

coreNOC system connects rural community to essential services

Changing Lives in a South American Village through Solar-Powered Communication

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Johnie Johnson
CEO
coreNOC

Summary

The lack of internet access in South American villages inhibits healthcare, education, commerce and cultural preservation opportunities for local residents. Together, coreNOC and Morningstar provided a high-speed, broadband connectivity solution powered by solar for the village of Rockstone in Guyana. A Morningstar charge controller and SureSine inverter ensure that the remote, off-grid telecom site runs efficiently and reliably in the rough conditions of the Amazon jungle, keeping the village connected and online and enabling its advancement.

Situation

The “digital divide” between those who have and those lacking internet access has posed enormous problems for many villages throughout the country of Guyana in South America. With only 43% of its population currently online, Guyana’s government was aware that the country was missing out on new business, education and critical medical opportunities, and promised to improve connectivity in remote communities.

As part of these efforts, Oklahoma-based telecommunications expert coreNOC was asked to bring high-speed, broadband connectivity to the indigenous village of Rockstone. The village has little running water and electricity and struggled with limited internet that could barely power a mobile app. A privately-owned Guyanese company looked to coreNOC to replace the poor-quality satellite service with more powerful 4G LTE connectivity.

Any off-grid, remote solution for such an application required a system that could be easily transported and installed using local resources. Residents also had to be able to use the system with little training time. Finally, the system needed a reliable, efficient source of electricity to maintain connectivity in the harsh rainforest conditions.



Morningstar’s SureSine inverter and charge controller efficiently and reliably produce the AC electricity needed to keep the communications tower operating



Project

Because diesel generators need refueling and regular servicing, which can be expensive and difficult in a remote location, coreNOC chose to install a solar-powered communication system to eliminate fuel dependency and maintenance costs. With solar-powered telecommunications systems, efficiency is paramount because they require operational autonomy to get by on batteries through long stretches without consistent sunshine. coreNOC knew Morningstar from the Telecom Infra Project, a community of companies and organizations working to deliver global high-quality connectivity. Morningstar was well-established in efficient and reliable solar electrical system components, and the logical choice for a system to successfully power an off-grid telecom system for this village too.

The teams worked together to oversize a system with four, 365W QCELLS solar modules and a 680Ah Deka battery bank, more than enough for the 2.5A satellite and LTE radio load to continuously operate for over a week—even without solar input. The lightweight tower consisted of 30-inch sections for easy pallet shipping and transportation on a small truck to the remote site where it could be bolted together on the dirt ground without a concrete base.

A Morningstar TriStar (TS-MPPT-45) charge controller serves as the “heart and brains” of the outfit, managing solar-generated electricity flowing from the modules into the batteries for storage while maintaining both system operation and battery health. TriStars are renowned for industry-leading efficiency. Morningstar MPPT-type solar charge controllers feature the company's proprietary TrakStar technology, which optimizes solar harvesting for maximum production and storage. The brand's hallmark fanless hardware design eliminates the need for cooling fans, which—along with their inherent risk of failure with moving parts and tendency to shorten component life by sucking in dust and debris—are a parasitic load requiring electricity to run. Together, these two innovations greatly improve reliability and system efficiency.

As a key part of the design, Morningstar's high-performance, industrial-grade 300W off-grid SureSine (SI-300-48-120-60-HW) inverter with 48V battery input also provides a comparable-quality DC to AC powering solution for the extreme environment, converting clean DC solar electricity into AC to power the Wi-Fi node off the system's cell tower along with the modem for the satellite radio. Teams can remotely monitor system operation and health to ensure a resilient system with maximum uptime.

Solution

“The work our teams did to remove barriers to entry through simple and cost-effective technology innovation was demonstrated in real-time in this village,” said Ben Ealey, Chief Operating & Technical Officer, coreNOC.

In 2022, coreNOC connected the system to the local school, clinic and market to enable high-speed, broadband internet access to these resources throughout the entire indigenous village. As a result, residents can now open online shops, accept cash digitally, receive medical services and attend virtual appointments, and participate in online learning to earn degrees. The coreNOC team enjoyed seeing residents watch their first World Cup on mobile devices glowing amid the rainforest brush.

“Working with Morningstar has been a good marriage of technologies to provide an answer for these rural and remote areas,” said Johnie Johnson, CEO, coreNOC. “Morningstar's engineering team designed a power system that was both reliable and clear and simple for users. We didn't have to worry. Together, I know we can continue to do things that haven't been done to deeply impact global communities.”