



REV Demonstration Project:
Commercial Battery Storage

2019 2Q Quarterly Progress Report

Dated: July 31, 2019

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1.0 EXECUTIVE SUMMARY

Consolidated Edison Company of New York, Inc. (“Con Edison” or the “Company”) submits this report for the second quarter of 2019 on the progress of the Commercial Battery Storage Demonstration Project (the “Project”) it is implementing as part of the Reforming the Energy Vision (“REV”) initiative¹. In the *Order Adopting Regulatory Policy Framework and Implementation Plan* (the “Order”), issued by the New York State Public Service Commission (“Commission”) on February 26, 2015², the Commission directed the Company to develop and file REV demonstration projects, consistent with the guidelines adopted by the Order. The Company’s REV Demonstration Project proposal dated January 20, 2017, provided an outline and overview of the Project and was assessed by the Department of Public Service Staff (“DPS Staff”). On May 18, 2017, DPS Staff approved the Project and provided a discussion of the Project implementation plan to be filed by the Company. Con Edison filed an implementation plan for the Project with the Commission on June 15, 2017.

The Project is designed to demonstrate how distributed, front of the meter (“FTM”) energy storage can be utilized to provide transmission and distribution (“T&D”) support, earn wholesale market revenues, and increase the market size of participating customers by aligning the interests of the Company, customers, and third-party developers. Con Edison is executing the Project in partnership with GI Energy (“GIE”) and Smarter Grid Solutions (“SGS”). Three out of four sites are in various stages of construction and a fourth site is close to finalization. In Q2 2019, Con Edison and GI Energy continued development of customer acquisition and site selection activities for 1-2 backup sites, construction and commissioning for the first two sites, communications integration, and continued discussions with the NYISO about a pilot program for wholesale market participation.

A permitting issue arose in Q2 2019. DOB has made a determination that any storage asset that does not serve a customer load will be ruled as a substation for zoning purposes. The implication of this ruling is that FTM projects may not be allowed in residential or commercial neighborhoods without obtaining required

¹ REV is a set of multi-year regulatory proceedings and policy initiatives launched in New York State in April 2014.

²Case 14-M-0101, *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision*, Order Adopting Regulatory Policy Framework and Implementation Plan (issued and effective February 26, 2015).

variances. The first project site in the Bronx and the third existing project site in Staten Island have been impacted by this determination. As a contingency plan, GI Energy is pursuing an expedited permit closeout process in the Bronx and has made progress towards executing lease agreements for a potential backup for the third site.

In Q2 2019, the Company continued to focus on the implementation of the Project, customer acquisition and construction, and preparation for the New York Independent System Operator (“NYISO”) pilot.

1.1 CYBERSECURITY AND PERSONALLY-IDENTIFIABLE INFORMATION PROTECTION

Consistent with Commission policy related to cybersecurity and the protection of personally-identifiable information (“PII”), each partner agreement executed for the implementation of the Project includes specific protections related to cybersecurity and PII. This protection is critical in encouraging customers to sign up with new and innovative services offered by the Company.

1.2 ACCOUNTING PROCEDURE ESTABLISHED

On February 16, 2016, in Case 15-E-0229, Con Edison filed an accounting procedure for the accounting and recovery of all REV demonstration project costs.³ This accounting procedure establishes a standardized framework that governs how the Company categorizes and allocates the costs of the REV demonstration projects, and facilitates analyzing each project to determine the overall financial benefits of the program to customers.

1.3 COSTS, BENEFITS, AND OPERATIONAL SAVINGS

Budget information for all of the Company’s REV demonstration projects is being filed confidentially with the Commission, concurrently with the filing of this document. All costs filed are incremental costs needed to implement the Projects. To date, no tax credits or grants have been available to reduce the net costs of the projects, but Con Edison will take advantage of such offsetting benefits when, they are available. Due to the early stage of implementation for the Project, there are no operational savings to report at this time.

³ Case 15-E-0299, *Petition of Consolidated Edison Company of New York, Inc. for Implementation of Projects and Programs that Support Reforming the Energy Vision, General Accounting Procedure* (issued and effective February 16, 2016).

2.0 COMMERCIAL BATTERY STORAGE – QUARTERLY PROGRESS

2.1 DEMONSTRATION HIGHLIGHTS

2.1.1 Since Previous Quarter - Major Task Completion

- **Customer Acquisition:**
 - The Project team has continued to identify additional sites to replace the site that is no longer available due to unresolvable issues that arose during lease negotiations with the City in 2018.
 - The Project team has is also exploring backup locations for the third site in Staten Island that was about to begin construction. The DOB has recently informed the team that they are treating these storage assets as equivalent to utility substations, which are not allowed in the current zoning districts the site. GI Energy is working on lease agreement options at two potential sites for the third and fourth backup locations..

- **Construction/Commissioning and Integration:**
 - Construction and operational commissioning at the Caddell Dry Dock site on Staten Island is complete. Communications testing has been mostly completed , and will be finished in July 2019, including testing of communications via Con Edison SCADA networks. The Con Edison witness test for interconnection approval is scheduled to take place early in Q3 2019 in addition to final FDNY inspections. The battery is expected to be operational in August 2019.
 - City Island construction is complete with the exception of a fire alarm system, which is pending FDNY approval. The DOB has stated the construction permit will not be closed out until the impacts of the zoning determination have been resolved by their office. Final commissioning and communications testing at City Island has been delayed due to this issue.
 - Draft specification documentation for reactive power capability has been approved by Con Edison.
 - Draft screens for Con Edison control center operators have been completed and are under review internally.

- **Market Participation:**
 - The Project team is in regular conversations with the NYISO to set up mechanics and procedures for a pilot program to test battery participation in NYISO wholesale markets.

2.1.2 Activities Overview

Phase 1, Customer Acquisition: The Project team is finalizing lease option agreements for a fourth site and a potential substitute site in the event the Staten Island site is not realized due to a DOB zoning ruling.

Phase 2, Construction/Commissioning and Integration: City Island construction is near completion. All electrical work is complete and hot commissioning is slated to begin in Q3 2019 but is dependent on the DOB zoning ruling. Fire suppression permits have been received. Civil and electrical work at the second site, Caddell, is complete, and commissioning was substantially completed in Q2 2019. For the third site, in Staten Island, DOB has denied the permit application based on an unexpected zoning ruling; a variance process of 6-12 months will be required to move this project forward. Construction and interconnection work are on hold and the Project team is evaluating options to obtain a variance or no longer pursue the site.

Smarter Grid Solutions has completed the build out of the project user interface to be ready for commissioning and has completed the majority of its testing at Caddell. Con Edison has accepted the SGS specification for power factor correction capability.

Phase 3. Dispatch Optimization: SGS has developed the user interface for dispatch and has tested communications up to the Con Edison SCADA network. Full communications functionality through SCADA will be tested in Q3.

Phase 4, Market Participation: The Project team continued dialogue with the NYISO on the evolving participation models for energy storage, including dual participation. The team engaged with NYISO staff on these new models to inform the Dispatch Optimization (Phase 3) and Market Participation (Phase 4) strategies. The Project team also began discussing communications protocols and program mechanics for the NYISO Pilot Program.

2.1.3 Key Metrics

In Q2 2019, the Project team continued customer acquisition activities and made significant progress on communications integration activities. The following data support these Phase 1 metrics (targets were set as 200 potential sites identified, 30 viable project sites, and four final project sites).

- Potential Sites Identified: 471 / 200 (target)
- Customers Approached: 396 / 471

- Customer Intake Forms Collected: 47 / 396
- Walkthroughs Conducted: 35 / 47
- Sites Selected for permitting: 5 / 4 (target)
- Sites with interval data: 5/ 20

2.1.4 Next Quarter Forecast

In Q3 2019, the Project team expects to have two operational sites, assuming zoning issues are resolved in the Bronx. The team expects clarity from the DOB on approvals for the third site and will make a decision to continue with that site or go to a backup site. In Q3 2019 the team plans to onboard the fourth site, and possibly a backup for the third site, and submit CESIR and permitting applications.

The Project Team plans to complete communications integration build-out with the goal of extending access and control of the assets into the utility control centers in Q3 2019.

Dispatch Optimization (Phase 3) is expected to begin with the enrollment of the first two assets into the NYISO Pilot Program.

2.1.5 Checkpoints/Milestone Progress

Checkpoint/Milestone	Timing*	Status
Customer Acquisition	Phase 1 Midpoint / End	
Construction/Commissioning and Integration	Phase 2 Midpoint / End	
Dispatch Optimization	Phase 2 End Phase 3 Midpoint/End	
Market Participation	Phase 4 Quarterly	

*Detailed descriptions of the Phases can be found in the Appendices.

Legend

On Schedule	Delayed w/out Major Impact	Delayed or Stopped – Project Goals Impacted
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2.1.6 Planned Activities

2.1.6.1 Customer Acquisition

Status: Yellow

Expected Target by Phase 1 Midpoint: Identification of 30 viable customer sites and a minimum of 20 sites for behind the meter (BTM) vs. FTM analysis

Actual by Phase 1 Midpoint: 30 viable customer sites identified, waiting on customer interval data to assess sites for BTM vs. FTM analysis

Solutions/strategies in case of results below expectations: In line with root-cause analysis, actions may include reassessing target, increasing marketing and outreach efforts, or adjusting monetization strategies to encourage improved customer acquisition efforts.

2.1.6.2 Construction/Commissioning and Integration

Status: Yellow

Expected Target by Phase 2 End: 4 MW/ 4 MWh installed storage across four sites

Actual by Phase 2 Midpoint: N/A

Solutions/strategies in case of results below expectations: The Project team will work to proactively manage any permitting restrictions that might delay construction and commissioning of project sites. The team will continually evaluate progress and adjust to back-up project sites if there is a site-specific issue.

2.1.6.3 Dispatch Optimization

Status: Green

Expected Target by Phase 2 End: Demonstrated aggregation and dispatchability of storage capacity

Actual by Phase 2 End: N/A

Solutions/strategies in case of results below expectations: In-line with root-cause analysis, actions may include systems upgrades, modified systems integration, and/or process review.

2.1.6.4 Market Participation

Status: Red

Expected Target by Phase 3 End: enrollment of batteries into NYISO markets

Actual by Phase 3 End: N/A

Solutions/strategies in case of results below expectations: The Project team will work with NYISO and other relevant stakeholders to identify alternative forms of battery participation, such as pilot projects. If no other suitable means exist, assets will continue to be dispatched to shadow NYISO markets and demonstrate the potential for revenues.

2.2 CHANGES TO THE PROJECT DESIGN

There were no changes to the project design in Q2 2019.

2.3 WORK PLAN & BUDGET REVIEW

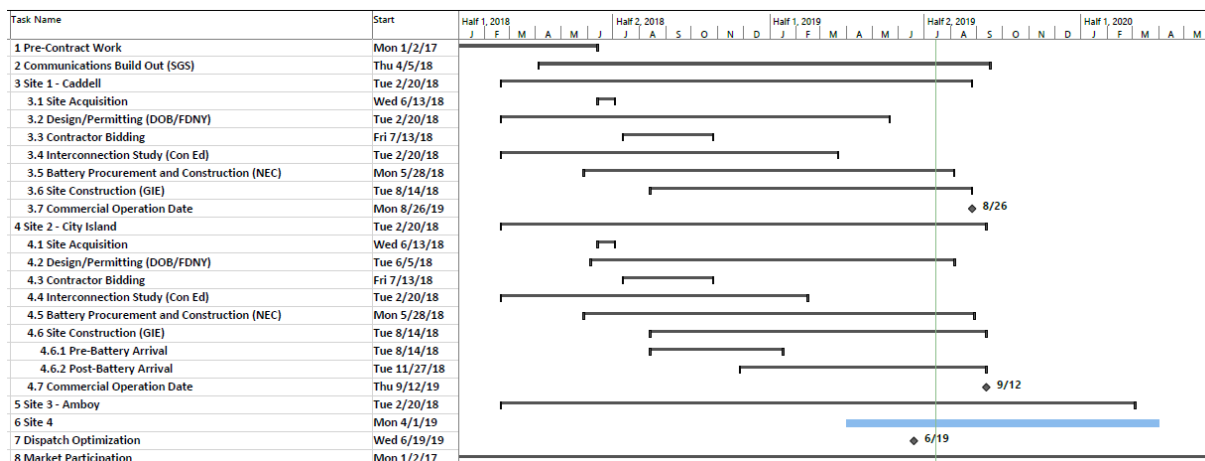
2.3.1 Phase Review

2.3.1.1 Phase Progress

The Project team has completed Phase 0 (Project Planning) and continues to make progress on Phase 1 (Customer Acquisition), Phase 2 (Construction/Commissioning and Integration) and Phase 3 (Dispatch Optimization). The Project team anticipates Phase 1 will be completed in Q3 2019 with receipt of applicable permits for final site. Phase 2 will begin for third and fourth sites which are expected to receive permitting approval in Q4 2019.

Phase 4 has been materially delayed by the NYISO's response to FERC Order 841 which delays battery market participation and dual participation to *no earlier than* May 2020 and applies Buyer Side Mitigation to storage resources below 2 MW.

2.3.2 Work Plan



2.3.3 Updated Budget

As set forth in Section 1.3, budget information is being filed confidentially with the Commission.

2.4 CONCLUSION

2.4.1 Lessons Learned

The Project team was successful in achieving nearly 150 percent of the customer identification target and successfully converted these leads to meet the viable site goal. However, the Project team encountered delays and difficulties in completing a prior site lease with the NYC Department of Citywide Administrative Services, the owner for the apartment of sanitation project site. While the team was unable to execute a lease due to a contract impasse, the Company continues to engage the City on a potential resolution for future projects. DCAS is a large land owner within the Con Edison service territory and could provide many beneficial sites for future storage projects.

A permitting issue arose in Q2 2019. DOB has made a tentative determination that any storage asset that does not serve a customer load will be ruled as a substation for zoning purposes. The implication of this ruling is that FTM projects will not be allowed in residential or commercial neighborhoods without obtaining required variances. Because of this ruling construction activities have paused at the third Staten Island site and the developer is determining the schedule for obtaining a variance. This will impact the schedule for the third site significantly and may end it entirely.

The Project team continues work on the analysis of BTM economics applied to the sites identified to this FTM project, as outlined in the Project Filing. The measurement of this metric has been delayed due to difficulty obtaining interval data and ongoing customer acquisition activities. The lack of interval data for the majority of viable project sites is an early indication that FTM model can be applied and scaled in locations that are unavailable for a BTM model.

The market participation rules for battery storage continue to evolve. The Project team continues to work with NYISO and other storage stakeholders to understand and inform these evolving rules. To this end, the Project team has volunteered to be a test case for Q3 2020 battery aggregation rules. If chosen, this collaboration will benefit not only the Project, but also enable the creation of battery market in New York.

2.4.2 Recommendations

The Company recommends maintaining open lines of communication with the Mayor's Office to understand the implications of zoning rules for this project and the storage market in New York City in general.

2.5 INCLUDED APPENDICES

The following appendices are included at the end of this Quarterly Progress Report:

Appendix A: Commercial Battery Storage Description of Phases

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Phase	0. Project Planning	1. Customer Acquisition	2. Construction / Commissioning and Integration	3. Dispatch Optimization	4. Market Participation
Milestone (Stage Gate to Next Phase)	<i>Negotiations to be Completed</i> <ul style="list-style-type: none"> • DPS approval • Partner contracts signed 	<i>Successfully execute leases for four customer sites</i> <ul style="list-style-type: none"> • Final site selection • Execute customer lease contracts 	<i>Install and commission 4.2 MW/4.4 MWh</i> <ul style="list-style-type: none"> • Design approval • Obtain permits • Battery installation • System commissioning 	<i>Dispatch for load relief</i> <ul style="list-style-type: none"> • Cyber-secure communication architecture • HMI functionality • Established NOC 	<i>Assets participate in wholesale markets</i> <ul style="list-style-type: none"> • Earn revenues in all market products available for battery participation
Key Elements	<ul style="list-style-type: none"> • Letter of No Objection • Developer contracted • Third-party financing identified and contracted 	<ul style="list-style-type: none"> • Customer lead identification • Complete site Walkthroughs • Complete viable site identification • Final site selection • Market analysis for FTM vs. BTM 	<ul style="list-style-type: none"> • Interconnection and civil design • Interconnection application and study • Permitting • Communications integration • System testing and training 	<ul style="list-style-type: none"> • Assets can be dispatched individually or in aggregate by each party • Fully integrated into SCADA with HMI functionality • Calculate T&D benefit values 	<ul style="list-style-type: none"> • Enroll in NYISO markets allowed today • Continue participation in DER roadmap proceedings to increase participation for ELRs • Quantify market revenues achievable under stacked value model
DER Categories	N/A	N/A	<ul style="list-style-type: none"> • Battery Storage 	<ul style="list-style-type: none"> • Battery Storage • DER Aggregation 	<ul style="list-style-type: none"> • Battery Storage • DER Aggregation



Commercial Battery Storage REV Demo Project

The **Commercial Battery Storage** project is designed to demonstrate how distributed, front of the meter (“FTM”) energy storage can be utilized to provide T&D support, earn wholesale market revenues, and increase the market size of participating customers by aligning the interests of the Company, customers, and third-party developers. Con Edison is executing the Project in partnership with GI Energy and Smarter Grid Solutions.

Project Start Date: January 2017
Project End Date: December 2020
Budget: \$11.7M
Q2 2019 Spend: *Filed Confidentially*
Cumulative Spend: *Filed Confidentially (on budget)*

Phase 1: Customer Acquisition
Ongoing

Phase 2: Construction and Commissioning
Ongoing

Phase 3: Dispatch Optimization
Ongoing

Phase 4: Market Participation
Ongoing

Lessons Learned: Customers

- Engagement with the City is ongoing and important to find potential resolution for future projects. The team was unable to execute a lease at a City site due to a contract impasse discovered after permitting was obtained.
- NYC DOB’s zoning determination for front of the meter batteries could have significant project and market impacts.
- The lack of interval data for most viable project sites is an early indication that the FTM model can be applied and scaled in locations that cannot support a BTM model.

Lessons Learned: Market

- The Project Team has volunteered to be a test case for Q3 2020 battery aggregation rules. If chosen, this collaboration will benefit the Project and the larger New York battery market.
- Zoning regulations could be a critical factor in future if front of the meter batteries are only allowed in manufacturing districts.

Application of Lessons Learned: *To be determined based on outcomes of City engagement and potential NYISO collaboration.*

Issues Identified: *A DSNY site that had received FDNY and DOB permits dropped out after conversations stalled on contract terms. A potential zoning determination from DOB could cause the loss of the third site. NYISO’s response to FERC Order 841 delays battery market participation and dual participation to no earlier than May 2020 and applies Buyer Side Mitigation to storage resources below 2 MW.*

Solutions Identified: *Have identified three potential replacement sites and expect site lease execution next quarter. Working with NYISO on pilot for market participation.*

Recent Milestones: *a) Completed electrical work and construction for first two sites b) Completed user interface for communications integration c) Delivered and installed all equipment for third site d) Identified potential replacement sites for 4th location and possible backup for 3rd.* **Upcoming Milestones:** *Complete commissioning on first 2 sites (3Q 2019). Submit permitting package to DOB/FDNY for fourth site (and third backup site if necessary) (3Q 2019). Begin operations of third site and fourth site (4Q 2019). Complete communications integration build out and control assets in utility control centers (3Q 2019). Enroll first two assets in NYISO pilot program (3Q 2019).*