Korea's Perspective and Strategies for Climate Change

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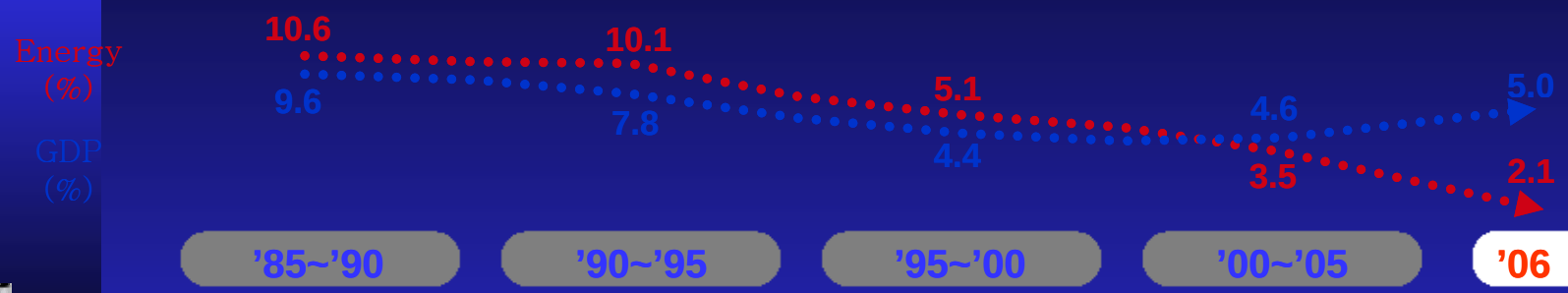
Outline

- Current and Projected Energy Use and GHG Emissions in Korea
- Role of Climate Change in Current National Policy
- Programs in Place to Meet Emission Reduction Goals
- Effectiveness of Policy Measures

Current and Projected Energy Use and GHG Emissions in Korea

Trends in Energy Consumption in Korea

Decreasing Energy Consumption in Korea



Industry (56.0%, 97.2 million TOE)

- '90~'00 Rapid Increase (8.8%) Stabilized after2000
  - ➡ Annual Increase Rate: ('90~'00) 8.8% ⇒ ('00~'06) 2.5%

Transport (21.0%, 36.5 million TOE)

- Rapid increase until 2000
  - ➡ Annual Increase Rate: ('90~'00) 8.1% ⇒ ('00~'06) 2.8%

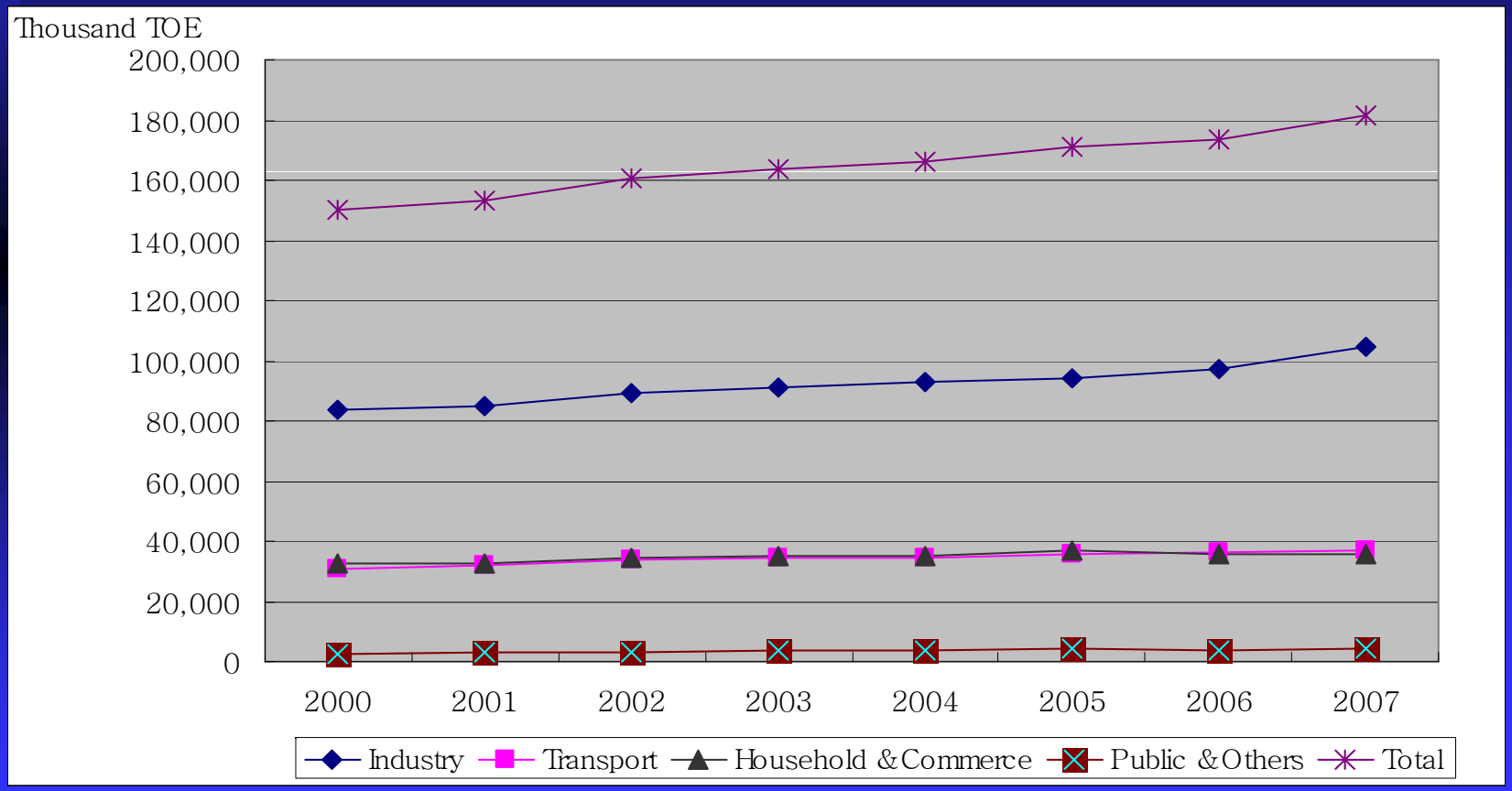
Household, Commerce & etc (22.9%, 39.8 million TOE)

- Mild increase
  - ➡ Annual Increase Rate: ('90~'00) 3.5% ⇒ ('00~'06) 2.2%

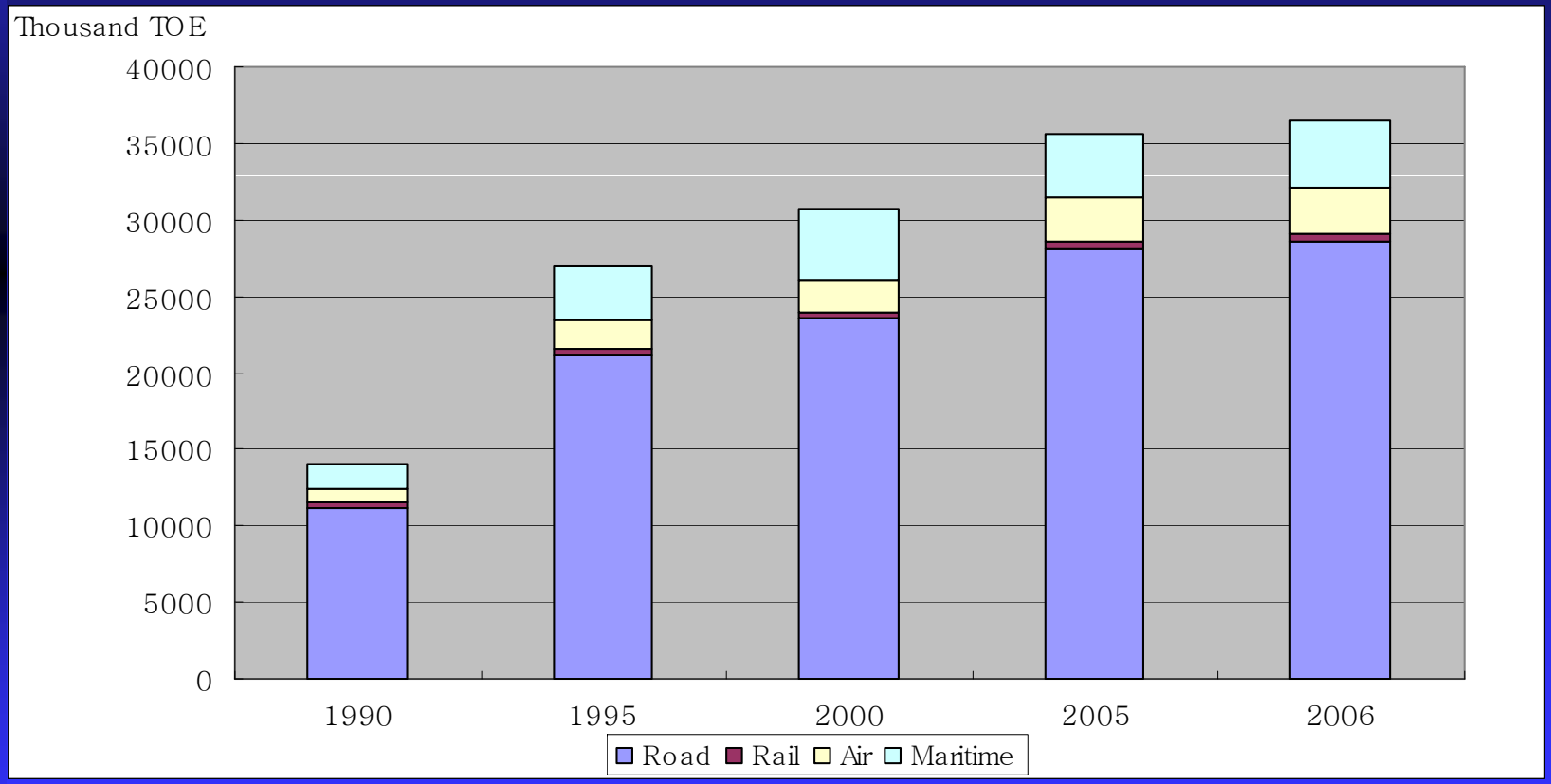
Trends in Transportation Demand

- Transport Sector: 20% of total energy consumption
  - Rapid increase in developing countries
- Second largest source of GHG and most rapidly increasing sector
- Road transport is responsible for more than 80% of social cost, more than 60% of urban air pollution
- Air transport: Rapidly increasing air transport demand
- Air transport sector is responsible for more than proportional impact on global warming
- Maritime sector is the major emitter of NOx and SOx

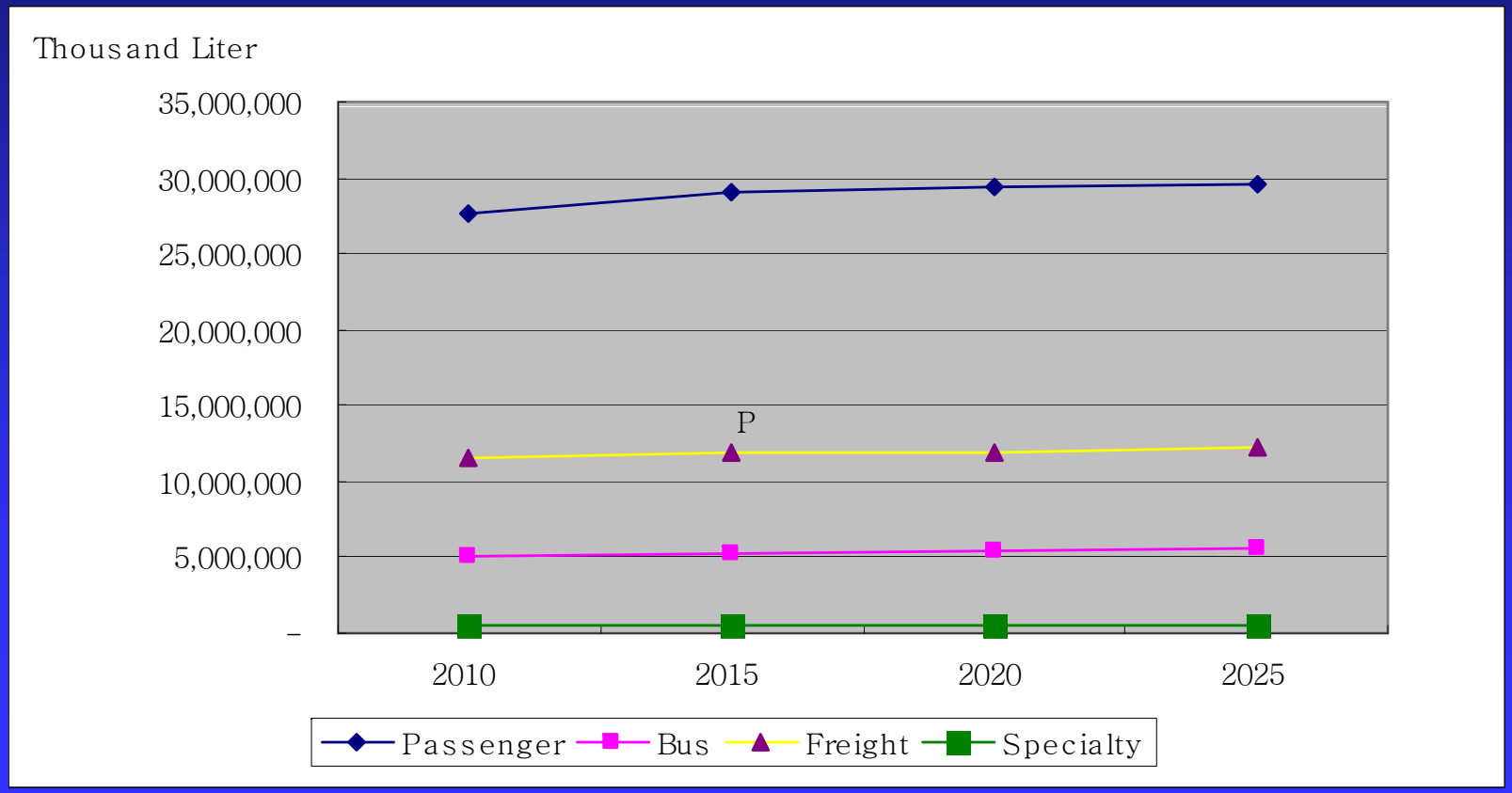
Sectoral Final Energy Consumption



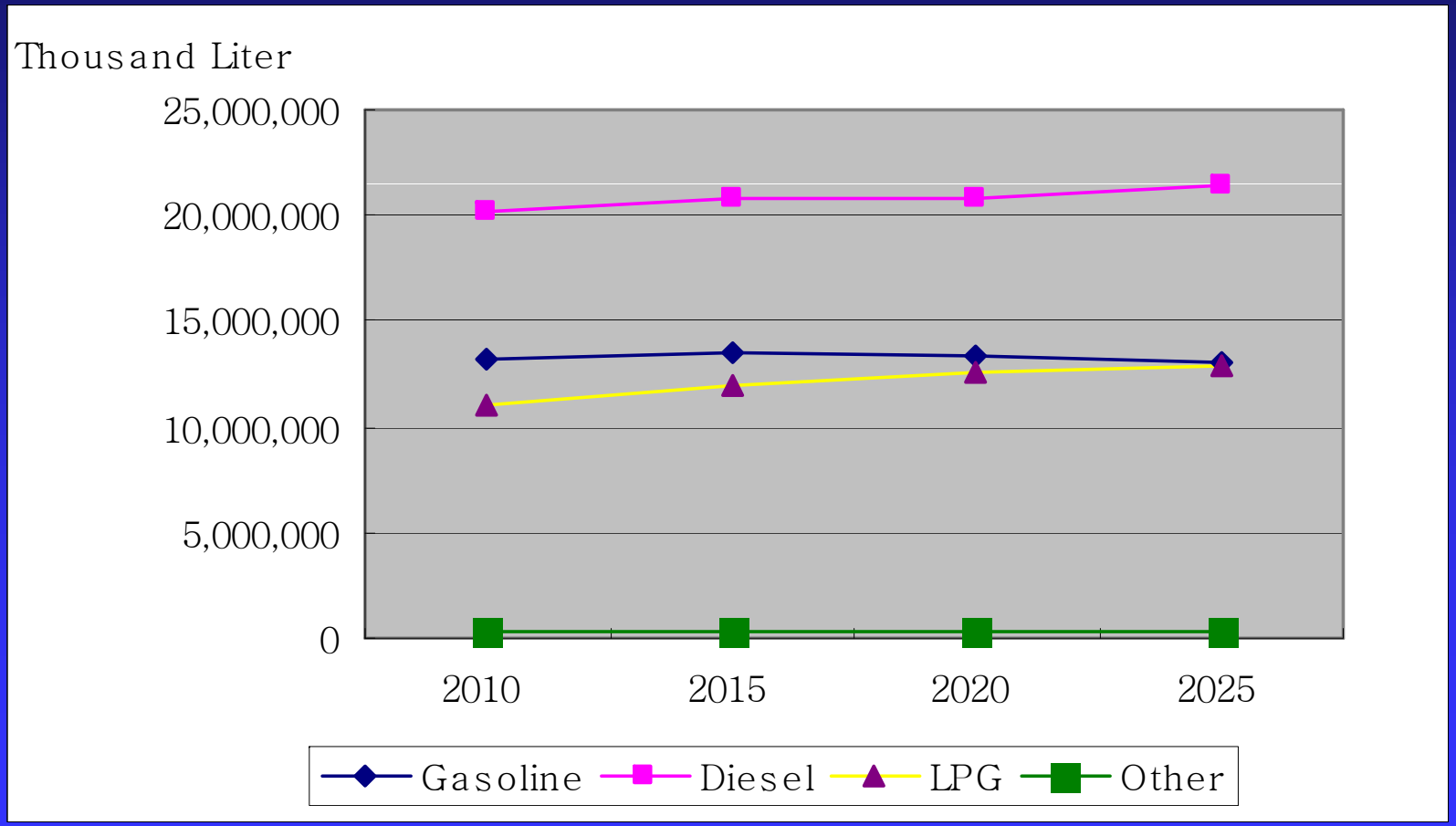
Transport Energy Consumption in Korea



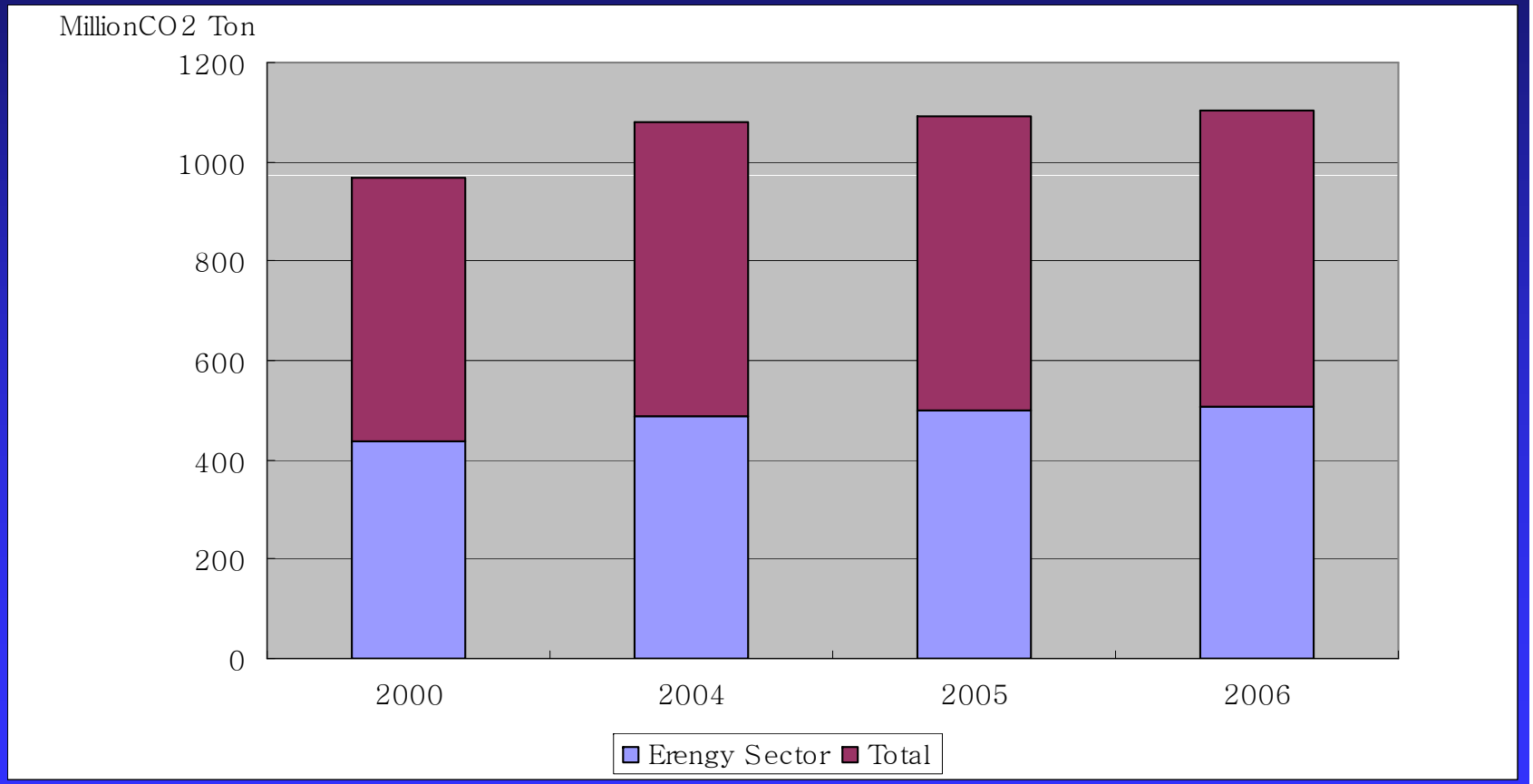
Transport Energy Consumption Forecasting by Vehicle Type



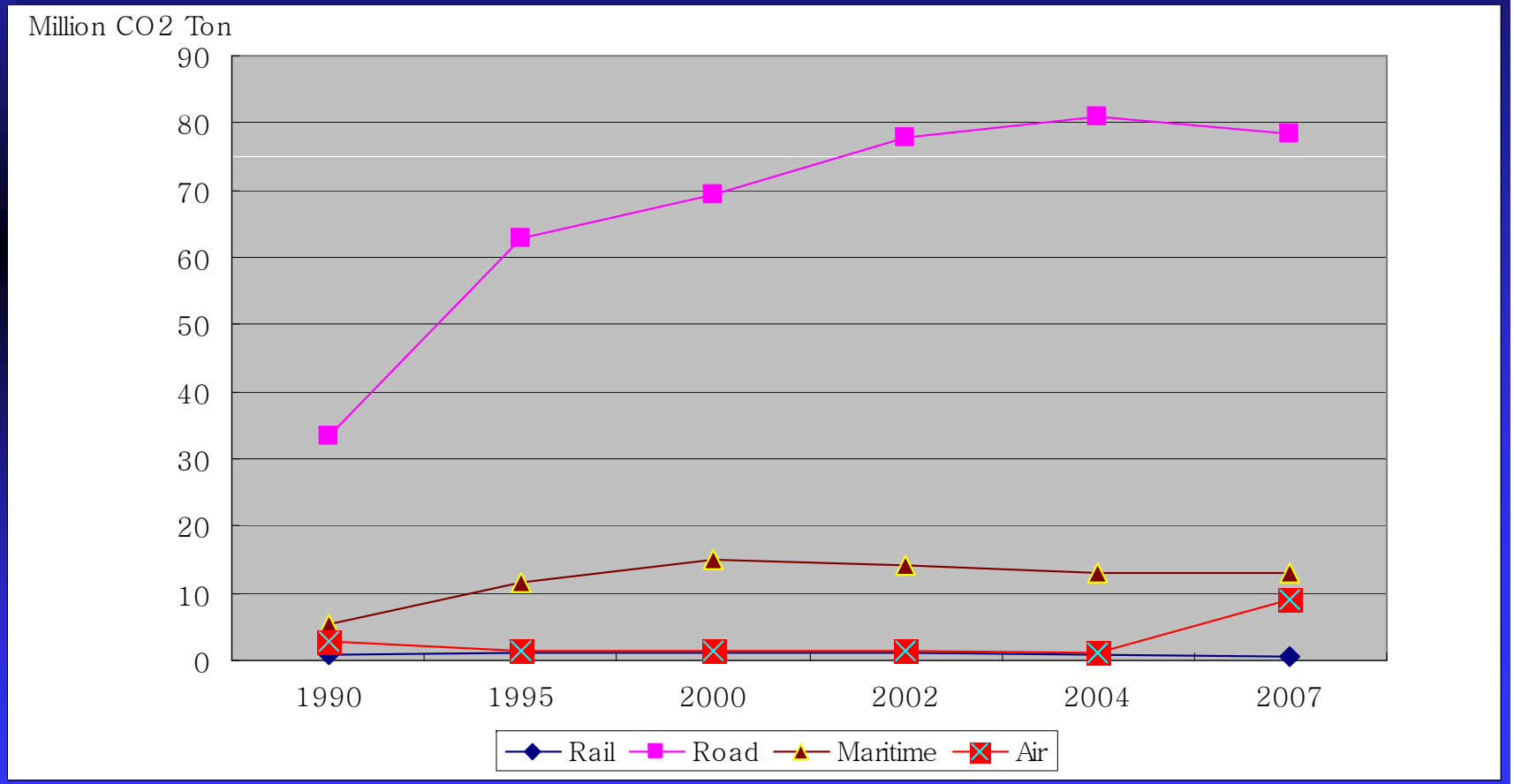
Transport Energy Consumption Forecasting by Fuel Type



GHG Emissions in Korea



GHG Emission Trends in Transport Sector in Korea



Role of Climate Change in Current National Policy

Climate Change and Korea

Korea In Climate Change

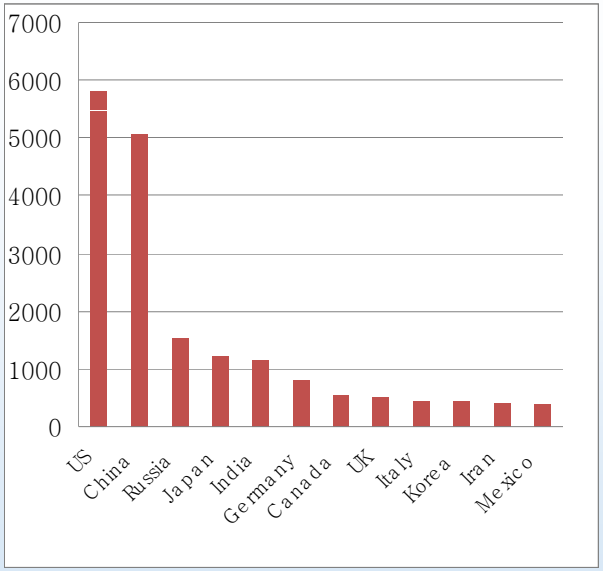
- Annual GHG Emissions **(2004) : World 10th**
  - **5,910 Mil CO2t**

- Historic responsibility (1850 ~ 2002) : World 23th

- OECD Member Country

- **Regarded as an Advance Developing Country along with Mexico within UNFCCC Framework**

Major GHG Emitting Countries



IEA/OECD, IEA Energy Indicator(2005년)

National Energy Planning (2008-2030)

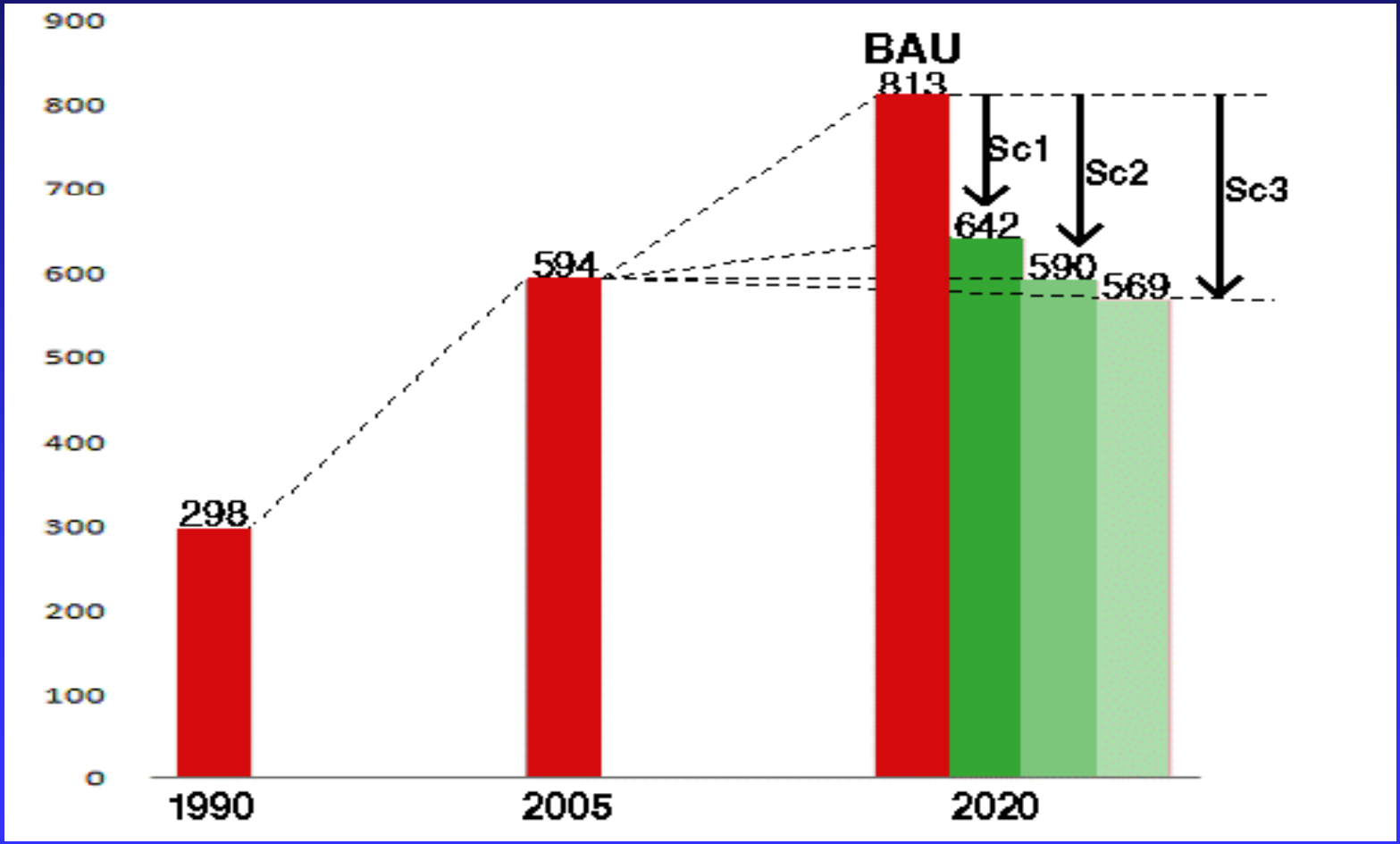
- In response to climate change, transform Korea into low energy low carbon society
- Improve energy intensity 47% by 2030
  - Annual improvement of 2.6% per annum
- Transport related policies
  - Low carbon fuel development
  - Development of low carbon transport and freight infrastructure
  - Limit transport energy increase to 0.3% per annum compared with 1% per annum BAU case

Transport Sector Policies

- Fuel economy standards and green cars
  - ULE Vehicles
- Eco-Driving
- Voluntary agreements
- Inter and intra urban rail expansion
  - Light rails and promotion of public transport
- Non-motorized transport
  -Bicycles and walking
- Efficiency improvements in freight transport
  - Freight networking and IT applications

Programs in Place to Meet Emission Reduction Goals

GHG Emission Forecasting and Reduction Scenarios



Reduction Scenario and Major Instruments

Scenario	Reduction Goals		Criteria for the Reduction Goals	Major Policy Instruments
	BAU	2005		
1	21%	+ 8%	Cost Effectiveness	.Energy Efficient Homes and Buildings .Energy Efficiency Improvements LED .Low carbon Transport System .Industry (green process) .Renewable and Nuclear Energy
2	27%	Freeze	Internationally Balanced Cost Sharing	.Reduction of Perfluorocarbons .Hybrid Vehicles .Bio fuel .Partial CCS(CO_2 Capture and Storage)
3	30%	4%	Highest Reduction Goals for DC	.Electric and Fuel Cell Vehicles .Advanced Energy Efficient Appliances .CCS

Effectiveness of Policy Measures

Macro-economy and energy consumption, reference case

Economic and environmental indicators	1995	2000	2010	2020	Growth rate *		
					1996-2000	2001-2010	2011-2020
Real GDP (1000 billion won)	377.4	442.4	729.6	1,067.6	3.23	5.13	3.88
Population (million)	45.0	47.2	50.8	52.4	0.96	0.74	0.30
GHG emissions (million TC)	120.0	138.1	215.1	313.5	2.85	4.53	3.84
Final energy consumption (million TOE)	120.9	149.6	253.1	380.9	4.35	5.40	4.17
Energy intensity (mil. TOE/1000 billion won)	0.320	0.338	0.347	0.357	1.08	0.26	0.28
Emission intensity (TC/million won)	0.318	0.312	0.295	0.294	-0.37	-0.57	-0.04

* Annual average growth rate

Public transport policy scenario

Scenario	Assumptions
BAU Scenario	**Current trends scenario: Declining public transport modal share**
Public transport scenario	**Bus: Maintaining current modal share (9.96%) up to 2020.** **Subway: Maintaining current modal share (9.49%) up to year 2020.**

Passenger transport demand forecast by public transport policy scenario

Unit: million person km

		2000	2005	2010	2015	2020
BAU Scenario	Passenger car	168,126	217,043	280,194	361,718	466,963
	Bus	27,695	25,917	24,253	22,695	21,238
	Subway	28,365	34,445	38,899	51,541	61,170
	Total	224,186	277,405	343,345	435,954	549,371
Maintaining public transport modal share	Passenger car	168,126	207,477	258,367	330,241	418,397
	Bus	27,695	35,254	42,842	53,297	66,032
	Subway	28,365	34,673	42,136	52,417	64,942
	Total	224,186	277,405	343,345	435,954	549,371

Estimation of CO_2 emission under public transport policy

Unit: thousand TC

		2000	2005	2010	2015	2020
BAU Scenario	Passenger car	6,853	8,847	11,421	14,745	19,035
	Bus	417	390	365	342	320
	Subway	85	103	117	155	184
	Sub-total	7,355	9,341	11,903	15,241	19,538
	Total Emission[1)]	18,681	22,176	26,565	31,044	34,748
Maintaining public transport modal share	Passenger car	6,853	8,457	10,532	13,461	17,055
	Bus	417	531	645	803	994
	Subway	85	104	126	157	195
	Sub-total	7,355	9,092	11,303	14,421	18,244
	Estimated reduction compared with the total[2)]	-	249 (1.12%)	600 (2.26%)	820 (2.64%)	1,294 (3.72%)

1) Total emission in the transport sector

2) The estimated reduction is in comparison with the total transport emission.

CO_2 emission units by freight transport modes

	Private freight vehicle	Commercial freight vehicle	Rail	Water	Air
Freight ton km (million ton-km)	33,376	9,227	10,072	33,699	151
Share (%)	38.6	14.6	11.6	38.9	0.2
CO_2 emission (thousand TC)	5,251.3	1,167.7	-	-	-
CO_2 emission unit (g-C/ton·㎞)	157.3	126.6	7.1	10.0	402.0

Proposed freight modal share change

Unit: %

	1997	2010	2020
Road	56.6	48.2	41.2
Rail	14.2	15.5	20.3
Water	35.8	36.0	38.1
Air	0.1	0.3	0.4

Freight modal shift policy scenario

BAU Scenario	**Current trend and no infrastructure investment**
Modal shift scenario	**Government infrastructure investment and modal shift plan**

Freight modal demand forecasting by scenario

Unit: million ton·㎞

		2000	2005	2010	2015	2020
BAU Scenario	Road Private	34,379	40,006	46,841	55,201	65,491
	Road Commercial	9,504	11,060	12,950	15,261	18,106
	Rail	10,375	12,073	14,136	16,659	19,764
	Water	34,712	40,394	47,295	55,736	66,125
	Air	156	182	213	251	298
	Total	89,126	103,715	121,435	143,108	169,784
Infrastructure & modal shift policy scenario	Road Private	34,379	38,448	40,972	41,468	41,971
	Road Commercial	9,504	10,417	17,560	22,494	27,980
	Rail	10,375	14,592	18,822	25,477	34,483
	Water	34,712	40,007	43,717	53,178	64,688
	Air	156	252	364	491	662
	Total	89,126	103,715	121,435	143,108	169,784

CO_2 emission forecasting and reduction potential under the infrastructure and modal shift policy

Unit: thousand TC

		2000	2005	2010	2015	2020
BAU Scenario	Road Private	5,409	6,294	7,370	8,685	10,304
	Road Commercial	1,203	1,400	1,639	1,931	2,291
	Rail	74	86	101	119	141
	Water	347	404	473	557	661
	Air	63	73	86	101	120
	Sub total	7,096	8,257	9,668	11,394	13,518
	Total	18,681	22,056	26,565	30,855	33,869
Infrastructure & modal shift policy Scenario	Road Private	5,409	6,049	6,446	6,525	6,604
	Road Commercial	1,203	1,318	2,222	2,847	3,541
	Rail	74	104	134	182	246
	Water	347	400	437	532	647
	Air	63	101	146	197	266
	Sub total	7,096	7,973	9,387	10,282	11,304
	Reduction potential	-	284 (1.29%)	282 (1.06%)	1,111 (3.60%)	2,214 (6.54%)

Policy implications

- Public transit related policies would bring GHG related improvements. They are more easily implementable politically.
- Freight modal shift could bring greater GHG emission. However this could imply substantial investments in related infrastructure.

Transport Policies for Climate Change

- Diverse measures required for reduction in GHG in transport sector
- Technological innovation and economic incentives
- Limitations in policy options and considerations for secondary impacts
- R&D in new technologies
- A comprehensive approach is required

Thank you!