

Friday, April 29, 2022

ENERGY: COST-EFFECTIVE SOFTWARE PLATFORM STREAMLINES DESIGN

XENDEE Powers Planning for Puerto Rico Microgrid Project

By Jeff Clemetson

Thursday, April 21, 2022

Like 0 Share Share Tweet



In recent years, Puerto Rico has felt the effects of severe

climate events that have disrupted life on the island nation – including disruptions to its energy grid. A new project connecting a hydroelectric power plant to a microgrid with solar and battery storage aims to bring environmentally and financially stable zero-carbon power to one mountain community in the country.

The project to support the Cooperativa Hidroeléctrica de La Montaña is led by the Idaho National Laboratory's (INL) Net-Zero Microgrid Program and San Diego-based [XENDEE Corporation](#), a leader in microgrid design and support software.

According to XENDEE's microgrid design models, the Microrred de la Montaña (Microgrid of the Mountain) project will be capable of cutting existing energy costs for the community by at least 20% using solar photovoltaic cells and batteries. By incorporating existing hydroelectric technologies these cost savings could be further increased to as much as 60%.

Also, with capital expenditure to further enhance the hydroelectric capacity, the Cooperativa Hidroeléctrica de la Montaña would have an option to sell energy to the rest of the island, creating the opportunity for an even higher return on investment when amortized over the lifetime of the project. Using this model, the cooperative would not only meet the needs of the existing community with resilient technologies, but be able to sell sustainable, reliable, and affordable power back to the Puerto Rican power grid for revenue and act as a template for future microgrid developments in financially disadvantaged communities.

"This project location and mix of technologies is ideal for showcasing XENDEE's ability to optimize microgrid designs based on organizational goals," said Michael Stadler, CTO and co-founder of XENDEE.

"This has provided the cooperative with a series of reliable, financially viable investment strategies that can be used to easily compare major design decisions like making hydroelectric upgrades or distributing technologies across different communities," Stadler added. "The XENDEE platform also includes integrated power flow simulation, enabling our team to properly place and size technologies in each of the investment strategies and verify the technologies and distribution system can operate under peak usage conditions."

At this time, the project team has provided eight separate investment strategies for the island utilizing a blend of technologies and upgrades to the hydroelectric power plants that could potentially increase the microgrid's power output from 6 megawatts to 39 megawatts.

When completed, the Microgrid of the Mountain will provide power to the 90,000 residents of Adjuntas, Jayuya, Lares and Utuado.

Bringing Cutting Costs to Sustainability Projects

Bringing zero-carbon microgrids to hard-to-reach places like the mountains of Puerto Rico in a cost-effective way is a culmination of work Stadler did before XENDEE was founded in 2018.

Before going into the private sector, Stadler was leading the research into renewables and grid integration at Lawrence Berkeley National Laboratory. His goal was to develop software that would reduce costs for sustainable energy grids by streamlining and simplifying the process to reduce costs.

"As we started doing the first projects back in 2014, just a conceptual design for a microgrid was half a million dollars," he said, adding that with his software platform, the cost of studies for microgrid projects is now around \$25,000. For his work in reducing costs of grip projects, Stadler was recognized with a Presidential Early Career Award for Scientists and Engineers for his work in 2016.

In 2018, he took his microgrid software platform and co-founded XENDEE with CEO Adib Nasle. The company's goal was to make energy projects simpler and less expensive by streamlining the various design processes into one.

"Once you've sold a community on a project, then you go deeper into the engineering. You can do this seamlessly in the XENDEE platform – move from the sales pitch into conceptual design. Once you figure out what technologies are involved, then you can move the project into engineering then you can implement it."

The streamlined process and, more importantly, the cost savings, is what drives the environmental impact of XENDEE's platform.

"It's really about scalability," Stadler said. "Because if we're really serious about getting rid of fossil fuels and building all these renewable projects, then we don't have the time to plan such a system for two to three years. We have to template this whole thing, make it really simple to design and cheaper to design."

Growing Demand

There is a growing demand for microgrids around the world for various industries, Stadler said. Besides the project in Puerto Rico, XENDEE has worked on projects for Army bases in Europe, as well as a project at Naval Base San Diego. Around 70% of XENDEE's clients are in the U.S. and include large business and education campuses, hospitals and airports.

There is also a growing demand for locally sourced and consumed power as communities work to implement Community Choice Energy (CCE) projects to comply with state climate mandates.

"Every coastal community here in San Diego, if they're really thinking about renewables then it can't cost half a million to plan the system before they actually start implementing it," Stadler said, adding that XENDEE's standardized approach to planning saves communities 90% in terms of time and money to plan the kinds of systems used for local power projects. "Only this way can you do thousands of projects and not just dozens of them. And that's where we're heading."

Besides California's climate mandates, people and businesses in the fire-prone state are attracted to microgrid projects for their resilience.

"California has a lot of outages in the utility space and a lot of clients really want to install batteries and other technologies to be really resilient against utility outages," Stadler said.

Resilience is also a main reason for implementing the microgrid in hurricane-prone Puerto Rico.

"Increasingly dangerous climate events have been devastating to Puerto Rico's local economy and energy infrastructure. By using this new resilient energy system, Puerto Rico's Mountain regions can offer greater stability for businesses and the community while also mitigating the consequences of the next major climate event including regional economic paralysis and the mass exodus of residents during recovery periods," said C. P. Smith, executive director of the Cooperativa Hidroeléctrica de La Montaña. "This added level of security and local control can immediately impact resilience and sustainability in the region while also enticing investment from both the public and private sector with reliable clean energy at attractive rates."

XENDEE Corporation

Founded: 2018

CEO: Adib Nasle

Headquarters: Sorrento Valley

Business: Power system design software platform

Revenue: Undisclosed

Employees: 20

Website: xendee.com

Notable: XENDEE CTO Michael Stadler was awarded a Presidential Early Career Award for Scientists and Engineers in 2016.