

RENEWABLE ENERGY MARKETS ASIA 2023 PANEL DISCUSSION

MARKET SPOTLIGHT: SOUTH KOREA



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Friday, 28 April 2:30-3:00 PM



Renewable Energy
Markets™ Asia 2023

Find the Next

Overview on Renewable Energy Market in Korea

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RESEARCH INTERESTS

- Energy Policy Design for Sustainable Future (Energy Transition Strategy)
- Electricity Market Design & Analysis
- Utility Regulation and Network Economics

EXPERIENCE

2020 - PRESENT	NEXT Group	<i>Chief Executive Officer</i>	Korea
2018 – PRESENT	Dept. of Electrical Engineering, Chungnam National University	<i>Associate Professor (tenure-track)</i>	Korea
2020 - PRESENT	Presidential Carbon Neutrality Committee	<i>Member</i>	Korea
2020 – 2022	Korea Energy Agency (government agency)	<i>Non-executive Director (board member)</i>	Korea
2020 - 2022	Hydrogen Economy Council (under the prime minister's office)	<i>Member</i>	Korea
2019 - 2022	National Council on Climate and Air Quality (the presidential advisory body)	<i>Member of Expert Committee</i>	Korea

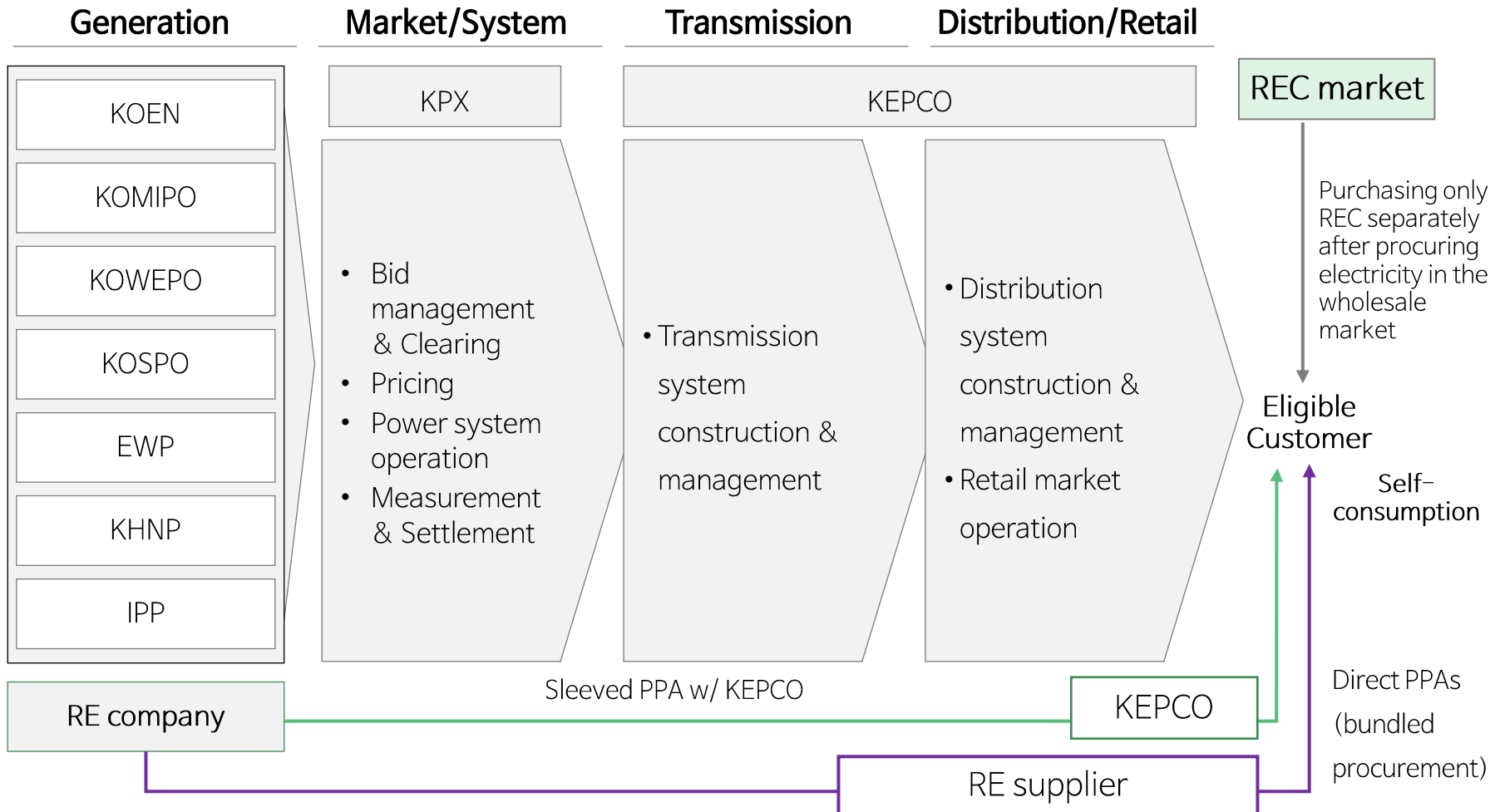
EDUCATION

FEB 2018	Seoul National University	<i>Ph.D. in Electrical Engineering</i>	Seoul, Korea
FEB 2012	Seoul National University	<i>B.S. in Electrical Engineering</i>	Seoul, Korea

Overview on Market Structure & Mechanism

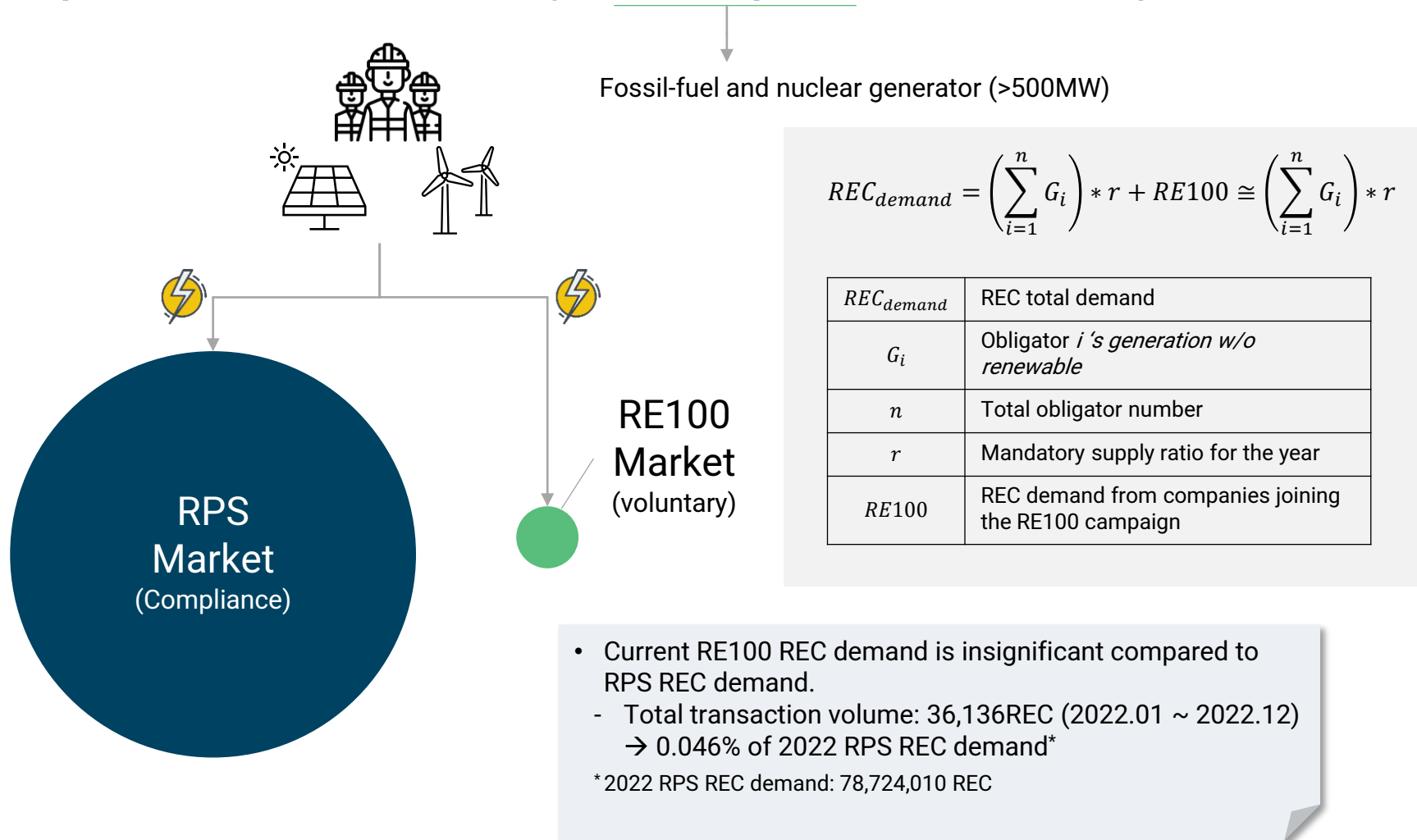
Structure of Korean Electricity market

The Korean electricity market consists of competitive generation companies and KEPCO which has transmission, distribution, and retail department as a monopoly.



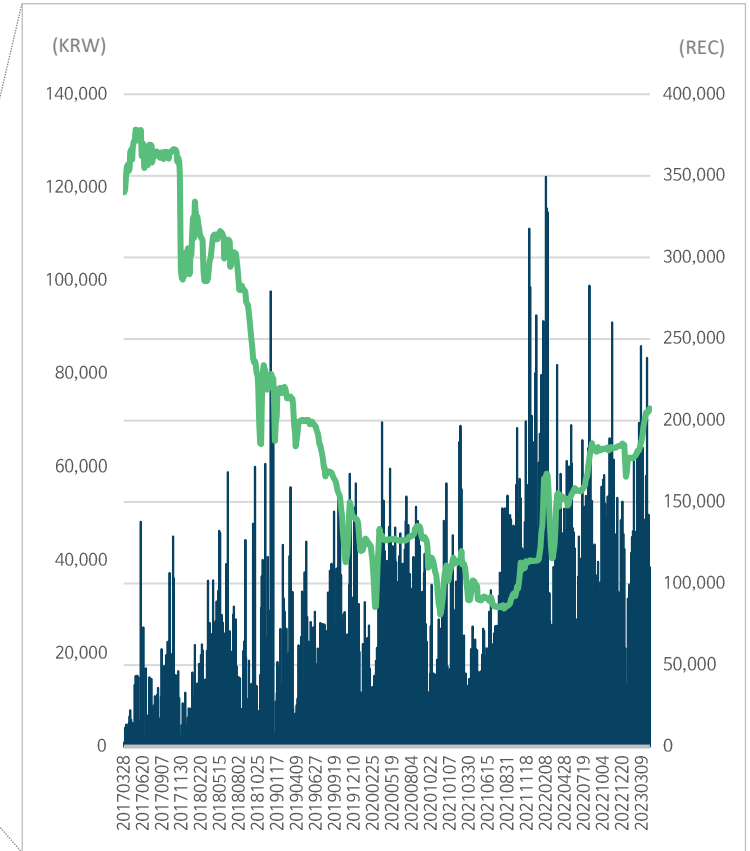
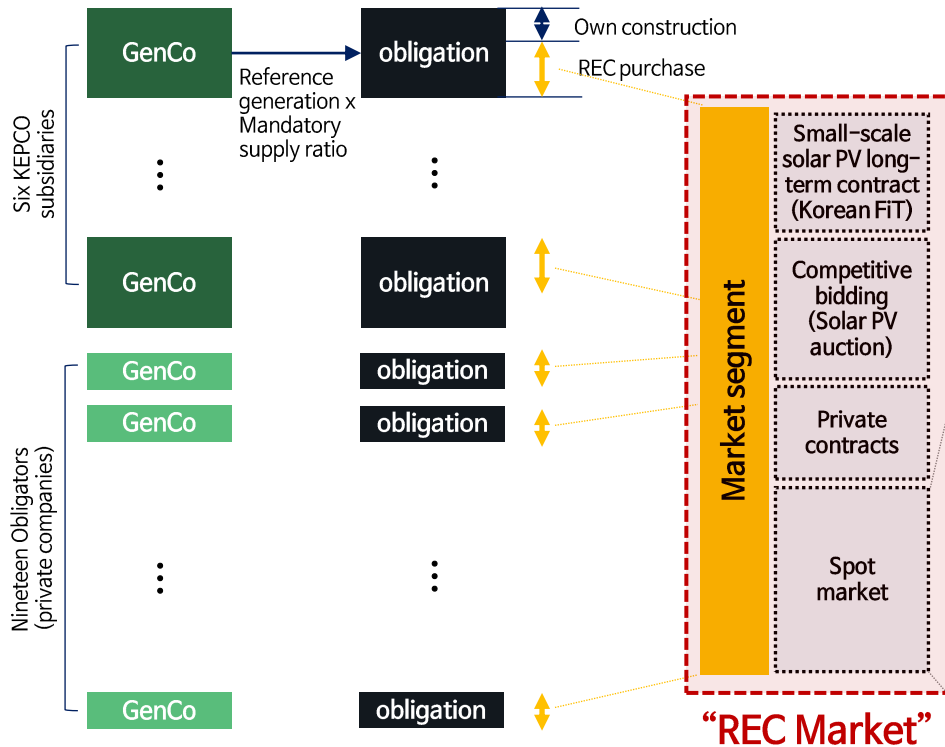
Korean Renewable Energy Market

RE generators can sell RE electricity to RPS obligators and/or RE100 corporates.



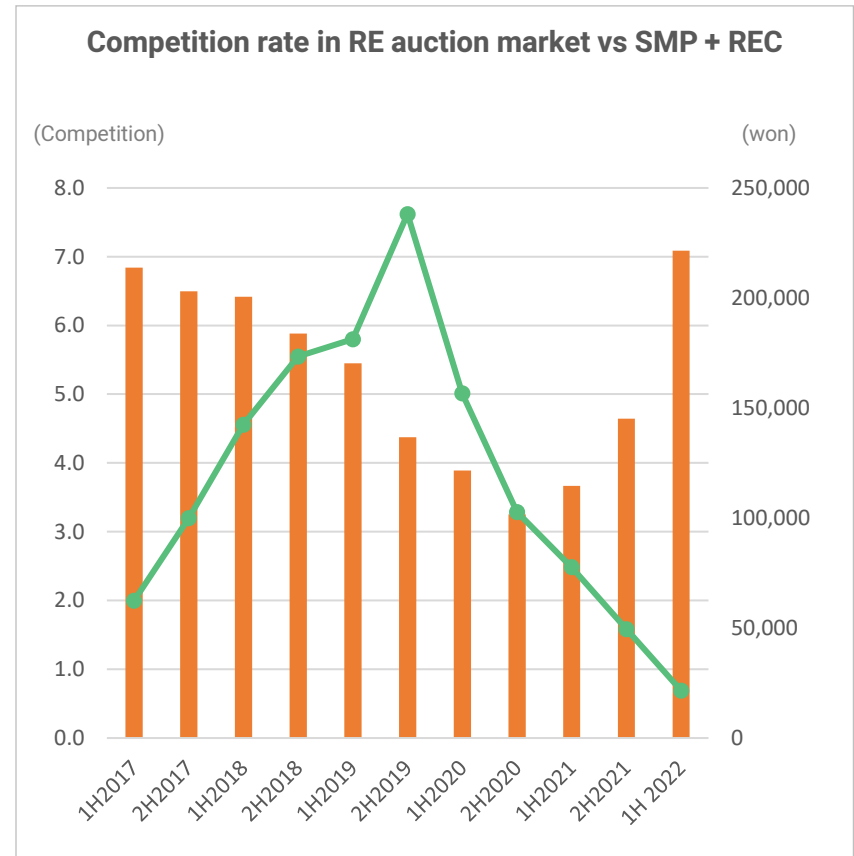
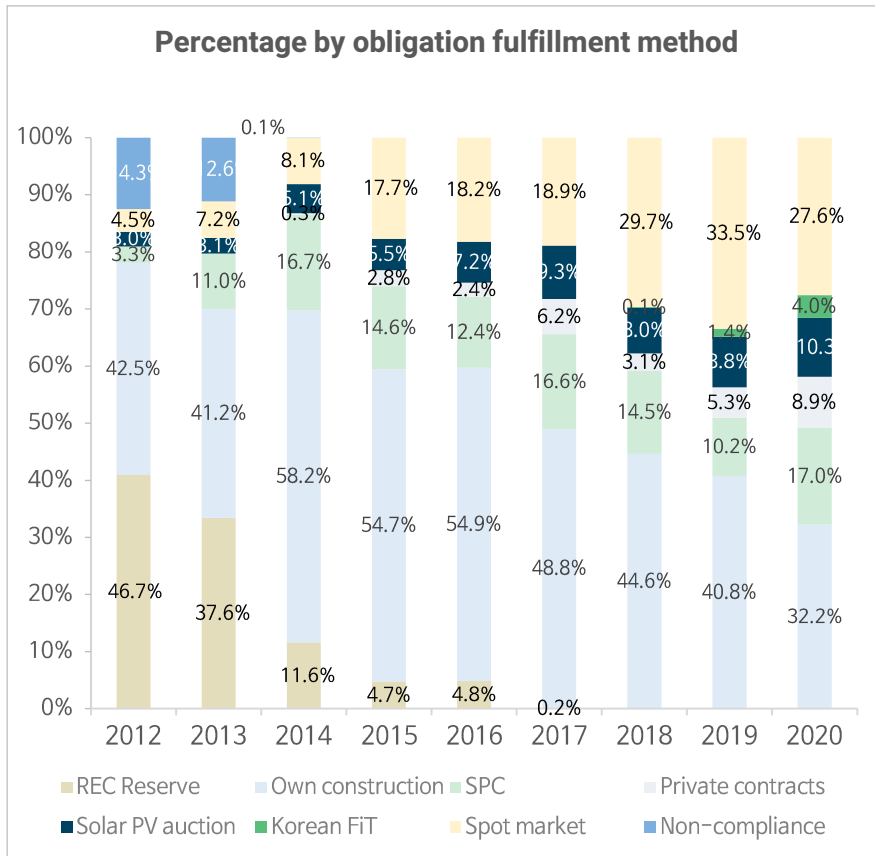
Current RPS mechanism in Korea

The government induces renewable generators from REC spot market to long-term fixed price tender auction to protect them from high price volatility in the spot market.



Current RPS mechanism in Korea

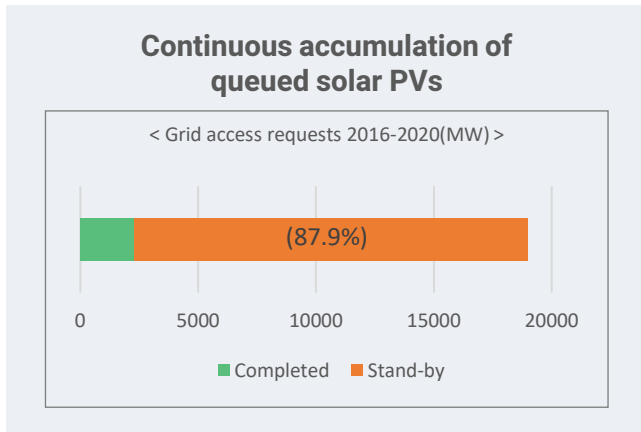
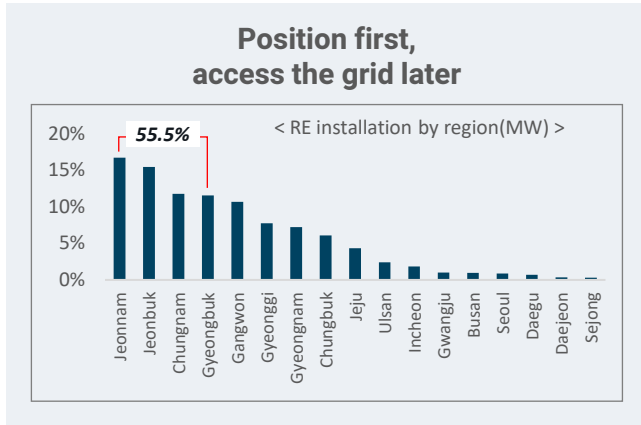
Currently, RE generators prefer spot market transaction because of its recent high price, rather than RE tender auction (fixed price) or direct PPA with RE100 corporates.



Challenges in Energy Transition to Renewable Energy

Challenges in the grid integration of RE

Regional imbalances in solar PV have been exacerbated by the government's guarantee of grid access to small-scale solar PV, putting pressure on grid operations.



Acceptance rate (%)
= (acceptale capacity/ratedd capacity) X 100(%)

80~100%
60~80%
40~60%
20~40%
20~0%
0%

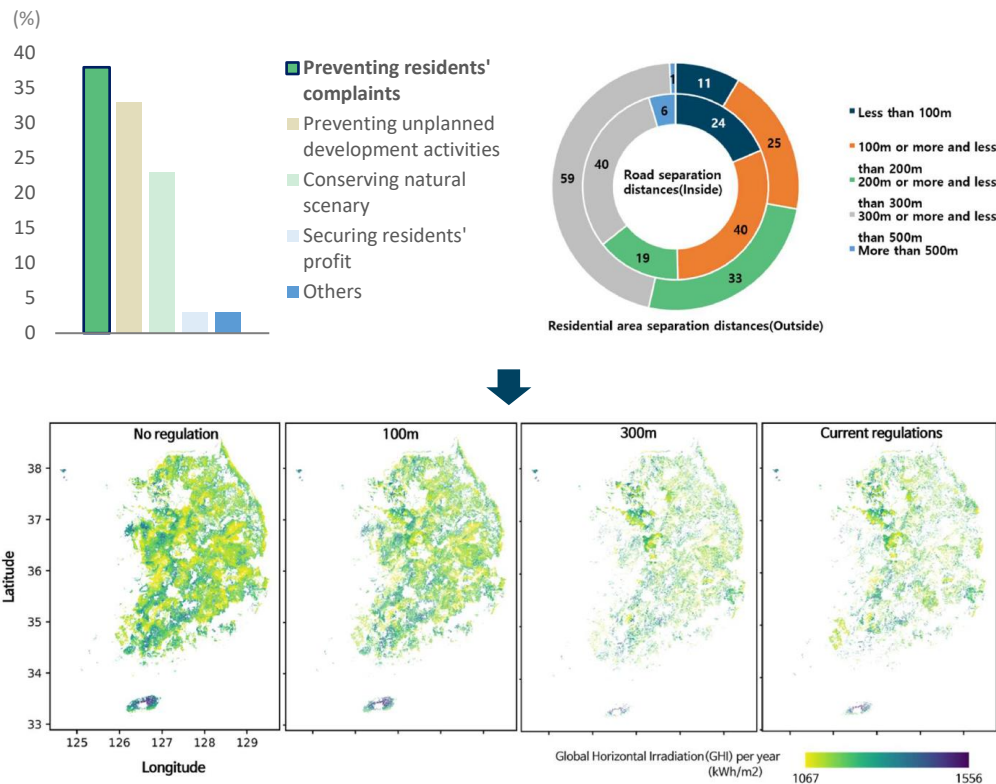
On-going change in RE policies

- End of the grid access guarantee scheme for small-scale solar PV
- Implementation of the Planned RE Zone

Challenges in the permitting process of RE

① High local concerns regarding RE generation facilities / ② lack of the integrated licensing laws and body for permitting process are the key hurdles for RE deployment.

Under-utilization of solar PV potential by over-regulation due to high local concerns



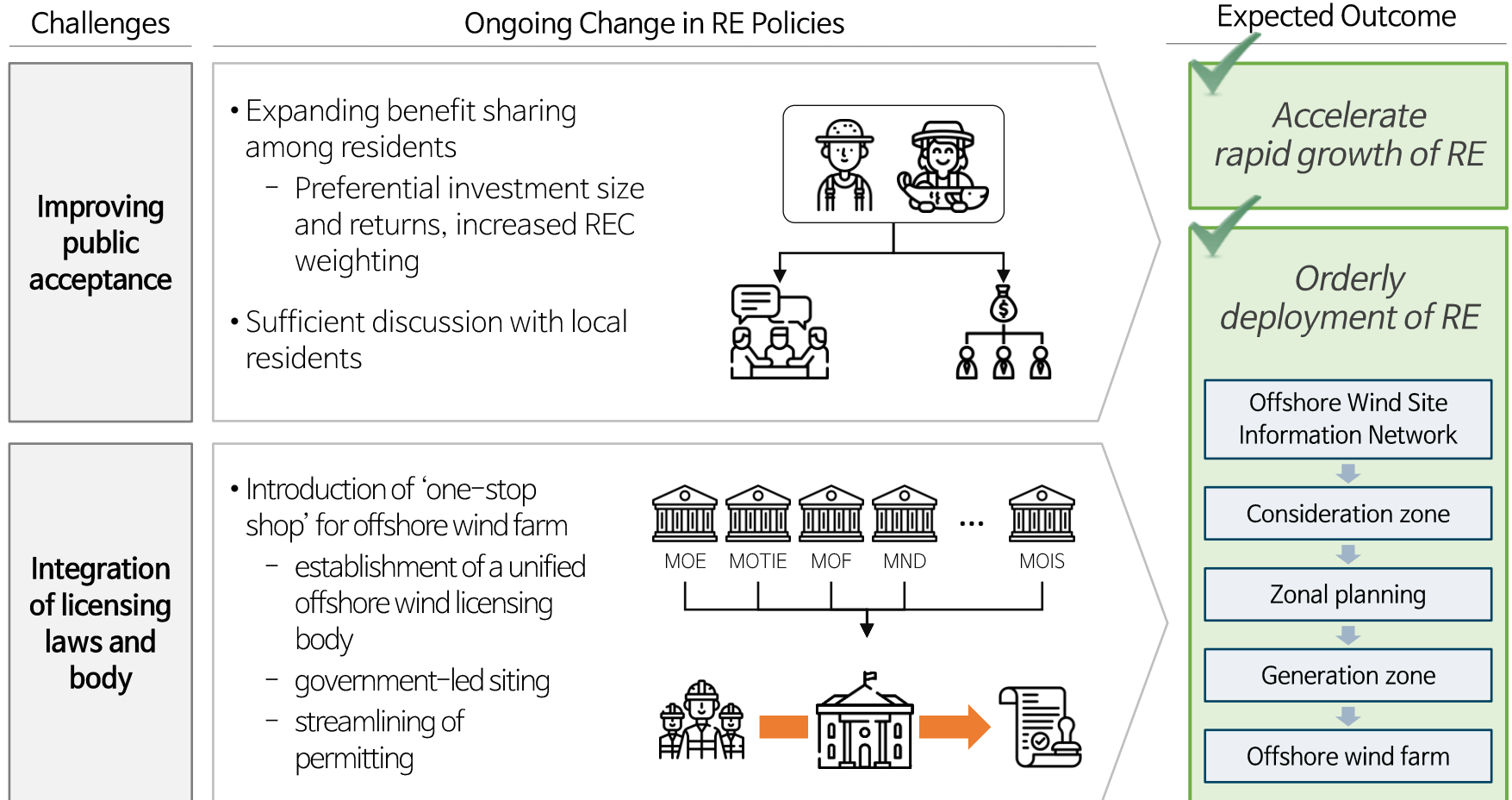
Dozens of required permits and dispersed authorities

Permission	Legal Ground	Relevant Agencies
Permit for electricity generation business	Electric Utility Act	MOTIE
Maritime traffic safety examination	Maritime Safety Act	MOF
Consultation on the results of ground surface inspection for cultural heritage	Act on Protection and Inspection of Buried Cultural Heritage	Cultural Heritage Administration
Environmental impact assessment	Environmental Impact Assessment Act	MOE
Disaster impact assessment	Countermeasures against Natural Disasters Act	MOIS
...

(The above items are not exhaustive.)

Challenges in the permitting process of RE

Improving public acceptance and the integrated licensing laws and body will help shorten the RE permitting time and avoid delays.



Retreated National RE Target in the pro-nuke New Government (2021 ~)

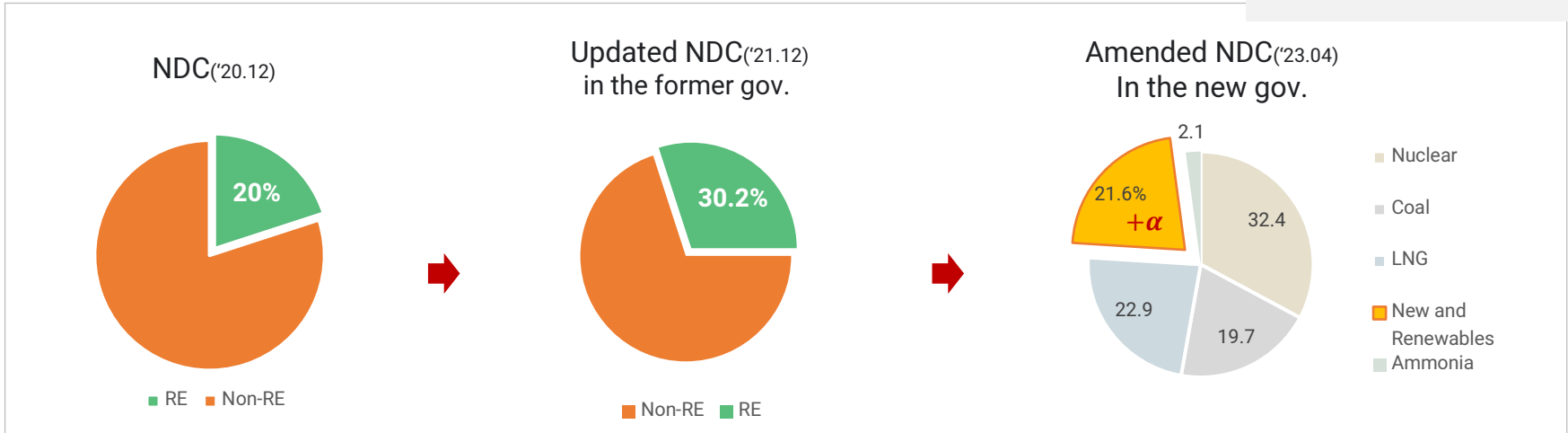
Amended RE Target in the national climate policy of Korea

What does “ $+\alpha$ ” mean?

Rooftop Solar on

- Industrial complex
- Residential Buildings

RE goal has decreased compared to the 2030 NDC of the former gov.



Note) This number is calculated in terms of generation(TWh)

Balanced Supply of RE Sources



87 : 13 ('21) → 60 : 40 ('30)

Note) This number is calculated in terms of generation(TWh)

PV



- Change the tender auction scheme
- Separate league by capacity → Unified league

WIND



- Introduction of tender auction

- Promotion of balanced supply of RE Sources by re-adjusting subsidy rates

Potential of Renewable Energy Market in Korea

Renewable Energy Potential in Korea: It's enough, regulation is matter

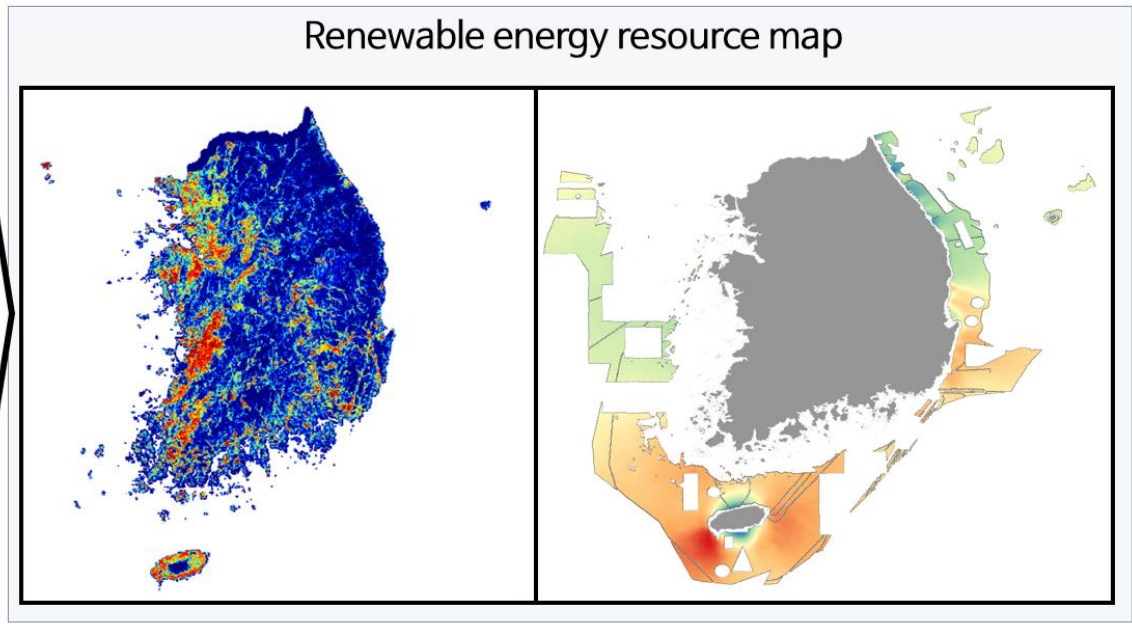
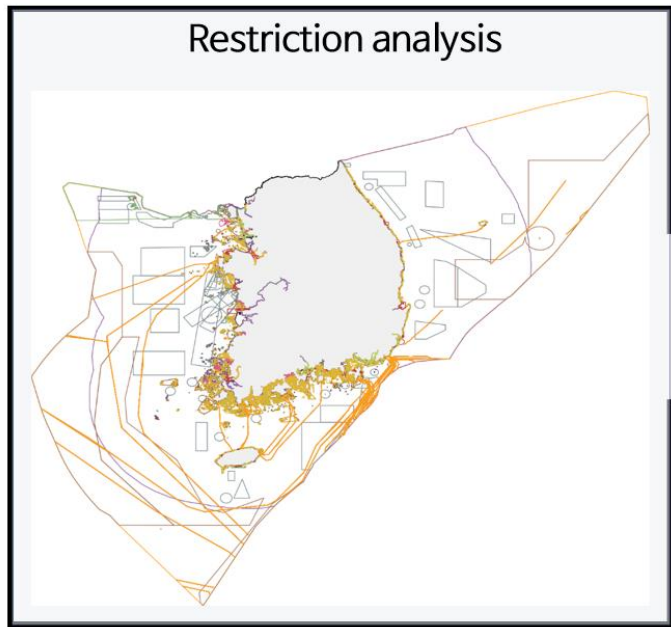
Misbelief

South Korea does not have enough capacity for renewable energy sources.



Data say

Korea has sufficient RE potential to achieve a net-zero transition by 2050. (Especially, technical potential of floating wind is 390GW)

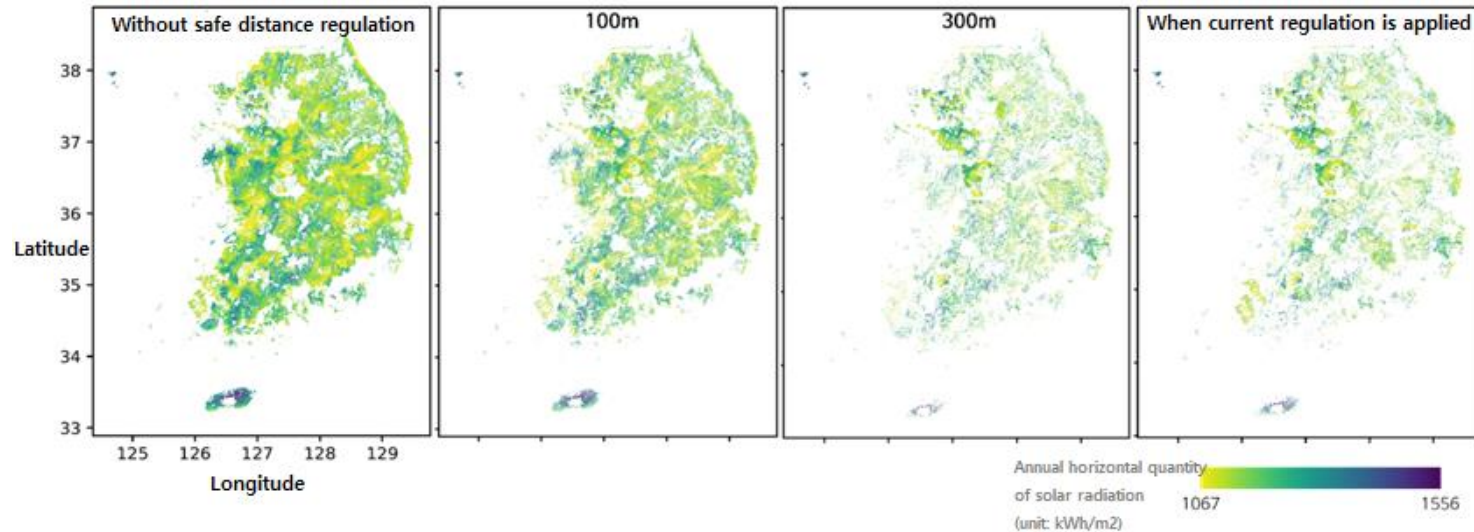


Source : NEXT Group (2021)

Renewable Energy Potential in Korea: It's enough, regulation is matter

Too much regulation exists hindering the full usage of renewable potentials

- NEXT Group's study found only 22.7% of the landmass is being used for PV by the regulation



<South Korea PV potentials for each separation distance>

Road(m) \ Residential(m)	0	100	300	Current regulation
0	2,507 (100%)	2,036 (81%)	1,243 (50%)	1,089 (43%)
100	1,391 (55%)	1,364 (54%)	990 (40%)	848 (34%)
300	639 (25%)	638 (25%)	625 (25%)	549 (22%)
Current regulation	670 (27%)	663 (26%)	578 (23%)	566 (23%)

Find the Next

THANK YOU

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Renewable Energy Procurement in South Korea

Korea Sustainability Investing Forum
Seung Youn SEO, Researcher



About KoSIF

▼ Non-profit founded in 2007 with the mission of promoting sustainable finance in Korea

*Socially Responsible
Investment*

*Corporate Social
Responsibility*

Climate Change

Our Work

- Legislative Support on [National Pension Act, Procurement Act, Industrial Development Act, Capital Markets Act, National Finance Act, Korea Investment Corporation Act]
- Revised Bill for RE100-related Renewable Energy Act, Electricity Enterprises Act & Support for the Ministry of Industry for Green Premium (2018~)

▼ Partner to



Local Campaign Partner



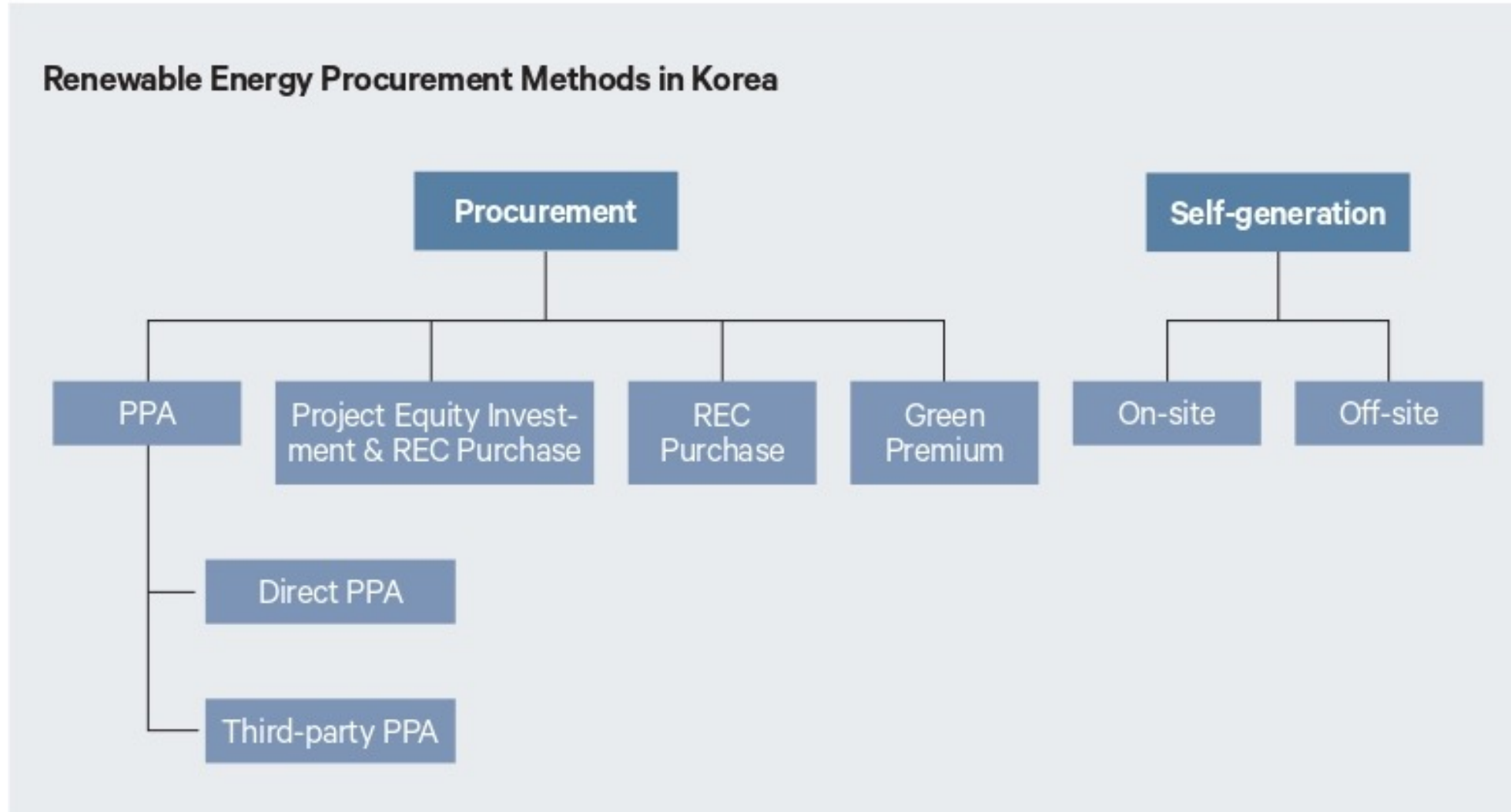
▼ Launched



Contents

1. **RE environment and procurement methods in Korea**
2. Challenges to RE Procurement in Korea
3. Next steps to accelerate the energy transition

RE Procurement Methods in Korea



RE Procurement Methods in Korea

Green Premium (Green Electricity Product)

- KEPCO sells RE (from RPS, FIT) for an additional “premium” (existing electricity rate + Green Premium)
- Auction held around 3 times a year
- Green Premium Proceeds reinvested for RE expansion (KEA)
- Not accredited for GHG emissions reduction under K-ETS

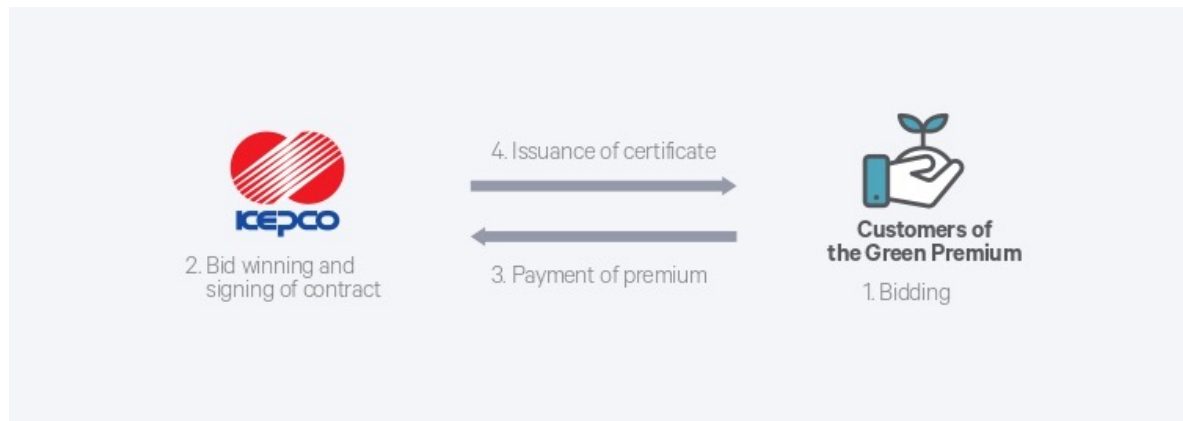
Direct PPA

- RE generator ↔ Corporate (Consumer)
- Contract for grid usage is needed (KEPCO ↔ Corporate)

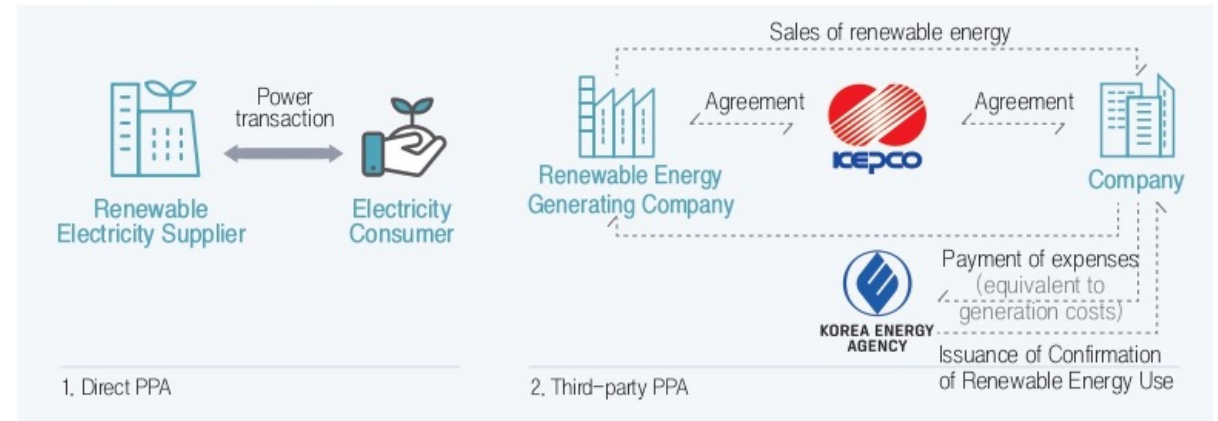
Third-Party PPA

- RE generator ↔ KEPCO ↔ Corporate
- 2 contracts are needed

Procurement Procedures for the Green Premium



Procedures for PPA Procurement



RE Procurement Methods in Korea

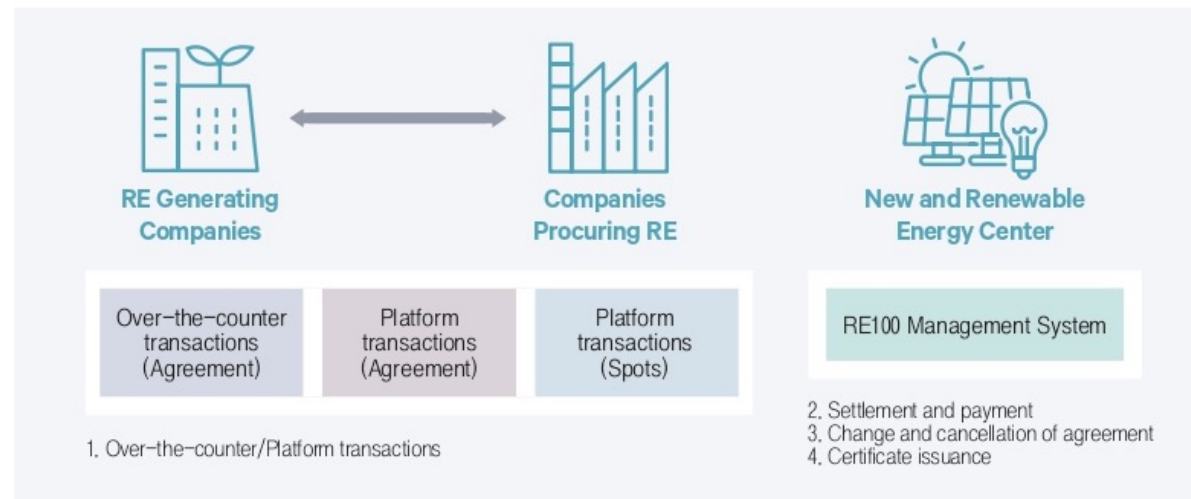
▼ REC Purchase

- Consumers purchase RECs that has not been used for RPS
- **Over-the-counter/platform transactions**

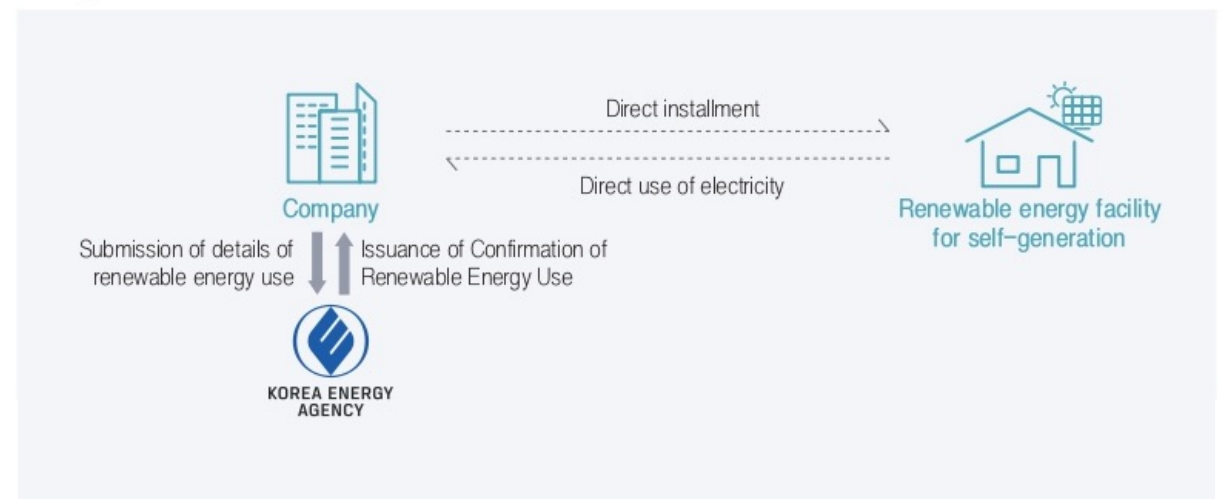
▼ Self-generation

- Companies generating and using RE from **self-owned** generation facilities
- ▼ **Project Equity Investment**
 - Consumers invest in RE projects
 - **Separate contract** for PPAs or REC purchases

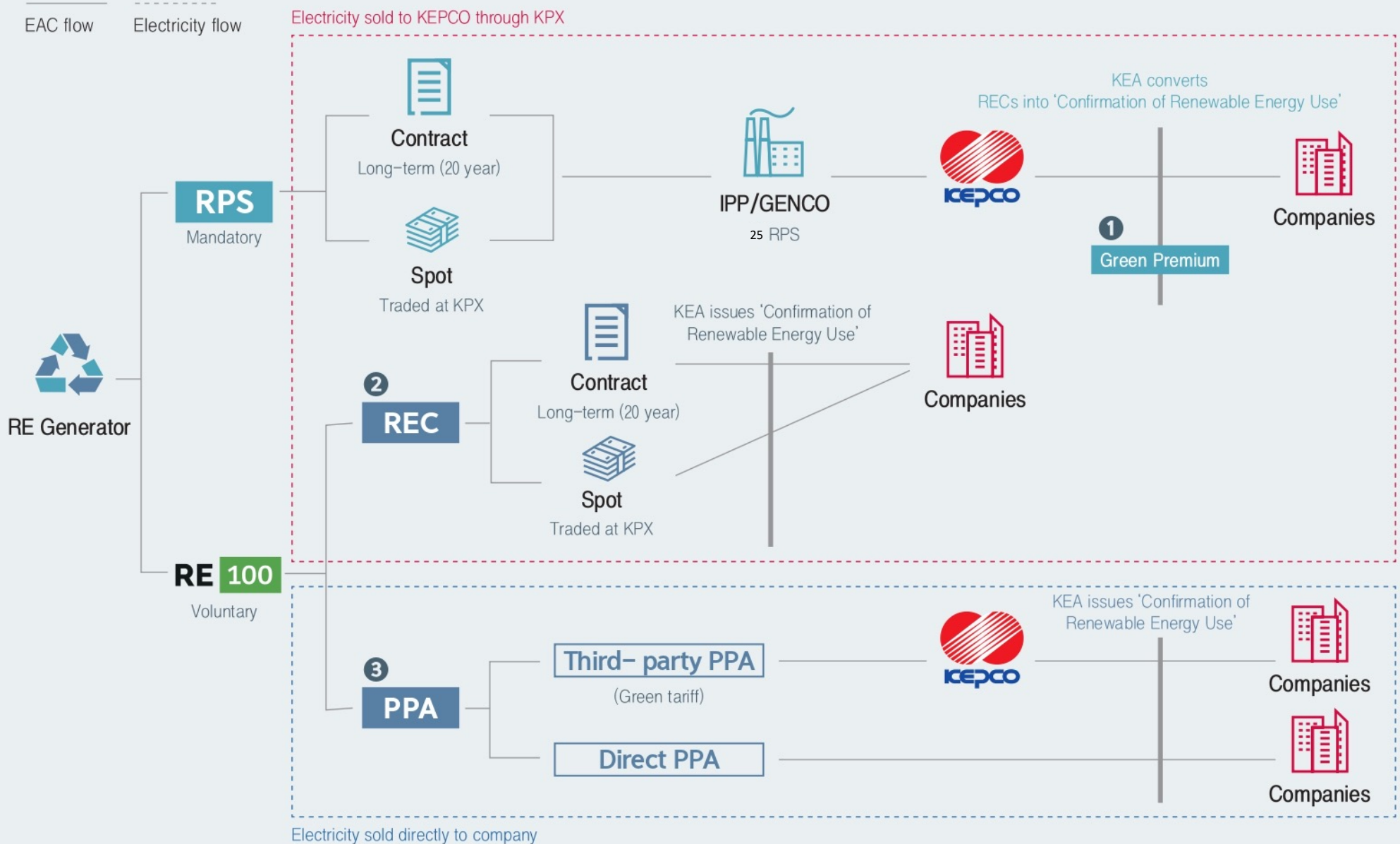
REC Purchase Procedures



Self-generation



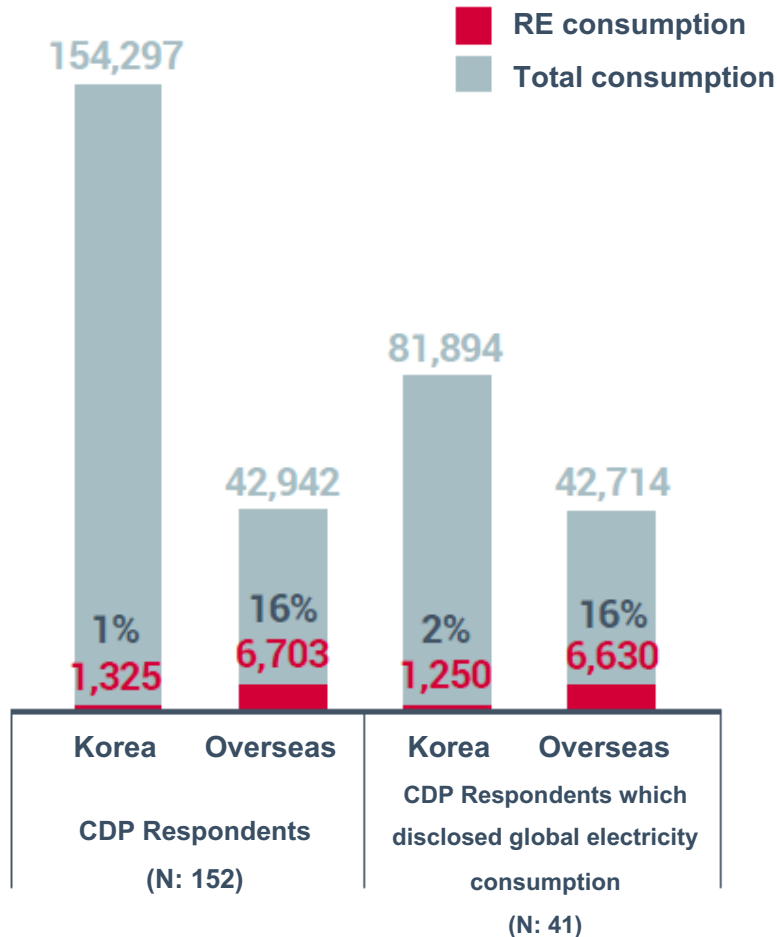
Korean RE Procurement Scheme



Corporate RE Procurement in Korea

Electricity consumption of Korean companies by region

Unit: GWh



▼ Client request (supply chain) + Mandatory disclosure

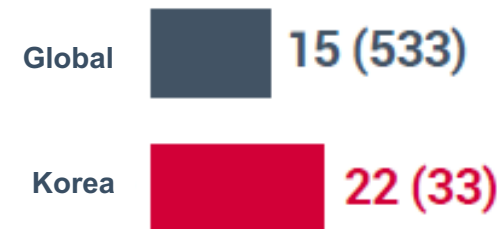
→ **Corporate transition to RE is inevitable**

▼ Although many Korean companies have established RE goals, RE consumption has been **growing at a slow pace**

▼ RE consumption of Korean companies: **Korea < Overseas**

% of companies with 100% RE usage target

Unit: % (number of companies)



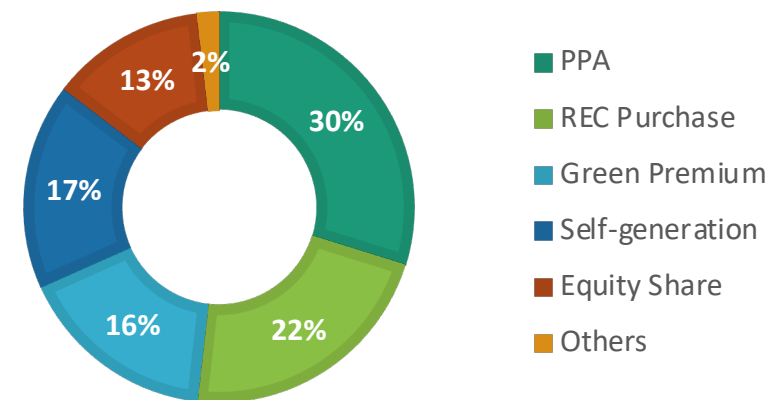
Corporate RE Procurement in Korea

- ▼ **Green Premium** was the most used RE procurement method
- ▼ Korean companies are **preferring PPAs in the long-term**
 - price hedging
 - GHG emissions reduction acknowledged under K-ETS
- ▼ **7 PPAs** have been contracted so far (2021~)

RE procurement of Korean companies



RE procurement method preference of Korean companies



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Challenges to RE Procurement in Korea

Insufficient RE supply

Complicated permitting & siting

Lack of grid flexibility

More incentives for RE generators in RPS

High cost of RE

Incidental costs double-charged

Unexpected changes in cost

(e.g. 'Electricity rate for RE users' from

KEPCO)

Governmental plan
for RE generation
in 2030

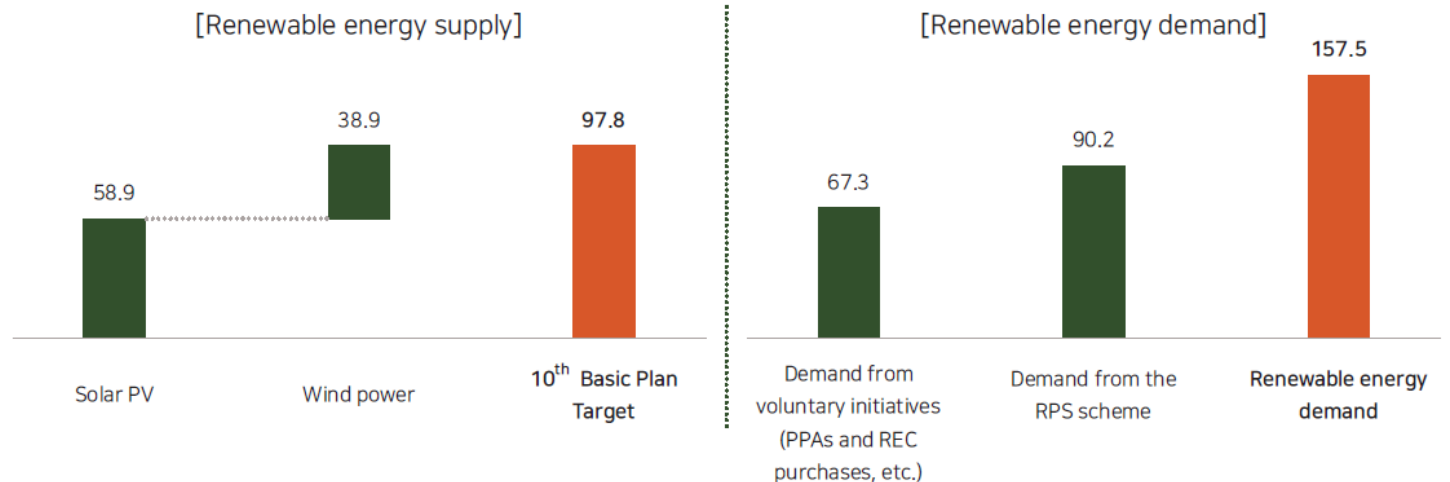
97.8
TWh

Estimation of
minimum RE
demand in 2030

157.5
TWh

Estimation of renewable energy demand for 2030 under two different scenarios

	Major assumptions	Renewable energy demand (TWh)
Baseline scenario	Voluntary initiatives (based on corporate reporting) + RPS demand (excluding green premiums)	157.5
Enhanced scenario	Voluntary initiatives (based on the 60% target under RE100) + RPS demand (excluding green premiums)	172.3



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South Korea RE100 Localised Policy Messages



#1. Create a policy environment with a fair and transparent power market structure to enable renewables to compete on an equal footing to fossil fuels



#2. Increase the renewable energy target and implement stable policy frameworks to accelerate corporate uptake of renewable electricity



#3. Remove obstacles to improve accessibility of Power Purchase Agreements for corporates



#4. Enhance grid flexibility and fairness for renewable electricity generators to scale the domestic supply of renewable electricity

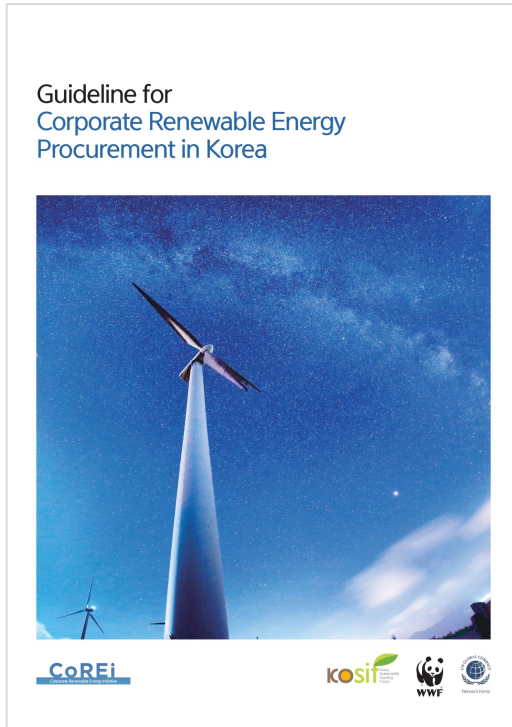


#5. Improve the renewables investment environment for on-site and off-site PPAs

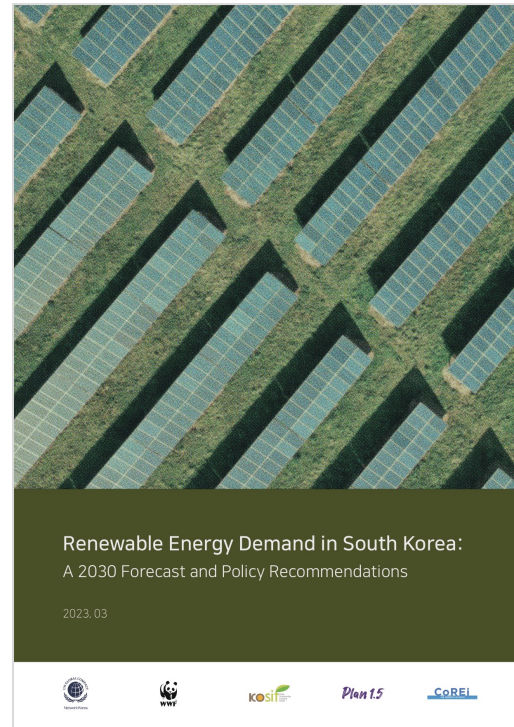


#6. Enhance transparency, sustainability and additionality of renewable electricity certificates and tracking systems

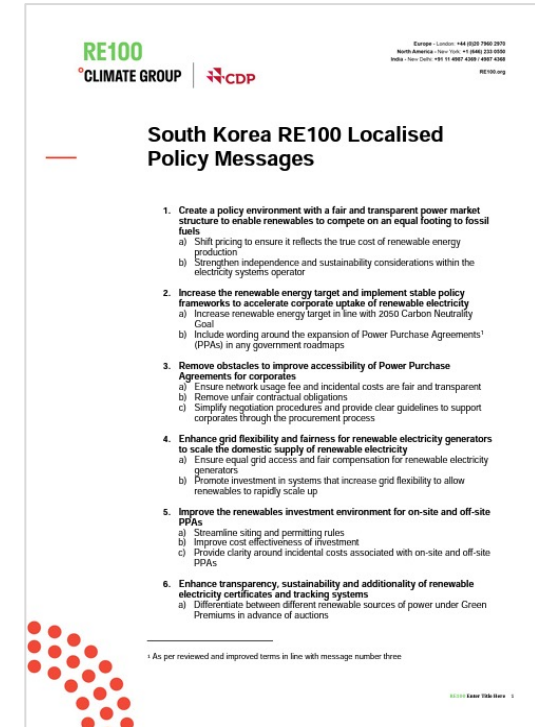
Available Resources



Guideline for Corporate Renewable Energy Procurement in Korea



Renewable Energy Demand in South Korea: A 2030 Forecast and Policy Recommendations



South Korea RE100 Localised Policy Messages

Thank you

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