Case Study

Jinko ESS's BESS Application for Maximizing On-Site Clean Energy Consumption

21.95MW/123.8MWh Li-ion BESS Project in Greece Athens Airport

Project Overview

In December 2019, Athens International Airport launched "Route 2025", a roadmap to achieve a net-zero greenhouse-gas emissions balance by 2025—well ahead of the aviation sector's 2050 target—through self-generation, storage and self-consumption of clean, renewable electricity produced within the airport. From 1 January 2026, Athens International Airport is set to cover 100% of its electricity demand with renewable energy produced on-site, enabled by an integrated PV and battery storage ecosystem.

As a key implementation of Route 2025, the airport deployed a 21.95 MW / 123.8 MWh battery energy storage power station. Jinko ESS was selected to supply the battery energy storage solution, leveraging its proven large-scale energy storage deployment experience to support AIA in firming renewable generation, optimizing energy dispatch and

ensuring stable, reliable power for one of Europe's most critical transportation hubs.

The project plays a central role in AIA's energy transition and places exceptionally high requirements on system safety, reliability and environmental adaptability, reflecting the mission-critical nature of airport operations.

The project faced a combination of safety, reliability and system integration challenges.

From the customer's perspective, these challenges required an energy storage solution capable of going beyond standardized configurations to support mission-critical airport operations under stringent safety, environmental and operational requirements:

- Extreme safety and reliability: The site is in a seismically active zone, requiring all electrical equipment to have very high seismic resistance to ensure the structural integrity and continuous, reliable system operation even under extreme geological conditions.

- Harsh environmental condition: The airport operating environment features high levels of airborne dust and

and long-term system reliability.

- Seamless integration and stable system support: The energy storage system must operate in close coordination with both existing and newly installed photovoltaic plants, enabling smooth energy storage and precise power dispatch, while providing continuous and reliable support for

The Solution

Jinko ESS supplied Athens International Airport with a total of 36 standardized 20-foot containerized energy storage units, each rated at 3.44 MWh, forming a large-scale, modular battery energy storage system tailored to the project's operational requirements:

Core product

Each unit is built on a standardized 3.44 MWh lithium iron phosphate (LFP) containerized energy storage platform and features a three-level fully integrated battery management system (BMS) to ensure safe, reliable, and stable system operation.

Electrical architecture

The system is configured with two independent grid connection points, each serving 18 energy storage containers. In accordance with project specifications, Jinko ESS integrated PCS units from designated third-party suppliers, including four 4.39 MW PCS units and two 2.195 MW PCS units. This modular and flexible configuration enables optimized power allocation across the interconnection points while maintaining the system's

project's operational requirements.

High seismic resilience

The container and internal structure were designed with simulation analysis and structural reinforcement in strict accordance with IEEE 693, High Performance Level requirement. We provided a detailed seismic simulation report demonstrating that the product maintains structural integrity and reliable electrical connections during earthquakes.

Enhanced environmental protection

To address the airport's operating environment, we added high-density dust screens rated G2 level per EN 779 to the ventilation inlets of all containers. This customization

cooling performance, significantly reducing contamination risk inside the equipment and extending maintenance intervals.

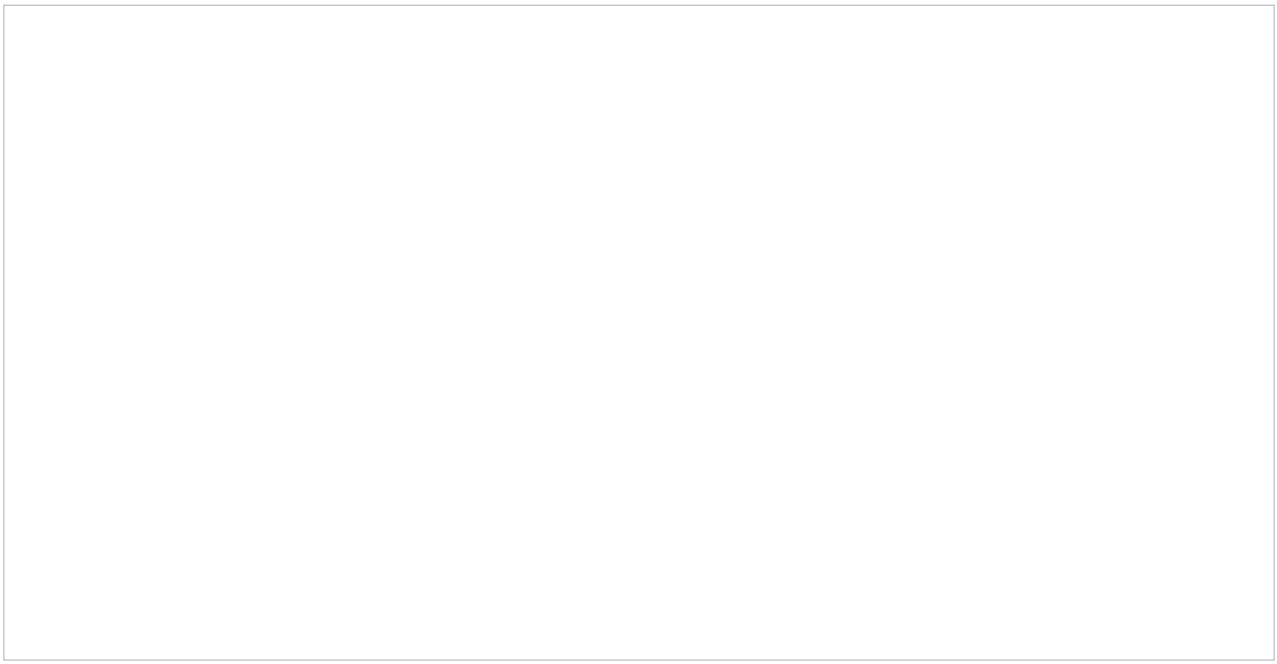

Fig. 1 System Diagram of the AC-coupled Project

Operation Logic

The project features a 21.95 MW / 123.8 MWh Battery Energy Storage System integrated with a newly developed 35.5 MWp PV plant, fully connected to AIA's internal electricity grid and coordinated with the existing 16 MWp PV plant. The BESS charged from both PV plants, enabling the airport to convert variable solar generation into dispatchable energy aligned with operational demand.

During daylight hours, the PV plants first served real-time airport load. When instantaneous PV generation exceeded on-site consumption, the system routed the surplus solar output to the BESS—capturing energy that would otherwise be curtailed or exported—so it could be used later for self-consumption. When PV generation dropped (e.g., evenings, night-time, or cloudy periods), the BESS discharged to supply the internal grid and maintain the on-site clean electricity across the full day.

This operating logic underpinned AIA's unified energy architecture, with a clear environmental purpose: maximizing on-site consumption of generated electricity for the airport's own needs, strengthening energy autonomy, and supporting decarbonization in Europe.

Maximized self-consumption of on-site solar energy

The BESS captures surplus on-site solar generation and ensures that all stored electricity is used exclusively to meet the airport's own demand, maximizing the value of locally produced clean energy.

Higher utilization of renewable generation

Through intelligent charging from the existing 16 MWp and the new 35.5 MWp PV plants, the BESS increases on-site consumption of solar output and minimizes curtailment.

Greater energy autonomy and resilience

Direct integration of the BESS with AIA's internal electricity grid enables a more autonomous and resilient energy system, better aligned with the airport's operational load

Enhanced sustainability leadership

Jinko's BESS solution plays a critical role by enabling on-site solar energy to be stored and used exclusively for self-consumption, reinforcing the AIA's leadership in sustainability. From January 1, 2026, AIA's electricity needs were covered solely by clean, renewable electricity produced within the airport fence for self-consumption—making AIA the only airport in Europe to cover 100% of its electricity needs exclusively with on-site clean energy.

Fig. 2 On-site Photo