

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION



Reforming the Energy Vision

Reforming the Energy Vision Demonstration Project Assessment Report

Con Edison: Commercial Battery Storage

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.

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 GI Energy and Smarter Grid Solutions (SGS) is proposing an energy storage demonstration project that will result in the installation of a total of 4.2MW/4.4 MWh of grid-scale, [in] front-of-the-meter (FTM) battery storage, in the form of four lithium-ion battery systems and one zinc manganese dioxide battery system deployed at four commercial customer locations. Three locations will only include 1MW/1MWh NEC lithium-ion battery systems, while the final location will include the 1MW/1MWh NEC lithium-ion battery system and an additional 200kW/400kWh zinc manganese dioxide battery system.

This project is designed to demonstrate how grid-scale FTM energy storage systems, located at customers' premises, can cost-effectively provide distribution system, wholesale market, and customer benefits that are not related to the customers' load profiles. The Company asserts that large, behind-the-meter (BTM) energy storage systems are typically installed and operated by large customers with relatively high peak demand. Those customers generally use the systems to reduce their demand costs by reducing their peak loads. Because of their focus on reducing their own demand costs, the customers do not consider the value of reducing distribution system peak system loads or other wholesale market opportunities.

In this project, the energy storage systems will not reduce the host customers' demand costs. Instead, the customers will receive lease payments for housing the storage systems. Con Edison argues that this arrangement will be more desirable

for many customers, as it increases the certainty of payments, relieves the customers of the responsibility of managing the systems, and enables customers with relatively low peak loads to participate in the market indirectly by serving as a site lessor.

Con Edison envisions that future investors will install these systems and sell storage to distribution utilities with a "storage as a service" model. In this way, the utility would only be required to pay for the portion of the storage used to derive T&D benefits, lowering costs for the utility and ratepayers. Investors would recover the rest of the cost of the system through wholesale revenue streams such as energy arbitrage, ancillary services, and frequency response markets.

Department of Public Service Staff (Staff) Review

Staff reviewed Con Edison's Commercial Battery Storage 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; transactive grid; scalability; market rules and standards; system benefits; cost effectiveness; and implementation with

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

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 meaningful experience in using grid-scale storage, and will provide GI Energy and SGS experience in developing and managing a fleet of grid-scale storage assets. There are several hypotheses that will be assessed within this project: that grid-scale FTM systems are easily scalable across Con Edison's territory; that they can provide a greater magnitude of distribution system peak load reduction than equivalently sized BTM systems by responding to system needs rather than to current tariff demand charges; a 1MW/1MWh battery system can be deployed in such a way as to provide substantial benefits to the distribution system; and a 1MW/1MWh system will be able to receive additional revenue from secondary usage in addition to providing distribution system benefits. Staff finds these questions to be relevant and valuable to the REV proceeding, and as documented in the January 31, 2017 letter from Staff, the Company's Commercial Battery Storage 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

System Wide Benefits and Efficiency

Con Edison's Commercial Battery Storage demonstration project has the potential to provide system benefits in several ways. Unlike BTM projects, where the incentives to place and use energy storage are tied closely to a customer's individual delivery service tariff and usage characteristics, FTM storage projects could allow these resources to receive compensation in response to current system-wide conditions and wholesale market signals. Thus, the demonstration will test the viability of locating and dispatching the resources in a manner that both participates in the wholesale market and relieves distribution-level constraints. At scale, the Company believes that grid-scale FTM energy storage installations on customer premises will become a viable Non-Wires Alternative (NWA) or a merchant asset.

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 estimated benefits. For this project, Con Edison is partnering with GI Energy and SGS.

GI Energy will provide customer acquisition, engineering, procurement and construction services, ongoing project management, dispatch services, and third party financing. Con Edison will identify target areas where it has identified a current or forecasted future system need. GI Energy will then identify suitable locations for battery storage installation, and will approach the owners of those locations. With appropriate permission, GI Energy will inspect and screen

sites, and eventually enter into leases and install the battery systems. Con Edison will have the first right to dispatch, in exchange for quarterly payments to GI Energy. The quarterly fee will support all project costs, including customer lease payments, operations and maintenance services, operation and dispatch of assets, financier's return on investment, balance of system, and integration costs. The principle benefit to Con Edison is primary dispatch of the asset for T&D deferral, when required, as either demand response or NWA solution. The distribution value of the Project will depend on how frequently the system participates as demand response or NWA solution. In addition, Con Edison will be entitled to a share of the secondary revenues through participation in wholesale markets (energy arbitrage, frequency response, and capacity) over the life of the contract.

While the current demonstration project is structured so that the quarterly fees paid to GI Energy by Con Edison will contribute toward the capital costs of the project, the Company believes that the information and experience gained from this demonstration will encourage private financing of grid-scale FTM energy storage systems. In that future business model, it is anticipated that the Company would pay only for the portion of the battery used for T&D benefit, lowering the cost of service for customers.

SGS, the communications and control partner, is the leading provider of active network management (ANM) technology. ANM is one of the leading foundational software control platforms for utilities to maximize benefit from DERs. SGS has been working with Con Edison extensively since 2013 on a NYSEDA co-funded microgrid project and has built a strong relationship with Con Edison and developed experience with the Company's

electricity network and associated systems. GI Energy and SGS will work with Con Edison to integrate the battery assets with the wider SGS ANM Platform, Con Edison's grid management system, and the NYISO, as appropriate.

Staff finds that this project will lead to a demonstration that allows each organization to specialize in its strengths while fairly sharing the risk and potential rewards. In return for the quarterly lease payments over the life of the contract, ratepayers will receive the economic benefits as described above. Staff believes the knowledge gained from this demonstration will encourage private entities to finance similar projects in the future, in exchange for receiving suitable economic benefits, significantly lowering costs for the utility and ratepayers.

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 adequately identifies the streams of economic value to each of these groups. The Company identifies four sources of value which provide five potential revenue streams. The four sources of economic value are the generation of system benefits, energy arbitrage, ancillary services, and frequency response markets. In this demonstration project, the five potential revenue streams are comprised of: the host site owner will receive lease payments; Con Edison and ratepayers will enjoy the system benefits of the battery installation; and both the Company and GI Energy will receive a portion of the revenues generated through energy arbitrage and in the ancillary services and frequency response markets.

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 demonstration embodies a new business model for DER providers and support Con Edison's new operation philosophy that seeks to defer or avoid traditional T&D investments. Similar to the Company's Storage on Demand project, Con Edison and GI Energy have characterized this demonstration project as a proof-of-concept for "storage as a service." The Company believes that in the future, when it identifies distribution-level constraints on its network, instead of investing in traditional T&D infrastructure or an NWA it may instead be able to offer payments to DER providers, buying relief as a service, as necessary. As discussed in this report, DER providers will have access to this and other revenues streams.

Scalability

One of the primary hypotheses of this project is that the size of the potential market for these systems will be increased by enabling investor-owned, grid-scale battery installations, and by decoupling the economic benefits of the battery system from the host customers' energy usage. Staff believes that if this project is successful the overall arrangement of the demonstration project will be replicable on a larger scale, with private financing. Con Edison and GI Energy further believe that the cost of the battery storage systems and

⁴ Track One Order at 12.

leases will decline over time as customers compete for the additional revenue streams outlined above.

Reasonable Timeframe

Con Edison expects to begin the customer acquisition phase of the project in the first half of 2017, with construction, commissioning, and integration occurring in the second half of 2017, dispatch optimization being started and completed in 2018, and active wholesale market participation beginning in January 2019. This schedule supports the Commission's goals of producing measurable outcomes within a timeframe that can help support REV implementation goals.

AREAS FOR FURTHER DEVELOPMENT

Milestones and Checkpoints

It is crucial to the success of REV demonstration projects to closely follow project progress to evaluate effectiveness and identify potential improvements. Staff finds that Con Edison has rigorously defined its hypothesis, the information that it wants to collect, and has (where appropriate) included specific projections. Staff will work with the Company to ensure that the project's implementation plan incorporates the project's milestones and checkpoints as detailed in the proposal.

POTENTIAL LEGAL BARRIERS AND/OR AREAS OF COMMISSION ACTION

Protection of Customer Information

The Commission's existing customer data policy is that electric utilities and third parties must protect customer privacy when proposing projects that involve the collection and use of granular customer data. Staff believes that the

Commercial Battery Storage project appropriately balances existing policy and the exploration of a new business model.

With respect to the sharing of customer data with core third parties providing analytics functions for Con Edison, the proposed demonstration project must comply with the December 3, 2010 Order, where the Commission considered earlier Opower projects with Central Hudson and Niagara Mohawk and stated:

Opower is prohibited from using the information for any purpose other than to perform the utility function of administering this program and may not contact customers in any fashion beyond what it was specifically contracted to do; provide usage analysis reports.⁵

Con Edison will not be required to obtain affirmative customer consent before sharing customer information with a third party partner who is performing the analytics function (i.e., GI Energy will use customer interval data to determine hypothetical BTM project economics), and where sharing such information is necessary to perform that function. The agreements between Con Edison and their third party partner will detail the protections afforded to customer information and the restrictions placed on those partners regarding the use of that information. Con Edison will be required to file with the Secretary any contract between Con Edison and a third party partner in order for Staff to ensure that sufficient consumer protections are offered in conformance with the December 3, 2010 Order.

NYISO Market Rules

The NYISO market rules governing the participation of DERs may pose potential barriers to the Commercial Battery Storage demonstration project. Current NYISO rules require that

⁵ Case 07-M-0548, Energy Efficiency Portfolio Standards, Order on Rehearing Granting Petition for Rehearing, p. 19 (Issued December 3, 2010).

Energy Limited Resources be able to provide a minimum 1 MW of power for four consecutive hours and they may not be aggregated between sites. Given the size of the Project, this would preclude the energy storage assets from participating in these markets. While the Company works with the NYISO to identify and address potential barriers as the project is implemented, GI Energy will simulate potential revenues based on the dispatch algorithm to determine a realistic value of secondary revenues until these revenues can be achieved.

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 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.