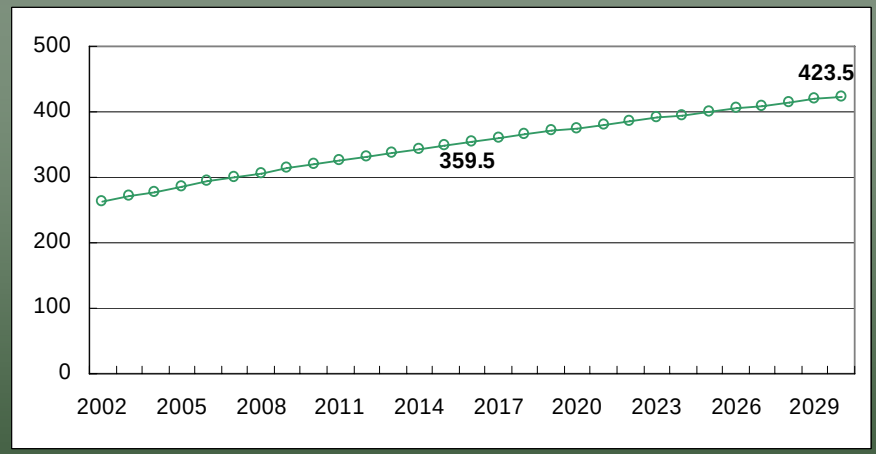


2. Input Data Comparison

Tokyo/Seoul/Beijing



Vehicle(Seoul)

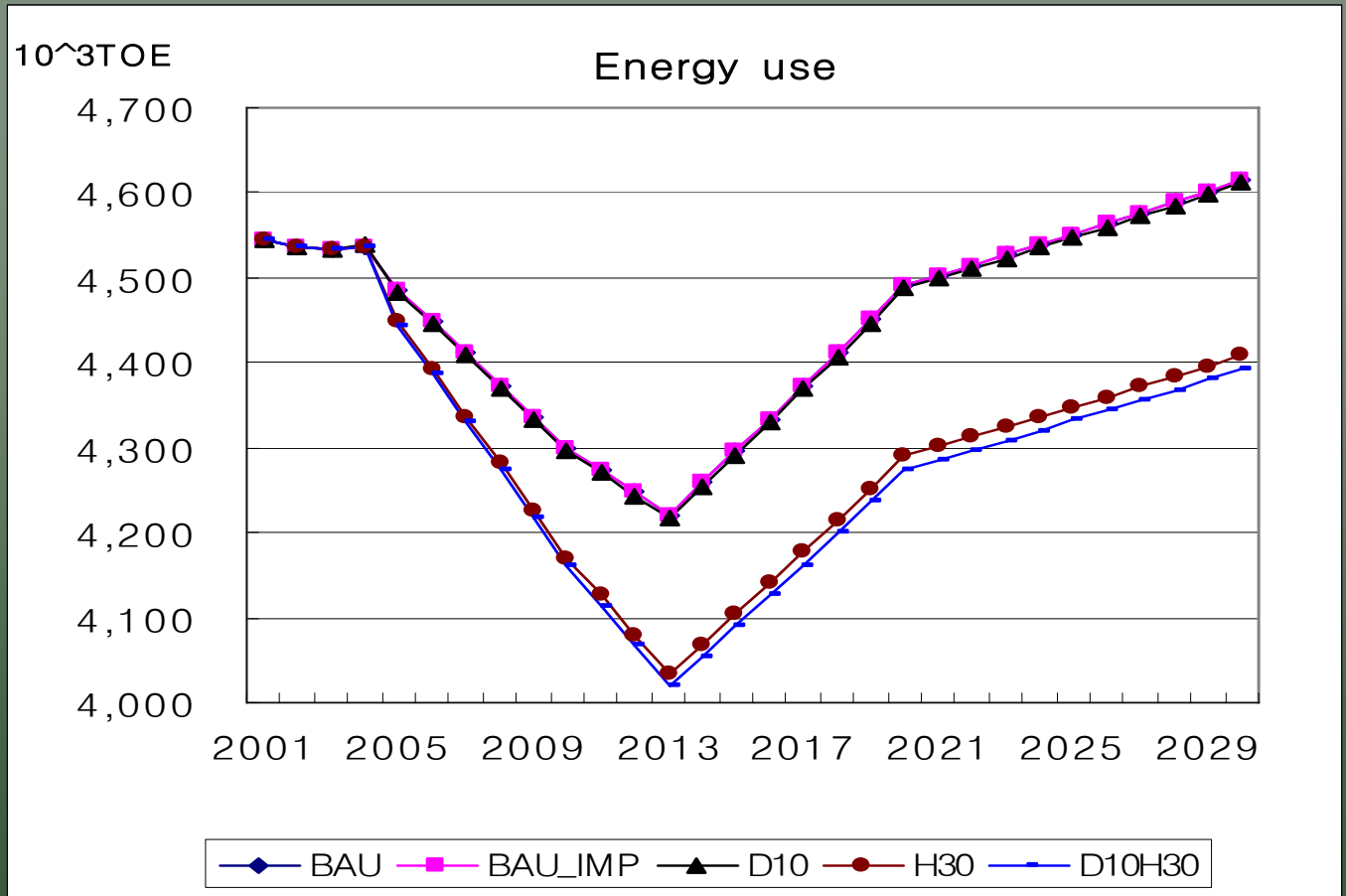


3. Scenario (Setting/Results)

Scenario	Description
BAU	Business-As-Usual (BAU) Scenario
BAU_IMP	Scenario that the new emission standard is applied
D10	Scenario that diesel passenger cars will take 10 % shares in 2030
H30	Scenario that new advanced technology vehicles will take 30% shares in 2030
D10H30	(D10 + H30) Combined Scenario

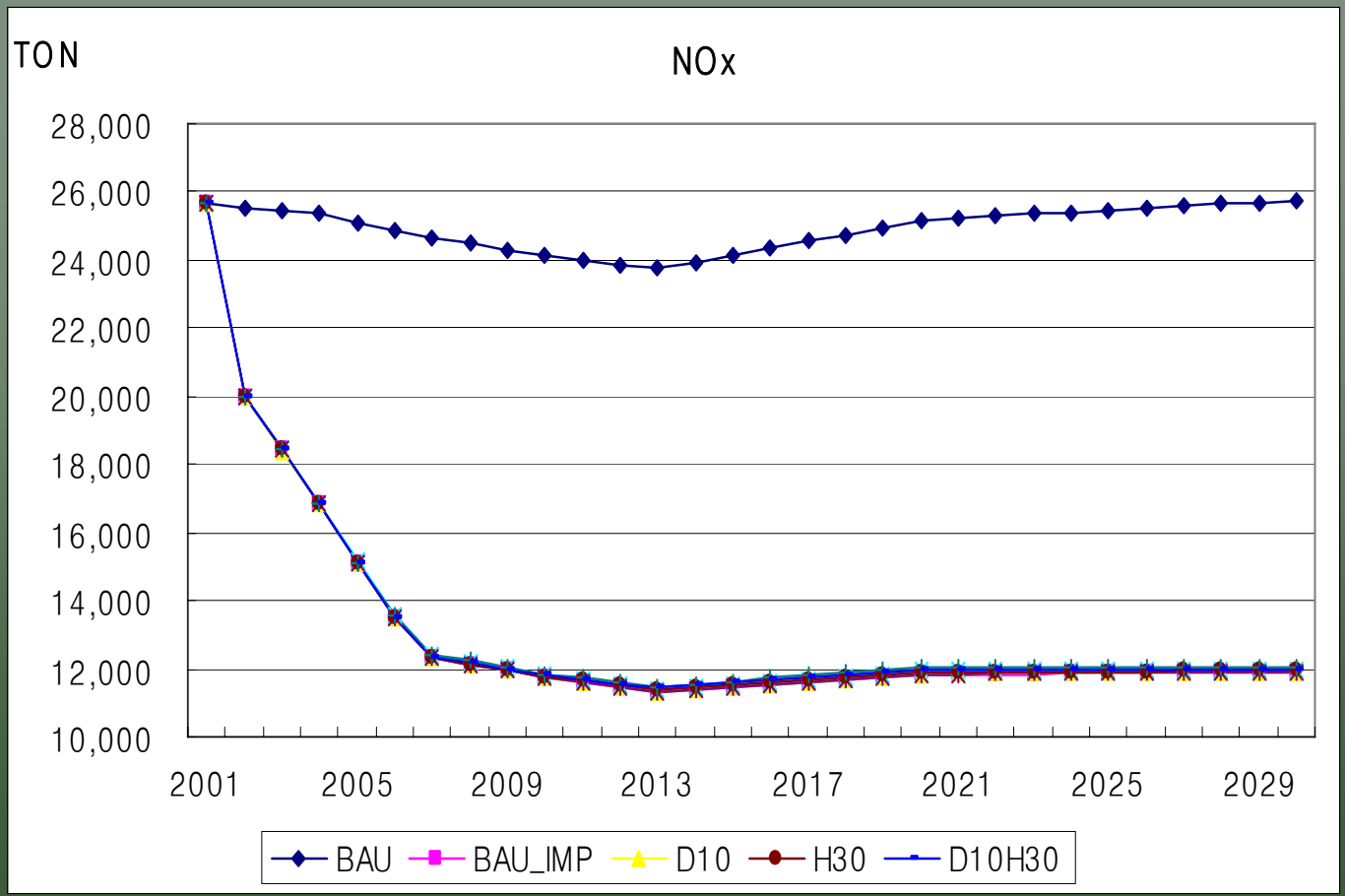
3. Scenario (Setting/Results)

Energy use



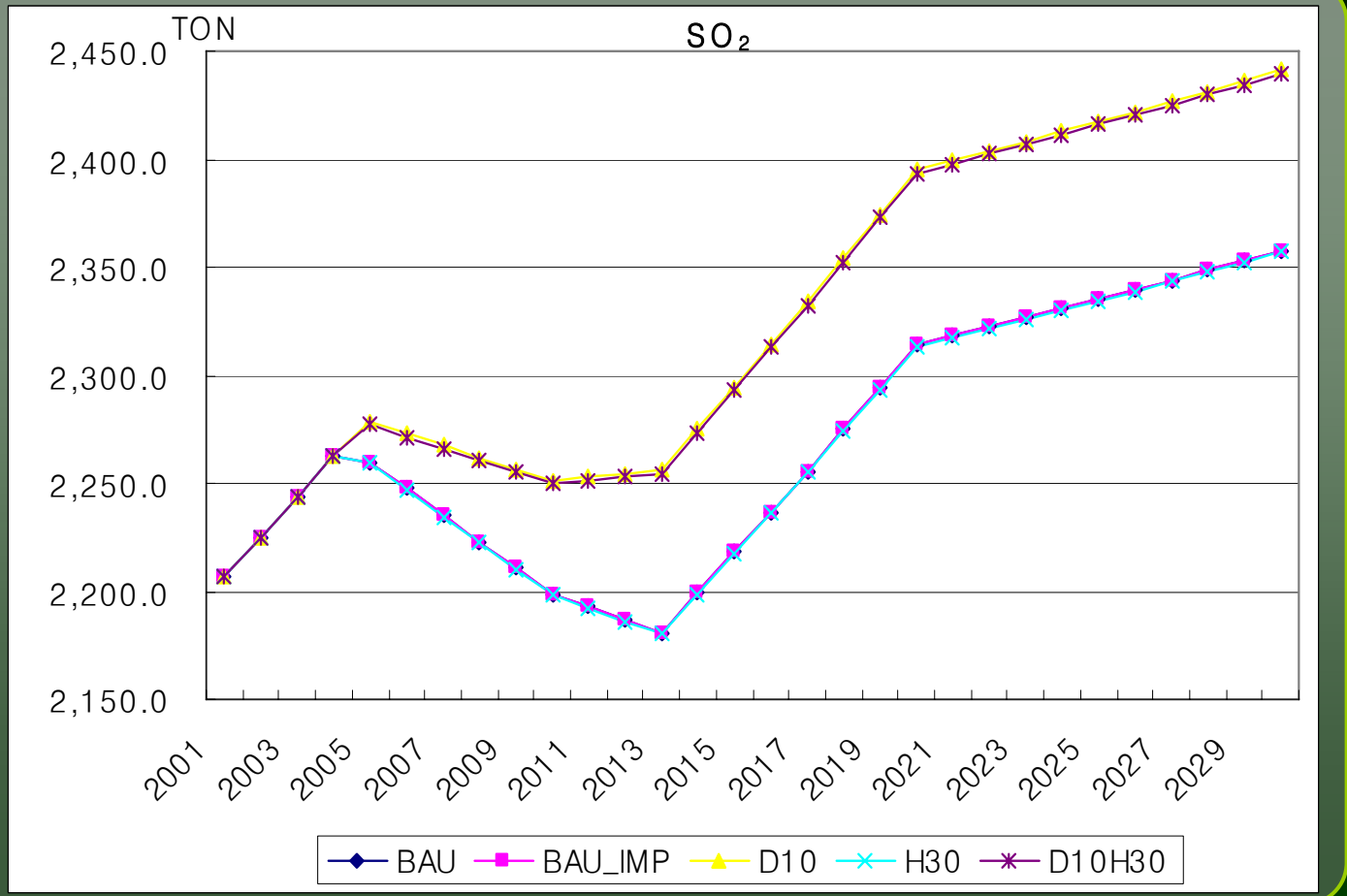
3. Scenario (Setting/Results)

NOx



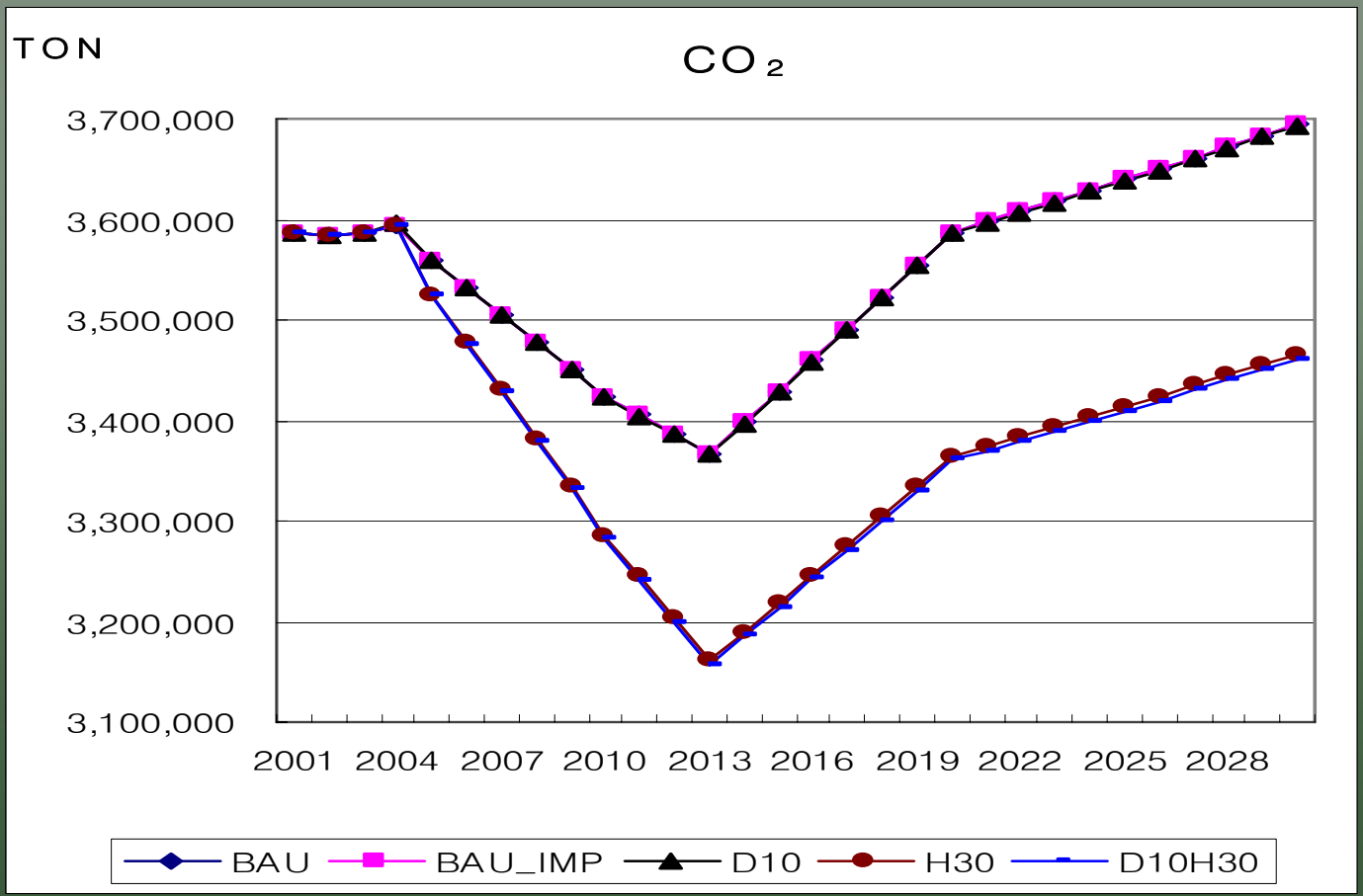
3. Scenario (Setting/Results)

SO_2



3. Scenario (Setting/Results)

CO_2



4. Policy Implication

- The new legislation of the Special Act on Metropolitan Air Quality Improvement will affect the emission profiles of air pollutants in this area especially with the introduction of diesel passenger cars.
- The environmental policies and measures would shift to more market-oriented approaches rather than the conventional 'command-and-control' type.
- The relative energy prices between gasoline and diesel should be re-examined (energy tax issues).
- Policy balance among sectors and policy integration is considered in more systematic way to achieve multi-targets and goals.
- To boost the R&D of advanced technologies in the transport sector with financial and tax incentives will contribute to the formulation of overall framework for environmentally sustainable society .

II

AIM/Enduse (MAC) Model

1. Introduction
2. Analysis Results
3. Policy Implication

1. Introduction

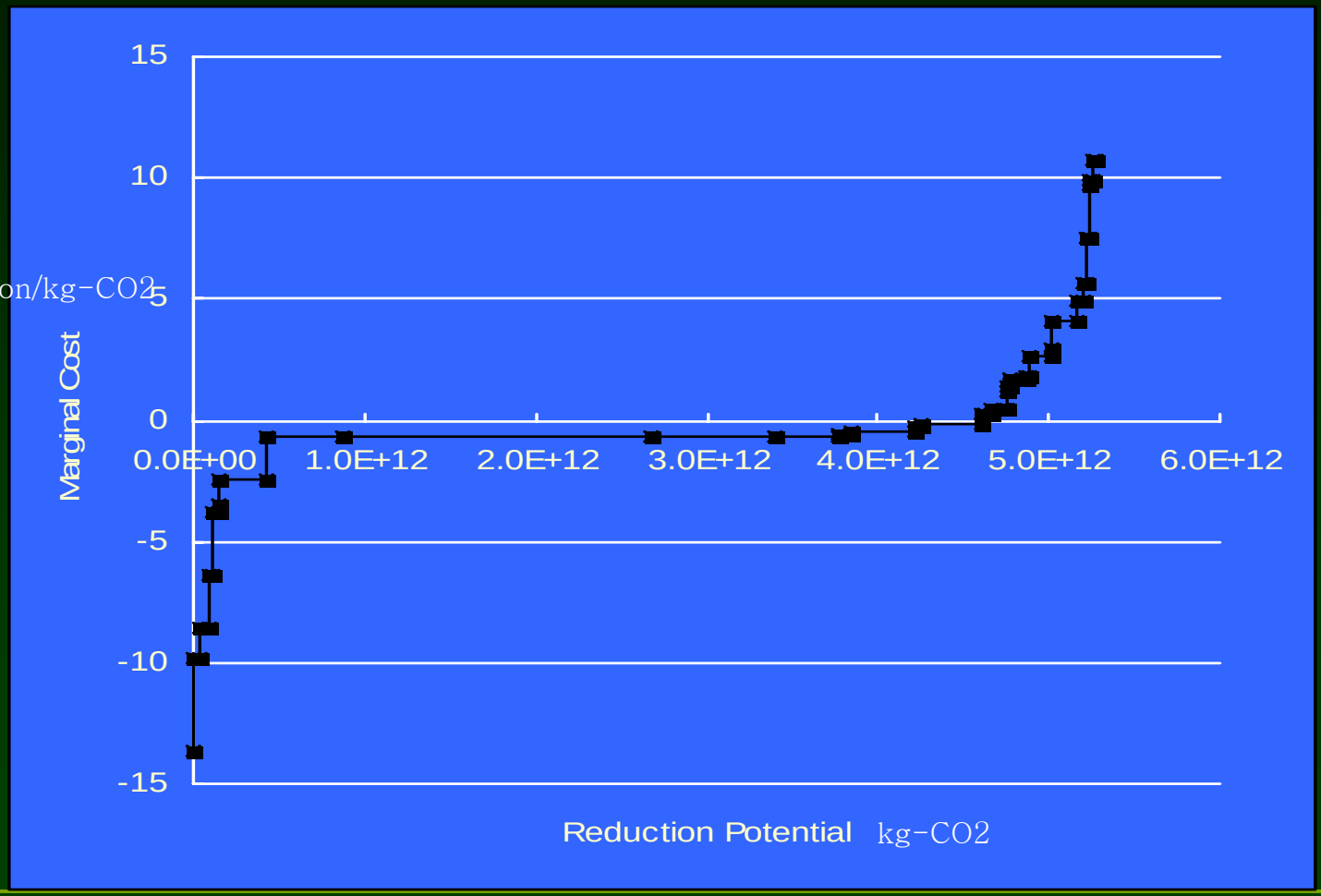
- Modeling the cost of abating greenhouse gases (GHGs) is crucial to demonstrate an economy's ability to reduce GHG emissions cost-effectively with specific options.
- The results of the analysis are presented as marginal abatement cost curves for 2030 in transport and residential sector.

- Starting year : 2001
- Ending year : 2030
- Sector : transport sector, residential sector
- Area : Korea

2. Analysis Results

- Transport sector

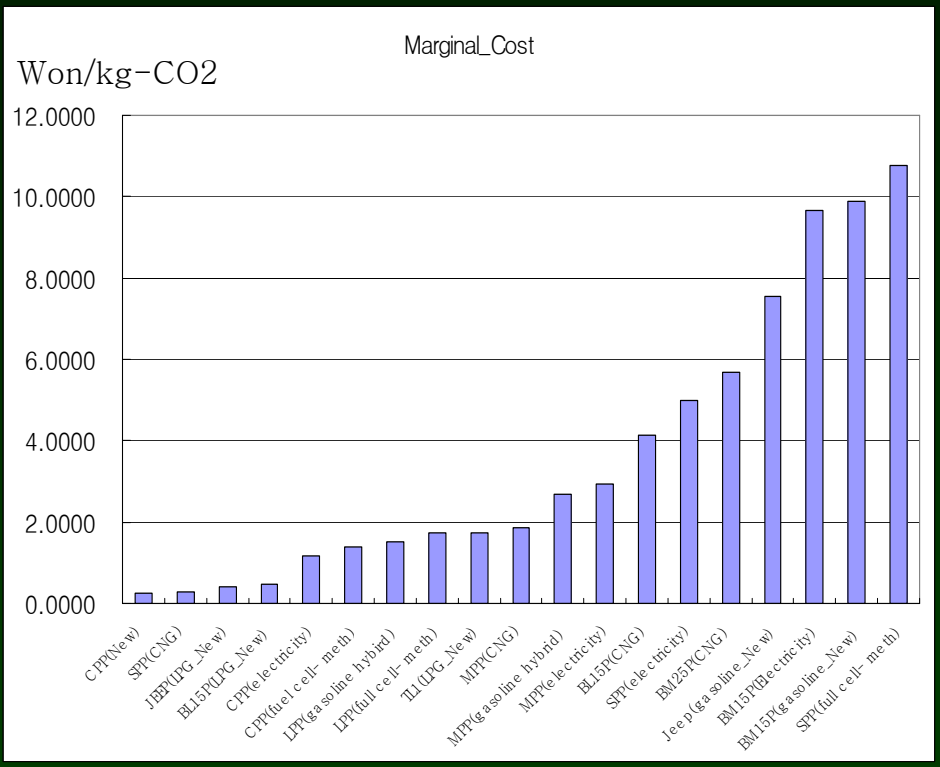
Marginal Abatement Cost Curve



2. Analysis Results

- Transport sector

Marginal Cost

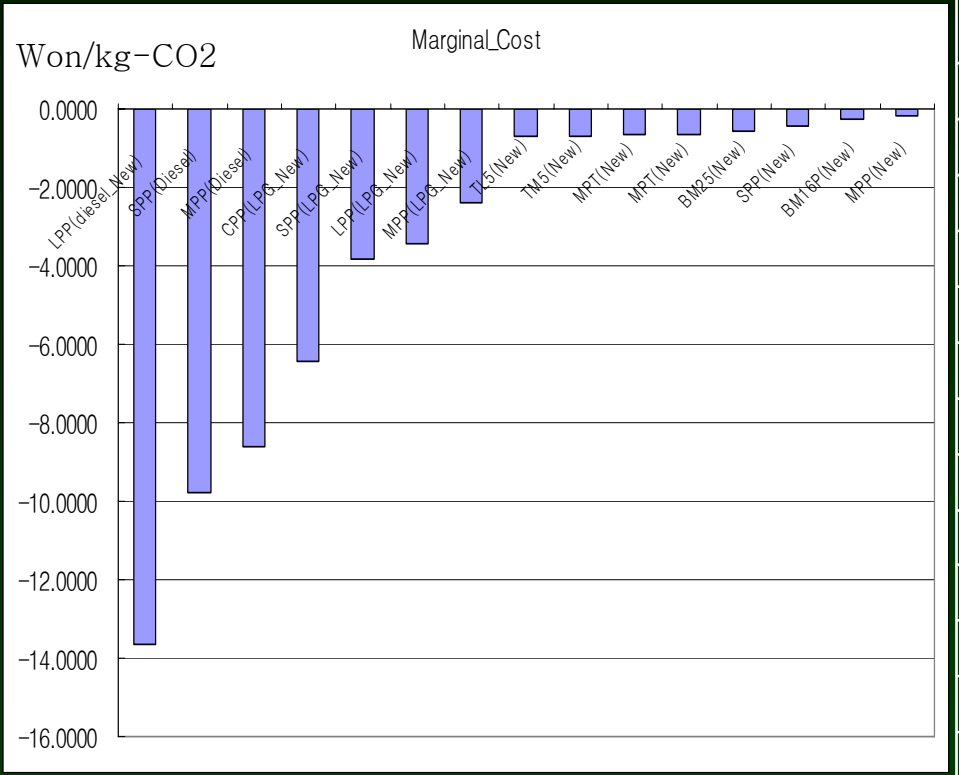


	Technology_name
CPP(New)	compact private passenger Cars(New)
SPP(CNG)	small private passenger Cars(CNG)
JEEP(LPG_New)	Jeeps(LPG_New)
BL15P(LPG_New)	Buses less than 15 persons(LPG_New)
CPP(electricity)	compact private passenger Cars(electricity)
CPP(fuel cell-meth)	compact private passenger Cars(fuel cell-meth)
LPP(gasoline hybird)	Large private passenger Cars(gasoline hybird)
LPP(full cell-meth)	Large private passenger Cars(full cell-meth)
TL1(LPG_New)	Trucks less than 1.0 tons(LPG_New)
MPP(CNG)	Medium private passenger Cars(CNG)
MPP(gasoline hybrid)	Medium private passenger Cars(gasoline hybrid)
MPP(electricity)	Medium private passenger Cars(electricity)
BL15P(CNG)	Buses less than 15 persons(CNG)
SPP(electricity)	small private passenger Cars(electricity)
BM25P(CNG)	Buses more than 25 persons(CNG)
Jeep(gasoline_New)	Jeeps(gasoline_New)
BM15P(Electricity)	Buses more than 15 persons(Electricity)
BM15P(gasoline_New)	Buses more than 15 persons(gasoline_New)
SPP(full cell-meth)	small private passenger Cars(full cell-meth)

2. Analysis Results

- *Transport sector*

Marginal Cost

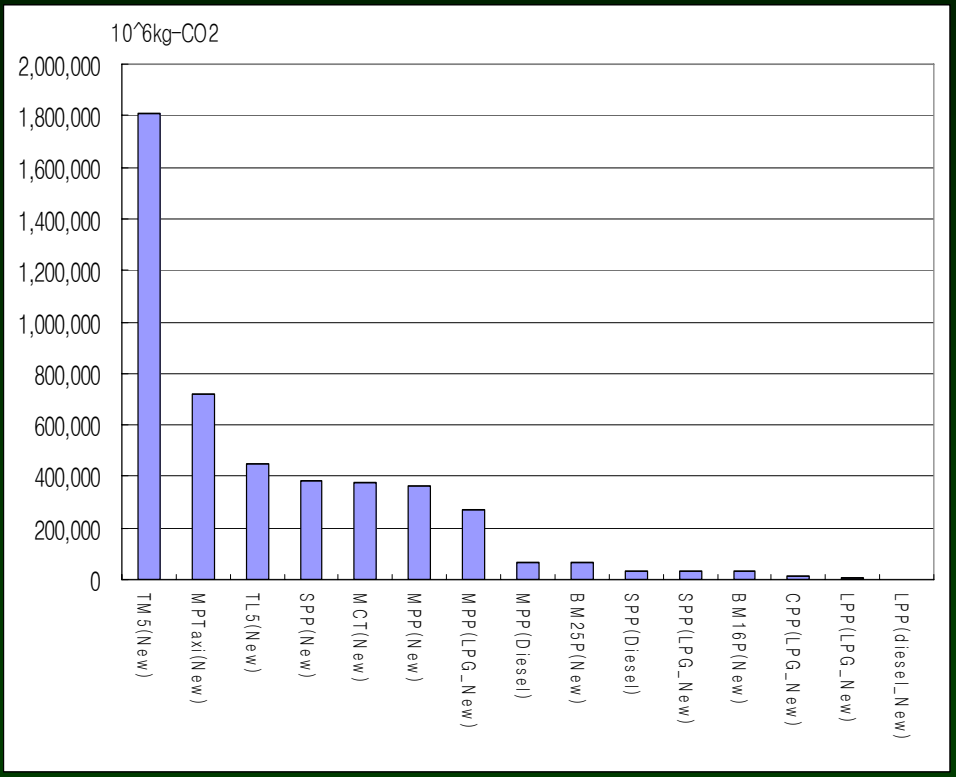


	Technology name
LPP(diesel_New)	Large private passenger Cars(diesel_New)
SPP(Diesel)	small private passenger Cars(Diesel)
MPP(Diesel)	Medium private passenger Cars(Diesel)
CPP(LPG_New)	compact private passenger Cars(LPG_New)
SPP(LPG_New)	small private passenger Cars(LPG_New)
LPP(LPG_New)	Large private passenger Cars(LPG_New)
MPP(LPG_New)	Medium private passenger Cars(LPG_New)
TL5(New)	Trucks less than 5.0 tons(New)
TM5(New)	Trucks more than 5.0 tons(New)
MPT(New)	Medium private Taxi(New)
MPT(New)	Medium company Taxi(New)
BM25(New)	Buses more than 25persons(New)
SPP(New)	small private passenger Cars(New)
BM16P(New)	Buses more than 16persons(New)
MPP(New)	Medium private passenger Cars(New)

2. Analysis Results

- Transport sector

Reduction Potential

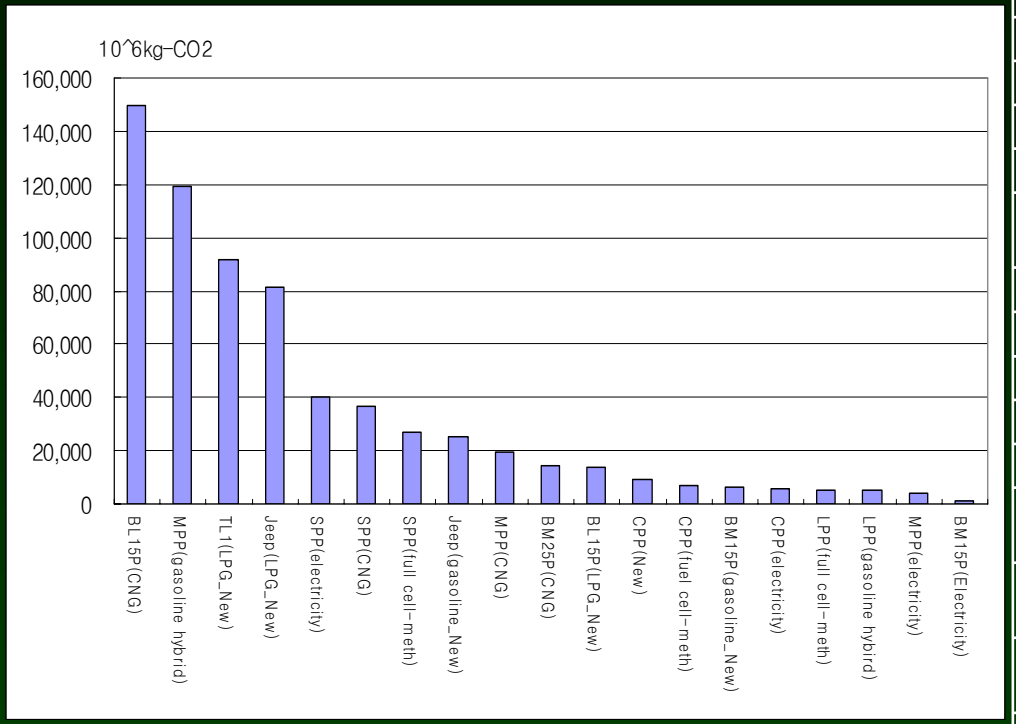


	Technology_name
TM5(New)	Trucks more than 5.0 tons(New)
MPTaxi(New)	Medium private Taxi(New)
TL5(New)	Trucks less than 5.0 tons(New)
SPP(New)	small private passenger Cars(New)
MCT(New)	Medium company Taxi(New)
MPP(New)	Medium private passenger Cars(New)
MPP(LPG_New)	Medium private passenger Cars(LPG_New)
MPP(Diesel)	Medium private passenger Cars(Diesel)
BM25P(New)	Buses more than 25persons(New)
SPP(Diesel)	small private passenger Cars(Diesel)
SPP(LPG_New)	small private passenger Cars(LPG_New)
BM16P(New)	Buses more than 16persons(New)
CPP(LPG_New)	compact private passenger Cars(LPG_New)
LPP(LPG_New)	Large private passenger Cars(LPG_New)
LPP(diesel_New)	Large private passenger Cars(diesel_New)

2. Analysis Results

- Transport sector

Reduction Potential

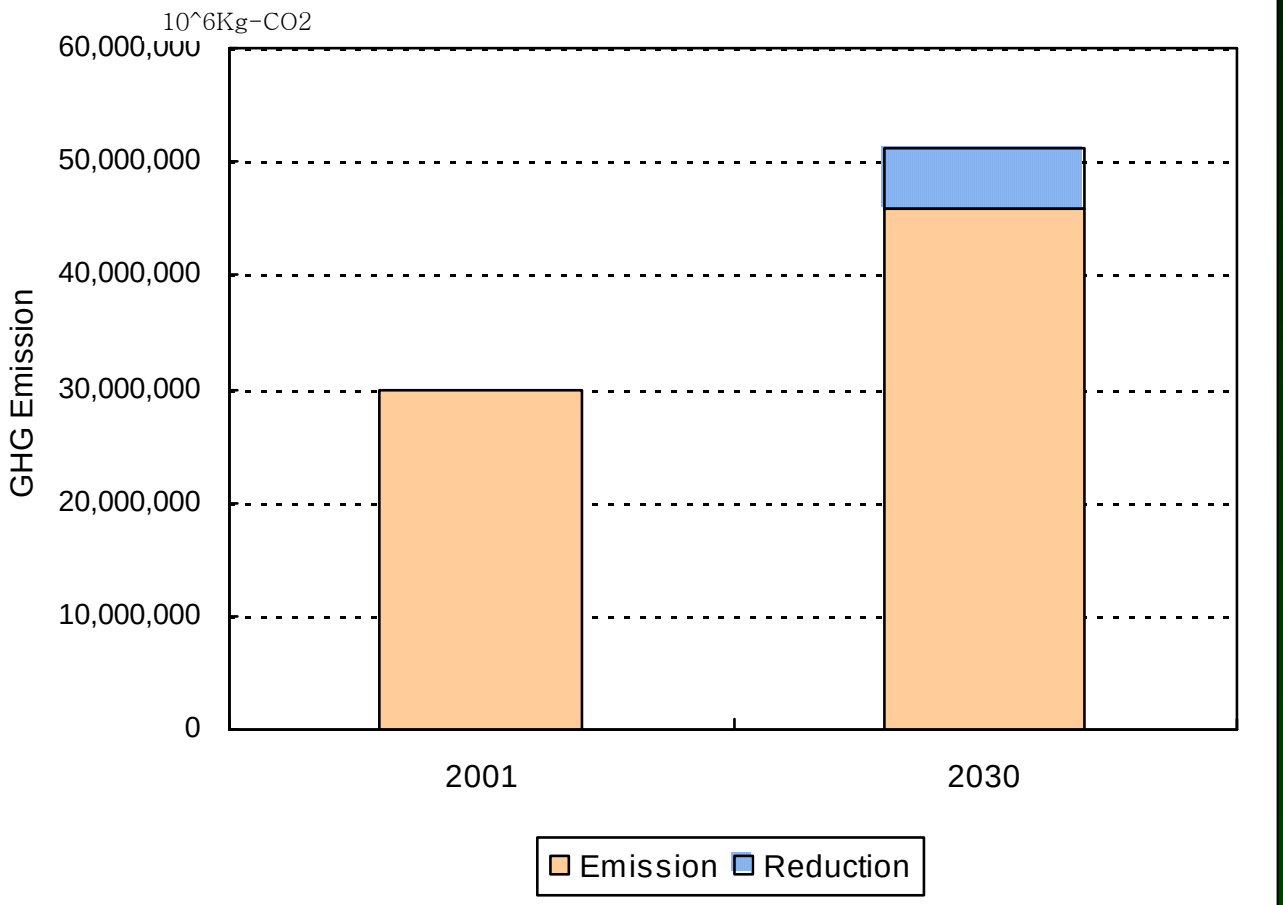


	Technology_name
BL15P(CNG)	Buses less than 15 persons(CNG)
MPP(gasoline hybrid)	Medium private passenger Cars(gasoline hybrid)
TL1(LPG_New)	Trucks less than 1.0 tons(LPG_New)
Jeep(LPG_New)	Jeeps(LPG_New)
SPP(electricity)	small private passenger Cars(electricity)
SPP(CNG)	small private passenger Cars(CNG)
SPP(full cell-meth)	small private passenger Cars(full cell-meth)
Jeep(gasoline_New)	Jeeps(gasoline_New)
MPP(CNG)	Medium private passenger Cars(CNG)
BM25P(CNG)	Buses more than 25 persons(CNG)
BL15P(LPG_New)	Buses less than 15 persons(LPG_New)
CPP(New)	compact private passenger Cars(New)
CPP(fuel cell-meth)	compact private passenger Cars(fuel cell-meth)
BM15P(gasoline_New)	Buses more than 15 persons(gasoline_New)
CPP(electricity)	compact private passenger Cars(electricity)
LPP(full cell-meth)	Large private passenger Cars(full cell-meth)
LPP(gasoline hybird)	Large private passenger Cars(gasoline hybird)
MPP(electricity)	Medium private passenger Cars(electricity)
BM15P(Electricity)	Buses more than 15 persons(Electricity)

2. Analysis Results

- *Transport sector*

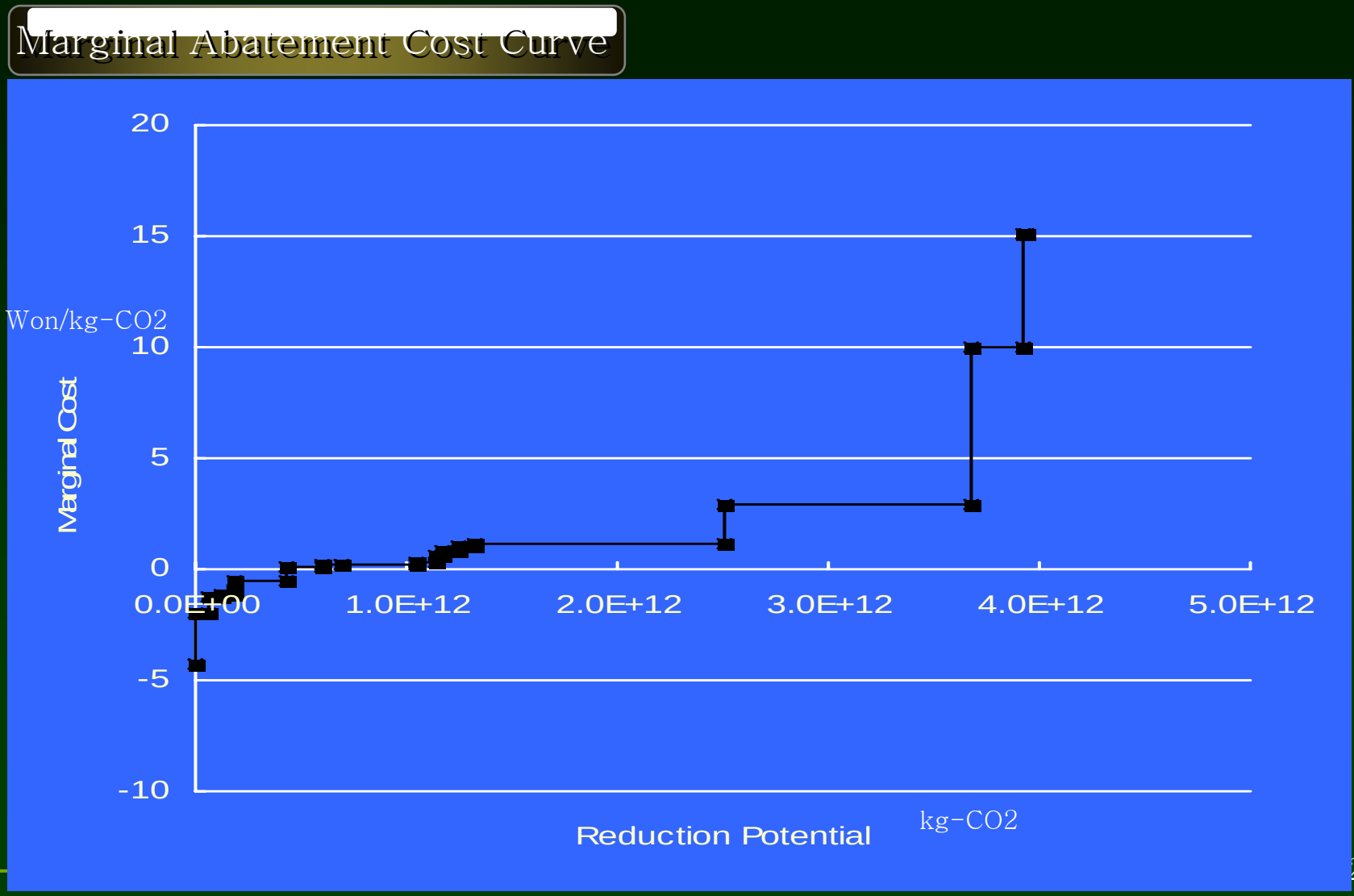
Reduction Potential



- GHG Emission
  - 2001 : 29.998.45010^6
  - 2030 : 45,884,380 10^6
- Reduction
  5,276,466 10^6kg-CO2

2. Analysis Results

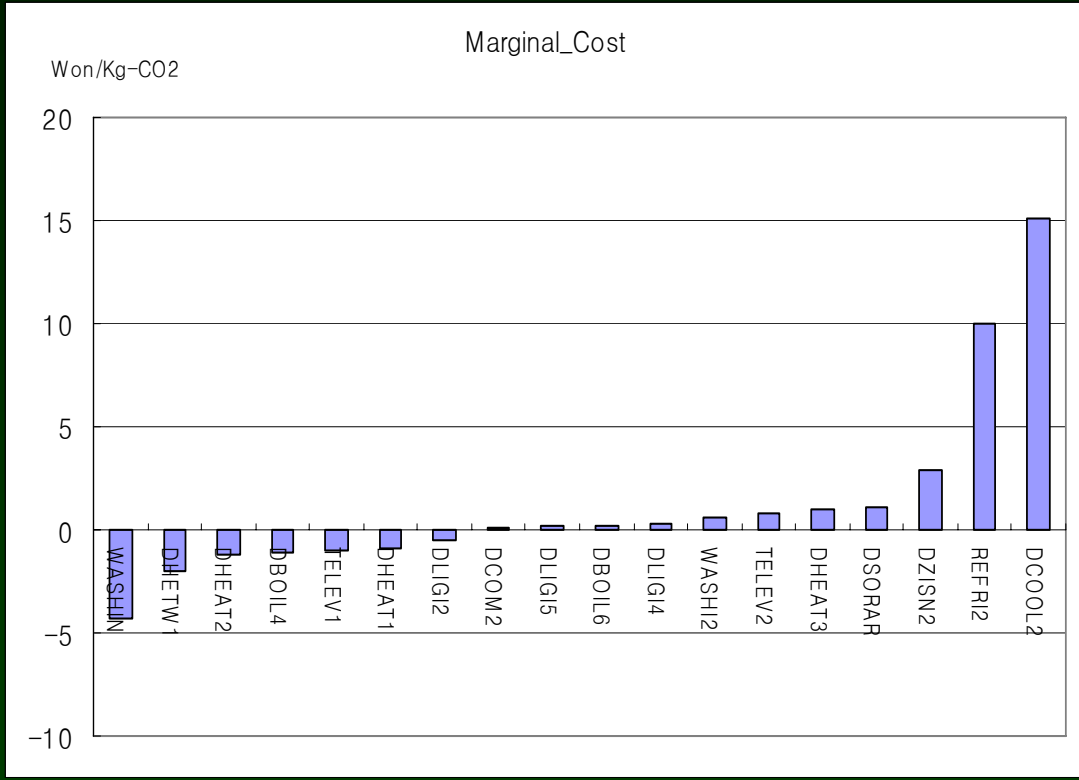
- Residential sector



2. Analysis Results

- Residential sector

Marginal Cost

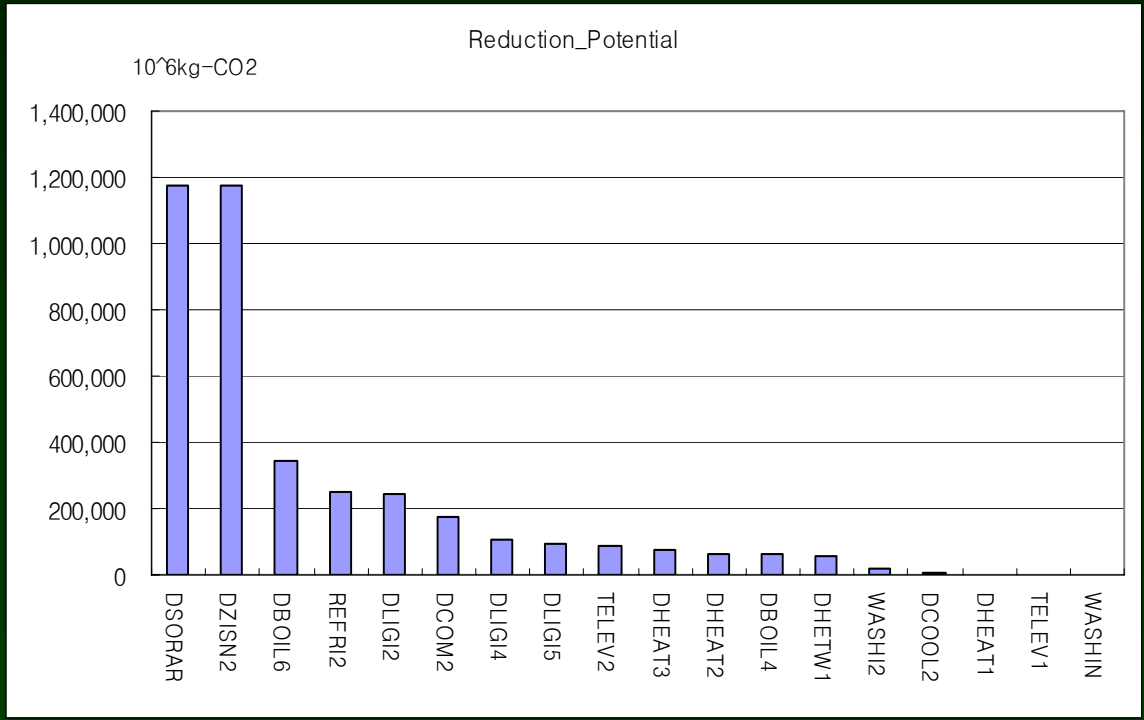


	Technology_name
WASHIN	Regular washing mashine
DHETW1	LPG oven range(LPG)
DHEAT2	LNG heater(LNG)
DBOIL4	Boiler(LNG)
TELEV1	Regular Television
DHEAT1	Kerosene pan heater
DLIGI2	Fluorescent lamp(luminous)
DCOM2	Efficient computer
DLIGI5	Compact Fluoresen lamp(saving 2)
DBOIL6	Condensing Boiler
DLIGI4	Efficient fluorescent lamp(saving)
WASHI2	Efficient washing mashine
TELEV2	Efficient Television
DHEAT3	LPG heater(LPG)
DSORAR	Solar energy
DZISN2	Insulation
REFRI2	Efficient Refrigeration
DCOOL2	High efficient air conditioner

2. Analysis Results

- Residential sector

Reduction Potential

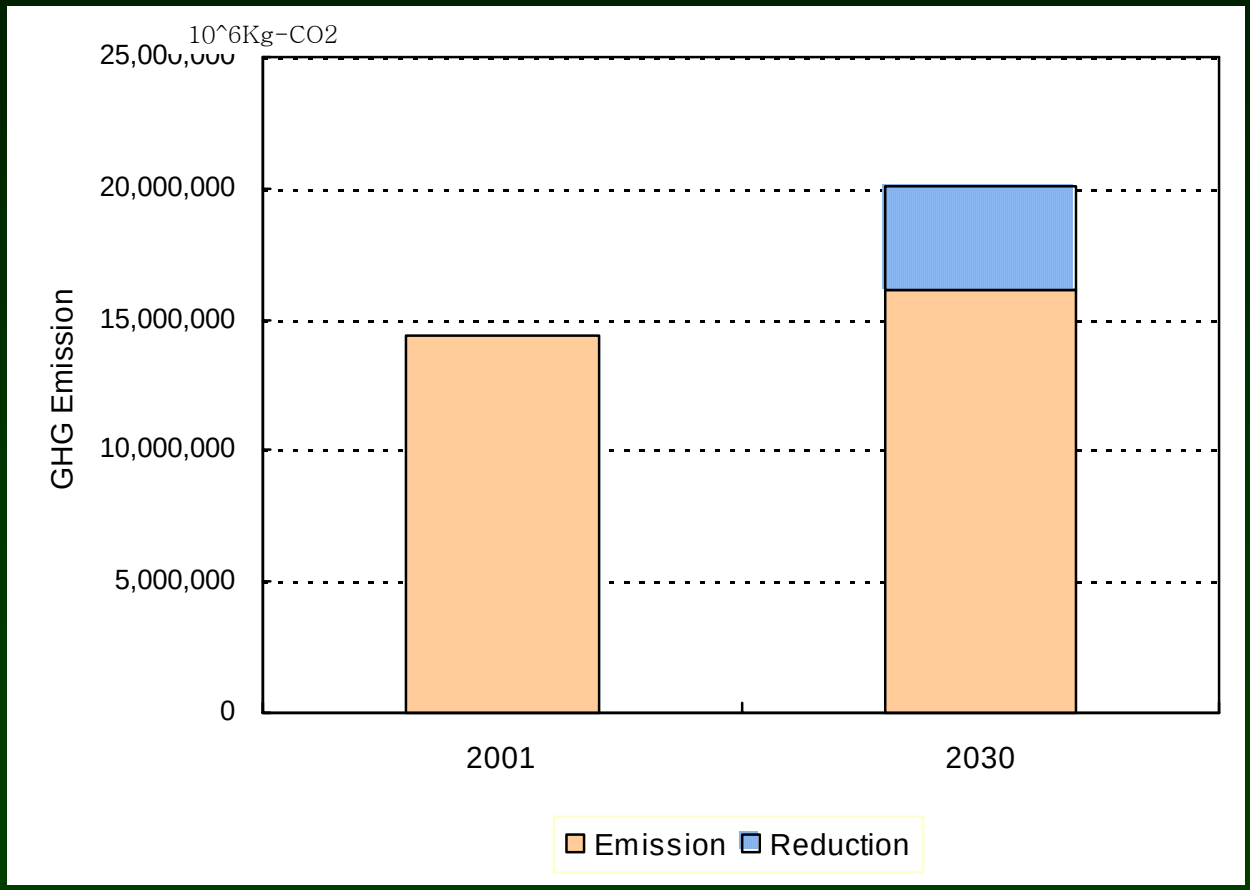


	Technology_name
DSORAR	Solar energy
DZISN2	Insulation
DBOIL6	Condensing Boiler
REFRI2	Efficient Refrigeration
DLIGI2	Fluorescent lamp(luminous)
DCOM2	Efficient computer
DLIGI4	Efficient fluorescent lamp(saving)
DLIGI5	Compact Fluoresen lamp(saving 2)
TELEV2	Efficient Television
DHEAT3	LPG heater(LPG)
DHEAT2	LNG heater(LNG)
DBOIL4	Boiler(LNG)
DHETW1	LPG oven range(LPG)
WASHI2	Efficient washing mashine
DCOOL2	High effiecient air conditionaer
DHEAT1	Kerosene pan heater
TELEV1	Regular Television
WASHIN	Regular washing mashine

2. Analysis Results

- *Residential sector*

Reduction Potential



- GHG Emission
  - 2001 : 14,396,73010^6
  - 2030 : 16,109,950 10^6
- Reduction
  3,933,938 10^6kg-CO2

3. Policy Implication

- Negative cost of reduction options implies that such options are feasible without extra cost of implementation, The list of such options will be a good information for policy makers to launch specific action programs to mitigate GHG emissions in a specific sector.
- In transport sector, most of options are to improve the energy efficiency in various vehicles. If high advanced technologies in this sector is considered, the potential of GHG reduction will be much bigger with much higher MAC.
- Even if the potential of GHG reduction in transport sector is bigger, relatively, it is easier to do it in residential sector. This finding implies that some policies will be implemented in residential sector.