

South Korea retail store energy storage

South Korea has set an ambitious goal to rise alongside the United States and China as one of the top three powerhouses in the global energy storage system (ESS) industry by 2036. The nation plans to capture 35% of the rapidly growing global ESS market, aiming to revitalize its currently stagnant domestic ESS industry.

On Oct. 31, Deputy Minister Kang Kyung-sung of the Ministry of Trade, Industry, and Energy announced the company's "ESS Industrial Development Strategy" at a forum held at LS Electric's Global R& D Campus in Anyang, Gyeonggi Province. The meeting brought together representatives from ESS companies, universities, and research institutions.

An ESS, or Energy Storage System, is a facility that stores excess electricity using large quantities of secondary batteries to use it later. As countries around the world push for carbon neutrality around 2050, there's an increasing demand for renewable sources like solar and wind energy, as well as carbon-free energy (CFE) like nuclear power. However, CFE generation, while carbon emission-free, poses challenges in adjusting output, necessitating the need for ESS to balance real-time supply and demand.

According to a report by energy market research firm Bloomberg New Energy Finance (BNEF), excluding pumped hydroelectric storage, the global ESS capacity is projected to surge from 43.8 GW in 2022 to over 508 GW by 2030. In terms of power capacity, it's expected to grow from 91.5 GWh to over 1,432 GWh, an increase of more than 15 times. The market size is also forecasted to grow from US\$15.2 billion in 2022 to US\$39.5 billion by 2030.

South Korea recognizes the growing need for ESS. According to the 10th Basic Plan for Power Supply and Demand confirmed earlier this year, the percentage of rigid power sources, which are difficult to adjust in terms of output, will increase from 34% in 2021 to 54.0% in 2030 and 65.2% by 2036. There are already concerns about oversupply during midday in spring and autumn in regions like Jeju and Honam, where there's a high proportion of renewable energy generation.

However, recent trends in South Korea have seen a decline in ESS adoption. After peaking at 975 installations with a capacity of 3.8 GWh in 2018, the installation in the past year decreased to 94 locations with a capacity of just 252 MWh. Reasons include reduced incentives for ESS installation during the power market reform and an increase in fire accidents related to ESS after 2017, which significantly reduced both demand and supply.

Given this trend, there are concerns about securing flexibility in the power grid with the increase in rigid power sources. The government had previously estimated in the 10th Basic Plan for Power Supply and Demand that by 2036 there would be a need for 26.3 GW of ESS, including pumped storage. Amid an unprecedented financial crisis at Korea Electric Power Corporation, the central hub of Korea's electric

industry, the estimated 45 trillion won (US\$33 billion) for ESS installation is a significant burden.

The Ministry of Trade, Industry, and Energy plans to refine ESS demand by type and cycle and promote ESS construction accordingly. By 2036, the short-cycle ESS facilities required within 30 minutes are 3.66 GW, while long-cycle facilities are segmented into more than 4 hours (4.22 GW), more than 6 hours (15.58 GW), and more than 8 hours (1.05 GW). The goal is to distribute them accordingly within the required period. Pumped storage power plants will also be distributed on a scale of 1.75 GW, with additional construction as needed to replace long-cycle ESS facilities for over 8 hours.

Following this plan, the government aims to construct 3.7 GW of ESS facilities, averaging 0.6 GW annually, from 2025 to 2030. There's also an objective to reduce the estimated ESS construction cost of 45 trillion won by 20%. Policies will be implemented to create a low-carbon central contract market, including ESS, within the electricity market. This will encourage renewable energy producers to voluntarily expand ESS facilities. Financial incentives, such as low-interest loans and tax breaks for ESS installation companies, are also under consideration.

Efforts to foster a new ESS market are also underway. Initiatives include establishing a private integrated management system for used battery recycling, introducing mobile ESS in ships and vehicles, and promoting the commercialization of a vehicle to grid system, which utilizes electric car batteries as ESS. Changes in related laws and regulations are also being pushed forward. The government will also strive to maintain a leading edge in ESS technology, focus on early commercialization, and develop strategic technology for new market challenges.

Export support policies will be implemented as well. When domestic renewable energy companies pursue global projects, they will be encouraged to incorporate ESS. Through joint technological development with major countries such as the United States, new export opportunities will be sought. Financial support will be provided through public finance, green bonds, and multilateral development banks, and overseas ESS projects will also be promoted through Official Development Assistance (ODA) from the government.

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