



Korea Power Industry Overview

Nov. 5, 2010



Ministry of Knowledge Economy

Electricity Regulatory Commission



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Electricity Industry Overview

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Power Market & Policy

III

Challenges & Future Prospects



I

Electricity Industry Overview



Korea Overview-Power Sector Characteristics

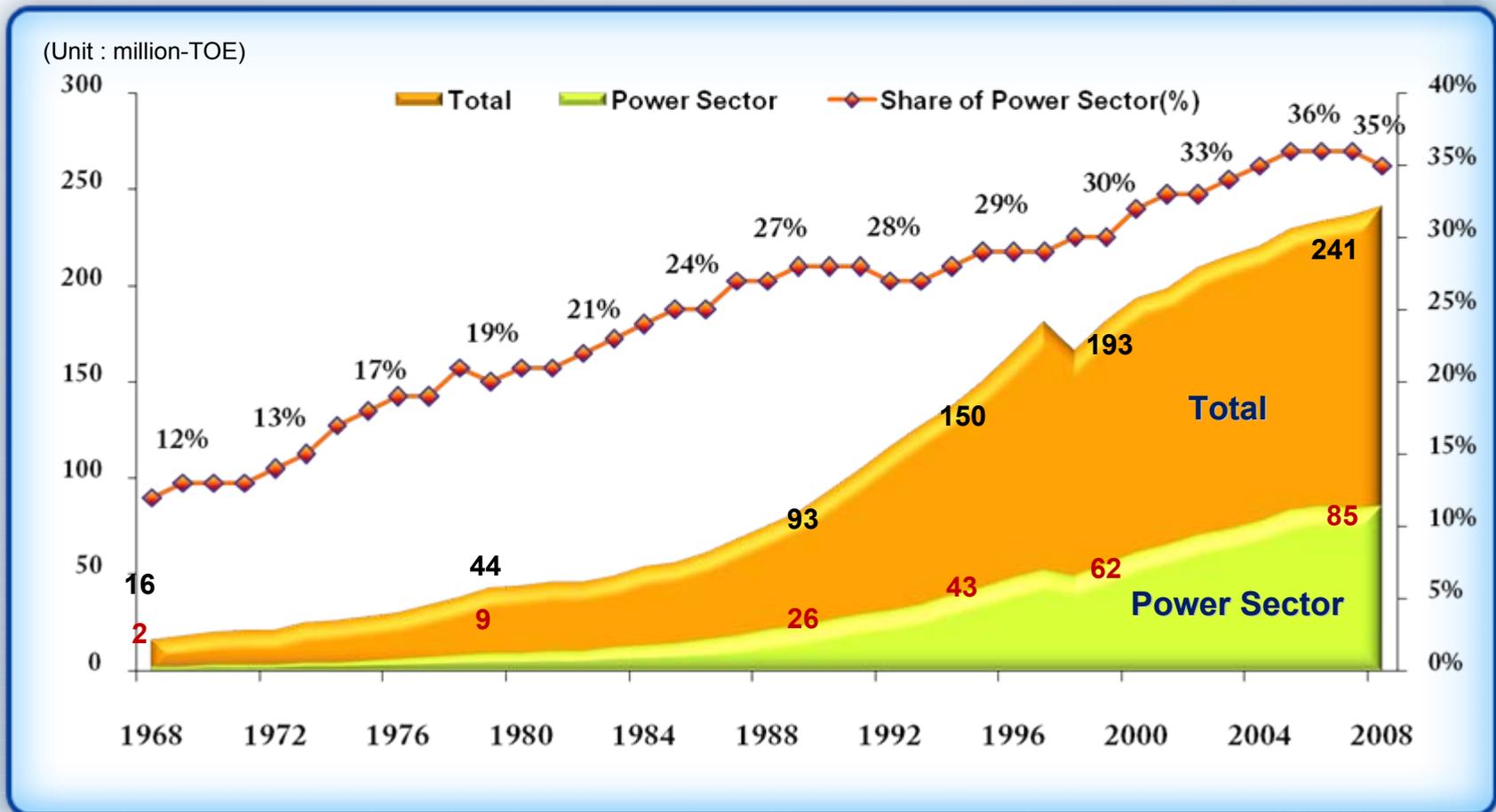


- Isolated System
- High Dependence on Foreign Resources
 - ▶ 96.4% of primary energy in 2008 (232 million toe)
- Fast Growing Demand
 - ▶ Annual Growth Rate
 - '91-'95: 10.9%
 - '96-'00: 7.4%
 - '01-'05: 6.6%,
 - '06-'09: 5.6%
- Peak Demand
 - ▶ 69.8 GW(Aug 20, '10)

Korea Overview – 1st Energy Consumption

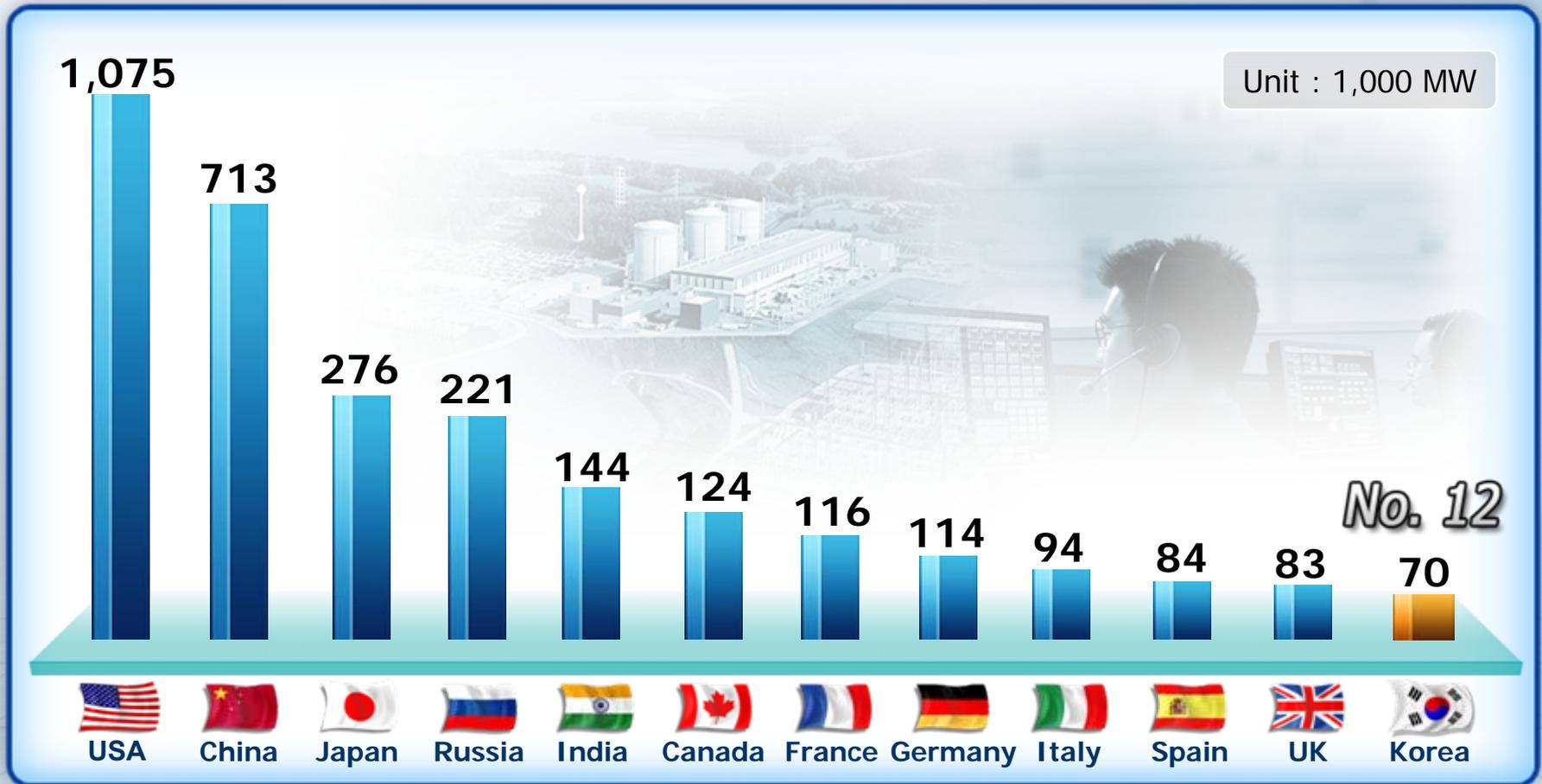
“Total Energy Consumption in 2008 : 2.6 Times versus 1990”

“Power Sector : 3.3 Times versus 1990”



Generating capacity

"Korea ranks 12th in terms of generating capacity in the world"

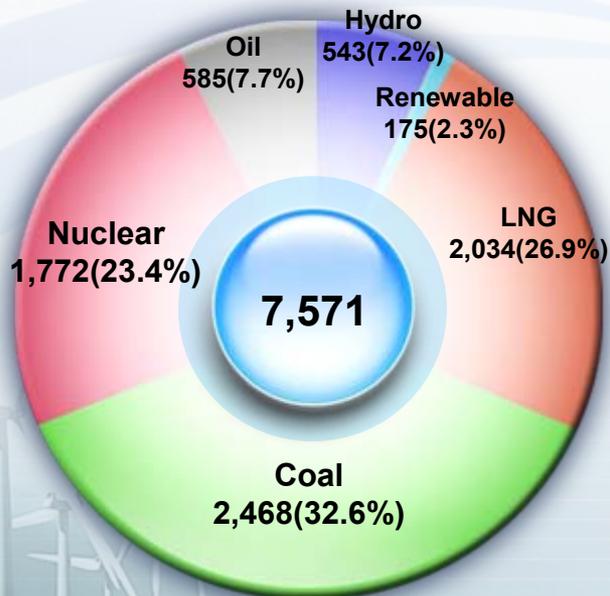


- Source : Statistics of Power Industry (Japan Electric Power Information Center, 2008)
- Japan, Russia, Canada, Germany, Spain : 2006 data

Capacity by fuel type & Genco

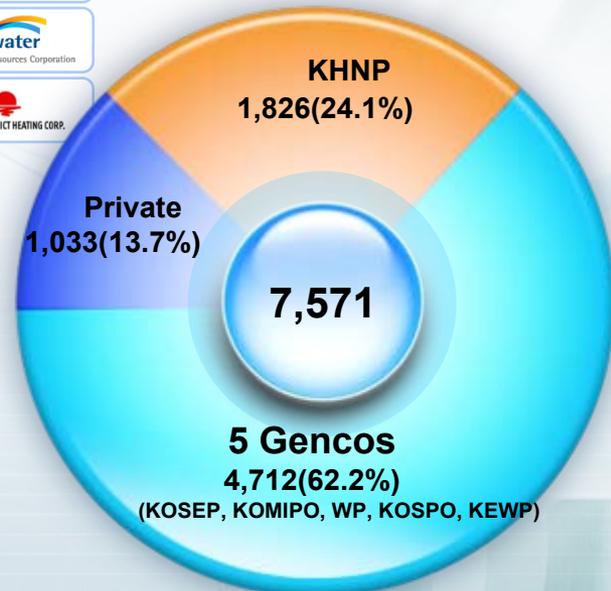
by fuel type

Unit : 10,000 kW



by generation companies

Unit : 10,000 kW



* As of June, 2010

Transmission Network

Characteristics

 **765kV**

● Mass transmission system

 **345kV**

● Main transmission system

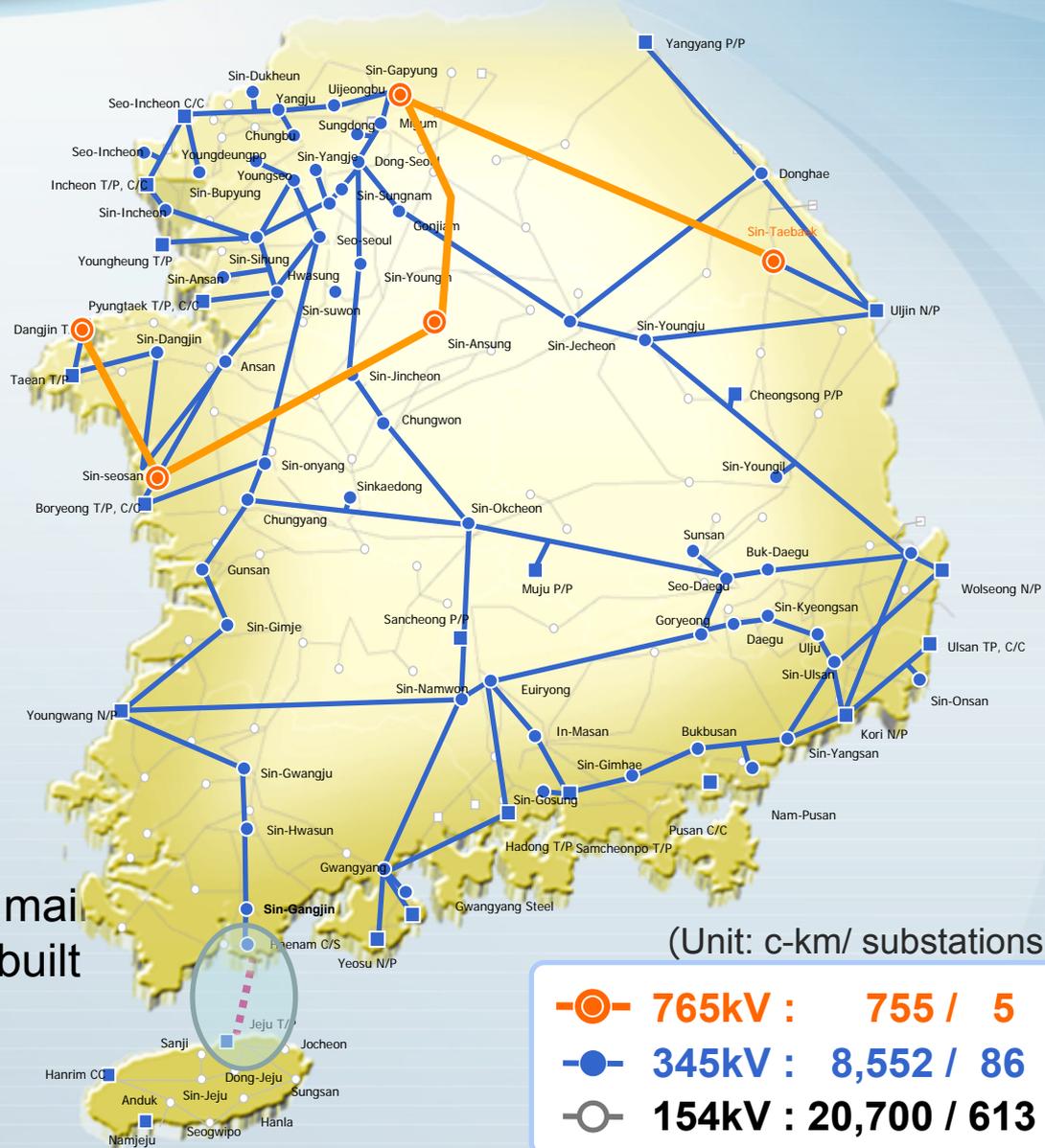
 **154kV**

● Distribution system
- Connected to major areas of consumption

 **Direct Current Line**
- Connects the main land to Jeju Island

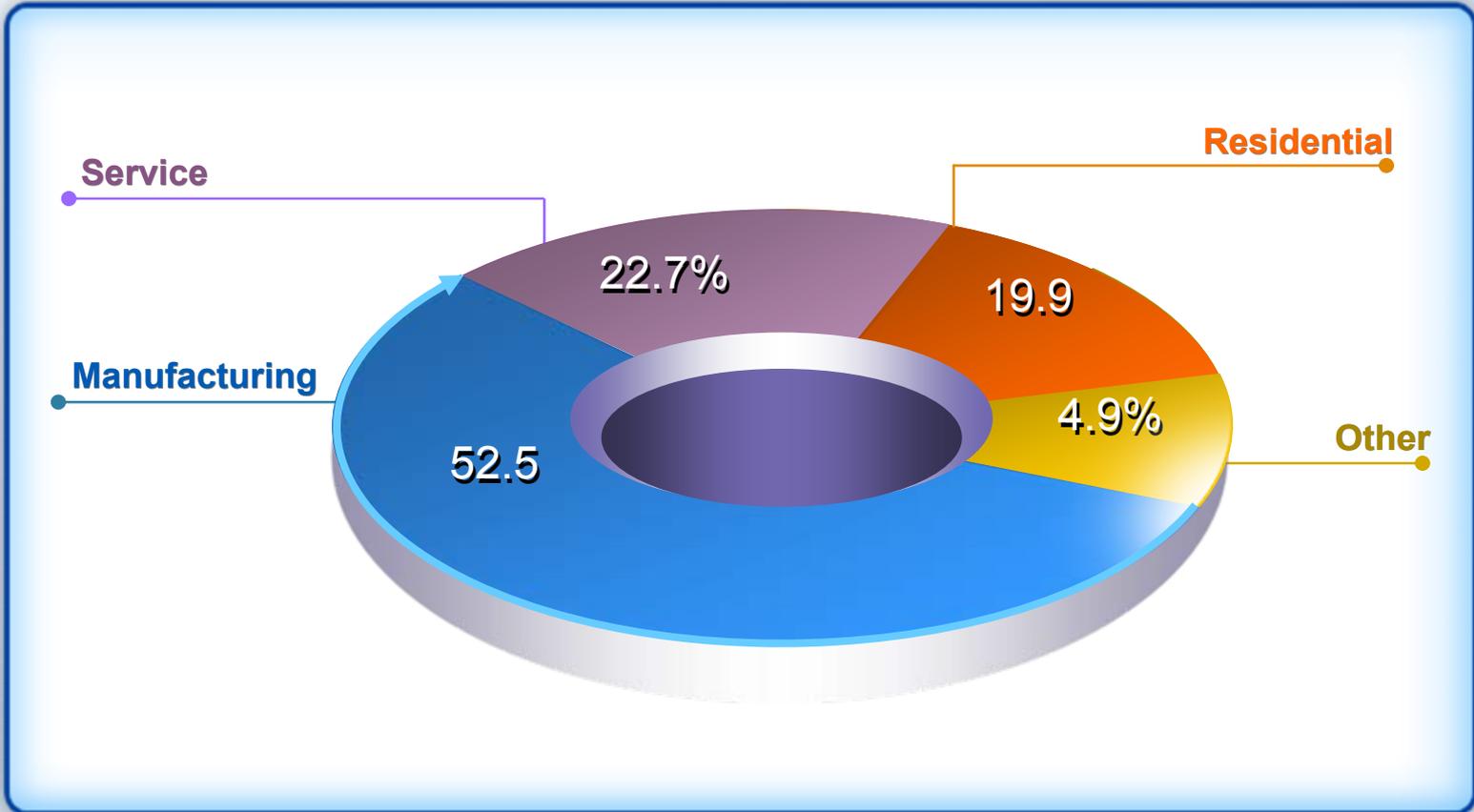
- Second HVDC Line between main land and Jeju island is being built by 2011

(300MW  700MW)



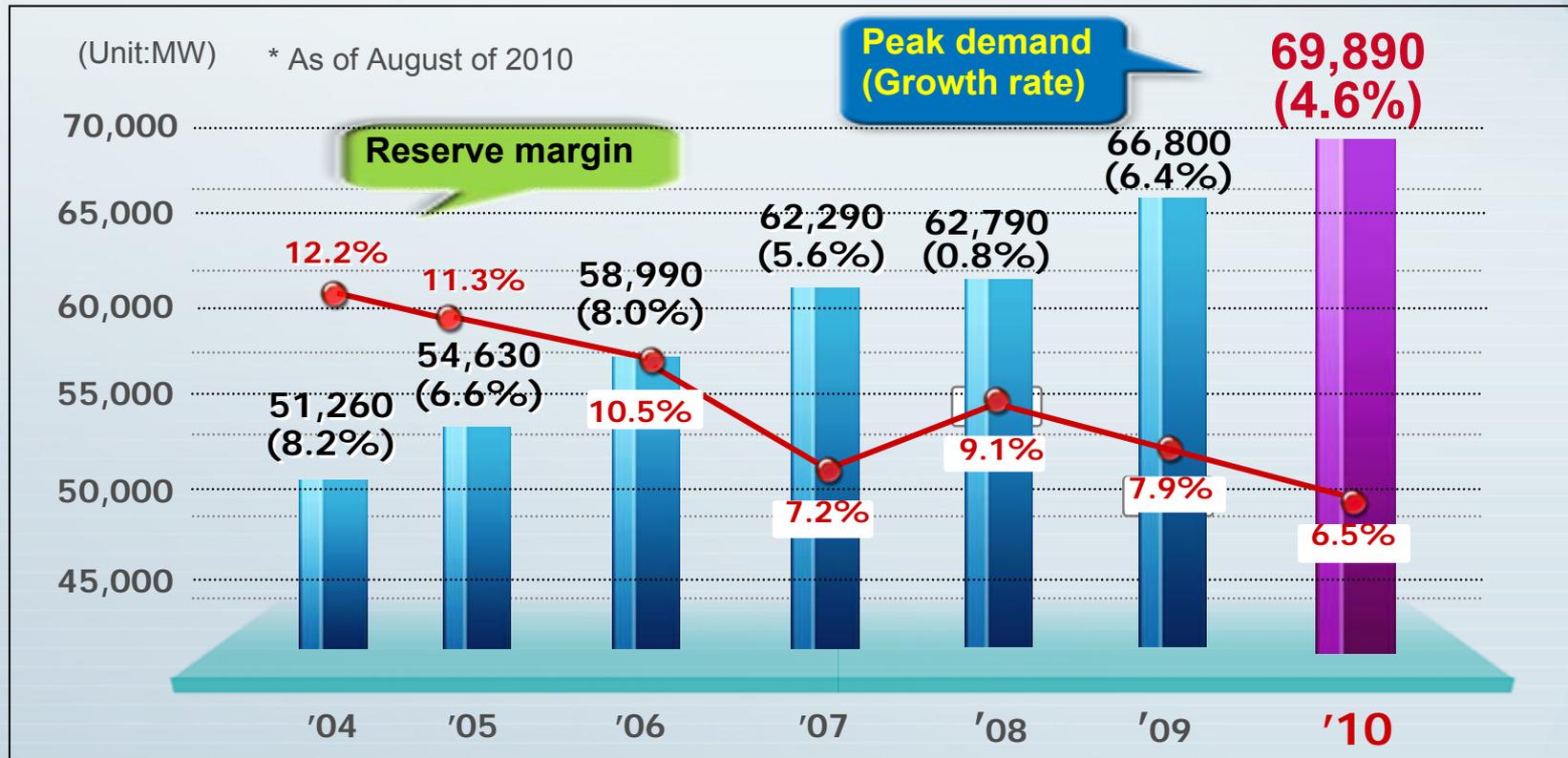
Power Demand by Sector

"Manufacturing Sector 207,216 million kWh (52.5%)"
"Total 394,475 million kWh (2009)"



Peak Demand and Reserve

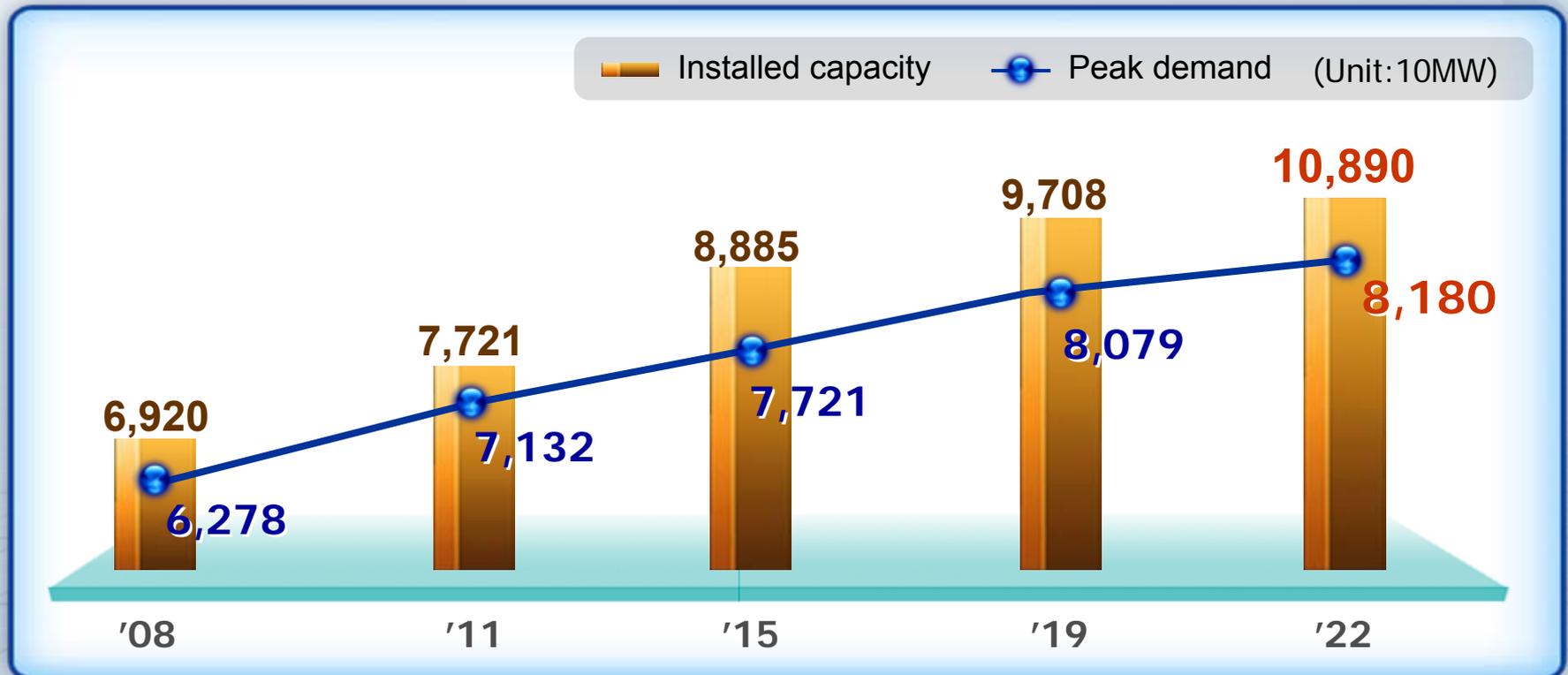
A Peak Demand of 70GW occurred on August, 2010
Reserve rate was just around 6.5% (the lowest since 2001)



Mid and long term electricity balance outlook (2008 ~ 2022)

"2022 Capacity : 108,910MW is expected (57% increase of 69,200MW in 2008)"

"2022 Peak : 81,800MW is expected (30% increase of 62,780MW in 2008)"





II

Power Market & Policy

KPX

전
력
거
래
소

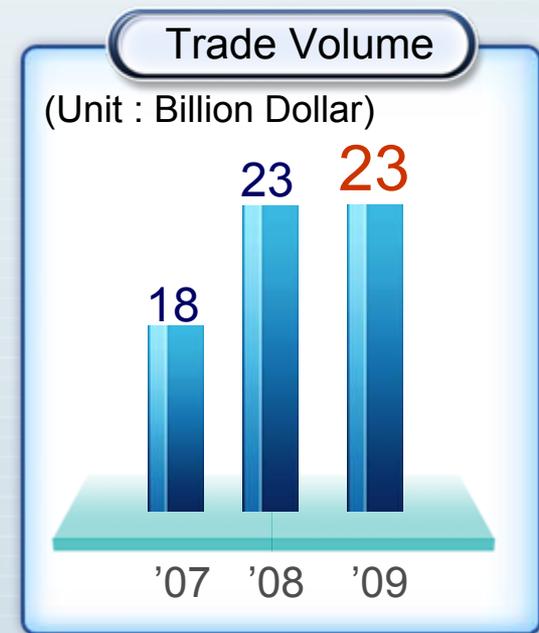
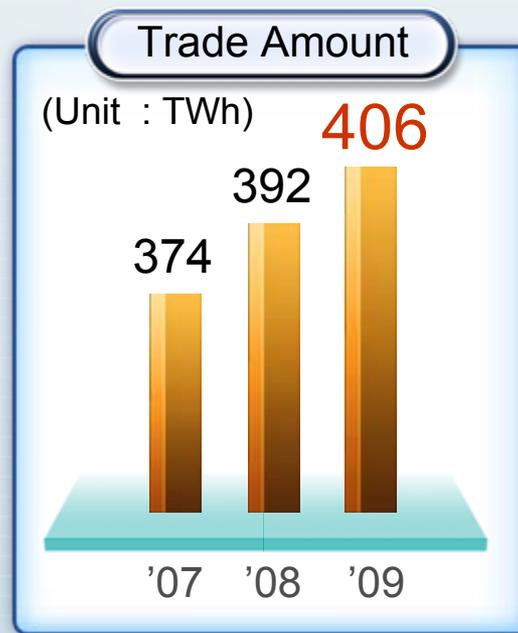
Growth of power market

Number of KPX members is increasing

[Due to the growing renewable energy sources]

Trade amount has increased steadily

[6Gencos, KEPCO's subsidiaries, take 95.8% of total trade amount]



* As of December, 2009

Renewable Energy Policy

Government plan for renewables in terms of primary energy

- 2.98% in 2010
- 6.08% in 2020
- 11.0% in 2030

Accounts for 1.7% (1,221MW / 73,470MW) of total capacity in power industry

Coal (33.6%)	LNG (25.3%)	Nuclear (24.1%)	Oil (8.0%)	Hydro (7.4%)	R.E. (1.7%)
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							(MW)
Solar	Wind	Waste	Hydro	Landfill Gas	Fuel Cell	Bio	
406 (33%)	347 (28%)	272 (22%)	85 (7%)	83 (7%)	23 (2%)	5 (0.4%)	

0.7% (3TWh / 406TWh) of total trade amount

Coal (45.9%)	Nuclear (34.8%)	LNG (14.2%)	Oil (3.2%)	Hydro (1.3%)	R.E. (0.7%)
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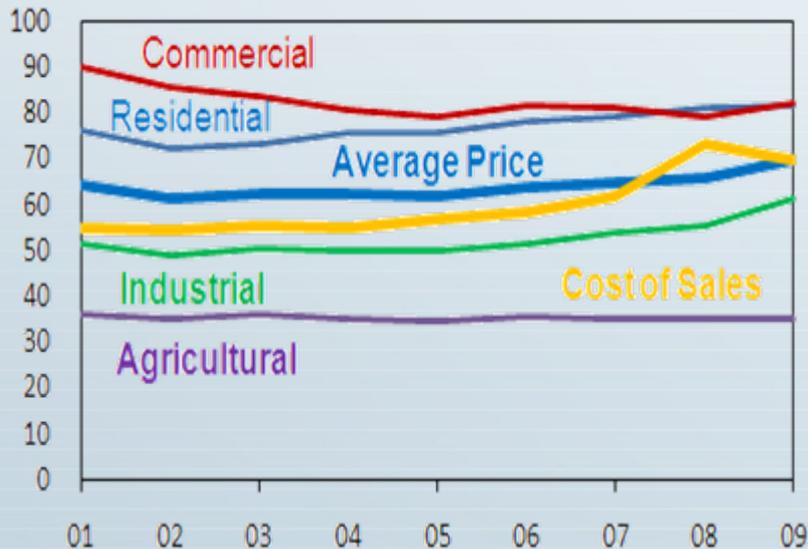
							(GWh)
Waste	Wind	Landfill Gas	Solar	Hydro	Fuel Cell	Bio	
854 (32%)	678 (26%)	418 (16%)	390 (15%)	213 (8%)	81 (3%)	8 (0.3%)	

Electricity Price

Wholesale Market Price

- Big jump in 2008 [Increase of fuel price]
- Going up 11% in this year

(\$/MWh) < Retail price by contract type >



(\$/MWh) < Market Price/Purchasing Price >



Retail Price

- Rising in line with wholesale market price
- Government regulates the retail price
 - Causing KEPCO's financial loss
- ⊠ Retail price is regulated by government

History of Electricity Market Reform

2000	<ul style="list-style-type: none">▪ <i>The Gov't established the master plan for restructuring of electricity industry</i>▪ <i>The Nat'l Assembly legislated for restructuring plan</i>
2001	<ul style="list-style-type: none">▪ <i>Established KOREC(Korean Electricity Commission) and KPX (Korean Power Exchange)</i>▪ Separated generation sector of KEPCO into 6 Gencos<ul style="list-style-type: none">- <i>46% of labor force and 55% of assets liabilities of KEPCO were transferred to Gencos</i> <p>➔ Completion of 1st stage restructuring plan</p>
2002	<ul style="list-style-type: none">▪ Set the detailed restructuring plan for the 2nd stage<ul style="list-style-type: none">- <i>Tried to privatize one of the 6 Gencos</i>- <i>Tried to unbundle the distribution sector from KEPCO</i>
2003	<ul style="list-style-type: none">▪ Stopped privatizing a Genco due to economic recession<ul style="list-style-type: none">- <i>The market value of stock estimated less than the face value</i>
2004	<ul style="list-style-type: none">▪ The Gov't announced suspension of the 2nd restructuring plan <p>➔ Suspension of 2nd stage restructuring plan</p>
2008	<ul style="list-style-type: none">▪ Declared not to privatize power industry by Gov't
2010	<ul style="list-style-type: none">▪ Announced □ The Advanced Plan for Power Industry □ (by Gov't)<ul style="list-style-type: none">- <i>Present a direction to strengthen a competitive and open-door policy</i>- <i>It will be implemented gradually considering political environment</i>

Recent Policy Change

Government announced

- *The Advanced Plan for Power Industry* □ (Aug.24,2010)
 - Maintain the current competitive and open-door policy in power industry
 - Prepare the retail competition infrastructures
 - 2011 : Operating □ The Fuel Cost Adjusted Tariff Mechanism □
 - 2012 : Operating □ The Voltage Based Tariff System □
 - Sorting the accounts of KEPCO to transmission, distribution, and sales parts, etc.
 - An introduction of the retail competition has not been definitely decided yet



Recent Policy Change

- Strengthen the competitions in the generation sectors
- Increase the autonomy and the responsibility of 6 Gencos
- Facilitate the competition among 6 Gencos
- The 6 Gencos will be supervised by the government directly, not by KEPCO
- Consistently develop the electricity market along with the current framework

Prospects

- Current government doesn't want abrupt change of the industry framework
- Restructuring will be gradually implemented in the long term

III

Challenges & Future Prospects

- Responding to climate changes -



Responding Scheme for climate changes

Contribute to National GHG Reduction Target

National Target : To reduce GHG emissions by 30% from its BAU by 2020

Voluntary Mitigation of GHG & Establishment of Implementation Scheme

Low Carbon Energy Energy Efficiency

- High Efficiency Facilities
 - Nuclear Power
- Renewable Energy
- Introduction of Tech. with High Efficiency

Infrastructure

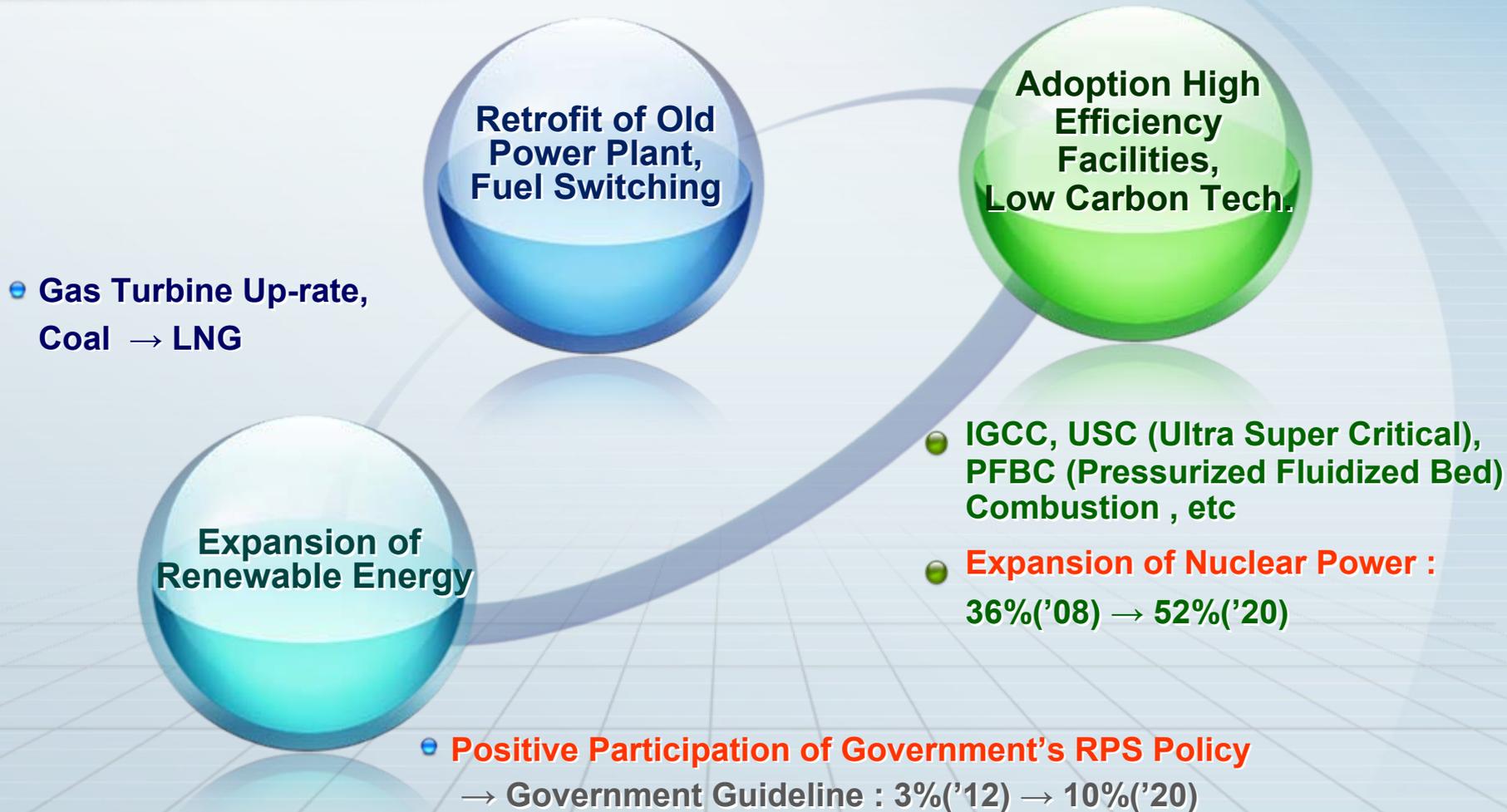
- Inventory System
- Establishment of GHG Management Procedure
- Enhancement of Emission Right Trade Skill

R&D Investment

- R&D for Source Tech.
 - GHG Control Tech.
 - Clean Coal Tech., CCS
- Drive of UN/Domestic CDM Project

Countermeasures (1)

Efficiency Improvement , Renewable Energy



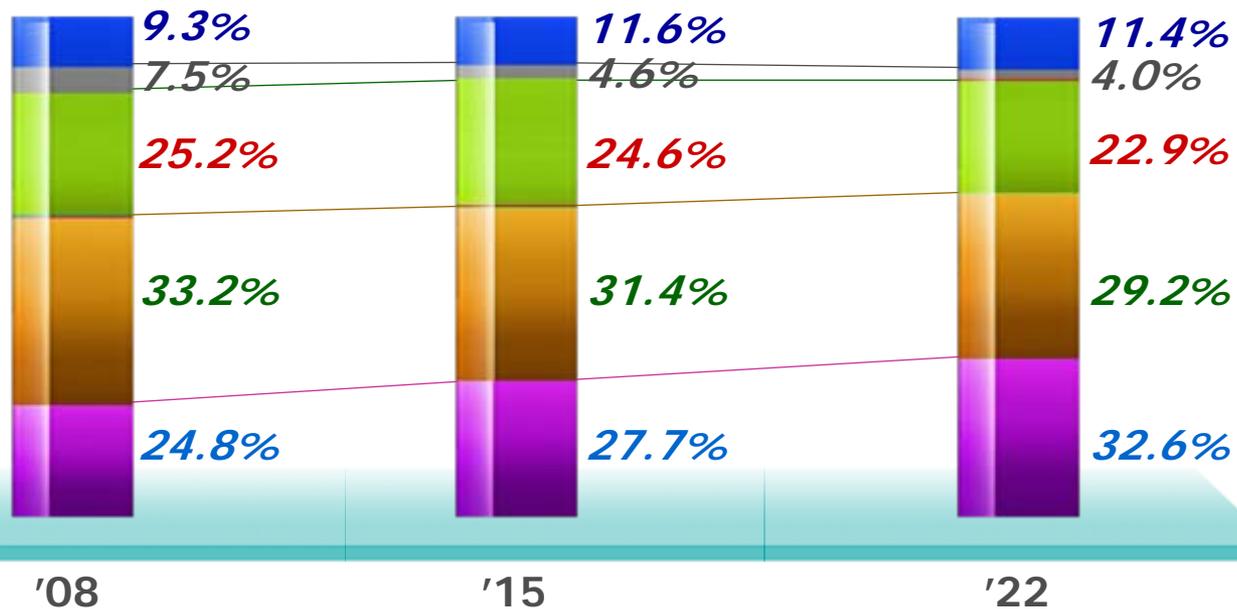
Generation capacity plan

"Optimal generation mix"

- Considering economical efficiency, technology, CO2 emission cost, characteristics of generators -

generating capacity mix

■ Nuclear ■ Coal ■ LNG ■ Oil ■ Renewables etc.



Optimal generation mix is based on the 4th BPE

Renewable Energy Policy – RPS

RPS (Renewable Portfolio Standard) will be operated in 2012

- Imposes compulsory renewable capacity to the generation companies
- To be enacted in 2012

Major details

- This obligation will be applied to the companies above 500MW of total capacity (i.e., 14 generation companies today)

<Renewable Energy Supply Schedule>

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022□
Ratio(%)	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0	9.0	10.0

* Solar has special target within total RPS schedule

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022□
Generation (GWh)	158	315	486	657	841	1,038	1,248	1,472	1,708	1,958	2,221

Extra cost by RPS will be shifted to distributor through market system

Countermeasures(2)

Establishment of Infrastructure

- Individual Implementation by Gencos, KOWEPO : '08. 11

Simulation Trade of Emission Right Gencos ↔ KPX)

Inventory System

GHG Management System

- Estimation & Registration Program (2006)
- Management System of Mitigation Potentiality (2009. 1)

- 2008 : 1st Exhibition Project
→ 2009 : 2nd Exhibition Project

Countermeasures(3)

R&D for Low Carbon Energy

- Goal : Securing Source Technology
- Investment : 467 million \$ (2001-2014)

	CCS	CCT	Renewables	Infra	Total
Investment	29.0	374.5	59.7	3.4	467

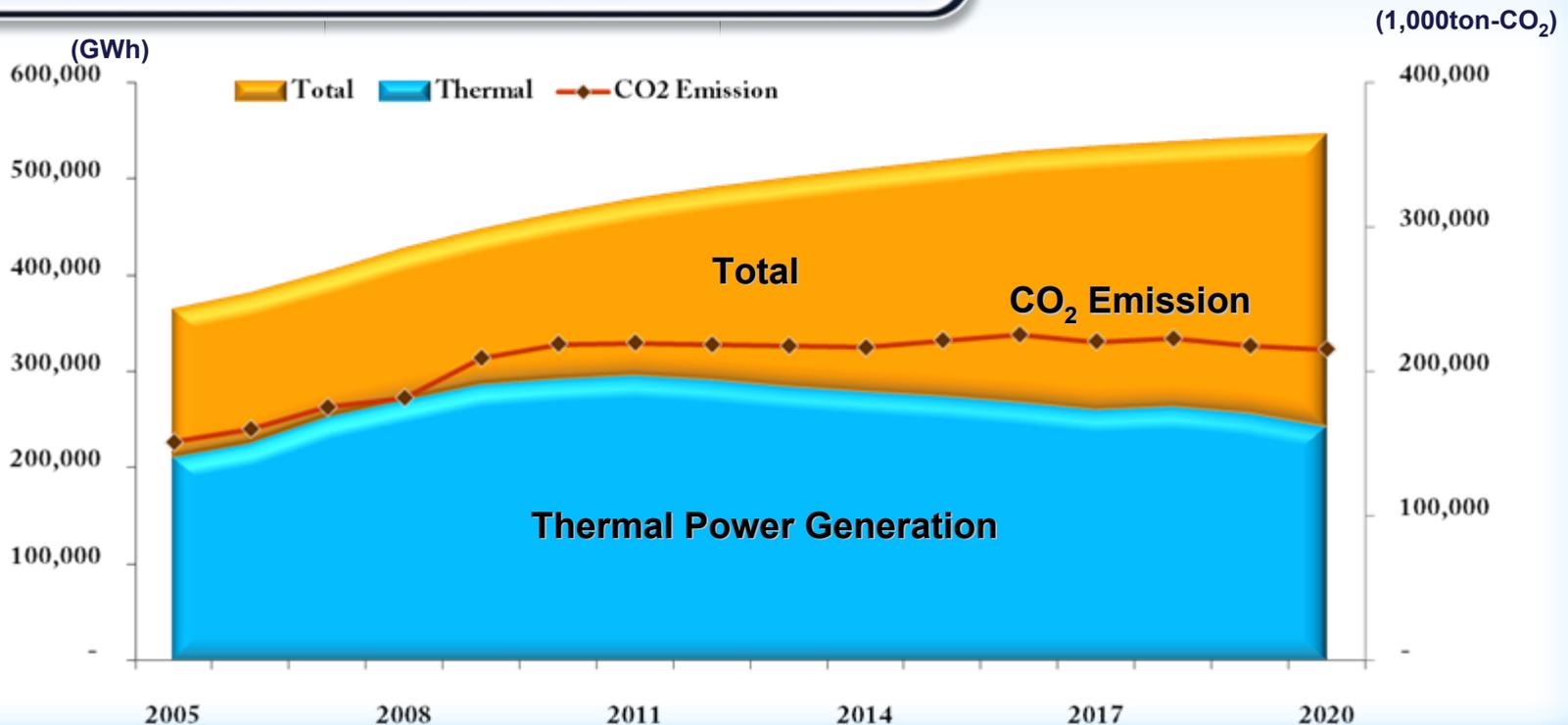
Drive of CDM Project

- UN-CDM : 13 Project, 146,000ton-CO₂
- Domestic-CDM : 16 Project, 691,000ton-CO₂

Outlook CO₂ Emission in Korea

- Continuous Increase in CO₂ Emission according to Increase of Power Generation → Limitations on CO₂ Mitigation
 - ▶ Generation Volume in 2020 : 518 TWh → 42% Increase versus 365 TWh in 2005

Amount of GHG Emission on the basis of BAU



III

Challenges & Future Prospects

- Smart Grid -



Smart Grid Vision of Korea

Vision

Low Carbon, Green Growth Korea

Goals for 2030

Energy
Efficiency

46.7%



Compared with 2006

Renewable

2.4%

11%



'08 '30
Percent share

PHEV and EVs
Deployment

0

2.4mil



'09 '30
Numbers

Korea is pursuing the Smart Grid initiative as a national policy to achieve the vision of **"Low carbon, Green growth."**



President Lee Myung-Bak announced in August 15, 2008, Korea's new national vision, **"Low Carbon, Green Growth."**

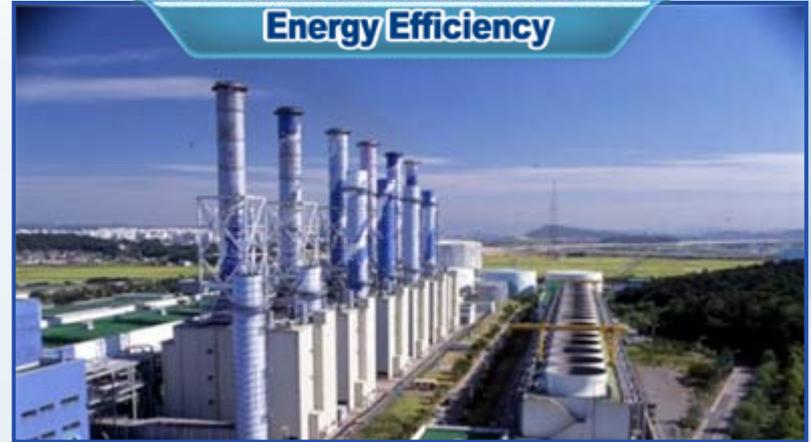
Why Smart Grid in Korea ?

- Smart grids combat climate change and enhance energy efficiency

Climate Change

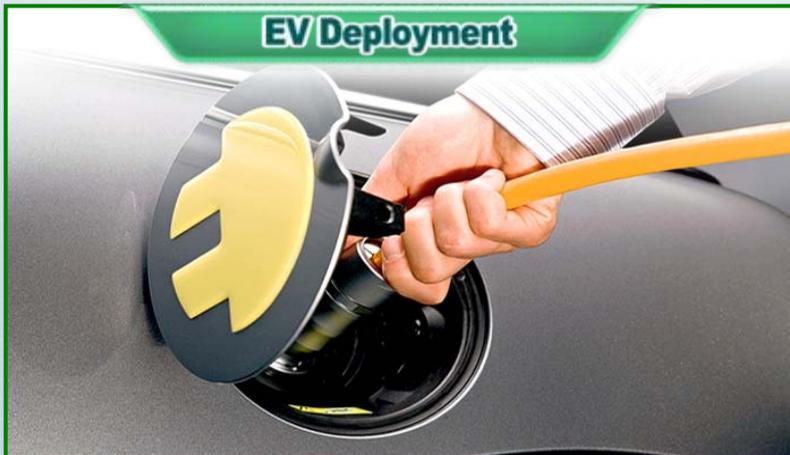


Energy Efficiency

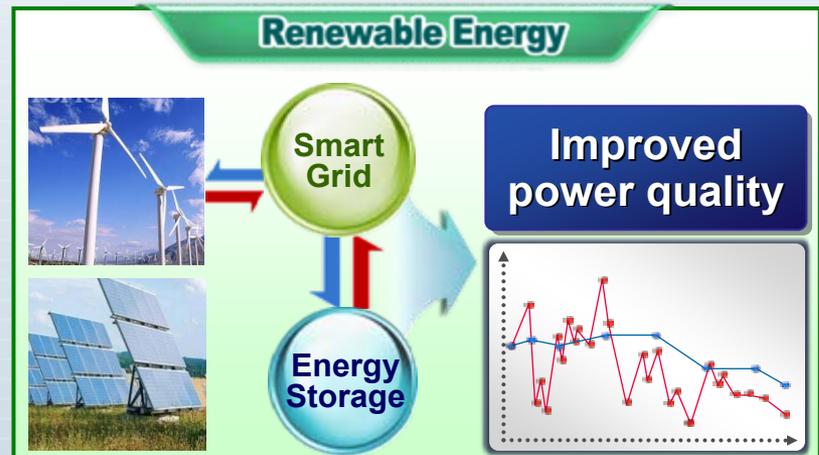


- Smart grids encourage consumers to save energy and provide physical infrastructure for the deployment of electric vehicles and renewable energy

EV Deployment



Renewable Energy



Smart Grid Strategy

- Smart grid in Korea is not just limited to build intelligent grid, but also expands into new value creation from the national business perspective.
- Smart grid in Korea is the green growth platform.

Smart Grid In Korea

Technology

Optimizing energy efficiency by upgrading power grid with ICT



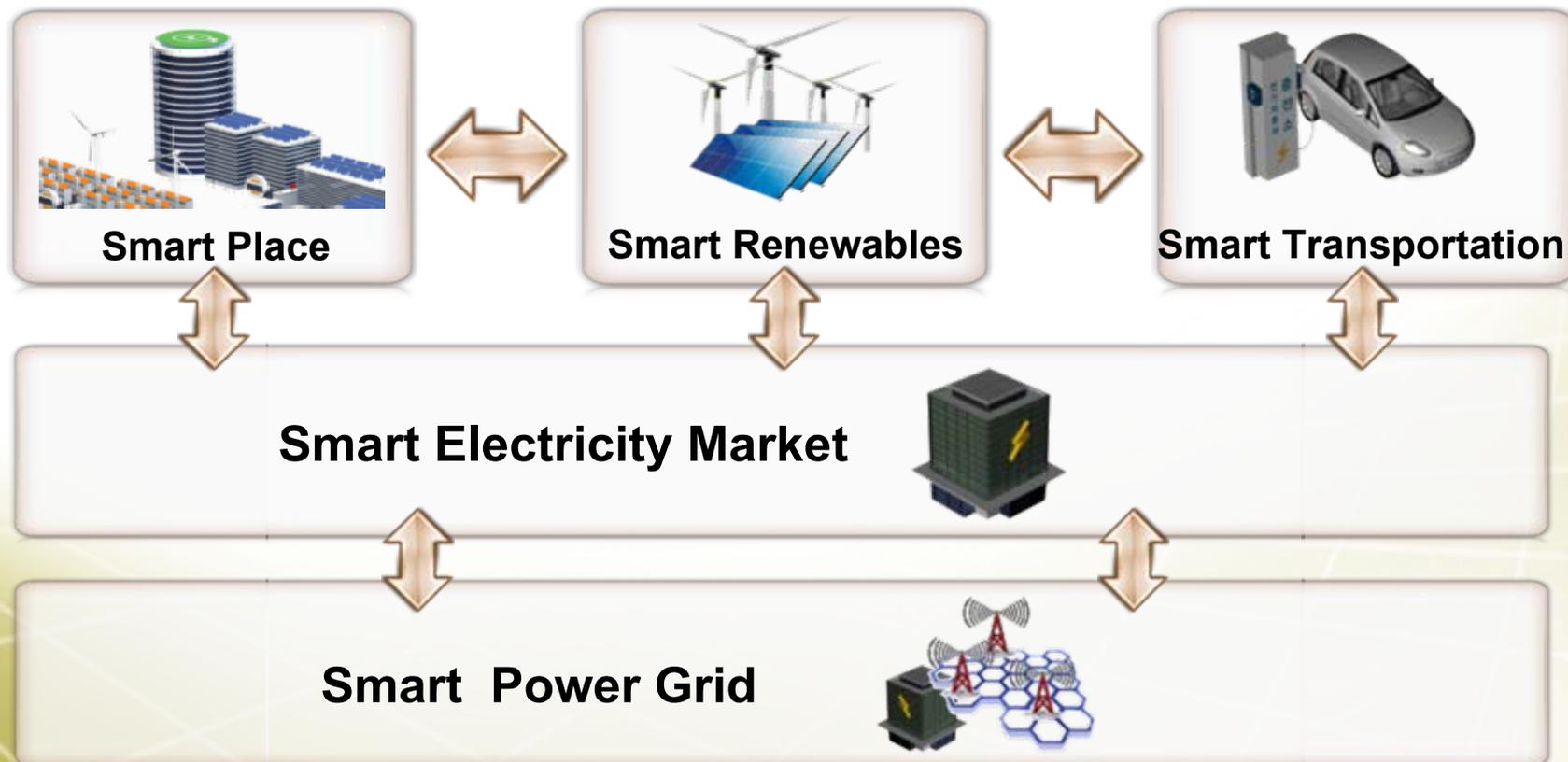
Business

Providing opportunities for fusion and synergies among industries

Complete green growth platform to facilitate new value creation

5 Domains in Korean Smart grid

Smart Grid Platform



National Smart grid Roadmap

Key Objectives

Construction of a smart green city

1st phase (2009~2012)

Expansion of smart city
(Enabling consumer)

2nd phase (2013~2020)

Completion of nationwide Smart Grid

3rd phase (2021~2030)

Milestones

2010. 1

Jeju Test-bed Project commencement

2012. 12

Smart Green city declaration

2020

100%AMI penetration

2030

Nationwide Smart Grid completed

Jeju Testbed Project (for initial 6,000 houses)

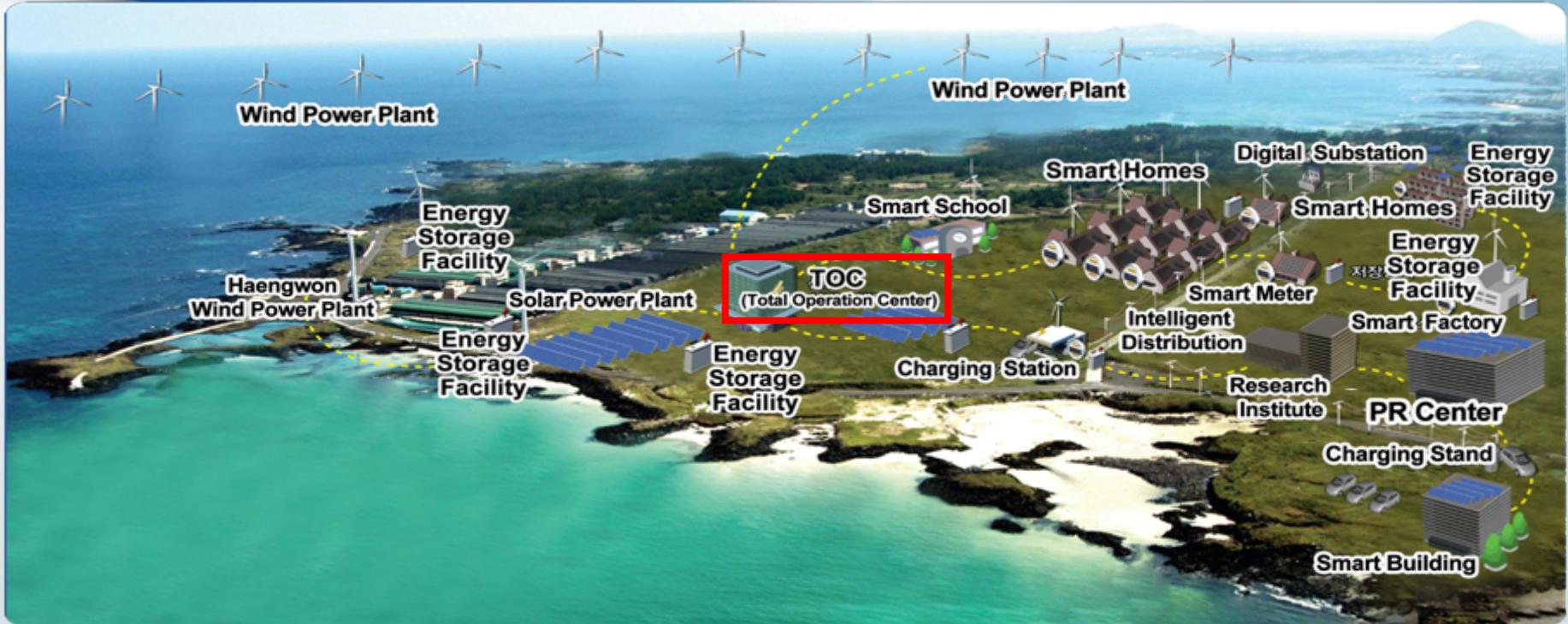


The three targets of Proof

- Business Models
- S.G Technologies
- Feasibility on S.G City

- Schedule: December 2009 to May 2013 (first 18 months to build infrastructure; next 24 months to test integrated operation of smart grid)
- Location: Gujwa-eup, Jeju Island (185 km²; 6,000 households)
- Budget: \$200 million (\$50 million public funds; \$150 million private investment)

Jeju Testbed Project : Features



- Integrated test bed
- Close collaboration between public and private sectors
- Verification of different power market models
- Participants: Korea Electric Power Corporation (KEPCO) plus automakers, telecommunications companies and home appliance manufacturers
 - Includes major companies such as LG, SKT, KT and Samsung
- Open to foreign companies

International Cooperations

Korean Government Completed the MEF Smart Grid Road Map in Cooperation with Italy (July 2009 to December 2009)

Korea's proposal for closer international cooperation

- Need for joint R&D, test-bed projects, capacity building and information sharing
- Smart Grid Working Group, proposed by Korea, needs to be launched at an early time
- Korea will provide all necessary support, and will share the results of the Jeju Test-bed project

About Korean Electricity Regulatory Commission

Legal status

-Korean Electricity Regulatory Commission is formed within the Ministry of Knowledge Economy

(MKE) power procurement, smart-grid, energy consumption, R&D
(KOREC) restructuring, tariff, climate-change, power system

-The Electricity Commission has a secretariat to carry out the affairs of the Commission

Mission

- create a fair and competitive environment for market participants**
- monitor the electricity market**
- pursue the restructuring of the electric power industry to better serve consumers**
- protect consumers from illegal activities of market participants**

Thank You

