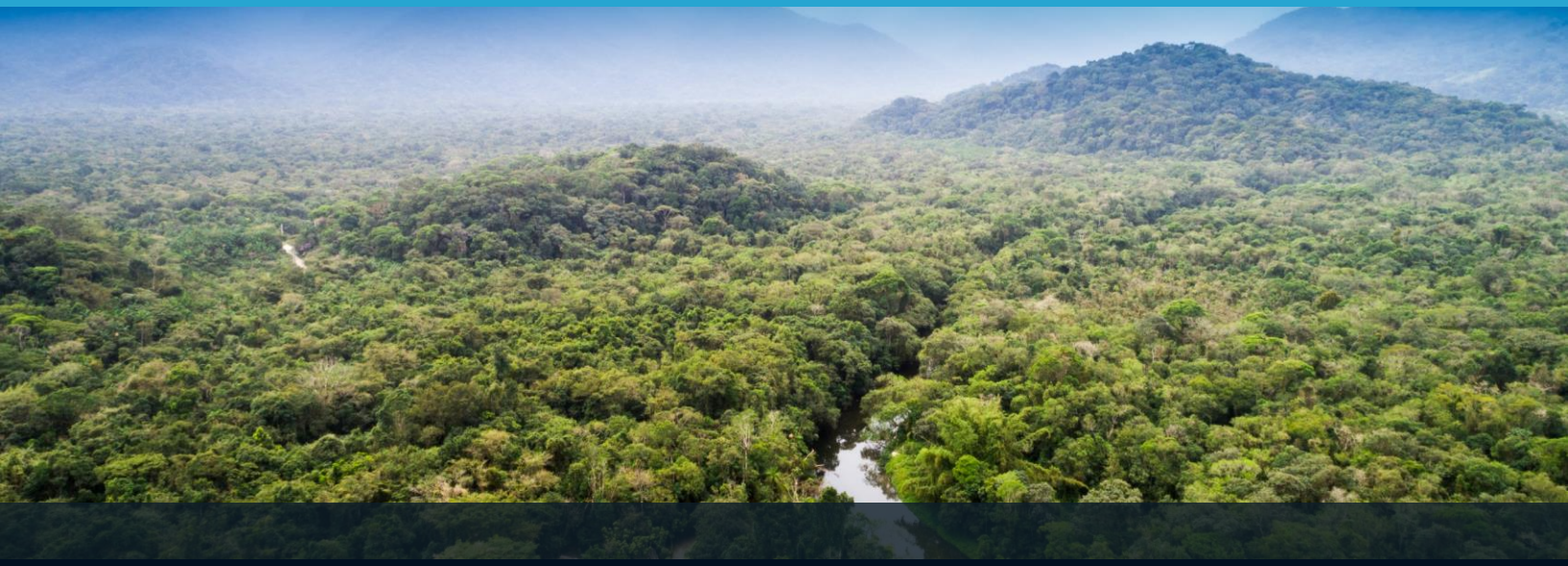
CONSORTIUM FOR BATTERY INNOVATION

TROJAN BATTERY COMPANY

LEAD BATTERIES: ENERGY STORAGE CASE STUDY



Trojan Battery Company

Solar-powered Remote Microgrids in Colombia

Chocó, Colombia

Located in a remote jungle area in western Colombia lies Ancandia, a municipality not connected to Colombia's electrical grid. Residents were only able to access unreliable electricity for a few hours each day through a diesel generator.

In 2015 five solar hybrid microgrids were built in the region to provide reliable, clean energy, supported by advanced lead battery storage.

"The durability, safety and reliability of advanced lead batteries make them ideal options for microgrids. Projects such as the Colombian solar microgrids are quite literally empowering communities who were previously unable to access electricity."

Dr Alistair Davidson, Director, Consortium for Battery Innovation

Technical Specification

Trojan's advanced lead batteries were chosen to provide energy storage for the project, with more than 400 households in the region now having clean, affordable and reliable energy.

With improved performance and lifetime when operating at Partial State-of-Charge (PSoC), Trojan's Industrial Line advanced lead batteries with Smart Carbon are an ideal option for solar applications:

- 288 Trojan SIND 04 2145 2,105Ah @ C100-Hr, deep-cycle advanced lead with Smart Carbon
- 12 Trojan SIND 06 920, 695Ah @ C20-Hr, deep-cycle, advanced lead with Smart Carbon

The battery bank configuration is 48V and 24V, and the batteries have a lifetime of 17 years, suiting the project requirement of a 15-year duration.

Working with system integrator Tecmac Ingenieria, a solar system with a capacity of 191 kWp was installed. The solar modules are comprised of 250W Trina Solar panels.

Bi-directional Sunny Island inverter-charges with Sunny Boy inverters are used for the five solar microgrids installed in the project.

Trojan's advanced lead batteries have provided a reliable energy storage solution with the lowest levelized cost of energy, combined with the ability to withstand the region's harsh conditions.

About the Company

Trojan Battery Company is the world's leading manufacturer of deep-cycle batteries. With HQ in Sante Fe Springs, Trojan has four plants in California and Georgia.

Products range from batteries for golf and utility vehicles, transportation, floor machines, aerial platforms to renewable energy and marine applications. The company has a strong commitment to research and development and is a leader in advanced lead batteries.

Technical Summary

Battery specification	288 + 12 batteries Advanced lead deep-cycle with Smart Carbon
Capacity	2,105Ah (288) C_{100} 695Ah (12) C_{20}
Overall voltage	48V + 24V
Rated power in kW	39 kW
Power in MWh	2.4 MWh (48V system) 50 kWh (24V system)
Project Duration	15 years
Microgrids	5
Lifetime of batteries	17 years
Households powered	400+

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