

RENEWABLE ENERGY

Global Market Size/Forecast

- ▶ **(MARKET SIZE)** In 2024, an additional 534 GW of renewable energy generation capacity is expected to be added, bringing the total cumulative capacity to 4,403 GW.
- **(Investment in Renewable Energy)** According to the IEA, global investment in renewable energy has grown at an average annual rate of 10% over the past five years. However, the investment amount in 2024 is expected to increase by only 5%, reaching USD 771 billion, showing a slowdown compared to the average growth rate of recent years.

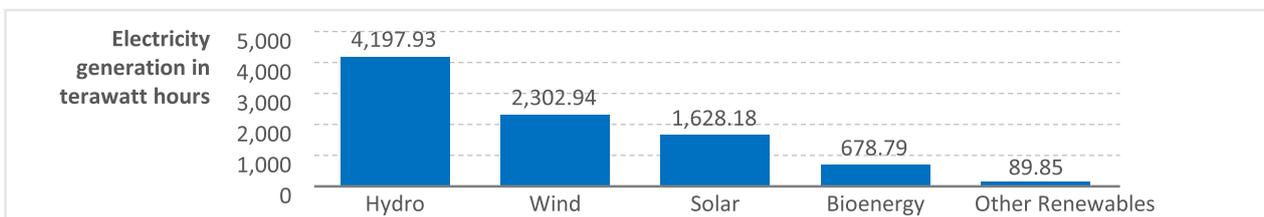
<Global Renewable Energy Generation Capacity and Investment Amounts (2020-2024)>

| Division | 2020 | 2021 | 2022 | 2023 | 2024 |
|--|-------|----------------|-----------------|-----------------|---------------------------|
| Cumulative capacity (GW) | 2,823 | 3,088 | 3,396 | 3,869 | 4,403(estimate) |
| Newly added capacity (GW) (growth rate) | N/A | +265 (9.4%) | +308 (10.0%) | +473 (13.9%) | +534(estimate) (13.8%) |
| Investment amount (USD 100 million) | 4,460 | 4,700 | 6,050 | 7,350 | 7,710 |

* Source: 「Renewable Capacity Statistics 2024(IRENA), 「Global Power & Renewable Report Q4 2024」(Fitch Solutions), 「World Energy Investment 2024(IEA), Invest KOREA)

- ▶ **(GENERATION OUTLOOK)** Renewable energy generation is expected to increase by 9% annually between 2025 and 2026. The IEA predicts that in 2025, renewable energy will surpass coal to become the largest power source, providing more than one-third of the global electricity supply.(「Electricity 2024: Analysis and forecast to 2026」, IEA)
- ▶ **(ENERGY SOURCE BREAKDOWN OF GENERATION)** In 2023, the global renewable energy generation was led by hydro > wind > solar > bioenergy > other renewable sources.

<Electricity generation from renewable sources worldwide in 2023, by source(in terawatt hours)>



* Source: Statista, Latest data as of June 2024

Domestic Market Size/Forecast

▶ **(DOMESTIC TRENDS AND OUTLOOK)** In 2023, South Korea's renewable energy generation totaled 53,146 GWh, accounting for 8.4% of the total electricity generation.

- The government's 11th Basic Plan for Power Supply and Demand, confirmed in February 2025, forecasts that renewable energy generation will reach 120,900 GWh by 2030, contributing 18.8% of the total generation.

<The 11th Electricity Generation and Generation Share Forecast(Unit: TWh, %)>

| Year | Division | Nuclear | Coal | LNG | Renewable Energy | New Energy | Clean Hydrogen, Ammonia | Others | Total | Carbon | Carbon-Free |
|------|------------------|---------|-------|-------|------------------|------------|-------------------------|--------|-------|--------|-------------|
| 2023 | Power Generation | 180.5 | 184.9 | 157.7 | 49.4 | 7.2 | - | 8.3 | 588.0 | 358.2 | 229.9 |
| | Share | 30.7 | 31.4 | 26.8 | 8.4 | 1.2 | - | 1.4 | 100.0 | 60.9 | 39.1 |
| 2030 | Power Generation | 204.2 | 110.5 | 161.0 | 120.9 | 18.7 | 15.5 | 11.8 | 642.6 | 302.0 | 340.6 |
| | Share | 31.8 | 17.2 | 25.1 | 18.8 | 2.9 | 2.4 | 1.8 | 100.0 | 47.0 | 53.0 |
| 2038 | Power Generation | 248.3 | 70.9 | 74.3 | 205.7 | 26.4 | 43.9 | 34.9 | 704.5 | 206.7 | 497.8 |
| | Share | 35.2 | 10.1 | 10.6 | 29.2 | 3.8 | 6.2 | 5.0 | 100.0 | 29.3 | 70.7 |

※ Carbon-Free Power Generation: Nuclear + Renewable + Clean Hydrogen, Ammonia

※ The "carbon-free competitive" portion of new facilities reflected in hydrogen generation and ESS-linked solar power

※ Changes may occur depending on the market conditions for carbon-free competition, handling of reserved volumes, etc.

* Source: Ministry of Industry

▶ **(GENERATION BY SOURCE)** In 2023, South Korea's renewable energy generation by source was as follows: solar > bioenergy > hydro > wind > other (marine and waste).

<2023 South Korea Renewable Energy Generation by Source(Unit: GWh, %)>

| Categorize | 2021 | | 2022 | | | 2023 | | | |
|---|----------------------|------------|------------------|------------|-------------------|------------------|------------|-------------------|-------|
| | power generation | proportion | power generation | proportion | percentage change | power generation | proportion | percentage change | |
| Total power generation | 611,015 | | 626,448 | | | 624,883 | | | |
| New & Renewable Energy | 50,657 | 100.0 | 57,780 | 100.0 | 14.1 | 60,400 | 100.0 | 4.5 | |
|  Renewable Energy | 43,669 | 86.2 | 50,406 | 87.2 | 15.4 | 60,400 | 88.0 | 5.4 | |
| | New Energy | 6,989 | 13.8 | 7,374 | 12.8 | 5.5 | 53,146 | 12.0 | ▲1.6 |
| Renewable Energy | Solar | 24,718 | 48.8 | 30,726 | 53.2 | 24.3 | 7,254 | 55.0 | 8.2 |
| | Wind | 3,180 | 6.3 | 3,369 | 5.8 | 6.0 | 33,236 | 5.6 | 0.7 |
| | Hydroelectric | 3,057 | 6.0 | 3,545 | 6.1 | 16.0 | 3,392 | 6.2 | 4.9 |
| | Marine | 455 | 0.9 | 424 | 0.7 | ▲6.8 | 438 | 0.7 | 3.2 |
| | Bio | 11,788 | 23.3 | 11,928 | 20.6 | 1.2 | 11,918 | 19.7 | ▲0.1 |
| | Waste | 471 | 0.9 | 414 | 0.7 | ▲12.1 | 444 | 0.7 | 7.3 |
| New Energy | Fuel Cell | 4,798 | 9.5 | 5,410 | 9.4 | 12.7 | 6,257 | 10.4 | 15.7 |
| | IGCC | 2,191 | 4.3 | 1,965 | 3.4 | ▲10.3 | 997 | 1.6 | ▲49.3 |

* Source: Korea Energy Agency, Latest data as of December 2024

Sales/Exports/Production Volume

- ▶ **(WIND POWER)** In 2023, the newly installed wind power capacity was 219 MW, a 7.8% decrease from the previous year, due to delays in the approval process.
 - Reference: Cumulative installed wind power capacity in 2023 was 2,165 MW.
- ▶ **(SOLAR POWER)** In 2023, the newly installed solar power capacity increased by 12.3% to 3,682 MW compared to the previous year.
 - Reference: Cumulative installed solar power capacity in 2023 was 28,033 MW.

<2023 South Korea Renewable Energy New and Cumulative Installed Capacity (Unit: MW, %)>

- New Renewable Energy Facility Capacity -

| Category | | 2021 | | 2022 | | | 2023 | | |
|-----------------------------------|-------------------------|--------------------|--------------|--------------------|--------------|---------------------|--------------------|--------------|----------------|
| | | Installed Capacity | Share | Installed Capacity | Share | Rate of Change | Installed Capacity | Share | Rate of Change |
| New & Renewable Energy | | 4,454 | 100.0 | 3,809 | 100.0 | ▲14.5 | 4,173 | 100.0 | 9.6 |
| | Renewable Energy | 4,275 | 96.0 | 3,689 | 96.9 | ▲13.7 | 4,002 | 95.9 | 8.5 |
| | New Energy | 179 | 4.0 | 120 | 3.1 | ▲33.2 | 171 | 4.1 | 43.0 |
| Renewable Energy | Solar | 3,915 | 87.9 | 3,278 | 86.1 | ▲16.3 | 3,682 | 88.4 | 12.3 |
| | Wind | 65 | 1.4 | 238 | 6.2 | 272.8 | 219 | 5.3 | ▲7.8 |
| | Hydroelectric | 18 | 0.4 | 0 | 0.0 | ▲98.8 | 5 | 0.1 | 2275.0 |
| | Marine | 0 | 0.0 | - | - | Net decrease | - | - | - |
| | Bio | 187 | 4.2 | 161 | 4.2 | ▲14.3 | 88 | 2.1 | ▲45.4 |
| | Waste | 90 | 2.0 | 13 | 0.3 | ▲86.0 | 8 | 0.2 | ▲35.4 |
| New Energy | Fuel Cell | 179 | 4.0 | 120 | 3.1 | ▲33.2 | 171 | 4.1 | 43.0 |
| | IGCC | - | - | - | - | - | - | - | - |

- Cumulative Renewable Energy Facility Capacity -

| Category | | 2021 | | 2022 | | | 2023 | | |
|-----------------------------------|-------------------------|--------------------|--------------|--------------------|--------------|----------------|--------------------|--------------|----------------|
| | | Installed Capacity | Share | Installed Capacity | Share | Rate of Change | Installed Capacity | Share | Rate of Change |
| Total power generation | | 142,458 | | 147,200 | | | 154,617 | | |
| New & Renewable Energy | | 30,212 | 100.0 | 33,234 | 100.0 | 10.0 | 37,371 | 100.0 | 12.4 |
| | Renewable Energy | 29,072 | 96.2 | 31,996 | 96.3 | 10.1 | 35,962 | 96.2 | 12.4 |
| | New Energy | 1,140 | 3.8 | 1,238 | 3.7 | 8.6 | 1,409 | 3.8 | 13.8 |
| Renewable Energy | Solar | 21,199 | 70.2 | 24,370 | 73.3 | 15.0 | 28,033 | 75.0 | 15.0 |
| | Wind | 1,709 | 5.7 | 1,946 | 5.9 | 13.9 | 2,165 | 5.8 | 11.2 |
| | Hydroelectric | 1,821 | 6.0 | 1,813 | 5.5 | ▲0.4 | 1,817 | 4.9 | 0.2 |
| | Marine | 256 | 0.8 | 256 | 0.8 | - | 256 | 0.7 | - |
| | Bio | 3,579 | 11.8 | 3,138 | 9.4 | ▲12.3 | 3,220 | 8.6 | 2.6 |
| | Waste | 507 | 1.7 | 473 | 1.4 | ▲6.7 | 472 | 1.3 | ▲0.3 |
| New Energy | Fuel Cell | 794 | 2.6 | 892 | 2.7 | 12.4 | 1,063 | 2.8 | 19.2 |
| | IGCC | 346 | 1.1 | 346 | 1.0 | - | 346 | 0.9 | - |

* Source: Korea Energy Agency, Latest data as of December 2024

Trends in Foreign Investment in South Korea

- Investment in renewable energy generation continues to grow steadily, though it declined slightly in 2024. Over the past three years, large-scale investments have focused mainly on offshore wind projects.

<Investment Performance by Sector (3-Year Data)>

(Unit: Cases, Million USD)

| Category | 2022 | | 2023 | | 2024 | | '62~'24년 | |
|--|------|--------|------|--------|------|--------|----------|--------|
| | Case | Amount | Case | Amount | Case | Amount | Case | Amount |
| Electricity & Gas, Water Supply, Environmental remediation, Construction | 155 | 1,388 | 158 | 2,932 | 99 | 2,176 | 1,850 | 21,296 |

* Source: Ministry of Industry, "2024 Foreign Direct Investment Trends"

Investment Strengths

- South Korean companies are leading global markets in wind power supply chains, with companies like SK Ocean Plant (substructures), CS Wind (towers), and LS Cable (cables).
- The government's commitment to expanding wind power: announcing government bidding for 7-8 GW over the next two years.
- Domestic conglomerates such as Samsung and LG are increasing their participation in RE100 (Renewable Energy 100%).

* (Note) Emphasized the strengths of the wind energy industry, as the majority of investments in the renewable energy sector are focused on offshore wind farm projects.

Incentives/Regulatory Status

- Foreign Investment Restrictions in Low-Carbon Energy Sectors
 - Closed Sectors:** Nuclear power generation.
 - Sectors with less than 30% of the total domestic generation capacity allowed: Hydro, thermal, solar, and other power generation sectors.

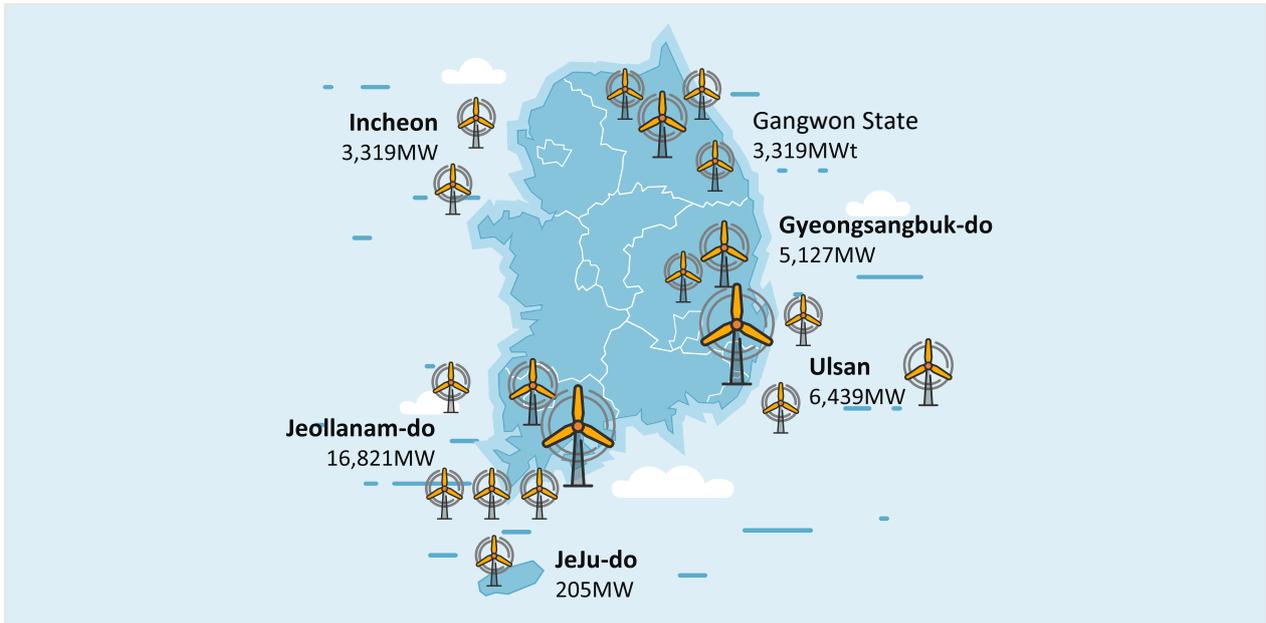
* Renewable energy generation typically falls under "solar" or "other power generation" sectors.

** "Other power generation" includes both onshore and offshore wind, as well as renewable energy production and sales, energy storage facility construction, etc.

Cluster Status

- As of 2024, wind power business licenses by region are as follows: Jeollanam-do > Ulsan = Gangwon-do > Gyeongsangbuk-do > Incheon.

<2024 Regional Wind Power Business License Status>

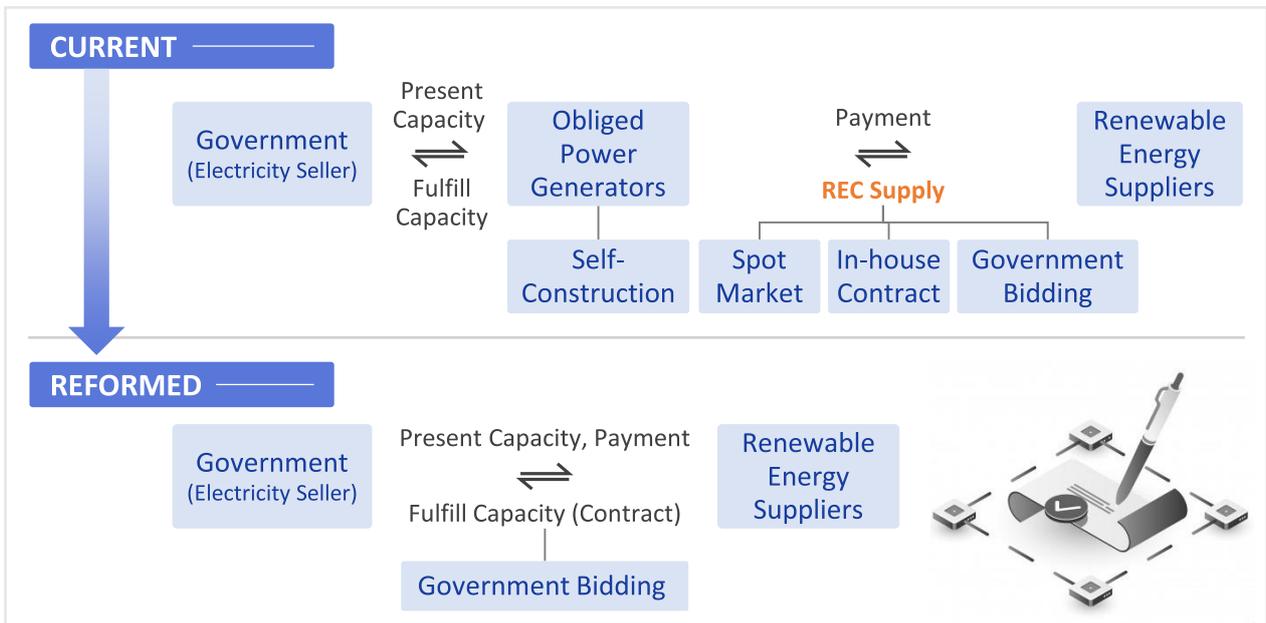


* Source: Korea Energy Agency, Invest KOREA

Industry Development Policies

- South Korea's renewable energy promotion system is guided by the "Energy Basic Plan" published every five years. According to Article 6 of the Renewable Energy Act, the MOTIE is expected to push for legislative amendments to shift the current RPS system towards a government bidding-based system. The details of the reform were announced in December 2024 as part of the "Renewable Energy Technology Development, Utilization, and Distribution Implementation Plan."

<RPS (Renewable Portfolio Standard) System Reform for Systematic Government-Led Distribution>



* Source: Ministry of Industry, "2024 Renewable Energy Technology Development and Utilization and Distribution Implementation Plan")

- ▶ **(OFFSHORE WIND POWER BIDDING ROADMAP)** In August 2024, the MOTIE announced the offshore wind power government bidding roadmap, outlining the upcoming bidding volumes for the next two years. A separate bidding market for floating offshore wind was newly established, considering the distinction between floating and fixed offshore wind.

<Domestic Offshore Wind Power Bidding Volumes (Draft)>

| Category | 2H 2024 (1 time) | 1H 2025 (1 to 2 times) | 1H 2026 (1 time) | Total (3 to 4 times) |
|--------------|---------------------|---------------------------|---------------------|-------------------------|
| Fixed | 1~1.5GW | 2~2.5GW | 1~1.5GW | 4.5~5GW |
| Floating | 0.5~1GW | 0.5~1GW | 1~1.5GW | 2.5~3GW |
| Total | 1.5~2GW | 3~3.5GW | 2~3GW | 7~8GW |

* Source: MOTIE, Offshore Wind Competitive Bidding Roadmap)

Key Examples

EQUINOR / OFFSHORE WIND POWER DEVELOPER/ NORWAY

- ▶ **Company Overview:** A Norwegian state-owned integrated energy company with USD 107 billion in revenue, operating about 50% of the global floating offshore wind capacity. The Norwegian government is the largest shareholder, holding 67% of the company's shares.
- ▶ **Investment Overview:** Equinor is developing a 750 MW floating offshore wind farm off the coast of Ulsan, South Korea, about 60-70 km from shore in water depths of 150-300 meters. The project is expected to break ground in 2025 and will supply power to 440,000 households annually and reduce CO2 emissions by approximately 37.5 million tons.
- ▶ **Special Note:** Collaborating with leading domestic companies such as Samsung Heavy Industries, POSCO E&C, and Doosan Enerbility.

CIP / OFFSHORE WIND POWER DEVELOPER / DENMARK

- ▶ **Company Overview:** A leading global renewable energy investment company managing approximately KRW 40 trillion in assets, with 11 renewable energy funds focused on wind, solar, and bioenergy.
- ▶ **Investment Overview:** CIP is currently developing both floating and fixed offshore wind farms in Ulsan and Sinan, Jeonnam.
- ▶ **Special Note:** Joint venture with SK E&S for Phase 1 of Jeonnam Offshore Wind, expected to start commercial operation in 2025.