

APEC HKC Workshop(EWG 211 2023A)

# Korea's Initiatives Toward Carbon Neutral

2025. 4.



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Phasing out Coal power



1

# Global Carbon Neutrality Trends





# Global Carbon Neutrality Trends

In response to the climate crisis, carbon neutrality is a historical and irresistible trend

## COP21

Nations Unies  
Conférence sur les Changements Climatiques 2015  
COP21/CMP11  
Paris, France

## Paris Climate Agreement



## Protest of future generation



2015

Oct 2016

Sep 2019

Dec 2019

Sep-Oct 2020

Apr 2021

## European Green Deal announced



## Carbon neutrality declaration by Korea, China and Japan



## Carbon neutrality Declaration by the U.S.

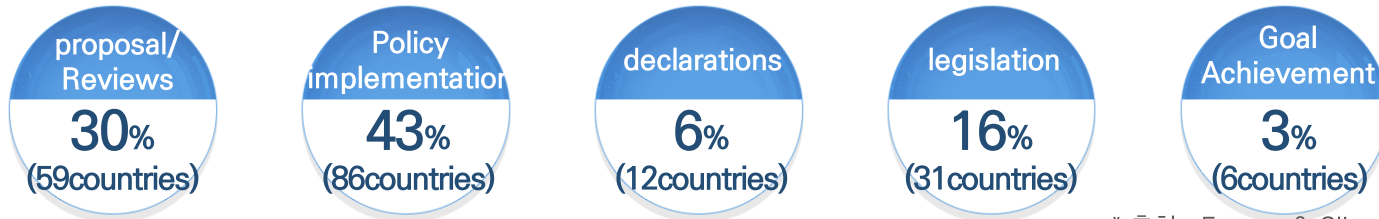




# Global Carbon Neutrality Trends

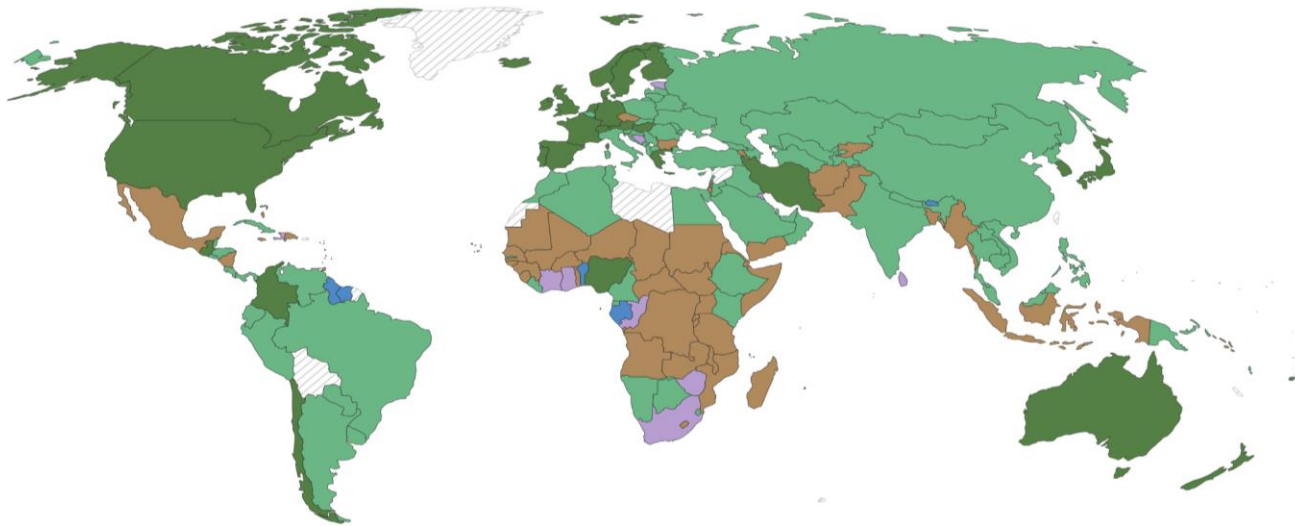
## Global Carbon Neutrality Trends

- Carbon neutrality participation rate (as of Oct 2023) : 194 out of 198 member countries of the Climate Change Convention (98% participation)



\* 출처 : Energy & Climate Intelligence Unit

## Participation status by country

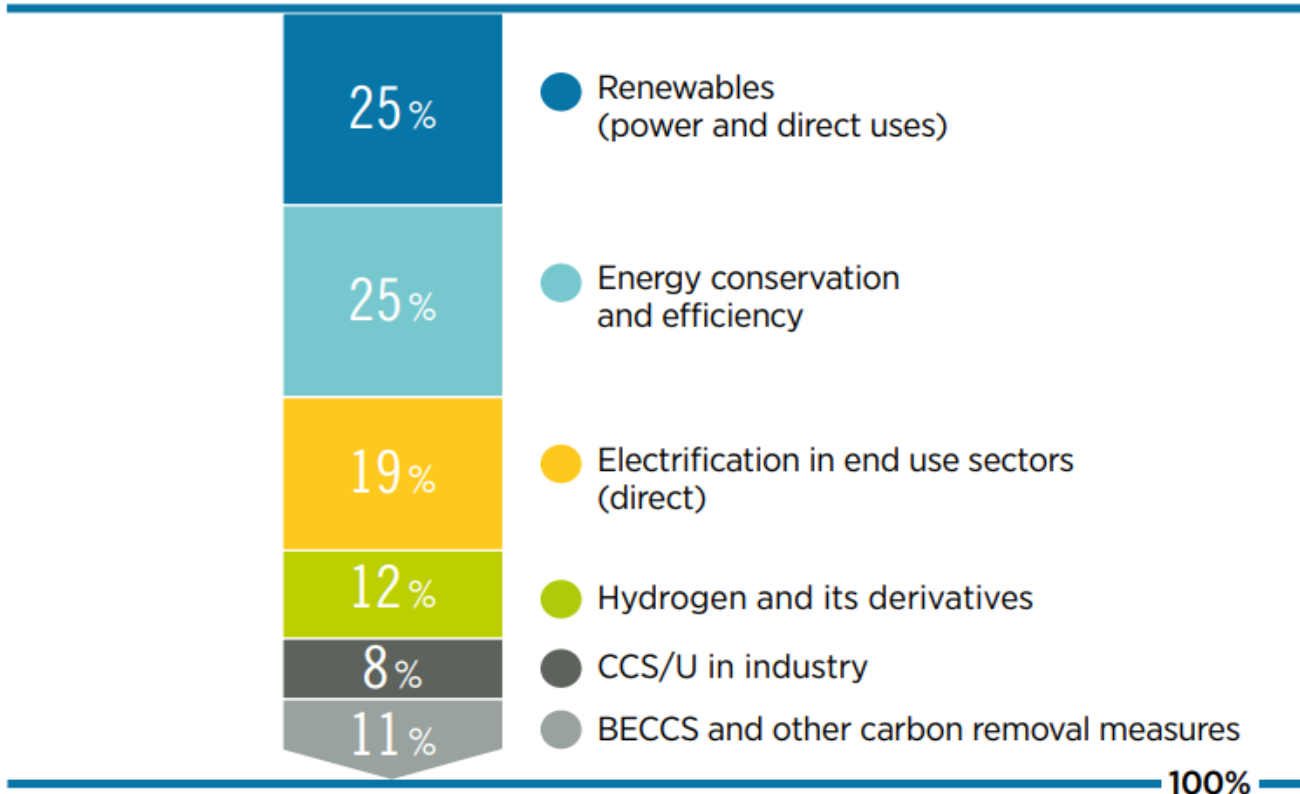


Data source: Energy and Climate Intelligence Unit, Data-Driven EnviroLab, NewClimate Institute, Oxford Net Zero - Net Zero Tracker (2023)  
[OurWorldInData.org/co2-and-greenhouse-gas-emissions](https://OurWorldInData.org/co2-and-greenhouse-gas-emissions) | CC BY

IRENA emphasizes renewable energy, electrification, and energy efficiency for achieving carbon neutrality

**FIGURE 1.5 Carbon dioxide emissions abatement under the 1.5°C Scenario in 2050**

Abatements



\* 출처 : World Energy Transitions Outlook 2023, IRENA



2



# Korea's Carbon Neutrality Plan





## Net-zero Korea

- ➔ Korea declared to achieve “Carbon neutrality by 2050 in Korea” (2020.10)
- ➔ Net Zero across all aspects of economy and society, while fostering a low carbon industrial ecosystem

### Background

- Accelerating concerns of climate change while COVID-19 spreading around the world
  - ➔ EU, US, China and other countries speeding up the declaration of Carbon Neutrality with Green New deal as opportunities for a smart recovery from the pandemic

### Status In Korea

- Korea has high energy-intensive industries such as steel and petrochemical companies
- Coal power proportion(40%) in energy mix is higher than Japan(32%), US(24%) and France(1%)
  - ➔ It is a challenging task for Korea to accomplish these obstacles overcome

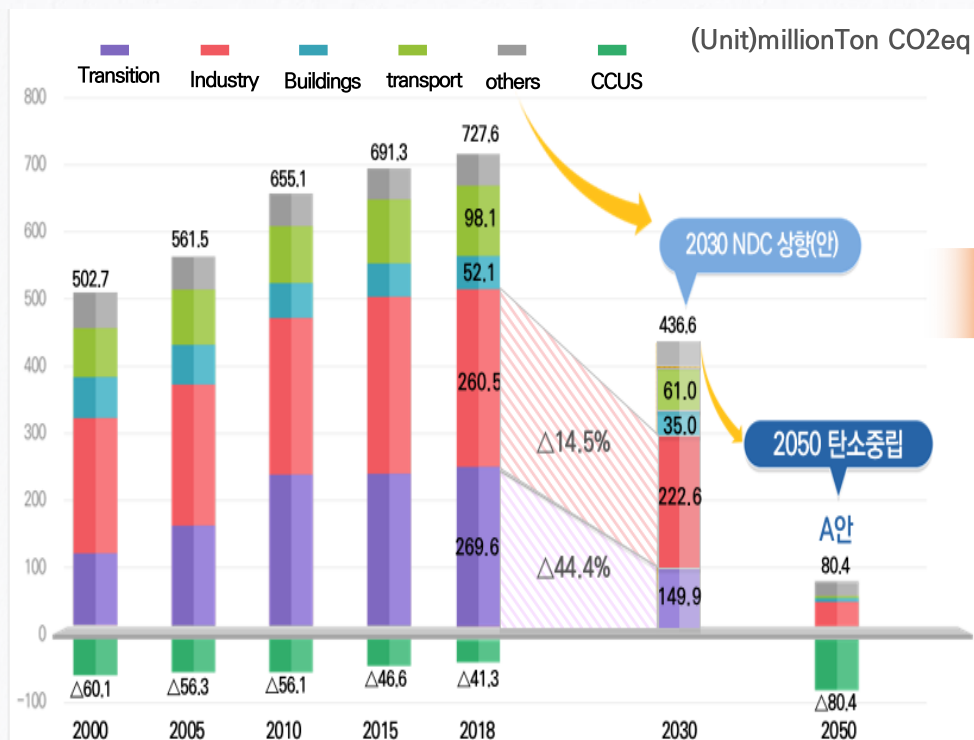
### Overseas Status

- Strengthening environmental regulations : Carbon border tax in the EU·U.S,  
Regulations on automobile emissions in the EU.
- Reinforcement of environmental management : Joining RE100, ESG investment

## ▶ 2030 NDC Upgraded Targets

- ➔ Announcement of the 2030 National Greenhouse Gas Reduction Targets (NDC) Upgraded Targets (October 2021))  
\* 40% reduction in greenhouse gas emissions by 2030 compared to 2018 levels
- ➔ Transition Sector ('18) 269.6 → ('30) 192.7 (28.5% reduction, existing NDC) → ('30) 149.9 Million tons CO<sub>2</sub>e (44.4% reduction, upgraded targets)

## Domestic greenhouse gas emissions and carbon neutrality goals



### Demand Sector

- ✓ Reflecting the increase in electricity demand, including the expansion of electric vehicles
- ✓ Strengthening the implementation of demand management tools

### Supply Sector

- ✓ Composition of Power Mix considering Reduction of Coal power generation And expansion of NRE generation

\* (Share of generation, 2030 NDC) :  
NRE 30.2%, Nuclear 23.9%, Coal 21.8% etc.

# Five Key Directions of Energy Policy

## 1 Practical and reasonable energy mix

- Incorporate an energy mix in detail into the 10th Basic Plan for Power Supply and Demand, by taking into account viability, public acceptance, and the competitiveness of the domestic energy sector

\* Announced on 12 January 2023, nuclear 32.4%, NRE 21.6%, coal 19.7%, LNG 22.9% by 2030



## 2 Robust energy and resources security

- Build a new system for natural resources security, strengthen the energy supply chain across the entire lifecycle, and restore the industry ecosystem of overseas natural resources development, which is driven by the private sector





3

## Improvement of energy efficiency and Establishment of the market structure based on market principles

- Shift the focus of energy policy from supply to the efficiency of demand
- Establish a electricity market structure based on market principles



4

## New energy industries as growth engines and export contributors

- Restore the nuclear energy industry as an export contributor and ease regulations to nurture new energy sectors like Hydrogen, PV and wind power as growth engines



5

## Strengthened energy welfare and higher policy acceptance

- Strengthen protection of the energy vulnerable and expand energy policy centered around local residents and communities to help increase social acceptance of energy policy





3



## **Enhancing Power sector Efficiency**

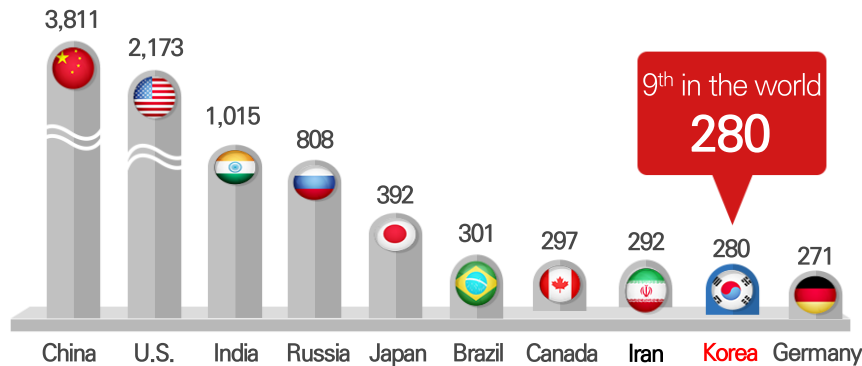


# Energy Consumption Status of Korea

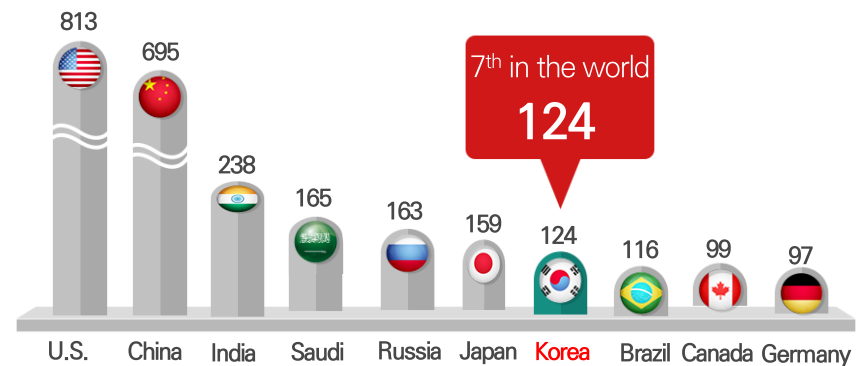
» Energy Import Dependency Rate of 94.4%, globally ranking 9th in primary energy consumption, 7th in petroleum consumption, and 6th in electricity consumption, making it an energy-intensive nation (as of 2022)

## International Standing in Energy Consumption (as of 2022)

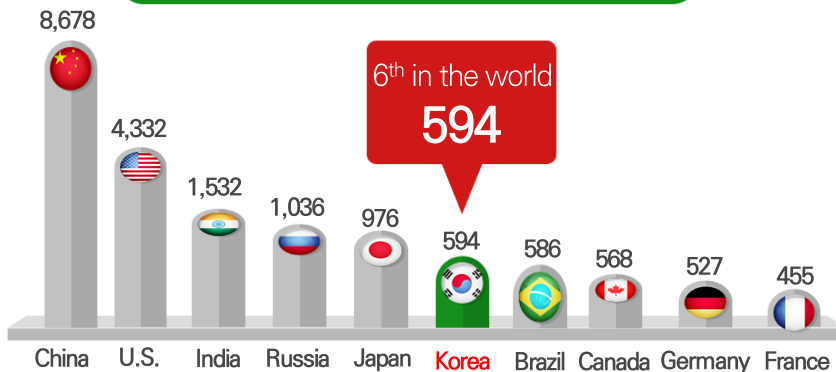
### 9th in primary energy supply (280 million TOE)



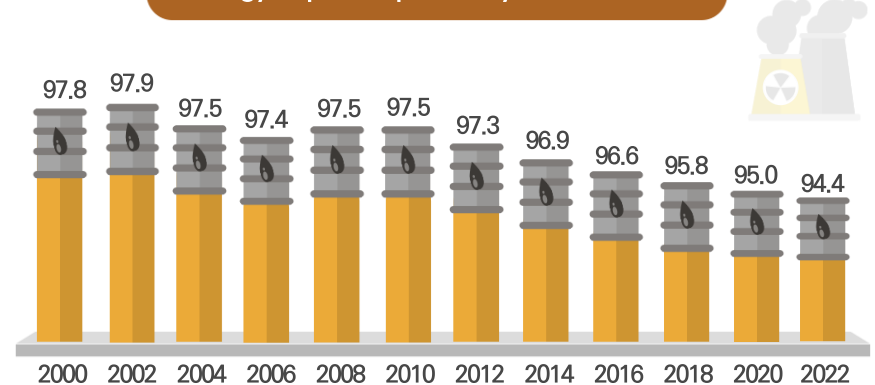
### 7th in petroleum consumption (124 million tons)



### 6th in electricity consumption (594TWh)



### Energy Import Dependency Rate of 94.4%







## Vision and Goals

### “Creating a Powerhouse in Energy Efficiency”

Reduce energy consumption by 22 million TOE

(6 years' worth of power consumption in Seoul)

Improve energy intensity by 25% (meeting the G7 average) (by 2027)

#### 10 Initiatives

##### Industry

- ① Bigsumer efficiency innovation
- ② Efficiency innovation by public organizations
- ③ Appliance efficiency system innovation
- ④ Industrial complex efficiency innovation

##### Households/ Buildings

- ⑤ National rollout of energy cashback
- ⑥ Large building efficiency enhancements
- ⑦ Zero energy building promotion

##### Transport

- ⑧ Reduction of fuel economy blind spots
- ⑨ Greater penetration of eco-friendly vehicles
- ⑩ Next-generation transport network

##### 5 Foundational Initiatives

- ① Data-based R&D activity to increase demand efficiency
- ② Demonstration of digital demand management systems
- ③ Incentive enhancements
- ④ Flexible electricity pricing
- ⑤ Policy governance and legal/regulatory reform



## Efficiency Innovation for Industry

### 01 | Energy Efficiency Innovation Partnership (KEEP30)

\* KEEP (Korea Energy Efficiency Partnership) 30

- ✓ Sign voluntary agreements for energy efficiency innovation\* with 30 companies that consume more than 200,000 TOE per year

\* [Content of agreements] ① Long-term vision for carbon neutrality and efficiency innovation, ② Efficiency innovation goals, ③ Detailed annual implementation plans, ④ Incentives awarded upon achievements, ⑤ Other areas of cooperation

### 02 | Energy consumption efficiency innovation led by public energy companies

\* EERS (Energy Efficiency Resources Standards)

- ✓ Full-scale roll out of EERS\*, which makes it mandatory for public energy companies to support demand-side efficiency innovation

\* Suppliers (KEPCO, KOGAS, KDHC) will be required to achieve demand-side efficiency innovation (sales reduction) targets calculated by multiplying energy sales volume of two years before by a predetermined ratio

### 03 | Gradual integration of industrial appliances into appliance efficiency management system



- ✓ Induce efficiency innovation and industrial competitiveness through drastic overhaul of the following three major appliance and equipment efficiency systems\*

\* Energy Efficiency Labeling and Standard ('92), High Efficiency Appliance Certification ('96), e-Standby Power ('99)

### 04 | Efficiency innovation of hub-based industrial complexes

\* LEEN(Learning Energy Efficiency Network)

- ✓ Provide diagnosis support for a Korea-type LEEN\*(tentative name) to tenants of smart green industrial complexes. Disseminate efficiency innovation expertise and coordinate support projects of the Korea Energy Agency, Korea Industrial Complex Corporation, and KEPCO

## Efficiency Innovation for Households & Buildings

### 01 | Energy cashback for the household sector

- ✓ Promote energy efficiency innovation in the household sector by providing incentives (cashback) to encourage voluntary energy saving

\* Households/apartment complexes that consume less electricity than the average of neighboring apartment complexes/households can receive a cashback refund for the amount saved

### 02 | Better energy consumption management of large existing buildings

- ✓ Control and manage energy consumption of large buildings that were in the blind spot of management through collaboration with the relevant local governments

\* Actively promote zero-energy conversion of existing buildings through full transfer of the authority to local governments to manage the efficiency of large-scale existing buildings and expansion of new and renewable energy supply

### 03 | Accelerate the proliferation of zero-energy new buildings

- ✓ Expand the coverage of the mandatory certification of Zero Energy Buildings for new buildings so that buildings will be designed and constructed in a way to optimize energy efficiency







# Recently announced 11<sup>th</sup> Basic Electricity Supply and Demand Plan('24-'38)



## Demand Management Plan

- **Strengthening of Existing Demand Management Measures**  
(e.g., enhancement of efficiency management policies and criteria)
- **Expansion of Demand Management Efforts**  
(e.g., additional support for the distribution of new high-efficiency equipment)

### KEA's Action Plan

**Aiming for a 2.6 GW reduction in peak power demand by 2038**  
**(1,477 MW from efficiency improvements + 1,163 MW from additional equipment)**

\*Total Reduction Target of 16.3 GW by 2038

## Industry Sector

- Energy efficiency innovation partnership (KEEP 30) to reduce energy consumption through voluntary agreements with the top 30 energy-consuming companies\*

\* KEEP 30 (Korea Energy Efficiency Partnership 30): A mid- to long-term plan to set and implement an average 1% energy efficiency improvement goal per year over 5 years (2023-2027)



## Building Sector

- Gradual mandatory energy efficiency ratings for public and private buildings to promote the spread of zero-energy buildings

\*Public: (2023) Buildings with a total floor area of over 500m<sup>2</sup> or public buildings with more than 30 apartments must meet grade 5 energy efficiency  
(2025) Non-residential buildings must meet grade 4  
(2030) Non-residential buildings must meet grade 3

\*Private: (2025) Buildings with more than 30 apartments must meet grade 5 / (2030) Buildings with a total floor area of over 500m<sup>2</sup> must meet grade 5



## Appliance Sector

- Promoting the spread of high-efficiency products through efficiency rating labels, banning the production and sale of products below minimum efficiency standards, and continuously raising standards

1) Raising consumption efficiency standards (2024: water heaters, 2025: rice cookers, 2027: three-phase induction motors),  
2) Item transfer (standby power reduction and high-efficiency product certification → consumption efficiency rating)  
3) New items (2024: dishwashers)



## Financial Support

- Providing financial support to small and medium-sized enterprises for energy-saving facility investments to expand the distribution of efficient equipment \* Annual 1% increase in support budget after 2024



4

# Expansion of Renewable energy for Phasing out Coal power



# Recently announced 11<sup>th</sup> Basic Electricity Supply and Demand Plan('24~'38)



## Major Directions (By Power Source)

**Management of aging Fossil fuel facilities,  
Systematic expansion of Renewable energy,  
Continued use of Nuclear power as a carbon-free source**

### Power Mix

Power mix reflecting energy security, efficiency, and carbon neutrality

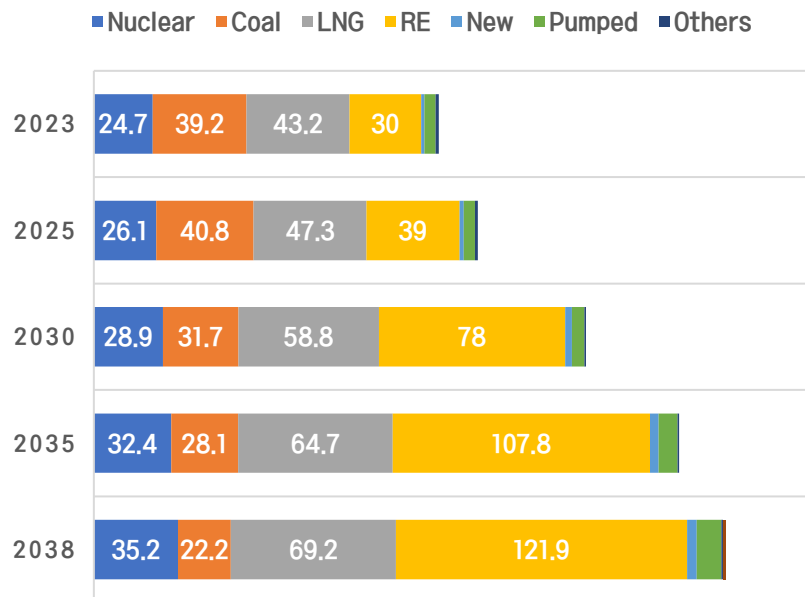
### Generation Outlook

Long-term reduction of coal and LNG to cut greenhouse gas emissions  
Expansion of carbon-free sources such as renewables and nuclear power

\* Share of CFE(%) : 53% in 2030 → 70% in 2038

## Projected Power Mix by Year

Unit : GW



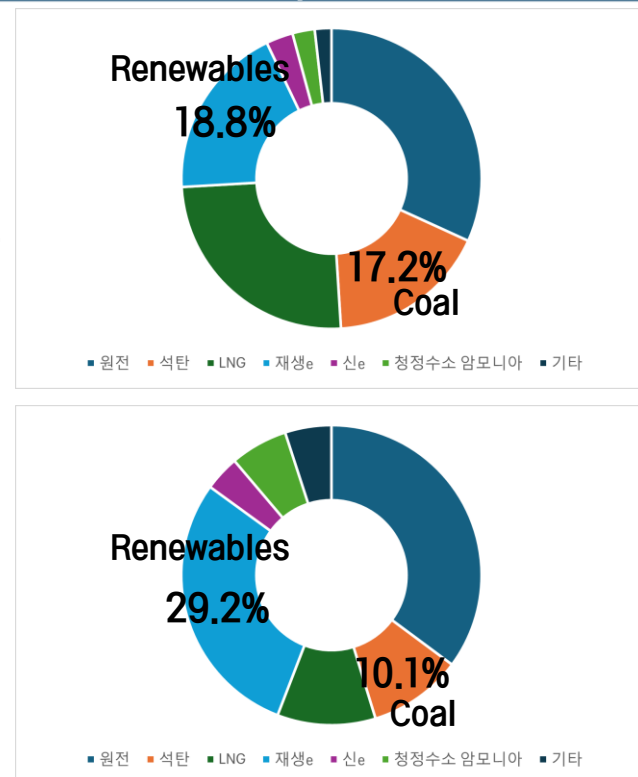
## Projected Power Generation Share by Source

Unit : %

'30  
Year



'38  
Year





# Recently announced 11<sup>th</sup> Basic Electricity Supply and Demand Plan ('24~'38)

## ▶ Promotion of Renewable Energy in Korea

### Target Adjustment

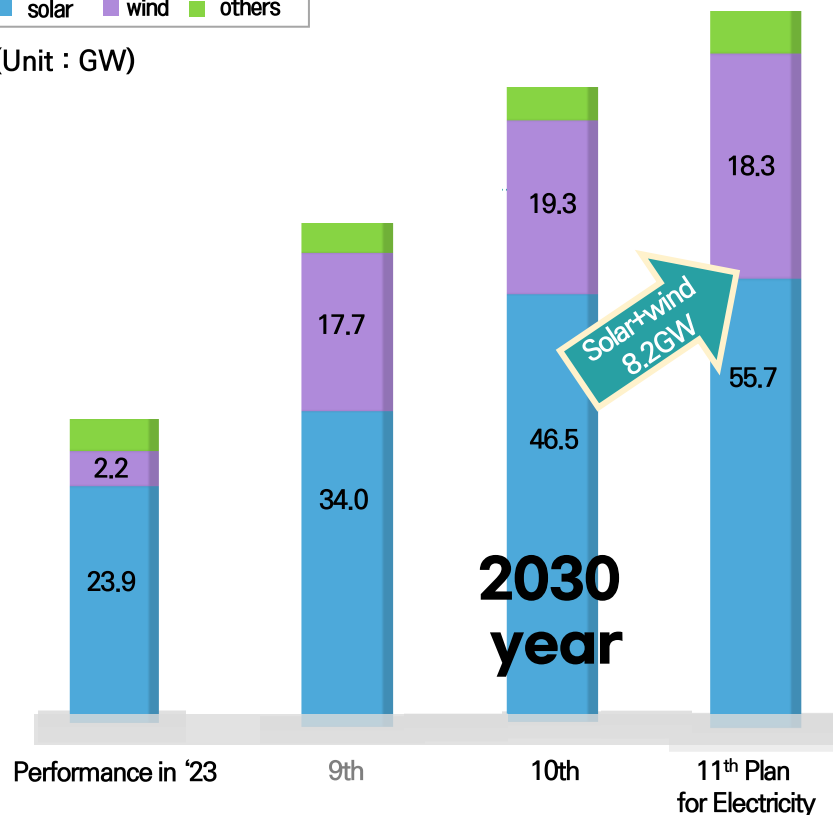
Consider the installation potential, power system conditions, and various policies comprehensively → Raise the outlook for solar and wind power supply

\* The 11<sup>th</sup> Plan for Electricity announced the 2030 Supply of Solar and Wind Power 74GW (March, '25)

### RE Supply outlook (accumulate for business)

■ solar ■ wind ■ others

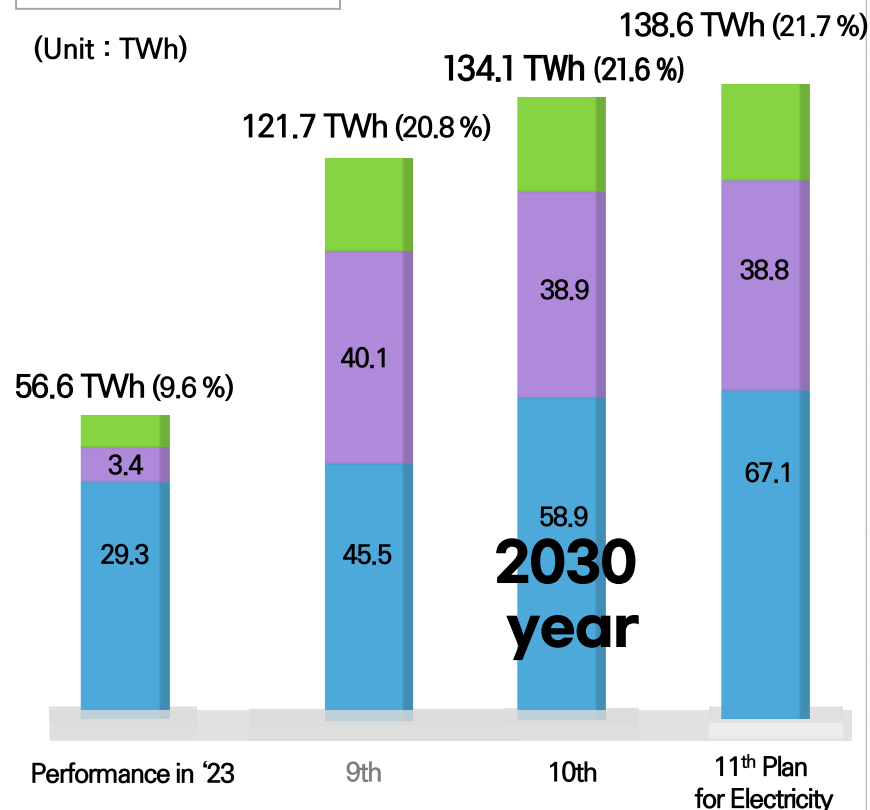
(Unit : GW)



### RE Generation Outlook (for business)

■ solar ■ wind ■ others

(Unit : TWh)

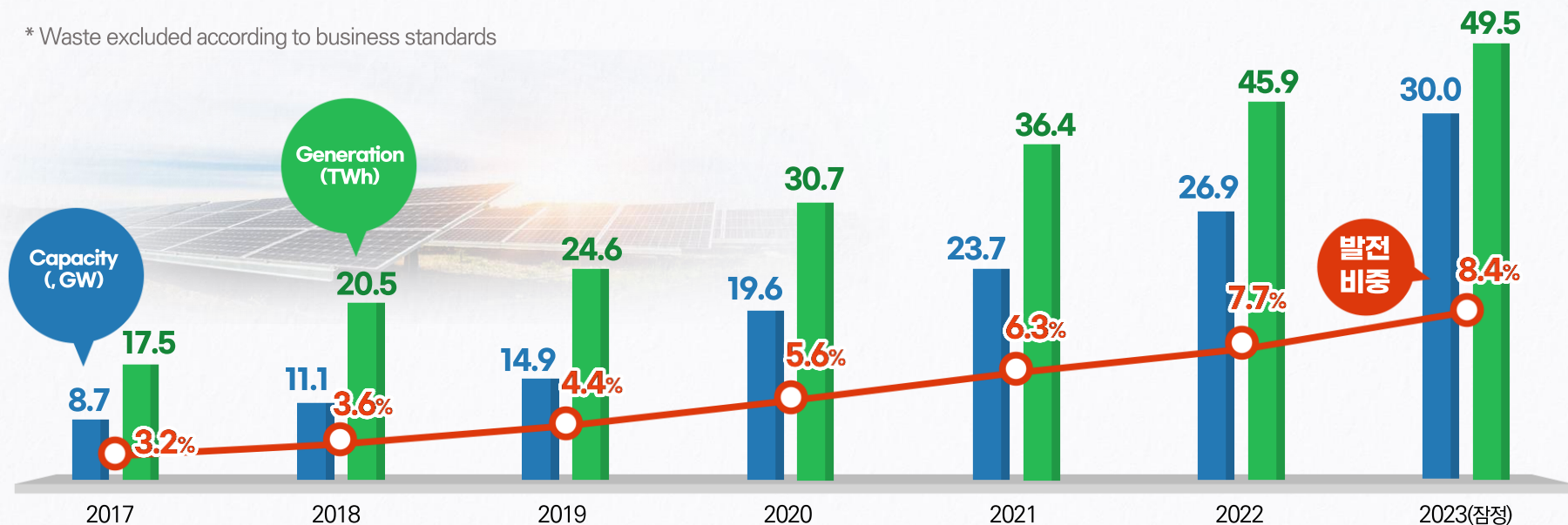




# Expansion Policies of Renewable Energy in Korea

## Domestic renewable energy supply status

\* Waste excluded according to business standards



\* 출처 : (Capacity) KPX, (Power Generation) KEPCO

## Status of renewable energy sources(new)

(Unit : GW, %)

Section	2017		2018		2019		2020		2021		2022		2023(잠정)	
Solar	1.3	(81)	2.1	(89)	3.4	(88)	4.1	(87)	3.9	(94)	2.6	(84)	2.8	(91)
Wind	0.2	(10)	0.2	(9)	0.1	(2)	0.1	(3)	0.1	(2)	0.2	(6)	0.3	(8)
hydro	0.0	(0.2)	0.0	(0.0)	0.0	(0.5)	▲0.0	(▲0)	0.0	(1)	▲0.0	(▲1)	▲0.0	(▲0)
marine	-	-	-	-	0.0	(0.0)	-	-	-	-	-	-	-	-
Bio	0.1	(8.6)	0.0	(1.9)	0.4	(9.5)	0.5	(10)	0.1	(3)	0.4	(11)	0.0	(0.3)
Total	1.7	(100)	2.3	(100)	3.9	(100)	4.7	(100)	4.2	(100)	3.1	(100)	3.1	(100)

\* 출처 : KPX / \*\* 0 : 단위미만, - : 숫자없음

## Future Improvement of RE Policy

### Vision

## Reasonable Balance between Nuclear & Renewable energy

### Strategies

Contribute to the domestic industries & Expand renewable energy in a rational and realistic with residents

Reasonable-  
realistic goals

Expand the use of renewables in a reasonable and realistic manner

- Recalibrate renewable energy goals & Ensure a proper energy mix
- Expand offshore wind power in an orderly manner

Cost-efficient  
Expansion

Expand the use of renewables cost-efficiently

- Modify policy to support small installations and cooperatives
- Review and overhaul government support programs
- Promote competition among power generation companies

Increased  
Grid  
Acceptability

Expand the renewable energy by taking into account the pressure on the grid

- Strengthen the responsibility of renewable energy in the power grid
- Select locations according to plans based on grid acceptability
- Strengthen grid requirements for the approval of generation business

Strengthen  
Resident  
Acceptance

Renewables based on Resident acceptance

- Expand guidelines and profit sharing with residents
- Increase the use of idle land significantly
- Reinforce safety management for solar panels in mountainous areas

Industrial  
Growth

Promote renewables with the Industrial growth

- Sharpen the competitive edge of the solar power sector
- Lay the foundation for propagating BIPV installation
- Fine-tune the value chain of the wind power industry
- Lay the groundwork for developing the biomass industry

## RE Supply and Supply Chain Enhancement Strategy

Korea also needs to expand renewable energy in earnest to achieve its greenhouse gas reduction goals (NDC)

- ① Korea has focused on expanding supply to achieve the national NDC goal, but it has exposed limits due to the burden of the power system, the congestion of facilities, and the high cost  
\* ('17) Renewable Energy 7.1GW (Solar 3.7GW, Wind Power 1.1GW) → ('23e) Renewable Energy 30.0GW (Solar 23.9GW, Wind Power 2.1GW)  
→ Over the past two years, focused on consolidating market order  
\* Strengthening market functions such as strengthening responsibility for power generation projects such as power systems, ending small-scale preferential treatment, and competition
- ② It is time to expand renewable energy and take a leap forward to implement NDC, Basic Electricity Plan, etc.

### 'Strategy for expanding renewable energy supply and supply chain,' ('24.5.16.)

**Goal** Orderly and systematic expansion of renewable energy for carbon neutrality and energy security

**Basic Direction** Promote government-led distribution(Top-down),  
Strengthen industrial competitiveness, Reorganize market systems

01

#### Creating a Healthy Offshore Wind Power Industry Ecosystem

Expand offshore wind power deliberately under government leadership

Establish a stable foundation for operating offshore wind power complexes

Distribute strategically by location type (industrial complex, farmland, etc)

02

#### Orderly Expanding Of Solar

Enter new facilities in an orderly way considering power grid conditions

Support to stabilize supply chain and secure technological capabilities

Support to stabilize supply chain and secure technological capabilities

03

#### Transforming the System to Fit the New Market

Reform the RPS system for systematic government-led distribution

Activate PPA and creating a voluntary renewable energy market

04

#### Supporting Entry into Overseas Markets

Support One-stop entry (Renewable Energy Overseas Entry Council\*) \*temporary name

Devise Top-down ways and support step-by-step customization through cooperation between government departments



# Thank you!