

Korean Energy Market and Low Carbon Issues

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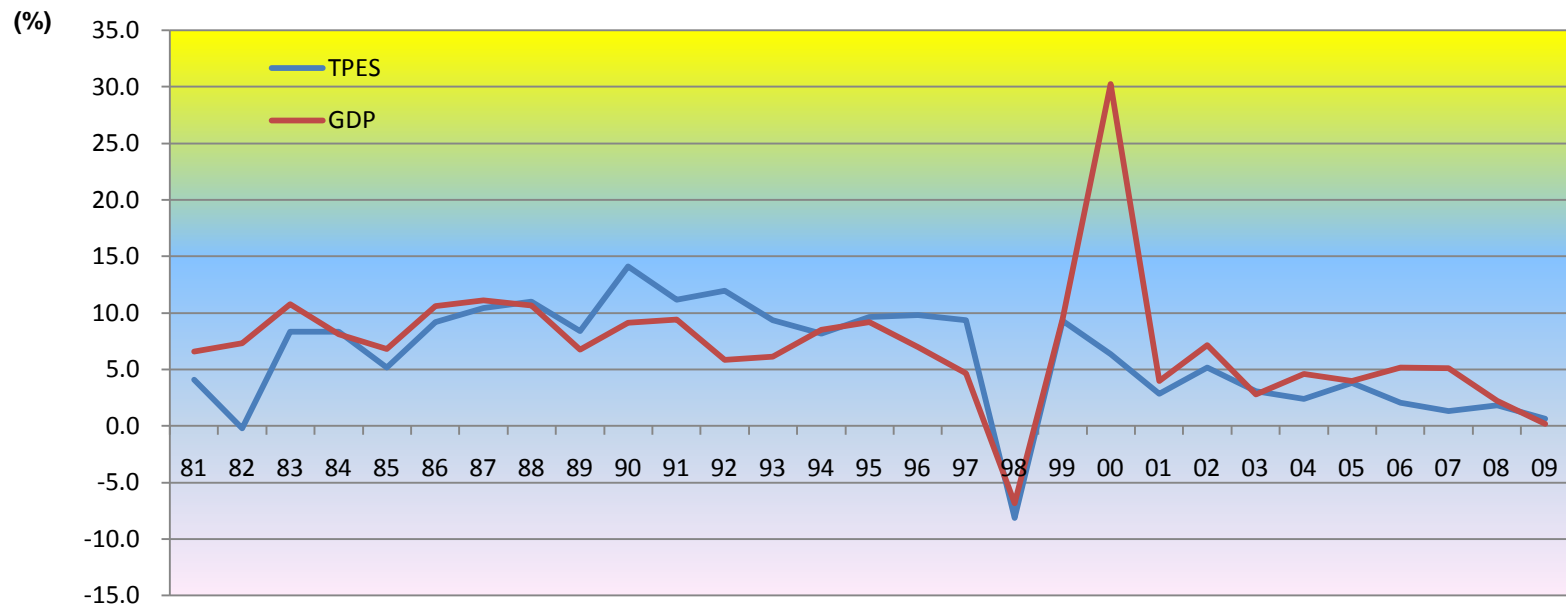
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I. Energy Situation of Korea

Economic Growth and Energy Demand Increase



□ For 1987 – 1997

- AAGR of Energy Consumption & GDP : 10.3% & 7.7%, respectively
- Elasticity of Energy Consumption to GDP : 1.34

□ For 1998 – 2009

- AAGR of Energy Consumption & GDP : 3.5% & 6.6%, respectively
- Elasticity of Energy Consumption to GDP : 0.53

Korea in the World Energy Market

Overseas Energy Dependency



Energy Import

1980 US\$ 6.7 billion

2009 US\$ 91.2 billion ('08: 141.5 billion)

Korea is one of big Energy Consumer(2008)

Oil : 9th, 103.3 Mil.TOE

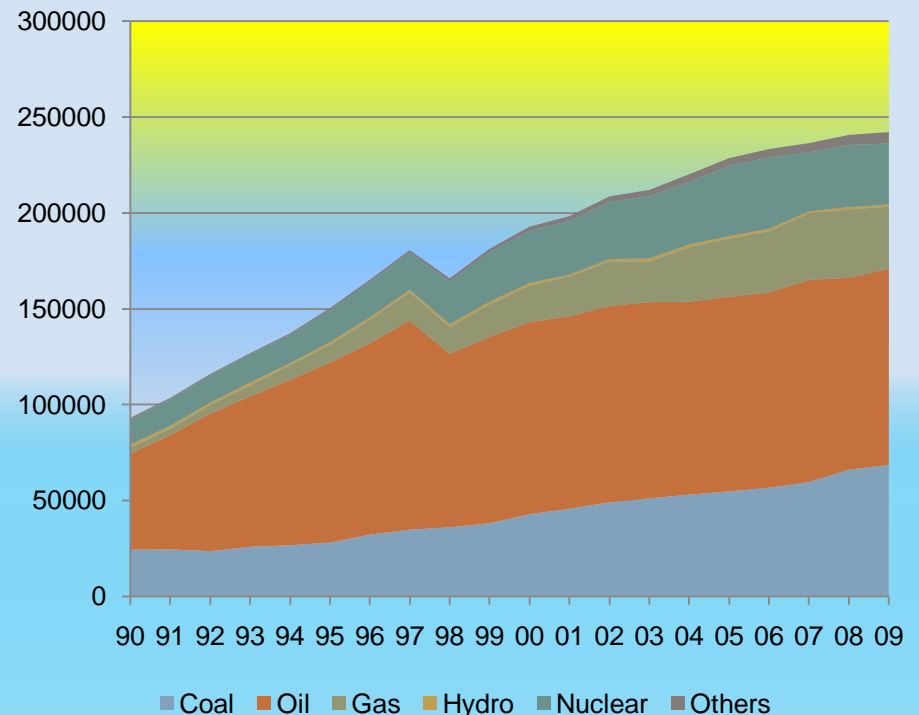
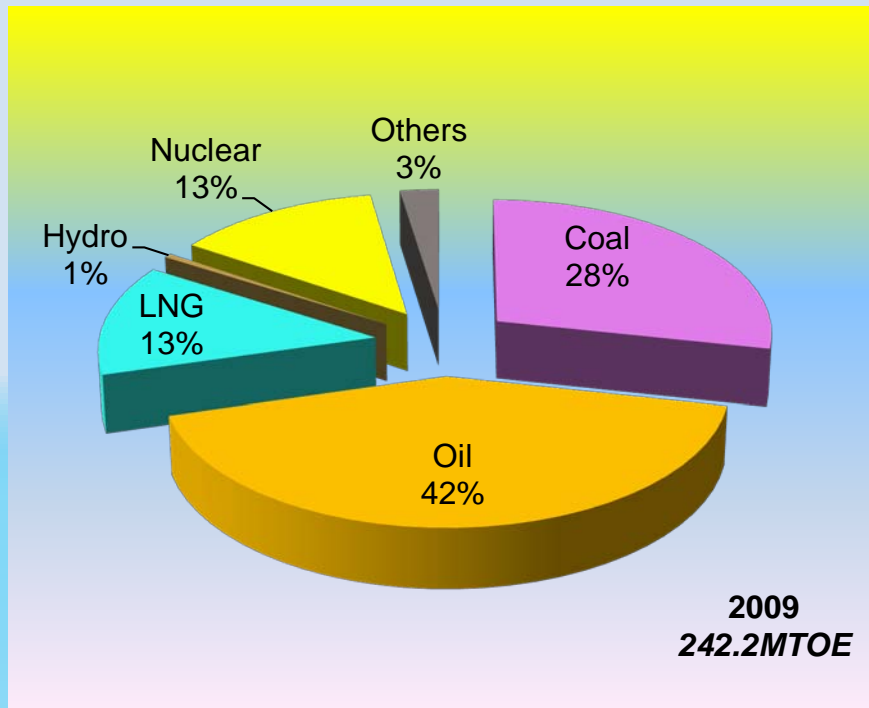
Nuclear : 5th, 34.2 Mil.TOE

N.Gas : 19nd, 35.7 Mil.TOE

TPES : 9nd, 240.1 Mil.TOE

Coal : 8th, 66.1 Mil.TOE

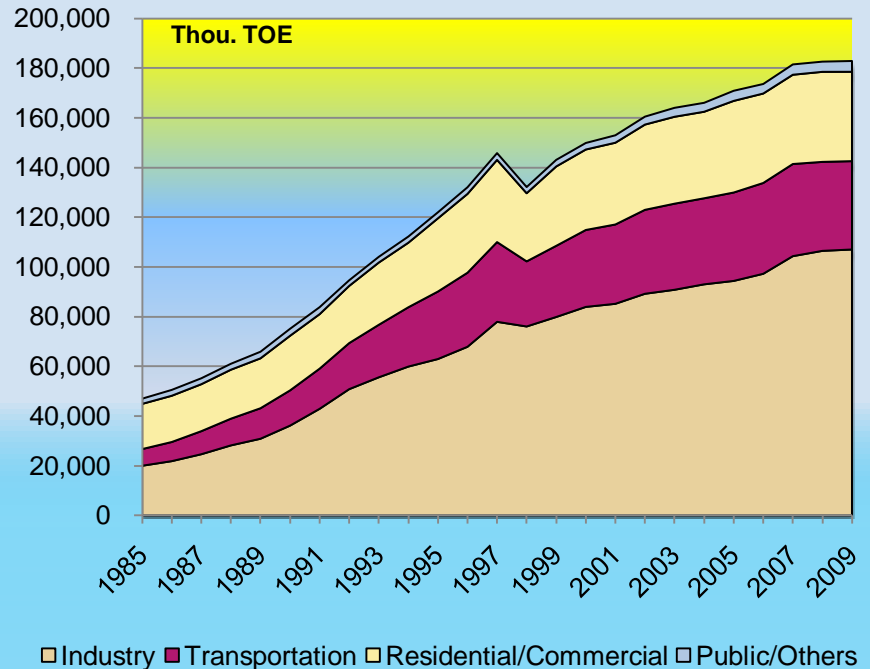
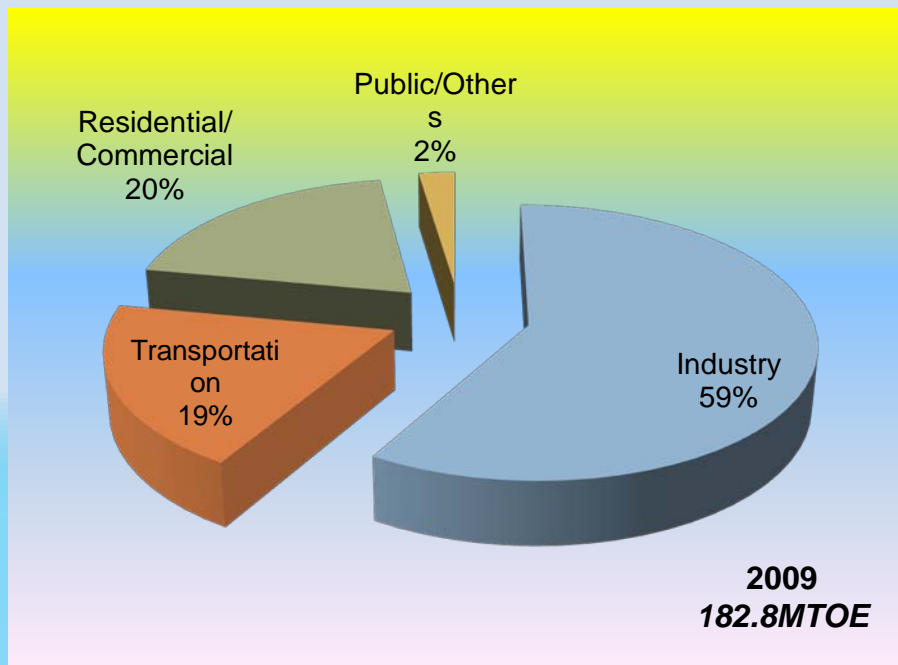
Primary Energy Consumption by Source



□ Trend in Consumption Shares (1981→1990→2009, %)

- Oil ↓: 58.1 → 53.8 → 42.2
- Coal ↓: 33.3 → 26.2 → 28.3
- LNG ↑: 0 → 3.2 → 13.3
- Nuclear ↑: 1.6 → 14.2 → 13.1

Final Energy Consumption by Sector



□ Trend in Consumption Shares (1981→1990→2009, %)

- Industry **↑**: 44.9→48.1→58.5
- Res. & Com. **↓**: 40.7→29.3→19.7
- Transport **↑**: 9.6→18.9→19.4
- Public & Others **↓**: 4.8→3.7→2.4

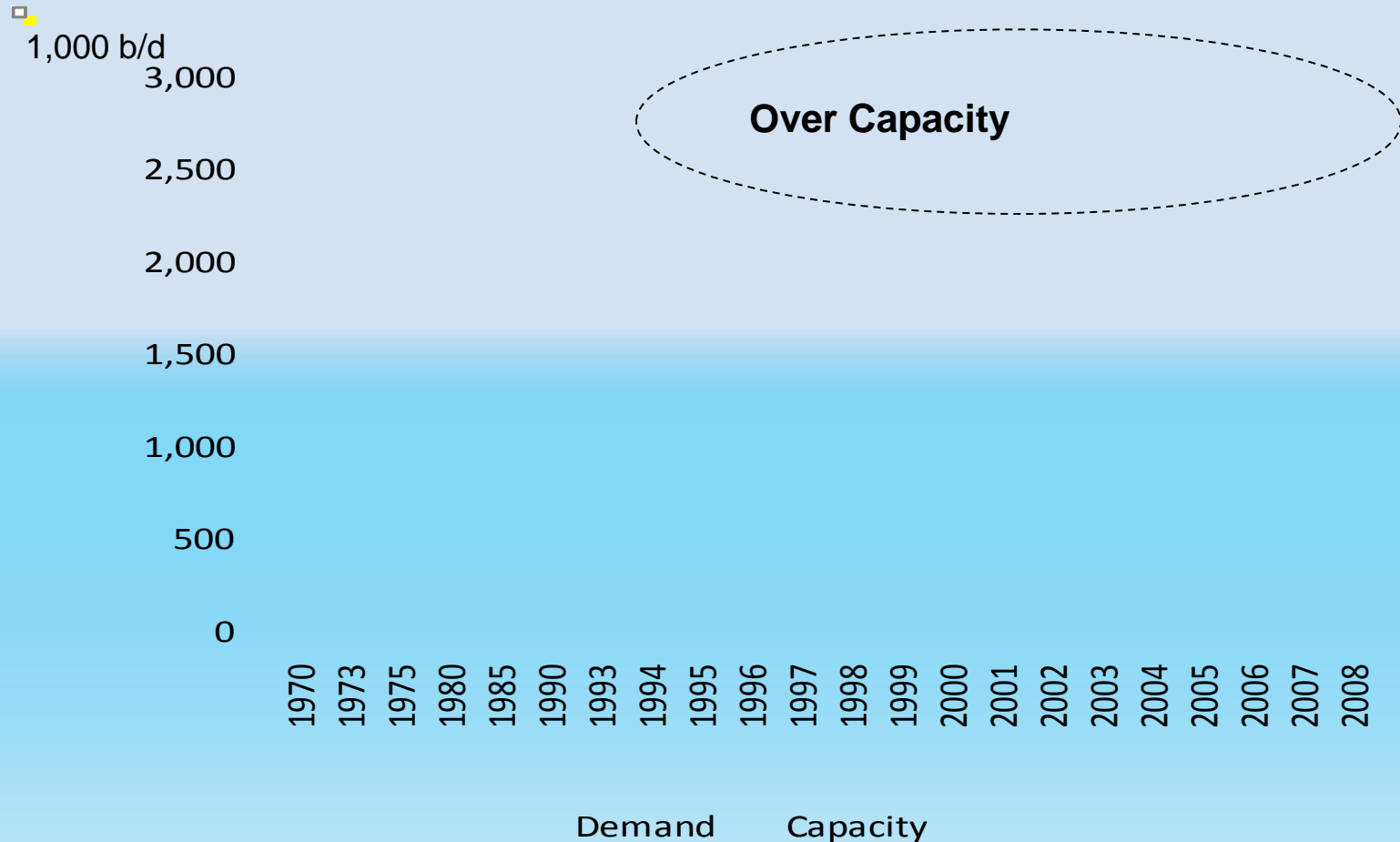
Energy Capacity Expansion

	Unit	1980	1990	2008
Generation capacity	GW	10.4	24.1	70.4
Generation	TWh	40.1	118.5	422.4
Refinery capacity	thousand bbl/d	640	840	2,855
Oil imports	MMbbl	196.7	409.6	1,089.5
LNG Imports	thousand M/T	-	2,291	27,259
City gas consumer	Thousand	99	1,220	13,361
Coal production	million ton	18.7	19.8	2.8
Coal imports	thousand M/T	7.7	24.0	96.4

Source: KEEI(2010 March), *Monthly Energy Statistics*

Oil Refinery Facility in Korea

- Due to large scale investments in 1990s, Refinery facilities has been over-capacity.



Natural Gas Infrastructure in Korea

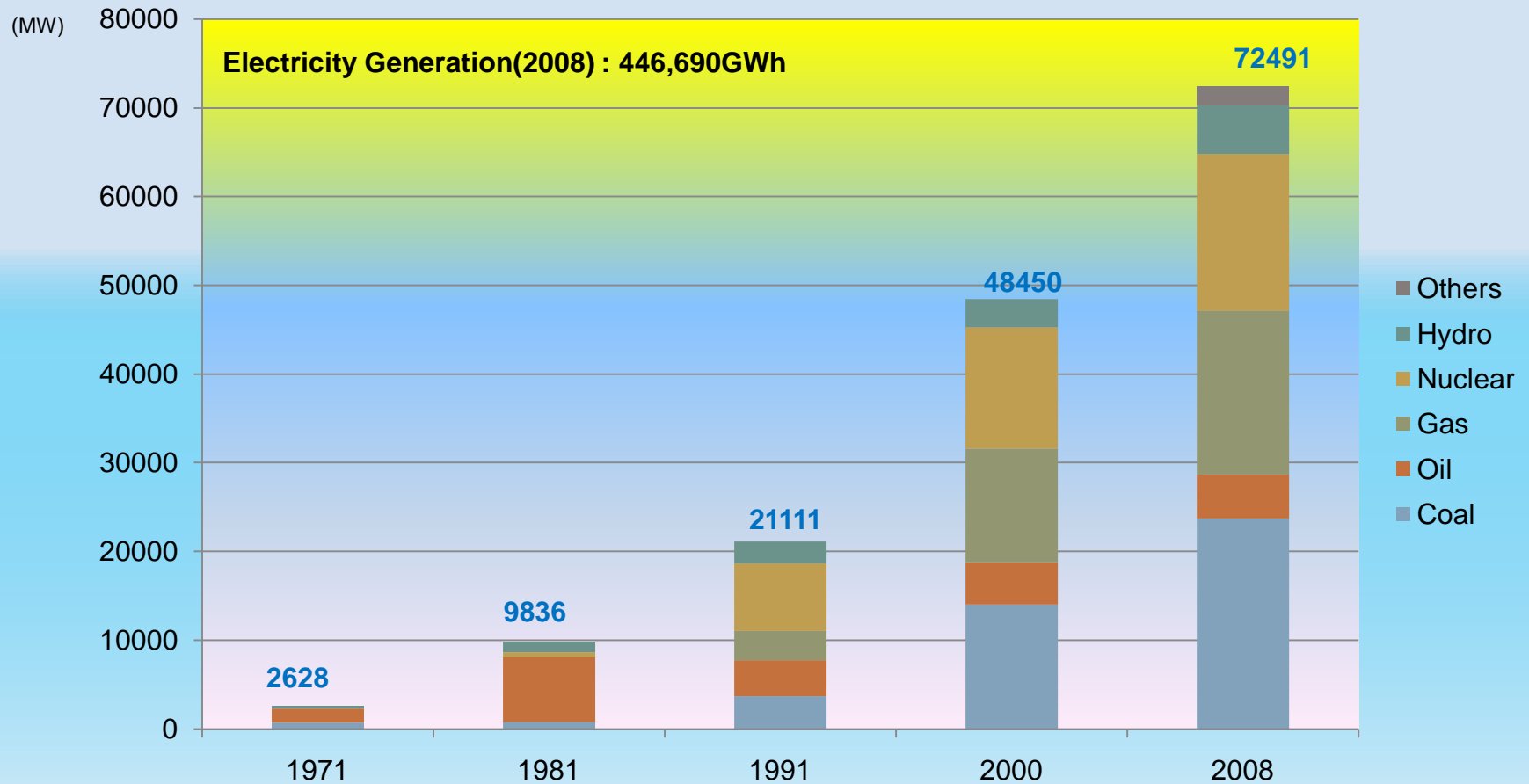
- Three LNG terminals and nationwide pipeline networks for transport of natural gas.



	<i>Start</i>	<i>Storage Capacity (1,000 kl, #)</i>	<i>Re-gas Capacity (Ton/h)</i>
<i>Incheon</i>	<i>Oct. 1996</i>	<i>3,480(18)</i>	<i>3,690</i>
<i>Pyeongtaek</i>	<i>Nov. 1986</i>	<i>1,000(10)</i>	<i>3,016</i>
<i>Tongyeong</i>	<i>Sep. 2002</i>	<i>1,400(10)</i>	<i>1,350</i>
<i>total</i>		<i>4,880(38)</i>	<i>8,056</i>

Electricity Sector Development in Korea

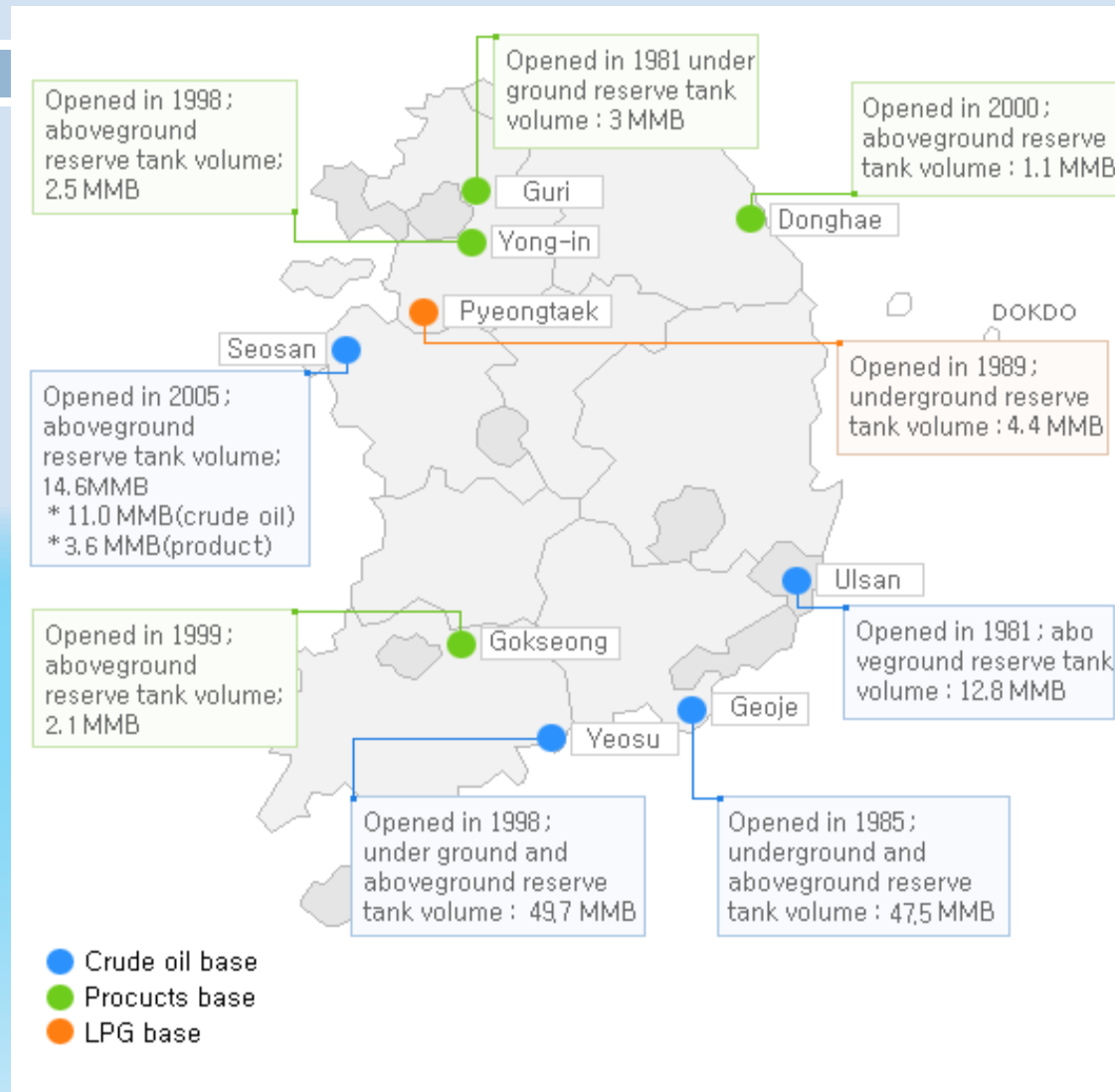
Power Generation Capacity Increase Trend



Oil Stockpiling in Korea

Nine stockpiling sites operated by the KNOC

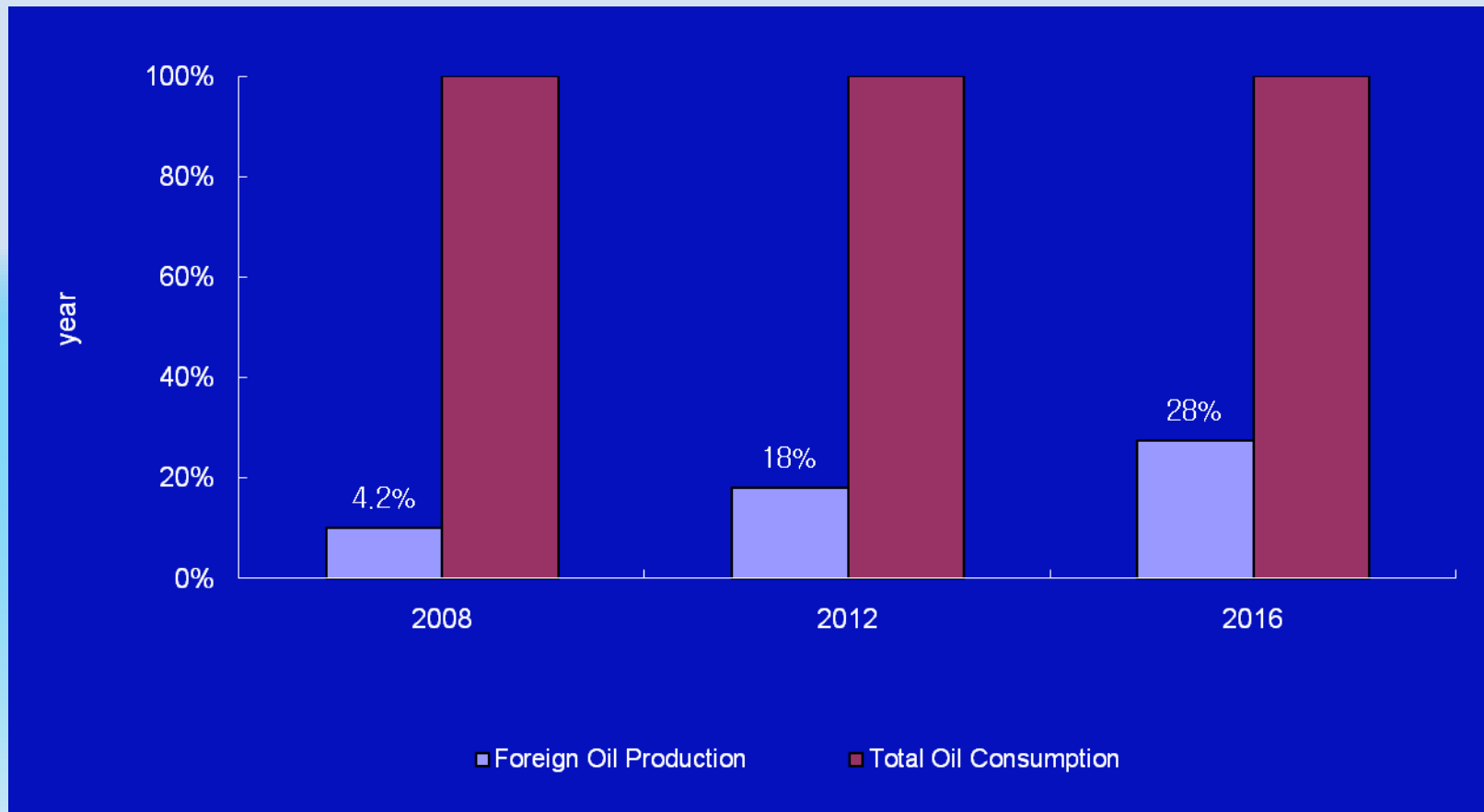
Total capacity: 138MMB with 102MMB of reserves ⇒146MMB by 2009.



Overseas Energy Resource Development

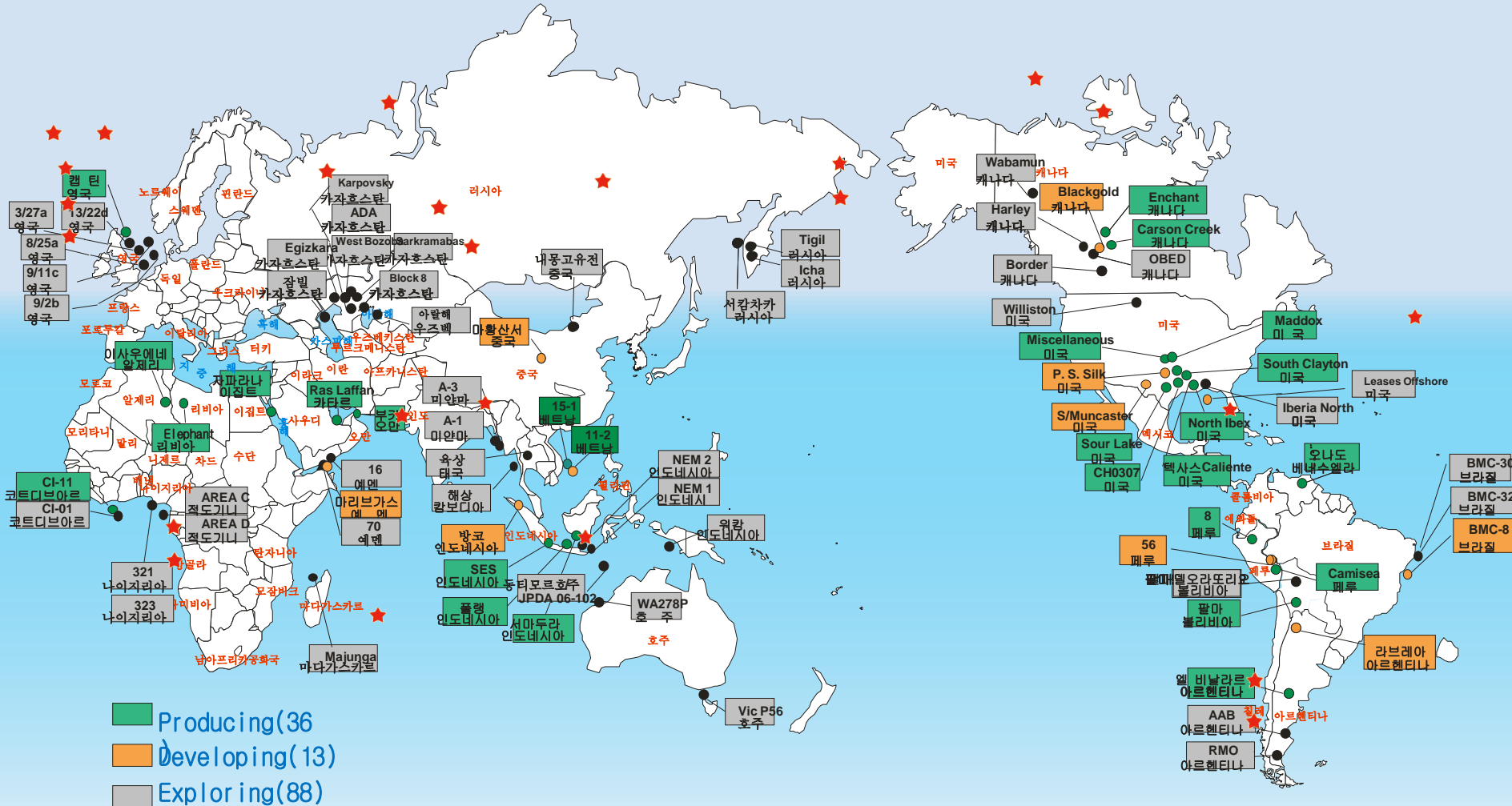
Government's target of overseas E & P business

- Overseas Oil Producing Amount equivalent to 18% of oil imports by 2012 and 28% by 2016 in overseas oil fields



Present Status of Overseas Projects by Korea

137 Projects in 35 Countries



II

Low Carbon Green Growth Strategies

- ① Transition to Low-Carbon Energy System
- ② Promotion of Green Energy Industries



Elements of LCGG



Policy Directions for LCGG in Korea

**LCGG
National
Strategy
(2009)**

**5
Year
Plan
(2009)**

1. **A Paradigm Shift to Low-Carbon Society**
2. **Green Technology as New Growth Engines**
3. **Enhanced Corporate Competitiveness**
4. **Creation of New Green Jobs**
5. **Green Transformation for Transport & Building**
6. **Green Revolution of Life Styles**
7. **Green Education and Cultural Policies**
8. **Eco-friendly Taxation Schemes**
9. **Global Green Leader Korea**
10. **Contribution to Global Community**



Transition to Low-Carbon Energy System

Energy Vision 2030

3 Basic Directions

Energy Security, Energy Efficiency, Environmental Protection

5 Targets

Realizing energy-independent society

Transforming into low energy consumption society

Becoming independent of oil

Enjoying energy welfare

Creating new jobs in energy sector

9 Action Plans

① Enhance capacity for overseas energy resources development

② Establish hydrogen-based economy and expand the use of new and renewable energies

③ Substantially improve energy efficiency

④ Develop nuclear energy policies

⑤ Realize energy welfare

⑥ Expand overseas energy business

⑦ Advance energy technology for national growth

⑧ Set up an effective energy market

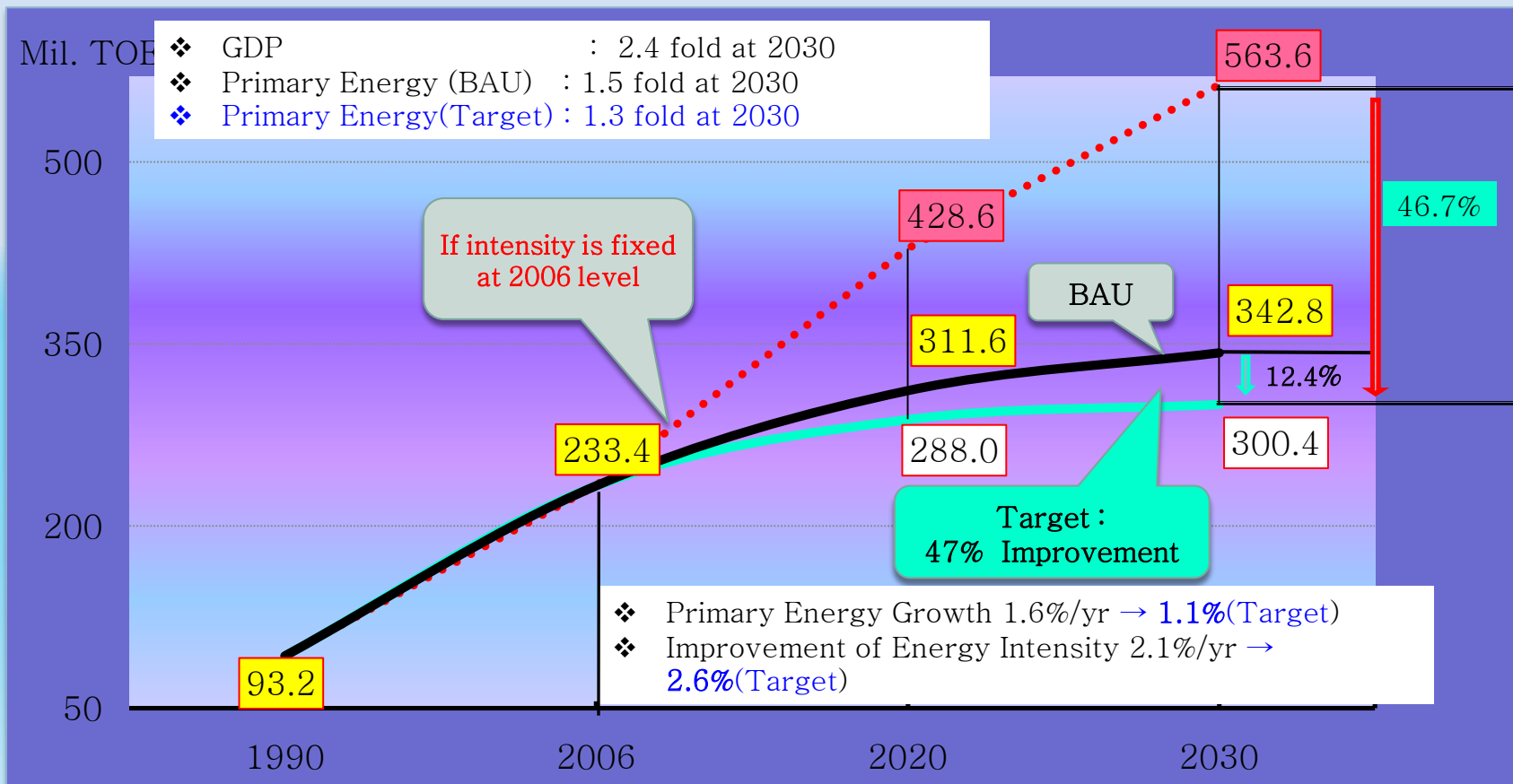
⑨ Build energy security for stable supply

Energy Intensity Target

Forecast & Target

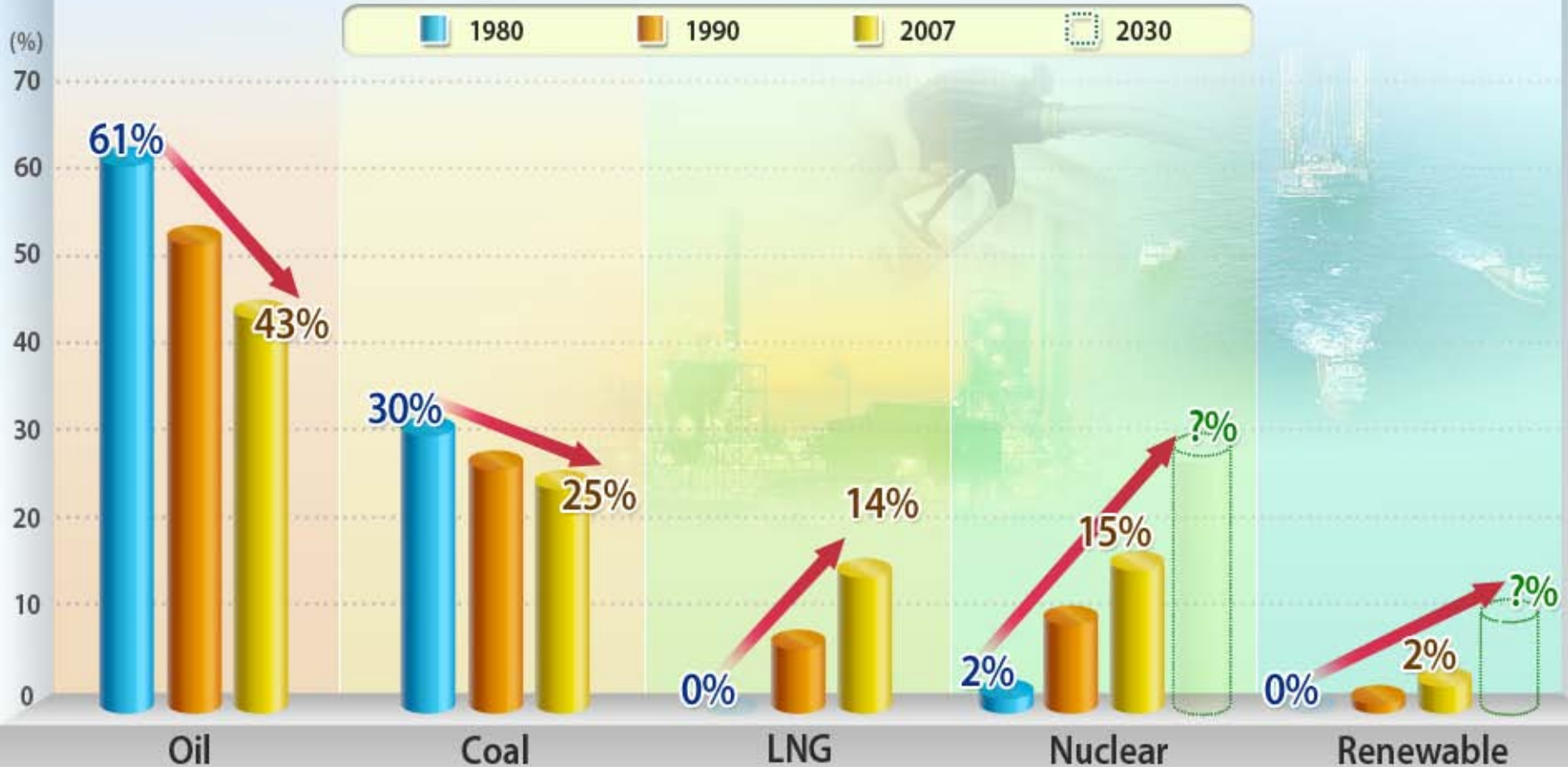
Target: 47% Improvement of Energy Intensity until 2030

- ❖ Additional reduction of Primary Energy Consumption at 2030: 12.4% of BAU(Business as Usual) Energy Consumption Forecast (42.3 million TOE)



Energy Mix Target

Energy consumption



New & Renewable Energy Mix Target

NRE Target : 11% in Total Energy Consumption by 2030

Mandatory Supply & Demand Creation

- Introduce RPS to utility and petro-chemical companies by 2012
 - 3% of total power generation
 - 3% biodiesel as transportation fuel
- Strengthen mandatory NRE use in new public buildings
 - over 5% in total energy consumption
- Deployment of 1 Million 'Green Homes'
 - utilize photovoltaic, geothermal, wood pellet, small-scale wind power



Development and Deployment of NRE

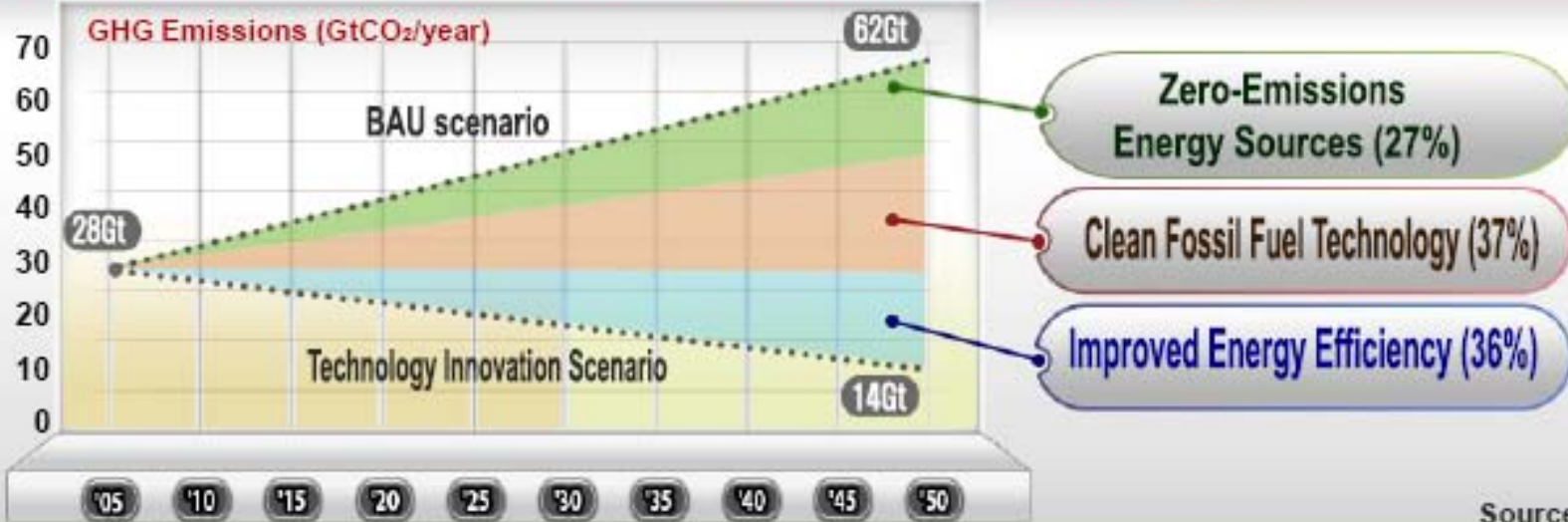
- (Wind) Develop and deploy ocean wind
 - Implement precise investigation and build a commercialization complex
- (Tidal) Increase deployment of tidal / tidal current power
 - Siwha Lake, Garorim Bay, Uldolmok, etc.
- (Bio) Assist development of domestic and international resources
 - increase R&D on micro/macro algae for biofuels



2 Promotion of Green Energy Industries

Scope of Green Energy Industries

New energy industry which significantly reduces GHG emissions



Type

Zero-Emissions

Clean Fossil Fuel

High Efficiency Equipment

Major Sectors



▶ Photovoltaic, Wind, Hydrogen Fuel Cell, IGCC, etc.

▶ CTL, GTL, Carbon Capture and Storage(CCS), etc.

▶ LED, Energy Storage, Cogeneration, Heat Pump, etc.

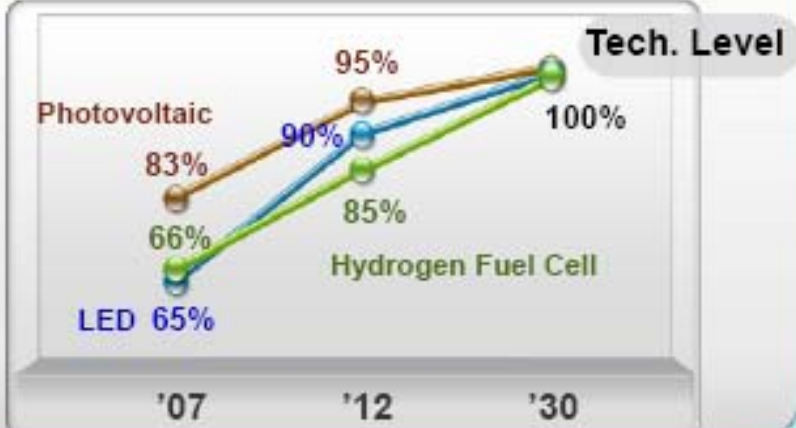
Strategic Selection of Potential Sectors

Concentrated Promotion based on Market Potential, Technical Advantage and Urgency

	9 Sectors	World Market Size	Domestic Production	Tech. Level (D.C. = 100)
 Short-Term Growth Engine	Photovoltaic	20.0 bil. \$	140 mil. \$	83%
	Wind	37.5 bil. \$	400 mil. \$	79%
	LED	14.0 bil. \$	1,160 mil. \$	65%
	Electrical IT	13.0 bil. \$	70 mil. \$	85%
 Next-Generation Growth Engine	Hydrogen Fuel Cell	3.2 bil. \$	–	66%
	IGCC (Integrated Gasification Combined Cycle)	8.6 bil. \$	–	56%
	CTL / GTL (Coal-to-Liquids/Gas-to-Liquids)	28.5 bil. \$	–	50%
	Energy Storage	0.5 bil. \$	–	60%
	CCS (Carbon Capture & Storage)	–	–	65%

Market-Oriented Technology Development

▶ Invest 3 trillion KRW for 5 years(08~12) ▶ Remove technological gap by 2012



Target Setting & Establishment of Technology Development Roadmap

	Technology Development Target (Example)	World Market Share	
		2012	2030
Photovoltaic	2020, Secure the economic efficiency to fossil fuel level	5%	15%
Hydrogen Fuel Cell	2015, Tec. development of kW unit household battery	6%	15%
IGCC	2012, Tec. Independence of 300MW unit design	1%	10%
LED	2015, Secure the key original technology of 100 lm/W unit	16%	20%

Thank You Very much

| New & Renewable Energy |

