



LEAD BATTERIES: ENERGY STORAGE CASE STUDY



Tozzi Green SpA

Providing Electricity and Irrigation for a Village

Satrokala, Madagascar

In the village of Satrokala in Madagascar, two renewable energy storage systems, supported by lead batteries, have been installed by Tozzi Green.

A leading player in sustainable rural electrification, Tozzi Green's installation in Madagascar generates electricity through a combination of wind turbines and solar panels.

The renewable energy generated provides public lighting and more than 20,000 litres of fresh water for the 1,500 residents of Satrokala every day. It also supplies the facility of JTF Madagascar with electricity and irrigation for their offices and warehouses.

"Energy is provided for numerous educational facilities, a sports field and a range of public buildings such as city hall, a bank and a town hall."

Tozzi Green

Technical Specification

The first system, installed in Satrokala in 2013, was rated 15 kW/ 57.6 kWh. Energy was generated through a combination of a 10 kW TN535 wind turbine and a 1.5 kWp PV plant.

The battery energy storage system was based on OPzS 1200 Ah C10 batteries for a total capacity of 2400 Ah at 48 V, allowing demand for energy to be met throughout the day and night.

As energy demand increased in the years since 2013, the installation system was upgraded by Tozzi Green. A new 60 kW wind turbine was added, and the storage system is now rated 600 kWh. The energy storage capacity is now 12480 Ah at 48 V, using RA12-260 gel batteries, provided by Ritar Power.

An ISO 40' container (pictured) contains the storage batteries and static converters.

Technical Summary

Battery specification	RA12-260 gel batteries
Capacity	12480 Ah
Overall voltage	48 V
Wind turbine	10 kW + 60 kW
PV plant	1.5 kWp
Available Stored Energy	600 kWh

About the Company

Tozzi Green is a specialist company for the development of plants and generation of energy from renewable sources.

Since 2006 Tozzi Green has been investing in agriculture for energy and alimentary purposes in Italy and abroad.

This is based on the strong conviction that the combination of renewable energy, rural culture, integration, tradition, scientific research and innovation is the sustainable path for the future of the planet.

Tozzi Green's project in Madagascar started and developed from the synergy between different experiences and cultures, with the purpose of helping business and the region grow economically and socially.



"Thanks to the Tozzi Green off-grid system, the Satrokala community can continue fundamental activities contributing to development, such as running the medical center. The center carries out free medical examinations for adults with 75,000 visits a year, and 11,000 children treated annually."

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