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Sharing Our Village's Power With Our Neighbors...

Jeju Launches “Energy-Zero Village” Initiative

- AI-powered integrated management of solar power, ESS, EV, and heat pump
- Lowering costs + increasing power grid flexibility
- Building a distributed energy hub spanning residential, mobility, and agriculture, from EV charging to smart farms

The Ministry of Climate, Energy and Environment (MCEE, Minister Kim Sungwhan) announced that it plans to prioritize the demonstration of various types of distributed energy projects selected through the “2026 AI-Based Distributed Energy Specialized Area Support Program” in Jeju.

With the rollout of residential heat pump distribution projects gaining momentum, Jeju is expected to lead the nation in the electrification of heating in the residential sector. In addition, Jeju already has the highest electric vehicle (EV) adoption rate in the country (12.2% as of the end of August 2026), and household electricity consumption is expected to continue rising. As such, Jeju offers optimal conditions for demonstrating various distributed energy business models.

The key details of the business models being implemented in Jeju this year are as follows.

< Selected Business Models for the Distributed Energy Specialized Area Support Program >

Category	Project Name
Energy-Zero Village	Development of an AI-based home and community energy management system (HEMS/CEMS) operations platform and demonstration of a Korean-style Kraken model for zero-energy villages
EV Charging Model	Establishment of an ultra-fast EV charging station based on a non-lithium energy storage system (ESS) and development of a virtual power plant (VPP) platform Implementation of a new vehicle-grid integration (VGI) service model through the establishment of charging infrastructure and an AI-based virtual power plant platform for the commercialization of bidirectional vehicle-to-everything (V2X) power transfer
Smart Farm	Smart farm development project based on solar power, non-lithium ESS, and air-source heat pumps

First, an “energy-zero village” will be established for approximately 20 households in Jeju (in Hallim-eup or Daejeong-eup), connecting solar power, heat pumps, EVs, ESS, and AI-powered appliances into a single integrated system. The system will manage electricity produced and consumed within the village in real time and efficiently balance supply and demand. Surplus electricity generated by individual homes will be shared among residents, while the system will automatically adjust when equipment operates by taking advantage of periods when electricity rates are lower.

This project aims to implement a business model that integrates and operates various distributed energy resources that have previously been managed separately, while utilizing and trading electricity generated within the village locally. It will also serve as a flexibility resource by efficiently adjusting electricity generation, consumption, and storage in response to power supply and demand conditions, thereby contributing to the stable operation of the power grid.

Second, the “EV charging station” business model links a VPP with ESS and ultra-fast EV charging services. It aims to improve the efficiency of electricity use through AI-based renewable energy generation forecasting and

optimized operation of ESS charging and discharging.

In addition, bidirectional EV chargers capable of both charging and discharging will be installed in key areas of Jeju to demonstrate vehicle-to-grid (V2G) integration, allowing electricity to be stored in EVs during periods of high renewable energy generation and supplied back to the power grid during periods of peak electricity demand.

Finally, the “smart farm” business model is an energy-agriculture convergence model that uses an AI-based environmental control and energy management system to forecast and adjust renewable energy generation and farm energy consumption, while efficiently utilizing surplus electricity for heating and cooling, lighting, and nutrient solution supply to simultaneously improve agricultural productivity and energy self-sufficiency.

In particular, the EV charging station and smart farm projects will use non-lithium ESS to assess their potential for commercialization in terms of long-duration operation, safety, and economic viability.

The distributed energy demonstration projects being implemented in Jeju will proceed for the next five years, following on-site inspections and other preparations at the end of this year.

Lee Jae-sik, Director General for Power Grid System Policy Bureau at the MCEE, said, “Just as important as expanding the deployment of distributed energy resources such as renewable energy and ESS is how efficiently we utilize the energy produced locally.” He added, “We will demonstrate various distributed energy business models that reduce residents’ energy costs and contribute to the stable operation of the power grid, assess their performance, and then expand them to other specialized areas.”