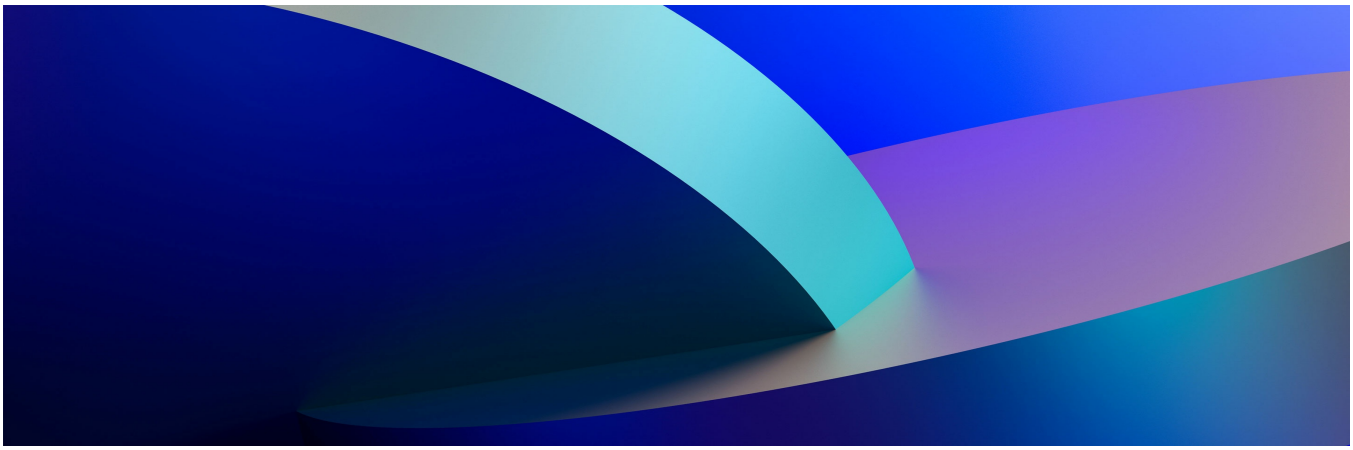

Renewable energy in South Korea

1. Overview of renewables sector

In July 2020, South Korea introduced its Green New Deal (GND) which includes commitments to generate 20% of the country’s power with renewables by 2030. It also aims to invest 9.2 trillion South Korean won (USD 6.8 billion) by 2025 in wind, solar, and hydrogen, and establish 12 GW of offshore wind capacity by 2030. This is a significant increase as, in comparison, South Korea had 124.5 MW of such capacity in place in 2022.

Additionally, in 2021, the South Korean government announced its commitment to achieving carbon neutrality by 2050. It also submitted its intended nationally determined contribution which sets out an unconditional target to reduce its domestic greenhouse gas (GHG) emissions by 40 per cent compared to 2018 levels by 2030.

The below further expands on the above and focuses on past and current key developments.

2. New legislation and policies

South Korea has enacted various legislation relating to renewable energy. This includes the Renewable Energy Act, Carbon Neutrality Act and the GHG Allocation Act. The Renewable Portfolio Standard (RPS) and the Korean Emissions Trading Scheme (K-ETS) instead serve as the two main regulatory frameworks supporting such legislation. The Ministry of Trade, Industry and Energy (MOTIE) and the Ministry of Environment (MOE) are the governmental authorities responsible for implementing energy related initiatives.

The Fifth Basic Plan for Use, Supply and Technology Development of New and Renewable Energy

Under the Renewable Energy Act, the government sets out a comprehensive plan every five years aimed at promoting the development and utilisation of new and renewable energy technologies. In December 2020, the Fifth Basic Plan for New and Renewable Energy Technologies was introduced, delineating the Korean government's roadmap from 2020 to 2034 concerning new and renewable energy. The plan's core objective is to bolster the proportion of new and renewable energy in the overall power generation to reach 25.8% by 2034. Within this target, 22.2% is designated to originate from renewable energy sources, while 3.6% is reserved for new energy sources. With the Fifth Basic Plan, the government is actively steering away from fossil-based energy as the predominant energy source, prioritising the adoption of renewable energy, especially solar and wind, in its pursuit of a

decarbonised economy.

The Renewable Portfolio Standard and the K-ETS

As noted above, South Korea's RPS scheme and K-ETS are the main regulatory frameworks assisting the country in the transition to renewable energy.

In particular, the RPS scheme, applies to power generation companies with installed capacity of over 500 MW. It requires them to ensure that a minimum proportion of their power (the RPS quota) is generated from renewable energy sources. In April 2021, the then Moon administration increased the RPS quota to 12.5% for 2022, 14.5% for 2023, 17% for 2024, 20.5% for 2025 and 25% in 2026. However, in 2023, the government reduced the RPS quota for 2023 to 13% and increased it to 15% and 25% for 2026 and 2030 respectively. This change may therefore lead impacted generators to reduce their reliance on renewable energy sources.

The K-ETS instead tackles GHG emissions. In particular, it caps the number of emissions that can be produced by specified sectors and allocates allowances to these, of which at least 10% are auctioned. Affected organisations must purchase sufficient permits to cover their emissions as they otherwise face a penalty. It still however remains to be seen the extent to which K-ETS has positively contributed to decarbonisation. Currently, the MOE is developing Phase 4 of K-ETS, which will cover 2026 to 2030. This is set to align the K-ETS cap with the country's GHG emissions reduction target and will likely be completed by 2024.

The 10th Basic Energy Plan for Electricity Supply and Demand

MOTIE is tasked with creating a comprehensive basic plan for electricity supply and demand, known as the "Basic Plan," every two years under the Electricity Business Act. This plan outlines the fundamental direction of electricity supply and demand over a 15-year horizon, including long-term assessments. Most recently, on 11 January 2023, MOTIE published its 10th Basic Plan. This aims to increase the utilisation of nuclear energy, in contrast to the previous administration's nuclear phase-out plan, commits to maintaining a de-coal policy and promotes renewable energy sources. Additionally, it ensures the stability of electricity supply and demand, and actively addresses the employment challenges arising from the gradual phasing out of coal power generation and its effect on the country's economy.

Notably, in comparison to the 9th Basic Plan, the proportion of renewable energy South Korea is aiming to produce by 2030 has been adjusted from 30.2% to 21.6%. In contrast, it is expected that nuclear energy will make up 34.6% of the country's electricity generation by 2036. This aligns with the new administration's energy policy direction, resulting in a decrease of the target while maintaining realistic goals and a balanced energy mix. Despite this reduction, there is still an expectation that the capacity of renewable energy will reach 72.7 GW by 2030.

K-RE100

The Korean RE100 initiative, known as K-RE100, is supported by an amendment to the Regulation on the Support of New and Renewable Energy Facilities. Effective from January 1, 2021, this amendment encourages companies and general consumers to transition to 100% renewable energy as part of the global RE100 initiative's goal to expedite the worldwide shift to carbon neutrality by 2050. Participation in K-RE100 is open to both industrial and general consumers who can register with the Korea Energy Agency. Companies taking part in K-RE100 will receive recognition for their greenhouse emissions reductions in line with updated guidelines provided by the MOE.

To foster greater business adoption of renewable energy, the Korean government has put in place

several notable incentives:

1. Green Premium Payment - This initiative allows electricity consumers to make an additional payment to the Korea Electric Power Corporation (KEPCO) to be recognised as users of electricity generated from renewable sources.
2. Procurement of Renewable Energy Certificates (RECs) - These certificates validate that power generators have produced and supplied power using new and renewable energy facilities. Power generators can meet their required new and renewable energy supply targets by purchasing RECs from renewable energy producers.
3. Amendments to the Electricity Business Act - These amendments establish a framework that enables corporate consumers to procure renewable energy electricity, either indirectly or directly through KEPCO. This framework promotes the adoption of corporate Power Purchase Agreements (PPAs), enhancing the ease of access to renewable energy sources for businesses.

With regards to the future, South Korea has set out plans to introduce a price-based pool market after 2024 which will enable decentralised price-setting for generators. This would allow them to bid individually into the market based on their own cost profiles and would allow the full costs of allowances to be passed through to the wholesale market.

3. Offshore wind

In July 2020, through its announcement of the Offshore Wind Collaboration Plan (OSWCP), the South Korean government clearly recognised the challenges faced by the industry and demonstrated determination to resolve these. The OSWCP was jointly issued by the MOTIE, the Ministry of Oceans and Fisheries (MOF) and the MOE and includes two main objectives. The first, as stated in the GND, is to install 12 GW of offshore wind capacity by 2030. This would create 87,000 new jobs and make South Korea one of the world’s top five offshore wind generating countries. The second objective is to ensure that local residents and fishing industries benefit from the advantages of offshore wind development equitably.

Additionally, in February 2021, the South Korean government announced its plan to develop a 48.5 trillion South Korean won (USD 36 billion) 8.2 GW offshore wind project in the country’s South Jeolla province. This would be South Korea’s largest offshore development to date and could bring it significantly closer to achieving its 2030 target of 12 GW offshore wind capacity. If the project is developed as planned, South Korea could be ranked sixth globally in terms of offshore wind capacity by 2030.

To encourage the development of further, similar projects by improving their profitability, the South Korean government has updated the RECs weighting system to more accurately reflect the higher costs of developing offshore wind projects.

4. Solar power

In 2022, South Korea's solar energy capacity escalated to 20.97 GW, signifying a substantial increase from the previous year's 18.16 GW. An exciting development within South Korea's solar industry is the emergence of floating solar farms. These projects have gained momentum in Asia, especially in countries where land for traditional solar farms is scarce due to extensive urban development and agricultural expansion.

A notable example is the Hapcheon Dam Floating Solar Power Project, a 41 MW floating solar array installed on a water reservoir at the Hapcheon dam in South Korea's South Gyeongsang province. The project, constructed by South Korean floating PV specialist Scotra, commenced in 2020 and became operational in December 2021. It features 92,000 solar panels arranged in the shape of plum

blossoms, adding an aesthetic touch to the site. What makes this project unique is community investment, with approximately 1,400 residents contributing 3.1 billion South Korean won (about USD 2.6 million), covering roughly 4% of the total project cost, and anticipating a 10% annual return over 20 years.

Furthermore, the Saemangeum Floating Solar Power Project, located on Saemangeum Lake in North Jeolla, South Korea, is an ambitious endeavour covering 30 square kilometres of the lake, equivalent to 11.6 square miles. Anticipated to be the world's largest floating solar power plant, this project is set to generate enough electricity to power approximately one million households. Construction is scheduled to commence in 2024, with commercial operation expected by 2025. The generated power from the Saemangeum Floating Solar Power Project will be supplied to Korea Hydro & Nuclear Power under a power purchase agreement, with a projected offtake capacity of 300 MW.

It is important to note that floating solar systems entail a relatively higher cost compared to their land-based counterparts. This higher cost is primarily attributed to the additional expenses associated with floats, moorings, and more robust electrical components. According to the World Bank, floating systems are estimated to be approximately 18% more expensive.

However, the South Korean solar energy industry is not without its challenges. Notably, the solar energy tenders conducted by the Korea Energy Agency, held twice each year since 2017, saw an unexpected decline in participation, resulting in undersubscribed bids. Out of the total 2.2 GW capacity, only 1.4 GW was allocated at an average rate of 155,270 South Korean won (USD 117)/MWh. These challenges have been compounded by rising power prices and increasing REC costs, diminishing developer incentives for competitive bidding on long-term contracts offered through these tenders. Additionally, the industry faces strict land laws, regulations, and community opposition, making it more challenging to identify suitable locations for solar projects. These issues underscore the complexities faced by the South Korean solar energy industry, despite its promising growth and innovative developments.

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