In the Field

Thinking Big in New York

EPRI, NYPA, and Central Hudson Gas & Electric Collaborate to Contribute In-the-Field Lessons to the Empire State's Energy Transformation

By Chris Warren

EPRI, the New York Power Authority (NYPA), and Central Hudson Gas & Electric are collaborating on research examining how best to integrate distributed energy resources (DER) into the grid.

The research is one of EPRI's 20 Integrated Grid Pilots worldwide and involves a 117-kilowatt photovoltaic (PV) system atop the Sojourner Truth Library at the State University of New York-New Paltz as well as a 101-kilowatt PV array and 200 kilowatt-hour battery energy storage system at the school's Elting Gymnasium. The projects will be connected to a distribution feeder operated by Central Hudson Gas & Electric.

EPRI will conduct several analyses:

- **Distribution feeder impacts**: EPRI will analyze the effects of the solar PV systems on grid voltage and power quality and determine how much PV can be installed on the feeder without requiring grid upgrades to maintain reliability.
- **Optimizing solar and storage**: EPRI will determine the settings for smart inverters and energy storage that maximize the benefits of distributed solar and minimize negative impacts. For example, smart inverters can help control voltage fluctuations common with PV generation, and energy storage can provide increased output during peak load.
- **Economic analysis**: EPRI will look at the costs and economic benefits resulting from integration of various types and levels of DER at SUNY-New Paltz. For example, if Central Hudson Gas & Electric has to install circuit breakers, sensors, and capacitors to accommodate new DER, how do the costs of the new equipment compare with the benefits provided by the DER in terms of increased capacity and grid resiliency?
- **Microgrid analysis**: EPRI will evaluate the technical feasibility and financial viability of using solar and batteries to establish a microgrid at the SUNY-New Paltz campus. The investigation will examine microgrid design and required size of solar PV and energy storage. Interest in microgrids to enhance grid resiliency and reliability has grown following the extensive power outages in New York as a result of Superstorm Sandy.

The research will inform New York's Reforming the Energy Vision (REV), launched in 2014 to create a more resilient, affordable, and low-carbon grid, with a target of generating 50% of electricity from renewable sources by 2030. DER is expected to serve an integral function.

While NYPA is a generation and transmission utility and doesn't connect DER to its high-voltage grid, it is also a quasi-governmental agency committed to advancing the knowledge that will make Reforming the Energy Vision a success. "We want to advance renewables, lower the costs and barriers to DER interconnection, and make sure the grid remains as reliable as possible," said Charles Hermann, a senior engineer at NYPA.

The New York project plans to communicate lessons and insights to the many stakeholders involved, including the state's Public Service Commission, policymakers, utilities, nongovernmental organizations, and the public.

By providing data generated from solar and battery systems in real-world operating conditions on distribution feeders, the analyses will inform distribution company decisions about where to site DER.

“Some locations are prime for DER as a result of grid design and a lack of capacity,” said Becky Wingenroth, EPRI principal technical leader. “This study will help utilities better understand grid impacts of DER siting, additional equipment needed to maintain grid reliability, and the costs of these technologies.”

“Utilities are responsible for the delivery of reliable service to all customers,” said Wingenroth. “So while they want to encourage DER, they are still accountable to make sure it doesn’t negatively impact service to other customers from both a reliability and safety perspective.”

Key EPRI Technical Experts

Becky Wingenroth