



Report 2022

# Korea

*Photo: Kokkai Ng / Getty Images Signature-Canva.*

**Author** *Seung-Ho Song, Kwangwoon University, Republic of Korea.*

**Total installed wind capacity reached 1,809 MW in 2022 – a 4.8% increase from the previous year.**

Having installed 96 MW capacity of wind turbines in 2022, the accumulated capacity in Korea reached 1809 MW at the end of 2022. In October 2020, it was announced that the Republic of Korea aims to achieve carbon neutrality by 2050. The new government starting in 2022, also announced to maintain the carbon neutrality target year and renewable energy deployment goals, 33% of the

electricity generation by 2036. The wind energy sector in Korea, which has shown slower deployment than photovoltaics, is preparing large-scale installation of wind energy especially in offshore wind for the energy transition.

**Table 1. Key National Statistics 2022: Korea**

Total (net) installed wind power capacity	1809 MW
Total offshore capacity	146 MW
New wind power capacity installed	96 MW
Decommissioned capacity	0 MW
Total electrical energy output from wind	3.35 TWh
Wind-generated electricity as percent of national electricity demand	0.6%
Average national capacity factor	23.7%
Target	17.7 GW by 2030
National wind energy R&D budget	45 mil USD

## Market Development

### National Targets and Policies Supporting Development

- At the end of 2017, the Ministry of Trade, Industry and Energy (MOTIE) announced the “Renewable Energy 2030 Implementation Plan” which states the national renewable energy target and its implementation plans towards 2030. The national objective is 20% renewable energy generation of the national electricity demand by 2030 [1].
- According to that plan, 63.8 GW of renewable capacity is required to meet the target of 20% of national electricity demand, by 2030 [1]. Among various renewable energy sources, PV and wind will lead the capacity. PV accounts for 36.5 GW (57%) and wind for 17.7 GW (28%) capacity by 2030 [1].
- At the end of 2022, the Ministry of Trade, Industry and Energy (MOTIE) announced the latest 10th Basic Plan for Long-Term Energy Supply and Demand,

including the national renewable energy target and plans towards 2036. The renewable energy generation objective is 33% of the national electricity demand by 2036 [2].

- The Renewable energy Portfolio Standards (RPS) is the main policy to support wind energy development, which is basically a technology-neutral, market-based system. In the RPS system, there are multiplying factors to adjust the amount of renewable electricity generated from each technology, which varies from 0.25 to 3.8 (excluding ESS applications) [3]. For onshore wind, the factor is from 1.0 to 1.3 depending on the type of projects (e.g., how many local communities were involved in the project). Among various renewable energy sources, offshore wind has the biggest factors, from 2.0 to 3.8, which means that the government strongly drives the deployment of offshore wind within the country [3]. It is expected that the country is going to deploy about 12 GW of new offshore wind

capacity by 2030 [4].

- New president of the Republic of Korea Mr. Yoon stated to maintain the policy of carbon neutrality target in 2050, which was established by the former president Moon. He also announced to increase the nuclear power generation, which currently supplies 29% of annual electricity consumption already in 2021.
- Because carbon neutrality is the promise to the world and the new government said to succeed it, Korea’s renewable energy policies will be, and should be continued. In addition, the request from major companies to achieve RE100 is getting stronger in Korea. And the lowest number of wind capacity 0.6% even shows the possibility and the room for the growth of wind energy development in Korea.

## Progress and Operational Details

- 96 MW wind turbine capacity was installed in 2022—35% higher than the previous year but still slow deployment [5]. Six wind farms with 20 wind turbines are installed in 2022 and all of them are land-based projects [5]. The average capacity of one single WTG installed in 2021 was 4.78 MW, including one 8MW prototype wind turbine [5].
- The total installed wind capacity in the country reached 1,809 MW by the end of 2022—a 4.8% increase from the previous year [5]. There are 115 wind farms with 779 WTGs in total. In 2022, the electricity generated from wind power was 3.348 TWh (provisional) which accounted for 0.6% of the national electricity demand (550.694 TWh, provisional) [6].
- According to the Electricity Business License (EBL) by the Ministry of Trade, Industry and Energy, a total of 20,709MW offshore wind projects have received the EBL at 68 locations at the end of 2022 [4].

## Matters Affecting Growth and Work to Remove Barriers

- On July 17, 2020, the Ministry of Trade, Industry and Energy (“MOTIE”), the Ministry of Oceans and Fisheries (“MOF”) and the Ministry of Environment (“MOE”) jointly issued a “Plan for Offshore Wind Power Generation in Collaboration with Local Residents and the Fishing Industry”. The Collaboration Plan sets out specific measures to encourage the speedy development of large-scale offshore wind farms and trickle-down benefits to local stakeholders [8].
- Two objectives of the “Offshore Wind Power Collaboration Plan”

are as follows. First, to install 12GW of offshore wind power, creating 87,000 new jobs annually, by 2030 to become one of the world’s five largest offshore wind power generating countries. Second, to share the economic benefits of offshore wind development with residents and the fishing industry [8].

- Three collaborative initiatives: 1. Government-led Siting and Streamlined Permitting 2. Encouraging Stakeholder Acceptance 3. Leveraging Large-Scale Projects to Enhance Industrial Competitiveness [8].
- The development of offshore wind farms is a key component of the Korean Green New Deal which would invest KRW 73.4 trillion to create 659,000 jobs in new and renewable energy sectors [9].

## RD&D Activities

### National RD&D Priorities and Budget

- In Korea, one of the R,D&D priorities has been the development of wind turbine generators and its major components for the value chain of wind industry. Also, the development of smart O&M strategies and technologies for the reduction of LCOE was important—especially in the offshore sector.
- Recently the topics of social acceptance and safety issues are being emphasised. Also R,D&D activities about the deployment of wind farms and the reduction of LCOE will be continued.

### National Research Initiatives and Results

- A project titled “Development of 8MW High Capacity Offshore Wind Turbine” is successfully finished. Also a project titled

“Development of recycling technology using recyclable resin of wind turbine blades (‘22~‘25)” was launched in 2022.

- Another project “Development of the localized technology for pre-piling to reduce the construction cost of sub-structures in the large scale of offshore windfarms (‘21~‘24)” and “Development of Design Technology for TLP-type Floating Offshore Wind Turbine System and Scaled Model Test Technique (‘22 ~ ‘25)” are in progress.
- Other important R,D&D projects include “Development of 70kV Dynamic Cable System Technology for FOWT (‘22 ~ ‘24)”, and “Development of layout design and underwater noise management technology for coexisting suitable offshore wind farm (‘22 ~ ‘25)”.

## Test Facilities and Demonstration Projects

- A blade test laboratory ‘Korea Institute of Materials Science (KIMS - WTRC)’ was recognised as one of the RE Testing Laboratories of IECRE in 2019. The KIMS-WTRC can accommodate and test 8MW blades as the dimension of the blade test building is large enough and equipped with static and fatigue test equipment for blades.

## Collaborative Research

- Currently Korea is participating IEA Wind TCP Task 11, Task 30, Task 32, Task 41, Task 42 and Task 52. As the wind industry expands in Korea, more participation in IEA wind tasks from the industry is expected.

## Impact of Wind Energy

### Environmental Impact

- The electricity generated from wind power covers only about 0.6% of the national electricity demand which is a very low percentage. However, in Korea, the increase of renewable energy (photovoltaics and wind) and curtailed operation of coal power resulted in the reduction of 30.4Mt CO<sub>2</sub> in 2022. The deployment of large-scale offshore wind energy is an essential measure for the carbon-neutral strategy in Korea.

### Economic Benefits and Industry Development

- Regarding the domestic wind industry, it seems that the amount of economic benefits and the level of industry development in 2022 did not deviate much from the previous year. In 2021, domestic wind manufacturing industry revenue recorded an overall turnover of 1,920 billion KRW (1,477 million USD) [9].
- As an indicator of the domestic capability of the wind manufacturing industry, roughly half of the installed capacity was covered by domestic WTGs in recent years [4]. The statistics had shown that national utilities had more preferences in domestic WTGs than those by private companies as a developer or an owner [4]. However, the domestic wind turbine suppliers are looking for other solutions for the offshore market such as strategic partnerships with major global wind turbine OEMs.

### Next Term

Rising energy prices are an opportunity for the expansion of renewable energy generation and the investment in renewable energy

generation is expected to expand in terms of energy security. Based on the newly determined REC (Renewable Energy Certificate) multiplying factor for offshore wind energy in 2018, greater involvement of local governments and communities and increased feasibility study cases will act as further positive drivers for large-scale offshore wind development. Also, some FEED studies for offshore projects and the increased number of cases for EBL (Electricity Business License) applications are indicators of the current status of offshore wind development in Korea.

The main challenges are complicated regulations, lengthy and unreliable permitting processes, opposition from locals, and grid uncertainties. In 2022, a new bill for offshore wind development was introduced in the Korean National Assembly to promote offshore wind deployment. Key components of the bill include government-led maritime zoning and permit centralization to achieve coordination with relevant stakeholders. However, the bill is still in the review process in the subcommittee. Wind energy is a key component of South Korea's energy transition, and especially offshore wind has tremendous potential in Korea. Every effort to remove hurdles and bottlenecks for the deployment of offshore wind needs to be more harmonized and accelerated.

### References

[1] Ministry of Trade, Industry and Energy (2017). Press release (20-Dec-2017): Korea's Renewable Energy 3020 Implementation Plan.

Downloads from:

[http://www.motie.go.kr/motie/press2/bbs/bbsList.do?bbs\\_cd\\_n=81](http://www.motie.go.kr/motie/press2/bbs/bbsList.do?bbs_cd_n=81)

[2] Ministry of Trade, Industry and Energy (2022). Press release (12-Jan-2023): 10th Basic Plan for Long-Term Energy Supply and Demand.

Downloads from:

[https://www.motie.go.kr/motie/press2/bbs/bbsView.do?bbs\\_seq\\_n=166650&bbs\\_cd\\_n=81](https://www.motie.go.kr/motie/press2/bbs/bbsView.do?bbs_seq_n=166650&bbs_cd_n=81)

[3] Ministry of Trade, Industry and Energy (2019). Administrative Order 2019-41(15-March-2019): Rules on Management and Operation of RPS, RFS system.

Downloads from:

[http://www.motie.go.kr/motie/ms/nt/gosi/bbs/bbsKist.do?bbs\\_cd\\_n=5](http://www.motie.go.kr/motie/ms/nt/gosi/bbs/bbsKist.do?bbs_cd_n=5)

[4] Ministry of Trade, Industry and Energy (2018). Press release (3-May-2018): Revision of an Administrative Order on a permitting process of wind energy development.

Downloads from:

[http://www.motie.go.kr/motie/press2/bbs/bbsList.do?bbs\\_cd\\_n=81](http://www.motie.go.kr/motie/press2/bbs/bbsList.do?bbs_cd_n=81)

[5] Korea Wind Energy Industry Association (2023). 2022 Annual Report on Wind Energy Industry in Korea.

[6] Korea Power Exchange, Electric Power Statistics Information System (<http://epsis.kpx.or.kr/epsisnew/selectMain.do>).

[7] Ministry of Trade, Industry and Energy (2020). Press release (26-Feb-2020): Continue to drive the promotion of renewable energy in 2020.

Downloads from:

[http://www.motie.go.kr/motie/press2/bbs/bbsList.do?bbs\\_cd\\_n=81](http://www.motie.go.kr/motie/press2/bbs/bbsList.do?bbs_cd_n=81)

[8] Ministry of Trade, Industry and Energy, the Ministry of Oceans and Fisheries and the Ministry of Environment, Press release (17-Jul-2020): Plan for Offshore Wind Power Generation in Collaboration with Local Residents and the Fishing Industry.

Downloads from:

[https://www.motie.go.kr/motie/press2/bbs/bbsView.do?bbs\\_seq\\_n=163153&bbs\\_cd\\_n=81](https://www.motie.go.kr/motie/press2/bbs/bbsView.do?bbs_seq_n=163153&bbs_cd_n=81)

[9] Korea Energy Agency (2021). Industry Statistics of New & Renewable Energy 2020 (2021 Edition).  
Downloads from:  
<https://www.knrec.or.kr/biz/pds/statistic/view.do?no=122>