North korea energy storage market

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Strengthen the Commission"s responsibilities in areas such as setting tariffs and monitoring of the market, and reinforce staff capacities in line with its increased responsibilities.

In addition to the clean energy targets, create performance-driven regulatory frameworks for energy efficiency and renewable energy deployment. In order to attract and facilitate investments in clean energy with new business opportunities, also develop regulatory frameworks for competitive energy and gas markets.

To accelerate the switch to lower emission technologies, warrant that taxation of fuels reflects their external costs, including carbon content and air pollution.

In October 2020, Korea announced its pledge to achieve net zero emissions by 2050. With 586million tonnes of CO?-equivalent in 2019, Korea accounts for 2% of global annual emissions. Its power and industrial sectors are major contributors to annual national emissions at 37% and 36% respectively.

Net zero emissions by 2050 would require very strong support measures and incentives that introduce renewable and other low-carbon energy sources and interventions to rein in emissions of greenhouse gases in all sectors of the Korean economy. The power sector is the largest source of emissions in many countries, including Korea, and should be the first sector to decarbonise as shown in the Net Zero by 2050 roadmap by the International Energy Agency (IEA).

Korea aims to reduce emissions from the power sector in a cost-effective way, without compromising electricity security. In liberalised power markets, like Korea"s, the wholesale market should be the key enabler to reach policy objectives and to ensure the efficient dispatch of all resources. However, Korea"s current cost-based system does not account for factors such as emissions and system security. In recent years, this has resulted in higher profits for technologies with lower fuel costs and higher emissions, like coal-fired generation.

Maintaining this pricing regime would not enhance the power system"s ability to secure sufficient low-carbon energy and dispatchable capacity by 2035. Considering the recent introduction of policies to phase out coal-fired generation and limit nuclear electricity, it will be important to secure enough investment in alternative low-carbon dispatchable resources such as hydro, pumped storage hydropower (PSH) and battery storage.

Second, allow the shortages of operating reserves to be reflected in wholesale pricing during hours of scarcity, which increases the prospects for flexible technologies such as PSH, batteries, hydro and gas plants.

Including both price enhancements would correct the existing biases in the wholesale market design and align

the incentives given to market participants with Korea"s decarbonisation objectives. This would foster a gradual substitution process where low-carbon energy replaces highly polluting sources and provides incentives to invest in assets that can provide the services needed to keep security of supply.

Korea"s annual variable renewable energy (VRE) share of electricity supply was 4% in 2020, and the country is in Phase I in the Phases of VRE integration framework developed by the IEA. Following the 9th BPLE would bring their VRE share to around 21% in 2034 and place the country in Phase III. This would require coping with maximum hourly VRE penetrations of 60% relative to load and coping with three-hour ramp-down requirements equivalent to 51% of the daily peak already by 2030.

For Korea, the current plan to reduce dispatch intervals from hourly blocks to 15 and 5 minutes provides a first good step to facilitate power system decarbonisation. Countries like Australia, which have introduced 5 minute dispatch intervals to cope with a high penetration of solar PV may offer useful experiences for Korea. This, along with intraday and real-time markets, would greatly complement the existing day-ahead market and provide participants with incentives to balance the system and properly forecast their output and demand, ensuring smooth operation of the system.

Korea"s current system has a single bidding zone power market with uniform pricing, which in practice does not recognise any physical constraints in the transmission and distribution networks. The market, therefore, lacks the proper signals for timely investment in transmission and optimal choice of locations for generation assets. This problem will grow larger with higher shares of VRE.