

April 30, 2018

VIA ELECTRONIC DELIVERY

Honorable Kathleen H. Burgess
Secretary
New York State Public Service Commission
Three Empire State Plaza, 19th Floor
Albany, New York 12223-1350

RE: Case 14-M-0101 – Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision (REV)

**NIAGARA MOHAWK POWER CORPORATION d/b/a
NATIONAL GRID: COMMUNITY RESILIENCE REV
DEMONSTRATION PROJECT – Q1 2018 REPORT**

Dear Secretary Burgess:

Niagara Mohawk Power Corporation d/b/a National Grid (“National Grid”) hereby submits for filing its quarterly update to the Community Resilience REV Demonstration Project Implementation Plan covering the period of January 1, 2018 through March 31, 2018 (“Q1 2018 Report”) as required by the REV Demonstration Project Assessment Report filed by the New York State Department of Public Service Staff (“Staff”) with the Commission on February 10, 2016 in Case 14-M-0101.

Please direct any questions regarding this filing to:

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National Grid looks forward to continuing to work collaboratively with Staff as it proceeds with the implementation of the Community Resilience REV Demonstration Project.

Respectfully submitted,

/s/ Karla M. Corpus

Karla M. Corpus
Senior Counsel

Enc.

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**Community Resilience
REV Demonstration Project
Potsdam, New York**

Q1 2018 Report

April 30, 2018

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1.0 Executive Summary

Under the New York Public Service Commission's ("PSC") Reforming the Energy Vision ("REV") proceeding, this Community Resilience Demonstration Project (the "Project") consist of developing financial and engineering plans for a community microgrid that, once constructed, improves the local resiliency during severe weather events in the remote Village of Potsdam ("Potsdam") in upstate New York. Potsdam and surrounding St. Lawrence County have experienced multi-day power outages as a result of microbursts and winter ice storms; most notably the "Ice Storm of 1998" which left over 100,000 customers without power for up to 3 weeks in the North Country and recently, in December of 2013, another ice storm isolated over 80,000 customers for several days.



Image 1.1 – Photo of Upstate New York after the 1998 Ice Storm¹

Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") has partnered with GE Energy Consulting ("GE"), OBG (formerly O'Brien & Gere) , Nova Energy Specialists, LLC ("Nova Energy") and Clarkson University ("Clarkson") to develop an engineering design and an investment grade financial model to build and operate a community resilience microgrid for Potsdam. The microgrid plan uses a robust underground distribution network and coordination of new and existing distributed energy resources ("DER"), including natural gas generators, hydroelectric generators, and a large photovoltaic ("PV") solar array. Essential infrastructure that needs to remain operational during prolonged power grid outages and which are planned to be connected to the microgrid include a hospital, the local police and fire departments, water and wastewater treatment plants, Village of Potsdam government offices, two (2) higher education institutions, a high school, a bank, a drug store, a grocery store, hotel, and a gas station.

¹ Image was taken during the aftermath of 1998 Ice Storm.

The Project includes developing a new economic model for community microgrid projects which involves hybrid ownership and operation of assets between the utility and DER owners, as well as a unique tiered tariff design that recovers the cost of the assets from the community segments that benefit from the microgrid's operation.

Concurrently, the Company will develop and evaluate new utility services and business model that may be required for further microgrid deployment in New York State. The four (4) services to be developed are:

1. Tiered recovery for storm-hardened, underground wires;
2. Central procurement for DER;
3. Microgrid control and operations; and
4. Billing and financial services.

While National Grid is leading the Project, this Project consists of a close-knit partnership effort between GE, Clarkson and National Grid. OBG and Nova Energy are also contributors via subcontracts under GE. Moreover, it will require significant input from other major Potsdam stakeholders, such as the Village of Potsdam government, the Canton-Potsdam Hospital, and the State University of New York at Potsdam ("SUNY Potsdam").



Image 1.2 – The major stakeholder partners of the Community Resilience demonstration (clockwise, from top left: Clarkson University, SUNY Potsdam, Village of Potsdam Offices, and Canton-Potsdam Hospital)

During Q1 2018, the National Grid Project team continued the major efforts of the Detailed Engineering Design and Financial and Business Plan phase (Phase 2) of the Project. The majority

of the activities during this quarter focused on refining the estimated amount of generation needed for the microgrid based on the revised estimated generation capacity one of the microgrid-connected customers stated they plan to use to meet their own load. Price estimates for generation equipment were obtained based on this revised load information. Additionally, documentation and a financial pro-forma for New York State Energy Research & Development Authority's ("NYSERDA's) NY Prize Stage 2 Scope of Work ("SOW") continued. National Grid also held one (1) in-person meeting with one (1) Tier 1B (load-only) connected customer, and a telephone discussion with another Tier 1B customer; both of which had not been visited in Q4 2017. The purpose of these interactions was to determine what these customers considered the value of resiliency, and to increase their understanding of how a microgrid will serve their needs.

The Project team held an in-person meeting in January 2018, as well as several team calls, mostly on a bi-weekly basis, to discuss the status of each partner's report responsibilities and progress.

In response to an article reflecting on the ice storm of 1998, a letter to the editor about National Grid's reflection on the storm was written by National Grid's regional manager of Customer and Community Relations and published in the Watertown Daily Times. (See Appendix A.)

A presentation on microgrid projects located in New York State was made at the Distributech 2018 Conference in San Antonio, Texas on January 25, 2018. National Grid featured this Project for half of the presentation, while GE Energy Connections, a consultant on this Project, devoted their half of the presentation to other microgrid projects located within New York State.

2.0 Highlights Since Previous Quarter

National Grid and the key Project partners made steady progress in Q1 2018. Figure 1-1 provides a reference timeline for 2017-2018 emphasizing the major milestones and accomplishments to date. Changes and additions are highlighted in yellow and are described in additional detail below in Section 3.1.

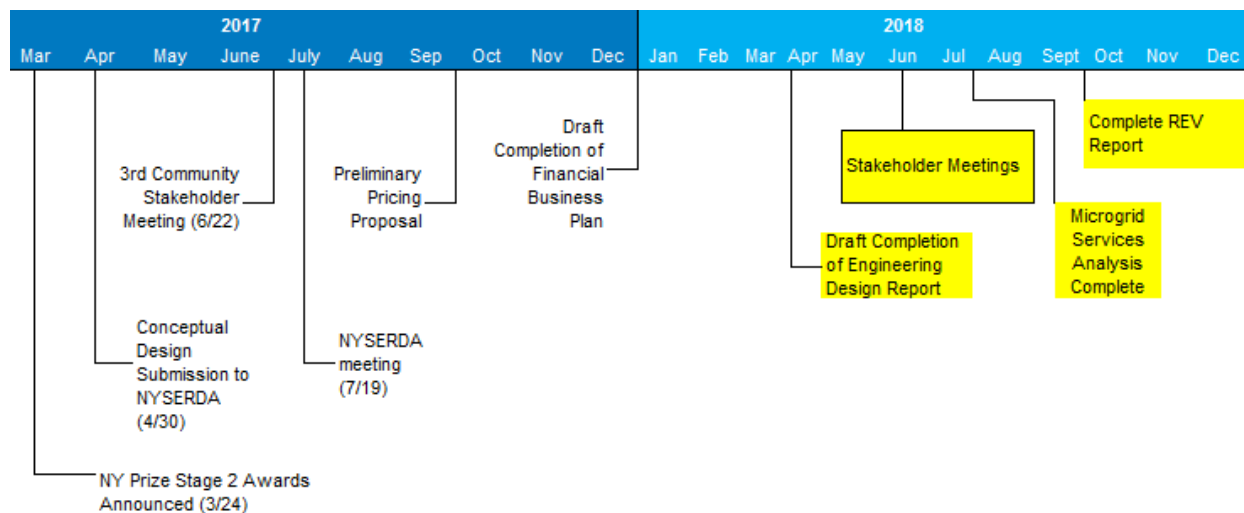


Figure 1.1 –2017-2018 Major Milestones Timeline*

**Note: The Project schedule stated in the Project Implementation Plan was predicated on the Project Conceptual Design, performed under a NYSERDA PON, being completed in mid- 2016. The conceptual design was completed approximately one year later, resulting in the need to extend this Project's schedule beyond the originally-planned completion date of Q2 2017.*

2.1 Major Task Activities

1. Stage 2 Report Preparation

Report drafting continued, with GE focusing on Power Distribution Systems Design (Task 1.6), and working with GE Grid Automation, completing Microgrid Controls Functionality (Task 1.7) and Microgrid Controls and Communications Design (Task 1.8). GE also oversaw Nova Energy Specialists, Inc., who in collaboration with GE Energy Consulting during Q1 2018, performed the detailed analysis and produced the draft reports for the Power Distribution System Modeling and Simulation (Task 1.10) and Harmonics and Flicker Studies (Task 1.11) tasks.

GE also oversaw Clarkson University, whose efforts during Q1 2018 consisted of completing the following tasks:

- Value Proposition: Business Model (2.4.1);
- Value Proposition: Grid Value Proposition (2.4.3a);
- Project Costs: Taxes (2.7.3);
- Project Financing: Government Financing (2.9.1);
- Project Financing: Private Financing (2.9.2);

- Develop Information for Benefit Cost Analysis: Costs to Maintain Service during a Power Outage (3.5); and
- Develop Information for Benefit Cost Analysis: Services Supported by the Microgrid (3.6).

2. DER-CAM Analysis

The Distributed Energy Resources Customer Adoption Model (“DER-CAM”)² is an economic, energy balance, and environmental model that is used for determining optimum sizing of DER assets in grid-connected and off-grid microgrid systems. A more detailed description of the DER-CAM model is provided in the Q2 2017 Project report.

Refined DER-CAM Results

The Distributed Energy Resources Customer Adoption Model (“DER-CAM”)³ is an economic, energy balance, and environmental model that is used for determining optimum sizing of DER assets in grid-connected and off-grid microgrid systems. A more detailed description of the DER-CAM model is provided in the Q2 2017 Project report.

3. Microgrid Configuration and Design

Staged Roll-out

There were no changes made this quarter to the Staged Rollout configuration or design. As noted in the Q2 2017 report, while the originally-envisioned community microgrid footprint involved supporting all critical services in the Town of Potsdam, the cost of the full microgrid was determined to be economically infeasible and a staged approach to microgrid construction was subsequently developed. As noted in the Q3 2017 quarterly report, the decision was made by team members to adopt the staged roll-out approach, with Stages 1, 1b, and 2 all being constructed under Stage 1; also termed ‘the smaller footprint.’ This approach allows the construction investment to occur over an extended period of time. Once selected, this decision was communicated to all members of the Project Team so that they could proceed with their tasks accordingly.

Data in Table 2.1 below describes the staged approach, while Figure 2.3 that follows provides a geographic location of each stage.

² See Distributed Energy Resources Customer Adoption Model (“DER-CAM”), available at: <https://building-microgrid.lbl.gov/projects/der-cam>.

³ See Distributed Energy Resources Customer Adoption Model (“DER-CAM”), available at: <https://building-microgrid.lbl.gov/projects/der-cam>.

Stage	Start/Finish Point	Route (Streets)	Load Connections	Generation Connections
Stage 1	Clarkson University (feeder 51) to Village Civic Center	Maple St. -> Main St.	Clarkson University, Kinney Drug Store, Stewart's Shops Gas Station, The Clarkson Inn, North Country Savings Bank, IGA Grocery, Civic Center/Rescue Squad	West Dam Hydro and Clarkson's new DERs, one available
Stage 1b	Maple St. to East Dam Hydro	Market St. -> Raymond St.	Stage 1 + Water Treatment Plant	West Dam Hydro + East Dam Hydro
Stage 2	Village Civic Center to Canton-Potsdam Hospital ("CPH")	Park St. -> Elm St. -> Lawrence Ave. -> Leroy St.	Stage 1 + Potsdam High School and CPH	West Dam Hydro + East Dam Hydro
Stage 3	CPH to Wastewater Treatment Plant	Grove St. -> Cherry St. -> Lower Cherry St.	Stage 2 + Wastewater Treatment Plant	West Dam Hydro + East Dam Hydro
Stage 4	Village Civic Center to SUNY Potsdam	Main St. -> SUNY at Morningside Dr.	Stage 3 + SUNY Potsdam	West Dam Hydro + East Dam Hydro + SUNY CHPs
Stage 5	SUNY Potsdam to solar PV via overhead line	Morningside Dr. -> Elm St.	Stage 4 + PV	West Dam Hydro + East Dam Hydro + SUNY CHPs + PV
Stage 6	Clarkson to National Grid Service Center	Pine St.	Stage 5 + National Grid Service Center	West Dam Hydro + East Dam Hydro + SUNY CHPs + PV

Table 2.1 – Staged Roll-Out Approach



Figure 2.3 – Staged Roll-Out Approach Map

Engineering Design of Staged Roll-out

There were no changes to the staged roll-out made this quarter. As stated in the Q4 2017 report, one-line diagrams for the large (full build-out) microgrid and small footprint (staged approach footprint through Stage 2) microgrid were previously developed and updated.

GE's GE Grid Automation team completed the Microgrid Controls Functionality (Task 1.7) and the Microgrid Controls and Communications Design (Task 1.8), and interfaced with National Grid's engineering staff. Additionally, the GE team oversaw Nova Energy on the Power Distribution System Modeling, Simulation, and Harmonics section (Task 1.10) and the Flicker Studies analysis (Task 1.11); both of which were completed during this quarter.

Cost Estimates of Staged Roll-out

Based on the final DER-CAM analysis, a final amount of additional generation was determined. Prices for that generation equipment were then obtained. However, the Project team had not completed updating the staged cost estimate based on this newest and final generation cost information. The updated cost estimates for each stage will be presented in the Q2 2018 report.

Regulatory Developments

Pursuant to the PSC's Value of Distributed Energy Resources ("VDER") proceeding⁴, the Project team continued to monitor development of value stack determinations and filings by NY PSC during this quarter as they relate to implications for the Potsdam Community Microgrid. There were no significant VDER-related developments by the PSC identified this quarter.

Customer Base - Tiered Recovery

The Project team developed two (2) detailed cost estimates for the smaller foot print microgrid (Stages 1, 1b and 2) in Q3 2017. There were no further activities conducted under this task during this quarter.

4. Financial Model Development

There were no updates made to the Project's financial model. Final cost and pricing data was received for most generation and system equipment. The staged-rollout pricing model will be updated based on this new data and presented in the Project's final report. The preliminary pricing proposal will provide the Company the opportunity to explain the pricing of each of the four (4) proposed services to Project partners and stakeholders. The final version of the tiered recovery of the underground wires network will also be included.

While the Tiered Recovery financial model addresses the grid materials and equipment costs, generation costs were expected to be recovered through other means. During Q1 2018, National Grid started development of a cost compensation model for DER owners.

⁴ See Case 15-E-0751 *et al.*, *In the Matter of the Value of Distributed Energy Resources* ("VDER Proceeding") *et al.*, Order on Phase One Value of Distributed Energy Resources Implementation Proposals, Cost Mitigation Issues, and Related Matters (issued September 14, 2017) ("VDER Phase One Order").

5. Stakeholder Outreach

Outreach to the two (2) Tier1b Project stakeholders was conducted to apprise them of the decision to initially use the smaller staged construction approach that will start with Stages 1, 1b and 2. In addition, these customers were asked what they consider to be their value derived from being connected to the microgrid. Survey results showed the value varies among customers based on such factors as the outage duration and season in which the outage occurs.

2.2 Challenges, Changes, and Lessons Learned

The following issues or changes occurred during Q1 2018.

Issue or Change	What was the resulting change to Project scope/timeline?	Strategies to resolve	Lessons Learned
<p>Customers reported electric loads used to calculate microgrid generation needs, but have not consistently reported developments in their backup generation plans.</p>	<p>The decreased load meant a smaller amount of generation would be needed for designing the microgrid’s peak generation capacity.</p>	<p>Contact Tier 1A and 1B stakeholders at least every six (6) months during the remainder of the period between now and the time these customers contractually agree to be a microgrid customer, to verify they have no significant load or available backup generation changes.</p>	<p>Microgrid planners cannot assume there will be no load changes among any Tier 1A and 1B customers. There may be changes between the conclusion of this REV Project and the time of construction. Project owners must implement a mechanism to identify load and generation changes occurring through the Project’s final design stage, and must be able to easily evaluate the effect on generation size caused by such a change, and modify the generation size plan as needed.</p>

3.0 Next Quarter Forecast

In the second quarter of 2018, the Project team will complete its efforts on the business modeling and detailed engineering design with its partners using the NYSERDA NY Prize SOW as a guide. Detailed explanations of the proposed provisions of the microgrid, such as fuel specifications, current generation sources, future generation needs, as well as other general information, will be documented for the NY Prize Stage 3 RFP response.

Cost estimate adjustments based on the staged construction configuration will be completed. This will be followed by outreach to the Tier 1a and Tier 1B Project stakeholders to present them with the project cost findings, and to identify their position on the four (4) microgrid services proposed to be provided by the utility, which are:

1. Tiered recovery for storm-hardened, underground wires;
2. Central procurement for DER;
3. Microgrid control and operations; and
4. Billing and financial services.

The Project team will complete the business and governance model based on the initial construction consisting only of the Stage 1, 1b, and 2 to present a clear and compelling case that the benefits to the community, stakeholders, and utility outweigh associated costs and risks.

The draft financial analysis and engineering design report writing tasks will be completed and submitted to National Grid for review. National Grid will review the report and obtain updates from GE, with the final report being prepared by the end of Q2 2018. National Grid will also commence preparing the final REV project report, which it anticipates submitting in Q3 2018.

3.1 Checkpoints/Milestone Progress

	Checkpoint/Milestone	Anticipated Start-End Date	Revised Start-End Date	Status
1	Clarkson University NYSERDA PON Study (<i>Conceptual Design</i>)	10/2015 – 6/30/16	10/2015 – 10/31/16	● Complete
2	Initial Engineering Design Recovery Plan (<i>Tiered Recovery Plan</i>)	4/6/2016 – 7/26/16	5/1/2016 – 9/30/16	● Complete
3	Preliminary Service Proposal & Pricing (<i>Pricing Proposal</i>)	7/01/16 – 11/01/16	11/01/16 – 5/31/18	● Ongoing
4	Phase 2 Completion (<i>Detailed Engineering Design and Business Plan</i>)	3/16/16 – 6/30/17	10/1/16 – 6/30/18	● Ongoing
5	Go/No Go Testing	4/11/18 – 6/30/18	5/1/18 – 9/30/18	● Not Started
Key				
● On-Track				
● Delayed start, at risk of on-time completion, or over-budget				
● Terminated/abandoned checkpoint				

1. Clarkson University NYSERDA PON Study – Task 4 (*Conceptual Design*)

Status: ● - Complete

Start Date: 10/2015

End Date: 10/31/16

Given all research tasks associated with the NYSERDA study are now complete, the Project team considers this Conceptual Design checkpoint complete. The Clarkson team completed the final Report on April 30, 2017. A final close-out meeting with NYSERDA was held on July 19, 2017.

2. Initial Engineering Design Recovery Plan (*Tiered Recovery Plan*)

Status: ● - Complete

Start Date: 5/1/16

End Date: 9/30/16

While continued adjustments of the microgrid design will ultimately affect the results of the tiered recovery, the approach and design of the recovery mechanism is not expected to change during the Project. Therefore, the Project team considers this checkpoint complete.

3. Preliminary Service Proposal and Pricing (*Pricing Proposal*)

Status: ● - Ongoing

Start Date: 11/1/16

End Date: 5/31/18

This milestone consists of presenting the preliminary service and pricing offerings to stakeholders. The Project team has continued to form and analyze a pricing strategy for the microgrid during Q1 2018. This task is predicated on completion of the project report by GE. The adjusted timeline shifts this task to Q2 2018.

4. Phase 2 Completion (*Detailed Engineering Design and Financial and Business Plan*)

Status: ● - Ongoing

Start date: 10/1/16

End date: 6/30/18

National Grid partnered with GE and OBG to develop a Detailed Engineering Design and Financial and Business Plan Assessment consistent with NY Prize Stage 2. GE is subcontracting with Clarkson and Nova Energy to perform some of the tasks that are outside of GE's area of expertise.

The Project team anticipated most of this milestone to be completed by the end of 2017, which it was, with drafts of most Project report sections being completed. Report preparation, internal review, and finalization will be completed in Q2 2018. The end objective of this Project continues to be collection and compilation of the data necessary to enable preparing a compelling NY Prize Stage 3 funding application. Based on information currently published on the NYSERDA website, NYSERDA has moved its NY Prize Stage 3 RFP announcement to the end of 2018. Therefore, the Project team still has sufficient time to complete REV Demonstration Project in advance of the Stage 3 RFP announcement.

5. Go/No Go Decision

Status: ● - Not Started

Start date: 4/1/18

End date: 9/30/18

The culmination of the preceding efforts conducted under this Project will be a go/no go decision made by the proposed Potsdam Microgrid customers and community leaders. This task consists of conducting stakeholder engagement efforts to determine which of the four (4) services offered under this Project the customers and community leaders will accept from National Grid. National Grid plans to present the findings of these analyses in the overall final REV Project report, which it plans to complete in Q4 2018.

4.0 Work Plan & Budget Review

4.1 Updated Work Plan

Based on discussions with PSC Staff, the Project schedule is extended to the end of Q1 2019. An updated Project completion schedule is forth below in Table 4-1:

Table 4-1: Project Schedule

Task Name	Start	Finish	1st Quarter		1st Quarter		1st Quarter		1st Quarter		1st Quarter			
			May	Oct	Mar	Aug	Jan	Jun	Nov	Apr	Sep	Feb	Jul	
1 <input type="checkbox"/> NYSERDA PON Feasibility Study	Wed 10/1/14	<u>Tue 7/11/17</u>												
2 Project Management and Reporting	Wed 10/1/14	Thu 6/30/16												
3 Define Loads and Required Generation	Wed 10/1/14	Tue 6/9/15												
4 Engineering Design	Wed 5/13/15	Tue 12/22/15												
5 Equipment Specification and Cost Analysis	Mon 1/4/16	Fri 4/22/16												
6 <input type="checkbox"/> Report Writing	Tue 3/15/16	<u>Fri 9/28/18</u>												
7 <input type="checkbox"/> REV Demonstration	Tue 3/15/16	<u>Fri 9/28/18</u>												
8 Demonstration Approval	Tue 12/15/15	Tue 12/15/15												
9 <input checked="" type="checkbox"/> General Project Management	Mon 3/21/16	Fri 9/28/18												
23 Benefit Analysis for Stakeholder Engagement	Mon 1/2/17	Thu 3/30/17												
24 <input type="checkbox"/> Stakeholder engagement and community outreach	Tue 3/15/16	Fri 6/15/18												
25 Initial Stakeholder Engagement	Tue 3/15/16	Fri 6/10/16												
26 Initial Stakeholder Meeting	Fri 7/22/16	Fri 7/22/16												

27	Second Stakeholder Meeting	Wed 7/12/17	Wed 7/12/17	
28	Third Stakeholder Meeting	Fri 6/30/17	Fri 6/30/17	
29	Conceptual Design Complete Milestone	Wed 7/12/17	Wed 7/12/17	
30	Initial Engineering Design Recovery Plan (Capital Costs)	Mon 6/13/16	Mon 4/30/18	
31	Initial Tariff Design (Commodity Costs)	Tue 9/19/17	Mon 4/30/18	
32	Preliminary Service Proposals & Pricing Milestone	Mon 12/18/17	Mon 4/30/18	
33	Stakeholder feedback on initial cost estimates and recovery/payment plan & additional community outreach	Mon 5/21/18	Fri 6/15/18	
34	Coordinate and incorporate stakeholder feedback with Detailed	Mon 6/18/18	Thu 7/5/18	
35	Revise tariffs based on possible changes to NY Prize technical study	Fri 7/6/18	Thu 8/2/18	
36	Draft contracts for Go/No-Go meeting with refined tariffs and business cases	Fri 7/13/18	Thu 8/9/18	
37	Financial/Business Plan & Contracting	Tue 7/17/18	Mon 9/10/18	
38	Completion of Financial/Business Plan ("Go/No-Go")	Tue 9/11/18	Tue 10/9/18	
39	NY Prize Stage 3 RFP Announced	Mon 1/1/18	Fri 11/2/18	
40	⊕ NY Prize Stage 2	Wed 4/20/16	Tue 9/18/18	
137	⊕ NY Prize Stage 3 (FYI)	Fri 11/30/18	Fri 11/30/18	

4.2 Updated Budget

Table 4.1 below displays the updated total expenditures through March 31, 2018.⁵

Project Task	4 th Quarter Actual Spend	Project Total Spend to Date	Incremental Project Budget	Incremental Remaining Balance
CapEx				
	\$0	\$0	\$0	\$0
Grants Credited Against Incremental Capital Costs				
n/a	n/a	n/a	n/a	(\$) n/a
OpEx				
Project Administration and Planning	\$11,987	\$334,081	\$131,000	(\$203,080)
Marketing and Community Engagement	\$6,745	\$59,528	\$200,000	\$140,771
Implementation	\$7,434	\$80,989	\$275,000	\$194,011
Audit Grade Detailed Engineering Design	\$404,474	\$671,272	\$1,000,000	\$328,728
Total	\$430,640	\$1,145,870	\$1,606,000	\$460,130

Table 4.1 – Updated Budget

The 'Total Spend to Date' values listed in Table 4-1 are the combined incremental and non-incremental costs, while the project budget items consist of incremental amounts only. The incremental costs associated with the Project as of March 31, 2018 total \$643,653.12, leaving a remaining Project budget balance of \$962,346.88. Continued monitoring and reporting of incremental costs will be included in subsequent Quarterly Reports.

This quarter the consultants submitted invoices for work that had been completed to date. As noted in previous quarterly reports, while the Project Administration and Planning budget has been depleted, the Project team will continue to record expenses in this category to track categorical administrative expenses of the Project.

⁵ The Company updated the Project budget to reflect incremental costs, and to illustrate costs that are capital or operating expenses.

5.0 Progress Metrics

The Project participant load size, participant quantity, and linear length of the microgrid dictate the projected cost and configuration of the microgrid construction. This section of the Quarterly Report tracks the current projected cost range of the microgrid depending on the most recent engineering design estimates, as well as the projected resiliency duration of the detailed design.

5.1 Total Cost of Microgrid

The total estimated cost of the microgrid has changed from Q4 2017, as displayed in Table 5.1 below. The staged rollout approach (described in Section 2 above) changes the timing of the expenditures and ultimately affects the successful business plan of the microgrid. Explanation of the staged rollout can be found in Section 2.1. Updated costs for each stage will be conveyed in future Quarterly reports.

Metric	As of Q3 2016	As of Q4 2016	As of Q1 2017	As of Q3 2017 – Stages 1, 1B, and 2	As of Q4 2017 – Stages 1, 1B, and 2	As of Q1 2018 – Stages 1, 1B, and 2
Projected Cost Range of Microgrid Construction	\$35M - \$60M ¹	\$26.4M - \$61.3M ²	\$26.4M - \$61.3M ²	Not Determined	<\$25M	\$30M ⁵
Underground Wire Cost Range	\$11.3M - \$11.8M	\$7.4M - \$12.0M	\$15.4M - \$23.8M ³	\$8.79M – \$13.465M	\$8.79M – \$13.465M ⁴	\$21M ⁵
Projected Resiliency Duration	14 Days	14 Days	14 Days	14 Days	14 Days	14 Days

¹ Range includes three (3) generation equipment options and two (2) distribution equipment options.

² Range includes three (3) generation equipment options and three (3) distribution equipment options.

³ Range includes cost of equipment and installation. Previous estimates only included equipment costs.

⁴ Range includes cost of equipment installation.

⁵ Based on using one (1) generation equipment option and one (1) distribution equipment option.

Table 5.1 – Cost of Microgrid

5.2 Tiered Recovery Population

There were no changes to the tiered recovery population as stated in the Q4 2017 quarterly report. Customer counts are displayed in Table 5.2.

	Commercial	Residential	Total
Tier 1	12	0	12
Tier 2	404	2,171	2,575
Tier 3	480	2,945	3,425
Tier 4	235	3,360	3,595
Tier 5	1,394	12,736	14,130
Total	2,513	21,212	23,725

Table 5.2 – Tiered-Recovery Customer Quantities

Appendix A

The following letter to the editor was published in the Watertown Daily Times on January 28, 2018.

Watertown Daily Times

Many improvements since ice storm of '98

PUBLISHED: SUNDAY, JANUARY 28, 2018 AT 5:15 AM

Your recent article on the 20th anniversary of the 1998 ice storm ("20 years later, reflecting on the ice storm of '98," Jan. 7) brought back many memories for National Grid. We remember with our neighbors in the north country the efforts taken by our Niagara Mohawk crews, other utility crews and the countless state, county and local government workers, first-responders and volunteers who helped ensure the safety of the community as we worked together to clean up from the storm's devastation and restore power as quickly as possible.

In the 20 years since the storm, National Grid has invested in system automation, improved our forestry practices and has made infrastructure improvements to further enhance safety, reliability and storm resiliency. In the last five years alone, National Grid has invested more than \$3 billion in our upstate New York energy delivery system.

In addition to these improvements, National Grid is working with partners, including Clarkson University and General Electric, to design a microgrid to improve reliability and community resilience for critical services located in Potsdam. The microgrid would ensure that vital community services continue to receive power if another natural disaster were to impact the area.

Watch for future announcements of National Grid's progress as we continue to use cutting-edge technology that helps us improve how we bring energy to life for our Northern New York customers.

Rich Burns

Potsdam

The writer is manager of Community & Customer Management for National Grid.

Source: Watertown Daily Times, January 28, 2018:

<http://www.watertowndailytimes.com/opinion/many-improvements-since-ice-storm-of-98-20180128>