



LEAD BATTERIES: ENERGY STORAGE CASE STUDY



Moura

Living Laboratory: Solar Microgrid Using Lead Batteries

Belo Jardim, Brazil

In a carport system for ITEM, a battery energy storage system (BESS) coupled with solar panels acts as a living microgrid laboratory.

Designed for smart and sustainable energy usage, the carport solar system uses Moura's lead-carbon batteries to store surplus photovoltaic (PV) energy generated during the day.

Partnering with ITEM – Institute of Technology Edson Mororó Moura – the project allows Moura to test other energy storage system applications such as PV power smoothing, voltage control and frequency regulation.

“Moura is at the forefront of developing lead-carbon battery energy storage systems in South America.”

Luiz Mello, BESS and Industrial Batteries General Director, Moura

Technical Specification

Installed in 2019, the 250 kW / 560 kWh BESS performs peak shaving, backup and reactive power management.

Powered by Moura's lead-carbon batteries, the technology provides:

- Better charge acceptance
- Improved Partial State-of-Charge (PSoC) performance

The system also features a battery management system (BMS) which controls a new charging algorithm based on smart overcharging control, enhancing the system lifetime up to 10 years at 80% Depth-of-Discharge (DoD).

With the solar panels installed in November 2020, the PV system provides up to 250 kW. This additional renewable element complements the sustainability of the project, which utilizes highly recyclable lead-carbon batteries.



The PV plant powers the load, and the BESS stores the energy surplus generated through the solar panels during the day.

During peak periods when the distribution grid tariffs are higher, the BESS supplies the load and performs energy arbitrage services.

The system acts as a living microgrid laboratory to allow Moura and ITEM to test a range of ESS applications and the performance of lead-carbon batteries in these applications:

- Solar PV power smoothing
- Voltage control
- Frequency regulation
- Different microgrid application algorithms

Technical Summary

Overall capacity	250 kW
Total panels installed	810 panels
Battery specification	Lead-carbon
Available stored energy	560 kWh

About the Company

Moura has seven industrial plants, six in Brazil and one in Argentina, with around 6,000 employees. Initially focused on the automotive sector, operations were expanded to other segments, producing batteries for numerous applications, such as battery energy storage systems, motorcycles, boats, forklifts, subways, trains and telecom stations.

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