Community Resilience REV Demonstration Project Potsdam, New York

Q2 2016 Report

August 1, 2016

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1.0 Executive Summary

Under the Commission's Reforming the Energy Vision ("REV") proceeding, this Community Resilience Demonstration Project (the "Project") focuses on improving the local resiliency during severe weather events in the remote Village of Potsdam ("Potsdam") in Upstate New York with the creation of a community microgrid. Potsdam and surrounding St. Lawrence County have experienced a number of 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 days.



Image 1.1 – Photo of Upstate New York during the 1998 Ice Storm

Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") has partnered with Clarkson University in order to develop a community resilience microgrid for Potsdam with an underground distribution network and coordination of new and existing distributed energy resources ("DER"). Concurrently, the Company will develop and test new utility services that may be required for further microgrid deployment in New York State.

The four services to be developed and tested are:

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

While National Grid is leading the Project, this demonstration is actually a close-knit partnership effort between Clarkson University and National Grid. 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, Canton-Potsdam Hospital, and Village of Potsdam Offices)

During the second quarter of 2016 the National Grid project management team began analyzing the tiered recovery tested service utilizing National Grid's customer accounts and usage figures. In addition, the team continued efforts to organize and motivate external partners (Clarkson University and GE Energy Connections) to provide updates on the New York State Energy Research and Development Authority ("NYSERDA") Program Opportunity Notice ("PON") 2715 and National Science Foundation ("NSF") Partnerships for Innovation: Building Innovation Capacity ("PFI:BIC") projects while meeting regularly to discuss RFP 3044 NY Prize Community Grid Competition - Stage 2: Detailed Engineering Design and Financial and Business Plan RFP issued April 20, 2016 ("NY Prize Stage 2 RFP").

2.0 Highlights Since Previous Quarter

National Grid and the key partners have made substantial progress in the second quarter of 2016, with all parties on track to deliver the expected outcomes laid out in the Implementation Plan. For a reference timeline emphasizing the major milestones and accomplishments, please see Figure 2.1. Changes and additions are highlighted in yellow and are described in more detail in Section 3.1.



Figure 2.1 – Achievements and Milestones Timeline

2.1 Major Task Activities

 Partner Working Sessions (May 3, 2016 and June 20, 2016) – NY Prize Stage 2 The National Grid team worked closely with Clarkson University and GE Energy Connections to analyze the NY Prize Stage 2 RFP. Two working sessions allowed the larger group to assign tasks and begin framing the approach to the Detailed Engineering Design and Financial Business Plan Assessment of the proposed microgrid.

Results from the meetings:

- GE taking the lead on majority of NY Prize Stage 2 scope of work.
- Clarkson University offering support on business modeling.
- Project funds to be used to execute Detailed Engineering Design and Financial Business Plan Assessment in accordance with NY Prize Stage 2 criteria.

GE Energy Connections will deliver a final proposed scope of work by end of July 2016 after concluding a team meeting on July 25, 2016.



Figure 2.2 - Excerpts from NYSERDA NY Prize Stage 2 RFP

2. Clarkson University NYSERDA PON Task 4

Clarkson University continues to work with GE Energy Connections on the initial design and cost ranges for all aspects of the microgrid (*i.e.*, underground wires, controller, and new incremental DER). In addition, this activity includes a benefit-cost analysis for microgrid stakeholders. Originally due on June 30, 2016, the report, which contains the primary aspects of the Project's initial "Completion of Conceptual Design," is delayed and is expected to be delivered on or about July 29, 2016.

As part of Task 4, Clarkson University met with numerous stakeholders to discuss how the microgrid could affect their businesses and to retrieve information regarding daily profit, revenue, and anticipated losses due to a power outage. Once finalized, this information will be essential in stakeholder engagement activities in order to convey the benefits of the microgrid to each individual stakeholder as well as the community in general.

In addition, the team analyzed societal benefits using the Federal Energy Management Agency ("FEMA") Benefit Cost Analysis Tool to estimate the social costs of losing the critical services provided by the hospital, fire and police department, Emergency Medical Services ("EMS"), and water and sewage treatment plants. For this methodology, it was assumed that if EMS, fire, and hospital services would be unavailable in Potsdam, then the next closest fire station, hospital, and EMS unit would serve the populations normally served by Potsdam. Under this scenario, the alternate services would be required to serve a larger population and a wider geographical area, which could result in higher losses. In looking at the wastewater and water services per capita, the loss of these services is represented as the impact on economic activity for the affected population.

Preliminary findings regarding anticipated losses, commercial spoilage, and societal benefits can be found in attached Appendix C.

3. Clarkson University NSF Activities

Clarkson University also continues their work with the NSF PFI:BIC project. The PFI:BIC project focuses on the human-machine operational impacts of the microgrid both during normal operations as well as during disaster response.

The National Grid team organized an instructional tour of the National Grid Syracuse Energy Control Center for the Clarkson University team to provide information as to the detailed operation of a control center and to illustrate how a disaster may affect the management and functionality of the operations. The tour will take place on July 13, 2016 and a report brief will be prepared during the next quarter detailing the tour and the resulting findings.

4. Bill Impact Analysis

During Q2 2016 the National Grid team began analyzing the first of four new services to be offered through the Project: tiered recovery of new storm-hardened, underground wires. The conceptual design phase of the Project estimated the cost of this capital expenditure to be roughly \$11.8M.

Process:

- 1) National Grid Data & Analytics team gathered appropriate customer accounts based on certain geographic criteria.
- 2) National Grid Billing Operations team gathered usage of customer base.
- National Grid NY Pricing Electric team set up allocations within each tier based on kWh and kW usage of selected customer base.

4) National Grid Project Management team analyzed data to distribute required revenue amongst tiers within recovery model.

Analysis and Results:

The Implementation Plan established the first tier approach to include only connected participants and Village residents. The initial analysis made clear that the population size is too small from which to recover the full investment in the underground wires. Further analysis extended the geographic range of recovery to include two additional tiers of residents within 5 miles and 10 miles of the Village limits (See attached Appendix, Figure A.1).

| Implementation Plan | New Approach |
|---|--|
| Two-tiered system | Four-tiered system |
| Connected Participants Village Residents | Connected Participants Village Residents Customers within 5 mile radius of village Customers within 10 mile radius of village |
| Village Residents Microgrid-Connected Customers | 10 Mile Radius 5 Mile Radius Village Residents Microgrid-Connected Customers |

Table 2.1 – Tiered Approach Changes

The team then used traditional rate design techniques to establish palatable bill impact figures and applied these calculations to the test population. Given the size of the customer base in the three residential tiers, it was determined that National Grid could potentially recover \$3.5M of the underground wire investment through the residential tiers using this approach.

| | S | C1 | SC-2ND | | | |
|---|----------------------|------|-----------|----------|--|--|
| | \$ Impact % Impact | | \$ Impact | % Impact | | |
| Village | \$2.69 | 3.05 | \$6.56 | 3.06 | | |
| 5 mile | \$2.67 | 3.03 | \$6.53 | 3.05 | | |
| 10 mile | \$2.71 | 3.07 | \$6.62 | 3.09 | | |
| Table 2.2 Pill Impact Figures for Pasidential Customers | | | | | | |

Table 2.2 – Bill Impact Figures for Residential Customers

Additional analysis is required to include the connected participants' contribution to the underground recovery efforts, including how additional generation will affect the distribution of costs. Furthermore, the benefit-cost analysis will continue to drive these efforts as contributions by each tier need to be established based on derived benefits (*i.e.*, access to critical infrastructure and services).

The National Grid team continues to work with their internal pricing team and with both GE Energy Consultants and Clarkson University to develop an approachable and realistic business model solution for the cost recovery of the underground wire investment.

2.2 Challenges, Changes, and Lessons Learned

| Issue or Change | What was the resulting change to Project scope/timeline? | Strategies to resolve | Lessons Learned |
|---|---|--|--|
| Change in Project Management. | Michael Duschen (Project Manager, Solutions Delivery Team of New Energy Solutions, <u>Michael.Duschen@nationalgrid.com</u>) and Daniel Payares (Project Manager, Solutions Delivery Team of New Energy Solutions, <u>Daniel.PayaresLuzio@nationalgrid.com</u>) replaced Christopher Yee as the Project Managers for the Community Resilience REV Demonstration Project. | Detailed transition task list developed by the former Project Manager to facilitate the transition. | Strong communication between all stakeholders is needed in order to maintain direction. |
| Delayed release for NY Prize Stage 2 RFP. | Project timeline may be modified due to the delayed release of the NY Prize Stage 2 RFP which was originally scheduled to be released in the fall of 2015, but was actually released on April 20, 2016. | Analyze which Project tasks are and are not dependent on the NY Prize Stage 2 RFP release. To ensure minimal delays, National Gird has progressed on independent tasks and will reassess timeline changes for tasks that are dependent. | Delays and changes to the project timeline are still being analyzed due to the delay of the Stage 2 RFP release. Some delays may be unavoidable but with good planning and communication, they may be controlled and minimized. Project delays, if any, will be specified in a subsequent quarterly report. |
| Some of the microgrid stakeholders may consider the costs to outweigh the added benefits and opt out. | If the major stakeholders opt out of the microgrid, the Project could not be constructed. | Create and maintain a list of available alternative commercial customers to reach out to if this happens. Another alternative is to scale back the size of the microgrid to make it more affordable. | It is important to be flexible with the design and assumptions of the microgrid design. The Project may need to be scaled back to accommodate fewer stakeholders. |
| Some of the major stakeholders do not have local decision- making authority (<i>e.g.</i> , SUNY Potsdam, KeyBank, Kinney Drugs). | Securing approval for capital investments may take a significant amount of time or ultimately be denied, as decision makers are not direct beneficiaries. | Engage decision makers early in the process to help alleviate potential delays. In some cases (<i>e.g.</i> , bank, pharmacy), investigate alternative locations that may have more local control. | It is important to engage the appropriate decision makers early to anticipate delays in approvals. |

| Issue or Change | What was the resulting change to Project scope/timeline? | Strategies to resolve | Lessons Learned |
|---|--|---|---|
| Capital investment for the 4MW of additional and necessary DER might not provide an acceptable return on investment ("ROI") for potential owners. | If the additional DER necessary to operate the microgrid is not procured, the Project might not be financially/technically feasible. | Have the Company backstop the generation from the additional DER through PPA agreements in order to have an acceptable ROI for the owners. | Contingency plans are needed to adjust microgrid size based on DER procurement. |
| Gas station confident with their own resilience provided by back-up generators. | Minor stakeholder may not want to work with microgrid team if they have adequate on-site generation. | Work within National Grid to find alternatives to participation of gas station site and mitigate other stakeholder self- generating alternative(s). | The team must understand each stakeholder's individual resiliency to calculate benefit from microgrid. |
| Wires recovery model challenged with current microgrid layout and target population. | May delay delivery of "Preliminary Service Proposals & Pricing" and may increase costs associated with pricing aspect of the Project. | Look for alternate funding sources, expand target population, or eliminate branches of microgrid (or some combination thereof). | It is important to establish target population size early in process. This will affect ability to recover costs. |
| Village progressing on possible repair of East Dam Hydro plant turbine gear boxes (see attached Appendix B.1). | The East Dam Hydro plant's gear box damage could be a major risk to the Project. Additional DER is required if this hydro generating facility cannot be returned to service. | Continued communication with the Village to assess timeframe and cost of possible repair. | Contingency plans are needed to account for possible additional DER. |
| American Society of Heating, Refrigerating and Air Conditioning Engineers ("ASHRAE") Level II audits are needed for NY Prize Stage 2 and therefore additional funding may be required. | NY Prize Stage 2 requires full ASHRAE Level II energy efficiency audits. This could result in additional cost and cause further delays. | Work with Clarkson University to assess need and establish which loads require full audit. | The team needs to know full cost of detailed design prior to execution. |

3.0 Next Quarter Forecast

In Q3 of 2016, the Project team will commence execution of the NY Prize Stage 2 Detailed Engineering Design and Financial and Business Plan Assessment. This detailed engineering will be performed by National Grid and its partners; GE Energy Connections, Clarkson University, and Nova Energy. Given the advances made prior to the delayed release of the New York Prize Stage 2 RFP, the team does not anticipate major postponements in the Project timeline. However, with

the anticipated 12-month completion timeframe for execution of the full detailed design, there may be some additional work to be completed after the current end date of June 30, 2017.

Another major focus in the next quarter will be additional analysis of potential business and revenue models for the microgrid. One chief requirement of the NY Prize Stage 2 RFP is an analysis of the commercial and financial viability of the proposed microgrid. National Grid, in conjunction with its partners, will continue evaluating ownership structure, operation, revenue potential, and DER generation as they pertain to the ultimate business model of the microgrid. A July 2016 meeting with GE's affiliate, Current, has been scheduled to brainstorm additional modeling.

In addition, National Grid will continue work on the customer bill impact analysis for the tiered recovery of the underground network to ascertain the level of return on investment and how customers will be affected. Additionally, community outreach efforts for microgrid generation and connected stakeholders will continue during the Q3 of 2016, setting the ground for the "Preliminary Service Proposals & Pricing" milestone expected to be completed in November 2016.

3.1 Checkpoints/Milestone Progress

| | Checkpoint/Milestone | Anticipated Start- End Date | Revised Start-End Date | Status |
|---|---|--------------------------------|---------------------------|--------|
| 1 | NY Prize Stage 2 RFP Detailed Design Study | 3/16/16 – 12/1/17 | 8/1/16 - TBD | • |
| 2 | Clarkson University NYSERDA PON Study | 10/2015 – 6/2016 | 10/2015 – 7/2016 | • |
| 3 | Initial Engineering Design Recovery Plan | 4/6/2016 – 7/26/2016 | 5/1/2016 – 8/30/2016 | • |

1. NY Prize Stage 2 RFP Detailed Engineering Design Study

Detailed Design Study Status: [-] Start date: 8/1/16 End date: TBD

National Grid has agreed to partner with GE Energy Connections to work on the detailed engineering design for NY Prize Stage 2 RFP. Additionally, GE Energy Connections will subcontract Clarkson University and Nova Energy Solutions to perform some of the tasks that are outside of GE's area of expertise. Although there was a four-month delay on the release of the NY Prize Stage 2 RFP, the initial design in the NYSERDA PON study covered some of the requirements of the RFP. This resulted in minimal delay to the entire Project.

The partners will meet on July 25, 2016 to negotiate contract terms. Provided the contract terms are finalized by the end of July, work on the study is expected to begin on or about August 1, 2016. The anticipated timeline for completion of the Stage 2 audit-grade detailed engineering design study is 12 months from commencement.

2. Clarkson University NYSERDA PON Study – Task 4 (Final).

Status: [-] Start Date: 10/2015 End Date: 07/2016

Task 4, the final technical task of the Project, is underway and will be delivered by the end of July 2016. Task 4 aims to accomplish the following items:

- Detailed cost of all aspects of the microgrid
- Benefit-Cost analysis for the microgrid
- Further refinement of microgrid performance
- 3. Initial Engineering Design Recovery Plan

Status: [-] Start Date: 05/2016 End Date: 08/2016

Further analysis of the tiered recovery of new storm-hardened underground wires is needed. The National Grid team plans to extend the recovery area to analyze the effects on the utility's ability to recover its costs. The Conceptual Design's benefit-cost analysis will contribute to these efforts as contributions by each tier need to be established based on derived benefits. In addition, analysis of the connected participants' contribution to the underground recovery efforts, including how additional generation will affect the distribution of costs, will be considered. In July 2016, the National Grid project management team will meet with Current to discuss potential business models, including the tiered recovery model.

4.0 Work Plan & Budget Review

4.1 Updated Work Plan

Updated Gantt chart from Project Implementation Plan is below:

| | Task Name | Duration 🗸 | Start 🗸 | Finish 🗸 | 2nd Quarter 3rd Quarter 4th Quarter 1st Quarter 2nd Quarter 3rd Quarter Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug |
|----|--|------------|--------------|--------------|---|
| 7 | REV Demonstration | 404 days | Tue 12/15/15 | Fri 6/30/17 | |
| 8 | Demonstration Approval | 1 day | Tue 12/15/15 | Tue 12/15/15 | |
| 9 | * General Project Management | 228 days | Mon 3/21/16 | Wed 2/1/17 | |
| 23 | Benefit Analysis for Stakeholder Engagement | 3.2 mons | Fri 7/1/16 | Wed 9/28/16 | 9/28 |
| 24 | Stakeholder engagement and community outreach | 64 days | Wed 12/16/15 | Mon 3/14/16 | |
| 25 | Initial Stakeholder Engagement | 64 days | Wed 12/16/15 | Mon 3/14/16 | 14 |
| 26 | Initial Stakeholder Meeting | 0 days | Mon 3/14/16 | Mon 3/14/16 | /14 |
| 27 | Conceptual Design Complete Milestone | 0 days | Mon 8/1/16 | Mon 8/1/16 | 8/1 |
| 28 | Initial Engineering Design Recovery Plan (Capital Costs) | 4 mons | Thu 5/12/16 | Wed 8/31/16 | -8/31 |
| 29 | Initial Tariff Design (Commodity Costs) | 3.5 mons | Mon 8/1/16 | Fri 11/4/16 | 11/4 |
| 30 | Stakeholder feedback on initial cost estimates and recovery/payment plan & additional community outreach | 1 mon | Mon 11/7/16 | Fri 12/2/16 | 12/2 |
| 31 | Preliminary Service Proposals & Pricing Milestone | 0 days | Fri 12/2/16 | Fri 12/2/16 | 12/2 |
| 32 | Coordinate and incorporate stakeholder feedback with Detailed Design Study team | 2 mons | Wed 12/7/16 | Tue 1/31/17 | 1/31 |
| 33 | Revise tariffs based on possible changes to NY Prize technical study | 2 mons | Mon 2/6/17 | Fri 3/31/17 | 3/31 |
| 34 | Draft contracts for Go/No-Go meeting with refined tariffs and business cases | 2 mons | Mon 4/3/17 | Fri 5/26/17 | 5/26 |
| 35 | Financial/Business Plan & Contracting | 25 days | Mon 5/29/17 | Fri 6/30/17 | 6/30 |
| 36 | Completion of Financial/Business Plan ("Go/No-Go") | 0 days | Fri 6/30/17 | Fri 6/30/17 | 6/30 |

Figure 4.1 – Updated Gantt Chart from Project Implementation Plan.

4.2 Updated Budget

| Task | Budget | Quarterly Spend | Spend to Date | Remaining Balance | | | |
|---|-------------|--------------------|------------------|----------------------|--|--|--|
| Project Administration and Planning | \$131,000 | \$57,087 | \$96,110 | \$34,890 | | | |
| Marketing and Community Engagement | \$200,000 | \$24,545 | \$44,913 | \$155,087 | | | |
| Implementation | \$275,000 | \$7,469 | \$10,736 | \$264,264 | | | |
| Audit Grade Detailed Engineering Design | \$1,000,000 | \$479 | \$794 | \$999,206 | | | |
| Totals: | \$1,606,000 | \$89,579 | \$152,552 | \$1,453,448 | | | |
| Table 4.1 – Updated Budget | | | | | | | |

Table 4.1 displays the updated budget through June 30, 2016.

In the event of an overrun in the Project Administration and Planning task of the budget, a portion of the budgets from Marketing and Community Engagement and/or Implementation tasks will be reallocated to Project Administration and Planning.

5.0 Progress Metrics

The size and number of participants in the microgrid will dramatically change the projected cost and configuration of the microgrid construction. This section will track the current projected cost range of the microgrid depending on the most recent engineering estimates as well as the projected resiliency duration of the detailed design.

5.1 Total Cost of Microgrid

| Metric | As of Q1 2016 | As of Q2 2016 |
|--|---------------|-------------------|
| Projected Cost Range of Microgrid Construction | \$5M - \$12M | \$36M* |
| Underground Wire Cost Range | \$12M | \$11.3M - \$11.8M |
| Projected Resiliency Duration | 14 Days | 14 Days |

*Includes all aspects of microgrid (underground wires, controller, new DER)

5.2 Tiered Recovery Population

The National Grid team's initial approach to the tiered recovery model used the below customer counts:

| | Commercial | Residential | Lighting | Total |
|----------------|------------|-------------|----------|--------|
| Connected | 16 | 0 | 0 | 16 |
| Village | 466 | 2,147 | 15 | 2,628 |
| 5 Mile Radius | 313 | 2,165 | 21 | 2,499 |
| 10 Mile Radius | 432 | 5,587 | 22 | 6,041 |
| Total | 1,227 | 9,899 | 58 | 11,184 |

Other metrics may be added to subsequent quarterly reports as they become more relevant as the Project progresses.

6.0 Appendices

Appendix A: Tiered Recovery Customers

Potsdam REV Demo



Figure A.1 – Map of Customers.



Appendix B: East Dam Hydro Plant News Clippings

POTSDAM-MASSENA LOCAL DAILY All Rights Reserved Price \$1.00 FRIDAY, MAY 27, 2016 **Board OKs cofferdam contract** POTSDAM: Temporary structure will allow experts to inspect the troubled East Dam and assess its future Village Administrator Everett better assess the situation, with Sheehan Contracting, cost between \$900,000 and By TOM GRASER where he is a manager. \$1.2 million. Mr. Tischler explained. toraser@wdt.net E. Basford said having the East Before work on the coffer The contract was adver-The cofferdam contract POTSDAM - The Village Dam operating and generatwas awarded to the sole bidtised and sent to at least two dam can be started, the village Board voted early Thursday ing power and revenue was companies that had previwill have to obtain a permit der, J.E. Sheehan Contractmorning to award a contract critical to the success of the from the New York State Deously expressed interest, Mr. ing. Sheehan's bid was for to build a cofferdam upstream budget. Tischler said, but only Sheepartment of Environmental from the troubled East Dam. "We're still exploring the \$27,250. han Contracting responded. The East Dam has been in- possibilities of either repair-Mr. Tischler, Trustee Conservation. operable since last August, ing it or, in a worst-case sce-Stephan Warr and Trustee El-If the village decides to re-Once the permit is obpair the dam, the cost could when the gears inside gearbox nario, selling it," Village Mayeanor Hopke voted to accept tained, the DEC will prohibit be very high. In April, Mr. Basnumber two failed and a bear- or Reinhold J. Tischler said. the bid. any work in the water until afford said that a rough estimate Trustee Ruth F. Garner was ing popped out of gearbox Once the cofferdam is in ter July 15-when fish spawnprovided by Hydro Consultplace, water will be pumped not in attendance and Trustee ing will have been completed. number one after running for ing and Maintenance Services out and the dam can be in- Nicholas Sheehan abstained less than a week During budget meetings, spected by experts who can because of his connection said East Dam repairs could See BOARD A2 nourcer 6/9/14

Potsdam enters agreement with power authority

FACILITY AUDIT: State organization to study and offer options for East Dam, which has been inoperable since last August

By TOM GRASER tgraser@wdt.net

POTSDAM -- The village of Potsdam Board of Trustees has

authorized Mayor Reinhold J. Tischler to enter into an energy services agreement with the New York State Power Authoritv.

The agreement will be used to help the village decide what can be done with the damaged dam.

The East Dam has been inopber two failed and a bearing popped out of gearbox number

week. Village Administrator Everett include repairing or replacing E. Basford said earlier this year that getting the dam operating

and producing revenue was critical to the village meeting its budget figures.

The agreement signed this erable since last August, when week allows the Power Authorthe gears inside gearbox num- ity to do a facility audit, Mr. Basford said.

"The Power Authority would one after running for less than a identify opportunities," he said. Those opportunities could

> the dam or some other solution. "The village has not committed to doing anything at this

> point," NYPA spokesman Steven P. Gosset said.

tured process. While the agreement does not rise to the level of a contract, Mr. Gosset explained it does move the village and the authority closer to doing something.

"We are performing an audit and then giving the village options," Mr. Gosset said.

There are no deadlines associated with the agreement, he added.

The audit, Mr. Basford said, is just the first step in a very struc-

After the village reviews the

recommendations and a feasibility report, it may then enter into a customer installation. agreement with the power authority to do the work, Mr. Basford said. "This is considered a turnkey

operation." Mr. Gosset said. "NYPA would have no involvement in its operation after the dam is repaired or rebuilt."

Figure B.1 – Potsdam-Massena Local Daily Courier Observer Articles

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REDACTED VERSION

Appendix C: Secondary Stakeholder Benefit Figures

Clarkson University met with numerous stakeholders to discuss how the microgrid could affect their businesses and to retrieve information about their profit, revenue, and anticipated losses due to a power outage. Below are preliminary findings from some of the secondary stakeholders.

| | Stakeholder Information | | | | | | |
|--------------------|-------------------------|--|-------------------|------------------|------------------|-----------------------|--|
| | Daily | | | Spoilage | | | |
| Stakeholders | Sales Profit Wages | | Employee Wages | After 4 Hours | After 8 Hours | More than 24 hours | |
| Kinney Drugs* | | | | | | | |
| IGA Grocery Store | | | | | | | |
| The Clarkson Inn** | | | | | | | |
| * | | | | | | | |

In addition, the Project team analyzed societal benefits using the FEMA Benefit Cost Analysis Tool to estimate the social costs of losing the critical services provided by the hospital, fire and police departments, EMS, and water and sewage treatment plants. Below are preliminary findings from the critical services analysis:

| | Daily Loss/Impact | | | | |
|----------------------------|-------------------|------------------|------|----------------------------|--|
| | Total Ser | Loss of vices | Ecor | mpact on nomic Activity | |
| Canton-Potsdam Hospital | | | | | |
| Potsdam Fire Department | | | | | |
| Potsdam Village Police | | | | | |
| Potsdam EMS | | | | | |
| Water Treatment Plant | | | | | |
| Wastewater Treatment Plant | | | | | |

Clarkson University and SUNY Potsdam offer the potential for being shelter sites, which would provide societal benefits to the local population. The Red Cross estimates the daily per person benefit of three meals per day and shelter to be approximately \$50. The range of benefit estimates for the number of people that Clarkson University and SUNY Potsdam could provide shelter for is approximately 100 to 150 people, which results in an estimated total range of benefits of \$10,000 - \$15,000 per day. This number may fluctuate, depending on whether students are on campus and the number of line crews that also need shelter during changes in shifts.