

Capturing the Benefits of Distributed Energy Resources

Arizona Public Service Awarded Renewable Integration Project of the Year at DistribuTECH 2017

The U.S. energy industry is in the middle of a significant transition. The status quo is shifting towards a more decentralized and dynamic two-way system, with increasing amounts of utility-scale and distributed renewable generation. Market drivers fueling this trend range from renewable generation and distributed energy resource integration to grid reliability and stability as well as regulatory mandates and incentives.

Microgrids offer organizations (utilities, universities, hospitals, commercials and industrials, and others) increased reliability and resiliency to outages, flexibility and integration of variable renewable, forecasting and planning tools, load frequency control, inclusion of all network assets, and real-time optimization.

Yet even with all these benefits, utilities, in particular, face technical, economic, and regulatory challenges when they consider deploying and/or integrating microgrids. Technical issues might include bi-directional power flow, fault current contribution, and island operation. Regulatory challenges may include rate structure, administrative burden, and ownership.

When it comes to overcoming some of these challenges, we can learn significant lessons from Arizona Public Service (APS), which was awarded the Renewable Integration Project of the Year at DistribuTECH – the largest annual transmission and distribution conference in North America – early this month for its Solar Partner Program. The \$30 million, utility-owned residential rooftop solar pilot program includes nearly 1,600 homes with 10 MW of total installed capacity and seeks to understand the role of solar on peak loads, inverters, and energy storage.

Unique Approach

Both the technology and the business model differentiate this unique pilot project. Unlike the typical application where the homeowner owns the solar assets, APS owns the residential rooftop solar panel, installed on the homeowner's roof. APS "leases" the roof space from the homeowner for \$30 per month. For APS, the benefits are tremendous – it can completely control problem distribution feeders with highly penetrated PV.

Through this Solar Partner Program, APS identified Siemens, a solution provider that could develop a cost-effective SCADA controller – a microgrid control used in a renewable integration application – with the capacity to control nearly 1,600 smart inverters across the Verizon cellular and Landis+Gyr AMI communications networks. As APS continues to evaluate the pilot, Siemens has the technology to scale up to the number of smart inverters if APS moves beyond the pilot phase.

Promising Results

In its report, "APS Solar Partner Program: Research Highlights," the Electric Power Research Institute (EPRI) demonstrates that smart inverters help grid operators manage distributed energy resources more effectively. Specifically:

- Distribution system operators communicated daily commands to the smart inverters and monitored outputs, demonstrating that smart inverters are of value to grid operators.
- Many PV systems will produce a steady reduction of peak load on distribution equipment.
- As the report highlights, "The inverters followed the commanded functions in the field with limited impact to their energy production."

If the success of the APS Solar Partner Program is any indication, microgrid management systems, distributed generation monitoring, and advanced controllers will play a critical role in helping APS take this pilot to scale. And, because of APS's success, more utilities may have the proof they need to transition to a prosumer business and energy delivery/management mode