Case Study: Sustainable Communities in Peru Driven by Clean Power

540 kW, 1,666 kWh ATESS Battery Energy Storage System (BESS) in Bretaña, Peru

Introduction

ATESS proudly announces the successful provision of equipment for a Battery Energy Storage System (BESS) in Bretaña, Peru. This state-of-the-art storage system boasts a capacity of 540 kW/1,666 kWh. The maximum load at the Bretaña power station reaches 150 kW. Remarkably, no issues have been reported with the ATESS equipment thus far.

Power Deficit in Bretaña

The Bretaña community faced significant power deficits. With the commencement of operations at the Bretaña power station, energy availability has surged exponentially, with an estimated 50% increase in load demand. This growth trajectory is expected to continue, driven by the expanding infrastructure and economic activities in the region.

The installed PV system integrated with ATESS Battery Energy Storage System (BESS) in Bretaña

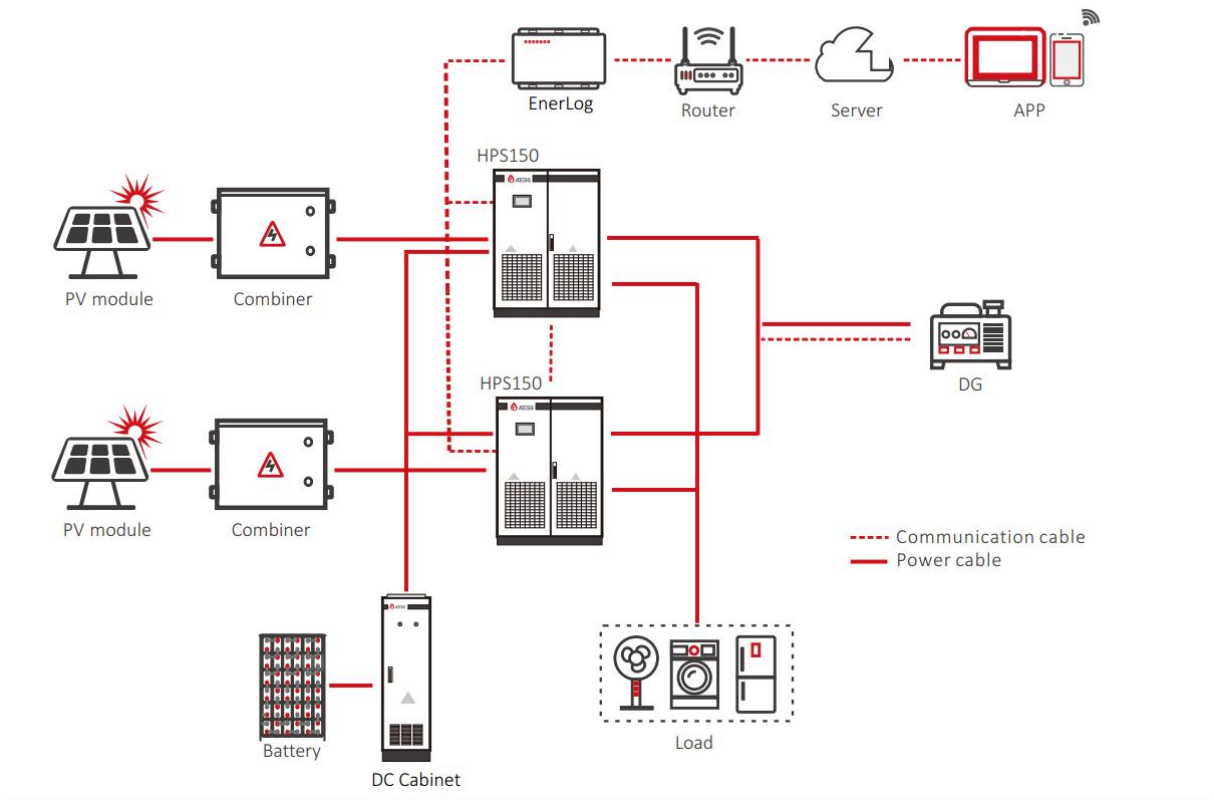
Application Scenarios and Operational Modes

The BESS system serves primarily commercial purposes, with the Energy and Mining Ministry funding the project to cover its operational costs. The dynamic nature of energy

consumption caters predominantly to domestic market entities related to residential needs. Recently, increased investments have attracted several ice factories, critical for the local fishing industry, which supports transporting fish to nearby ports like Iquitos and Pucallpa. This industrial growth has further boosted energy consumption.

System Configuration

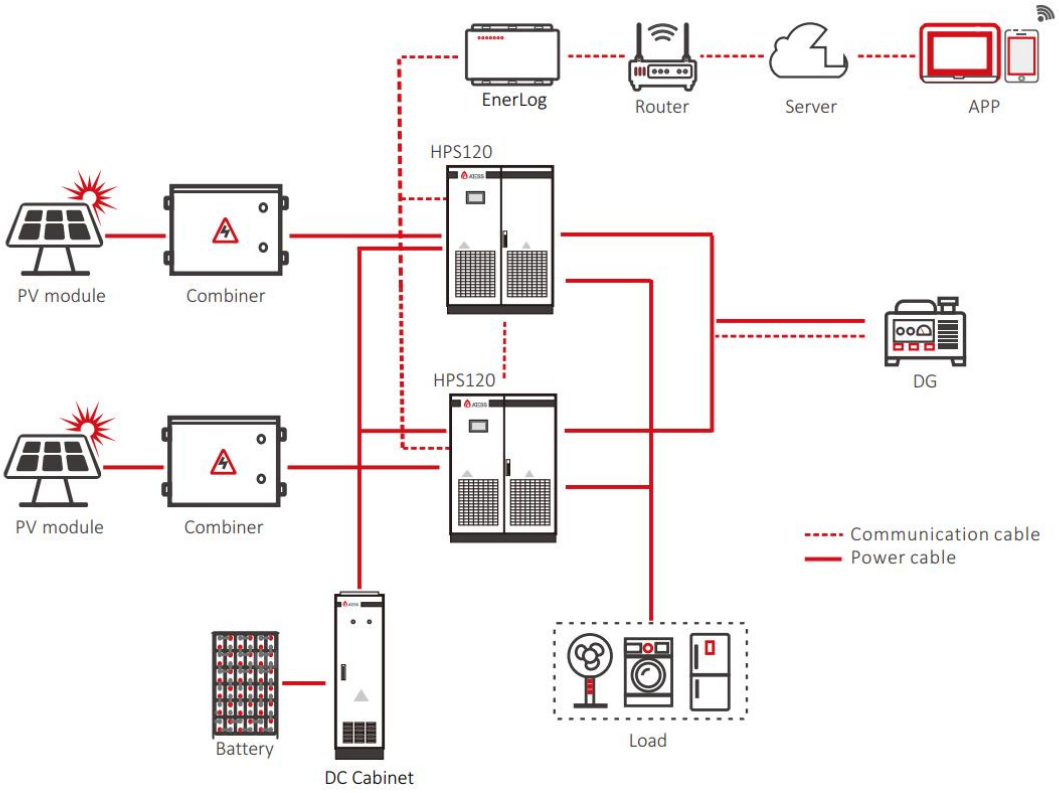
The setup includes two microgrids: Micro-grid System One comprises two HPS150 hybrid inverters, forming a 300 kW system, while Micro-grid System Two has two 120 kW HPS120 hybrid inverters, creating a 240 kW system. During peak nighttime loads, the system's generation capacity reaches up to 500 kW, representing 35% of the maximum theoretical load,



Micro-grid System One diagram

System Configuration				
Item	Quantity		Description	Comments
PV	300kWp		The maximum accessible PV capacity is 450kWp	EPC
Battery 967.6kWh (774.1kWh available at 80% DOD) Backup	ATESS Batt-Master Cabinet9R	1	For combination of multiple battery racks	ATESS
	ATESS Slave Battery Rack BR100T	9	With BPU in battery rack	ATESS
	ATESS ESS-BM-38.4-200TPB	126	Battery module 38.4V, 200Ah Capacity 7.68kWh	ATESS
PV-CB16M		4	For combination of multiple PV module strings	ATESS
HPS150		2	150kW hybrid inverter	ATESS
EnerLog		1	Monitoring datalogger	ATESS

System Configuration of Micro-grid System One



Micro-grid System Two diagram

System Configuration				
Item	Quantity		Description	Comments
PV	240kWp		The maximum accessible PV capacity is 450kWp	EPC
Battery 698.8kWh (559.1kWh available at 80% DOD) Backup	ATESS Batt-Master Cabinet9R	1	For combination of multiple battery racks	ATESS
	ATESS Slave Battery Rack BR99T	7	With BPU in battery rack	ATESS
	ATESS ESS-BM-38.4-200TPB	91	Battery module 38.4V, 200Ah Capacity 7.68kWh	ATESS
PV-CB16M		2	For combination of multiple PV module strings	ATESS
HPS120		2	120kW hybrid inverter	ATESS
EnerLog		1	Monitoring datalogger	ATESS

System Configuration of Micro-grid System Two

The project also includes backup generators to power the batteries during discharge periods, typically from midnight to 7 AM. The system features 16 battery racks, an ATESS Enerlog monitoring system, and a solar power plant.

Operational Principles

Off-Grid Mode

1. When PV output exceeds load consumption, PV supplies the load and charges the battery.

2. When PV output is below load consumption, the battery discharges until it approaches the under-voltage limit, then:

1) In the default setting, HPS stops working, and PV will charge the battery only.

2) If a generator is connected, HPS will start the generator via relay output, with the generator supplying the load and charging the battery.

DG Mode

Generator connection (dry contact control)

In off-grid mode, when the battery voltage nears the undervoltage limit, HPS will start the generator to supply the load and charge the battery. HPS will then stop supplying power, relying solely on the generator for battery charging.

If the generator is started,

1) When PV output exceeds charging power, PV charges the battery only.

2) When PV output is below charging power, PV prioritizes charging the battery, while the generator will supply the load and also allow charging the battery according to customers' requirements.

3) Once the battery is full, HPS stops the generator and switches back to off-grid mode.

4) During off-grid mode, the generator can connect directly to HPS. An ATS is required if both the grid and generator need a simultaneous connection to HPS.

System Advantages

ATESS's integrated energy storage systems are ideal for remote villages and areas with unstable or nonexistent utility grids. The inverters can directly connect to PV and batteries, and multiple units can operate in parallel, addressing power needs for large off-grid communities.

Total ATESS 16 sets of battery racks installed for the Bretaña project

Impact on the Local Community

The renewable energy-driven economic growth in Bretaña is exponential, encouraging local migration. New plots are being developed for sale as the economy and population grow. Additionally, the presence of an oil extraction company has provided numerous employment opportunities, alongside the burgeoning commercial activities in fisheries and agriculture, attracting new residents.

The advent of photovoltaic power and the energy supplied by the Bretaña community has paved the way for new projects. The modernization of Bretaña is evident, with economic

growth driving higher energy demand. Educational institutions are under construction, healthcare systems are being upgraded, and significant improvements are planned for the postal system. Consequently, energy demand is projected to rise further, with the current generation meeting 35% of the designed load. The renewable energy production in Bretaña promises substantial benefits for both the people and the economy.

The energy consumption and demand are rising, with the power station's franchise revenues expected to increase, significantly impacting the project's return on investment over a projected period of 6 to 7 years. The development of new projects is enhancing energy consumption and demand, likely accelerating the payback period.

This project has brought electricity to the off-grid regions in the Peruvian Amazon, enabling night lighting, entertainment, and other amenities akin to urban areas while reducing reliance on diesel generators, thus improving the environment and saving costs with green energy.

Expansion Plans

The person responsible for the project indicated plans to address battery capacity limitations through redesign and expansion documentation. Budget support is sought to increase generator capacity and construct administrative offices for the plant. This process, anticipated to take 12 to 18 months, is currently in the governmental administrative approval phase. The aim is to achieve system self-sufficiency, ensuring 24-hour renewable energy availability.

In summary, ATESS Power's BESS project in Bretaña exemplifies the transformative impact of renewable energy solutions in off-grid regions. The system's success paves the way for continued economic and social development, fostering a sustainable future for the community.