Energy Policy Of The New Korean Government

KGCCI Webinar: New Energy Policy In Korea – Perspectives & Implications

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Tuesday 20th September 2022

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Energy trends

New Energy Policy Direction In Korea

Implications For Businesses Procuring RE In Korea

Way Forward

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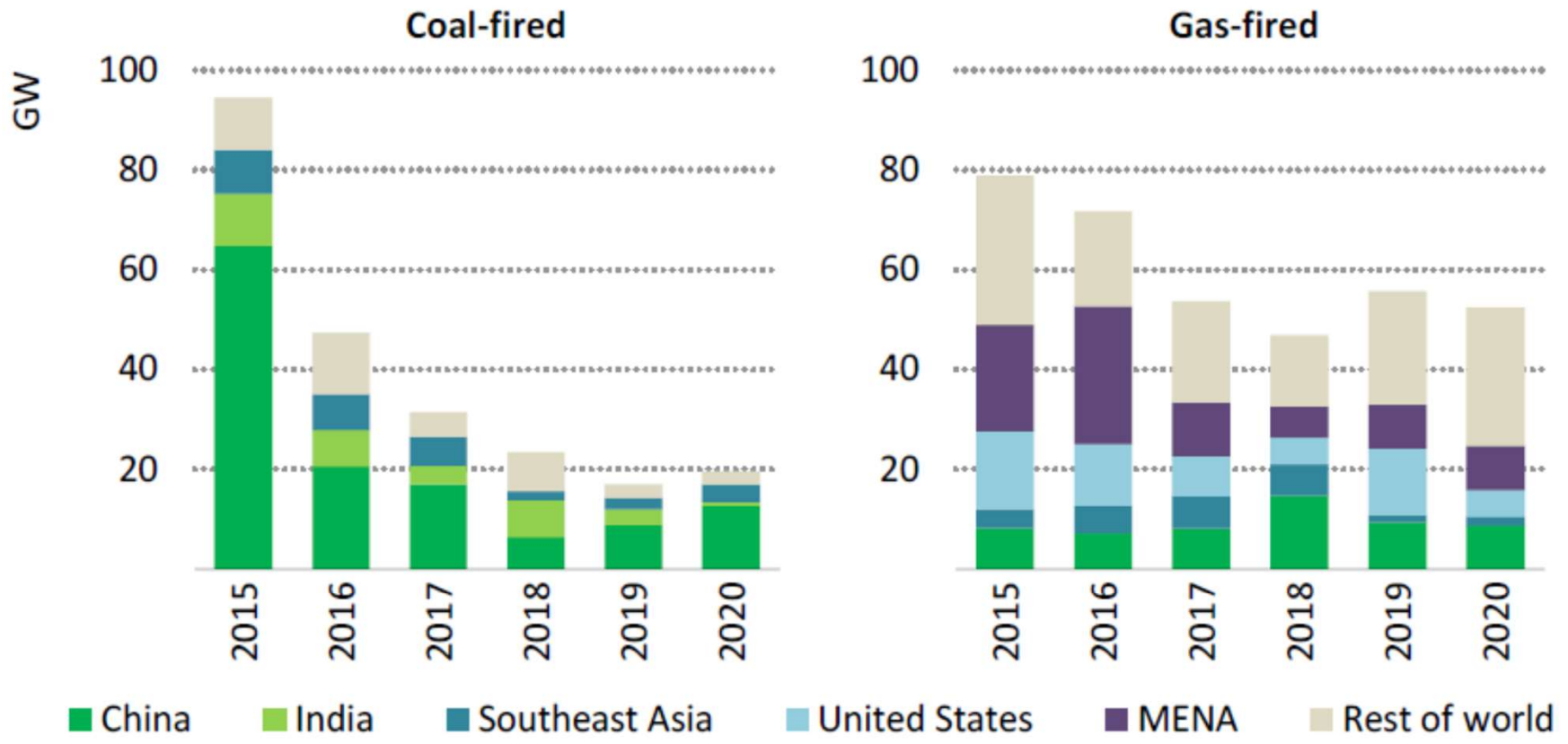
World Energy Investment (IEA, 2021)

New coal and gas power investments in decline

FIDs for coal and gas, 2015-2020 (GW)

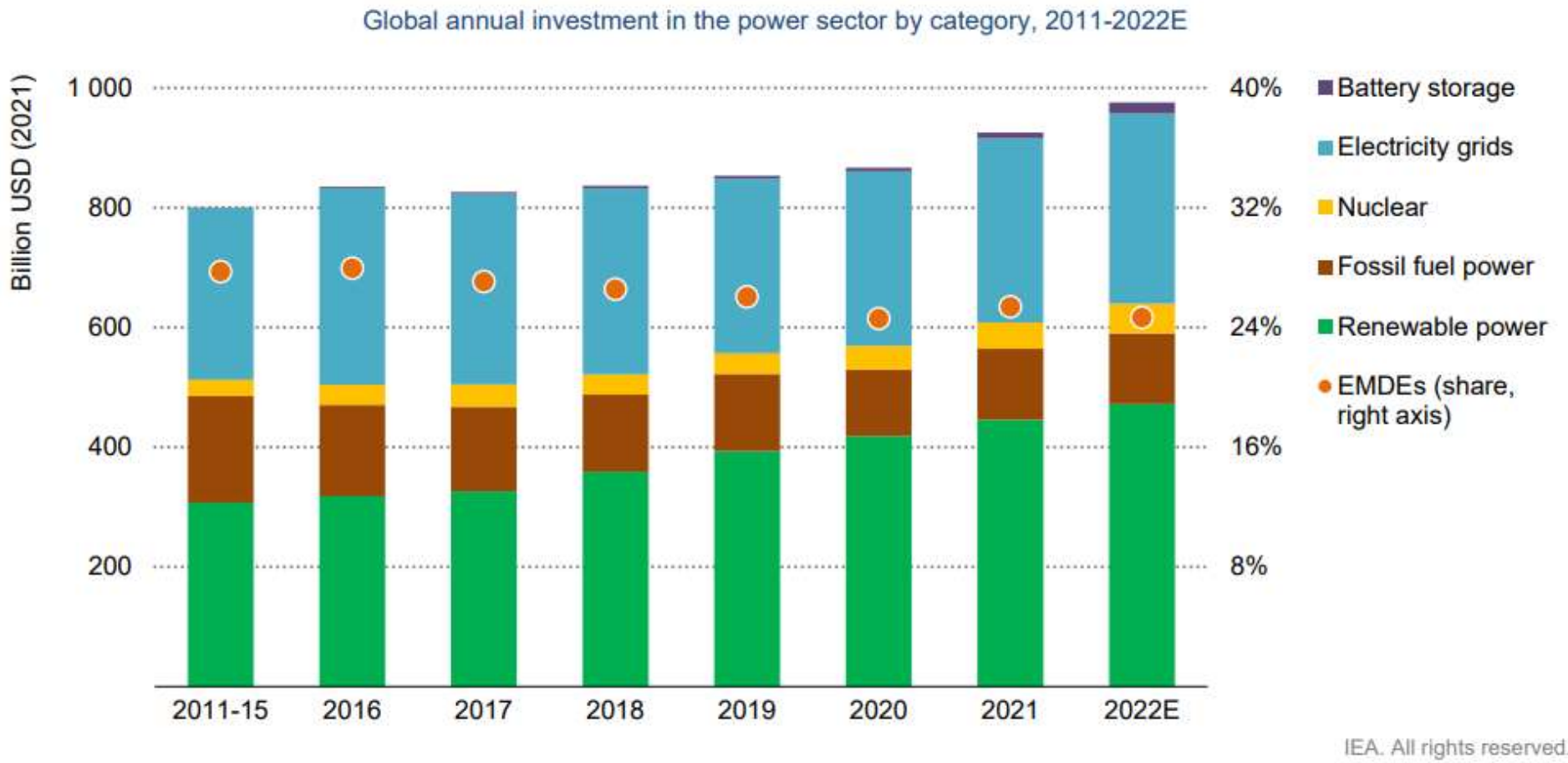


Note: MENA = Middle East and North Africa.

Source: IEA calculations based on McCoy (2021).

World Energy Investment (IEA, 2021)

Nuclear and fossil has a very marginal share compared to renewables

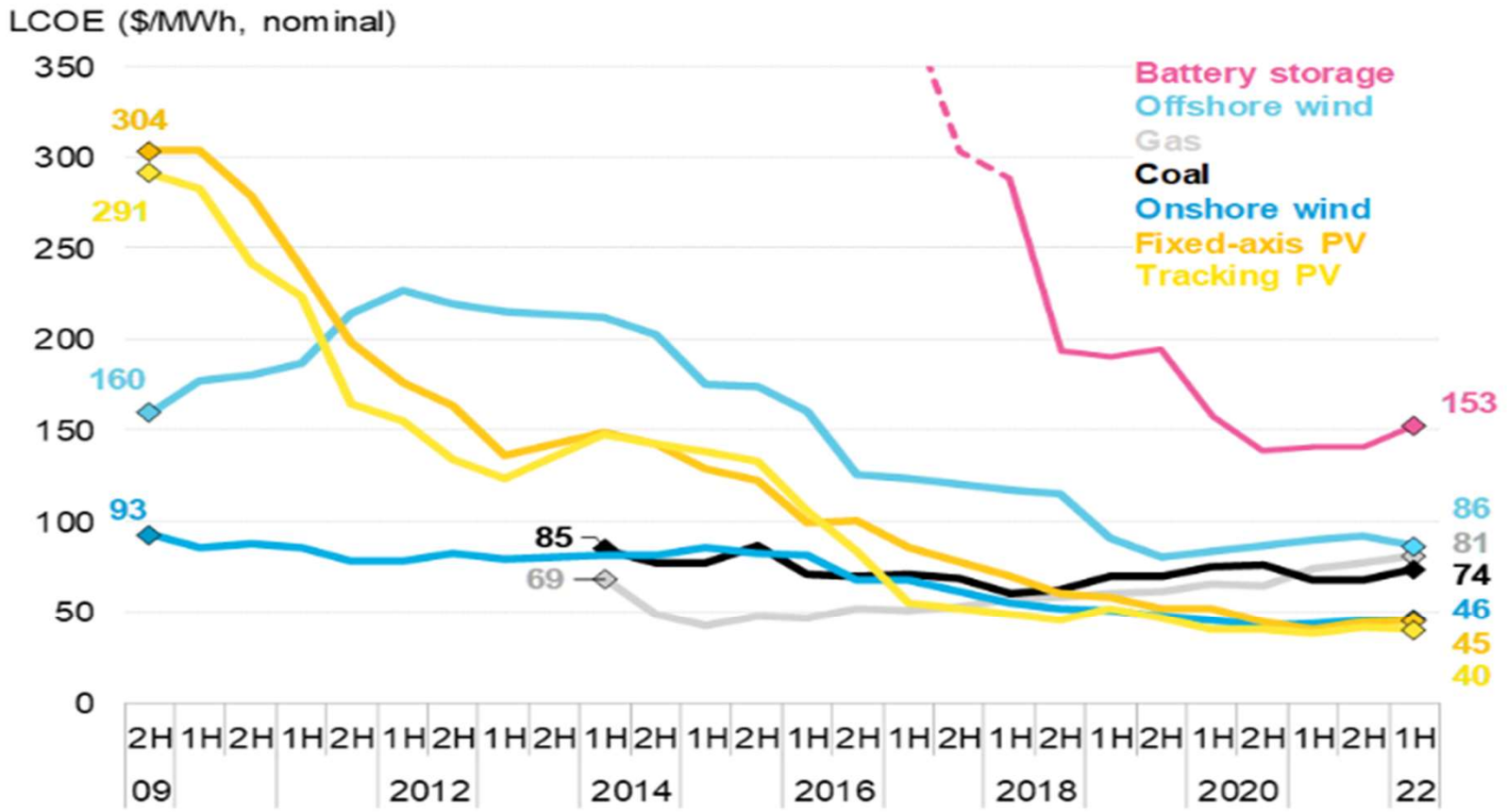


Notes: Investment is measured as ongoing capital spending on power capacity. EMDEs = emerging markets and developing economies, excluding China.

Global downward trends of RE price

Levelized Cost Of Electricity (LCOE) for RE, Cheaper than Coal and Gas

Figure 1: Global levelized cost of electricity benchmarks, 2009-2022

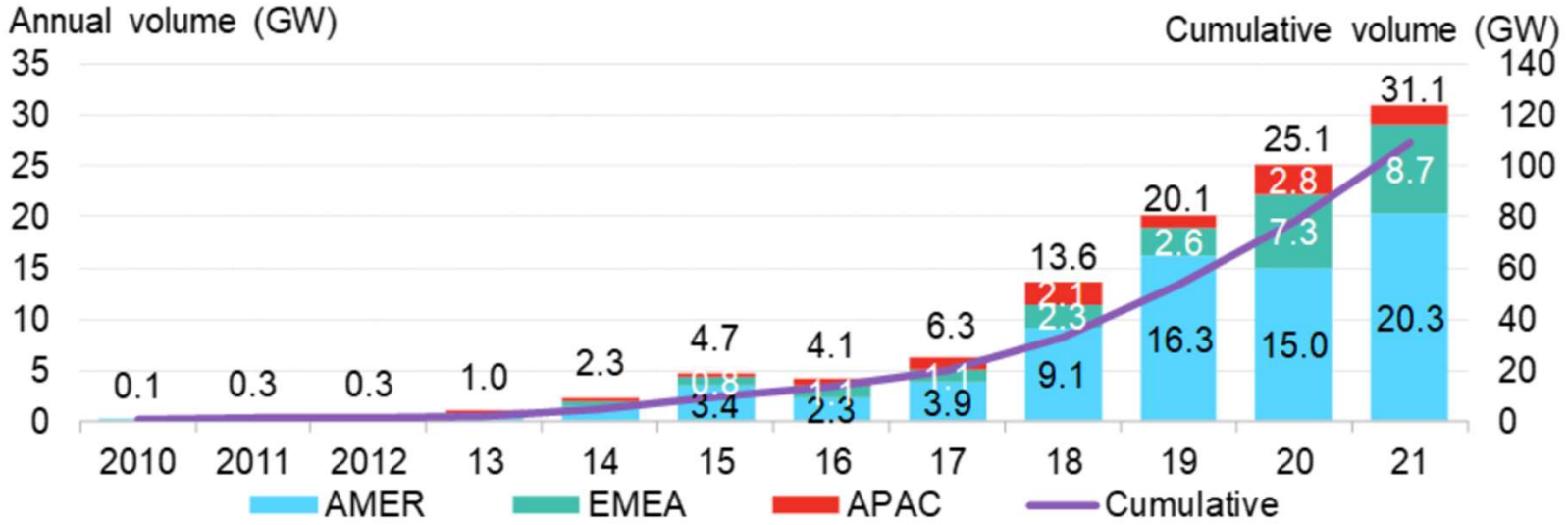


Source: BloombergNEF. Note: The global benchmark for PV, wind and storage is a country-weighted average using the latest annual capacity additions. The storage LCOE is reflective of a utility-scale Li-ion battery storage system with four-hour duration running at a daily cycle and includes charging costs.

Corporate renewable energy procurement trends

Power purchase agreements are accelerating RE capacity

Figure 1: Global corporate PPA volumes, 2010-2021



Source: BloombergNEF. Note: Onsite PPAs excluded. APAC volume is an estimate. Pre-reform PPAs in Mexico and sleeved PPAs in Australia are excluded. Capacity is in MW DC.

- **31.1GW of clean energy purchased through PPAs, however APAC only represents a small portion – common regulatory issues in the region**
- **Top buyers of renewable energy are US tech companies including Amazon, Google, Meta, Microsoft**

Source: BNEF's 1H 2022 Corporate Energy Market Outlook , RE100 2021 Annual Disclosure Report

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New Energy Policy Direction In Korea

Presidential Transition Committee

Feasible and Reasonable Composition of Energy Mix

- Nuclear Energy – Construct Shin Hanul 3&4 plants, life extension of existing plants to reach more than 30% of energy mix by 2030.
- Renewable Energy – Take into factors such as feasibility and public agreement to adjust it to a reasonable level.
- Coal and LNG – Coal reduced to a reasonable level and utilize carbon-free energy.

New Energy Policy Direction In Korea

Presidential Transition Committee

Create Market Based Power Market and Electricity Rate System

- Diversify energy sources, strengthen price signals, strengthen competitive environment and create power market based on competition and fairness principles.

- Expand PPAs, gradually reduce monopolized market structure, and ensure grid neutrality

- Create cost-based electricity rate through Cost plus mark up principle and fuel-cost linked pricing system.

New Energy Policy Direction in Korea

Draft working Basic 10th Electricity Plan

		Nuclear Power	Coal	LNG	Renewables	Non-carbon Power Source	Other	Total
9th	Generation	146.4	175.1	136.6	121.7	-	6.0	585.8
	Proportion (%)	25.0%	29.9%	23.3%	20.8%	-	1.0%	100%
Enhanced NDC (from Moon administration)	Generation	146.4	133.2	119.5	185.2	22.1	6.0	612.4
	Proportion (%)	23.9%	21.8%	19.5%	30.2%	3.6%	1.0%	100%
10th	Generation	201.7	130.3	128.2	132.3	13.9	8.6	615.0
	Proportion (%)	32.8%	21.2%	20.9%	21.5%	2.3%	1.3%	100%

- **The 10th Basic Electricity Plan saw big decrease in the renewable energy target from 30.2% to 21.5%, while Nuclear power saw significant increase from 23.9% to 32.8% and LNG also increased from 19.5% to 20.9%.**

Source: Translated text from the 10th Basic Energy Plan (tentative)

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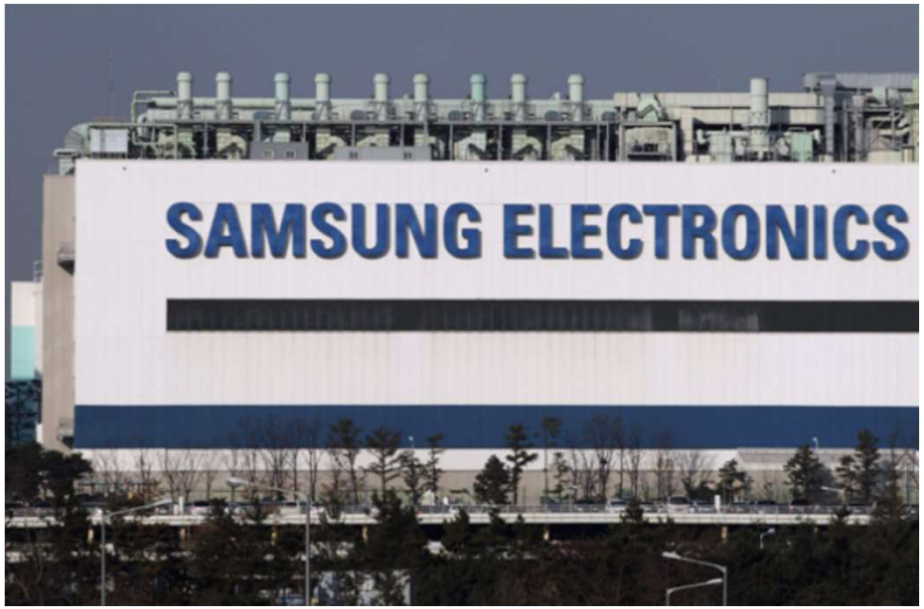
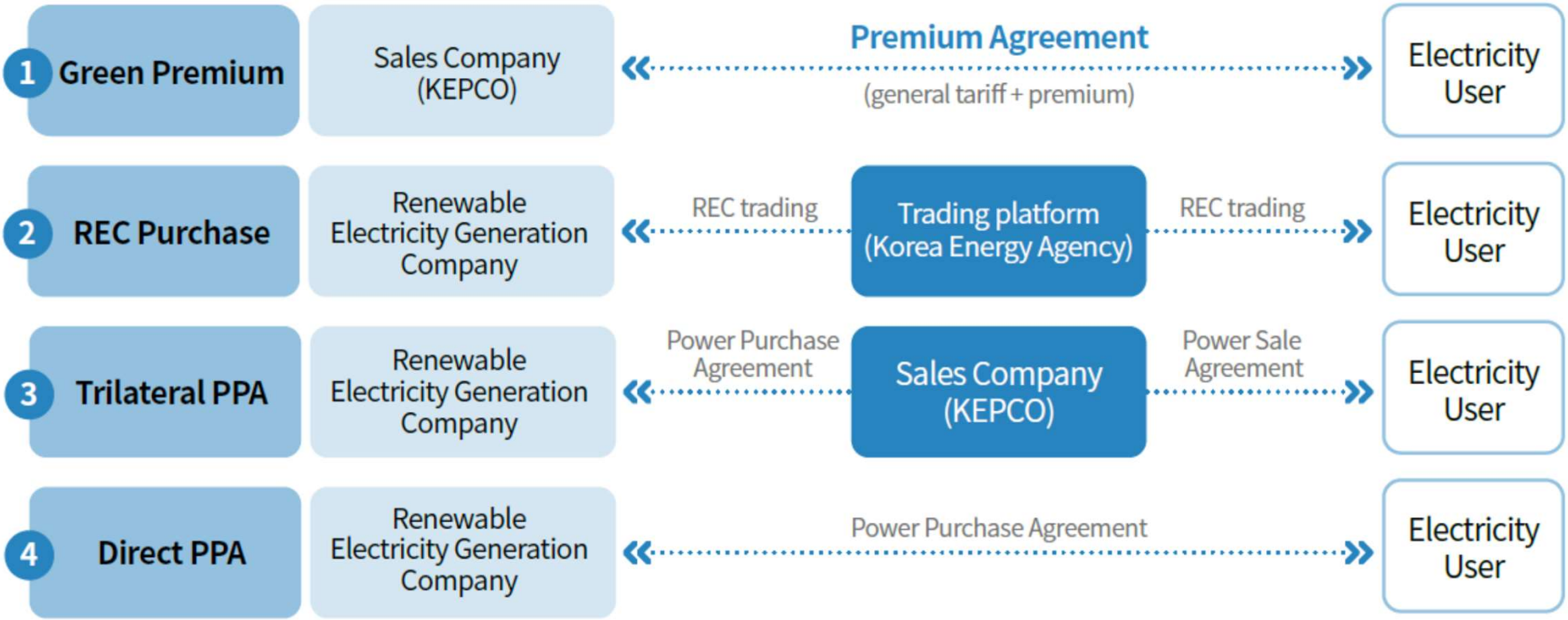
Growing demand side voice for RE in Korea

- Approx 23 companies headquartered in Korea
- 55 with operations and headquartered in Korea
- Electricity consumption in TWh as UK
- Korea identified by members as one of the most challenging markets
- Only 2-3% of total electricity renewable consumption is renwable



Corporate RE Procurement via The K-RE100 scheme



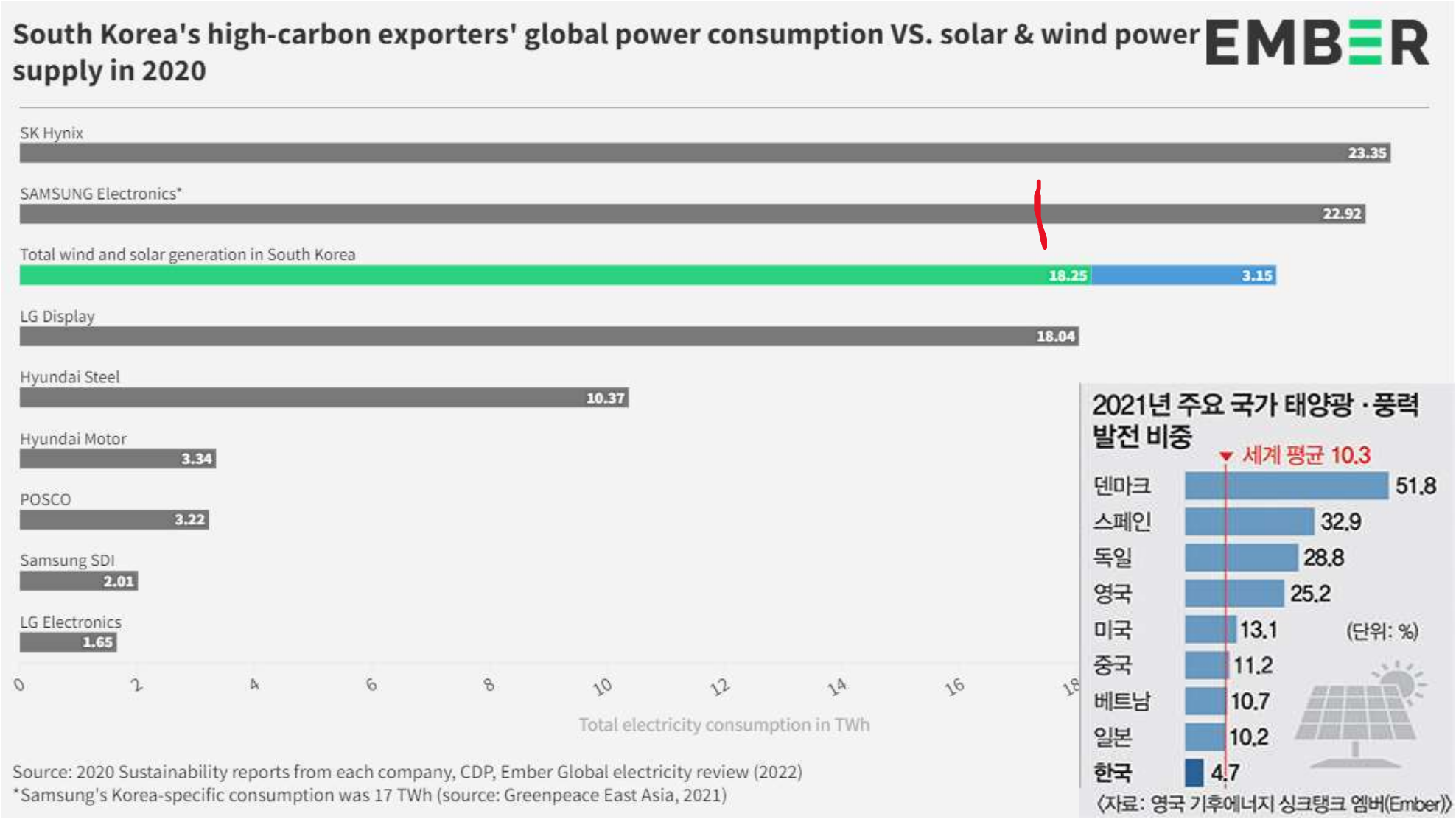
Low uptake via the K-RE100 scheme

Table 1. Status of the K-RE100 scheme

Option	Number of Corporates	Consumption (MWh)	Cost per kWh
Green premium	59	1,440,393 (99%)	Electricity Price + Green Premium Bid Price (Avg. 10.9 KRW/kWh)
REC	20	10,114 (0.7%)	Electricity Price + REC Price (Avg. 47 KRW/kWh)
Trilateral PPAs	0	-	~180-190 KRW/kWh
Direct PPAs	1	-	~180-190 KRW/kWh
Self-generation	10	4,325 (0.3%)	Similar to LCOE (Solar ~146 KRW/kWh, Wind ~170 KRW/kWh)
Sum	84 (Excluding 6 firms who used multiple options)	1,454,832 (100%)	

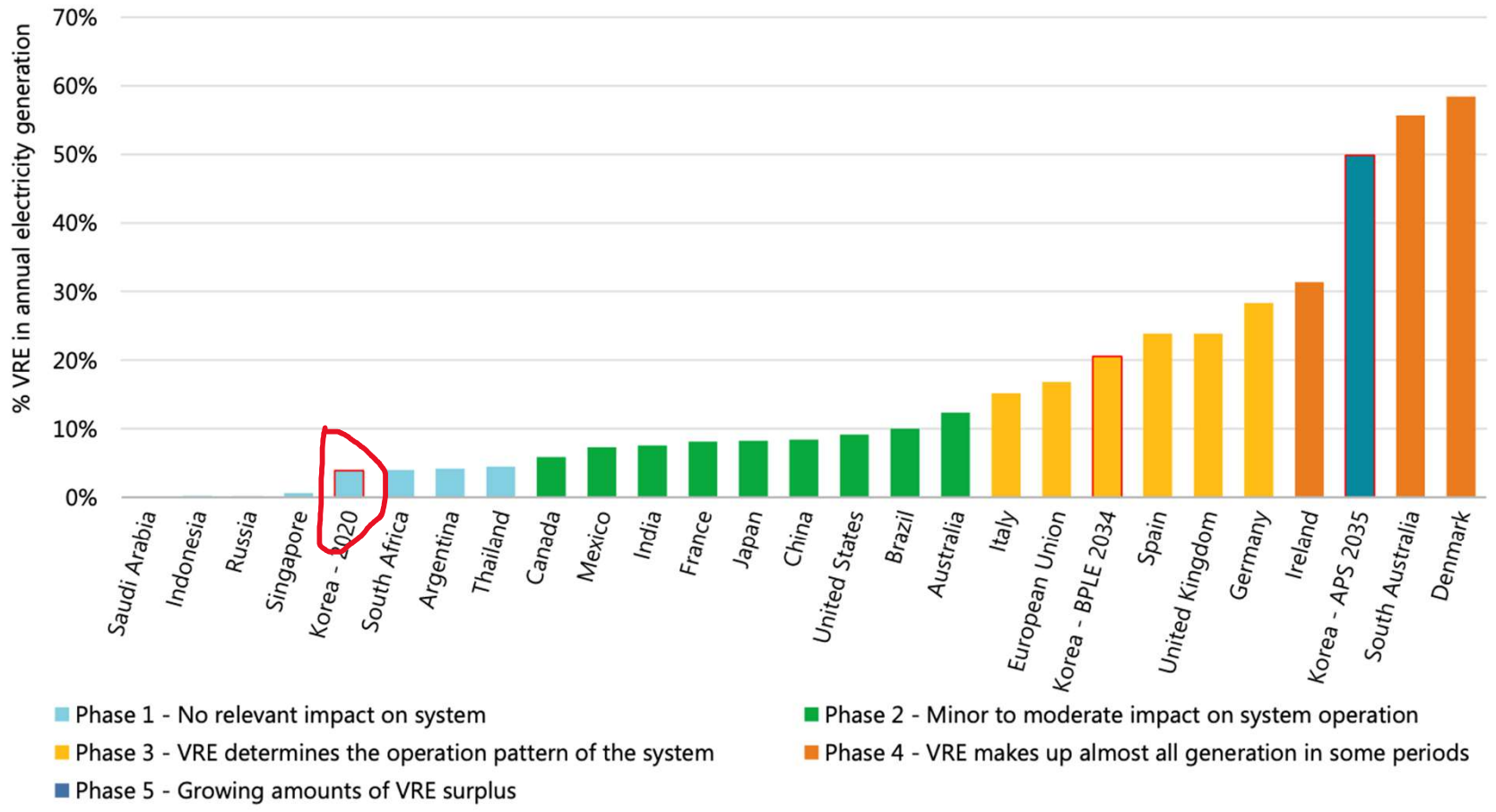
Source : Own analysis based on Korea Energy Agency, April 2022

Low level of RE supply



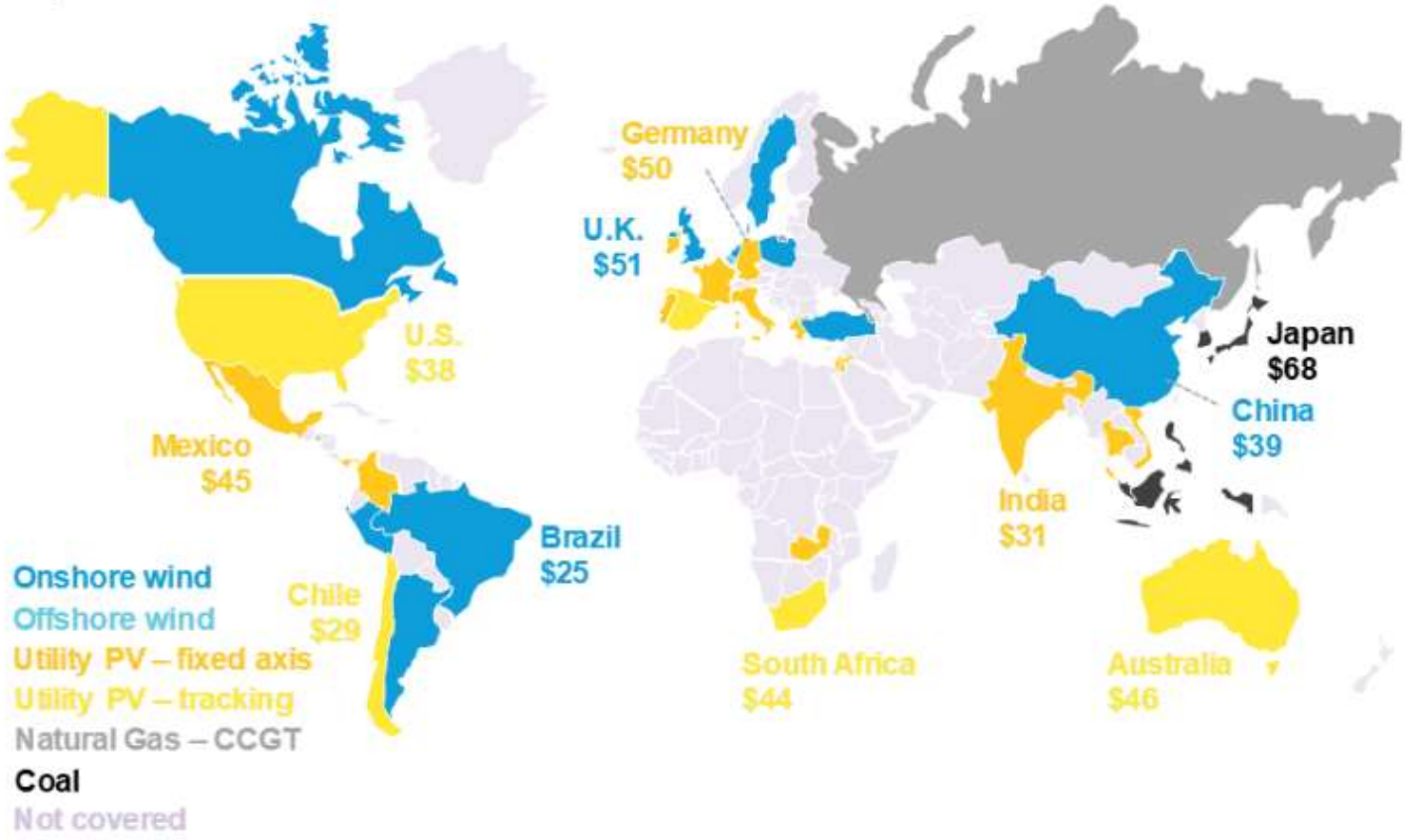
Low level of RE supply

Annual VRE share in selected countries for 2019 and Korea in 2020, and the Basic Plan for Long-Term Electricity 2034 and Announced Pledges 2035 scenarios



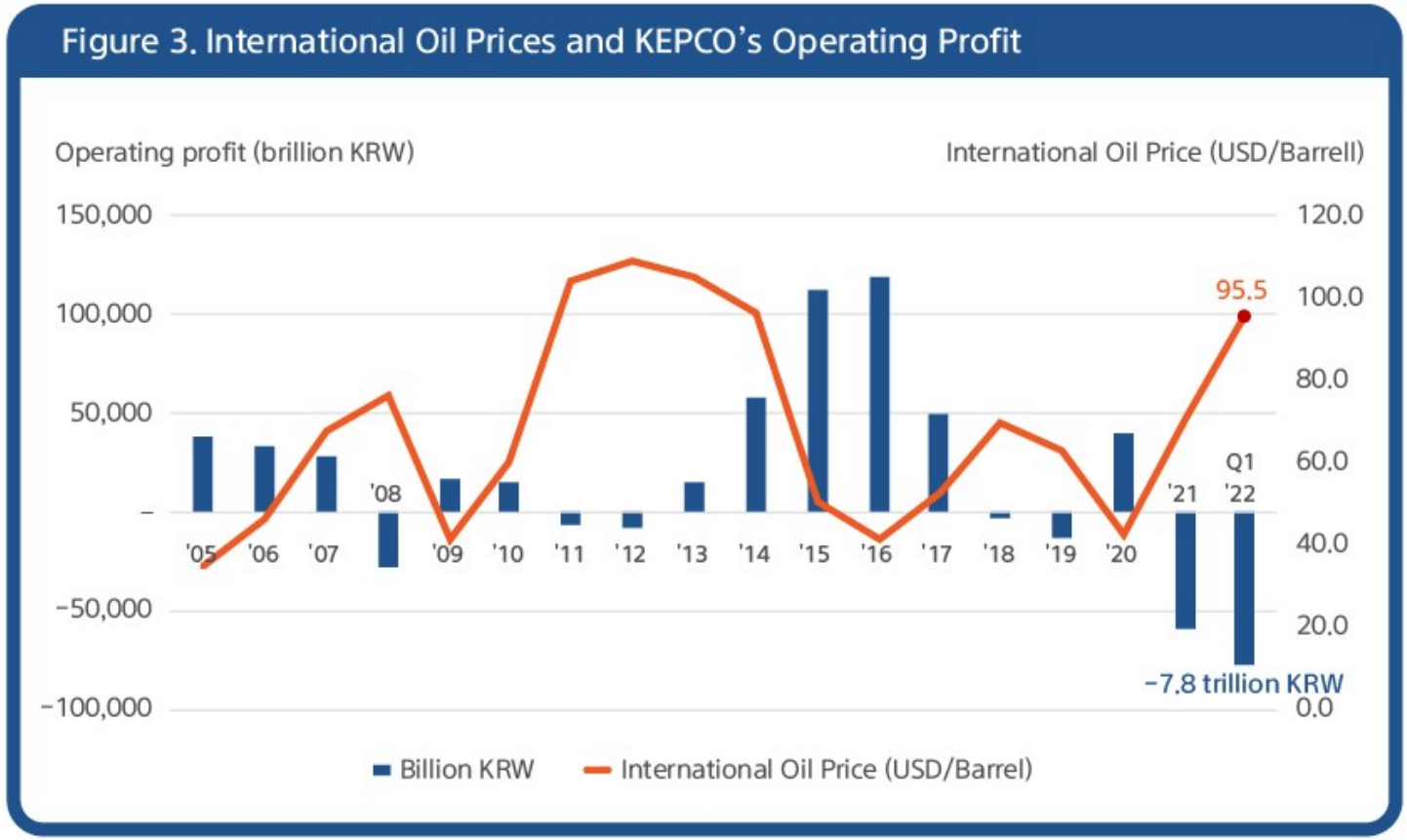
High price of RE in Korea

Figure 2: Markets where new-build solar and/or wind are cheaper than new-build coal- and gas-fired power, 1H 2022



Source: BloombergNEF. Note: The map shows the technology with the lowest LCOE for new-build plants in each country where BNEF has data. The dollar numbers denote the per-MWh benchmark levelized cost of the cheapest technology. All LCOEs are in nominal terms. Calculations exclude subsidies, tax-credit or grid connection costs. CCGT is combined-cycle gas turbine.

Energy Crisis & Impact In Korea – Fossil fuel risk



- **In the Q1 of 2022, KEPCO spent 75% more in electricity generation than Q1 of 2021. More than 90% of the increase was from increase in the cost of coal and LNG.**

Source: Solutions for Our Climate's Fossil Fuels the Main Culprit Behind KEPCO's deficit

High costs of PPAs

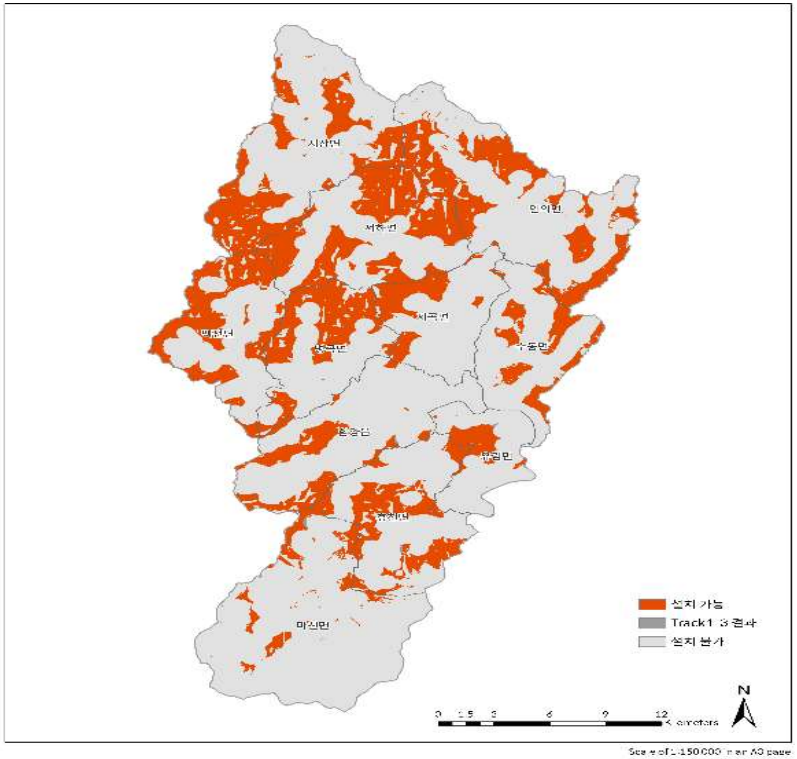
- **Economic issue** - At least 60% higher than industrial retail power prices (~KRW 110/kWh)
- Some items may be considered as costs charged twice
- **Equity issue** – Competition with KEPCO Gencos

Scenario based on network cost		Photovoltaic Power Generation Case 1 (Medium to large)		Photovoltaic Power Generation Case 2 (Small: 500kW or under)		Wind Power Generation Case	
Location	Power generation company	Non-metropolitan area		Non-metropolitan area		Non-metropolitan area	
	Electricity user	Metropolitan area		Metropolitan area		Metropolitan area	
Network access by power generation company		High-voltage distribution network		Low-voltage distribution network		Transmission network	
Network access by electricity user		Distribution network		Distribution network		Distribution network	
Substation		Substation in different area		Substation in different area		Substation in different area	
		Unit cost (KRW/kWh)	**Percentage**	**Unit cost (KRW/kWh)**	**Percentage**	**Unit cost (KRW/kWh)**	**Percentage**
Levelized cost of renewable energy		136	77%	136	72%	170	78%
Total Incidental Expenses		40	23%	53	28%	45	22%
Network cost (base rate)		18	10%	22	12%	13	6%
Network cost (usage rate)		7	4%	15	8%	15	7%
Cost of network loss		3	1%	3	1%	3	1%
Uplift cost		4	2%	4	2%	4	2%
Transaction fee		0	0%	0	0%	0	0%
Welfare/special discount		3	2%	3	2%	3	1%
Electric Power Industry Base Fund		6	4%	7	4%	7	4%
Total		**176**	**100%**	**189**	**100%**	**215**	**100%**

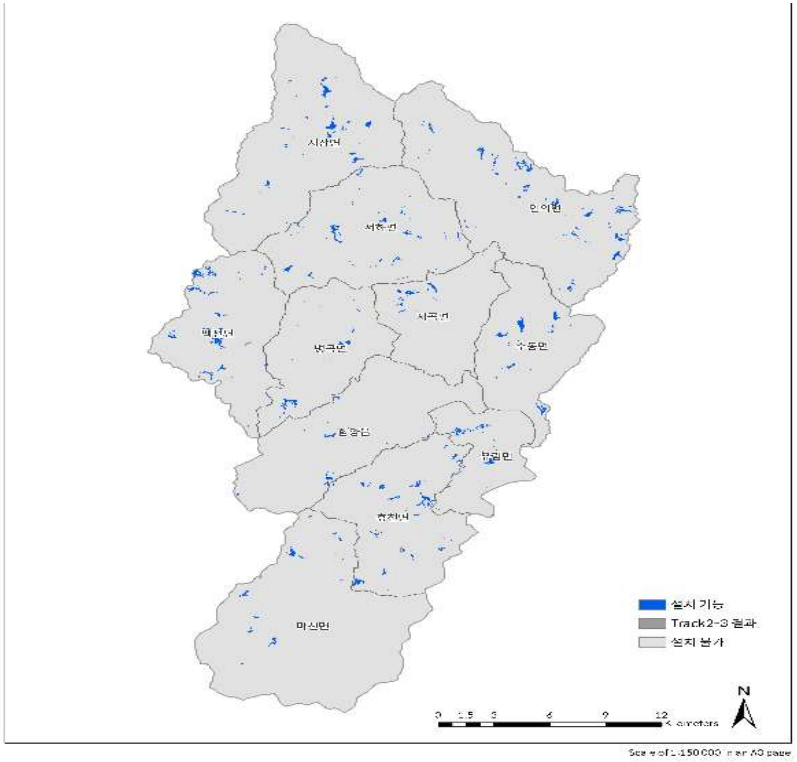
Source: SFOC, 2021

RE siting & Permitting procedures

areas restricted by mainly subnational regulations 27%

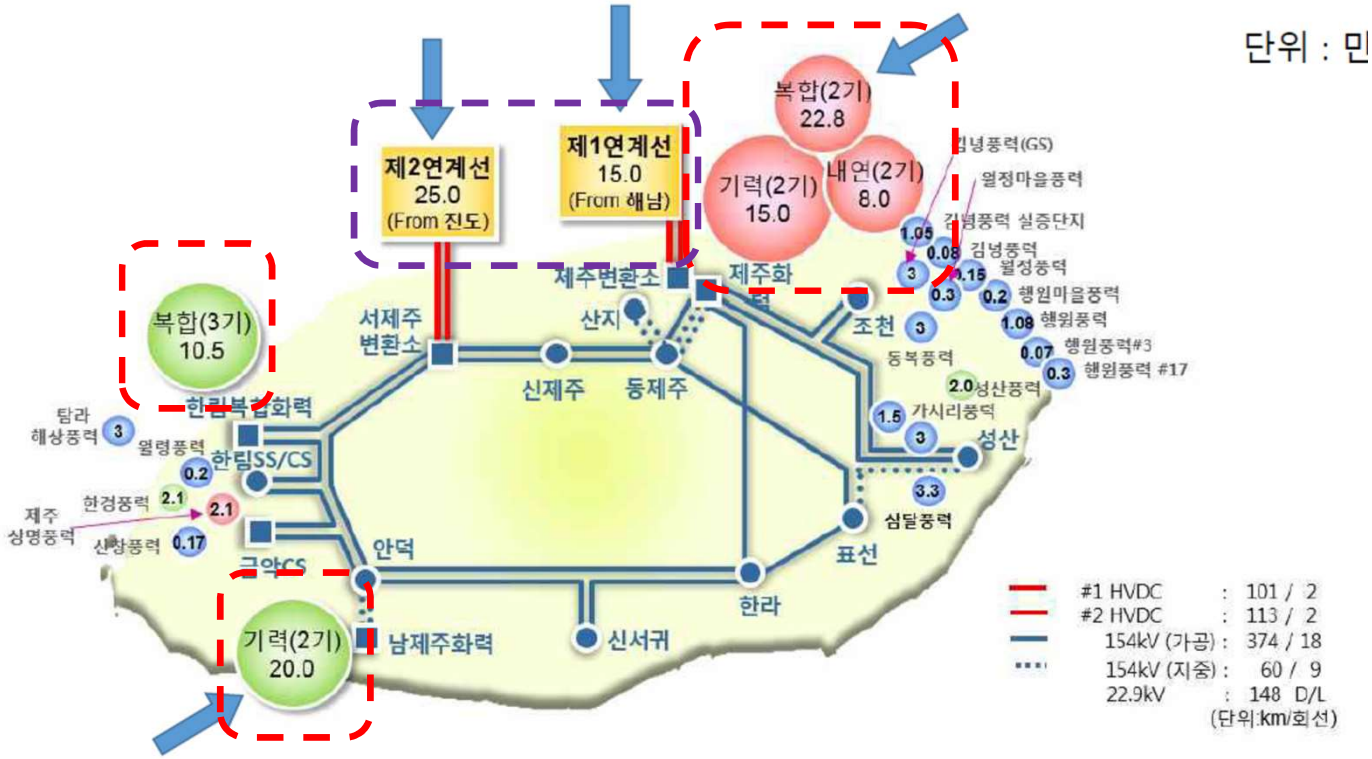


areas restricted by national, subnational and foresty regulations 0.6%



RE curtailment/grid access issues: Jeju case study

Interconnections from mainland Korea originally intended to import (not export leftover renewable) electricity



단위 : 민

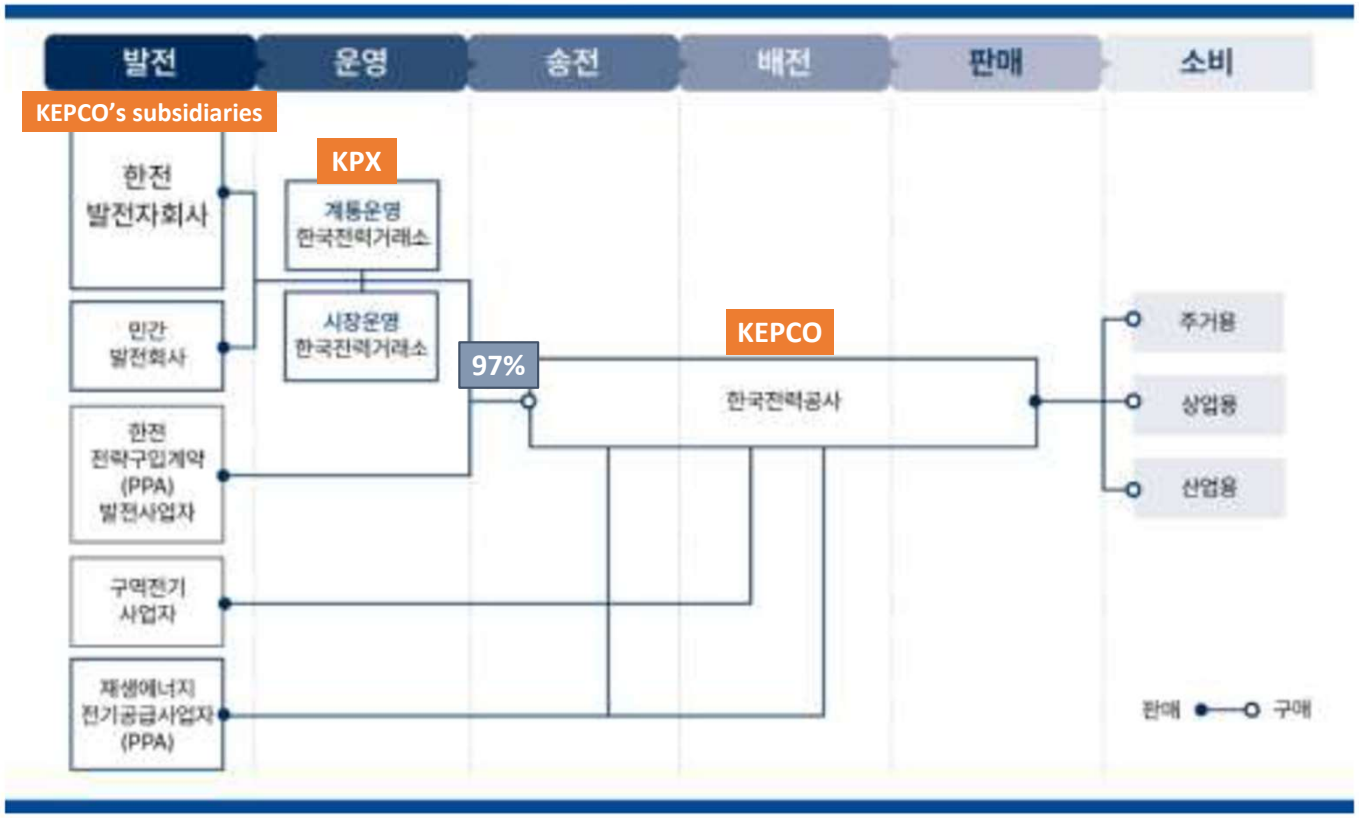
- Approx. **900 MW** of gas / diesel power plants - most recently retrofitted + all 100% owned by KEPCO
- Approx. **800 MW** of wind + solar plants – owned by private companies
- **600 MW** average load - theoretically possible to be 100% renewables at certain times

Large scale gas / diesel plants

Wind + solar plants scattered throughout province

Power Market structure

70% of total national electricity generation is KEPCO subsidaries



[그림 8] 한국전력산업 구조

출처: 기후솔루션, 재생에너지 유통망의 개선방안, p7 자료 재구성

Way forward

How the new administration can respond to rising demand side voices for RE

- Increase the accessibility, additionality, cost effectiveness, fairness and transparency of the Korean power market;
    - Set net zero compatible renewable energy targets
    - Remove unreasonably high, duplicative, and unfair network costs or contract terms from renewable PPA schemes
    - Reflect the true price of RE in the market to capture the benefits of economies of scale for all consumers
    - Streamline RE siting and permitting regulations and procedures
    - Ensure independent system operation & strengthen the sustainability mandate
    - Ensure fair compensation and grid access for RE generators
    - Invest in flexibility resources to ensure renewables can be integrated