

Japan energy storage solutions

Tesla Japan announced last week (4 June) that the large-scale battery system has been installed and begun operation at the site of Sendai Power Station, which is in Sendai City, Miyagi Prefecture, around 360km northeast of the nation's capital Tokyo.

The Megapack installation is based on Tesla's integrated solution which includes lithium-ion (Li-ion) batteries, power conversion system (PCS, described as "power conditioner" in Japanese industry parlance), thermal management and controls.

It is listed as available in Japan in 2-hour duration (1927.2kW/3854.4kWh) and 4-hour duration (979.2kW/3916.8kWh) configurations.

The BESS will enter Japan's newly opened ancillary services markets through which assets will participate in helping balance the frequency of the electricity grid. The services, which require fast response times to correct deviations in grid frequency, were launched through tenders which were held for the first time in April.

Kanden Energy Solutions, the services arm of regional electric utility Kansai Electric Power Company (KEPCO or Kansai Electric), will handle the market operation.

KEPCO operates as a utility in the Kansai region in the southwest of Japan, but the 112MW coal-fired Sendai Power Station is part of its generation fleet, which the company operates as well as joint-owning with Enex Electric Power, a retail electricity subsidiary of Itochu Corporation.

KEPCO is one of Japan's former monopoly energy companies which until the mid-2010s operated both electricity markets and grids across 10 major regions. Through a process of deregulation and unbundling of electricity supply and transmission and distribution (T& D), the market is now nationalised, but with regional pricing.

As noted in a recent LinkedIn article by Jack Greenwood, an APAC market analyst at Octopus Energy-owned electricity trading and optimisation software group Kraken, the national procurement of ancillary services is a "key feature of the new country-wide market".

Formerly, ancillary services were procured regionally and served solely by thermal generation and pumped hydro energy storage (PHES) plants. They are now procured nationwide through auctions, although it is worth noting the Japanese grid network is split into two operating frequencies: 50Hz in the north and east and 60Hz in the south and west of the country.

Kraken's Jack Greenwood highlighted that auctions, which have been rolled out this year with the most recent

in April, have so far been undersubscribed. This is a major contrast to the country's first-ever low-carbon capacity market auction, which saw 20-year contracts handed to 1.67GWh of storage, mostly batteries, along with around 500MWh of PHES.

The Supply and Demand Adjustment Market was established by the Electric Power Reserve Exchange in 2021, gradually introducing new ancillary services markets from that year onward, beginning with tertiary adjustment reserve, then adding primary adjustment reserve and secondary adjustment reserve this year, as well as starting trading in all markets.

Tesla Japan said its system at Sendai will provide two levels of frequency regulation, tertiary adjustment and primary adjustment:

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