STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Reforming the Energy Vision Demonstration Project Assessment Report

Con Edison:
Storage On Demand

May 18, 2017

INTRODUCTION

In an order issued February 26, 2015, the Commission directed the six large investor owned electric 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).

As the Commission noted, these projects are intended to demonstrate new business models with new revenue stream opportunities for both third parties and the electric utilities. These projects will also 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 assessing value; explore new ways of planning, operating, and maintaining the grid; 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 these demonstrations, the projects will be assessed regularly. Lessons learned should be incorporated into the projects or utilities' operations as expeditiously as reasonable.

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[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

Con Edison's Proposal

Consolidated Edison Company of New York, Inc. (Con Edison or the Company), in partnership with NRG Energy (NRG), is proposing a mobile energy storage demonstration project (the Project) that will result in the construction of two mobile battery trailers and one mobile electrical switchgear trailer, with a total capacity of 1MW/4MWh. These trailers will collectively be known as the mobile storage assets and will be deployed as a unit. The Company and NRG have designed this project to address the underutilization that characterizes many behind-the-meter battery system installations. Con Edison's proposal explains that those systems may only be utilized for 5 to 50 percent of their useful life when used solely for demand charge reduction. By expanding the role of these assets and allowing them to become mobile, the Project aims to increase the utilization of these assets, increasing the profitability, and decreasing the risk of investing in storage DER. Con Edison expects that this project will allow them to use these mobile storage assets to better manage seasonal capacity constraints on its distribution system, and eventually will enable the use of the trailers to respond to emergency outages and adverse system conditions.

Con Edison will fund the construction of the two mobile battery trailers and the mobile electrical switchgear trailer, and will maintain a 100 percent ownership stake in all the mobile storage assets. These mobile assets will be primarily based at NRG's Astoria site, where NRG has contributed the real estate space and existing interconnection equipment as an in-kind contribution to the demonstration. Con Edison will pay NRG a "Mobility Option Premium" for operating and

maintaining the units, and ensuring they are available for deployment by Con Edison to networks needing support, which the Company will identify in the months prior to the summer peak planning period. When located at the site in Astoria, NRG will manage the asset's participation in the NYISO wholesale electricity market. NRG and Con Edison anticipate that participating in the NYISO wholesale market in between active deployments will generate gross margin revenues that will help cover Con Edison's mobility option premium fee it pays to NRG. Any gross margin revenues generated in excess of this fee will be split between the Company and NRG.

This demonstration aims to animate the market for "storage as a service", allowing firms to achieve high utilization for their storage systems by moving them to where they are needed, and then supply electricity and ancillary services in the wholesale market when they are not.

Department of Public Service Staff (Staff) Review

Staff reviewed Con Edison's Storage on Demand Project 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: customer/community engagement; identification of economic value; pricing and rate design;

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

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.

Staff concludes that the Project will enable Con Edison to gain experience in managing on-demand mobile storage units, and will provide NRG and other parties experience in developing and managing a fleet of mobile storage assets. There are several hypotheses that will be assessed within this project: MW-scale batteries can be valuable in generating revenues in NYISO wholesale markets; the mobility of assets enables the system to solve multiple short-term problems over the course of the batteries' operating lives, with the increased T&D benefits offsetting the incremental cost of mobile solutions compared to a stationary battery installation; and, mobile units will be capable of deployment within emergency operational timeframes. Staff finds these questions to be relevant and valuable to the REV proceeding, and as documented in the February 27, 2017 letter from Staff, Con Edison's Storage on Demand Project complies with the requirements of the Commission's Track One Order and Staff expects Con Edison to file an implementation plan for the project with the Secretary of the Commission within thirty days of issuance of this report.

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

REV OBJECTIVES ADDRESSED

Market Animation and Leveraging of Customer Contributions

Currently, storage installations are installed in stationary locations, often to handle peak system loads or reduce demand charges. One of the purposes of this demonstration project is to animate the market for "storage as a service", with Con Edison envisioning private firms creating fleets of these mobile assets. By mobilizing these assets and expanding their scope of operation, this demonstration can show whether the flexibility of being mobile would enable market opportunities that a fixed asset cannot access.

System Reliability and Resiliency

The Project will improve system reliability and resiliency by allowing the Company to relieve seasonal or transient T&D constraints quickly and affordably, without a requiring permanent infrastructure investment. This is an important source of savings because, as Con Edison points out in its filing, relieving many of these constraints today is both time consuming and expensive, necessitating some level of overbuilding. This project will allow the Company to relieve these constraints as needed, and then move the mobile storage assets to another location as needed.

Initially, there will be a lead time of 2.5 days to deploy the mobile storage assets from the Astoria site. However, both Con Edison and NRG hope to reduce this time using learnings from the Project, and hope that this will enable emergency use of the mobile storage assets in the future. This will help improve system resiliency during unplanned outages.

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.

This project proposes a new business model for DER providers, and a new operation philosophy for Con Edison. Like Con Edison's Commercial Battery Storage project, the Company and NRG have characterized this demonstration project as a proof-of-concept for "storage as a service." Con Edison believes that in the future, when it identifies distribution-level constraints on its network, instead of investing in traditional T&D infrastructure or a Non Wires Alternative, it may instead be able to offer payments to DER providers, buying T&D constraint relief as a service. DER providers may be able to achieve a high utilization for these assets not because they will be needed to relieve constraints in one area consistently, but because they will be able to move to where non-coincident constraints occur as needed, and participating in the NYISO wholesale market in between active deployments.

DEMONSTRATION PROJECT ELEMENTS

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 the estimated benefits. For this project, Con Edison is partnering with NRG Energy, who will contribute in-kind capital to the project.

[4] Track One Order at 12.

NRG and its partners, LG Chem and Greensmith, will design, build, and deliver the mobile storage assets for Con Edison. NRG will provide the real estate to position the mobile storage assets at NRG's Astoria site when they are not deployed at a Con Edison location, and will also manage the assets in the NYISO wholesale market during these periods. NRG will also be responsible for performing any necessary maintenance. NRG is providing the space and existing electrical interconnection equipment at no additional cost as an in-kind capital contribution.

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. Staff finds that Con Edison identifies the streams of economic value to each of these groups. The Company predicts that the project will not only create value through potential T&D deferrals, but will also generate market revenue through activities in the NYISO wholesale market. These activities could include capacity payments, energy revenues, and ancillary services.

T&D deferrals will benefit both Con Edison and its ratepayers, and the Company will initially compensate NRG for its contribution through the mobility premium option fee. When the mobile assets are not being actively deployed elsewhere, NRG will use the mobile facilities interconnected at its site to participate in the NYISO wholesale market. Any gross margin revenues generated by this activity will be used to offset the mobility premium option fee. If gross margin revenues exceed the amount necessary to offset this fee, the excess will be split between Con Edison and NRG. Con Edison anticipates that in the future, private developers who own such mobile assets

outright will use the ability to participate in NYISO wholesale markets to maximize the utilization of their assets when not actively deployed, and Con Edison (or any other utility) would only pay for services needed on an on-demand basis. Staff notes that such private mobile storage developers should be able to obtain compensation for a multitude of values, including the localized distribution value, though future applications of the VDER tariff.[5] This will provide an alternative compensation path for private mobile storage developers to consider.

Customer and Community Engagement

Staff finds that Con Edison appears aware of the interest and potential concerns that ratepayers may have surrounding this project. Residents of an area understandably may have concerns about the safety and the visual impact of such large and mobile installations of this type.

Con Edison intends to include information about the systems in communications with local community boards in areas where the mobile assets may be deployed. Con Edison intends to inform them about the reliability and environmental benefits of the project, and has committed to working collaboratively to find a suitable deployment solution for the affected communities. For example, the mobile storage solution results in reduced noise and reduced localized emissions as compared to a traditional diesel mobile generator. In addition, these assets would be serving peak shaving needs and therefore be replacing peaking plants and the associated carbon of meeting that demand.

[5] Case 15-E-0751, In the Matter of the Value of Distributed Energy Resources, Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources, and Related Matters (Issued March 9, 2017).

Scalability

Con Edison indicates that it believes there are many locations within its service territory that could benefit from energy storage, and that many of these locations would only require the services of that storage for a limited period to meet peak demands during the summer period or to address emergency situations. Consequently, the Company believes that the critical barrier to private firms investing in such mobile storage assets are the front-end engineering and design cost, and the risk inherent in such a new business model. If this demonstration is successful, the Company believes there may be a future where a DER provider may own its own fleet of mobile energy storage, and those assets would be used to serve multiple service territories where non-coincident constraints occur.

Reasonable Timeframe

Con Edison expects to have the mobile storage available for commercial operation in the first half of 2018, following the engineering, design, and procurement of the system. The project will then run through 2021, at which point the continuation of the project will be evaluated. Staff believes that this schedule supports the Commission's goals of producing measurable outcomes within a timeframe that can help support REV implementation goals.

System Benefits

Staff finds that this project has the potential to generate benefits to the grid. As noted in Con Edison's filing, energy storage offers a mechanism to balance the intermittency of renewables, helping to achieve the State's clean energy vision. Con Edison also expects the project will result in

improved system load factors, and potentially the ability to better manage emergency contingency needs.

AREAS FOR FURTHER DEVELOPMENT

Milestones and Check Points

It is crucial to the success of REV demonstration projects to closely follow project progress to evaluate effectiveness and identify potential improvements. While Staff believes that Con Edison has rigorously defined many of its hypothesis, it needs to be more specific about how many and where the sites this system is intended to be deployed in are. Identification of these areas is particularly important if the Company intends to carry out outreach in these areas ahead of deployment. Staff will work with Con Edison to ensure that these sites are identified in the implementation plan, and the outcomes from the deployment to these sites are properly reported.

System Planning

Staff notes that employing significant numbers of mobile grid-scale energy storage systems may complicate system planning and the coordination of wholesale market resources. The NYISO market values resource stability and predictability; consequently, mobility might diminish a storage asset's value in the wholesale markets. Therefore, Con Edison should explore the potential resource planning and coordination impacts of large amounts of mobile storage as part of its evaluation of the scalability of this project. In addition, the project should include an examination of how might transient deployment of mobile grid-scale energy storage systems affect forecasting, planning, and management of distribution system hosting capacity.

POTENTIAL LEGAL BARRIERS AND/OR AREAS OF COMMISSION ACTION

Utility ownership of DER

Con Edison, as part of the demonstration project, proposes to purchase and own the mobile energy storage 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."[6] Therefore in light of the limited size and scope of this demonstration project, Staff finds in the limited setting of this project that such ownership is within the guidelines set by the Commission.

NYISO Market Rules

The participation of the mobile energy storage resource in the NYISO wholesale market is critical to achieving high utilization of the assets by using wholesale market activity to fill in the "gaps" between when the system is deployed. Con Edison and NRG expect to work with the NYISO to ensure that the system will be able to participate in wholesale markets, and acknowledges that it is currently unclear as to how that participation will take place. At a minimum, the demonstration project could participate as a Limited Energy Storage Resource, but the Company and NRG are planning to work with the NYISO to participate instead as an Energy Limited Resource. Thus, this project will help inform the NYISO with if and how it should change its current participation rules.

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

[6] Track One Order, p.70.

with Con Edison 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 will be filed with the Secretary within thirty days of the issuance of this assessment report.