

Solar Energy Solutions for Rural Communities

Morningstar Corporation Selected as the Main Supplier of Tozzi Green for Turnkey Solution Peruvian Rural Electrification Project

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Giovanni Fasola

Validation Engineer
at Tozzi Green

Summary

- Largest, most ambitious rural electrification project in history
- Project will bring access to electricity to nearly one million Peruvians
- Morningstar Corporation manufactured the charge controllers of the solar home-system called DC Energy Box with a no-fail user-friendly design developed by Tozzi Green
- Project replication may bring access to electricity to an estimated 1 billion people worldwide

Situation

With mountainous regions, Amazon rainforest, and a coastal region stretching more than 2900 kilometers, Peru is one of the most ecologically diverse countries on the planet. Explosive economic growth in population-dense urban areas has spurred the Peruvian economy into becoming one of the fastest growing in the world. At the same time, the populations of small, remote villages scattered throughout Peru struggle to survive in harsh climate conditions including extreme temperatures, high altitudes, continuous rains, wild fauna and invasive insects. More than one-third of the population is currently living in isolation, cut off from access to a power grid and infrastructure that can bring vital economic opportunities.

Project

To encourage development and improve the quality of life in these remote villages, the government of Peru launched the most ambitious rural electrification project ever attempted. The National Rural Electrification Plan (NREP) will bring access to electricity to 96% of the population of Peru, and with that, access to educational opportunities, medical care and the global economy.

Phase One of the project will provide power to 175,000 homes and 3,000 community buildings, and will provide electricity to almost one million Peruvians in a little more than five years. With the expansion of a traditional power grid both economically and logistically unfeasible, the NREP turned to renewable energy power plants.




Solution

To implement a solar solution that would work on such a massive scale and in such varied climates, the Peruvian government has made a tender won by Tozzi Green, an Italian company specializing in products, services and projects for the development of plants and the generation of energy from renewable sources.

The plan calls for three different solar powered energy centers: two higher capacity AC Energy Station versions for clinics and schools, and a high-volume residential DC Energy Box sized for individual homes. The Morningstar charge controller is the main electronic component of these energy centers which consist of a pole-mounted solar panel and an enclosed, integrated charge controller/battery system feeding house wiring and lighting for a safe, home-friendly electricity source. The DC Energy Box, the turnkey energy solution for home applications, consists of:

- Morningstar charge controller
- Battery box
- One output power channel
- One USB power port
- One USB data port
- Mobile phone app to collect data



"Morningstar is uniquely suited to deliver a high-quality, reliable product in compliance with our exacting specifications. The effective cooperation with the Morningstar team ensured the fulfillment of challenging goals in due times." said Giovanni Fasola, Validation Engineer at Tozzi Green.

The end users for this project had no previous experience with electricity or solar powered battery systems. In order to assist with user education of energy management, and maintain the desired battery life, Morningstar worked with Tozzi Green to develop software to optimize the daily energy usage, enough for two 10W lamps for 10 hours per day. When coupled with the LED battery gauge, the users can learn to better manage their available battery energy and prolong the system life.

To meet the five-year rural electrification goal, the Government of Peru imposed a tight delivery schedule. Morningstar completed the final design and manufacture of the first 2,300 custom units within 90 days of contract signing, and delivered the initial 50,000 units within six months.

The success of this Peru project will serve as a model for future solar rural electrification. There are an estimated one billion people in the world today living without electricity. With education, agriculture, health care and other essential services dependent on electricity, solving "electrical poverty" through deployable renewable energy is the single greatest step that can be taken toward improving their quality of life.

Toward that goal, Morningstar is introducing its new MultiWave off-grid solar inverter/charger and its Essentials series of affordable charge controllers. By reducing complexity, improving efficiency, and addressing long-term reliability, these products are designed with the needs of rural electrification in mind.

