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Introduction of Regional Power Grid Battery Storage Project

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Abstract
On September 2022, government approved the "Regional Power Grid Battery Storage" as a forward-looking infrastructure demonstration project. The project goal is to select second substations (S/S) with high penetration of renewable energy to build "Battery Storage System(BSS) " ，"Energy Management System(EMS)" and "Diesel Generator ". Normally, the project system can regulate the power quality. However, if the transmission system black out during disaster, the Feeder Dispatch Control Center (FDCC) can remote control the feeder switch segmented and increase load gradually. Combined with the PV on the feeder, it can provide power around the local areas, maintain the important basic electricity demand of customers or residents.

Taipower currently has eight regional demonstration sites. According to its function, regional power grid mainly divided into the following three modes:
Grid-connected mode: The transmission system supplies power, power conversion system (PCS) operates in "grid following mode", the energy storage acts as a current source to regulate the feeder power, such as system Automatic Frequency Control (AFC), Electrical energy transfer, Smoothing of renewable energy.
Islanding mode: If transmission system black out, the power conversion system (PCS) operates in "grid forming mode", the energy storage system plays the role of a voltage source, loading and connecting each section of the feeder one by one, restarting the disconnected solar photovoltaic system, and maintaining the balance of the regional power grid with the solar photovoltaic power output. In this mode, the diesel generator can start operation based on the remaining battery power.
Restoration procedure: When transmission system is restored, FDCC confirms that EMS has received the synchronization signal sent by the PMU, FDCC switch on FCB, operating state from "islanding mode" to "Grid-connected mode".