



# National Grid Distributed System Platform REV Demonstration Project

## Program Description

Launched in 2014, Reforming the Energy Vision (REV) is Governor Andrew Cuomo's comprehensive energy strategy for the state of New York. REV represents a multifaceted strategy encompassing initiatives in the areas of renewable energy, building and energy efficiency, clean energy financing, sustainable and resilient communities, energy infrastructure modernization, innovation and R&D, and transportation. REV helps consumers make more informed energy choices, develop new energy products and services, and protect the environment while creating new jobs and economic opportunity throughout the state. Combined heat and power (CHP) is identified as a Building and Energy Efficiency initiative to achieve REV goals.

In February 2015, the New York Public Service Commission issued an official order directing the state's six electric investor-owned utilities to develop and file initial demonstration projects that were consistent with REV guidelines. These projects are intended to demonstrate new business models, create new revenue streams for the state's electric utilities and third parties, and determine the most effective approaches to implementing distributed energy resources (DER).

The National Grid Distributed System Platform REV Demonstration Project (DSP Demonstration Project) tests advanced methods for integrating diverse forms of DER to meet the evolving needs of customers and society. The aim of the DSP Demonstration Project is to develop, deploy, and test a distribution-level energy market. This market creates new, mutually beneficial revenue streams for DER and the utility. The DSP Demonstration Project documents customer motivation through market price signals, market entrance with existing or new DER, and the willingness of customers to operate their DER in response to market signals. The DSP market also generates new utility revenue streams, allowing the utility to charge fees for access to DSP data and markets.

The platform for the DSP Demonstration Project was developed by National Grid, Opus One, and the Buffalo Niagara Medical Campus, Inc. (BNMC). The project tested a small-scale DSP that communicates with different forms of DER at the BNMC. Implementation has since been expanded to other sites with different DER types and distribution-level constraints.

For CHP and microgrids with CHP, the DSP can pay CHP for presently uncompensated value that it provides to the grid and to society at large. The National Grid Distributed System Platform REV Demonstration Project Q4-2018 Quarterly Report states that, "if successful, the DSP will create new revenue streams for both the DER owners and National Grid." Services transacted and purchased through the DSP will test the implementation of the "LMP + D + E" financial model for electric services:

- The "LMP" portion is the locational-based marginal prices for day-ahead and real-time market prices established by the New York State Independent System Operator (NYISO) and any additional capacity constraints and transmission losses that can be determined for the local area.
- The "D" portion refers to a distribution delivery value, that is, the value that DER can provide to the electric distribution system, such as load relief to help alleviate substation or feeder constraints.
- The "E" portion refers to the external societal value from DER, for example, the use of low-carbon, domestic, or renewable fuel sources.

### Quick Facts

**LOCATION:** New York

**MARKET SECTOR:** All

**PROGRAM TYPE:** Rate design pilot

**GEOGRAPHY:** Buffalo and Utica

**PROGRAM START:** 2015

## Program Outcomes

National Grid chose the Buffalo Niagara Medical Campus in Buffalo, New York, as the initial site for its DSP Demonstration Project because of the diversity of load shapes, fuel sources, control capabilities, and automation. BNMC consists of 13 institutions and almost 100 public and private companies, almost all serviced by on-site generation for resilience and back-up. The medical center also has a long-standing history of energy innovation and participation in REV and National Grid projects (for example, the BNMC community microgrid project was an awardee in the NY Prize microgrid challenge).

The DSP Demonstration Project is in its second phase, technology development, which follows the first phase of financial model development. Technology development includes developing the technical platform and enrolling DER resources. This phase includes expansion outside of the BNMC to test implementation for other types of DER and under different distribution constraints. The first DER enrolled in the DSP Demonstration Project outside of the BNMC is a 2.2 MW CHP facility in Utica, New York.



**The VOLTRON platform can be operated on almost any chipset.**

IMAGE COURTESY OF VOLTRON.ORG

One takeaway from the project so far is the importance of a common protocol for communication between the grid and DER, which resulted in the project's use of the Pacific Northwest National Laboratory's VOLTRON open-source platform. VOLTRON connects HVAC, energy equipment, and controls with a common platform and is a transactional network platform, using autonomous controls to respond to market price signals. The goal of this integration is to allow building systems to participate in ancillary service markets for utilities. The Q4-2018 Quarterly Report describes ongoing work to integrate the DSP's application program interfaces with the CHP system's VOLTRON implementation. The DSP Demonstration Project will continue to enroll new DER participants, focusing on the most interesting case studies based on distribution system needs and DER technology.

Phase 3 of the project will consist of field demonstrations of relaying price signals to DER for when participants and the utility are connected at a common point of control. The DSP hardware and software, as well as in-operation DER performance, will be measured and evaluated. These performance data and other feedback from DER operators will allow refinement of price signals and market structure to maximize the incentive for DER participation.

## Lessons to Share

The DSP Demonstration Project shows the role that CHP can play in markets enabled by smart grid technology. The ancillary services and distribution-level benefits can be priced and linked with controls to maximize revenue and grid benefit. To do this successfully requires effective and actionable price signals, along with a common platform and protocols for standardization among all market participants.

## For More Information

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