

STATE OF NEW YORK  
PUBLIC SERVICE COMMISSION



Reforming the Energy Vision  
Demonstration Project Assessment  
Report

National Grid:  
Fruit Belt Neighborhood Solar

December 2, 2015

## 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.<sup>1</sup> 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 decisions 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 variables, and innovate 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. Lessons learned should be incorporated into the projects or as appropriate into the utilities' operations as expeditiously as reasonable.

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<sup>1</sup> 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 Fruit Belt Neighborhood Solar demonstration project (Fruit Belt Solar project) on July 1, 2015. National Grid's Fruit Belt Solar project seeks to engage low-to-moderate income (LMI) residential customers in the Fruit Belt neighborhood of Buffalo, New York, with solar and energy efficiency products and services. The Company will provide LMI customers with the benefits of installing solar photovoltaic (PV) panels on the roofs of customers and will provide home energy audits and energy efficiency measures at no-cost. The no-cost approach will eliminate the traditional financing obstacles that LMI customers currently face when deciding whether to participate in the solar and/or energy efficiency markets.

In addition to providing participants with bill credits generated by the output of the solar panels, and access to energy efficiency measures, the demonstration will be testing the grid efficiency benefits for the local distribution system that distributed resources (like rooftop solar) can provide. To do the latter, it is necessary to physically install solar assets within a concentrated geographic area and along a common electric feeder close to the load.

During the demonstration, National Grid will own and operate the five kilowatt (kW) PV units which will be installed in front of the customer's meter. This will allow for the value of the PV generation to be distributed equally among the 100 customers hosting PV systems as well as an additional 50 customers chosen to participate by lottery, by providing a monthly bill credit to those customers. The 150 participating

customers are expected to receive approximately \$18 per month in bill credits on average to help pay back arrearages and reduce the customers' monthly bills. In addition, to the monthly bill credits generated by the Solar PV, the demonstration will include connecting all participants interested in rooftop solar to NYSERDA's EmPower New York energy efficiency program, whether or not their roof qualifies to host solar. This will result in a total participation in the demonstration project of 300 LMI customers.

The PV generating units will also be equipped with smart inverters that will communicate with National Grid's system control center. Using these smart inverters, National Grid will be able to engage in Volt/VAR Optimization (VVO) and Conservation Voltage Reduction (CVR). This will enable the Company to test the achievement of a number of benefits including: (1) power factor correction at host locations; (2) improved voltage control on the distribution grid; (3) monitoring and control of reactive power; and (4) reduced line losses on the distribution grid.

National Grid will engage a third party to perform home site and structural audits to select the 100 customers whose homes are sufficiently structurally sound, including those which require less than \$5,000 in Company paid repairs, and well suited, in terms of roof orientation, shading, and condition of the home's electrical panel, for the installation of solar systems. Simultaneously, National Grid will also leverage its interactions with Fruit Belt-area residents to engage eligible residents in state and local LMI assistance programs, including the EmPower NY energy efficiency program run by the New York State Energy Research and Development Authority (NYSERDA). These offerings are expected to produce additional energy efficiency savings and lower bills.

Department of Public Service Staff (Staff) Review

Staff reviewed National Grid's Fruit Belt Solar project filing for consistency with 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.<sup>2</sup>

The Fruit Belt Solar project is the only demonstration project, among the 12 filed to date, that directly engages an LMI community of New York State. Reducing the energy burden for LMI customers, among other LMI customer-focused goals, is a major policy focus of the Commission's proceeding addressing energy affordability for low income utility customers.<sup>3</sup> The Fruit Belt Solar demonstration project tests a method for reducing LMI customers' electric bills through the provision of DER to such customers while leveraging the PV assets to also provide system efficiency benefits. These grid operations and system efficiency benefits will grant National Grid greater visibility and control of DER on its distribution system and potentially save ratepayers money by optimizing system voltage and reactive power.

The multifaceted portfolio of customer engagement channels proposed by National Grid, including leveraging: (1) the nearby Buffalo Niagara Medical Campus, Inc. (BNMC), which has well established relationships with its surrounding

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<sup>2</sup> Case 14-M-0101, Reforming the Energy Vision, Order Instituting Proceeding (issued April 25, 2014).

<sup>3</sup> Case 14-M-0565 Proceeding to Examine Programs to Address Energy Affordability for Low Income Utility Customers.

neighborhoods including the Fruit Belt LMI neighborhood of just under 2,000 residents; (2) local government and community organizations; and (3) one-on-one customer interactions, is a promising feature of the Fruit Belt Solar project. National Grid has performed extensive outreach efforts in the Fruit Belt neighborhood, and this will serve as a model for LMI community engagement efforts going forward.

For these reasons, Staff concludes that the Fruit Belt Solar project has the potential to engage LMI customers in DER and help them better manage their utility bills, and at the same time create grid operations and system efficiency benefits. As documented in the August 3, 2015 letter from Staff, National Grid's Fruit Belt Solar project complies with the requirements of the Commission's Track One Order and the utility will file the implementation plan with the Secretary of the Commission within thirty days of issuance of this report.

#### REV OBJECTIVES ADDRESSED

##### Enhanced Customer Knowledge and the Provision of Tools that Will Support Effective Management of the Total Energy Bill

The Fruit Belt Solar project gives LMI customers the opportunity to participate in the deployment of solar PV installation that will have a direct impact on their energy bill. This addresses the concern raised in the 2015 New York State Energy Plan that these consumers are less likely to be reached in the near term by clean energy market actors and project developers because of perceived credit risks.<sup>4</sup> Through their share of PV generation and energy efficiency audits and measures undertaken as part of this demonstration project,

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<sup>4</sup> The New York State Planning Board, "The Energy to Lead: 2015 New York State Energy Plan Volume 1," p.39.

participating customers will be provided with the tools to reduce and better manage their energy bills.

#### Market Animation and Leverage of Customer Contributions

Although the Fruit Belt Solar Project does not include direct contribution of capital by the third party partners, this project will help to animate the market for new and innovative DER products and services. This includes feeder network modeling and performance assessment by GE Global Research, solar mounting systems manufacturing by American Douglas Metals, development, proto-typing, testing and certification of PV micro-inverters by SPARQ Systems, and solar site assessments, installations, maintenance, and solar workforce development by Solar Liberty. In addition, the business model being established can be altered to allow more third party options when applied to other communities; for example, by shifting all or a portion of the ownership interest in the solar PV systems to a third party provider. National Grid reports that it has spoken with other third parties which would be willing to engage in similar projects at scale if this demonstration project is successful. Staff concludes that the success of the Fruit Belt Solar project could spur considerable market animation for providing energy products and services for LMI customers.

#### System Wide Efficiency

By making use of smart inverter technology, the Fruit Belt Solar project will allow National Grid to test ways to better control voltage and inject reactive power into the distribution grid by leveraging the output the solar PV generation installations. The solar PV generation will also be used to correct the power factor of PV hosts' homes. Reductions in reactive power and better control of voltage on the distribution system will lead to reduced line losses and has the potential to reduce energy usage while delivering the same

amount of power required by customers. With the ability to engage in VVO and CVR using the monitoring, communications, and control features of the solar PV and smart inverter, National Grid will be able to achieve distribution system efficiency benefits.

#### Reduction of Carbon Emissions

Solar PV generation supplied by the Fruit Belt Solar project is clean and free of carbon emissions. By supplying a portion of the project participants' energy usage with clean solar PV generation, carbon emissions will be reduced. Similarly, energy use reductions associated with energy efficiency measures taken in response to audits will reduce the need for fossil fuel based generation.

### DEMONSTRATION PROJECT ELEMENTS

#### Customer/Community Engagement

The Fruit Belt Solar project includes an extensive customer and community engagement component consisting of a three-phased approach that includes awareness, enrollment, and installation. National Grid began its outreach efforts in late 2014 and early 2015 by conducting meetings with multiple Fruit Belt neighborhood leadership groups including Orchard Community Initiative, Fruit Belt Advisory Council, Buffalo Federation of Neighborhood Centers, Fruit Belt Coalition, and the Fruit Belt Homeowners and Tenant Council. In addition, letters of support were secured from key leaders including the Orchard Community Initiative and the Fruit Belt Advisory Council; and the Company communicated with numerous legislative contacts to apprise them of the project and seek input and support.

National Grid's primary outreach partner has been the BNMC. The BNMC serves as the umbrella organization of the anchor institutions that make up the Buffalo Niagara Medical



Campus located within the 120 acre campus bordering Allentown, the Fruit Belt, and Downtown. In addition, the outreach plan includes a mix of traditional grassroots engagement, marketing, public relations, and media relations. Staff concludes that these efforts should be effective in getting customers engaged with the Fruit Belt Solar demonstration project.

#### Identification of Economic Value

The Fruit Belt Solar project will create economic value for not only participating customers, but also National Grid and its entire body of ratepayers. Participating customers will gain the benefits of the solar PV generation bill credits and from energy efficiency projects completed to improve their homes. Solar Liberty, National Grid's third party partner responsible for assessing rooftop structural integrity and installing the solar PV panels has committed to creating five new jobs for Fruit Belt residents through a workforce development initiative as part of this project. Finally, National Grid ratepayers as a whole should benefit from lower uncollectable expenses, power factor correction at host or system level, improved voltage control on the distribution grid, monitoring and control of reactive power, and reduced line losses on the distribution grid.

#### Scalability

Staff concludes that the model for the Fruit Belt Solar project should be reasonably repeatable and expandable in other LMI communities. In addition, the system and energy efficiencies from implementing a similar approach could be used alone or in combination with other DER to address a constrained area elsewhere in the National Grid service territory, or at a different New York State utility, that would otherwise be addressed with a traditional T&D investment. Furthermore, the

Fruit Belt Solar project supports National Grid delivery system modernization initiatives.

#### Reasonable Timeframe

National Grid expects to complete deployment and commissioning of the solar PV systems within twelve to eighteen months of approval. This is followed by a period of six to twelve months during which the company will gather data and assess the performance of the demonstration project in mitigating the arrears, producing energy efficiency benefits for LMI customers, and increasing the efficiency of the electric distribution system. This schedule supports the Commission's goals of producing measurable outcomes within a timeframe that can help support REV implementation goals.

#### Market Rules and Standards

The Fruit Belt Solar project makes use of a new business model for solar PV units. Unlike most installed residential solar PV which is connected behind customer meters and relies on Net Metering to monetize the benefits of the PV generation, the solar PV units used in the Fruit Belt Solar project will be connected in front of customers' meters and will not require customer energy usage to be net metered in order to monetize benefits.

#### Distributed System Platform (DSP) Functionalities

The Fruit Belt Solar project includes a focus on smart grid, automation, and communications. National Grid will use the two-way wireless communicating microinverters included in each solar PV generating unit to perform volt/VAR optimization, conservation voltage reduction by controlling them from its Western Region Control Center. This will enable the Company to optimize for real or reactive power output to examine how different inverter settings can be used to optimize the distribution system.

## AREAS FOR FURTHER DEVELOPMENT

### Third Party Participation

While National Grid is purchasing equipment from a number of third parties and partnering with the BNMC to perform customer outreach, education, and engagement, National Grid will own the solar PV panels placed on host participants' roofs for the duration of the demonstration period. Staff discussed the option of third party ownership of the solar PV panels and encouraged the Company to explore sharing or other arrangements for the ownership of the PV systems. National Grid reported that there was a lack of interest from the market to serve the LMI customers under this demonstration project. To enable the rapid deployment of these systems for this project and maintain the momentum related to the outreach and partnerships already established, Staff concludes that it is reasonable for National Grid to own the panels in this instance. The implementation plan will include a process to determine the ownership of the panels beyond the demonstration period. Staff has advised the Company to consider other ownership arrangements for future LMI solar PV demonstrations being contemplated in other parts of its territory and to continue to reach out to various third party suppliers of solar PV panels to explore their willingness to participate.

### Price and Rate Design

One important component of REV that can benefit from comprehensive real-world testing is alternative rate designs that better align customer incentives to react to system conditions. The Fruit Belt Solar project does not offer any new opportunities for participating customers to engage with their energy usage through new rate design options. Staff has discussed this with the Company and the implementation plan will

include the examination and development of price and rate design options as National Grid captures metering data from the participating customers during the term of the demonstration.

#### 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, energy efficiency participation, number of solar host qualifications, average solar bill credits, arrears change rates, electric distribution grid efficiency, and power factor optimization on a per solar PV system basis. National Grid will continuously monitor these metrics and associated checkpoints as the Fruit Belt Solar project progresses. In addition, the utility will use the milestones and checkpoints to be established in the Implantation Plan to trigger actions to modify various aspects of the demonstration. This is an essential activity to develop effective project recommendations to inform REV.

#### POTENTIAL LEGAL BARRIERS AND/OR AREAS OF COMMISSION ACTION

##### Utility Ownership of DER

National Grid, as part of the demonstration project, proposes to purchase and own the solar PV units. The Commission stated that utility ownership of DER will only be allowed under certain circumstances one of which is "...a project is being sponsored for demonstration purposes."<sup>5</sup> Therefore, in this circumstance, Staff finds that such ownership is within the guidelines set by the Commission.

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<sup>5</sup> Track One Order, p.70

## CONCLUSION

Staff has determined that the proposed demonstration 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 and checkpoints, and reporting requirements. Staff will also continue to discuss the areas of further development with National Grid. 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.