

May 1, 2017

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: FRUIT BELT NEIGHBORHOOD SOLAR REV
DEMONSTRATION PROJECT – Q1 2017 REPORT**

Dear Secretary Burgess:

Niagara Mohawk Power Corporation d/b/a National Grid (“National Grid”) hereby submits for filing its quarterly update to the Fruit Belt Neighborhood Solar REV Demonstration Project Implementation Plan covering the period of January 1, 2017 to March 31, 2017 (“Q1 2017 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 December 2, 2015 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 Fruit Belt Neighborhood Solar REV Demonstration Project.

Respectfully submitted,

/s/ Kara M. Corpus

Karla M. Corpus
Senior Counsel

Enc.

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**Fruit Belt Neighborhood Solar
REV Demonstration
Q1 2017 Report**

May 1, 2017

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1.0 Executive Summary

The Niagara Mohawk Power Corporation d/b/a National Grid (“National Grid”) Fruit Belt Neighborhood Solar REV Demonstration Project (“Demonstration Project” or “Project”), through the partnership with Buffalo Niagara Medical Campus (“BNMC”), Solar Liberty, and the New York State Energy Research and Development Authority (“NYSERDA”), provides solar-generated energy and financial benefits to low-to-moderate income (“LMI”) customers while delivering grid efficiencies to the local electric distribution system. The concentration of one hundred (100) rooftop solar systems totaling 0.5 MW of solar photovoltaic (“PV”) generation capacity within a specific neighborhood provides the technical conditions necessary for exploring grid efficiency as well as the opportunity to build positive relationships with the local residential community, and increase energy awareness and Project participation. Using utility-owned solar PV equipment mounted on residential roofs, participating residents who are National Grid customers will receive a monthly electric bill credit for the lifespan of the solar PV system.

This Demonstration Project will test the following hypotheses:

- Providing solar bill credits to participants in a LMI neighborhood, as well as partnering with NYSERDA to deliver energy efficiency (“EE”) programs to further drive energy bill savings, will have a positive impact on bill payment behavior and enable customers to better manage their arrears.
- Concentrating distributed solar PV resources with reactive power support within a boundary served by a common substation versus scattered deployment of conventional solar PV will deliver measurable grid efficiency benefits.

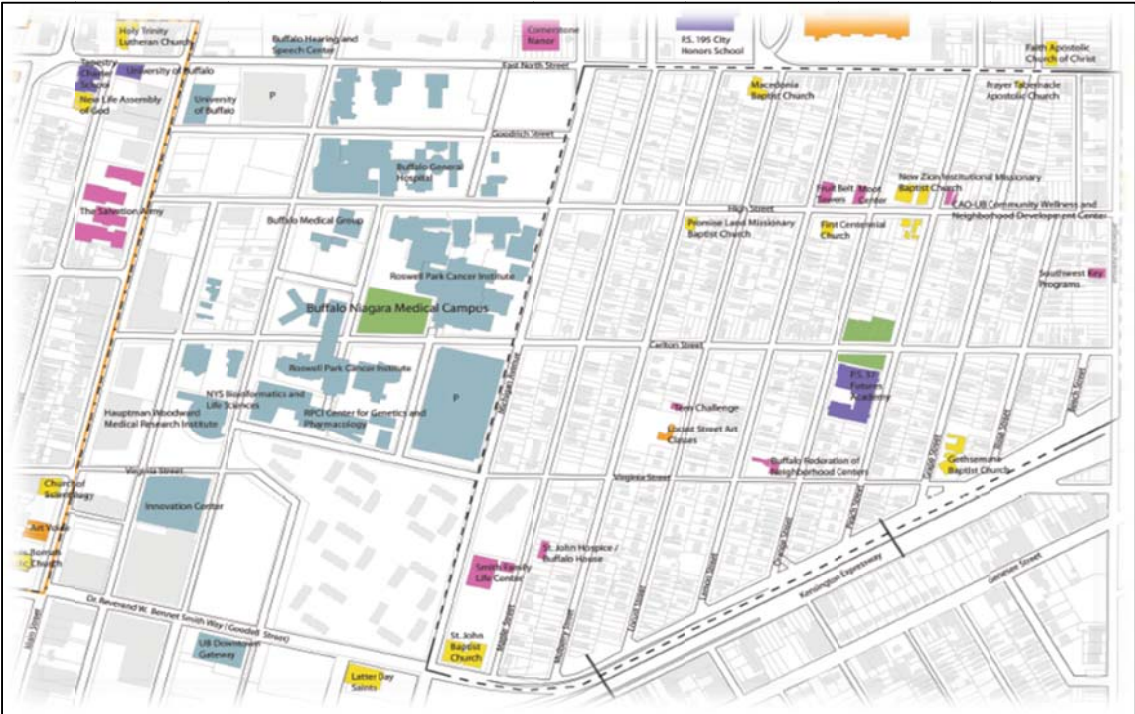


Figure 1-1: Location of the Fruit Belt Neighborhood (dashed perimeter), located adjacent to the Buffalo Niagara Medical Campus

REV Goal Support

The Demonstration Project supports multiple REV goals using an innovative approach to clean energy collection in a residential area. The electricity generated offsets demand for fossil-fuel generated electricity, thereby meeting the REV goal of reducing greenhouse gas emissions. Local energy production adds resiliency to the local grid, and hiring and training local residents on solar PV system sales and installation fulfills yet another REV goal – that of creating new jobs and business opportunities. Collectively, the Demonstration Project's support of multiple REV goals makes it highly valuable in testing the effectiveness of REV objectives as well as modeling how to effectively attain REV goals in a cost-effective, integrated manner.

Progress to Date and Planned 2017 Q2 Goals

Progress continued on this Demonstration Project during Q1 2017 in the areas of customer/non-profit organization engagement; conducting structural, electrical, and roofing reviews and permitting, culminating with the Project's fifth and sixth solar PV system installation and interconnection to the grid, and the installation of a seventh solar PV system. Customer engagement activities completed consisted primarily of in-person meetings with those customers owning a house that require the roof be replaced in order for the house to become solar ready. Solar PV power generation data reporting also continued. A presentation was made to New York State Department of Public Service ("DPS") Staff regarding the option of deploying un-spent solar readiness funds toward a roof replacement to make a house solar ready. General Electric Global Research ("GE"), the consultant contracted to evaluate grid effects resulting from the solar PV installations, completed their draft baseline power use model for one of the of the Project area feeders and is making revisions per National Grid's review. The workforce development process plan, which details the hiring process for two Fruit Belt residents to install solar PV systems, was finalized and the hiring process commenced. Lastly, an analysis of tax credits was conducted to determine what federal and state tax credits are currently available to National Grid under this Project's work scope.

As more fully set forth below, several major efforts are planned for Q2 2017. Additional engagement of religious and non-religious non-profit owned buildings will be pursued to identify additional suitable roof space for solar PV installation within the neighborhood to compensate for reduced opportunities for residential roof deployment. Additionally, engagement of those previously expressing Project interest will continue. Solar PV system installation will be completed at approximately thirty (30) additional houses, pending timely building permit issuance and



minimal weather constraints. The grid efficiency effects evaluation by GE will continue and bill pool lottery participants will continue to be identified. Workforce development will commence with the hiring of local staff to install solar PV systems.

2.0 Highlights Since Previous Quarter

2.1 Major Tasks Completed

- Regulatory Filings:
 - The Q4 2016 quarterly report was prepared and filed with the New York State Public Service Commission on January 31, 2016.
- Community Engagement:
 - Completed customer stewardship efforts consisting of enrolling customers who had previously expressed interest in the Project, establishing appointments, and obtaining customer authorization signatures using a local outreach firm, Threshold, Inc. (“Threshold”).
 - For all houses determined eligible to become solar houses once their roof is replaced or repaired, Threshold visited the owners to offer them the option of using unused solar readiness funds toward their roof replacement, provided they indeed enroll to become a solar PV host.
 - National Grid and Solar Liberty held meetings with five (5) religious organizations and two (2) non-profit organizations owning and operating buildings within the Fruit Belt to offer them the opportunity to host a PV system through the Project.
- Internal Engagement:
 - National Grid’s Specifications for Electrical Installations Committee (“SEIC”) continued its review of the proposed meter collar as a way of connecting the solar PV output to the grid.
 - In preparation for grid efficiency monitoring and evaluation, additional metering must be installed on National Grid’s feeders 3463, 3466, and 3467 located within Substation 34. An internal funding requisition was prepared and submitted for approval. It was subsequently approved, and the engineering design and equipment specification process commenced.
 - Completed a detailed analysis of state and federal tax credit eligibilities for the solar PV systems under current federal and state law to determine if, and to what extent, tax credit amounts may have changed since the initial financial analysis was completed when the Project was in the proposal stage.

- Data Evaluation, Measurement & Verification (“EM&V”):
 - Enphase, Inc. continued to send generation data twice monthly; each deliverable containing either the first fifteen (15) days or second fifteen/sixteen (15/16) days of the previous month’s generation data. National Grid’s New York Pricing Group calculated and published the bill credit amount each month of the quarter.
 - The automated bill credit system underwent an internal audit to verify the proper credit amount was being delivered to the correct recipient. This audit identified one programming flaw. A second electric account, which is for an apartment at a solar PV host house, received the bill credit in addition to the homeowner’s account receiving the bill credit. This issue was immediately remedied.
 - Commenced drafting a method for identifying solar PV bill credit impacts on arrearage accounts.

- Partner Participation:
 - Two (2) separate weekly progress calls with Solar Liberty were conducted each week to ensure timely information flow; one to address overall Project matters and another to address specific installation issues.

 - Solar Liberty:
 - Installed the Project’s fifth, sixth, and seventh solar PV system arrays;
 - Interconnected both the fifth and sixth solar PV system installations to the grid;
 - Conducted thirteen (13) residential and two (2) religious building construction management reviews;
 - Conducted nineteen (19) residential and one (1) religious building structural reviews;
 - Pursued and obtained forty-three (43) electrical one-line drawings;
 - Prepared and submitted twenty-two (22) building permit applications to the City of Buffalo; and
 - Determined five (5) more houses need roof repairs or roof replacement at a cost exceeding the \$2,000 per premise solar-readiness funding.

 - NYSERDA :
 - National Grid and NYSERDA determined they could move forward with a memorandum of understanding (“MOU”) specific to activities conducted under the Project provided the work scope to be executed was detailed and specific. Both parties worked on revising the draft MOU, which is expected to be finalized in Q2 2017.

- GE:
 - GE and National Grid held bi-weekly conference calls, during which GE provided inventories of input data requirements and reported on their progress on model development.



Figure 2-1: A two-person team conducting the customer stewardship effort in the Fruit Belt neighborhood.

- BNMC:
 - National Grid discussed with BNMC the option of involving non-profit organization-owned buildings located within the Project area. BNMC encouraged this possible enrollment, and provided insight on managing the relationship with the some non-profit groups based on their knowledge and working relationships.
- Community Participation:
 - As of the end of the Q1 2017, of the 154 houses proposed by owners to become solar PV system hosts, approximately 59 of those houses are expected to become hosts, with the bulk of those non-host homes rejected on the basis of roof shading and roof size. The following are quantities are reported as of the end of Q1 2017:
 - Fourteen (14) additional customers expressed interest in becoming a solar PV host during this quarter, bringing the overall total to one hundred fifty-five (154) customers.

- One (1) additional house was deemed unfit to host solar PV due to roof size, bringing the total quantity of houses deemed unfit to host solar PV due to shading, roof size, pitch, or orientation, or having a location external to the Project area to sixty-five (65).
- Of the remaining eighty-nine (89) houses:
 - Two (2) solar PV systems were installed and energized during Q1 2017, bringing the total number of solar PV systems installed under the Project to six (6);
 - Twelve (12) houses are currently in the review process for solar PV;
 - Sixteen (16) houses were reviewed and determined to need roofing repairs that cost more than the \$2,000 allocation provided by the Project;
 - During this quarter, an additional six (6) owners of houses needing a roof replacement were offered, and accepted, the roof replacement assistance funding in exchange for replacing their roof and becoming a solar PV host;
 - Nineteen (19) houses are now in the process of building permit application preparation and review;
 - Twenty (20) houses were determined to be build-ready and are scheduled for installation in Q2 2017;
 - Five (5) houses are owned by customers currently evaluating whether or not they want to participate in the Project; and
 - Four (4) homeowners opted out of the Project for personal reasons.
- Held a series of meetings with the executive director of the Fruit Belt Coalition to obtain contact information for the churches and non-profits in the Project area.
- Presentations were made at five (5) church organizations and one (1) non-religious non-profit organization that owns two (2) buildings to encourage enrollment in the Project. As noted in the Q4 2016 report, inclusion of these roofs is necessary to reach the Project's goal of 500 kW of installed PV generation capacity, as an insufficient quantity of qualified roofs have been enrolled in the Project. The Project area was found to have fewer qualified roofs than what was originally expected, as the initial estimate was calculated prior to the City of Buffalo enacting a solar panel set-back requirement and prior to Solar Liberty conducting a ground-truth survey of all housing stock in the Project area. To date, the non-profit organization owning two (2) buildings has enrolled, two (2) churches have enrolled and two (2) additional churches are still considering whether to join the Project. The Project team learned during a meeting with the fifth church that they already have a large-scale solar project planned, which already includes another church, a non-religious non-profit building and three houses. Therefore, they opted out of Project enrollment.

- Worked with the Fruit Belt Coalition to obtain names of local residents interested in applying for a solar PV system installer position.
- Meetings with the churches revealed interest of one (1) church to enroll two (2) houses it owns in the Project area. Both houses have been enrolled. Another church stated it may be interested in enrolling several houses it owns in the Project area, provided those houses have sufficient roof size to participate.
- A follow-up discussion was held with DPS Staff regarding use of the \$2,000 solar readiness funds as a contribution to roof replacement. The discussion concluded with permission for National Grid to offer any remaining unused portion of the \$2,000 solar readiness fund as a contribution to roof replacement, should roof replacement be required for a building to become solar ready. This incentive offering is available to all home owners of premises located within the Project area that need a new roof to become solar ready. It requires the home owner to commit to becoming a solar PV host; and it shall only be paid out following a post-installation review by Solar Liberty. All home owners previously identified as owning a house that required a new roof were re-visited and informed of this new offering. To date, owners of fifteen (15) houses have chosen to move forward with roof replacement as a function of this incentive.
- Developed a post-implementation documentation worksheet to document roof replacement done in preparation for becoming a solar PV host.
- Developed and distributed a solar PV hosting process flow chart to enable enrollees to visualize the various steps in the overall Project process.
- Researched potential inclusion of the two (2) public schools located in the Project area: Futures Academy (also referred to as Public School 37), located on Carlton Street; and City Honors, located on East North Street. The roof of Futures Academy was found to be suitable; however, it was also found to already be enrolled in a solar program being undertaken by the City of Buffalo. Review of the City Honor's roof indicated it is not suitable for solar PV.

2.2 Key Metrics

Key Project metrics were developed based on the data needs and the proposed work scope. The ability of the selected equipment and systems to provide the key metric data was verified. Attached Appendix C contains the Key Metric Reporting Matrix. Q1 2017 activities consisted primarily of field inspections, building permit document development and submittal and continued customer engagement. The fifth and sixth solar PV systems were installed and twenty (20) more systems were permitted and are ready to be installed.

2.3 Challenges, Changes, and Lessons Learned This Quarter

Challenge or Change	What was the Resulting Change to Scope/Timeline?	Strategies to Resolve	Lessons Learned
<p>Connecting the solar PV system to the grid at houses with underground feeds require a power disconnection/reconnection at the pole.</p>	<p>Connection was slightly delayed because the electrical contractor did not file a service disconnection/reconnection request with National Grid's Overhead Line Department.</p>	<p>Require turnkey solar PV contractor to require its electrical contractor to review electrical one-line drawing at the time of building permit issuance, and to file a service disconnection/reconnection request if needed.</p>	<p>File a disconnect/reconnect order with National Grid's Overhead Line Department three (3) weeks in advance of planned solar PV installation date.</p>
<p>Additional customer and community priorities/needs were learned during the field effort after the Project work scope had been finalized. Work scope did not address roofing financial assistance needs or electrical code non-compliance issues found at some houses.</p>	<p>Project work scope alterations to better meet customer needs were made after the October 2016 canvassing effort. This led to re-visiting some select customers in Q1 2017.</p>	<p>Identify local community organizations; meet with them and solicit citizen concerns and priorities during the Project design phase.</p>	<p>Engaging local community organizations early in the Project enables alignment of the work scope with community concerns and priorities.</p>
<p>Many home owners who are willing to become a solar PV host cannot do so without first replacing their roof, and they require financial assistance to make the roof investment.</p>	<p>The project enrollment was falling short of its solar PV host goal.</p>	<p>Plan to offer remaining solar-readiness funds not used for electrical or structural upgrades to instead be used as a contribution toward roof replacement, provided the home owner commits to hosting a solar PV system.</p>	<p>Applying solar-readiness funds not used for electrical or structural upgrades as a contribution toward roof replacement provides an attractive incentive to become a solar PV host.</p>

<p>Some residents receiving roof replacement financial assistance through the Project were not aware the assistance is considered income by the Internal Revenue Service (“IRS”).</p>	<p>Any roofing assistance application is placed on hold until a signed W-9 form is received.</p>	<p>Include a statement on the roofing assistance form created for this Project and provided to customers considering roof replacement, that financial assistance is income and recipients are required to complete a W-9 form at the time of Project enrollment.</p>	<p>Ensure residents seeking roof replacement financial assistance from this Project understand the assistance is classified as income by the IRS by providing a written fact sheet about the assistance and requiring them to complete a W-9 form at the time of Project enrollment.</p>
<p>Project solar-readiness funds are to be used strictly for solar readiness, but some potential solar PV system hosts seek to have National Grid make upgrades or repairs unrelated to the solar PV system installation.</p>	<p>Customers may delay submitting a signed host agreement if they believe repairs or upgrades unrelated to the Project should be made by National Grid.</p>	<p>Provide each potential solar PV host enrollee a concise fact sheet explicitly listing items eligible for upgrading to make a house solar ready. State on this sheet “no other upgrades or repairs will be made by National Grid as part of the Project.”</p>	<p>Providing each potential solar PV host enrollee a concise fact sheet explicitly listing items eligible for upgrading to make a house solar ready minimizes customer requests to use Project funds to address items unrelated to hosting a solar PV system at their house.</p>
<p>Customers are provided several Project documents over the course of a few months and may not be successful in keeping those documents orderly and readily accessible.</p>	<p>Customer field visits are lengthier when customers cannot locate documents they were asked to read, and in some cases, sign.</p>	<p>Provide each potential solar PV host enrollee with a Project folder containing documents they need to read and/or sign, as well as note paper to record key information.</p>	<p>Providing a Project folder with Project note-paper helps the customer keep his/her relevant Project documentation orderly and available.</p>
<p>Some Project steps requiring several weeks are conducted without contact with the customer. Thus, a few months can elapse between customer contact events, leading to some customers wondering about the Project status.</p>	<p>The contractor’s Project manager spends time fielding calls on an installation’s status and explaining the overall application review and permitting process to customers.</p>	<p>Provide to each solar PV host enrollee a flow chart showing the various Project steps and listing approximate durations between each step.</p>	<p>Providing to customers a flow chart listing Project steps and approximate durations between those steps helps set customer expectations for the Project timeframe.</p>

3.0 Next Quarter Forecast

Annotated below are the status of the open checkpoints and milestones stated in the January 4, 2016 Implementation Plan, with dates stated in this Q1 2017 Report.

As noted in the Q4 2016 Report, as the Customer/Stakeholder Outreach Phase 1 (Awareness) and Phase 2 (Enrollment) efforts were undertaken during Q2 2016 and Q3 2016, it became evident that these phases are actually occurring simultaneously, with enrollment occurring as an output of these efforts. Also note that the Phase 3 (Installation) Outreach efforts commenced upon the customer's initial expression of interest and continue throughout the analysis, permitting, and installation processes. This differs from the Implementation Plan, which indicates all customers would first be identified, with installation to immediately follow thereafter.

Table 3.1 Checkpoints/Milestone Progress

	Checkpoint/Milestone	Anticipated Start/End Date Stated in Q4 2016 Report	Revised Start-End Date	Status
1	Finalize contracts with Partners	08/16	<i>Completed</i>	●
2	Customer/Stakeholder Outreach: Phase 1: Community Meetings	04/16- 06/16	<i>Unchanged</i>	●
3	Customer/Stakeholder Outreach: Phase 2: Enrollment	04/16-08/17	<i>Unchanged</i>	●
4	Customer/Stakeholder Outreach Phase 3: Installation	10/16-11/17	<i>Unchanged</i>	●
5	Solar PV Assessments	05/16- 08/17	<i>Unchanged</i>	●
6	Site Selection and Design	01/16 – 8/17	<i>Unchanged</i>	●
7	Meter Installation	07/16-4/17	<i>Unchanged</i>	●
8	Permitting	06/16 -10/17	<i>Unchanged</i>	●
9	Solar PV Installation	06/16-11/17	<i>Unchanged</i>	●
10	Interconnection	07/16-11/17	<i>Unchanged</i>	●
11	Bill Credits Administrated	08/16 ongoing	<i>Unchanged</i>	●
12	Solar Workforce Hiring	03/17-04/17	<i>Unchanged</i>	●
13	GE Commissioning and Grid Monitoring	10/16 – Q1 2019	<i>Unchanged</i>	●
14	Internal Systems Capability	10/15-11/17	<i>Unchanged</i>	●

KEY

- On Track
- Delayed start, at risk of on-time completion; or over-budget
- Terminated/abandoned Checkpoint

1. Partner Contracts Executed.

Status: ● [Completed]

National Grid's contract with GE was signed in Q3 2016. No further action on this task is required. The Solar Liberty contract was previously executed.

2. Customer/Stakeholder Outreach: Phase 1: Community Meetings.

Status: ● [Ongoing]

Outreach and Education Phase 1 continued in Q1 2017 to drive Project enrollment. Phase 1 efforts consisted of continuing the individual customer visits to two (2) different customer groups: those who had previously expressed interest but had not provided the required documentation or access permission; and those needing a roof replacement and needed to learn about the Project's roofing financial assistance offering. In addition, Project representatives continued to provide information to potential and existing participants regarding enrollment, billing credits, educational resources, workforce development, solar PV, and energy efficiency.

All targets for Q1 2017 were met.

Targets/Actuals in Q1 2017:

- Target: Conduct customer stewardship consisting of re-visiting customers failing to show up to a site visit or structural review appointment.
 - Actual: Conducted stewardship outreach efforts to all customers previously expressing interest but who had not yet scheduled a site visit or a structural review appointment.
- Target: Via the customer stewardship effort, obtain host agreement signatures on 90% of the houses declared solar ready during the quarter.
 - Actual: Obtained host agreement signatures from 100% of all customers declared solar ready during the quarter, and also obtained host agreement signatures from the two (2) solar ready customers remaining at the end of Q4 2016.
- Target: Conduct outreach to buildings owned by non-profit corporations located within the Project area, present Project participation options, and secure execution of host agreements from 50% of the non-profit owners successfully visited. Conduct further viability assessment of the two public schools located in the project area, and provided they are viable solar PV system hosts, conduct as many as three (3) meetings with each school's staff to pursue Project enrollment.
 - Actual:
 - Contacted 100% of the churches and non-religious non-profit organizations.
 - Met with leadership of six (6) of the nine (9) religious buildings and three (3) of the four (4) non-religious nonprofit-owned buildings located within the Project area. Obtained signed access agreements for one (1) of the churches and for two (2) non-religious non-profit organization owned buildings. Determined that two (2) other church buildings and one (1) non-religious nonprofit-owned building are currently included in another solar PV project in the planning stage. No host agreement signatures were obtained during this quarter.

- Determined that School 37 was previously enrolled in a solar project through the City of Buffalo School District. Therefore, no further attempts to enroll this school in the Project will be made.

Targets in Q2 2017:

- Target: Conduct customer stewardship efforts consisting of visiting customers needing a roof replacement to become solar ready to determine if they wish to utilize the Project's financial assistance toward replacing their roof. Obtain a signed W-9 form from those who do wish to receive such funds.
- Target: Reach all of the religious and non-religious organizations owning buildings within the Project area who have not previously determined if they wish to enroll their buildings in the Project. For those who wish to enroll, obtain a signed access agreement and proceed to conduct the appropriate next steps in the Project process.

Solutions/strategies in the event results are below expectations:

As of the end of Q1 2017, the estimated total kW committed, or expected to commit to join the Project is 376 kW. If all three (3) of the remaining churches commit to becoming a solar PV host for all of their respective buildings, the Project would still fall short of its 500 target kW total by approximately 75 kW. Some of the remaining capacity needed may be derived from home owners with roofs needing repair, and who, to date, have not committed to do the repair. Additionally, some home owners who have qualified houses but have not yet committed, may choose to join the Project. If a kW shortfall still exists after exhausting these sources, National Grid will then evaluate the potential of including residences and nonprofit-owned buildings abutting the exterior perimeter of the Project area, and which are served by the same three (3) electric feeders serving the Fruit Belt neighborhood. Two (2) churches and three (3) residences could become enrolled through this approach. Based on preliminary reviews of those roofs, it appears they are large enough to collectively house the balance of kW needed to meet the project's 500kW solar PV goal.

3. Customer/Stakeholder Outreach: Phase 2: Enrollment.

Status: ● [Ongoing]

Enrollment continued during this quarter, and focused primarily on religious and non-religious nonprofit-owned buildings. As first noted in the Q4 2016 report, enrollment of a greater number of roofs capable of hosting >5 kW results in meeting the 500kW installed goal via fewer houses. The enrollment endpoint definition was modified to "a maximum of 500 kW of installed solar on a maximum of 100 "solar-ready" houses and nonprofit-owned buildings."

Targets/Actuals in Q1 2017:

- Target: Five (5) non-profit organizations sign an Access Agreement and enroll as Tier I.
 - Actual: Obtained signed access agreements for one of the (1) churches and from two (2) non-religious nonprofit-owned buildings.

- Target: Provided the MOU between NYSERDA and National Grid has been executed, fifty (50) participants are referred to NYSERDA's residential energy efficiency programs, including the EmPower New York program.
 - Actual: The MOU between National Grid and NYSERDA has not yet been signed.

Target in Q2 2017:

- Target: Obtain a signed access agreement to enroll three (3) religious or non-religious non-profit buildings into the Project.
- Obtain a Project enrollment commitment for eight (8) houses currently needing a roof repair or replacement.
- Execute the MOU between National Grid and NYSERDA.

Solutions/strategies in the event results are below expectations:

If, after all churches and non-profit organizations in the Project area have been contacted, the participation level, as measured in kW, is projected to be less than 500 kW, National Grid and the Project partners will plan a series of block club meetings, distribute additional collateral materials, and engage existing solar PV host home owners to encourage neighbor participation.



Figure 3-1: Performing a current check prior to installing a dedicated meter on the Solar PV system.

4. Customer/Stakeholder Outreach: Phase 3: Installation.

Status: ● [Ongoing]

Customer engagement activities continue throughout the solar PV host approval process for each homeowner who signed up to participate in the Project.

Targets/Actuals in Q1 2017:

- Target: Maintain positive engagement throughout the installation scheduling and implementation process with each home owner and other types of property owners throughout the review and permitting process.
 - Actual: Maintained contact with almost all home owners enrolled as the houses progressed through the review and permitting process.
- Maintain engagement with enrolled and permitted customers who are awaiting installation to occur once the weather permits installation.
 - Actual: Solar Liberty maintained contact with permitted customers, and was able to identify likely installation dates that are acceptable to those customers in the upcoming construction season, commencing at the beginning of the next quarter.

Target in Q2 2017:

- Target: Continue to maintain positive engagement throughout the installation, scheduling, and implementation process with each home owner enrolled to host a solar PV system.



Figure 3-2: Installing the second rooftop solar PV system in the Fruit Belt neighborhood

5. Solar Assessments.

Status: ● [Ongoing]

Curbside assessments continued to be conducted at each house for which the owner expresses interest, and for which the Google review shows to be viable. This process will be continued until 500 kW of rooftop solar PV systems are secured via host agreements. Structural assessments, which are conducted following the curbside review and are thus not part of the target/actual evaluation criteria, are conducted by a third-party engineer.

Targets/Actuals in Q1 2017:

- Target: Complete a Project cumulative total of eighty (80) initial solar PV site assessments.
 - Actual: The cumulative quantity of solar PV solar assessments conducted from inception through the end of Q1 2017 was eighty-seven (87).
 - Actual: Completed one (1) nonprofit-owned site assessment.
- Target: Complete a Project cumulative total of sixty (60) structural assessments.
 - Actual: The cumulative quantity of solar PV structural assessments conducted from inception through the end of Q1 2017 is fifty-seven (57).
- Target: Complete a Project cumulative total of sixty (60) roof assessments.
 - Actual: The cumulative quantity of solar PV roof assessments conducted from inception through the end of Q1 2017 is seventy-eight (78).
 - Actual: Completed one (1) nonprofit-owned roof assessment.

Target in Q2 2017:

- Complete a Project cumulative total of ninety (90) residential and five (5) nonprofit-owned initial solar PV site assessments.
- Complete a Project cumulative total of sixty (60) residential and four (4) nonprofit-owned structural assessments.
- Complete a Project cumulative total of sixty-five (80) residential and six (6) nonprofit-owned building roof assessments.

Solutions/strategies in the event results are below expectations:

If the solar PV assessment quantity is low due to the contractor's efforts, National Grid will meet with the contractor and request additional staffing resources be placed on the job and require them to conduct the curbside and roof assessments within ten (10) days of customer enrollment. Structural assessments require coordination with the customer to permit entry into the house, thus the structural assessment step most always requires more than ten (10) business days to complete. National Grid will request its stewardship contractor, Threshold, meet with customers needing a structural analysis and together, call the structural engineer to schedule a structural review at a mutually agreeable date/time.

6. Site Selection and Design

Status: ● [Ongoing]

A solar array design (site plan) is prepared for each residence and nonprofit-owned building for which the owner expressed interest, and is deemed eligible following completion of the curbside solar assessment process and the roof assessment.

Targets/Actuals in Q1 2017:

- Target: Continue to design a site plan for each home and/or nonprofit-owned building at which a curbside review shows the building to likely be solar eligible.
 - Actual: A site plan was completed for each home at which a curbside review was completed and which showed the house likely to be solar eligible.
 - Actual: A site plan was completed for each non-profit building considered for solicitation to enroll in the Project.

Target in Q2 2017:

Continue to design a site plan for each home or other building at which a curbside review shows the structure to likely be solar eligible.

Solutions/strategies in the event results are below expectations:

- Site plan development will continue in the next quarter for those buildings whose owners express interest, which pass the solar screening assessment, and which pass the roofing assessment. Site plans for which insufficient development time remains prior to the quarter end will be finalized in the following quarter.

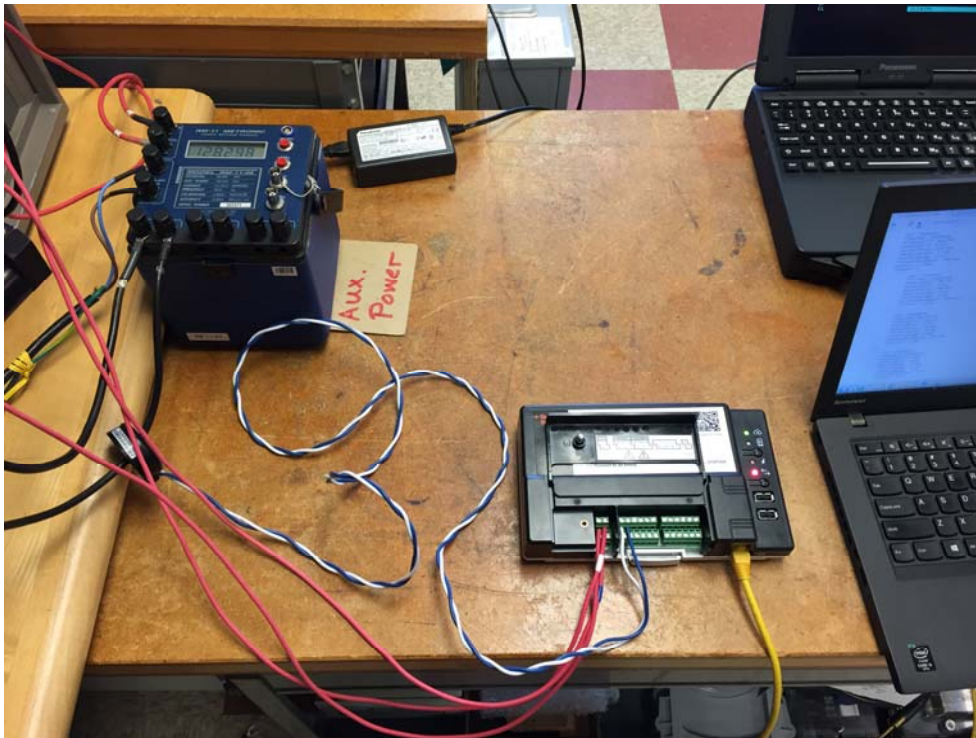


Figure 3-3: Four tests conducted using the Enphase meter showed it met the minimum accuracy required by the ANSI C12.20 standard.

7. Meter Installation

Status: ● [(Revised) 3/31/2017]

The Project plan was adjusted in Q4 2016 to install a meter separate from the Enphase electronic meter in five (5) of the proposed one hundred (100) solar PV systems. These will be installed as a check on the Enphase metering system. Four (4) solar PV systems had already been built in Q4 2016, and building permit applications for three (3) PV systems had already been submitted to the City of Buffalo prior to the option of installing the single Enphase meter was provided. Due to the lengthy building permit review process, the decision was made not re-draw the electrical one-line diagrams and then re-submit these building permit applications for approval. Rather, there will now be seven (7) houses equipped with a secondary electrical meter in addition to the Enphase electronic meter.

Targets/Actuals in Q1 2017:

- Target: Secondary meters will be installed on the fifth, sixth, and seventh of the seven (7) PV systems proposed for having two (2) meters, weather permitting.;
 - Actual: A second meter was installed on the fifth and sixth system. While the meter installation was scheduled for the seventh solar PV system, the lack of a City of Buffalo inspection, as well as inclement weather, prevented the 7th meter from being installed by the end of the quarter.
- Target: 100% of solar PV panel arrays are connected and being metered within ten (10) business days of completing solar PV system installation.
 - Actual: Six (6) of the seven (7) systems were connected within ten (10) business days of installation. The seventh system is on track to be installed within ten (10) business days of installation. However, that date falls within the next quarter.

Target in Q2 2017:

- A secondary meter will be installed on the seventh of the seven (7) PV systems.
- All solar PV systems installed in Q2 2017 will be connected within five (5) business days following the City of Buffalo's post-construction review of a the installed solar PV system.

Solutions/strategies in the event results are below expectations:

- Since the next systems only utilize an Envoy system with no secondary meter, and with the Envoy meter being part of the solar PV panel installation, delays in meter installation are not expected. If a solar PV panel system is not active within ten (10) days of installation completion, National Grid will first communicate with Solar Liberty and Enphase to determine what is preventing the timely interconnection, and will then address the findings so that all subsequent solar PV systems are active within the ten (10) day timeframe. Following commissioning, to the extent feasible by National Grid and its contractors, the root cause of the delay will be determined and a plan will be made to both prevent this delay from occurring again. Also, methods to prevent delays and mitigate existing delays will be published in a 'lessons learned' list.



Figure 3-4: Use of safety harnesses by all roof workers is one of several safety protocols followed by the contractor's field installation crews.

8. Permitting

Status: ● [Ongoing]

Solar Liberty strives to submit permit applications to the City of Buffalo within three (3) weeks following receipt of a signed host agreement. This time frame is dependent on Solar Liberty's design contractor completing a one-line drawing for each system.

The City of Buffalo Building Department staff report that permitting typically takes four (4) to six (6) weeks. However, part way through this quarter, the City imposed new information requirements for all building permit applications, including applications that had been previously submitted but not approved. Solar Liberty provided the required information, and the updated building applications were approved.

Targets/Actuals in Q1 2017:

- Target: All building permit applications to be issued within four (4) weeks of submittal to the City of Buffalo.
 - Actual: Six (6) permits were issued within six (6) weeks, and five (5) permits were issued within four (4) weeks.
- Target: Notify the City of Buffalo Building Department approximately one (1) week in advance of each permit submittal; advise them of the quantity of permit applications they should expect, and provide applications in groups, if feasible.
 - Actual: Solar Liberty did not advise the City of Buffalo in advance of permit submittal. However, they did submit permit applications in small groups of four (4) to five (5), so as not to overwhelm the City's Building Department.

Target in Q2 2017

- Target: Continue to submit building permit applications to the City of Buffalo Building Department in small groups of no more than five (5).

Solutions/strategies in the event results are below expectations:

Hold a third project meeting with the City of Buffalo Building Department to discuss the rate of building permit application review. Determine what else can be done by Solar Liberty to facilitate the permit application review process.

9. Solar Installation**Status:** ● [Ongoing]

As of the end of Q1 2017, six (6) solar PV system installations had been completed. A seventh system has been installed, but the City of Buffalo did not conduct its inspection until after the quarter had ended. This system will be connected in Q2 2017.

Targets/Actuals in Q1 2017:

- Target: Install three (3) rooftop solar PV systems, based on anticipated winter weather conditions and the time frame required for the City of Buffalo to complete its review of building permit applications. Installation is also heavily dependent on weather conditions during the quarter, as noted under Milestone 7, above.
 - Actual: Three (3) rooftop solar PV systems were installed, although only two (2) were connected this quarter. The last system (the seventh system to be installed in the overall Project), could not be connected due within this quarter because the City of Buffalo had not completed its inspection by quarter's end.

Target in Q2 2017:

- Connect the seventh system installed in Q1 2017.
- Install thirty (30) residential rooftop solar PV systems and one (1) nonprofit-owned building rooftop solar system.
- Connect twenty-five(25) of the thirty (30) new systems to the electric grid by the end of Q2 2017, as the connection process typically requires two (2) weeks to undertake following system installation, and requires obtaining an inspection by the City of Buffalo's Building Department.

Solutions/strategies in the event results are below expectations:

National Grid will meet with Solar Liberty to identify what issues prevent shorter analysis times and what solutions can be implemented to decrease the turnaround time. If the issue lies with one of their contractors, National Grid will ask Solar Liberty to meet with those contractors to analyze the situation and determine viable solutions to increase the pace of installations.

10. Interconnection**Status:** ● [Revised: 07/16 – 11/17]

Interconnection of two (2) installed rooftop systems was completed in Q1 2017.

Targets/Actuals in Q1 2017:

- Target: Complete, or schedule for completion, each solar PV system interconnection within five (5) business days of installation.
 - Actual: Connected two (2) solar PV systems to the grid within five (5) day of the meter being set. Meter setting is scheduled following the City of Buffalo completing its electrical inspection.

Target in Q2 2017:

- Complete, or schedule for completion, each solar PV system interconnection within five (5) business days of the City of Buffalo completing its electrical inspection.

Solutions/strategies in the event results are below expectations:

Delays in scheduling or conducting interconnections are not anticipated at this time.

11. Bill Credits Administered.

Status: ● [(Revised) 08/2016 ongoing]

The billing system to calculate and distribute the billing credit was created in Q1 2016.

Targets/Actuals in Q1 2017:

- Target: Distribute all bill credits for the previous month's solar PV credit using the designed bill credit system.
 - Actual: Monthly bill credits are being generated and issued for each of the six (6) solar PV systems installed and commissioned to date.

Target in Q2 2017:

- Target: Continue to distribute all bill credits for the previous month's solar PV credit using the designed bill credit system.

Solutions/strategies in the event results are below expectations: Once identified, any issue with the bill credit system will be reviewed and resolved as soon as feasible.

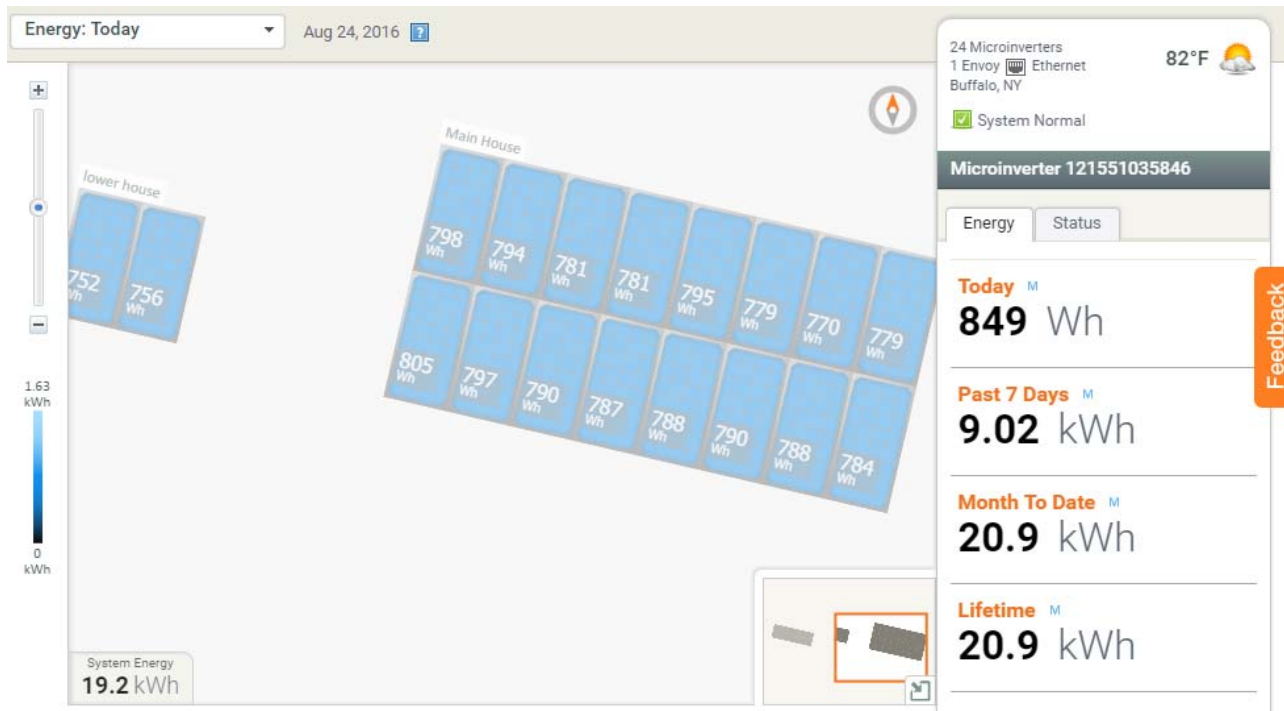


Figure 3-5: The Enphase metering system is capable of concurrently reporting the output of each individual PV panel.

12. Workforce Development (Recruitment of Local Solar PV Employees)

Status: ● [(Revised) Q4 2016]

Solar Liberty had previously worked with BNMC (in Q3 2016) to evaluate options for identifying and hiring local employee candidates. A hiring source for eligible candidates was selected. The Buffalo Federation of Neighborhood Centers, Inc., which has its main office in the Fruit Belt, was also contacted to identify additional candidates for solar PV installation positions.

Targets/Actuals in Q1 2017:

- Target: Post one (1) job position and identify eligible candidates;
 - Actual: One (1) job posting was prepared during this quarter and submitted to the hiring entity, Tradesman International, Inc. ("Tradesman").
 - Actual: Discussions were held with the Fruit Belt Coalition to solicit their help in identifying viable candidates for solar PV system installers. Two (2) candidates were identified, and their resumes were submitted to Tradesman.

Target in Q2 2017:

- Tradesman will interview eligible candidates and select at least one (1) candidate to be hired for Solar Liberty's work force.

Solutions/strategies in the event results are below expectations:

Solar Liberty will maintain communication with BNMC to explore hiring alternatives if the proposed hiring processes prove ineffective for identifying viable, qualified candidates.

13. GE Commissioning and Grid Monitoring.**Status:** ● **[[Ongoing]]**

GE grid efficiency analysis consists of feeder modeling and simulation, controls integration, and grid testing.

Targets/Actuals in Q1 2017:

- Target: GE to complete baseline development.
 - Actual: Completed validation of the feeder F3466 baseline model using current and voltage measurements taken in field at locations indicated.
 - Actual: Completed development of the PV systems models including source size, impedance and location identification relative to the baseline model (PV model parameters are subject to change following update of the PV participants and systems size).
- Target: GE to validate the model performance using voltage, power and current measurements at specified nodes along the network.
 - Actual: GE validated the model performance using voltage, power and current measurements at specified nodes along the network.
 - Actual: Commenced study of the use of case scenarios for F3466 including scenario 1 (pf =1) and scenario 2 (pf =0.9).

Target in Q2 2017:

- Complete baseline model for feeders 3463 and feeder 3467.
- Complete baseline analysis for feeders F3463 and F3467.
- Complete study of use case scenarios 1 and 2 for feeders F3463 and F3467.
- Finalize analysis of F3466 including use case scenario 3 (centralized control of PV systems – not design of the controller).

14. Internal Systems Capability.**Status:** ● **[[Ongoing]]**

The toll-free number continued to operate in Q1 2017. The Sanction Paper, an internal document used by National Grid for cost authorization, was previously completed in Q3 2016. The capital cost included in that paper was based on a preliminary budget prior to the Implementation Plan finalization. The Sanction Paper will require updating per the budget values listed in the final Implementation Plan.

Targets/Actuals in Q1 2017:

- Maintain internal systems in working condition.
 - Actual: The internal systems were maintained in working order.
- Update the National Grid Sanction paper using the capital cost listed in the final Implementation Plan budget.
 - Actual: The sanction paper was not revised, as National Grid intends to reclassify the Project's implementation labor expense from being an operational expense ("Opex") to a capital expense ("Capex"), as the Project's final Implementation Plan erroneously classified all labor as Opex.

Target in Q2 2017:

- Maintain internal systems in working condition.
- Update the National Grid Sanction paper to include the all contracted installation costs (such as those of Solar Liberty), as well as the labor expenses associated with National Grid's installation labor

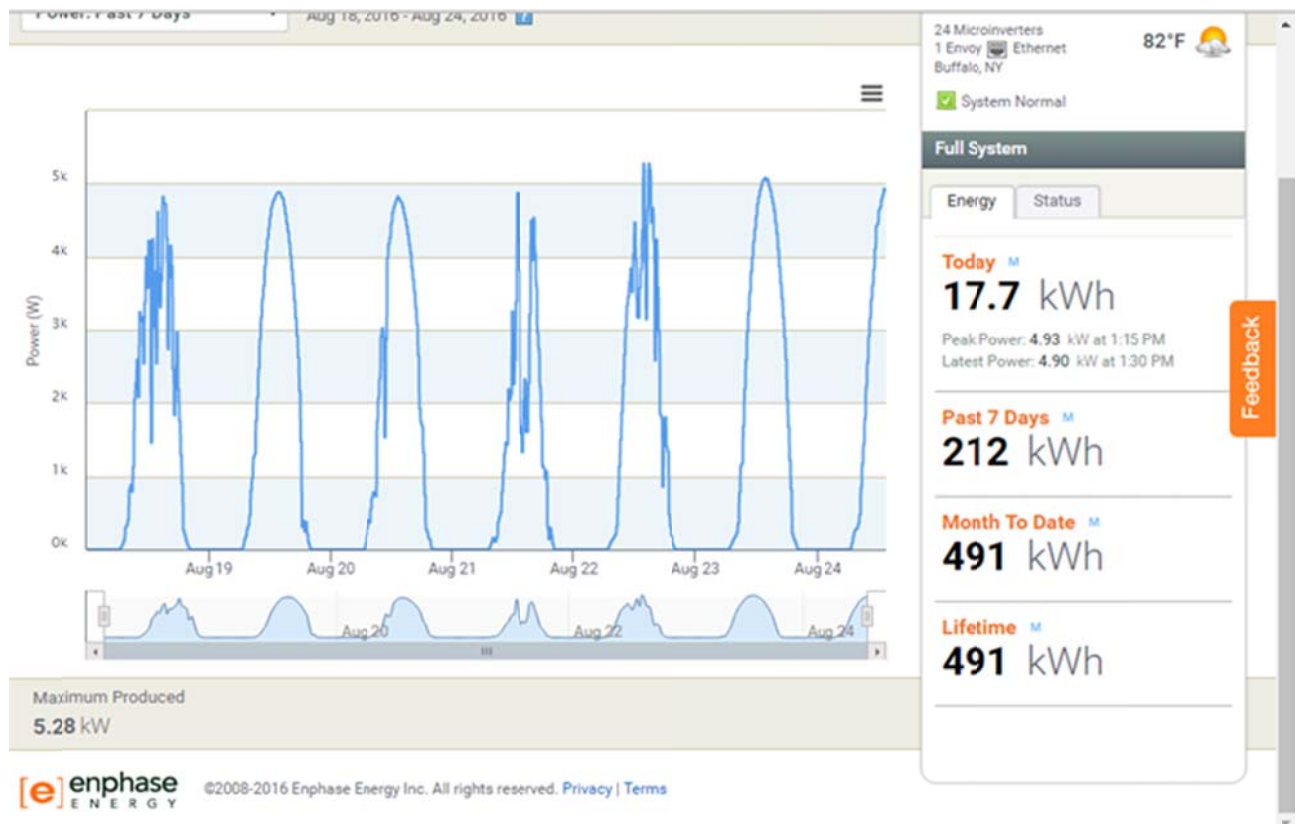


Figure 3-6: The Enphase system provides multiple reporting displays, including a 7-day total daily output graph.

4.0 Work Plan & Budget Review

4.1 Updated Work Plan

The overall Project work scope and work plan have been adjusted per field findings. Updates include:

- Incorporating into the Project religious and non-religious non-profit owned buildings located within the Project area.
- Use of solar readiness funding as roofing replacement assistance.
- Using an alternative PV system interconnection, as the meter collar had not yet been approved.

The Project timeline has changed due to the delays mentioned in previous project quarterly reports. See Appendix A, Figure A-1.

4.2 Updated Budget

The following items may impact the budget as they remain unresolved as of the end of Q1 2017.

1. The meter collar connection equipment proposed for use in this Project was not approved by National Grid. The incremental cost for interconnecting houses or other buildings using the dedicated service entrance cable without a dedicated meter channel will cost an additional \$1,152 per structure or cumulatively, \$107,136 if the expected remaining ninety-three (93) houses/buildings are connected using this approach.

Solutions:

The following solution is proposed:

- Continue to design solar PV systems using a dedicated service entrance cable.

The Project budget is presented below:

**Fruit Belt Neighborhood Solar
Quarterly Budget Status
Q1 2017**

Operational Expenditures					
Task	Incremental Cost Budget	Incremental and Non- Incremental Quarterly Spend	Incremental and Non- Incremental Spend to Date	Incremental and Non- Incremental <u>Total</u> Expected Completion Cost	Total Spend Versus <u>Incremental</u> Budget Variance
General Administration and Planning	\$ 30,000	\$ 40,315	\$ 148,812	\$ 330,000	\$ (300,000)
Marketing and Community Engagement	\$ 250,000	\$ 51,059	\$ 133,467	\$ 150,000	\$ 100,000
Incentives	\$ -	\$ -	\$ -	\$ -	\$ -
Implementation	\$ 1,777,200	\$ 17,329	\$ 41,141	\$ 1,777,200	\$ -
Evaluation & Analysis	\$ 325,000	\$ 50,000	\$ 50,000	\$ 300,000	\$ 25,000
Totals:	\$ 2,382,200	\$ 158,703	\$ 373,420	\$ 2,557,200	\$ (175,000)
Capital Expenditures					
100 Solar PV Systems	\$ 1,410,000	\$ 76,447	\$ 195,939	\$ 1,410,000	\$ -
Totals:	\$ 1,410,000	\$ 76,447	\$ 195,939	\$ 1,410,000	\$ -
Project Totals:	\$ 3,792,200	\$ 235,150	\$ 569,359	\$ 3,967,200	\$ (175,000)

As noted in previous quarterly reports, the final equipment vendors selected resulted in a lower Project material cost. The additional cost of the solar PV panel removal and re-installation during any future roof repairs/replacements, as well as the cost of removing the solar PV panels after twenty-five (25) years of service, will be derived from re-allocating some funds originally budgeted for those material costs. Therefore, a budget increase for future solar PV panel removal/replacement will not be sought at this time.

Project costs reported above are total incremental and non-incremental costs, while the budget values listed are the incremental cost only. Total task budget costs consisting of combined incremental and non-incremental costs have not been developed. This Project's total incremental costs as of March 31, 2017 were \$338,609.33.

5.0 Progress Metrics

Appendix B presents key Project metric tracking data available as of the end of Q1 2017. Note that arrears payment data is not available in this quarter because the first solar PV systems were not installed at locations where customers were in arrears. Additional fields have been added to better display the arrears data once arrears data is generated. Also, tier description fields were added to more accurately reflect true Tier enrollment status.

Appendices

Appendix A: Updated Gantt Chart (as of the end of Q1 2017)

Table A.1 – Updated Gantt Chart

Description	Ownership	2015				2016								2017															
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Project Management																													
Develop/Finalize Implementation Pla	P. Austen (NGrid)																												
Finalize contracts with partners	J. Spring (NGrid)																												
Project Kick Off	P. Austen (NGrid)																												
Customer/Stakeholder Outreach																													
Phase 1 - Awareness	S. Brady (NGrid)																												
Phase 2 - Enrollment	J. Nickerson (Ngrid)																												
Phase 3 - Installation	J. Nickerson (Ngrid)																												
Solar Host Site Selection																													
Solar Assessments	R. Gauchat (Solar																												
Site Selection and Design	R. Gauchat (Solar																												
Solar Installation																													
Meter Installation	R. Gauchat (Solar																												
Permitting	R. Gauchat (Solar																												
Solar Installation	R. Gauchat (Solar																												
Billing System Prep for Solar Credits																													
Billing to determine requirements	M. Wilder (NGrid)																												
IS to perform changes to billing syste	M. Wilder (NGrid)																												
Workforce Development																													
Recruit local labor	R. Gauchat (Solar																												
Training program	R. Gauchat (Solar																												
Commissioning and Grid Monitoring																													
Feeder Modeling and Simulation	C. Burns (NGrid) & GE																												
Substation Metering	C. Burns (NGrid)																												
Controls Integration	C. Burns (NGrid) & GE																												
Grid Testing	GE, NGrid																												
Reporting																													
Quarterly Reports	P. Austen (NGrid)																												
Final Project Report	P. Austen (NGrid)																												

Key
 Previously-Identified Changes:
 Estimated extensions identified this quarter:

Appendix B: Metric Tracking

	Outreach		Customer Tier					Solar Installation Progress					Generation and Credits				Arrearage Participant Evaluation	
Project Quarter	Expressions of Interest (Calls Received, Canvass)	Geographically Disqualified Calls	Tier 1 Enrollment	Tier 1 Eligibility	Tier 2 Enrollment	Tier 3 Eligibility	Tier 3 Eligibility	Roof Assessments Completed	Structural Assessments Completed	Electrical Assessments Completed	Roof Systems Installed	Roof Systems Connected	kW on-line	kWh generated	Credits Generated [\$]	Cumulative Qty of Bill Credit Recip-	Enrollee Total Quarter Credit [\$]	Arrearage Participant Quantity
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0.00	0	\$0.00	0
2	34	0	1	5	0	14	14	14	10	14	1	0	0	0	\$0.00	0	\$0.00	0
3	28	2	1	10	0	16	16	26	9	5	1	2	12.22	2,408	\$33.96	2	\$16.98	0
4	78	1	2	16	0	34	34	54	21	24	2	2	10.92	5,039	\$116.99	3	\$50.49	0
5	14	0	2	40	0	14	14	13	19	5	3	2	12.74	10,709	\$268.10	6	\$47.77	
6																		
7																		
8																		
Totals:	154	3	6	71	0	78	78	81	59	48	7	6	35.88	18,156	\$419.05			

* - Five added after changing minimum roof system size from 4.0 kW to 3.0 kW.

Table B.1 – Metric Tracking Table