



IEA Technology Collaboration Programme

COUNTRY REPORT [South Korea]

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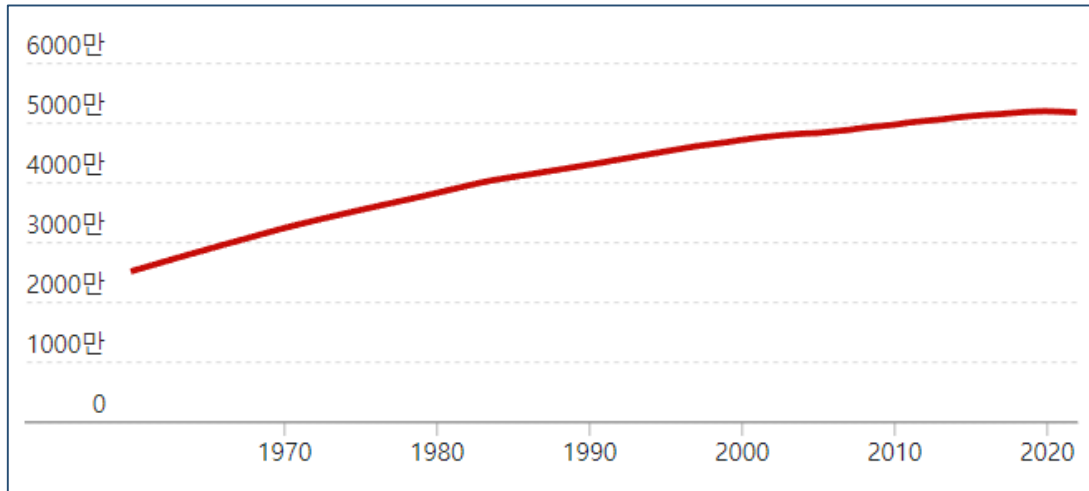
Korea Institute of Energy Research, Energy Storage Department.

IEA ES-TCP ExCO 97 meeting, 06. 04. 2024

Country Specific Information

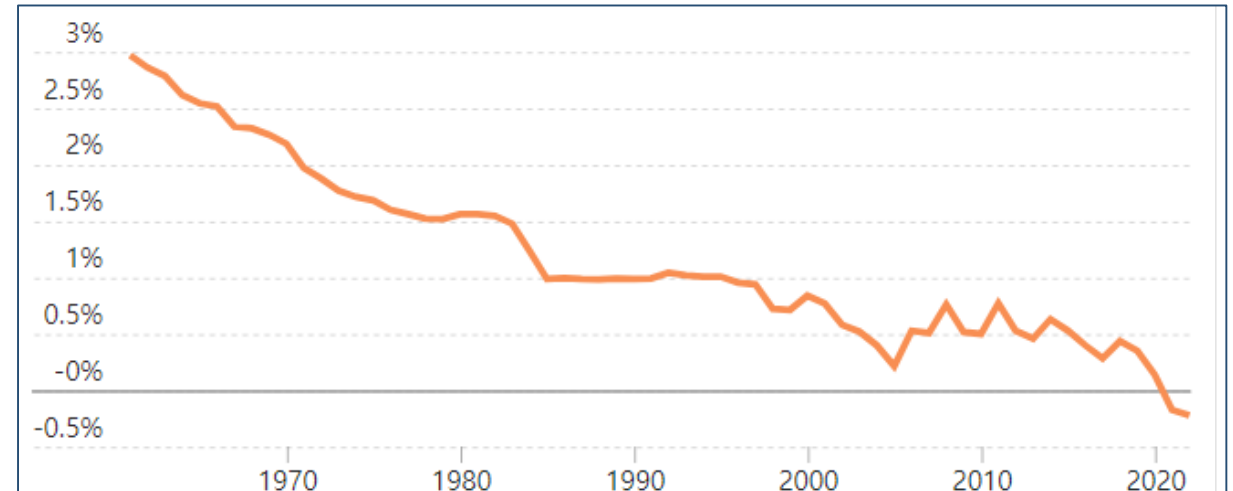
- Population : approximately 51.745 million in 2024

Population



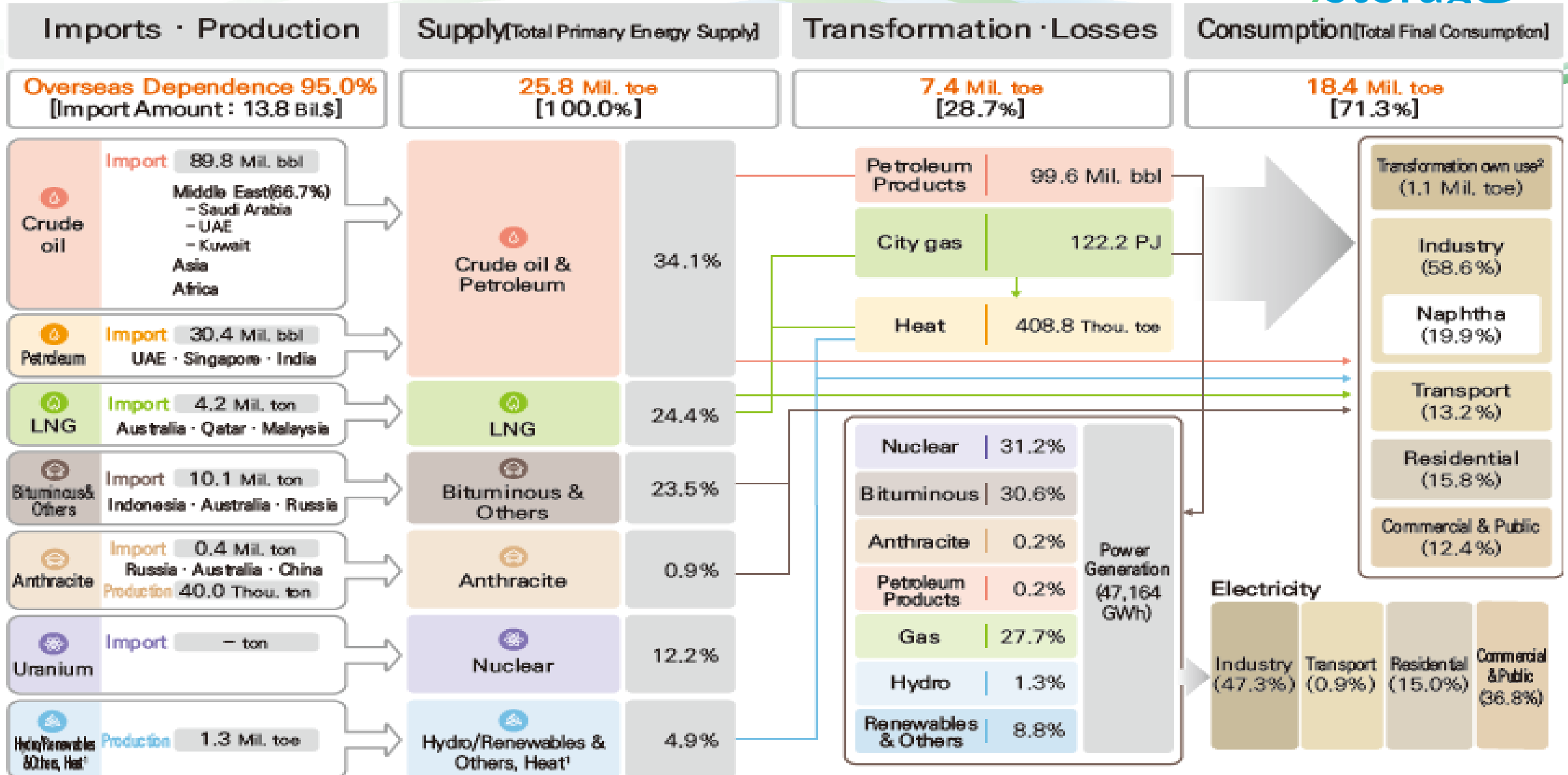
- The population of Korea has slightly increased from the past.

Population Growth Rate



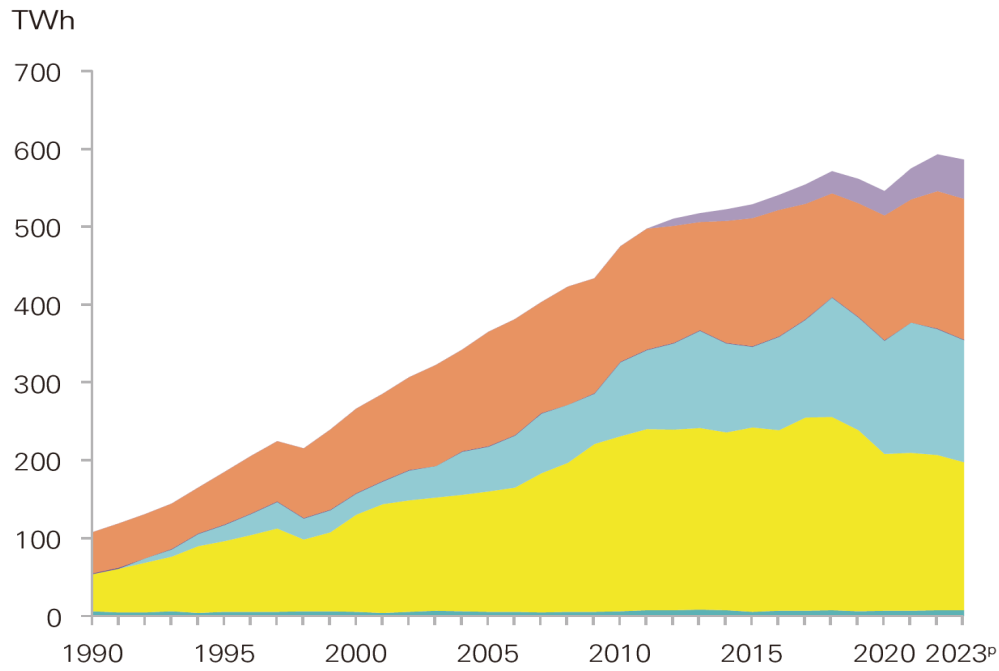
- South Korea's population growth rate in 2024 is approximately -0.02%

Energy Flow



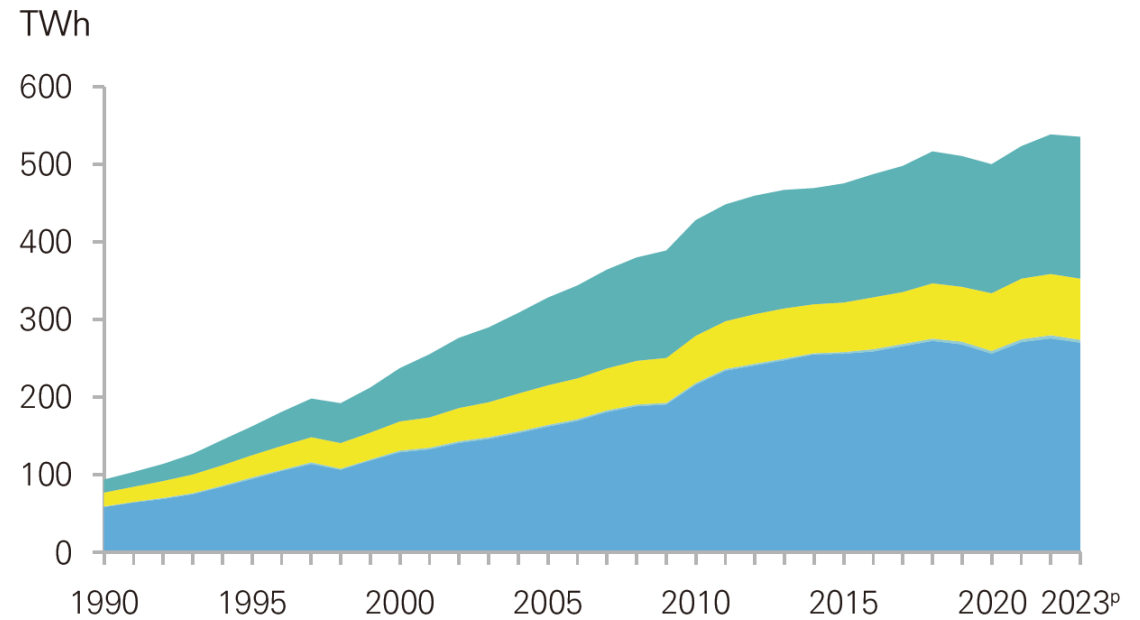
Primary Energy Consumption (2023)

Power Generation Amount by Generating Facility



- Hydro
- Combined
- Nuclear
- Steam
- Internal
- Renewables&Others

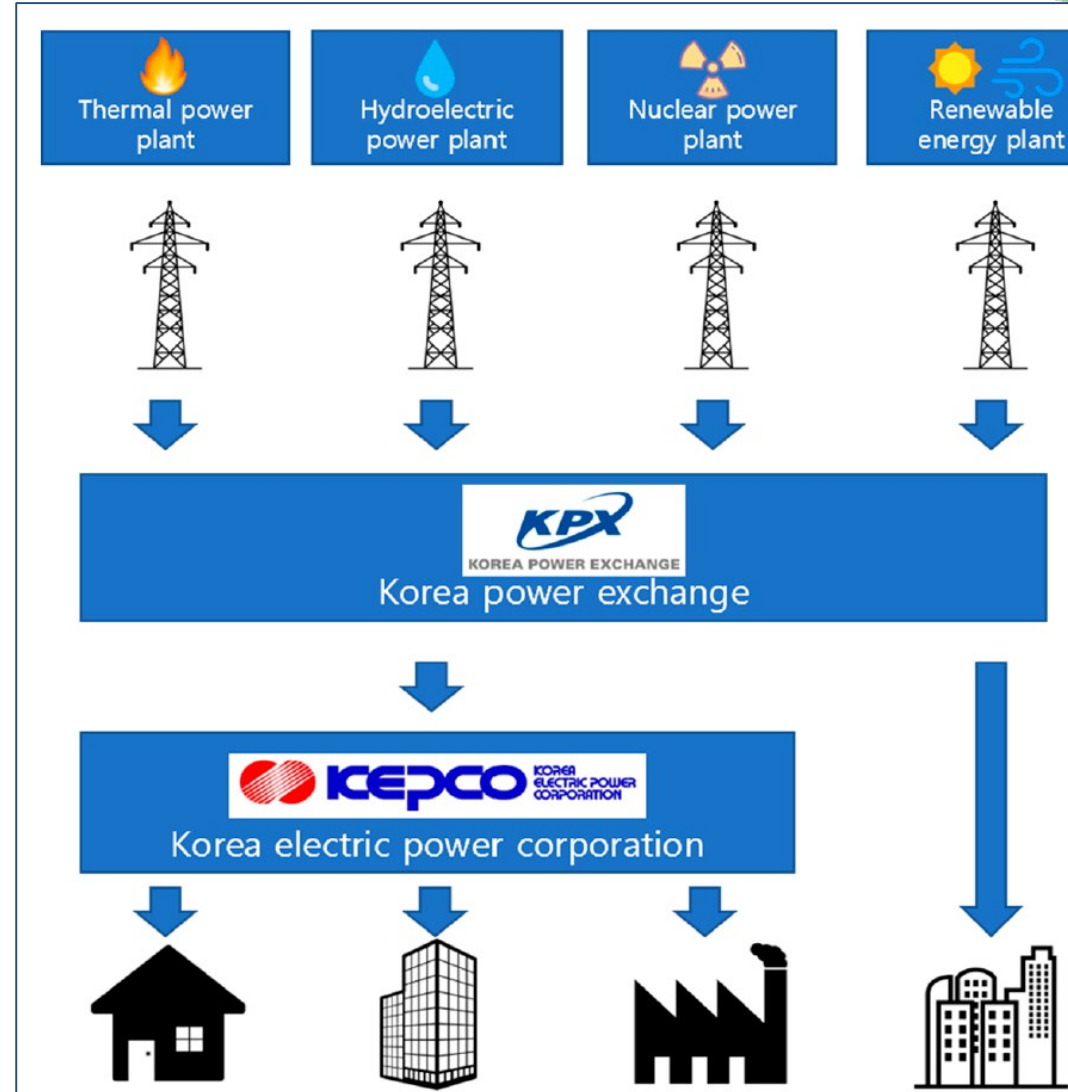
Electricity Consumption by Sector



- Industrial
- Transport
- Residential
- Commercial & Public

Korea Electricity Security Policy

■ Korea's electricity infrastructure



■ Korea Power Exchange (KPX)

- sole transmission system operator (TSO) for electricity supply in Korea

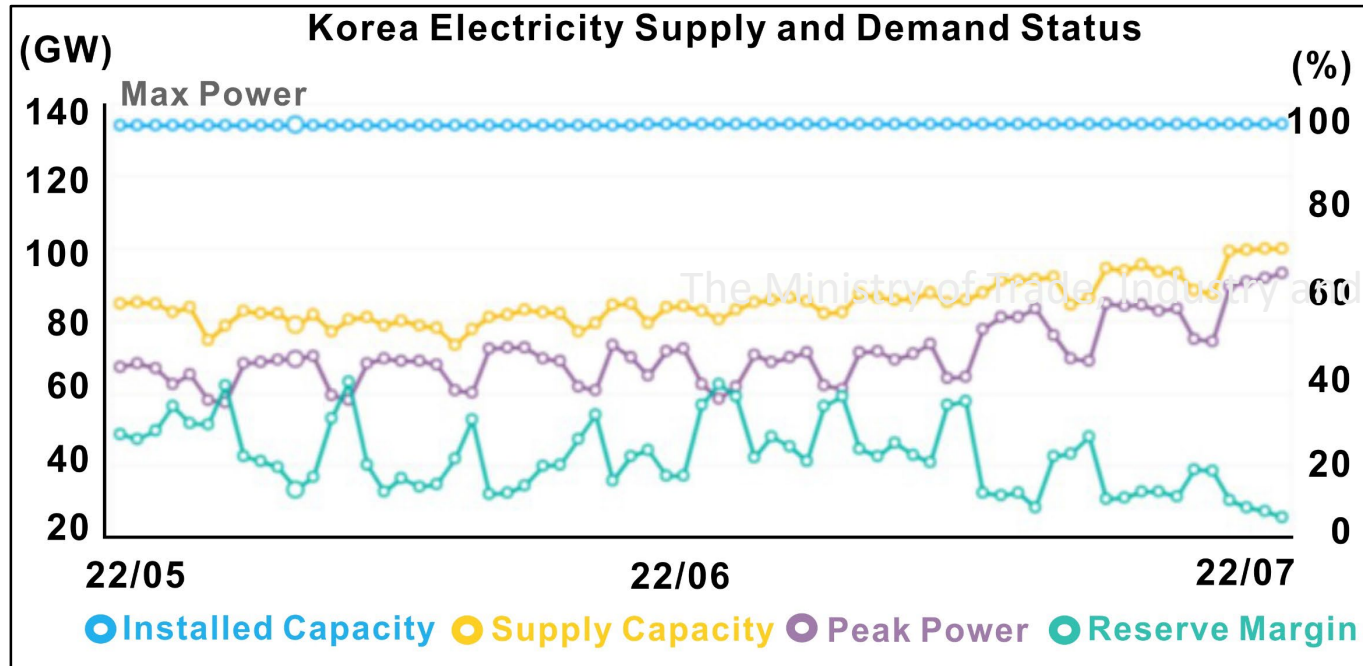
■ Korea Electric Power Corporation (KEPCO)

- majority-owned by the government, is responsible for transmission facility management as the asset owner

National Policy

10th Basic Plan for Electricity Supply and Demand (10th BPLE)

Primary Objective - Guaranteeing a Stable Power Supply and Demand



Reserve Margin

Year	Target
2024	< 10%
2026	20%
2030	21%
2036	22%

Plan targets a margin of 20% between 2023 and 2026, reserve which will increase to 21% in the medium-term from 2027 to 2030 and to 22% in the long-term time frame 2031-2036.

National Policy

- 10th BPLE (2023. 01)

Renewables → 22% increasing plan by 2030

ESS Market in Korea

Implementation of 20.85GW long-duration ESS (22.31 to 30.77 billion USD investment) confirmed

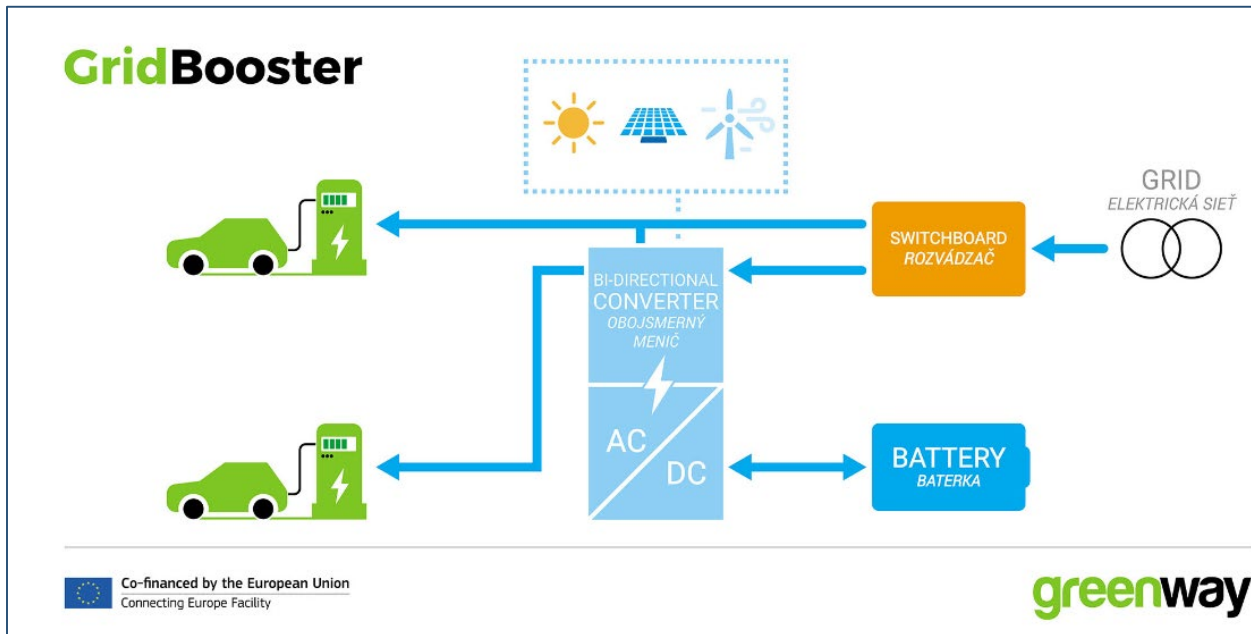
- Full-scale start of the long-duration ESS market in Korea → 2023 Jeju island, 260 MWh ESS facilities

Duration	4-hr	6-hr	8-hr	Sum
'24~'36	4.22 GW	15.58 GW	1.05 GW	20.85 GW
Installation Ratio	20%	75%	5%	100%

Duration	4-hr	6-hr	8-hr	Sum
Candidate Technology	LiB	■	■	Battery
	VRFB	■	■	
	NaS	■	■	
	Hydro Pump, CAES, Thermal Storage		■	■

RDD Information

- Optimization of transmission and distribution network
- (South-West Area) Grid Booster ESS Plan (2025~2027)
- Candidate Technology :VRFB, NaS, LiB



Major Battery Technologies for LDES

1 LiB	2 VFB	3 NaS
Shorter than 4 hours	4~12 hours	6 hours

■ (Jeju) Long-duration ESS Project

Bidding Year	Capacity	Duration
~2025	95 MW	6hr

■ (South-West Area) Long-duration ESS Project

Bidding Year	Capacity	Duration
2024 -2029	3,660 MW	≥ 6hr



Optimization of transmission and distribution network

ESS Demonstration Projects

- (Project Title) Development of a Redox Flow Battery with 20 MWh and Demonstration of Its Integration with the Power Grid

- (Specifics) 20 MWh

- (Consortium) H2 Corporation, Korea East-West Power Corporation, KIER

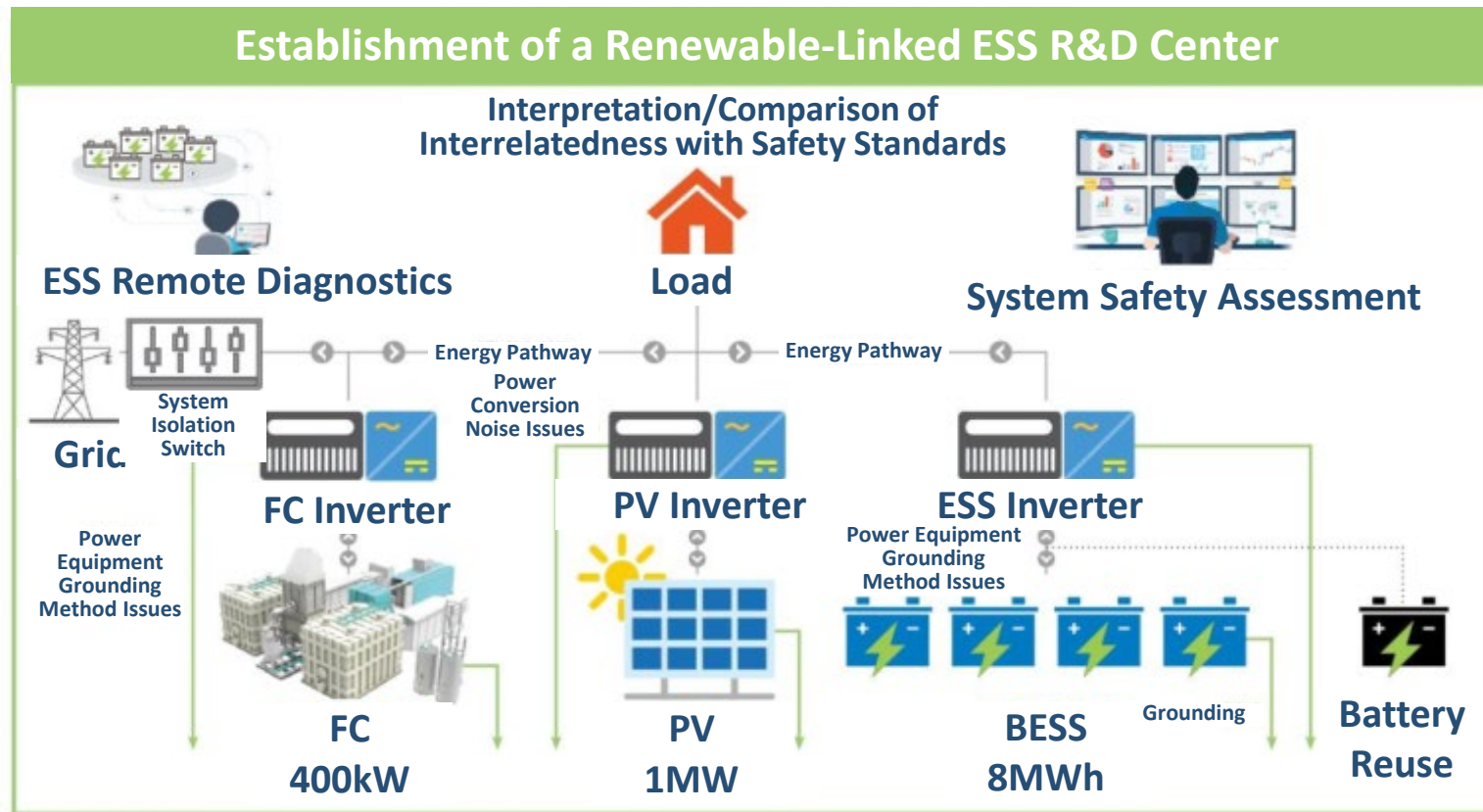
- (Demonstration) Integration with the California Power Grid



- (Contents) Establishing a demonstration site for a VRFB ESS in California, USA, to secure various operational data and track records, contributing to the activation of the industry

ESS Safty Projects

- R&D Project : Establishment for Renewable Energy-linked ESS Safety Evaluation Center



6 Safety Standards

Common Mode Electrical Noise

Internal Resistance

Insulation Resistance

Module Fuse

Charge Rate

Temperature and Humidity Environment

Project : 2022. 01. 01. - 2025. 12. 31.

(EV) National Strategy & R&D Project of Secondary Battery

■ Secondary Battery

- National Strategy for the Advancement of Key Technologies (October 2022)
- Four Key Technologies in the Secondary Battery for the Development of World-Leading Superior Technologies

Four Key Technologies in the Secondary Battery



High-Performance, High-Safety, Eco-Friendly Core Materials and Manufacturing Process Technology

Commercialization and Core Technology of Next-Generation Solid-State Lithium Metal Batteries

High-Efficiency, High-Safety, Innovative Design and Management Technology

Market Viability and Industrial Popularization Technology for Used Secondary Batteries

(EV) R&D Investment & Project for K-Battery

- Strategy to Strengthen Competitiveness in the Secondary Battery Industry



- Investment of \$15 billion by 2030

Battery Type	LiB (NCM)	LFP Battery	ESS
Investment	Public and private sectors to invest \$100 million R&D over the next five years	Over \$37 million in new R&D investment by public and private sectors	Public and private sectors to invest \$100 million in R&D over the next five years
Target	Maximization of LiB Performance: 800 km Range by 2030	Securing Top Competitiveness for Electric Vehicle Batteries by 2027	Achieving More Than Fivefold Increase in ESS Exports by 2030



IEA Technology Collaboration Programme

The Energy Storage TCP

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