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Ana Maria Murillo,
Business Director
of Tecmac Ingenieria (solar installer)

Solar-Powered Remote Microgrids

Choco, Colombia

Total Residents Served with 5 microgrids: 431

System specifications:

- Solar System Capacity: 191KWp
- Batteries: (288) Trojan IND29-4V*, 2,105 Ah @ C100-Hr, deep-cycle, advanced lead acid with Smart Carbon™ (12) Trojan IND13-6V, 695 Ah @C20-Hr, deep-cycle, advanced lead-acid with Smart Carbon
- Battery Life: 17 years (per IEC 61427)
- Battery Bank Configuration: 48V and 24V
- Solar Modules: 250W Trina Solar panels
- Inverter-chargers: Bidirectional Sunny Island inverter-chargers
- Inverters: Sunny Boy inverters
- Backup Generator: Cummins Diesel Generators
- Total Microgrid, Installed: 5

System Integrator:

- Tecmac Ingenieria

In the northern department of Choco, located in western Colombia, is the Municipality of Acandí. The area is mainly jungle along the Caribbean Sea on the border with Panama.

This region is located within the zones that are not tied to the country's electrical grid due to their remote locations. The only electricity residents have access to is available for a few hours a day and is provided by diesel generators. Through its Ministry of Mines and Energy, the government of Colombia issued a mandate to expand the availability of electricity to these remote areas by building five solar hybrid installations, or microgrids. Trojan's Industrial Line of batteries with Smart Carbon™ were selected for the project, with 288 batteries installed as energy storage for all five Microgrids.

“This project is the first of its kind in the Choco region and has allowed 431 households, including an indigenous community, to have access to clean, affordable and reliable energy for the next 20 years,” said Ana Maria Murillo, Business Director of Tecmac Ingenieria, the project's solar installer. “One of the greatest incentives to installing these microgrids was to reduce the use of diesel fuel.”

The key to the successful implementation of this project was to choose durable components that would last for the estimated 20-year duration of the project, as well as withstand the region's harsh environment. The project was designed with a long-term vision to reduce the burden of increasing electricity prices for the community.

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It was quickly becoming unsustainable due to the cost of running the microgrids with diesel generators. Adding additional capacity with solar photovoltaic panels and batteries to extend the hours of electricity proved to be a more economical choice, as well as the most environmentally friendly.

With batteries being one of the most expensive components of a microgrid, the projects required batteries designed to last for the duration of the installation, while also having the lowest Levelized Cost of Energy (LCOE).

Trojan's Industrial Line of advanced lead acid batteries with Smart Carbon™ were selected as the energy storage solution for all five microgrids, which total 50KWh of storage and 191KWp of solar photovoltaic capacity. The Trojan Industrial Line features Smart Carbon™, Trojan's proprietary paste formula that addresses the negative effects of inconsistent or under charging of batteries due to environmental conditions such as long periods of cloudy days.

The rugged design of the Industrial Line helps prevent possible costly mishandling

of the batteries during transportation to these remote areas. Trojan Industrial batteries are housed in a dual container to protect the 2V cells from damage during transport, and feature built-in handles that enable easy manual movement of the batteries when forklifts are not available.

Weighing more than 75 tons, the 288 Trojan batteries traveled from California to Buenaventura, Colombia, crossing 1,100 miles. From there they were transported to

the town of Turbo, Colombia along the Atlantic Ocean and then transported on wooden barges to the 5 communities of the Choco. After arriving in Turbo, the batteries then had to be manually loaded and unloaded with the help of residents in the area.

Thanks to installing a battery-based PV system, dependency on diesel generators has

been minimized for electricity. The generators were noisy, emitted pollutants, and could not easily be maintained or repaired by the community due to the very remote locations of these towns, which are only accessible by boat. Oftentimes, the communities would have to go without power until repairs could be made, or the delivery of fuel.

Having reliable electricity available for most of the day enables these villages to expand

and improve the quality of life of residents, as well as enhance commercial business activities. In addition, improved communications capabilities, education, and more jobs were major benefits to the residents.

The five Communities that benefited from this project include Bahia de Trigana (San Francisco), CHUGANDI, Caleta, Aguas Blancas, and Pescadito.

* The IND29-4V battery has transitioned to the Solar Industrial SIND 04 2145 battery.

For more information:
Trojan Battery Company
www.trojanbattery.com

Tecmac Ingenieria
<http://tecmacingeneria.com/>

Trojan batteries are available worldwide.
We offer outstanding technical support, provided by full-time application engineers.

call 800.423.6569 or + 1.562.236.3000 or visit trojanbattery.com

12380 Clark Street, Santa Fe Springs, CA 90670 • USA or email re@trojanbattery.com

