Achieving Grid Independence: ATESS Powers a Cannery in South Africa with Solar Storage Solution

An ariel view of Lucky Star Meat Cannery with 500 KW solar panels on the rooftop

Overview

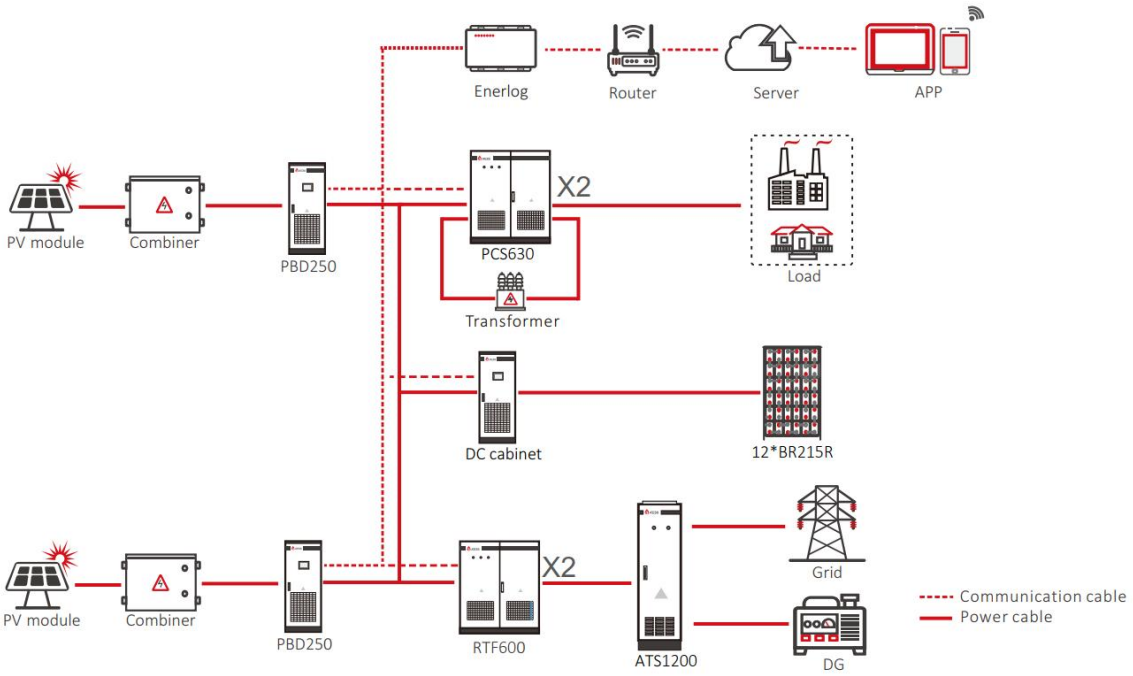
ATESS proudly partnered with Oceana Group on an ambitious renewable energy initiative at the new Lucky Star Meat Cannery, located on South Africa's West Coast. Our advanced energy solutions at Lucky Star's cannery—one of the top five solar projects in Africa—have transformed the facility, enabling uninterrupted operations and shielding it from grid disruptions. This technical white paper highlights the detailed design, operation, and benefits of ATESS' state-of-the-art energy solutions implemented at the cannery, which not only enhances production continuity by minimizing grid dependency but also contributes to Oceana Group's sustainability and local economic goals.

Project Background

Oceana Group's Lucky Star brand has been a staple for South African families since 1959, trusted for quality and rich in essential nutrients. With the construction of a new meat cannery, Oceana Group invested about 1.79 million USD in solar technology to meet its production demands sustainably. This investment is aligned with Oceana Group's commitment to responsible resource management, making the cannery operate independently of grid electricity.

2 sets of ATESS 40HC BESS Container

In alignment with Oceana Group's sustainability and efficiency goals, ATESS provided a tailored energy storage system at Lucky Star's newly established meat cannery where a 500kW solar panel array and 2 sets of ATESS 40HC BESS Container including 2.5MW ATESS battery system, and dual ATESS PCS630 battery inverters and 2 sets of ATESS modular rectifier cabinet RTF600 have been installed. The result is uninterrupted production capacity, regardless of grid status, significantly reducing environmental impact while maintaining energy costs.



System diagram

System Configuration		
Item	**Description**	**Quantity**
ATESS PCS 630	Battery Inverter	2
ATESS RTF 600	Modular rectifier cabinet	2
Isolation Transformer 630	Transformer	2
ATESS ATS1200	Automatic Transfer Switch	1
ATESS PBD 250	Solar Charger Controller	2
ATESS PV-CB8M	PV Combiner	10
ATESS Enerlog	Data Logger	1
ATESS Batt-Master cabinet15R-1C	DC Cabinet	1
ATESS Slave Battery Rack BR215R	Battery Rack	12
ATESS ESS-BM-51.2-280RPB-A	Battery Module	84
ATESS ESS-BM-51.2-280RPB-B	Battery Module	96
Hybrid Container 40HC Type 1	Container	2

System Configuration

System Architecture

The solution is centered on a highly flexible configuration designed to support multiple operating modes. The system's key components are:

1. **Solar Array**: A 500kWp solar array installed on the cannery's roof generates power for daytime operations and charges the battery bank during periods of low demand.

2. **Battery Storage**: A 2.5MWh lithium iron phosphate (LiFePO4) battery system stores surplus solar power, capable of achieving a 90% depth of discharge. This high-capacity storage system ensures continued factory operations during grid outages.

3. **Inverter System**: Two ATESS PCS630 inverters manage power flow and provide seamless switchover between on-grid and off-grid modes, and the switching time is 0ms. This rapid transition capability guarantees a smooth, uninterrupted power supply essential for continuous factory operations.

Two sets of ATESS PCS630 battery inverters

4. **Modular Rectifier Cabinets**: Two ATESS RTF600 rectifier cabinets convert AC power from the grid or a generator into DC power for battery charging or direct supply to the PCS (Power Conversion System). This setup ensures that the energy storage battery remains in a “charged state”, guaranteeing consistent power supply to the load.

Grid Online Mode

1.1 Back-Up Mode

In Back-Up Mode, when PV power combined with Grid power meets or exceeds load consumption requirements, parameters such as Grid charging power and Grid charging cut-off State of Charge (SOC) should be configured. The system operates under three distinct charging scenarios in this mode (with Grid charging cut-off SOC set to 95%):

1. **Grid Charging Only**: When only the Grid is charging, the system will cease Grid charging once the Grid charging SOC reaches 95%.

2. **PV Charging Only**: When solely PV power is utilized for charging, PV power is higher than Load consumption necessarily under this condition. Any surplus PV power, after fulfilling load requirements, continues to charge the battery until the PV charging cut-off voltage is achieved.

3. **Simultaneous PV and Grid Charging**: During combined PV and Grid charging, the Grid will discontinue charging once the real-time SOC reaches 95%, while surplus PV power continues to charge the battery until the PV charging cut-off voltage is met.

1.2 Standard Mode

In Standard Mode, the system dynamically balances PV power, battery power, and grid supply based on load requirements:

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

2. If PV power is insufficient to meet load demand, PV power and battery power jointly supply the load until the battery reaches its discharging cut-off SOC. At this point, the Grid will take over to meet the load demand. In this configuration, the Grid does not recharge the battery but maintains the SOC at the discharging cut-off level.

1.2 **Time Schedule**

The Time Schedule function allows configuration according to seasonal and temporal parameters, optimizing energy use based on predictable demand patterns:

- Level 1: Off-Season and Peak-Season designations

- Level 2: Monthly schedules for Off- and Peak-Seasons

- Level 3: Daily settings for Weekdays, Saturdays, and Sundays

-Level 4: On-Peak corresponding Standard Mode, Off-Peak corresponding Back-up Mode and Mid-Peak corresponding battery state without charging & discharging.

Grid Offline Mode

In Grid Offline Mode, the system ensures continuous load supply by alternating between PV, battery, and generator (GEN) resources:

1. When PV power is greater than load demand, PV power alone supplies the load and charges the battery.

2. If PV power falls short of load demand, PV and battery power work together to supply the load. Once the battery reaches its discharge SOC threshold, the generator (GEN) will activate to meet load requirements. GEN charging parameters are configurable, and the generator will halt operations once the battery reaches the designated stop SOC.

Note: Upon initiation of GEN Mode, the system will display GEN as “online.”

This configuration enables a resilient, uninterrupted power supply, leveraging renewable and supplementary sources for reliable and efficient energy management across varied operational conditions.

2.5 MWh ATESS battery system

Benefits of ATESS' Energy Solution for Lucky Star Meat Cannery

1. Energy Independence and Grid Resilience

The ATESS system equips Lucky Star Meat Cannery with reliable, off-grid functionality, allowing it to maintain productivity regardless of grid stability. In South Africa, where grid disruptions are common, this capability is vital for sustaining manufacturing operations without interruption.

2. Environmental Impact

Oceana Group's commitment to renewable energy aligns perfectly with ATESS' vision of a sustainable future. By significantly reducing reliance on fossil-fuel-generated grid electricity, the Cannery cuts its carbon footprint, minimizing environmental impact while promoting clean energy use in the local economy. The shift towards renewable energy sources reduces the carbon emission of the factory by approximately 2872.8 tons annually.

3. Economic Efficiency

The ATESS solution reduces operational costs through improved energy efficiency, as reliance on costly grid power decreases. Additionally, by integrating advanced battery storage, the system ensures that energy usage aligns with demand, reducing wastage and further lowering expenses.

Workers working in the Lucky Star Meat Cannery

4. Community and Economic Growth

The Cannery's energy independence is more than a technical achievement; it is a boon for the local economy, generating new job opportunities and fostering resilience in the region. This project exemplifies the positive impact that renewable energy infrastructure can have on regional development.

Conclusion

ATESS' collaboration with the Oceana Group has successfully delivered a sustainable and economically beneficial power solution for the Lucky Star Meat Cannery. Through advanced solar and battery storage technology, ATESS' system enables grid independence, stable energy supply, and operational continuity, significantly boosting the cannery's productivity.

Moreover, this project exemplifies the transformative potential of renewable energy systems in enhancing the socio-economic landscape. It not only helps enterprises achieve its sustainability goals but also drives local economic growth through job creation and reduced energy costs and carbon emission, conributing to a cleaner, greener future for the region.