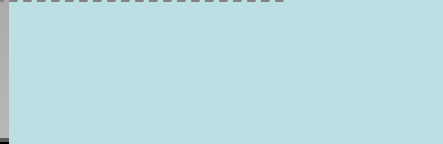
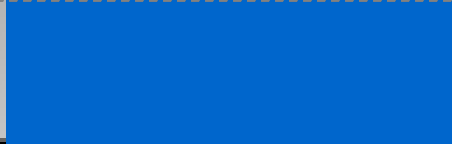




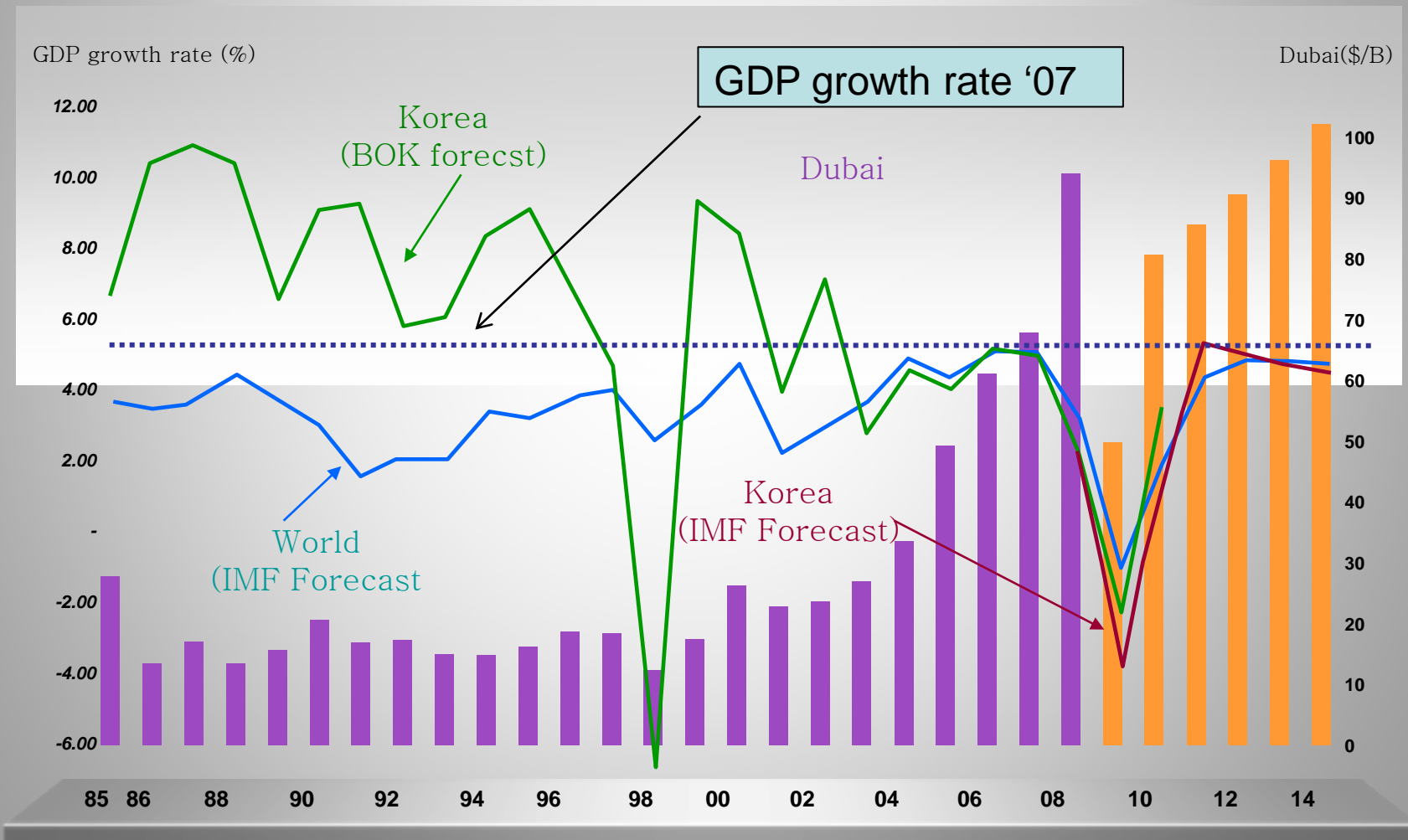
A road to the low carbon energy future: Korean perspective

East West Center
August 20-21, 2009

Yonghun Jung, Ph.D
Executive Director, Energy Policy Research Center
KEEI



Economic Recovery?





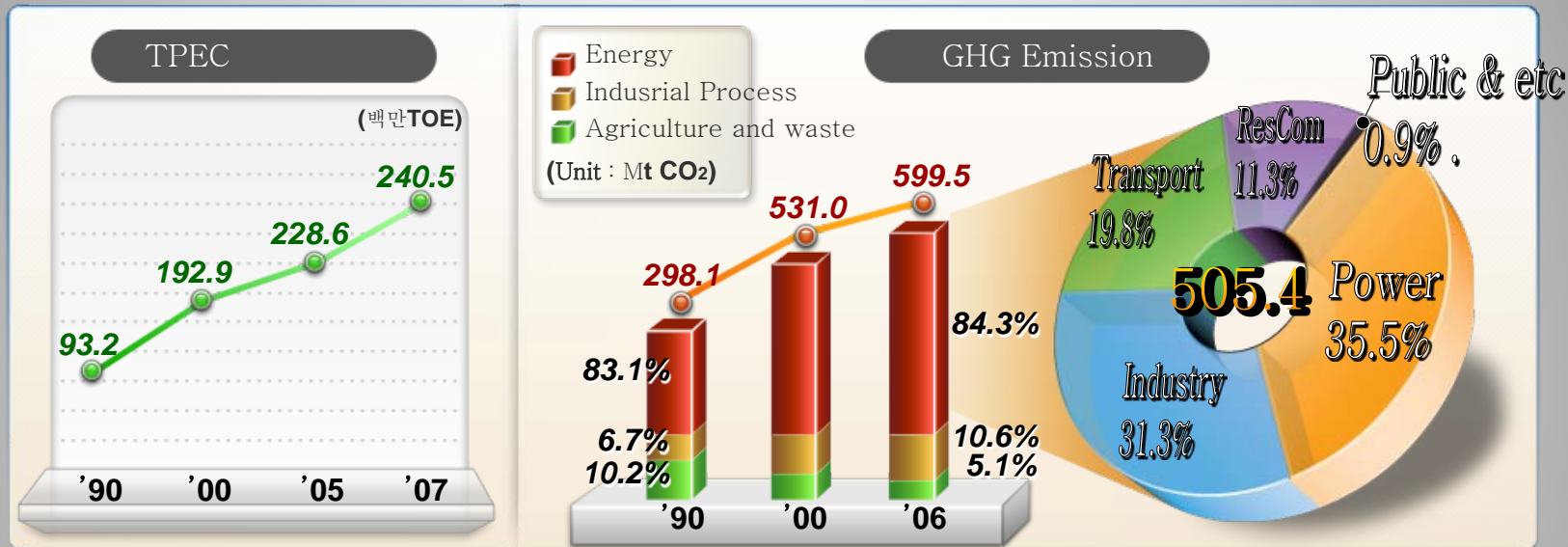
Outline

- Energy Challenges in Korea
- Korea's vision for the energy future
- Policy Schemes for the low-carbon energy future
 - Energy Efficiency
 - Developing NREs
 - CCT and CCS
 - Security of conventional energy sources
- Some thoughts



Energy Challenges in Korea

Continuous increase in energy consumption and GHG emission



Energy Intensive industry based economy

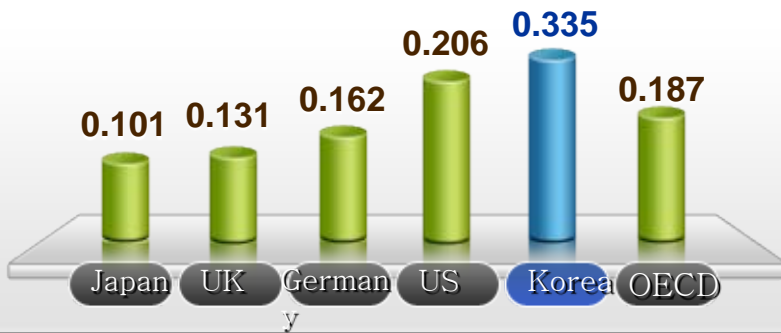
- Total GHG emission, 16th in the world, **Per Capita Emission 28th(9.3tCO₂)(IEA, '05)**
- **84.3% of GHG Emission from Energy Use** and 10.6% from Industrial Process
- Share of industrial energy consumption : **(Korea) 55%, (US) 26%, (Japan) 39%, (EU) 30%**

- ◆ Supply oriented energy policy neglected the efficiency and conservation
- ◆ GHG emission would increase by 180% in 2030 compared to the 1990 level

Korea's Energy Challenges

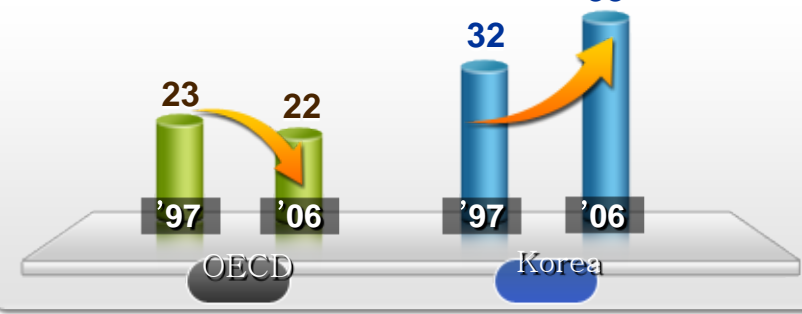
Low energy efficiency

* Energy Intensity (Mtoe/\$1000, '07 IEA)

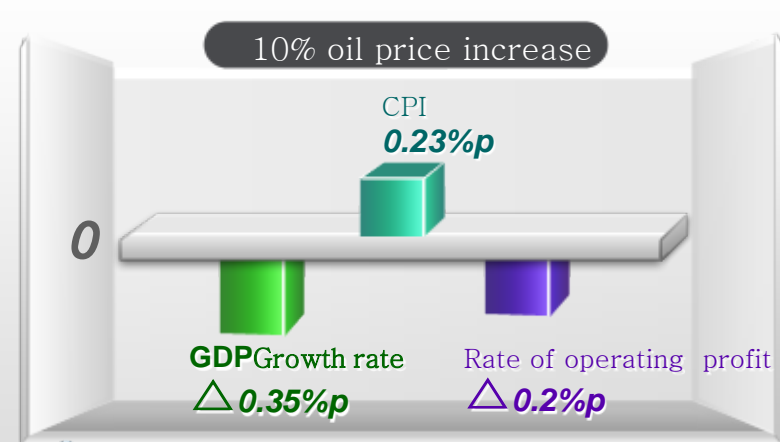
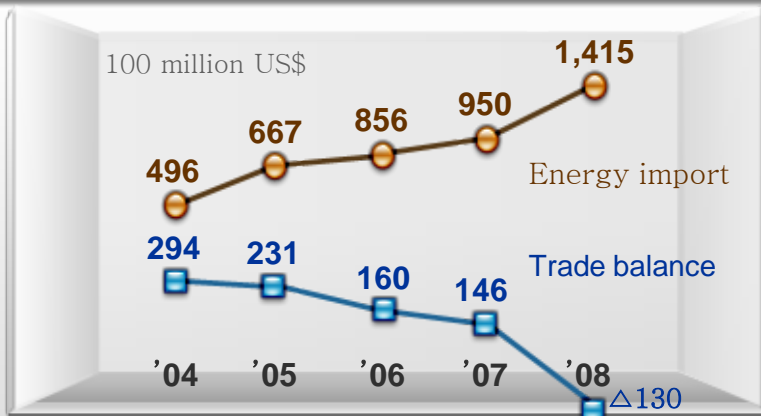


Energy Intensive Industry (Seri)

• consuming 38% of TPES, 80% of total manufacturing consumption



Energy import dependency, 97% and fossil fuel 83%



SERI('07)

'08 import => 141.5 billion USD
IT+ Automobile+ Ship export => 110.9 billion USD

Korea's vision for the future



“Low Carbon Green Growth”

- A government’s initiative for the next 60 years announced August 2008.
- Greenhouse gas reduction is the core strategy.
- “Green growth 5 year plan”
 - Setting GHG emission reduction target
- Investment in GHG reduction technologies as a new engine for economic growth





Green Vision for Korea (2008-2030)

5 Targets	Indicator	2006년	2030년
Energy Independence	Self-sufficiency	3.20%	40%
	NRE Portion	2.20%	11%*
Low energy consumption society	Energy Indensity	0.347	0.185
Energy Independence	Oil dependency	43.60%	33%
Equitable Energy Society	Share of energy poverty class	7.80%	0%
New Economic Growth Paradigm	Energy technology level	60% of the developed	Top of the world



Korea's green growth initiative

- Establishment of low carbon society and economy
 - Goal: Energy efficiency improvement: 28% by 2020, 46% by 2030 (base year 2002)
 - Strategy: Sectoral Efficiency Management encompassing Transportation, Rescom, and Industry
 - Criteria: Economic and environment acceptability, increase of NRE share up to 11% by 2030 including bio-energy (19 fold increase)
 - Instrument: RPS, Regulation, Green Home 2mil., increase of the nuclear power share, smart grid, large scale LED projects.
- Fostering green industry
 - NRE: Wind, solar, hydrogen fuel cell, IGCC
 - Clean fuel: CTL, GTL, CCS
 - Appliance: LED, Power IT, Storage, small CHP, Heat Pump,
- Establishment and vitalization of carbon market
 - Green Growth Basic Law has been drafted as of now for emissions trading



Policy schemes for the low-carbon future



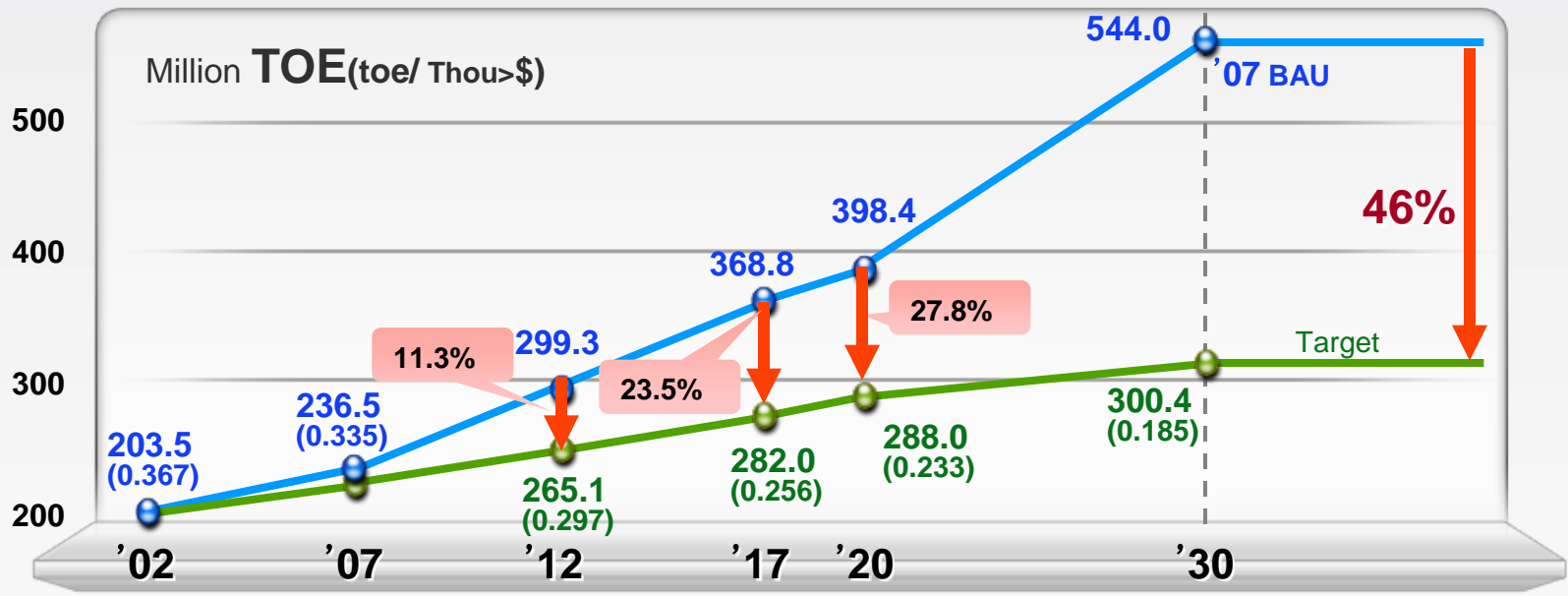
Korea's policies and measures: Direction

- Green growth policies and measures (planned)
 - Price
 - Rationalization of energy prices: subsidy removal
 - Citygas and electricity tariffs.
 - Introduction of carbon tax
 - Regulation
 - Target and time table approach for mitigating GHGs for industries
 - Cap and trade under consideration
 - Technology development and diffusion
- Energy security measures:
 - Expansion of KNOOC for overseas resource development
 - Increase the stock of SPR for emergency



Efficiency Improvement


Energy Efficiency Improvement 28% by 2020, 46% by 2030



- For the last **15 ('90~'05)** years, highest improvement was done by Germany (1.8%/y)
- For the last **8 ('98~'06)** years **Koreaa's efficiency has improved by 1.3%** per annum

 **' 30% by 20209(?)**

 **'20% by 2020**

 **'28 % by 2020**



Measures for energy efficiency I

- Establishment of the national energy demand and supply system inside government through the national energy demand and supply plan
- Transport sector: \
 - Drastic improvement in fuel efficiency for automobiles: **5% efficiency improvement per year**
 - **Hybrid vehicle, clean diesel, and eco-driving**
 - **Voluntary agreement** with transport companies consuming more than 5000 toe a year.
 - **Promotion of off-shore shipping**





Measures for energy efficiency II

- Household sector
 - Promotion of energy efficient appliances through tax and subsidy
 - Carbon-point program: cash for actual carbon savings
 - Introduction of a new electricity bill with more information
- Buildings sector
 - Incentives for **energy efficiency certified buildings** including local tax exemption
 - Mandatory requirement for the installation of **stand-by power reducing devices** for new homes
 - Mandatory reporting of energy efficiency for each residential buildings
 - Raising the **thermo-efficiency (insulation) standard** every two years





Measures for energy efficiency III

- Industry sector
 - Energy Auditor for large industrial consumers and buildings over 2000TOE per year
 - Energy conservation target setting and management
 - If the target is achieved, financial and fiscal incentives will be provided. However if not, administrative orders and fines
 - Energy supporter for SMEs
 - One supporter manages 20-30 smes
 - Provision of Investment incentives for energy efficiency for those companies achieve their targets for energy efficiency
 - 10,000 smes will be managed by these supporters
 - It would cost 30million USD each year for the next 5 years





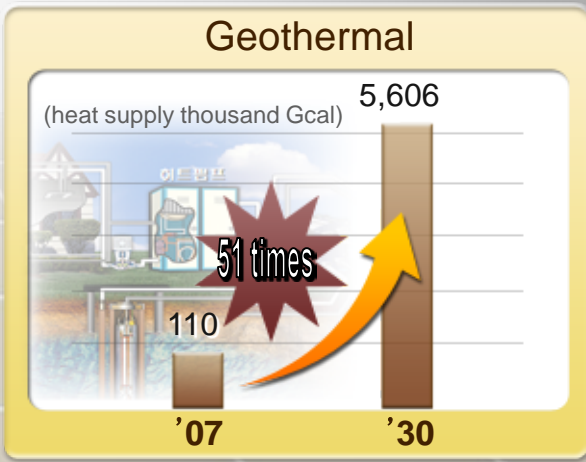
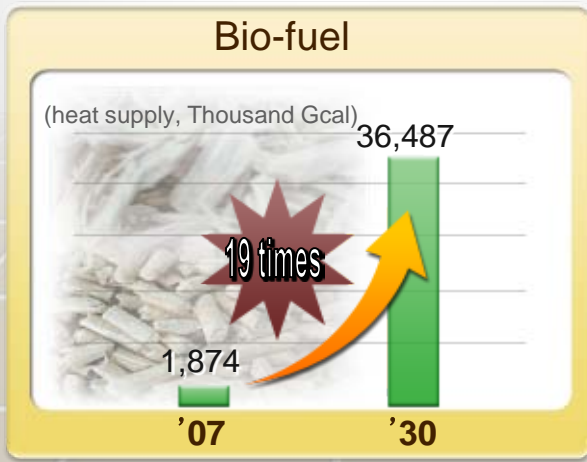
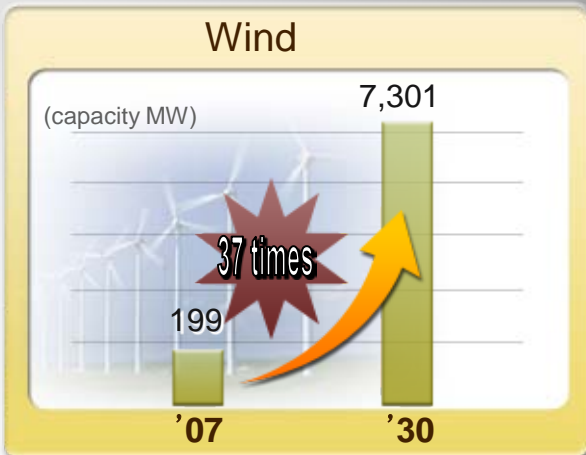
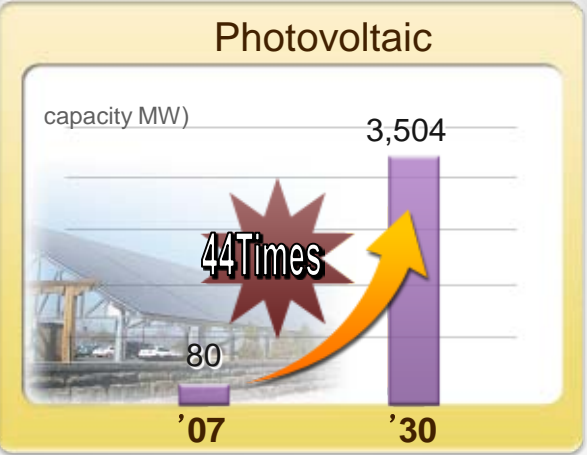
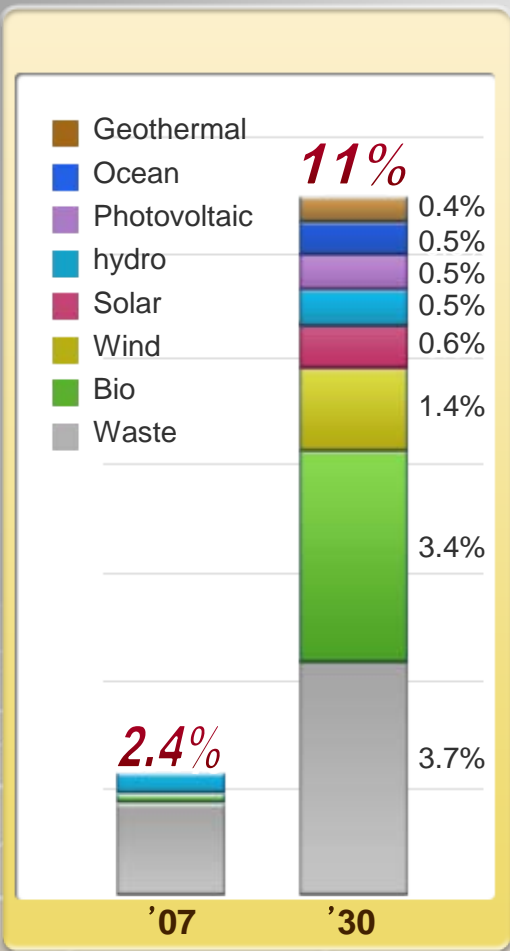
Measures for energy efficiency IV

- Public Sector
 - Mandatory Procurement Criteria of the first rate energy efficiency products
 - Energy efficiency management for the public offices
 - Green buildings for the public organizations
- Strengthening the energy efficiency regulation
 - Top-runner program for the appliances including washing machine and refrigerator
 - Application of minimum energy efficiency standards to wider range of goods
 - Mandatory labeling requirement for level of standby power





How to achieve 11% NRE target





NRE policies and measures

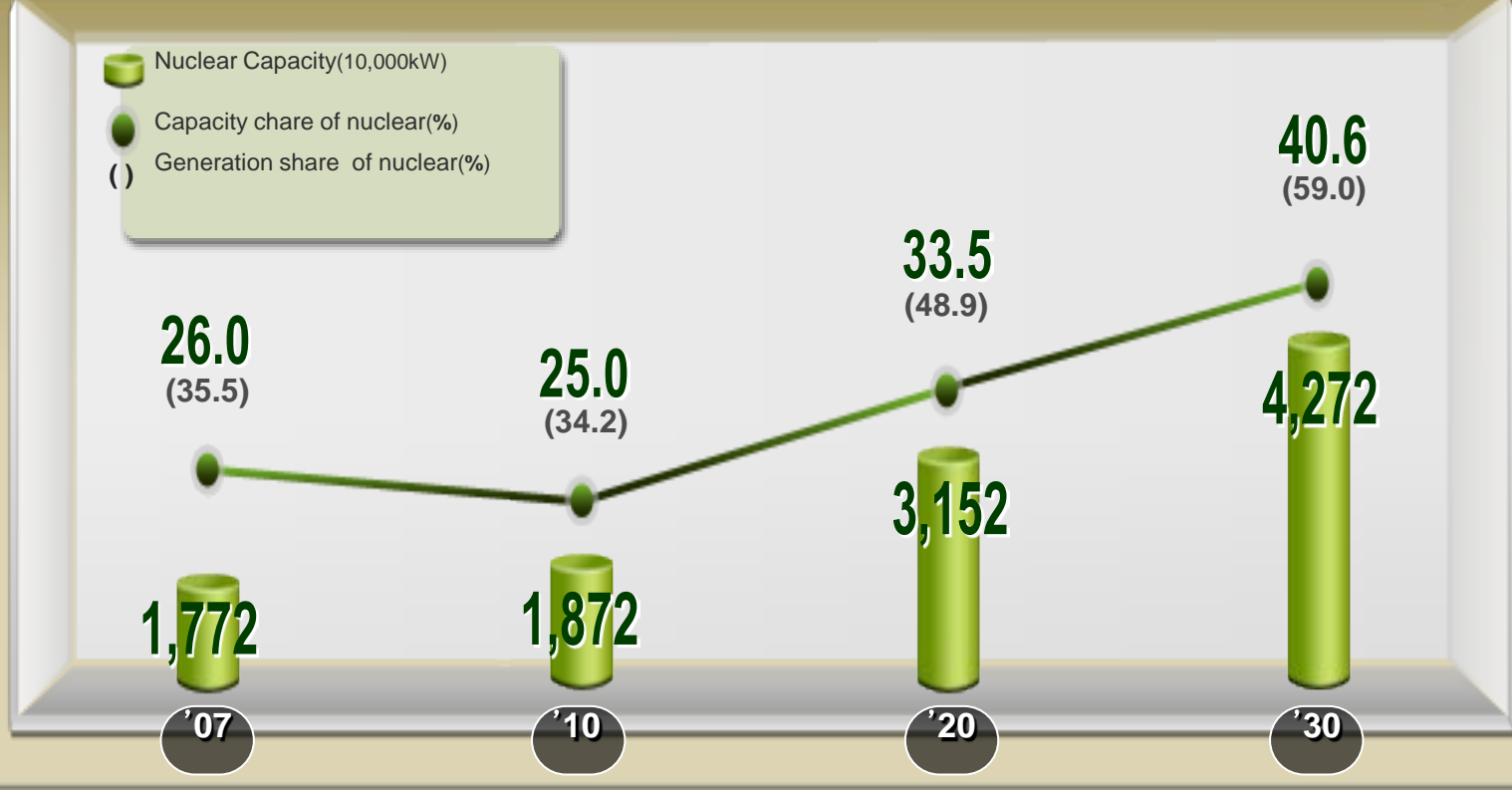
- So far
 - One million green home project
 - Feed-in-Tariff for photovoltaic
- From now on
 - Concentration on Photovoltaic, Wind and Hydrogen fuel cell
 - RPS for power generation
 - Government support for R&D





Expansion of Nuclear Power Generation

By 2030 the share of Nuclear capacity up to 41% of the total generation capacity



Other measures

- Restoration of market mechanism for natural gas and electricity by linking domestic energy prices with international ones
 - Privatization of public utilities is not under way
- Provision of more price information to consumers aiming to encourage voluntary efforts
 - New electricity bills for households – “smart grid”
 - New design of appliance labels with actual savings in monetary terms





Midterm GHG emission target announced on August 4, 2009

Three scenarios are under consideration as below for national consensus building

< Scenario 1 > 21% reduction from BAU (8% increase from 2005 level)

- Achieved through implementation of measures with short-term cost but potential long-term benefits.

< Scenario 2 > 27% reduction from BAU (Return to 2005 level)

- Implementation of additional measures from scenario 1 which have mitigation cost less 50,000 KRW per ton of CO₂.

< Scenario 3 > 30% reduction from BAU (4% reduction from 2005 level)

- Implementation of aggressive measures with high mitigation cost.

* Korea's 2005 GHG emission = 594 MtCO_{2e}

* BAU = Business as Usual

* Target figures do not include offsets from forest management



A long road for the success

- **Global Financial Crisis**
 - Cost of Capital is high: no one knows when the global economy will make a turn: Investment, Trade, and Employment
 - Climate Change is taking a backseat.
 - Politically wrong timing
- **Green Industry still needs massive help for quite some time to stand on its own feet**
 - High relative (direct) cost compared to fossil fuels
 - Absence or lack of international mechanism for enforcing uniform environment standards
- **Public acceptance of nuclear power generation**
- **Our view of value and lifestyle have to change, perhaps drastically for the successful transition**





Thank you for listening.
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