2008 Korea-Uzbekistan
Energy Cooperation

Electric Power Industry in Korea

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Background Information

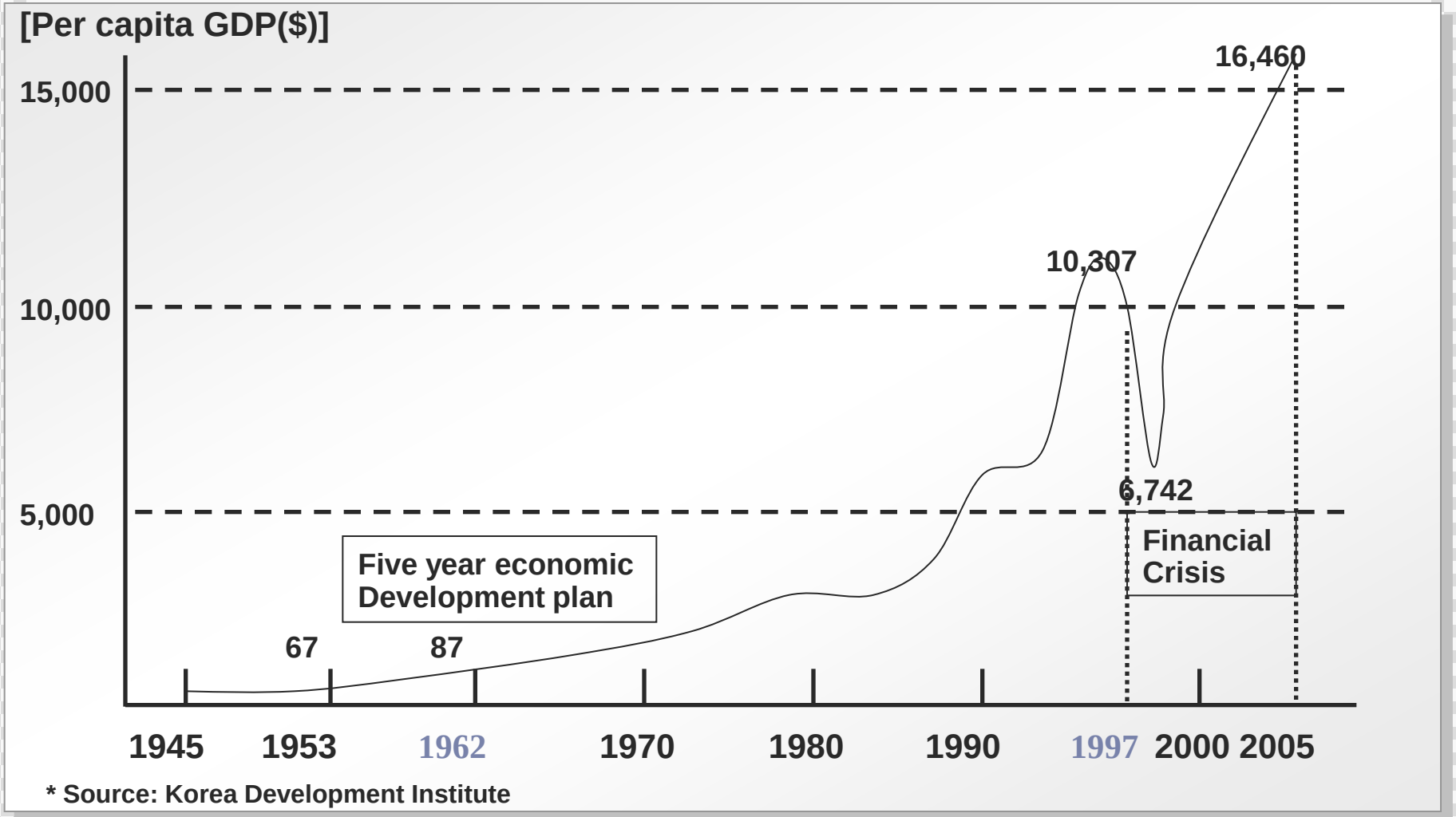
Rapid Economic Development in 1960s - 1970s

◆ **First & Second 5 Year Economic Development Plan(1962 -1971)**

- GDP per capita was $87 (1962)
- Government adopted export-oriented economic growth strategy, starting from labor intensive small scale industries such as wig, shoes and textile etc.
- Turning point from agricultural society to modern industrialized urban society
- Export surpassed $1 billion (1971)

◆ **Third 5 Year Economic Development Plan (1972 -1976)**

Economic Development of Korea



* Source: Korea Development Institute

Overview of Korean Economic Growth

1948 — Foundation of Republic of Korea

1950-53 — Korean War
- 1 million casualties
- More than 3 billion dollars of economic losses

1953-60 — Postwar Reconstruction
- Foreign aids from 1953 to 1961 totaled $2.3 billion
- Most of aids from abroad were consumer goods (rice, wheat, fertilizer) and didn't contribute to the accumulation of capital resources

1960s-1980s — Rapid Growth

1990s — Globalization

2000 — IT-Driven Advanced Economy

Korea's Economic status (as of 2007)

- GDP ranking: 13th by volume ($969 billion)
- Per capita: $20,045
- Main industries: electronics, automobile, semiconductor, mobile phone, shipbuilding, steel, chemicals Machinery, Information technology

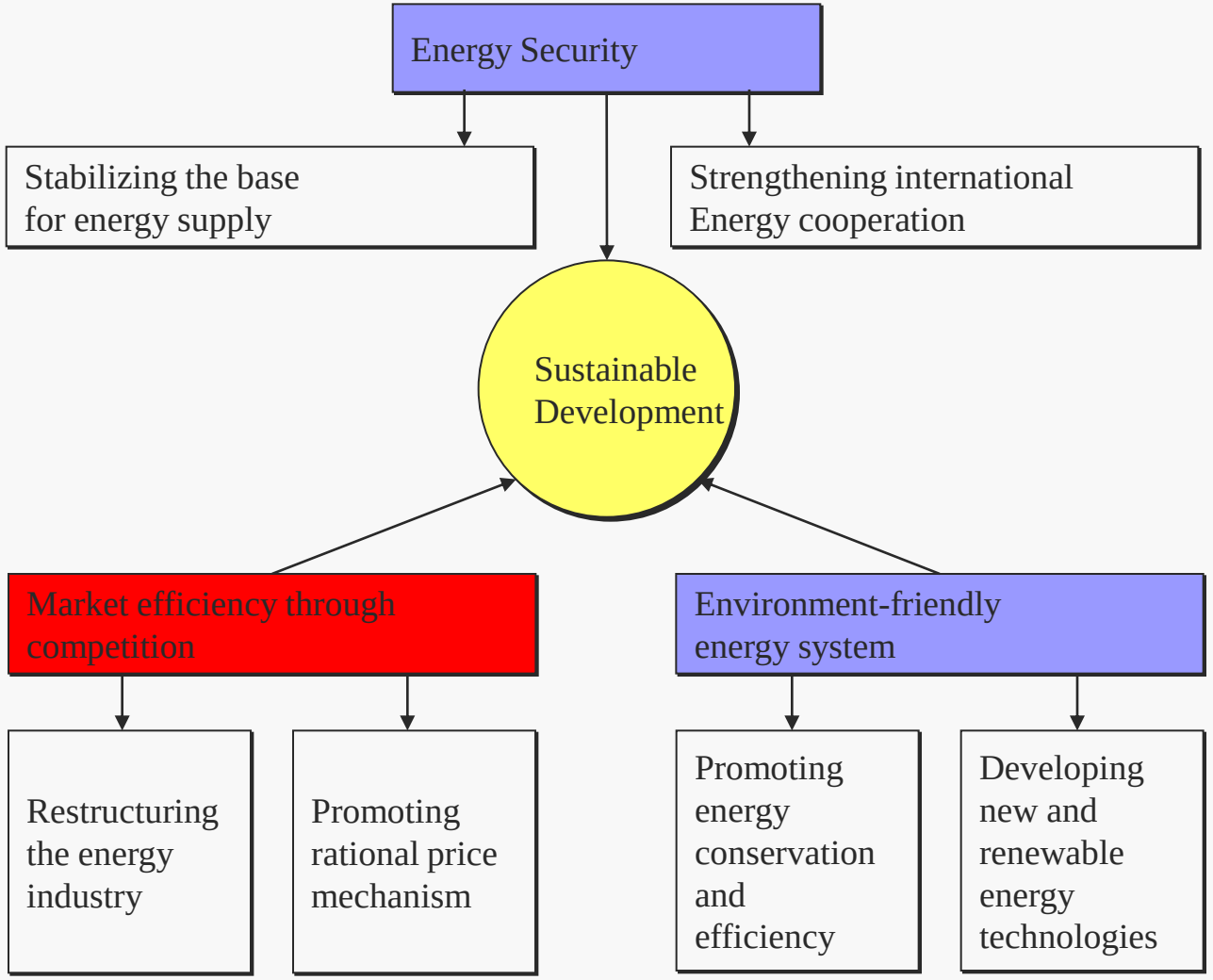
- Trade Volume: $728.6 billion
  - Exports: $371.8 billion
  - Imports: $356.8 billion

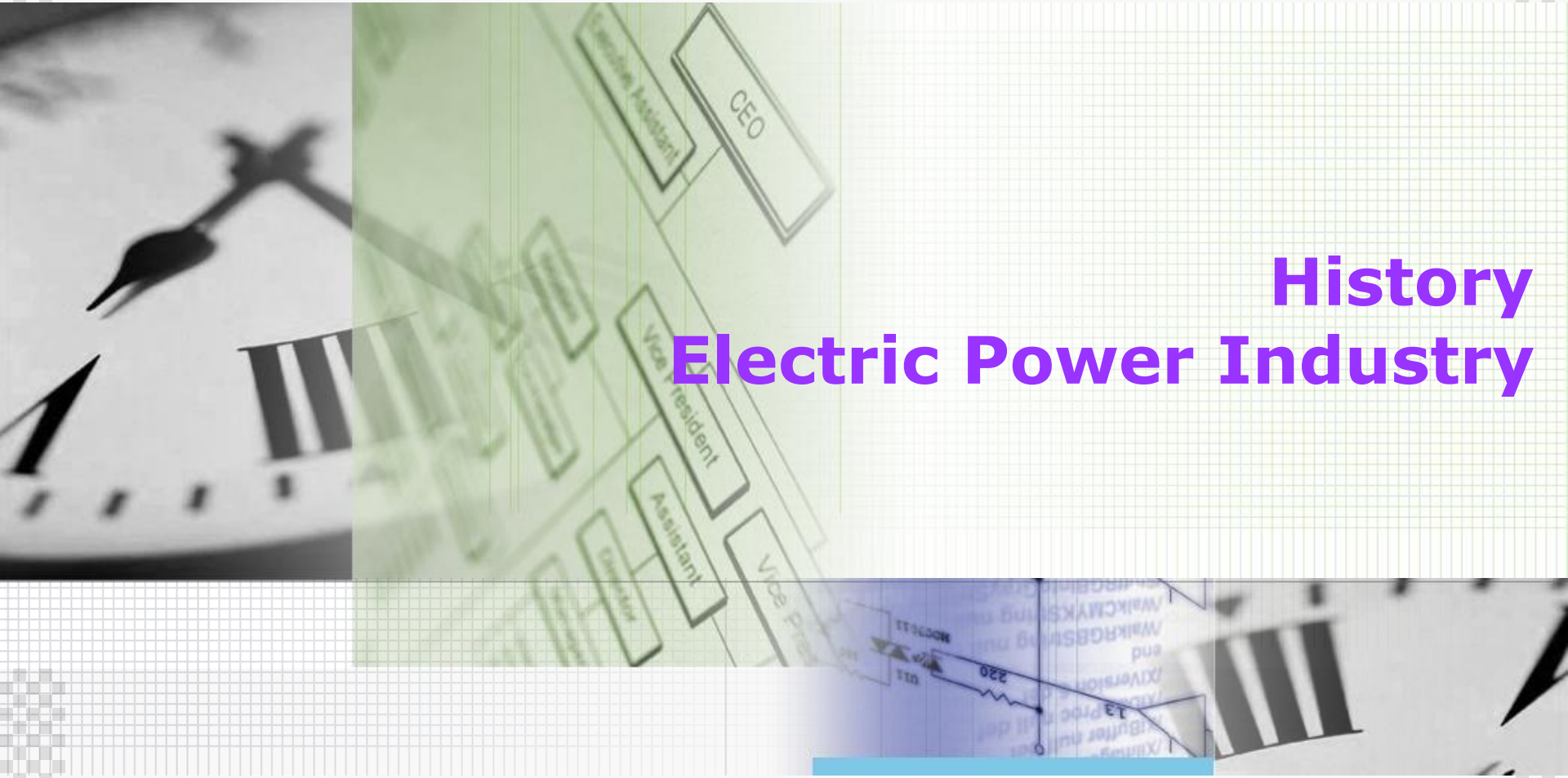
Primary Energy Demand in Korea (Mtoe)

	1971	2000	2010	2030
Coal	8 (47.06%)	42 (21.65%)	58 (21.97%)	79 (20.90%)
Oil	11 (64.71%)	104 (53.61%)	126 (47.73%)	165 (43.65%)
Gas	-	17 (8.76%)	33 (12.50%)	61 (16.14%)
Nuclear	-	28 (14.43)	45 (17.05%)	65 (17.20%)
Hydro	0	0	0	1 (0.26%)
Other renewables	-	2 (1.03%)	3 (1.14%)	7 (1.85%)
Total Primary energy demand	17	194	264	378

* Reference : IEA, 2002, World Energy Outlook 2002 : Korea Energy Outlook

Goal and Direction of Korea's Energy Policy





History
Electric Power Industry

Pre-KEPCO : 1887-1960

1887	The first electric bulb lit the loyal palace, 7 years after Edison's light bulb invention
1898	The first electric power company was established in Korea
1948	North Korea cut off transmission line without prior notice 90% of generation capacity was located in the north South Korea's installed capacity was 198MW
1950 - 1953	Korean War - Most of generation, transmission, distribution facilities were destroyed
1953 - 1960	Political turmoil, Extreme poverty, Power shortage (Standard line vs. Special line)

Foundation & Development: 1961-1981

1961	Three regional electric companies were merged into a single national electric power company (KECO) with 367MW capacity
1964	Unlimited power supply began first 5-year economic development plan (1962-1966)
1968	Generation facilities capacity reached 1,000 MW
1978	The first nuclear power plant was commercialized (587 MW) Generation Mix diversification (Oil → Coal, Nuclear)
1981	T&D loss: 29.4% (1961) → 6.7% (1981) Rural electrification was completed: 12% (1960) → 99.3% (1981)

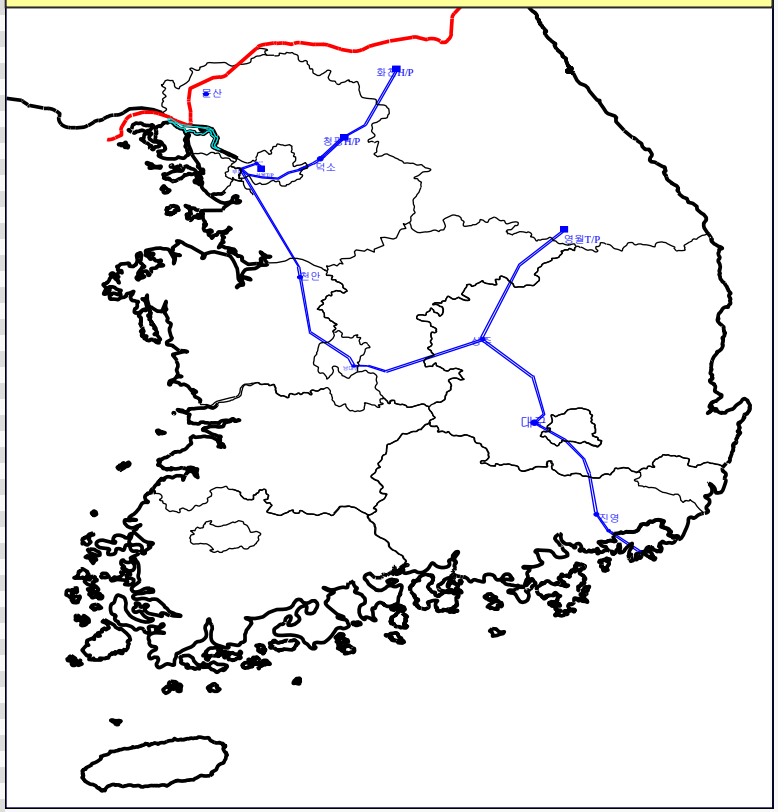
Globalization : 1980s-2000s

1982	KEPCO was reborn, as a wholly government owned corporation
1988	Summer Olympic Games were held in Seoul The first Olympic event with “No power supply failure”
1994	Listed on the New York Stock Exchange USD 300 million worth of ADRs were issued
1995-1996	The first and second overseas projects were kicked off in the Philippines
2002	Successful commercialization of 765kV system → First of its kind in Asian region
2007	International cooperation

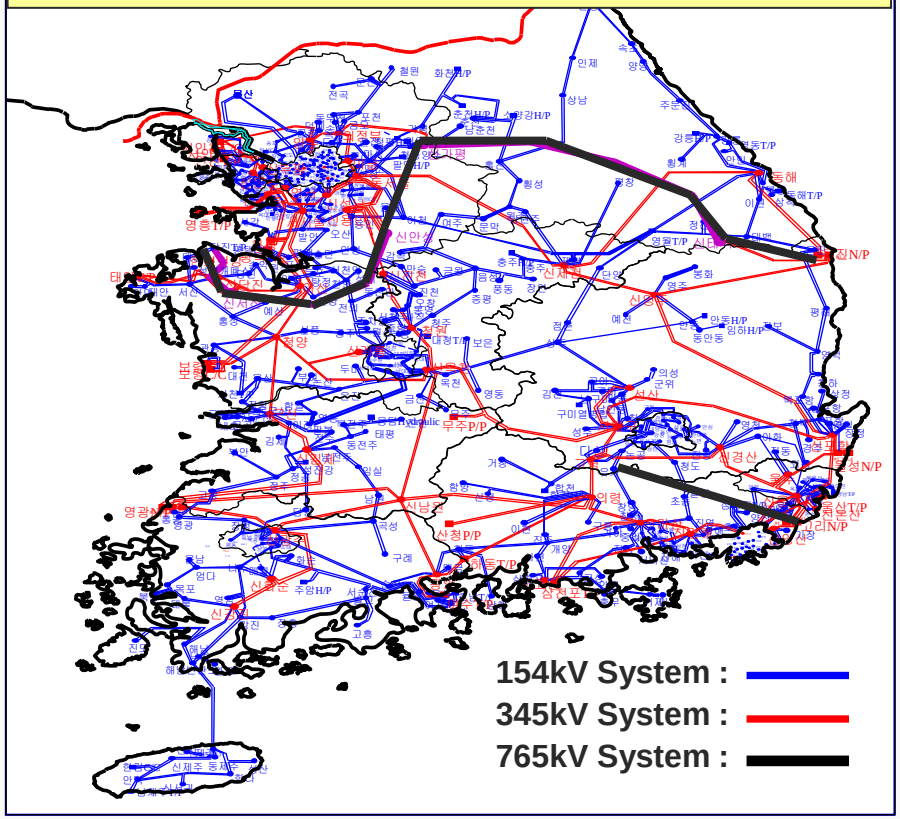
Transmission Grid

- Asia's first 765kV Transmission line
- World's first Double-circuit 765kV Transmission line
- World's first 765kV with full-GIS substation

The Year of 1965

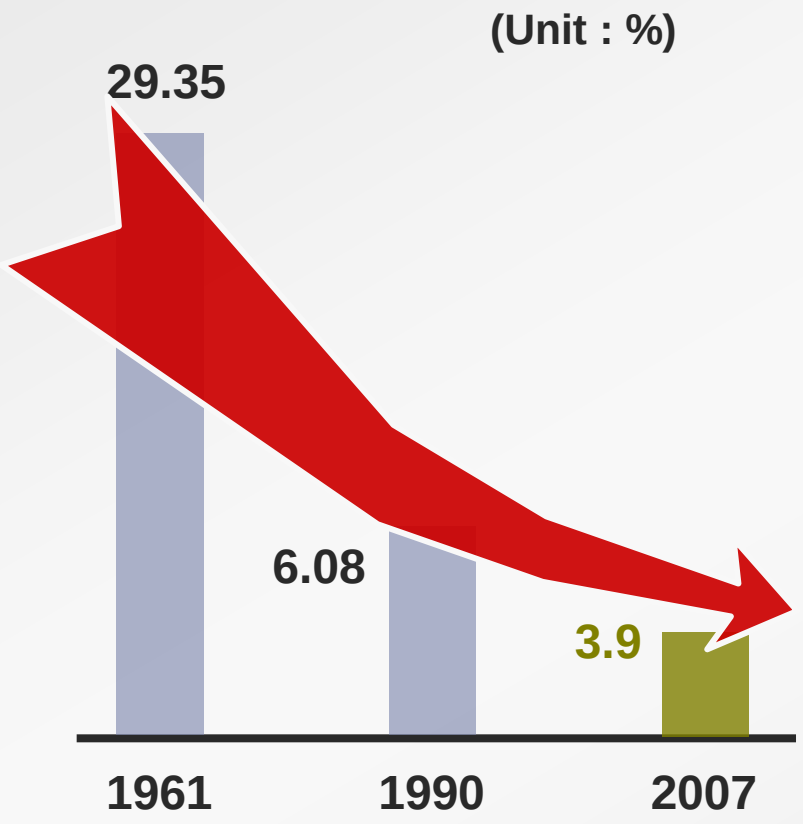


The Year of 2007

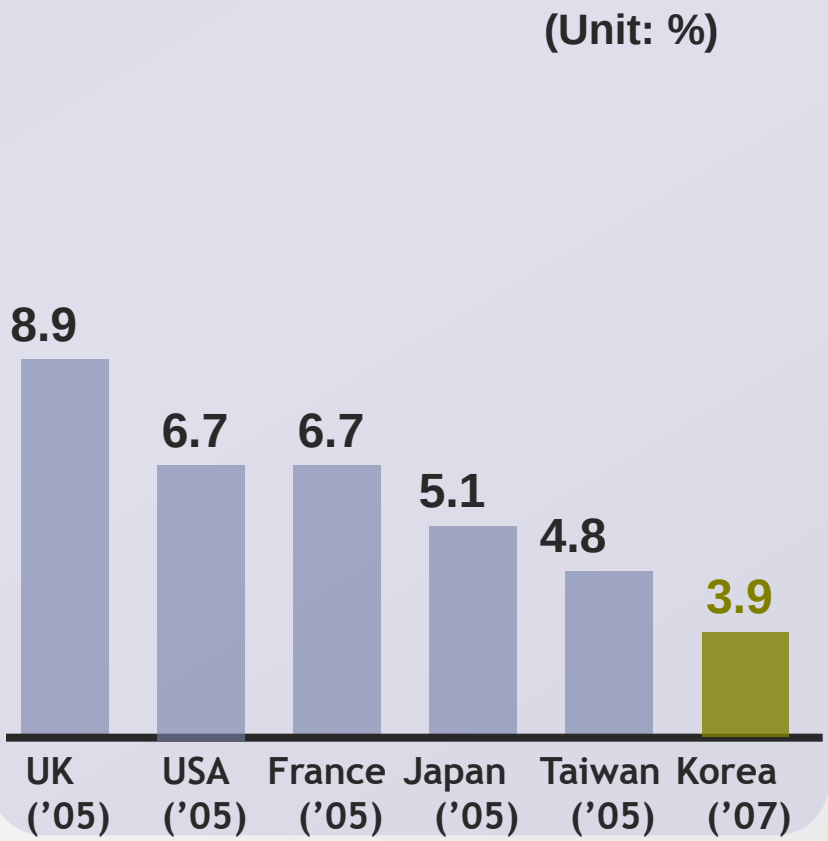


Transmission & Distribution Loss

Historical Improvement



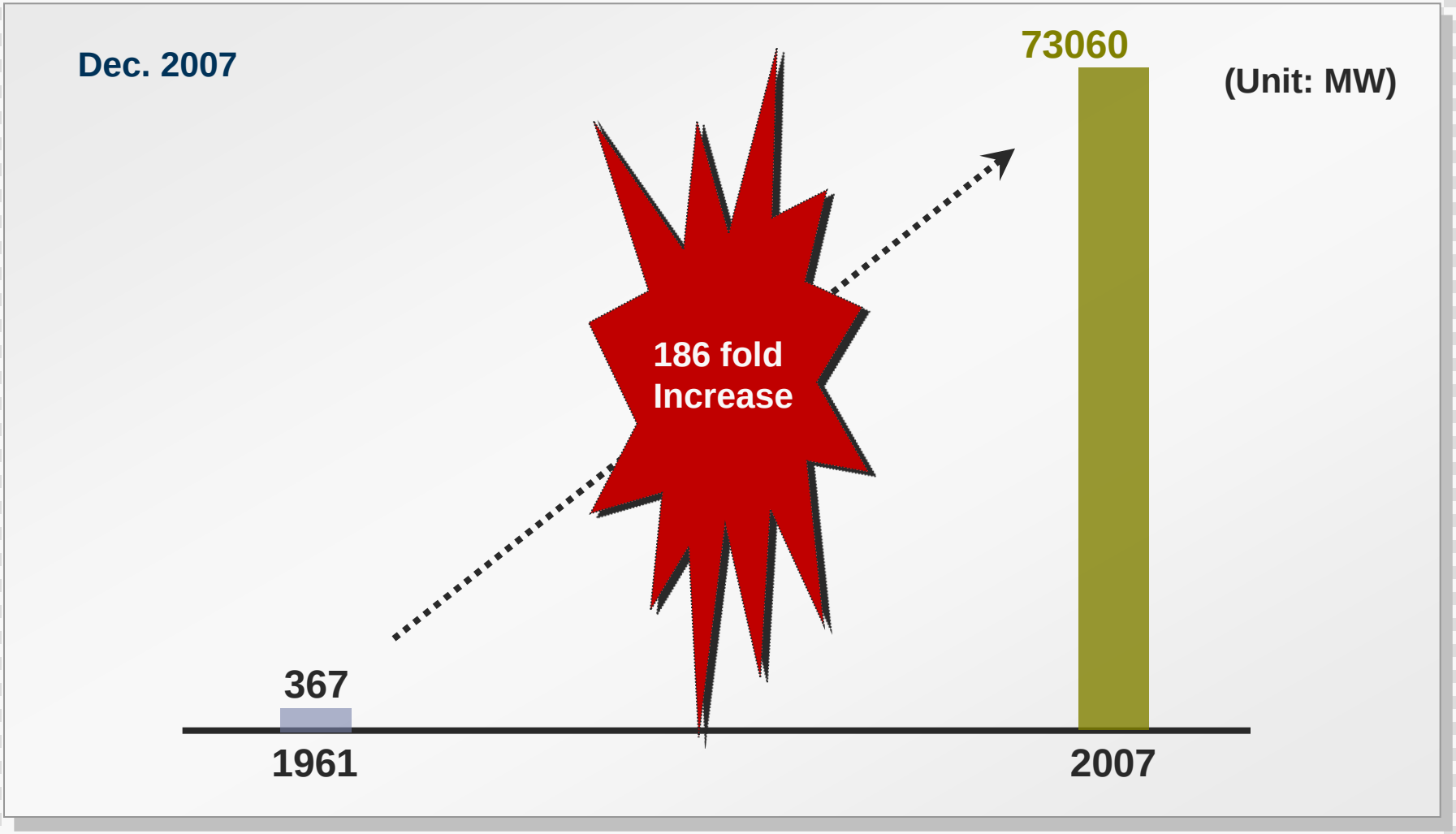
International Comparison



Rural Electrification

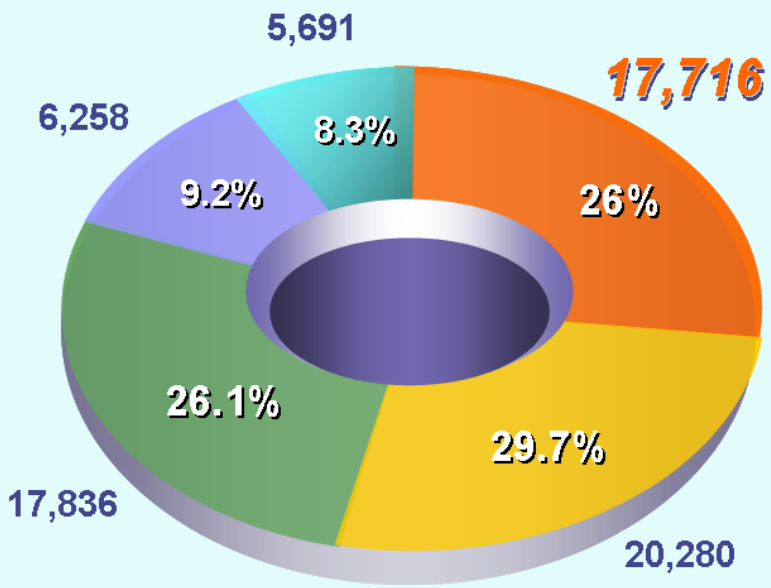
- Korea's rural electrification was completed in 1981 (17 year project)
- A special law to facilitate the rural electrification by simplifying the formalities and procedure of land acquisition, right of way securing, compensation and arbitration has been enacted and proved itself to be a great success

KEPCO'S Generation Capacity Growth



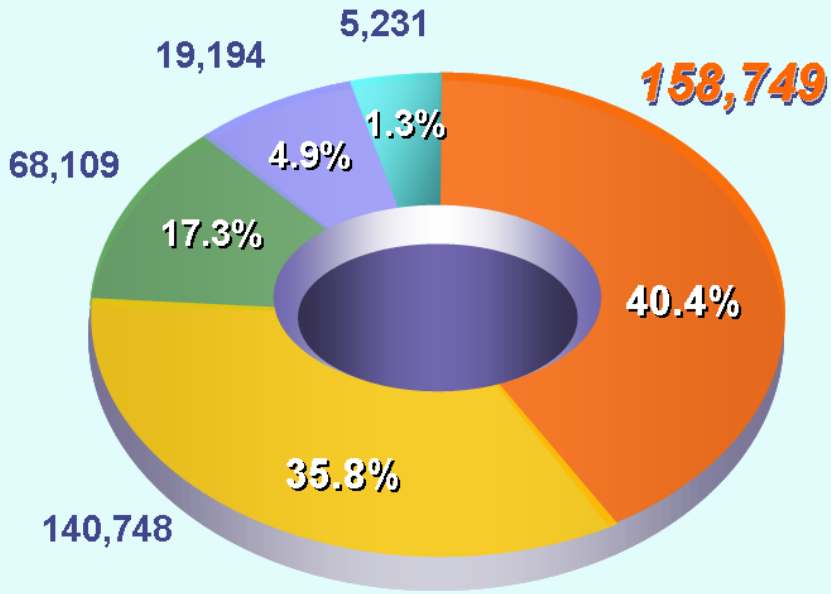
Generation Capacity & Energy

Installed Capacity Mix



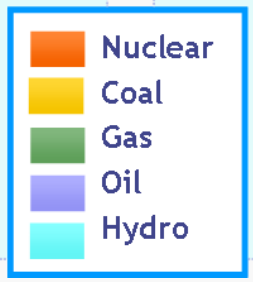
Total: 68,268 MW

Actual Generation Mix

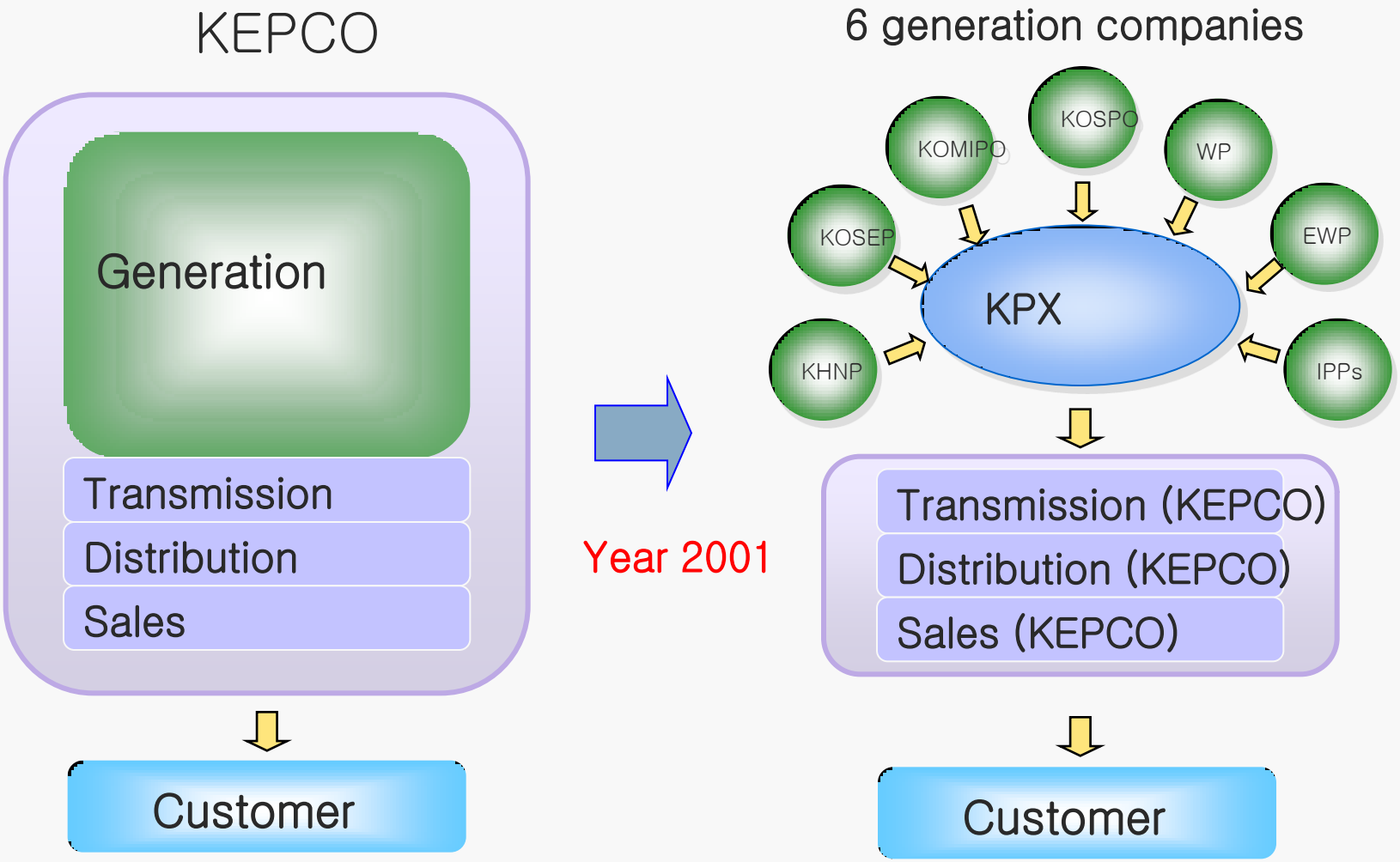


Total: 392,869 GWh

As of 2007



Structure of Electric Power Industry



Lessons from KEPCO's Rapid Growth

◆ Phased Approach in Technology Development

Time	Level of Technology	Descriptions
• 1st Phase (1960s)	Import, License	• 100% foreign technology
• 2nd Phase (1970s)	Imitate, Mimic	• Slight adjustment, tiny addition to original technology
• 3rd Phase (1980s)	Partially Independent	• Substantial modification, some new technologies
• 4th Phase (1990s)	Competition	• Give-and-Take partnership with advanced countries Mutually beneficial cooperation and information exchange
• 5th Phase (2000-)	Brand New Technology	• Technology transfer, implementation of international training program (Acceptance of trainee worldwide)

◆ Emphasis on Training & Development

- KEPCO still send a large number of employees to technologically advanced nations for training and development (e.g., USA, Europe, Japan).
- KEPCO signed more than 20 different MOUs for training delegation exchange program with countries in Asia, Africa, Europe and America.

Thermal Power Plants

Coal-Fired Power Plant

500 MW Class

- Capacity: 500 - 519 MW
- Efficiency: 39.49 - 43.45%
- 34 Units (17,000 MW) operating
- 4 Units (2,000 MW) under construction

800 MW Class

- Capacity: 814 - 886 MW
- Efficiency: 43.5 - 43.64 %
- 2 Units (1,600 MW) operating

1,000 MW Class

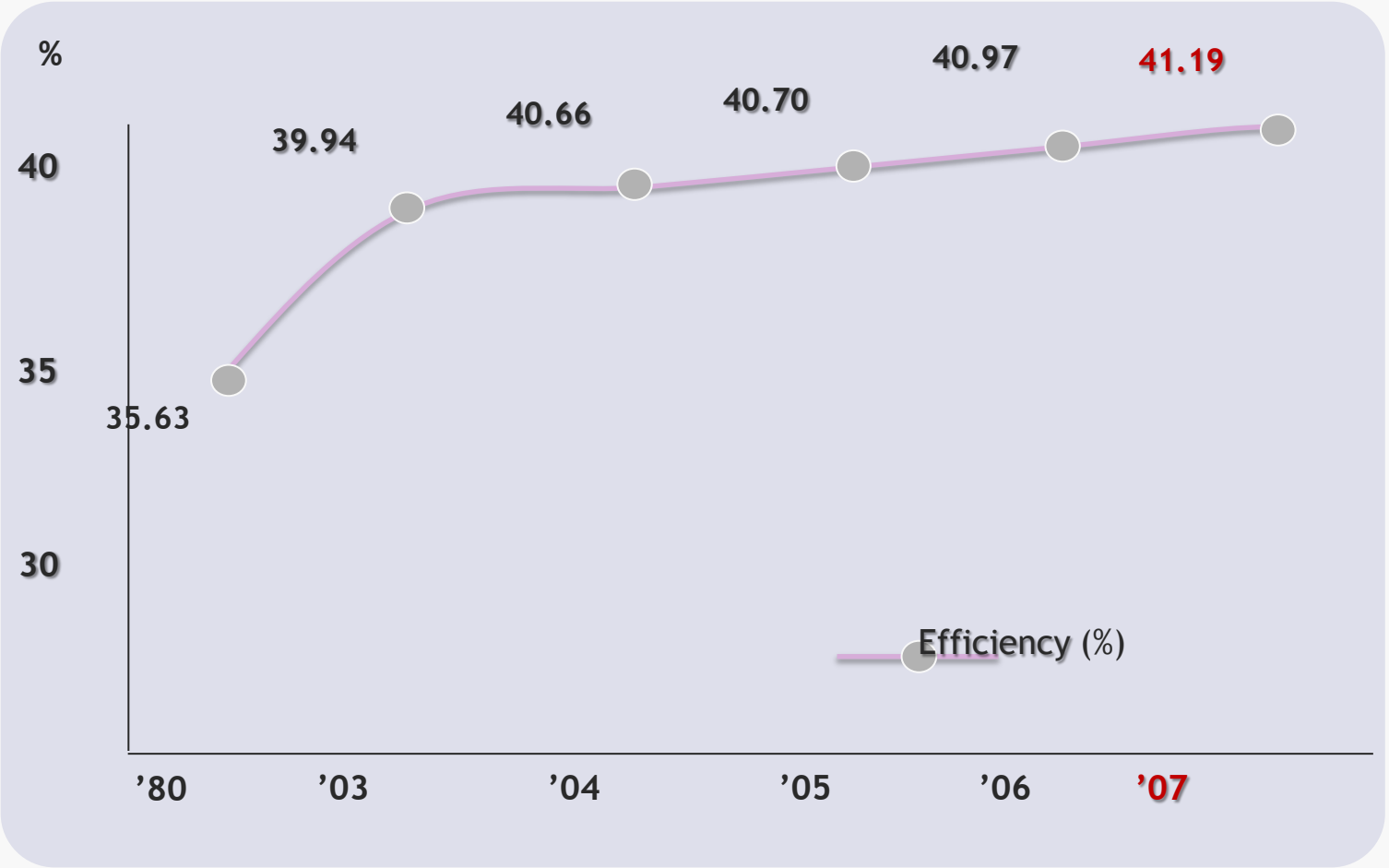
Plant design was completed in 2007.

- Design Capacity: 1000MW
- Expected Plant Efficiency: 45%

Dangjin Thermal Power Plant (500MW × 6)

Yonghung Thermal Power Plant (800MW×2)

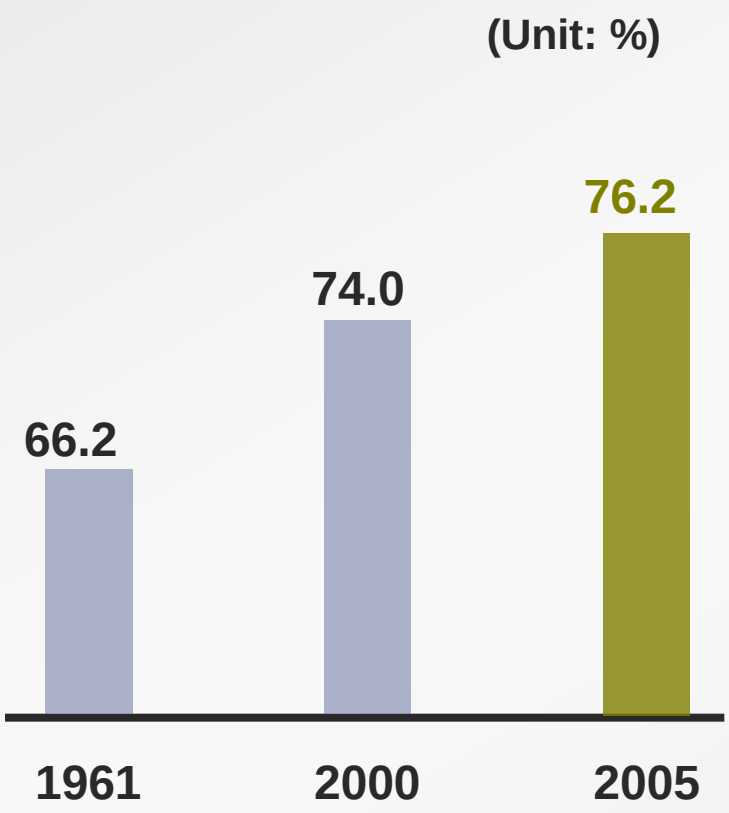
Thermal Power Plant Efficiency Improvement



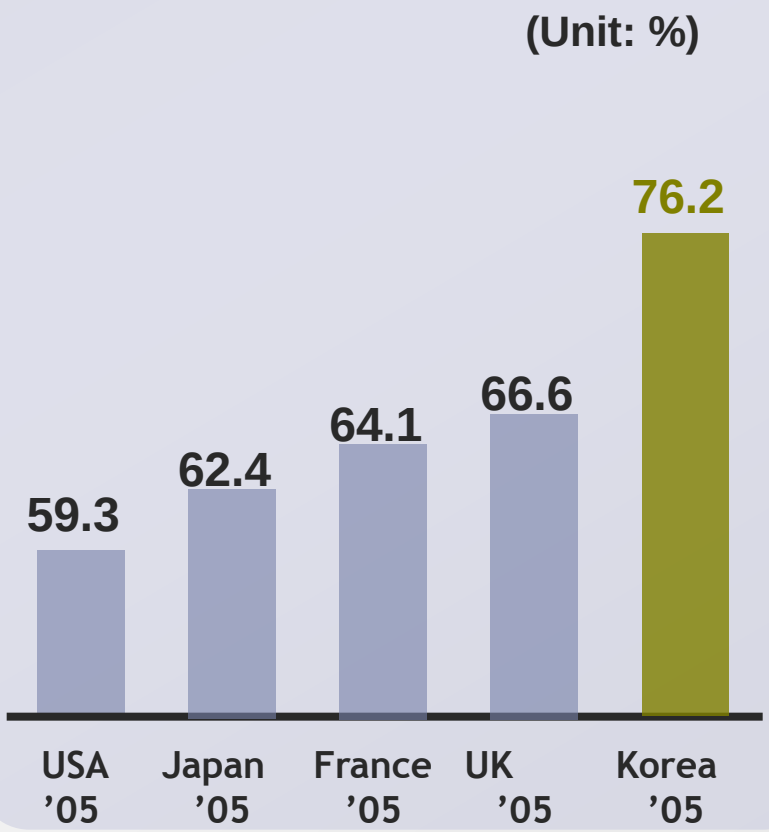
***gross efficiency

Thermal Power Plant Capacity Factor

Chronological Improvement



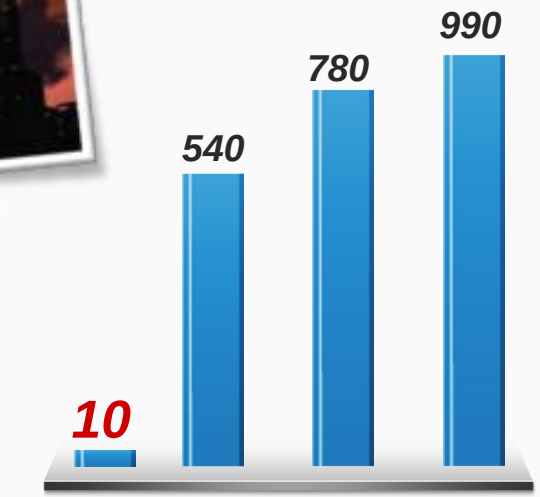
International Comparison



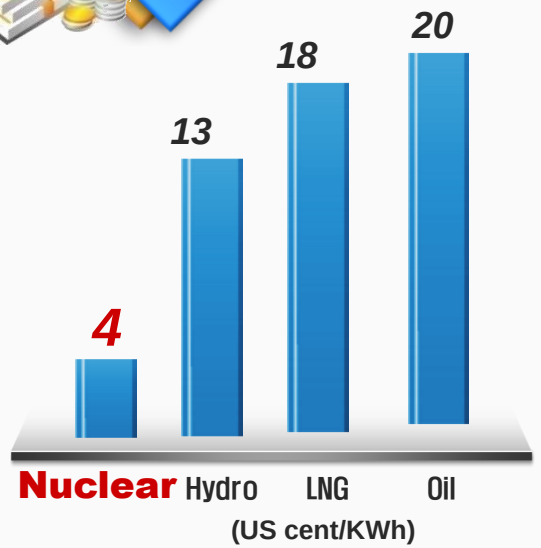
Nuclear Power Plants

Why Nuclear ?

Low CO_2 Emission

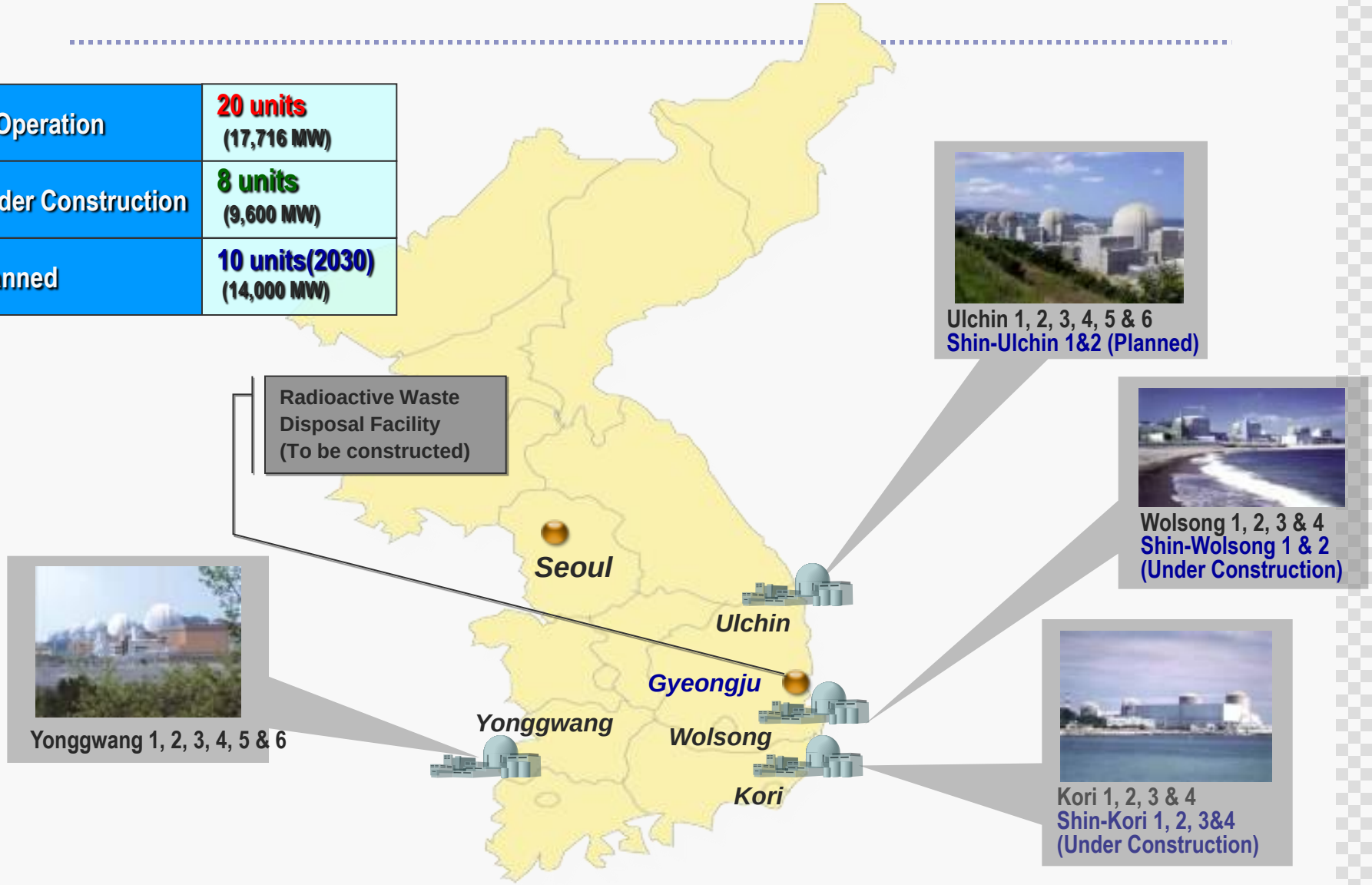


Cost Effective

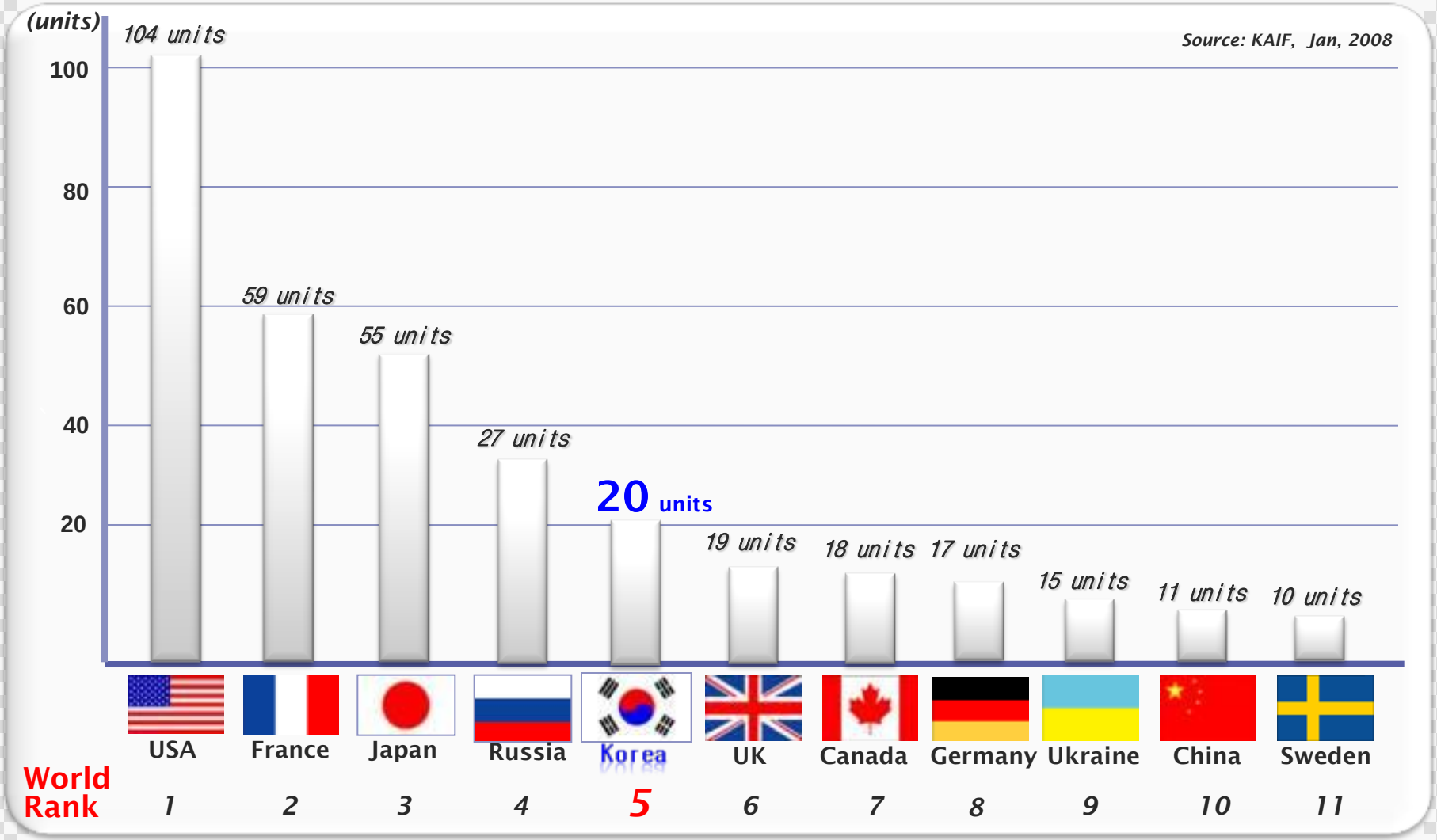


Nuclear Power Plant

In Operation	20 units (17,716 MW)
Under Construction	8 units (9,600 MW)
Planned	10 units(2030) (14,000 MW)



Nuclear Power in the World



Korea's Position in Nuclear Power

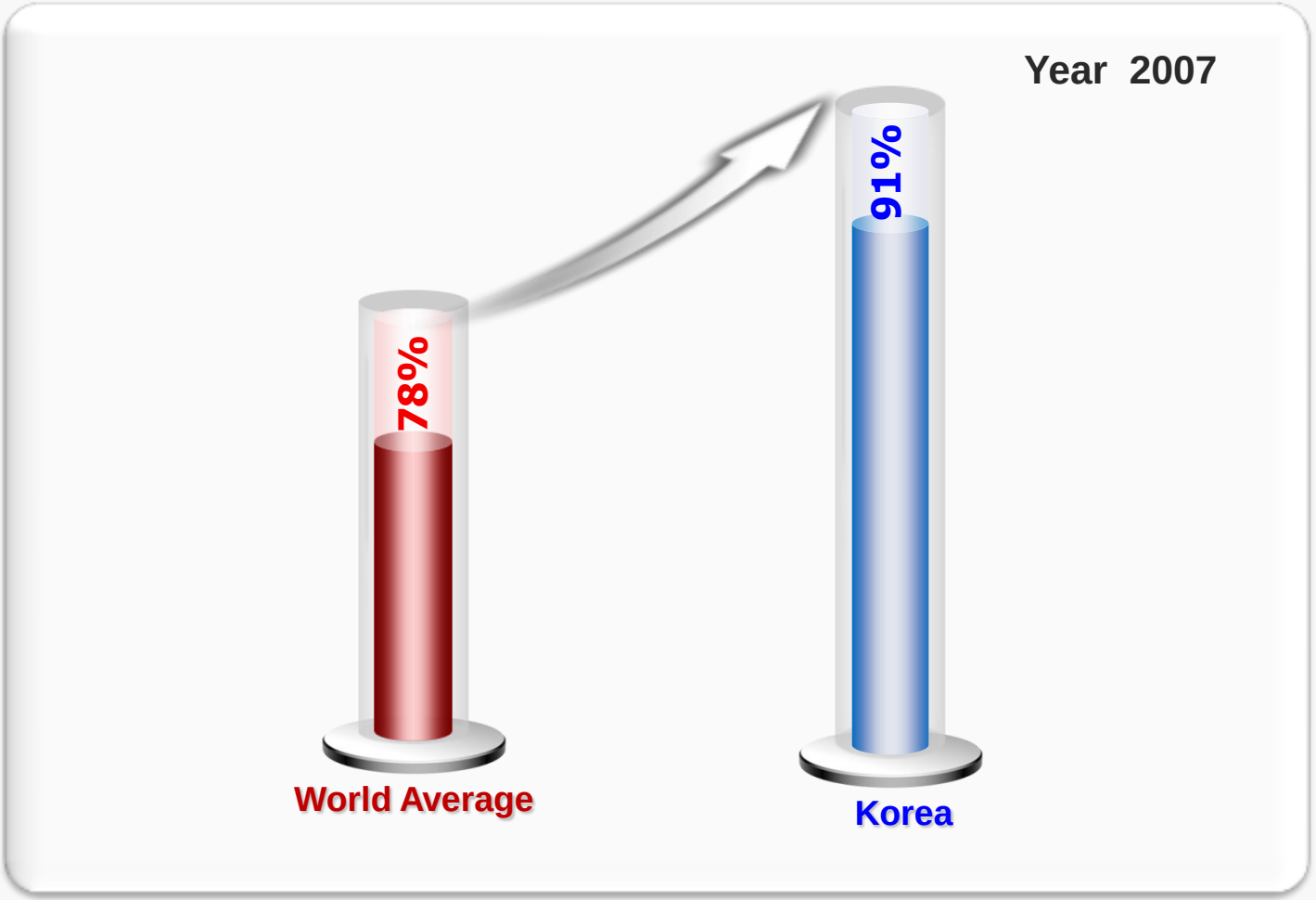
1 **No.5** : World 5th Largest Nuclear Power

2 **91%** : Higher Capacity Factor

3 **47 months** : Shortest Construction Time

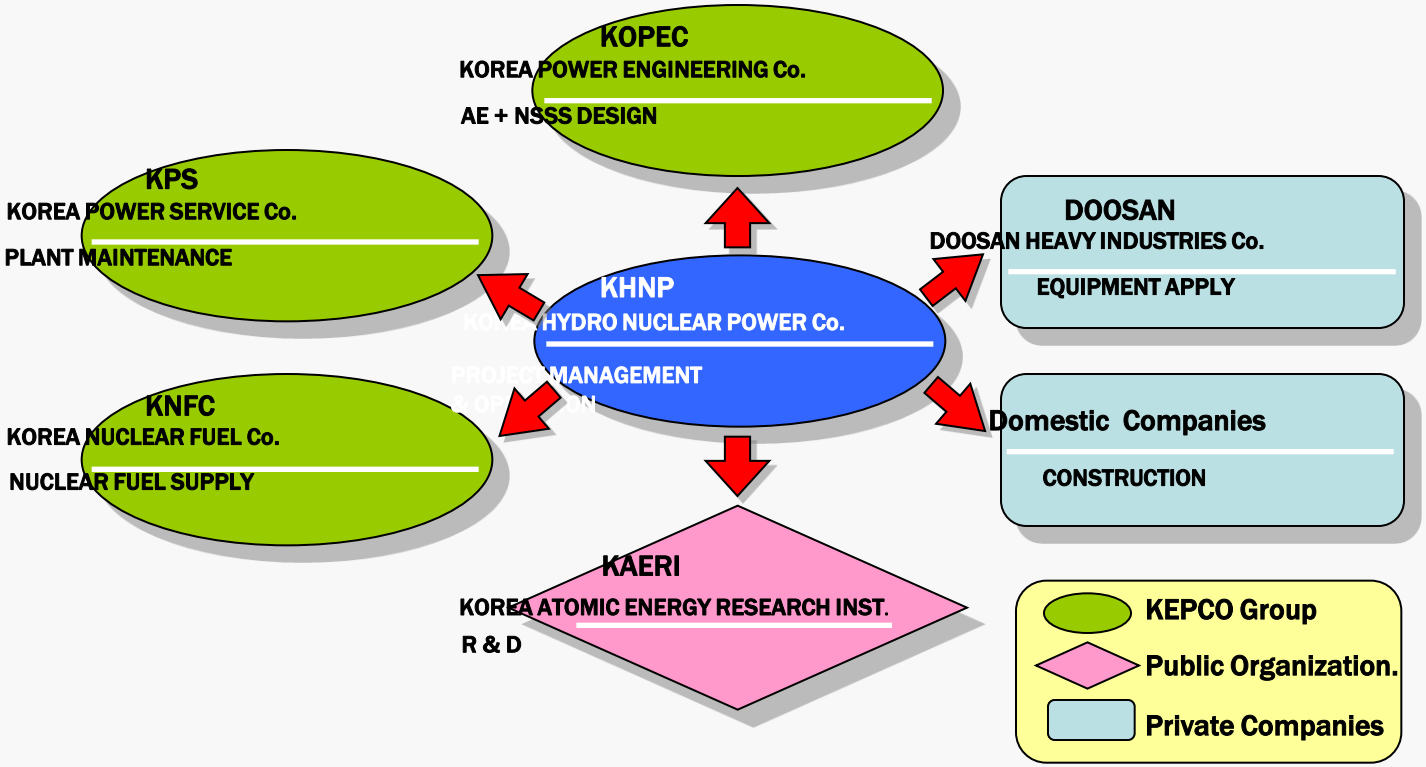
4 **2,000$/kW** : Low Construction Cost

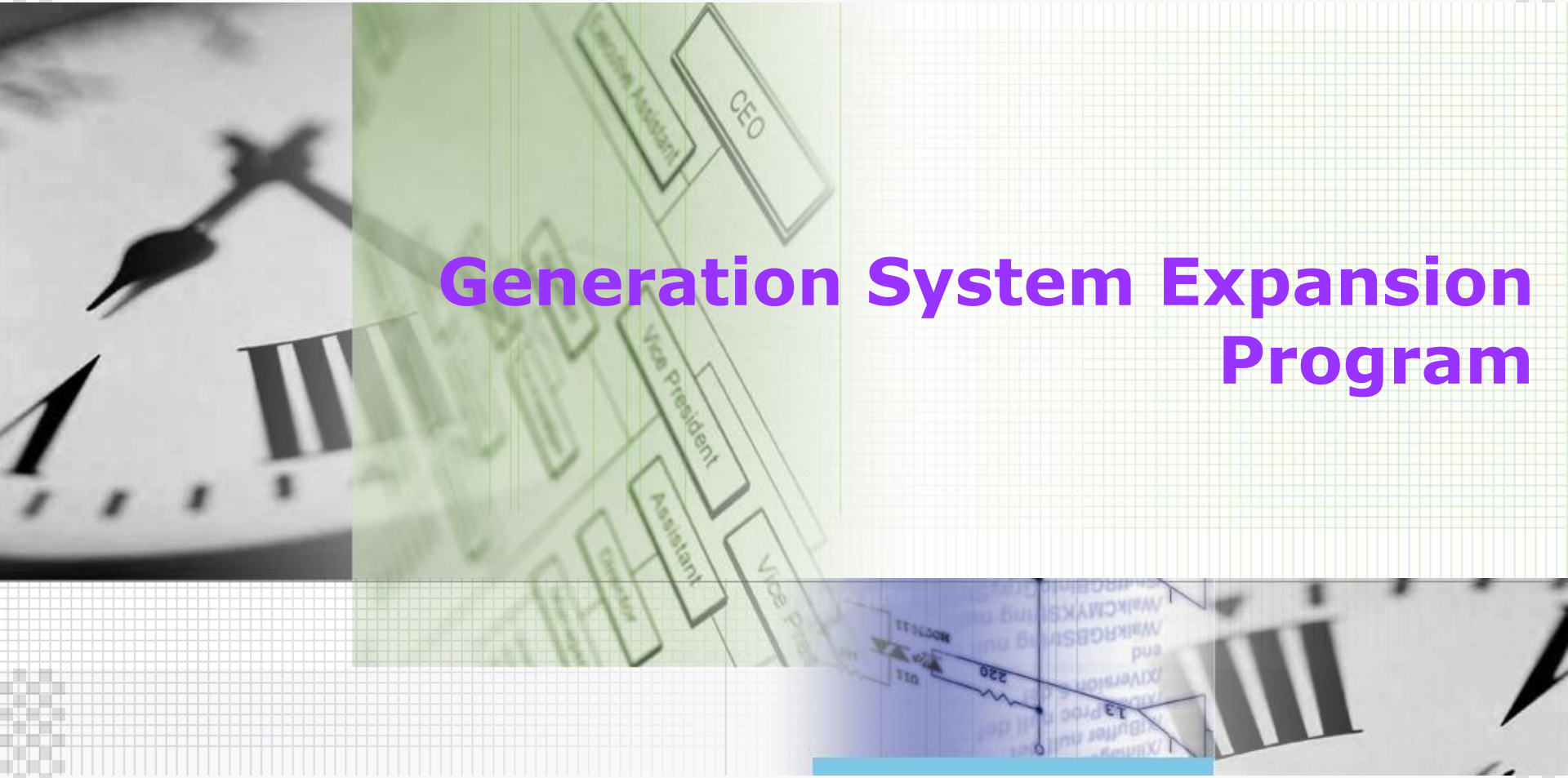
Nuclear Power Plant Capacity Factor



※ Source: Nucleonics Week Magazine in U.S.

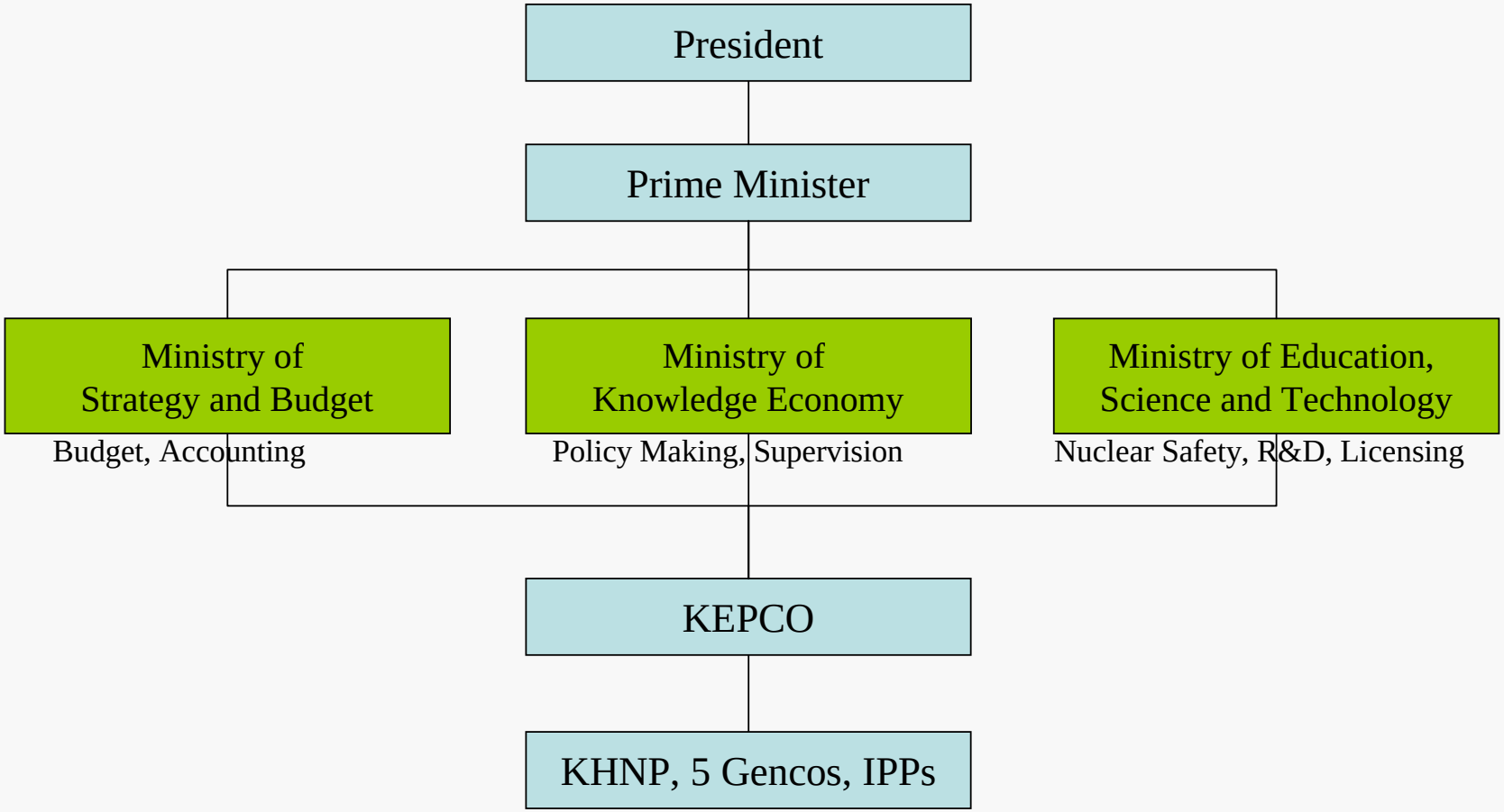
Structure of Nuclear Power Industry



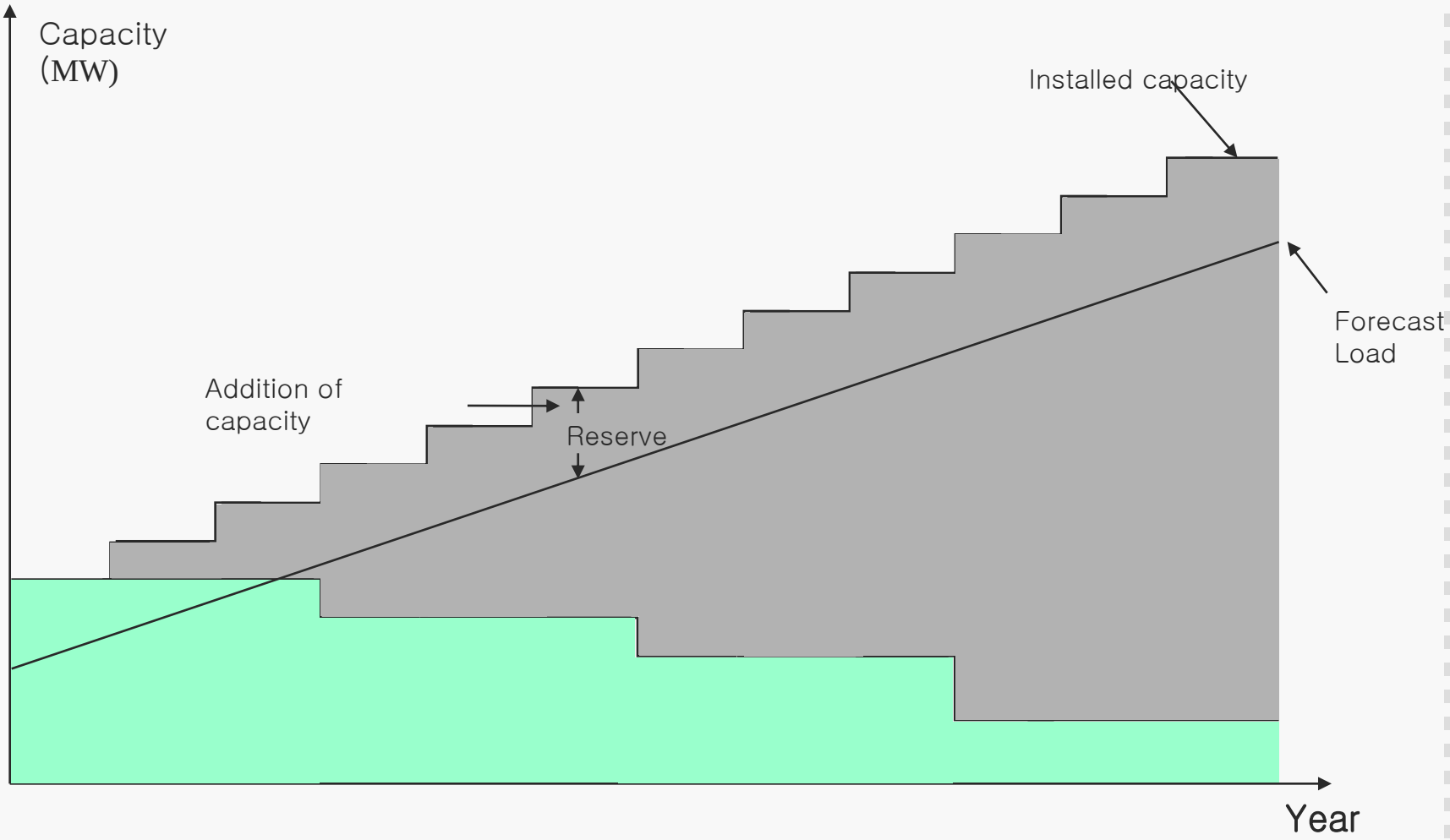


Generation System Expansion Program

Electric Power Sector



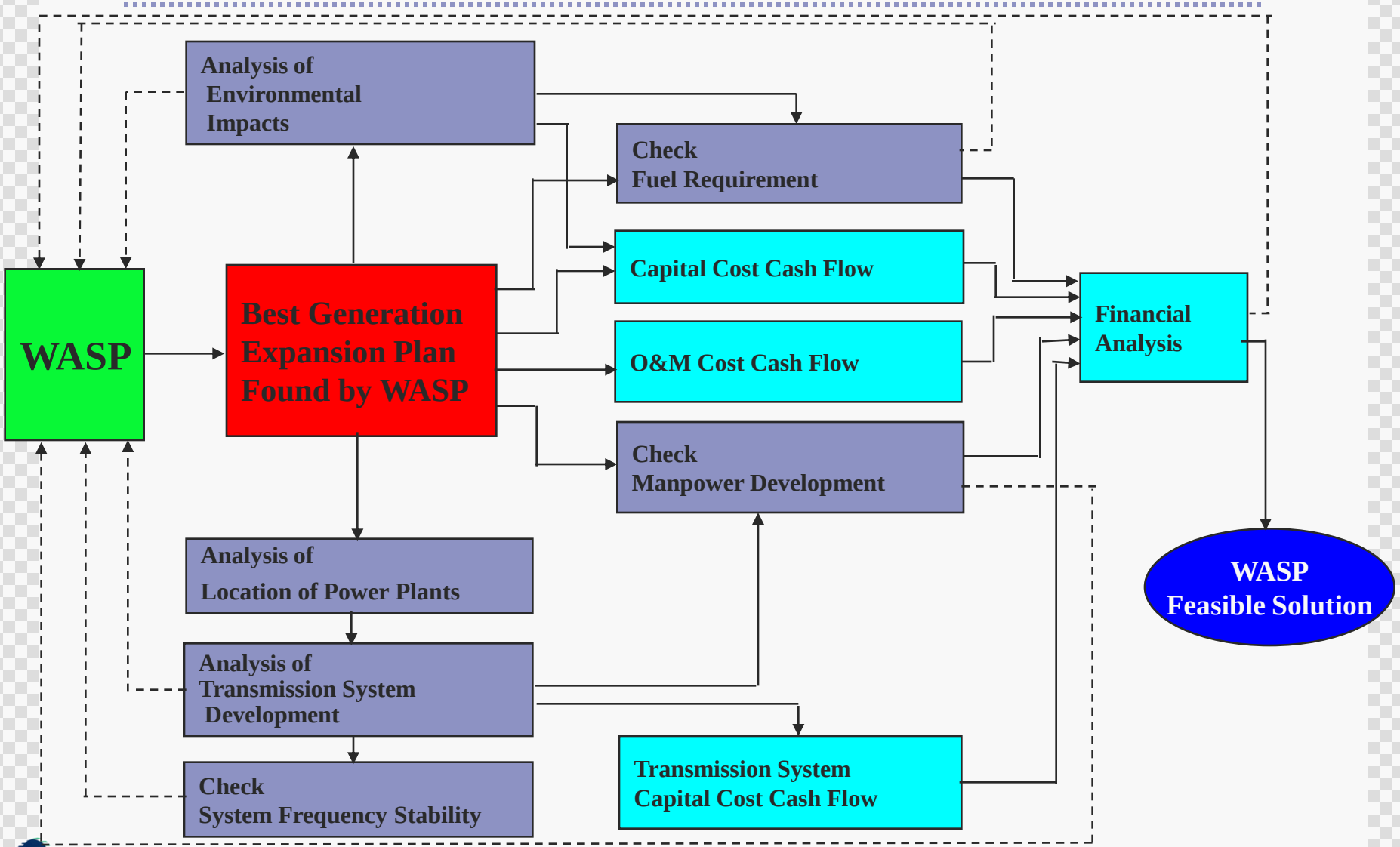
Generation Expansion Program



Generation Expansion Plan: Establishment Procedure

Establish directions for Master Plan	○ Government
⇩	
Submit materials covering each field (Including the letter of intent for construction submitted by the electricity business operators)	○ Electricity business operator/Korea Power Exchange
⇩	
Review and prepare working drafts	○ Practical work by the 6 working subcommittees
⇩	
Collect opinions related to Master Plan (tentative plan)	○ Public Hearing
⇩	
Examine Master Plan (draft)	○ Electricity Policy Examination Council
⇩	
Finalize and announce the Master Plan	○ Government

Analysis of the WASP output



Conclusion

- Based upon discussions so far we can come to conclude that Korea has successfully overcome a variety of challenges in developing its technologies and skills over the past 4 decades and has made itself one of the world-leading power companies.
- Korea wishes to share knowledge & experience with developing countries in Asia, Africa and Central & South America to help ease their sufferings and hardships coming from the shortage of electric power.

Thank You