

Case Study: Transforming Lives in Lambata, A Leap Towards Nigeria's Sustainable Future

Project Overview

Lambata, located in Niger State, Nigeria, is a region full of potential with abundant solar energy resources. Due to the low electricity access in rural areas and insufficient grid coverage, Lambata has become a key target area for driving the transition to renewable energy and achieving sustainable development.

Supported by Nigeria's Rural Electrification Agency (REA), the Lambata project, which integrates solar and energy storage solutions, provides reliable power to 3,700 homes and businesses. The project not only addresses energy scarcity but also fosters long-term energy independence, creating economic growth and promoting social development in the region.



Two ATESS PCS500 battery inverters

Project Highlights

Solar Power Generation: A 995 kWp solar PV system harnesses the abundant sunshine in Lambata.

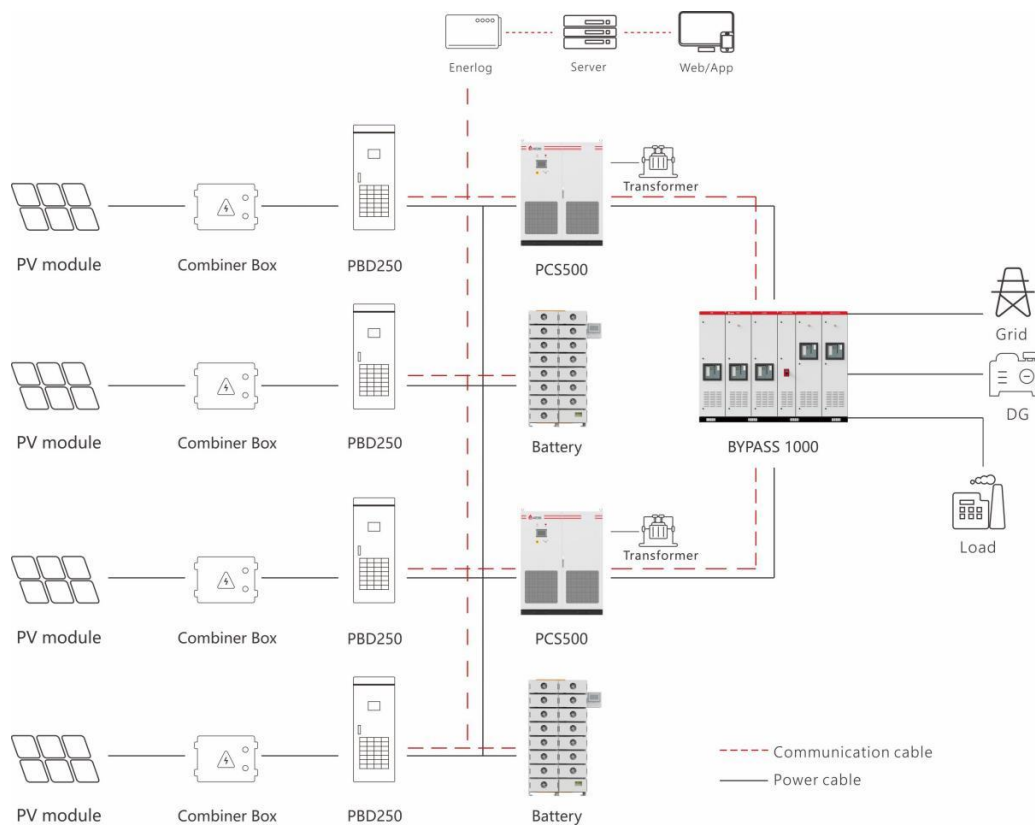
Advanced Energy Storage: ATESS' PCS500 battery inverters (2 units) play a pivotal role in ensuring efficient power conversion and reliable energy storage, empowering the community with sustainable electricity.

Bypass1000 Cabinet: The system is equipped with a Bypass1000, which ensures seamless transfer between on-grid and off-grid modes, maintaining

power supply during grid outages.

Battery Racks (BR138T): The 1.38 MWh energy storage system also includes 10 BR138T outdoor battery cabinets. These battery racks with self-developed 3-level BMS are essential for optimizing energy storage and ensuring safe, reliable operation.

The project features two custom-built 40-foot containers, housing and protecting the equipment while facilitating efficient installation and operation.



System Diagram

System Configuration			
Item	Description	Quantity	Comments
PV Panel	PV Panel	995 KWp	EPC
ATESS PCS500	Battery Inverter	2	ATESS
ATESS Isolation Transformer500	Transformer	2	ATESS
ATESS BYPASS 1000	Bypass Cabinet	1	ATESS
ATESS PBD250	Solar Charge Controller	5	ATESS
ATESS PV-CB8M	PV Combiner	25	ATESS
ATESS Batt-Master Cabinet15R-1C	Batt-Master Cabinet	1	ATESS
ATESS Slave Battery rack BR138T-1C	Battery Rack	10	ATESS
ATESS ESS-BM-38.4-200TAB-1C	Battery Module	180	ATESS
ATESS Enerlog	Data Logger	1	ATESS

System Configuration

Working Principle

In the presence of a grid connection, during the day, the electricity generated by the PV system is first used to power the load. Any excess power is used to charge the battery. At night, the system prioritizes using the stored battery power to supply the load. If the battery capacity is insufficient, the grid supplements the extra power demand.

In the event of a grid outage, the system will prioritize using the battery to supply the load. When the battery discharges to its cutoff state of charge (SOC), the inverter signals to start the generator, and the system switches to generator power for the load. Once the battery is fully charged, the inverter sends a signal

to shut down the generator, and the system will continue to use the battery to supply the load.

Technical Highlights

This project primarily functions as a backup power solution, addressing the frequent power outages faced by rural communities. The combination of PCS500 battery inverters, BYPASS1000, and 10 BR138T battery racks provides a highly efficient, reliable, and flexible energy storage system designed to meet the power needs of Lambata.

PCS500 Battery Inverters: These inverters convert stored DC energy into high-quality AC power. They provide essential backup power, ensuring that Lambata's homes and businesses continue to operate smoothly even during grid failures. With a seamless transfer function, the system switches between on-grid and off-grid operation in less than 10ms.

BYPASS1000 Cabinet: Serving as the key element for managing the transition between on-grid and off-grid states, the BYPASS1000 enables uninterrupted power supply during grid disruptions. This is vital in maintaining continuous service to critical infrastructure, such as hospitals, businesses, and residential areas.

BR138T Battery Racks: The 10 BR138T battery racks provide modular, scalable energy storage, offering 1.38MWh capacity. Each rack supports long-term, stable energy storage with active and passive cell balancing technologies, ensuring a longer lifespan and reliable operation under demanding conditions. The self-developed 3-level Battery Management System (BMS) ensures the safety and efficiency of these racks, optimizing the battery lifespan while protecting against overcharging and excessive discharging.



A 1.32MWh battery storage system

Project Significance

Addressing Rural Power Shortages and Enhancing Energy Independence

The electrification rate in rural Nigeria has long remained low, with inadequate supply and frequent outages significantly hindering development. By combining solar and energy storage solutions, the Lambata project provides reliable power to 3,700 residents and businesses, ensuring sustainable energy access. This has not only met basic living needs but also significantly enhanced energy independence in the region.



Nigerians struggle with power outage(image source: newscentral.africa)

Driving Economic Growth

The deployment of this clean energy project created numerous employment

opportunities, ranging from equipment installation and maintenance to operational management. Moreover, stable electricity supply has provided essential support to agriculture, education, and small businesses, unlocking the potential for local economic growth.

Promoting Sustainability and Carbon Reduction

The Lambata project significantly reduces annual CO₂ emissions, with an estimated reduction of approximately 1,042.6 tons of CO₂ per year, making a meaningful contribution to global climate change mitigation. By advancing solar and energy storage technologies, it sets a model for sustainable rural development in the region.

Future Outlook

The success of the Lambata project represents just the beginning of ATESS's efforts to support Nigeria's energy transition. In the future, ATESS will continue to collaborate with local partners to promote solar and energy storage technologies in more rural regions. Together, we aim to drive clean energy development across Nigeria and the African continent, contributing to global sustainable development goals.