



Reforming the Energy Vision

Reforming the Energy Vision Demonstration Project Assessment Report

Innovative Storage Business Model Demonstration Project

May 30, 2018

INTRODUCTION

In an order issued February 26, 2015, the Commission directed the six largest investor owned utilities to develop and file demonstration project proposals consistent with the guidelines adopted by the Order.¹ These projects are intended to demonstrate the potential of various aspects of the regulatory initiative launched by the Commission as part of Governor Cuomo's comprehensive energy strategy for New York, Reforming the Energy Vision (REV). Those aspects include new business models with new revenue stream opportunities for both the electric utilities and their third-party partners. These projects are also intended to inform decisions related to developing the Distributed System Platform (DSP) and its functionalities, measure customer response to programs and prices associated with REV markets, and determine the most effective implementation of Distributed Energy Resources (DERs). Further, as demonstration projects, they are intended to test new 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 possible.

DISCUSSION

Orange and Rockland's Proposal

Orange and Rockland Utilities, Inc. (O&R, or the Company) has partnered with Tesla to propose the Innovative Storage Business Model Demonstration Project (the project), an energy storage REV Demonstration Project that will demonstrate an innovative business

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

model to enable the wider-scale deployment of battery-based energy storage systems by identifying and making full use of their unique characteristics, taking advantage of multiple value streams, and utilizing a unique financial model that spreads the costs and benefits of the asset between multiple stakeholders. The entire project will consist of a portfolio of aggregated batteries totaling 4MW/8MWh in size. The partners intend to target two customer segment or installation types, the first of which is Commercial & Industrial (C&I) customers. These customers will have 250-500kW/0.5-1MWh behind-the-meter (BTM) battery systems installed on site, with a combined aggregated capacity of 2MW/4MWh. These systems will provide grid services to O&R, ancillary services to the NYISO wholesale market, and demand charge reductions to the host customer. The cost of the batteries and their installation will be shared amongst the Company, Tesla, and the host customer such that the host customers will be able to achieve demand charge savings at a lower system cost than would otherwise be possible. Tesla will retain ownership of the battery storage system, and will offer "make whole" payments to the host customers if the batteries are unable to achieve the contracted demand charge reduction due to unavailability. The second customer segment is front-of-the-meter (FTM) remote photovoltaic (PV) installation customers, who will be able to use the storage to shift generation (grid injection) to the most valuable time periods, and will consist of one or two sites for a total of 2MW/4MWh of battery storage paired with the PV. Tesla will also retain ownership of these installations, and will limit the batteries to charging from the PV system for the first five years during the investment tax credit (ITC) recapture period. These sites will be utilized for utility T&D cost deferral and participate in the NYISO wholesale market.

The Company filing states that this demonstration project is seeking to animate the market for energy storage systems by creating a financial model that allows for the distribution of costs and benefits of energy storage systems to all relevant stakeholders. Currently, energy storage systems are utilized for a single purpose,

such as demand charge reduction or utility T&D cost deferral. While there is no direct barrier to a single owner constructing and owning an asset that can take advantage of multiple value streams, most customers do not have the sophistication, interest, or financial resources to construct and manage an energy storage system sufficient to take advantage of the potential multiple streams of value available to such a system. This demonstration project is intended to demonstrate an alternative model where a firm like Tesla can work with the utility and the NYISO to take advantage of these alternative value streams while providing demand charge reductions at a lower cost (to the host customer) than a traditional energy storage system.

Department of Public Service Staff (Staff) Review

Staff has reviewed the demonstration project proposal filing 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.² 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 a reasonable timeframe.³ Staff has also evaluated the extent to which the demonstration project maintains a reasonable relationship between costs and estimated benefits, including demonstration value.

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

³ Case 14-M-0101, Reforming the Energy Vision, Memorandum and Resolution on Demonstration Projects (issued December 12, 2014).

The Innovative Storage Business Model Demonstration Project benefits from O&R's partnership with Tesla, an experienced vendor in storage assets, PV, and combined PV + storage by allowing the project to focus on the monetization of the value generated by the energy storage system instead of demonstrating the viability of the technology itself. Staff also believes that the combination of Tesla's Gridlogic control system and O&R's distribution-level analysis will allow for effective forecasting of local requirements and dispatch of the storage assets.

Staff concludes that the Project will enable O&R to test increasing storage utilization through combining value streams. There are several hypotheses that will be assessed within this project, including that: (1) aggregated storage and PV + storage can provide value to multiple stakeholders; (2) utilities can leverage aggregated BTM storage and combined PV + storage systems to provide T&D benefits; (3) aggregated storage and PV + storage will be able to earn revenues in the NYISO wholesale market; and (4) customers benefit from participating in a multi-user model to reduce their demand charge through the performance of a shared storage asset. Staff finds these questions to be relevant and valuable to the REV proceeding, and as documented in the February 22, 2018 letter from Staff, O&R's Innovative Storage Business Model REV Demonstration Project complies with the requirements of the Commission's Track One Order, and Staff expects the Company to file an implementation plan for the project with the Secretary of the Commission within thirty days of issuance of this report.

REV AND DEMONSTRATION OBJECTIVES ADDRESSED

New Utility Business Models

In the Track One Order, the Commission notes that utility earnings should depend on creating value for customers and achieving policy objectives, and thus ". . . [can] find earning opportunities in

enhanced performance and in transactional revenues.”⁴ Consequently, utilities have been directed to find alternative revenue sources that are consistent with the REV vision and policy objectives. One of the primary purposes of this demonstration project is the creation and validation of a new business model for energy storage systems that allows the costs and benefits of the system to be equitably spread between multiple stakeholders. If successful, customers will be able to reduce their demand charges more affordably than previously possible while sharing the costs and benefits of the system with the utility and Tesla. The Company will gain experience in providing coordination and settlement services, paving the way towards acting as a distributed system platform (DSP) providing platform services.

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. In a typical storage installation, the customer would purchase and own the battery storage asset while also receiving all the benefits, typically limited to demand charge reduction, and potentially backup/resiliency services. In this demonstration, economic value is shared between the host customer, O&R, and Tesla, with various value streams to and from each group. Staff believes that the Company has identified these streams of economic value in its proposal to a satisfactory degree, with further development expected in its implementation plan and quarterly updates.

Hosting site customers will pay a portion of the installation costs of the battery unit and host the unit on site, and in return will receive guaranteed reductions in their demand charge. These reductions will be guaranteed by O&R, and the size and frequency of these payments will be one of the critical learnings of the demonstration. Tesla will receive contract payments for the duration of the demonstration (three years) from O&R, and share in the proceeds from participation in the wholesale market. Finally, O&R will receive

⁴ Track One Order at 12.

the majority of the revenue generated from participation in the wholesale market, will enable T&D cost deferrals, and will receive a fee from Tesla for providing scheduling coordinator and settlement services.

Market Animation and Leveraging of Customer Contributions

Behind-the-meter storage installations are typically installed for one primary purpose: to reduce the customer's demand charge. This limits the market size for BTM storage installations because the decrease in the demand charge must be enough to compensate for the construction of the unit. Asset utilization tends to be low, and risk is high, as the value of the demand charge reduction is exposed to future usage and tariff changes. Staff expects that this demonstration, if successful, will serve to animate the market for storage by facilitating partnerships and monetizing multiple value streams that BTM storage customers can take advantage of; thereby encouraging customers to invest in BTM storage.

System Wide Efficiency and System Benefits

Traditionally, BTM battery storage installations are used to reduce customers' demand charges, which can be a large proportion of the customer's total electricity bill. Unfortunately, unless the customer's peak usage coincides with the utility's distribution system peak, the distribution system receives minimal benefits from the reduction of the customer's peak usage. This project will take both the customer and the local distribution grid into account when pursuing potential customer sites. Using algorithms developed by Tesla, Tesla will attempt to optimize the usage of the battery to allow it to be used for demand charge reductions, distribution-level grid services, and participate in the NYISO wholesale market.

Fuel and Resource Diversity and the Reduction of Carbon Emissions

Staff expects that this demonstration project will help encourage the adoption of PV+ES installations, increasing fuel and resource diversity while reducing carbon emissions. Standalone PV installations produce electricity only when the sun is shining, and their only mode of control (where available) is to disconnect from the

grid if the local distribution is unable to accommodate the DER's output. In the case where advanced grid controls are not available, the circuit must be able to support the PV and its variable output. By combining PV with storage, the system's flexibility is increased, as energy generated from the PV can be exported or used to charge the energy storage unit for export at a later time.

Third Party Participation

Demonstration projects should be collaborative efforts that provide benefits to ratepayers, third parties, and the utility. They should also maintain a reasonable relationship between the costs of the project and estimated benefits. For this project, O&R is partnering with Tesla, a manufacturer of both photovoltaic panels through its SolarCity subsidiary, and a manufacturer of lithium-ion batteries, useful in the production of its eponymous EVs. In addition to automobiles and residential PV installations, Tesla also has experience with grid-scale storage projects,⁵ and brings that experience to this demonstration. Tesla will work with the Company to find locations on the distribution grid where storage installations would be able to provide grid services. Tesla will be responsible for signing up customers in these areas for a demand charge reduction service, and will maintain ownership of the batteries. Tesla, O&R, and the participating host site customer will share the cost of installing the batteries, and Tesla will have the sole responsibility to operate, maintain, and warranty the batteries. Staff believes Tesla adds significant value to the demonstration through its partnership with O&R.

Scalability

One of the primary hypotheses of this demonstration project is that the market for battery storage can be expanded by taking advantage of multiple value streams, allowing the costs and benefits of the storage system to be shared among the end-use customer or host site, the utility, and Tesla. If this hypothesis proves to be

⁵ See <http://money.cnn.com/2017/11/23/technology/tesla-south-australia-battery-wind-farm/index.html>.

correct, Tesla and the Company believe that the project will increase the penetration of battery storage, and the Company intends to leverage the demonstration solution as part of a portfolio of solutions used in future NWAs. The business model used in this demonstration project, if successful, should also be scalable to other utility territories and storage vendors. None of the components of the project are vendor or utility-specific.

Reasonable Timeframe

It is critical that demonstration projects are designed in such a way to deliver measurable and actionable results within a reasonable timeframe, typically three years. The Innovative Storage Business Model Demonstration Project has three phases whose lengths range from 12 months to 26 months. These phases are: (1) the Customer Adoption/Site Selection phase; (2) the Operational Control and Dispatch Phase; and (3) the Wholesale Market Participation phase. O&R and Tesla intend to operate the phases simultaneously so that the project is executed as quickly and efficiently as possible. Staff finds that this strategy supports the Commission's goals of producing observable outcomes and useful lessons learned within a timeframe that can help support REV implementation goals.

Market Rules and Standards

Staff concludes that the Innovative Storage Business Model demonstration project provides O&R with the opportunity to develop and test rules that can be used in the creation of competitive markets and integrate DERs into wholesale markets. Specifically, O&R and Tesla plan to utilize the BTM storage assets and PV + storage installations to gain insight into the optimized participation of a collection of aggregated assets in the wholesale market while maintaining the ability to simultaneously provide grid services and, in the case of the BTM installations, providing demand charge reduction services.

AREAS FOR FURTHER DEVELOPMENT

Financial Contract Details

One critical aspect of REV Demonstration Projects is the leveraging of capital contributions from third parties, customers, and the utility. In exchange for these contributions, the value (and risk) created by the demonstration project should be shared in an equitable fashion among each party. As described above, the Innovative Storage Business Model sufficiently describes the potential value streams the project may be able to produce, and also defines how value will be distributed to customers, through demand charge reduction with make whole payments in the case of non-performance, and how wholesale revenue among Tesla and the O&R will be divided (10/90%, respectively). However, the project does not fully describe how the other payments described above will be apportioned, nor does it describe how these allocations will affect the asset optimization routine. The Company and Tesla shall work with Staff to more fully describe these details and reflect such in the implementation plan.

POTENTIAL MARKET BARRIERS

The potential market barriers this project may face relate to participation in the NYISO markets. The current NYISO markets have size and duration requirements, and the ability to meet these requirements through aggregation is unclear. O&R and Tesla believe the storage systems will be able to overcome the majority of these barriers with cooperation from the NYISO.

The behind-the-meter installations are expected to participate in the NYISO Demand-Side Ancillary Service Program (DSASP), Day-Ahead Demand Response Program (DADRP), and Special Case Resource (SCR) markets while the FTM PV + storage systems aim to participate in the Energy Limited Resources (ELR) market. O&R and Tesla will coordinate with the NYISO to discuss the aggregation of the BTM storage systems to meet minimum size requirements, and hope to receive partial payments in the ELR market due to the systems' inability to meet the minimum four-hour threshold. Staff expects that

these potential barriers and the steps the Company is taking to overcome them to be included in the implementation plan.

CONCLUSION

Staff has concluded that the proposed demonstration project complies with the objectives set forth in Order Clause 4 of the Track One Order. Staff will continue working with O&R to develop a detailed implementation plan, which will include a more detailed schedule, budget, projected milestones and checkpoints, and reporting requirements. 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 shall be filed with the Secretary within thirty days of the issuance of this assessment report.