

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION



Reforming the Energy Vision
Demonstration Project Assessment
Report

National Grid:
Resiliency Demonstration Project
Potsdam, New York

February 10, 2016

INTRODUCTION

In an order issued February 26, 2015, the Commission directed the six large investor owned electric utilities to develop, and file initial demonstration projects, consistent with the guidelines adopted by the order, on or before July 1, 2015.¹ These projects are intended to demonstrate the potential of various aspects of the Reforming the Energy Vision (REV), the regulatory initiative launched by the Commission as part of Governor Cuomo's comprehensive energy strategy for New York.

As the Commission noted, the projects are intended to demonstrate new business models, i.e. new revenue stream opportunities for third parties and the electric utilities. In that regard, the projects will inform decision makers related to developing Distributed System Platform (DSP) functionalities, measure customer response to programs and prices associated with REV markets, and determine the most effective implementation of Distributed Energy Resources (DER). Further, as demonstration projects, they are intended to test new technology and approaches to assess value, explore options, and stimulate innovation before committing to full-scale implementation. Therefore, demonstration projects should also be designed to deliver observable results and actionable information within a reasonable timeframe. During the demonstrations, the projects will be assessed regularly by each utility. Lessons learned should be incorporated into the projects or as appropriate into the utilities' operations as expeditiously as reasonable.

¹ Case 14-M-0101, Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan (Issued February 26, 2015) (Track One Order).

DISCUSSION

National Grid's Proposal

In compliance with the Commission's Track One Order, Niagara Mohawk Power Corporation d/b/a National Grid (National Grid or Company) filed its Resiliency Demonstration Project for Potsdam, New York (Potsdam Resiliency Project or Project) on July 1, 2015. Department of Public Service Staff (Staff) determined the filing represented a relevant and innovative REV demonstration project; however, further development was required in order to determine compliance with the Commission's Order. On December 7, 2015, National Grid filed an addendum addressing the additional information and clarifications to the original proposal. This assessment report draws together information contained in both the original filing and the updated addendum filing.

National Grid is proposing new services that would facilitate and allow for the creation of a community-resilience microgrid in Potsdam, NY, in which the utility owns the distribution facilities but other entities own some of the DER assets internal to the microgrid.² The Company states that the primary design objective of the Potsdam project is to develop utility services allowing the microgrid to deliver electricity to microgrid-connected customers for up to two weeks, during widespread power outages that would otherwise leave those

² The United States Department of Energy defines a microgrid as "[a] group of interconnected loads and distributed energy resources (DER) with clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid [and can] connect and disconnect from the grid to enable it to operate in both grid connected or island mode." The Commission adopted this definition and noted that microgrids have great potential value, not only for the obvious purpose of providing resilience in the case of grid outages, but also as a means of integrating clean distributed resources and offering grid services such as demand reduction and ancillary services. (Track One Order p. 109)

customers without power, thereby allowing essential services to continue. For this demonstration, the focus is on customers and services that include the State University of New York, Potsdam (SUNY Potsdam), Clarkson University, gas stations, banks, grocery stores, drug stores, and critical facilities such as local police, fire, hospital, shelters, water and sewer, and governmental facilities (collectively referred to as critical services for the purpose of this document). A number of community stakeholders have expressed interest in such a community-resilience microgrid to enable them to provide services during extended outages, use Potsdam as a staging area for countywide emergency services, and optimize everyday use of DER within the microgrid to reduce commodity costs.

The filings describe how new utility services designed for microgrid applications may help to overcome regulatory and market barriers to the development of community-resilience microgrids. The Company identifies those barriers as: (1) the attractiveness of existing net metering and remote net metering statutes and rules; (2) the complexity of multi-customer contracting for new agreements/services; (3) the existing contractual agreements with DER owners and DER developers; and (4) customer willingness to directly invest capital up-front. Through the demonstration project, National Grid will test customer and community willingness to pay for a premium resiliency service. As part of the project, the Company will develop four services and complete the audit grade detailed engineering design needed in order to design these services.³ Specifically, the project will test: (1) tiered cost allocation and recovery for underground infrastructure to supply customers

³ The detailed engineering design will follow the specifications and requirements within New York State Energy Research and Development Authority's New York Prize program.

during events; (2) central procurement for DER; (3) microgrid control and operations; and (4) billing/financial services.

First, the proposed Potsdam microgrid design includes new underground distribution infrastructure capable of withstanding the impacts of severe weather. Rather than using the traditional rate base method to pay for the underground wires, the Company will develop and test a new rate design that has the majority of the cost recovered from microgrid-connected customers and the remaining costs socialized to Potsdam residents who benefit by having the continued availability of key services.⁴ A distribution surcharge, a revised or new standby rate, or other cost recovery mechanism will be proposed and if supported by the microgrid stakeholders, the Company would file a corresponding tariff proposal with the Commission.

Second, to test the efficacy of using a tariff for procurement, National Grid will centrally procure the expected 2 to 4 megawatts of additional generation required to serve critical loads by the microgrid in island mode. To aid in the development of DER by third party entities within the microgrid's footprint, the Company will develop and offer a central procurement service where National Grid agrees to purchase the power under a long-term tariff and sell the output to microgrid participants through a tariff that will include an upcharge for providing this service. National Grid will not own the DER, rather only agree to purchase the energy.

Third, National Grid will develop and test a microgrid control and operations service to address the control, dispatch, and operations requirements for a microgrid. The Company expects to offer this service for a fee to microgrid-connected

⁴ National Grid states "the total cost and the extent of Village government support, on behalf of its constituency, will inform the optimal approach to residential cost-sharing."

customers with the help of a technology partner specializing in this emerging market.

Lastly, the Company will develop and test offering energy providers within the microgrid metering, billing and financial services similar to the consolidated billing services presently provided to energy service companies (ESCOs). Contracts for these services will include a service fee.

With the exception of the underground distribution infrastructure,⁵ National Grid believes non-utility market participants could provide the other three services being tested in this demonstration. The Company believes it is best positioned to provide these services to facilitate the development of community resilience microgrids through the hybrid utility microgrid business model that includes partnering with technology companies, where necessary, to leverage their expertise. Therefore, the demonstration will test new proposed utility services with customers, stakeholders, and non-utility market participants. The Company's demonstration project design includes an iterative process for parties to evaluate the Company's proposed contractual and tariff terms as they develop.

The first stage of the project will determine which of the services will be provided by National Grid and which services will be provided by other entities. Services ultimately provided by National Grid will require evaluation to determine the effectiveness of the business model and the services provided. A formal evaluation plan will be included in a quarterly report to the Commission following the determinations of which services will be provided by the utility.

⁵ Because of its existing franchise rights for assets that cross a public right of way, National Grid believes it is the preferred entity to construct, own, and operate the distribution infrastructure.

Department of Public Service Staff (Staff) Review

Staff has reviewed the demonstration project compliance filings for consistency with the Track One Order as well as the Commission's REV policy objectives and the Commission's demonstration project principles. The REV policy objectives are: enhanced customer knowledge and tools that will support effective management of the total energy bill; market animation and leverage of customer contributions; system wide efficiency; fuel and resource diversity; system reliability and resiliency; and reduction of carbon emissions.⁶ The Commission's demonstration project principles defined in the Commission's Resolution on Demonstration Projects are: third party participation; new business models; customer/community engagement; identification of economic value; pricing and rate design; transactive grid; scalability; market rules and standards; system benefits; cost effectiveness; and implementation with constructive feedback within reasonable timeframe.⁷ Staff has also evaluated the extent to which the demonstration project maintains a reasonable relationship between costs and estimated benefits, including demonstration value.

The Potsdam Resiliency Project is the only demonstration project, to date, that explores the development of utility services and tariffs for the facilitation of community microgrids. In the Track One Order the Commission noted, community microgrids offer great potential for innovation, and parties have identified the lack of a clear regulatory path as a barrier for this type of microgrid. The Potsdam Resiliency

⁶ Case 14-M-0101, Reforming the Energy Vision, Order Instituting Proceeding (issued April 25, 2014).

⁷ Case 14-M-0101, Reforming the Energy Vision, Memorandum and Resolution on Demonstration Projects (Issued December 12, 2014).

Project acknowledges and addresses that microgrids will interact in new ways in energy markets and provide services that are not yet developed. Because the Company believes there is potential value of these services, National Grid and its third party partners will attempt to resolve the challenges and lay the groundwork for the development of more community-resilience microgrids throughout the state.

Staff concludes that the Potsdam Resiliency Project will enable National Grid to develop and test several new utility services and revenue streams. In addition, the Company will explore how to attract DER generation providers needed to create a community-resilience microgrid. There are several aspects that will be assessed within this project, including: the Company's ability to aggregate and optimize customer load and DER; customers' willingness to pay for resiliency services; and a financial structure that appropriately shares the incremental costs and benefits associated with the microgrid. As documented in the December 15, 2015 letter from Staff, National Grid's Potsdam Resiliency Project complies with the requirements of the Commission's Track One Order, and the utility will file the implementation plan with the Secretary within the next thirty days.

REV OBJECTIVES ADDRESSED

System Reliability and Resiliency

The Potsdam Resiliency Project will provide value to microgrid-connected customers and the community as a whole by providing power to critical services in the event of an outage that would have otherwise effected the microgrid customers. Business customers and emergency service providers will also be able to remain energized and operate during outages. The value for the residential community will be the availability of emergency and other services during an extended outage. To

accomplish this added reliability, the project will use underground infrastructure capable of withstanding the impacts of severe weather. Additionally, National Grid will be designing a microgrid control and operations service to address the control, dispatch, and operations requirements for a microgrid. Community microgrids require a higher degree of coordination than the single-customer model, due to the required aggregation and optimization of customer load and DER.⁸ For the microgrid to operate properly, the system needs a grid-connected and island mode. The microgrid will normally operate in the grid-connected mode, but the control system will switch to island mode during extreme outage events keeping the power on when the surrounding grid is out of service. Staff concludes that the Potsdam project will effectively test the Company's ability to facilitate the development of community microgrids that will ultimately increase the reliability and resiliency of the system.

COMMISSION DEMONSTRATION RESOLUTION PRINCIPLES

New Utility Business Models

National Grid's proposal will be testing a new community-resilience microgrid business model by developing and testing four new microgrid services: (1) tiered recovery for storm-hardened underground wires; (2) central procurement for DER; (3) microgrid control and operations; and (4) billing/financial services. Through the demonstration project, National Grid will test customer and community willingness to pay for premium resiliency services through new approaches to rate design and cost recovery. In addition, the Company will be testing its ability to be a facilitator of microgrid development and earn new fees for doing so.

⁸ The single-customer model serves clusters of buildings on a single corporate, military, or university campus.

Pricing and Rate Design

National Grid will develop and test a new, tiered rate plan to recover the cost of the underground wires the Company proposes to install in order to effectuate the Potsdam microgrid. The infrastructure costs will be amortized over the life of the wires and the rates will be allocated based on the customer's level of benefit such that the microgrid-connected customers carry the majority of the cost recovery and the remaining minority share be socialized to Potsdam residents. The Company believes it is appropriate to consider residential cost-share since the residential community will benefit from the availability of critical services enabled by the microgrid, however, the exact costs to be recovered from residents would be based on total cost and the extent of village government support. One goal of the demonstration project is to develop tariffs with appropriate recovery terms for both microgrid connected customers and residents. In addition to the recovery of the underground infrastructure costs, National Grid will be developing services and pricing structures/revenue streams for commitments to procuring energy from DER providers that supply the microgrid, controlling and operating the microgrid, and providing billing and financial services that are similar to those currently provided to ESCOs.

Customer/Community Engagement

In its filing, National Grid stated that it began stakeholder outreach and engagement and it received formal letters of support from the Village of Potsdam, Clarkson University, SUNY Potsdam, and the Canton-Potsdam Hospital. The Company also plans to engage microgrid customers, non-utility market participants, and other stakeholders in the design and pricing of the four new services. As a result, the project design includes a process for parties to evaluate the Company's proposed contractual and tariff terms as they develop and

compare the Company's proposed services against services proposed by non-utility market participants. Staff concludes that the benefits offered by the microgrid and options for continued services will be effective in getting customers engaged with the Potsdam Resiliency Project demonstration.

Identification of Economic Value

As the Commission noted in the Track One Order, demonstration projects should allocate economic value between the utility, customers, and third parties. Through the Potsdam Resiliency Project, National Grid will develop and evaluate the four new services and revenue streams. DER participants should be able to monetize their DER assets, during both everyday "blue-sky" scenarios and during an outage when the microgrid is islanded. The value for third party distributed generation developers will be a long-term revenue stream guaranteed by the Company in the form of a tariff. The tariff will include terms for emergency and grid-connected operations, and may include commodity service for microgrid participants. The Company also stated in its filings that it will work with microgrid participants, DER asset owners, and the NYISO to identify potential wholesale market monetization opportunities, including capacity, energy, and ancillary services markets.

Transactive Grid/Market Rules and Standards

The Potsdam Resiliency Project provides the opportunity to develop and test rules that may lead to standards and market rules for microgrids. The project will also test two-way communications and real time operation of DER assets and possibly dynamic load as the Potsdam Resiliency Project will include the establishment of a microgrid control and operations service to address the control, dispatch, and operations requirements for a microgrid. The microgrid control and operations service requires standardizing operating and dispatch procedures to ensure safe reliable service while the microgrid

is islanded and for the economic dispatch of DER while in grid-connected mode. In addition to operations aspects, the Company will investigate opportunities, rules, and standards for microgrid-related DER assets to bid into NYISO capacity, energy, and ancillary services markets.

Scalability

The use of microgrid applications is expected to expand to improve reliability and emergency preparedness within communities. The services offered and rate designs developed and evaluated as part of National Grid's demonstration project are replicable to other microgrid applications. This would include those in National Grid's service territory and areas throughout New York served by other utilities.

Cost Effectiveness

Demonstration projects should provide benefit to ratepayers, both qualitatively and quantitatively as compared to costs. In addition, the projects to the extent possible should leverage third party capital. The Potsdam Resiliency Project will develop and test new utility revenue streams and create other sources of value. The project will develop a business model for microgrid development and examine whether customers and the community as a whole are willing to pay for the resiliency services provided by a community-resilience microgrid. The project will require incremental operating costs including labor, project management support, marketing and communications, and stakeholder and community engagement expenses.

To help mitigate initial infrastructure costs, National Grid has developed a tiered rate plan for long-term cost recovery. Staff believes that the demonstration project provides the opportunity to examine the financial viability of microgrids and a new business model for the utility as a facilitator of microgrid development. There are also several

unquantified societal benefits associated with the demonstration project, for example, public safety, using Potsdam as a staging area for county-wide emergency services, and the ability to provide basic needs such as fuel, food, and water to residents in times of widespread outages. The implementation plan will include measuring, monitoring, and reporting on the actual benefits and costs both qualitatively and quantitatively.

Third Party Participation

National Grid will work with a partner to develop the microgrid control and operations. The control and operations hardware and software will be used to optimize the monetization of DER assets. The microgrid will use existing local renewable resources and 2 to 4 megawatts of additional generation located within the microgrid footprint to supply critical loads during major power outages. To ensure third parties develop the incremental DER generation, National Grid proposes central procurement of the additional capacity. The Company would serve as the central purchaser of energy output from new DER under a long-term tariff or National Grid will serve as the microgrid DER purchaser of last resort. The Company believes the central procurement model has a number of advantages over the existing individual power purchase agreement model, including increase customer convenience; reduced customer risk and cost; reduced DER developer risk by ensuring a long-term revenue stream; and the Company's ability to propose tariffs.

Reasonable Timeframe

Staff has determined that the Potsdam Resiliency Project will be implemented within a reasonable timeframe. National Grid expects both the conceptual design to be completed and the audit-grade detailed engineering study to begin by June 2016. The preliminary service proposals and rate designs will then be developed and presented to the Potsdam microgrid customers by the end of 2016. The Company indicates that over

the first six months of 2017, affected parties within the Potsdam community will evaluate and compare National Grid's offerings, and the financial/business plans will be finalized. Therefore, the total duration of the demonstration is expected to be one and a half years.

AREAS FOR FURTHER DEVELOPMENT

Milestones and Check Points

Following discussions with Staff, National Grid has made progress in further defining checkpoints and metrics of success for this project. It will measure customer interest in paying for the infrastructure necessary to obtain the benefits that the microgrid offers, whether it can attract DER necessary to operate the microgrid through the use of long-term tariffs to purchase the energy, and if it can develop and offer microgrid control and operation functions for a service fee. National Grid will use the milestones and checkpoints finalized in the Implementation Plan to modify various aspects of the demonstration and ultimately trigger go/no go decisions for future services to be supplied by the Company.

POTENTIAL LEGAL BARRIERS AND/OR AREAS OF COMMISSION ACTION

Tariff Filings

The tariffs to be developed and tested under this demonstration will need to be filed with the Commission for approval before the microgrid stakeholders will be subjected to them. The Company shall take the timing of such filings into consideration when developing the implementation for this project.

CONCLUSION

Staff has determined that the proposed Potsdam Resiliency Project complies with the objectives set forth in Ordering Clause 4 of the Track One Order. Staff will continue working with National Grid to develop a detailed implementation plan, which will include a detailed schedule, budget, projected milestones with acceptance or performance criteria, and reporting requirements. Staff will also continue to discuss the areas of further development with National Grid and identify any issues that may require Commission action. The implementation plan will incorporate the results of these discussions, and will be updated quarterly, incorporating lessons learned and new developments within the scope of the project. The implementation plan will be filed with the Secretary of the Commission within thirty days.