Demand Reduction
REV Demonstration Project
in
Clifton Park

Q3 2020 Report

October 30, 2020

nationalgrid

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1.0 Executive Summary

On January 17, 2017 Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") filed an implementation plan for the Demand Reduction REV Demonstration Project in Clifton Park (the "Project"), which is designed to provide residential customers in the Town of Clifton Park ("Clifton Park" or the "Town") with price signals, tools and information, enabled by infrastructure investments and distributed energy resources ("DER"), to reduce electric demand during peak times and inform the Reforming the Energy Vision ("REV") Proceeding.[1] The total number of customers affected (*i.e.,* those receiving a meter and those opting out) is approximately 14,400.

The Project aligns with the New York Public Service Commission's ("Commission") REV Track Two Order, wherein the Commission states that "[o]ne of the most important objectives of REV is improving overall system efficiency including the efficiency of capital investment to create value for customers. Toward that objective, electric peak reduction is among the most immediate priorities for REV implementation."[2] National Grid believes it is possible to create more responsive relationships with customers by leveraging infrastructure, customer outreach and engagement, deep energy insights, actionable information, price signals, DER products, and other services, to incentivize customers to reduce peak electric load and overall energy use. The Project includes the following elements:

- Infrastructure
  - Advanced Metering Infrastructure ("AMI")
  - Volt/VAR Optimization ("VVO"), including Conservation Voltage Reduction ("CVR")
- Customer Outreach & Engagement
- Deep Energy Insights & Actionable Information
- Price Signals
  - Peak Time Rewards ("PTR")
  - Voluntary Time-of-Use ("VTOU") Rate
- DER Services[3]

Key activities and milestones accomplished this quarter (Q3 2020) include:

Key Activity/Milestone	Outcome
Innovative Pricing	• Continued work to identify and design potential innovative pricing rate and test scenarios.
PTR	• Completed PTR Summer 2020.
Information Technology ("IT"), Advanced Analytics	• Advanced Analytics and Energy Forecasting team, as well as IT continued Project support.

[1] Case 14-M-0101, *Proceeding on Motion in Regard to Reforming the Energy Vision* ("REV Proceeding"), National Grid Demand Reduction REV Demonstration Project in Clifton Park Implementation Plan (filed January 17, 2017) ("Implementation Plan").
[2] REV Proceeding, Order Adopting a Ratemaking and Utility Revenue Model Policy Framework ("REV Track Two Order") (issued May 19, 2016) at page 72.
[3] Part of the initial Project proposal included utility-supported Community Choice Aggregation ("CCA"); however, the Town decided not to pursue utility-supported CCA.

and Energy Forecasting efforts	
VVO efforts	• Began VVO data collection for Measurement and Verification ("M&V").
Customer Outreach & Marketing	• Updated Project communications to reflect Company's COVID-19 response and support. • Issued PTR Summer 2020 customer communications.
DER	• Awaiting outcome of innovative pricing demonstration proposal to understand impact on DER promotions.
COVID-19	• Implemented Business Continuity Plan. • Monitoring impacts on vendors, as well as customer load shapes; considering potential effects on innovative pricing proposal. • Adjusting protocols to ensure consistent and effective customer communications throughout the pandemic

Project Elements

A visual depiction of the Project's key services and offerings is provided below. Except for VVO, customers can opt in or opt out of each Project element. A description of each Project element is included with the individual sections of this quarterly report.

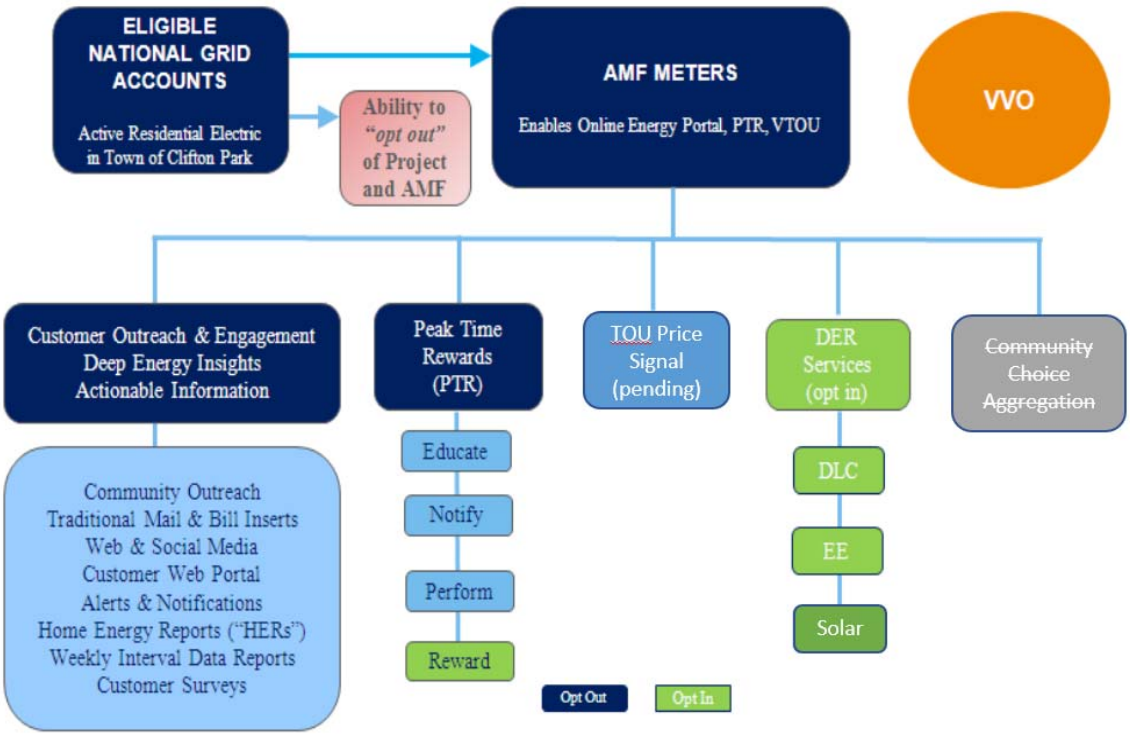


Figure 1: Project Elements

2.0 Highlights Since Previous Quarter

The following highlights key activities accomplished to date on the Project, as well as key activities planned for the next quarter.[4]

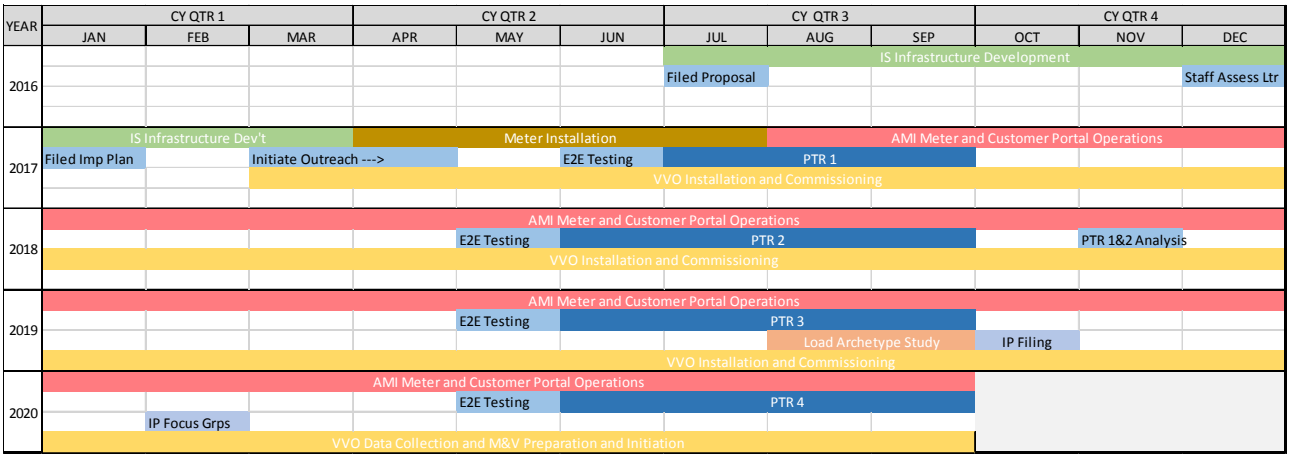


Figure 2: Work Plan Summary

2.1 Major Task Activities

2.1.1 Advanced Metering Infrastructure

AMI deployment in Clifton Park replaced existing National Grid electric and gas meter reading and billing processes for customers that have not opted out of the Project. AMI meters are read and select portions of data are transferred over a cellular network to National Grid for utility billing. Portions of data are also transferred to the Project's partners over secure networks to enable various elements of the Project, including the customer web portal. Interval data is used for PTR, customer billing, and to support authorized Project evaluation activities.

AMI deployment commenced at the end of the first quarter of 2017. Letters introducing Clifton Park customers to "Smart Energy Solutions," the customer-facing name of the Project, and postcards alerting customers of the AMI installation timeframe were distributed prior to installations. This allowed for a period during which customers could opt out of the AMI metering technology, as well as certain other aspects of the Project.

Customers choosing not to have AMI installed were directed to a specialized team at the National Grid Contact Center, who informed Customer Meter Services ("CMS") not to install AMI technology for those customers. Instead, the opt-out customers retained their existing meter (*i.e.*, automated

[4] The effects of the COVID-19 pandemic may impact the Project schedule. As those impacts become better understood, the Company will adjust the schedule accordingly.

meter reading ("AMR") meter or standard non-AMI meter). Additionally, during the Project term, customers may also have their AMI meter removed and replaced with an AMR meter at no additional cost.

The initial AMI opt-out rate was 8.8 percent, which equals approximately 1,256 premises. AMI meter opt-outs include customers who: 1) opted out through the National Grid Customer Contact Center; 2) informed CMS field workers in-person that they did not want the meter; or 3) were unable to provide access to the meter after three attempts by the Company without success.

National Grid continues to monitor AMI opt-outs throughout the term of the Project, as part of normal customer fluctuations in the Town (*e.g.*, new growth and customers moving). The National Grid Customer Contact Center is also accepting customer requests to install or remove the AMI technology and process orders.

2.1.1.1 Information Technology Activities

Timeframe	Completed Milestones
3rd Quarter 2020	• Continued Project support via National Grid's IT Support team. • Successfully migrated from dedicated Multiprotocol Label Switching ("MPLS") network to internet-based file transfer process, which aligns with vendor's cloud-based data center. The data center transition is anticipated late summer /early fall 2020.

2.1.1.2 Meter Installation Activities

Timeframe	Completed Milestones
3rd Quarter 2020	• Continued to support business practices related to move-in/out of customers.

2.1.2 Volt/VAR Optimization Device Installations

National Grid will enhance the efficiency of the electric system through the installation of software and devices that better regulate the voltage of the distribution system. These system enhancements will benefit all customers connected to those substations being upgraded. Working with the Project's VVO partner, Utilidata, National Grid started installing devices on the electric distribution system that monitor voltage along with advanced controllers for voltage regulators and reactive capacitors.

National Grid will evaluate the extent to which optimized regulation of the voltage and power factor of the electric distribution system benefits customers, ultimately reflected by improved feeder power factor, flatter voltage profiles, reduced feeder losses, reduced peak demand, and reduced energy consumption by customers. National Grid's targeted efficiency gain through the VVO portion of the Project is approximately three percent.

VVO installation scope includes:

- Three substation transformer load tap changers;
- Eleven feeders, including:
  - Twelve line voltage monitors;
  - Thirty-one advanced switching capacitors; and
  - Five pole-top regulators;
- A central controller and data concentrator installed at the National Grid Control Center;
- Supervisory control via National Grid's Supervisory Control and Data Acquisition ("SCADA") and Energy Management System ("EMS"); and
- Cellular connectivity between all field, substation devices, and the data concentrator.

The VVO equipment is installed and commissioned. The Company also worked with Utilidata to resolve system instability created by consecutive tap failures by increasing polling intervals. The Company began M&V work in June, after it completed site-acceptance testing.

Timeframe	Completed Milestones
3rd Quarter 2020	• Data collected for M&V is currently being analyzed by 3rd party.

2.1.3 Customer Outreach

National Grid has engaged residents of the Clifton Park community to learn about the Project and solicit input. The strategies include:

- Community outreach;
- Mail and bill inserts; and
- Web and social media.

Community Outreach

The National Grid marketing team performed studies of Clifton Park residential customers to assess areas of concern and to present recommendations. The studies were conducted by Market Probe moderators, a third-party market research group, via:

- Outreach sessions with Clifton Park residents in June 2018;
- Phone and online annual surveys; and
- Testimonial campaign with radio and billboard outreach launched in 2018.

Mail and Bill Inserts

Prior to the installation of AMI, National Grid delivered a set of communications via standard mailings to introduce Clifton Park customers to the Project and notify them of the imminent AMI technology. Customers were asked to contact National Grid if they did not want to receive a new AMI meter. Each letter spoke to the benefits of the Project and touched upon key Project elements available immediately and in the near future. The Company sent the communications as direct mail and bill inserts.

Thereafter, National Grid also sent a series of meter installation notifications letting customers know when the new meters would be installed. Included in the communications was an invitation to attend one of the Company's customer outreach and education meetings to learn more about the Project, ask questions, and interact with the National Grid team.

Following AMI meter installation, customers received educational materials focused on the various Project elements, such as enrolling in PTR. Bill inserts will continue to be incorporated four (4) times per year as Project elements are developed and implemented. The Company will also provide ongoing Project updates throughout the year using local media. Additionally, the Company created video tutorials that are posted on the National Grid website.

Web and Social Media

National Grid continues to expand the existing Clifton Park micro-site (https://www.nationalgridus.com/Upstate-NY-Home/Energy-Saving-Programs/Clifton-Park), a component of the Company's website (http://www.nationalgrid.com), to include information on the Project for Clifton Park residents.

The Project website includes the following information:

- Frequently Asked Questions video overview of the Project;
- Frequently Asked Questions pdf;
- Information about PTR;
- DER product and service options available (*e.g.*, New York Solar Marketplace); and
- Updates throughout the year to announce the rollout of new products and services.

National Grid also proactively reviews publicly available social media information to join conversations regarding the Project and to help answer questions

The Company also tracks customer interaction with the Opower web portal as part of the Project. Emails, bill inserts, direct mailings, and social media contributed to raising awareness of the information available to customers, as evidenced by increasing levels of customer interaction throughout the PTR seasons. Customer outreach activities continue outside of the PTR season to encourage ongoing customer engagement.

Areas of the portal experiencing common customer interaction include:

- My Energy Use;
- Ways to Save;
- Compare My Bills;
- Dashboard; and
- Home Energy Audit.

The Company also created the following key performance indicators to track and measure the success of Customer Outreach:

- Customer Acceptance of AMI Technology;
- Awareness;
- Customer Control of Energy Usage;
- Customer Satisfaction with National Grid; and

- Portal Engagement (*e.g.,* login creation, enrollment in PTR, and profile completion).

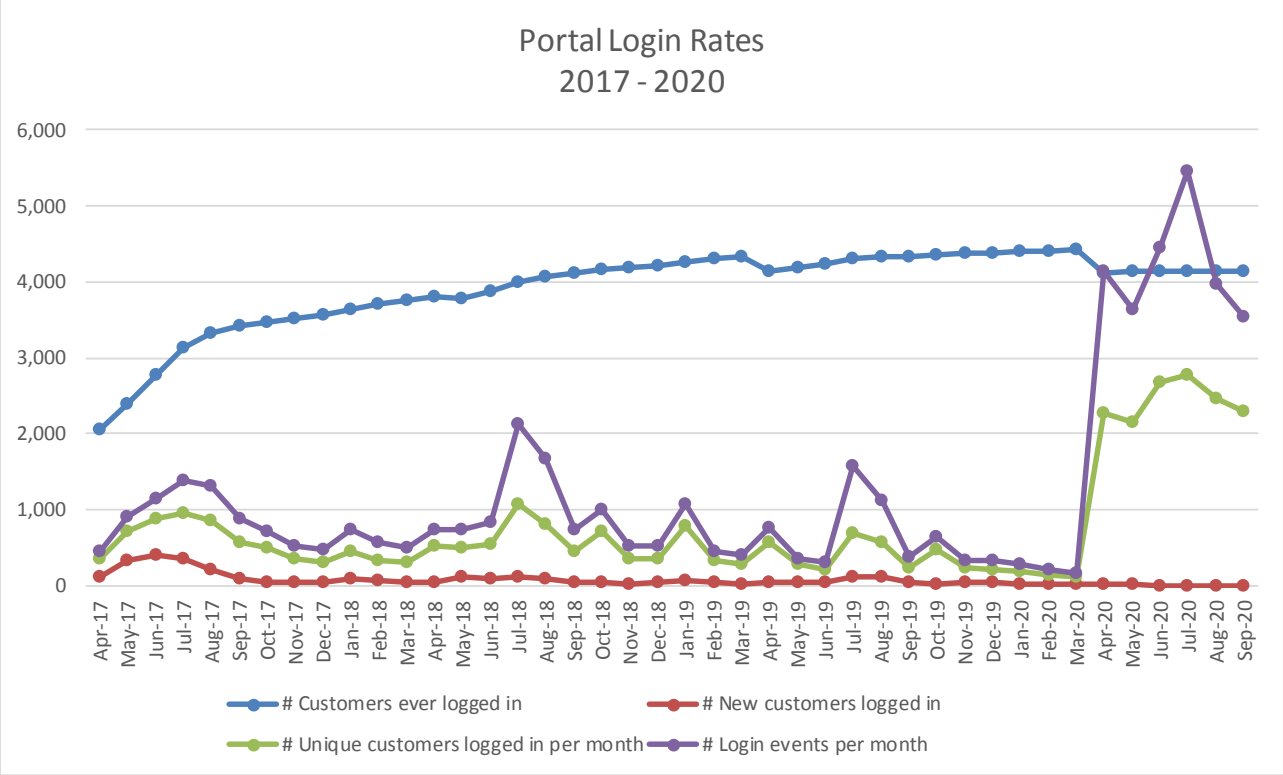


Figure 3: Portal Activity

Note: The Company recently learned that data collection methods to report Unique Logins Per Month (green) and Login Events Per Month (purple) were not identifying all web traffic for Clifton Park customers. The data have been updated for April 2020 to present. Future reports will include updated data for prior project years.

Timeframe	Completed Milestones
3rd Quarter 2020	• PTR pre-season letter deployed announcing start of PTR season 4.
	• Project communications updated with COVID-19 related language acknowledging customers may be home more using more energy.
	• Continued research on best practices for innovative pricing customer communications.

COVID-19 Related Communications

Project communications have been updated to acknowledge residential customers are likely spending more time at home and that is impacting their energy use.

2.1.4 Peak Time Rewards

National Grid seeks to incentivize Clifton Park customers to reduce electric use during specified peak times. Participating customers are rewarded for curtailing electric load through behavioral actions such as turning off lights, adjusting thermostats or using customer-controlled technology.

Key elements of PTR include:

- Event performance analytics performed on all customers with AMI;
- Pre-event and post-event email notifications;
- Rewards earned by those enrolled in “Points-and-Rewards”;
- Rewards awarded based on participation in up to twenty PTR events per year; and
- No penalties for failure to reduce load during PTR events.

National Grid reviews load forecasts for the New York Independent System Operator (“NYISO”) system and Zone F, which includes Clifton Park, as well as local Clifton Park weather forecasts, to determine whether to call a PTR event, also referred to as a “Conservation Day.”

PTR events are entered into two systems: one triggers event notifications to Clifton Park customers; and the other sets in motion the energy use predictive model, which will compare predicted values to actual AMI metered usage. The second system is used to determine curtailment participation. Over 8,000 pre-event emails notifying customers that a Conservation Day is scheduled are sent to Clifton Park customers for each event.

Once the Company determines the curtailment performance for the Conservation Day, each customer’s electric service account is assigned a value of “true” or “false” for each event, based on whether the customer curtailed during the event. Accounts enrolled in the Points-and-Rewards program which are assigned a value of “true,” are then awarded points. National Grid tracks customer enrollments in Points-and-Rewards as a measure of customer engagement – enrollment has increased each month as the Project has progressed.

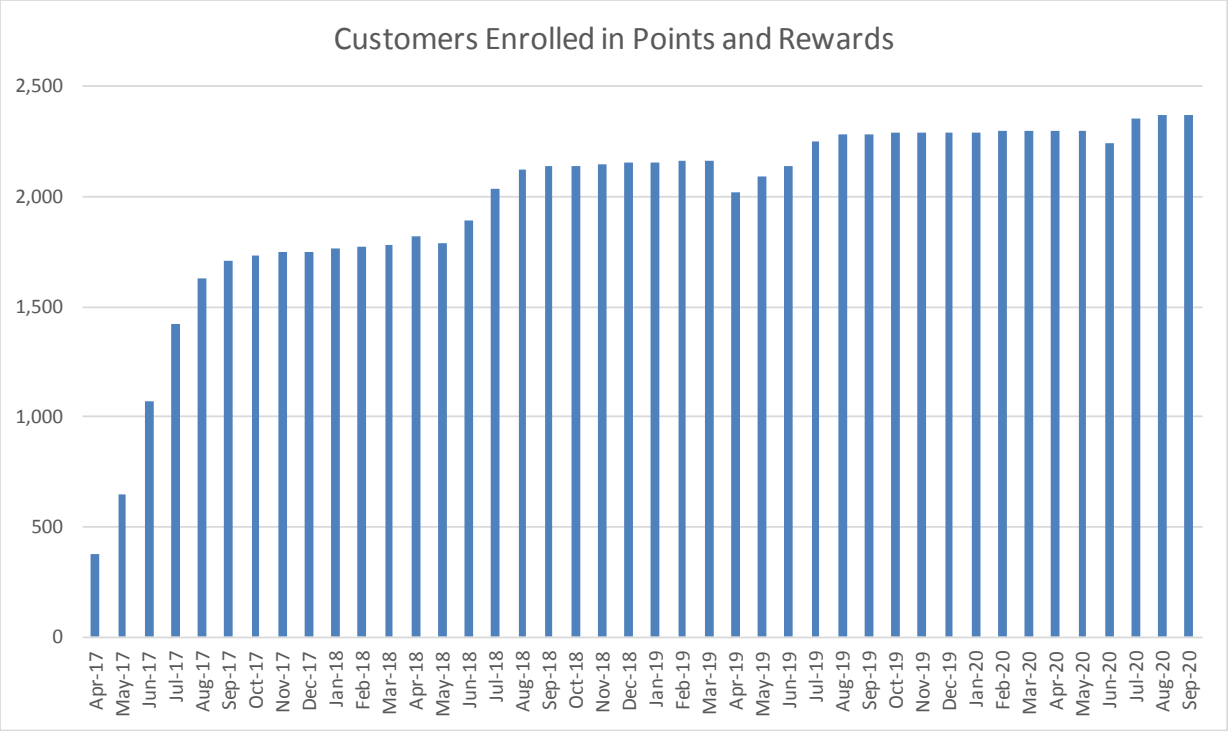


Figure 4: Customers Enrolled in Points and Rewards

The Company implemented a fourth season of PTR/Points-and-Rewards during the summer of 2020 within the original Project budget. A summary of PTR year-over-year performance can be found as Appendix B. In addition, initial procurement discussions have taken place to assure continued operation of AMI and portal functionalities.

Timeframe	Completed Milestones
3rd Quarter 2020	• PTR summer 2020 was completed with 8 Conservation Days called. • PTR year-over-year performance can be found in Appendix B.

2.1.5 Advanced Analytics and Energy Forecasting

National Grid's Advanced Analytics and Energy Forecasting team developed the residential energy use predictive model to determine the expected energy use during PTR events. The predictive model uses prior customer level energy consumption data and event weather conditions to predict customers' energy consumption during events. The predicted values are compared to the actual AMI data to determine whether customers curtailed energy use and to ascertain which customers earned points. The results of the analyses are also used to determine if the aggregated community load meets certain threshold requirements for bidding into the NYISO wholesale electricity market. In addition, the Advanced Analytics and Energy Forecasting team has supported the development of innovative pricing rate designs.

Timeframe	Completed Milestones
3rd Quarter 2020	• Continued to support normal business operations. • Continued to develop innovative rates deployment strategy.

2.1.6 Time-of-Use Price Signals

As a result of the AMI collaborative, National Grid is continuing to look for opportunities to test innovative pricing rate designs using AMI infrastructure. The Company filed two proposals for rates to test in Clifton Park (*see* Case No. 19-E-0111). Work to refine the time-varying rate structures and the research methodology is ongoing.

Timeframe	Completed Milestones
3rd Quarter 2020	• Continued strategic alignment of Clifton Park, AMI Business Case, and innovative pricing designs.

2.1.7 Distributed Energy Resource Opportunities

National Grid seeks to animate the market by facilitating DER provider opportunities as part of the Project. DER products and services will be opt-in offerings to customers, publicized via the customer engagement channels outlined above (*e.g.*, the National Grid Marketplace and related Solar Marketplace). DER services may include energy efficiency, demand response, or renewable distributed generation opportunities. The Company is continuing to monitor the COVID-19 situation and adjust its proactive outreach and communications strategies with customers as necessary.

Timeframe	Completed Milestones
3rd Quarter 2020	• Continued evaluation of DER promotions.

2.1.8 Community Choice Aggregation

In 2017 National Grid engaged Clifton Park officials and community members on potential adoption of a utility-supported CCA; however, the Town decided not to pursue the CCA option.

2.1.9 Project Management

A group of individuals in the Company work to manage the Project, keeping it on track regarding scope, schedule, and budget, while also lending visibility into processes, accomplishments, and financial tracking. The project managers regularly engage in and promote, the following:

- Weekly Core Team Status Reporting;
- Monthly General Staff Meetings;
- Quarterly Commission Reporting;
- Issue Tracking;
- Lessons Learned Recording and Review;
- Change Log Processes; and
- Financial Reporting activities.

Timeframe	Completed Milestones
3rd Quarter 2020	• Conducted weekly status reviews with core team leads, monitoring progress, providing corrective measure(s), and escalating issues, as needed.
	• Provided Project updates for management review.

2.1.10 Innovative Pricing

On February 14, 2019 and October 22, 2019, National Grid submitted proposals to implement an innovative pricing demonstration to leverage the status of the current Project (*see* Case No. 19-E-0111). The proposal, which includes draft tariff leaves, rate design options, and a related budget, remains pending before the Commission.

The Company has worked closely with Staff to develop a proposal for testing demand-based delivery rates based on the Standby rate design. However, at this time the Company intends not to pursue the project actively on the basis that the Commission is separately considering a Standby rate package, which will be available to residential customers. The Company anticipates action on such a rate package could occur in Spring 2021 or thereafter.

Timeframe	Completed Milestones
3rd Quarter 2020	• Continued work to identify and design potential innovative pricing rate and test scenarios.

2.2 Challenges, Changes, and Lessons Learned

Qtr	Issue or Change	Resulting Change to Project Scope/Timeline?	Strategies to Resolve	Lessons Learned
Q3.20	A previous event file was transmitted for distributed rewards.	Some customers did not receive their appropriate reward until after correction was made.	Accurate data was transmitted to resolve. Analysis of impact was made. All customers made whole.	Event protocols need to assure previous event files are cleared from server in preparation of next event.
Q3.20	Gas ERTs deployed in Clifton Park will cease being manufactured in 2021.	Near term strategy for projected replacement ERTs by model comparing current inventories to projected need.	Projected 5-year need based on industry failure rates; and compared to current inventories.	ERT models have various rates of inventory. Also, ERTs supporting AMR infrastructure can be encrypted to support cellular AMI infrastructure.

3.0 Next Quarter Forecast

During the fourth quarter of 2020, the Project team will develop a strategic plan for program operations for 2021 (*e.g.*, another season of PTR and potential other promotions). The Project team will continue to develop plans related to scope, schedule, budget, and resources for testing rate designs. The Company will also continue to monitor potential COVID-19 related impacts and adjust, as necessary, any customer communications.

3.1 Check Points/Milestone Progress

3.1.1 Summary

	Checkpoint/Milestone	Anticipated Start-End Date	Revised Start-End Date	Status
1B	Phase 1: Network Configuration and Meter Deployment	1/2/17 – 6/16/17	1/2/17 - 7/17/17	Complete
1B	PTR Operations	7/1/17 - 9/30/19	7/1/17 – 9/30/21	
2	Phase 2: VVO; REV Operations and Evaluation	6/19/17 – 3/31/20	6/19/17 – 3/31/21	
3	Phase 3: Project Wrap-up	10/1/19 – 9/30/20	10/1/2020 – 3/31/2021	
4	Phase 4: Innovative Pricing	9/1/20- 7/1/2024	4/1/2021 -	

Key

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

3.1.2 Work Stream – 4th Quarter 2020

Work Stream	Future Milestones	Status
IT	• Support Project via National Grid's IT Support team. • Meter Data Management System (MDS) upgrade	
AMI	• Support normal business practices related to move-in/out of customers.	

Work Stream	Future Milestones	Status
VVO	• Continue study to evaluate overall system performance, leveraging AMI data for additional efficiencies. • VVO site acceptance testing, followed by initiation of M&V period.	
Customer Outreach	• Continue customer communications and education engagement.	
PTR	• Develop plans for future PTR offerings.	
Advanced Analytics and Energy Forecasting	• Provide continued support to Project team. • Prepared to calculate PTR curtailment results.	
TOU Price Signal	• Not pursued under initial Project; however, Project team anticipates transition to innovative pricing.	
DER	• Not continued due to anticipated transition to innovative pricing.	
Project Management Group	• Conduct weekly Project update meetings.	
	• Monitor and report Project key performance indicators.	
	• Continue tracking, monitoring and controlling the Project schedule, tracking on a weekly basis.	
	• Continue tracking, monitoring and controlling the Project financials, tracking on month-by-month basis.	
	• Continue to identify, monitor and manage risks and issues as they arise.	
	• Work with AMI team on future rate structure strategies.	
Project Evaluation	• Develop Project evaluation plan.	
	• Evaluate additional AMI data analytics to capitalize on availability of meter data.	

4.0 Work Plan and Budget Review

4.1 Updated Work Plan

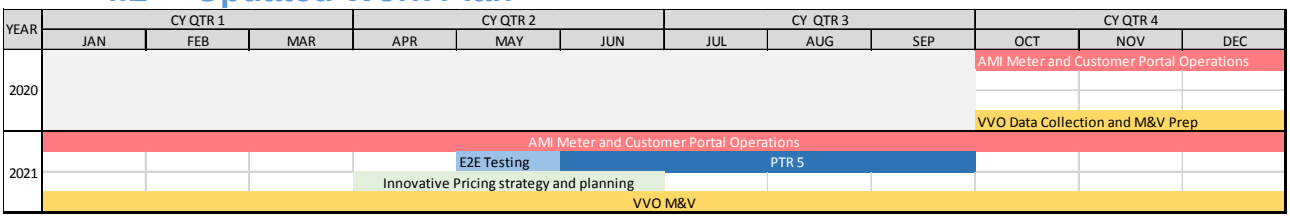


Figure 5: Current Year Work Plan

Figure 5 represents the work plan for the Project. AMI meters and the customer portal will remain operational, PTR operations will continue, and VVO data collection will commence to support measurement and verification efforts.

4.2 Updated Budget

	3rd Qtr 2020 Actual Spend	Project Total Spend to Date	Project Initial Budget	Revised Budget	Remaining Balance
CAPEX					
	-	8,694,206	12,516,057	8,766,057	71,851
OPEX					
	306,817	9,744,146	14,437,176	13,936,353	4,192,207
TOTAL					
		18,438,352	26,953,233	22,702,410	4,264,058

Note: Total spend includes 2019 payment of $432,736 for software services through March 31, 2021 to support the customer portal and PTR.

5.0 Progress Metrics

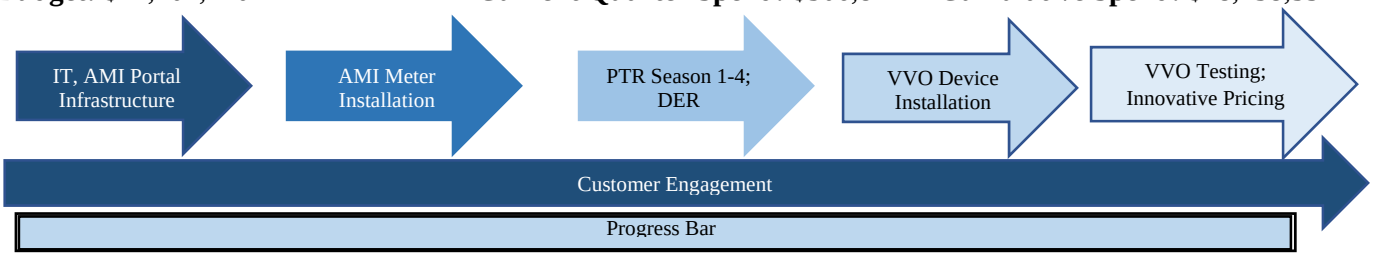
Checkpoint[5]	Progress / Target Completion
Infrastructure	
AMI Acceptance vs. Opt Out	Continuing to monitor opt-out rates as Project progresses, and through the life of the Project. Current opt-out rate is 8.8 percent.
VVO System Benefits	Established infrastructure required to enact VVO and monitor progress. Equipment installation and commissioning completed. Initiated VVO evaluation period.
Customer Outreach and Engagement / Deep Energy Insights and Actionable Information	
Customer Outreach and Engagement	Continuing engagement through life of the Project. Annual surveys tracked against initial baseline survey.
Customer Energy Portal Engagement	Continue customer engagement metrics related to portal use, PTR participation, etc.
Price Signals	
PTR	Began PTR in July 2017; continue evaluation through life of the Project regarding participation rates and curtailed load.
TOU Price Signal	Strategic transition to innovative pricing demonstration.
DER	
DER Opportunities	Promotion of Connected Solutions demand response and related technologies, National Grid's Solar Marketplace, and energy efficient pool pumps and pool pump timers.

[5] *See* Implementation Plan at pages 24-26, for specific metrics.

6.0 Appendix A – One Page Summary

nationalgrid **Clifton Park REV Demo** **09/30/2020 (Q3 2020)** **Overall Status (Active)**

Project Start Date: 01/17/2017 **Project End Date:** 03/31/2021 for initial phase
Budget: $22,702,410 **Current Quarter Spend:** $306,817 **Cumulative Spend:** $18,438,352



Project Summary: Address REV principles to reduce peak demand, increase DER adoption and give customers greater insight into their energy usage so they can make more informed energy decisions. Primary deliverables include: installation of approx. 13,300 AMI electric meters and 11,500 gas ERTs, energy management education and engagement; implementation of a Peak Time Rewards (PTR) program; improve system-wide efficiency. Partners include Itron, Opower/Oracle, Utilidata; vendors include Wipro, Verizon, Navigant. A petition proposing transitioning the Project into an innovative pricing REV demonstration project was filed October 22, 2019.

Cumulative Lessons Learned		
The Customer	**Market Partner**	**Utility Operations**
• Customer participation has been moderate despite specific marketing campaigns and customer outreach meetings. • Meter acceptance rate > 90% • Portal usage is at ~24% • Points-and-rewards enrollment ~16%	• DER promotion dependent on available information to disseminate (*e.g.*, Solar Marketplace launch). • Partner system restrictions limit availability to deliver PTR.	• Meter deployment was challenged by temporary workforce hiring. • VVO construction was challenged by reallocation of resources due to storm duty obligations.

Application of lessons learned: National Grid is aligning its AMI opportunities in Clifton Park with its broader AMI Business Case through its proposal to transition Clifton Park into an innovative pricing REV demonstration. An innovative pricing demonstration will include omni-channel marketing, multiple touch-point customer engagement, along with an enhanced customer portal to deliver the benefits of AMI technology to better manage energy usage and succeed on innovative pricing designs.

Issues Identified: Rewards-type structure is not sustainable and does not align with other regulatory initiatives. Innovative pricing structures and research design not finalized.

Solutions Identified: VVO M&V data currently being analyzed. PTR rewards points has been extended for another summer to bridge build of innovative pricing structures and delivery.

Recent Milestones/Targets Met: PTR summer 2020 has completed.

Upcoming Milestones/Targets: Develop innovative pricing strategy.

COVID-19: Enacted Business Continuity Plan March 12; monitoring vendor/load impacts; adjusting communications.

7.0 Appendix B – PTR 2020 Summary