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REV Demonstration Project:  
Commercial Battery Storage

2017 3Q Quarterly Progress Report

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**Dated: October 27, 2017**

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## **1.0 EXECUTIVE SUMMARY**

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Consolidated Edison Company of New York, Inc. (“Con Edison” or the “Company”) submits this quarterly report on the progress of the Commercial Battery Storage REV demonstration project (the “Project”) it is implementing as part of the Reforming the Energy Vision (“REV”) proceeding, as required by the *Order Adopting Regulatory Policy Framework and Implementation Plan*, issued by the New York State Public Service Commission (“Commission”) on February 26, 2015.

### **1.1 PROGRAM ACHIEVEMENTS**

On January 20, 2017, Con Edison submitted the Project for approval by Department of Public Service Staff (“DPS Staff”); on May 18, 2017, DPS Staff approved the Project. Con Edison filed an implementation plan for the Project with the Commission on June 15, 2017. In Q3 2017, the Company focused on the implementation of the Project, specifically contract execution and customer acquisition activities.

### **1.2 CYBERSECURITY AND PERSONALLY-IDENTIFIABLE INFORMATION PROTECTION**

Consistent with corporate instructions and 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. Assurance of this protection is critical in encouraging customers to sign up with new and innovative services offered by utilities.

### **1.3 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. This accounting procedure establishes a standardized framework that will govern how the Company categorizes and allocates the costs of the REV demonstration projects, and will facilitate analyzing each project to determine the overall financial benefits of the program to customers.

## **1.4 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.

## **1.5 COMMERCIAL BATTERY STORAGE**

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 and Smarter Grid Solutions.

In Q3 2017, Con Edison and GI Energy continued their development of the final contract agreements, customer acquisition and site selection activities, and communications integration. Stakeholders from across the Company have collaborated to advance the Project.

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## **2.0 COMMERCIAL BATTERY STORAGE – QUARTERLY PROGRESS**

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### **2.1 DEMONSTRATION HIGHLIGHTS**

#### **2.1.1 Since Previous Quarter - Major Task Completion**

- Project Planning: Continued contract terms development and transaction document development
- Customer Acquisition:
  - Developed marketing collateral for customer identification and lead creation
  - Completed customer identification efforts
  - Identified four primary and four secondary sites for permitting and interconnection processes
- Construction/Commissioning and Integration:
  - Began work on requirements specification documentation and data flow configurations
  - GI Energy and Con Edison held preliminary meetings with Fire Department of New York (“FDNY”) and New York City Department of Buildings (“DOB”) to gather permitting requirements
- Market Participation: initiated outreach to the NYISO to determine optimal strategy for coordination with New York Independent System Operator (“NYISO”) systems

#### **2.1.2 Activities Overview**

Phase 0, Project Planning: The Project team executed a Limited Notice to Proceed which allowed the following work on Phases 0, 1, 2 and 4 to begin in parallel. This created more lead time for Phase 0 contract development, Phase 1 customer acquisition, Phase 2 Commissioning Activities and Phase 4 NYISO integration. With respect to Phase 0 activities, the Project team completed the initial draft of the transaction documents.

Phase 1, Customer Acquisition: In Q3, the Project team completed customer identification efforts. Of the 304 customers contacted, the Project team collected 41 intake forms and completed 37 host site walkthroughs. From these walkthroughs and viability analysis performed by the Company, eight sites were selected to move forward with permitting. The Project team chose four primary sites, but due to permitting uncertainty the team selected an additional four secondary sites in the

event there are any issues with the four primary sites. Final sites will be selected from the primary and secondary sites which receive full permitting.

Phase 2, Construction/Commissioning and Integration: The Project team began work on the requirements specifications documentation and information technology architecture schemes needed to integrate the storage assets into Con Edison's system and the Network Operations Center ("NOC"). The Project team expects to complete these documents and to begin building the network architecture in Q4 2017.

Phase 4, Market Participation: In order to ensure timely market participation and gather requirements for communications integration, the Project team initiated conversations with NYISO in Q3. The continued dialog with NYISO will inform the Dispatch Optimization (Phase 3) and Market Participation (Phase 4) strategy.

### **2.1.3 Key Metrics**

In Q3, the Project team made significant progress on customer acquisition activities. Measurement of key outcomes will not be reported until Q4 2017 when Customer Acquisition has been completed. The following data supports these Phase 1 metrics (targets were set as 200 potential sites identified, 30 viable project sites, and four final project sites).

- Potential Sites Identified: 312 / 200
- Customers Approached: 304 / 312
- Customer Intake Forms Collected: 44 / 304
- Walkthroughs Conducted: 32 / 44
- Sites Selected for permitting: 8 / 4

### **2.1.4 Next Quarter Forecast**

In Q4, the Project team will complete the permitting packages and submit them to the DOB Office of Technical Certification and Review ("OTCR"). If more than four of the eight sites receive permits, the final four will be selected and host site contracts can be finalized. The Project team will also begin analyzing the differences in number of eligible customers and storage system size for the same site under the behind-the-meter ("BTM") and front-of-the-meter ("FTM") business models for the viable customers with interval data.

The Project team will continue any and all activities possible to prepare for Phase 2, however battery construction and commissioning cannot begin until receipt of final permits from the OTCR, anticipated in Q1 2018.

### 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 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:** 4.2 MW/ 4.4 MWh installed storage across four sites

**Actual by Phase 1 Midpoint:** N/A

**Solutions/strategies in case of results below expectations:** The Project team will work to proactively manage any permitting restrictions which 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:** Green

**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

During Q3, the Project team decided to extend Phase 0 by executing a Limited Notice to Proceed to begin Phases 1, 2 and 4 immediately. This was done to provide more time for contract development, customer acquisition and permitting activities. The challenges associated with implementing a first-of-its-kind business model extended Phase 1 customer acquisition activities beyond Q3. While Phase 0 and Phase 2 activities will continue in parallel to minimize delay, commissioning date is still targeted for summer 2018.

## 2.3 WORK PLAN & BUDGET REVIEW

### 2.3.1 Phase Review

#### 2.3.1.1 Phase Progress

The Project team has made progress on Phase 0 (Project Planning), Phase 1 (Customer Acquisition) and Phase 2 (Construction/Commissioning and Integration). The Project team anticipates Phase 0 will be completed with contract signing in Q4 2017, Phase 1 will be completed in Q1 2018 with receipt of OTCR permits.

### 2.3.2 Work Plan

Number	Task	Lead	2017				2018				2019				2020			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	<b>Phase 1: Customer Acquisition</b>																	
1.1	<b>Project Management</b>	Con Edison																
1.1.1	Public Service Commission Approval	Con Edison																
1.1.2	Limited Notice to Proceed Negotiated/Executed	Con Edison																
1.1.3	Refine Scope of Work	Con Edison																
1.1.4	Draft GIE/Con Edison Partnership Contract	Con Edison																
1.1.5	Finalized Partnership Contract Executed	Con Edison/GI Energy																
1.2	<b>Customer Acquisition</b>	GI Energy																
1.3	<b>Market Analysis (BTM/FTM Study)</b>	GI Energy																
2	<b>Phase 2 - Permitting, Construction, Commissioning, &amp; Integration</b>																	
2.1	<b>Project Management</b>	Con Edison																
2.2	<b>Equipment Procurement/Site Construction/System Design</b>	GI Energy																
2.2.1	Batteries Released for Construction	GI Energy																
2.2.2	System Design	GI Energy																
2.2.2.1	Control System Design	GI Energy/SGS																
2.2.2.2	Interconnection Design	GI Energy																
2.2.2.3	Civil Design	GI Energy																
2.2.3	Design Approved	Con Edison/GI Energy																
2.2.4	Construction Documents Complete	GI Energy																
2.2.5	Permitting	Con Edison/GI Energy																
2.2.6	Secondary Equipment Ordered	GI Energy																
2.2.7	Site Work	GI Energy																
2.2.8	All Equipment Delivered	GI Energy																
2.2.9	Battery Installation Complete	GI Energy																
2.3	<b>Communications Integration</b>	GI Energy/SGS																
2.4	<b>Overall System Startup/Testing</b>	GI Energy																
2.5	<b>System Full Site Commissioning Complete</b>	GI Energy																
2.6	<b>Training</b>	GI Energy/Con Edison																
3	<b>Phase 3 - Dispatch Optimization</b>																	
3.1	<b>Project Management</b>	Con Edison																
3.2	<b>Dispatch Testing</b>	GI Energy/Con Edison																
3.3	<b>Dispatch for Load Relief</b>	GI Energy/Con Edison																
3.4	<b>Ongoing O&amp;M</b>	GI Energy																
4	<b>Phase 4 - Market Participation</b>																	
4.1	<b>Project Management</b>	Con Edison																
4.2	<b>Battery Enrollment in NYISO Markets</b>	GI Energy																
4.2.1	Annex 1 Forms	GI Energy																
4.2.2	Annex 2 Forms	GI Energy																
4.2.3	NYISO Review	GI Energy																
4.2.4	NYISO Class Year Study (If Necessary)	GI Energy																
4.3	<b>Batteries Participate in Secondary Markets (Real or Virtual)</b>	GI Energy																
4.4	<b>Report Submitted on Annual Secondary Market Earnings</b>	GI Energy																

### **2.3.3 Updated Budget**

Budget information is being filed confidentially with the Commission.

## **2.4 CONCLUSION**

### **2.4.1 Lessons Learned**

The team was successful in identifying nearly 150 percent of the customer identification target and successfully converted these leads to meet the viable site goal. As this is a new business model for energy storage, the Project team is encouraged by this success. However the process to achieve these goals took longer than anticipated. Before any conclusions can be drawn about the customer appetite for this business model, the Project team needs to gather more feedback and information from customer conversations.

### **2.4.2 Recommendations**

The Company recommends maintaining focus on OTCR permits required to complete Phase 1 and launch primary Phase 2 activities. While the Project team has continued dialogue with the permitting agencies, the timeline for approval has varied greatly for previous projects. The Project team will continue to work on all integration activities, including communications architecture and interconnection applications, to ensure a swift start to Phase 2 upon receipt of permits.

## **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

## Appendix A: Commercial Battery Storage Description of Phases

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