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February 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

Niagara Mohawk Power Corporation d/b/a National Grid – Proposed Smart Home Rate REV Demonstration Project Filing

Dear Secretary Burgess:

In accordance with the requirements set forth in the Commission's May 19, 2016 Order Adopting a Ratemaking and Utility Revenue Model Policy Framework in Cases 14-M-0101, Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") hereby submits the Company's Proposed Smart Home Rate REV Demonstration Project.

Please direct any questions regarding this filing to:

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Respectfully submitted,

/s/ Janet M. Audunson

Janet M. Audunson

Enc.

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National Grid Proposed Smart Home Rate REV Demonstration Project Filing

Case 14-M-0101 – Reforming the Energy Vision (REV)

February 1, 2017

Niagara Mohawk Power Corporation
d/b/a
National Grid

Submitted to:

New York
Public Service Commission

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EXECUTIVE SUMMARY

On May 19, 2016, the New York Public Service Commission ("Commission") in the Order Adopting a Ratemaking and Utility Revenue Model Policy Framework ("Track Two Order"),[1] directed utilities to file one or more Smart Home Rate ("SHR") demonstration proposals by February 1, 2017.[2]

On July 1, 2016 Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") filed a proposal for the Demand Reduction REV Demonstration Project (the "Project" or the "Clifton Park Project")[3] designed to provide residential customers in the Town of Clifton Park ("Clifton Park") with price signals, tools and information, enabled by infrastructure investments and distributed energy resources ("DER"),[4] to reduce electric demand during peak times and inform the Reforming the Energy Vision ("REV") proceeding. On December 1, 2016, the New York State Department of Public Service Staff ("Staff") filed the Assessment Report for the Project[5] and on January 17, 2017 the Company filed the Project Implementation Plan.[6]

National Grid believes the Project aligns with the SHR criteria in the Track Two Order wherein the Commission asserts "[i]n keeping with the distinction between traditional consumers, active consumers, and prosumers, Staff recommended that prosumers should be served by an opt-in Smart Home rate (SHR) to advance the early adoption of sophisticated home energy management technologies. A SHR would unbundle price signals to incentivize different types of DER and energy management responses."[7]

In order to further demonstrate a SHR, National Grid proposes to leverage the offerings, tools, and price signals being provided in the Clifton Park Project, through the offering of a voice recognition technology that will enable customers to control appliances in their home via use of a phone app or voice activated technology during times when electricity prices are high in order to reduce demand at their homes and create energy savings. This technology will be offered to customers in Clifton Park who enroll in the Company's residential voluntary time-of-use

[1] Case 14-M-0101, *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision* ("REV Proceeding"), Order Adopting a Ratemaking and Utility Revenue Model Policy Framework ("Track Two Order") (issued May 19, 2016).
[2] *Id*., p. 156.
[3] National Grid's July 1, 2016 submittal was an errata filing to replace the proposed Customer Convenience Demonstration Project for Clifton Park, contained within the Company's July 1, 2015 submittal of a suite of REV demonstration projects, with a renamed project entitled "Demand Reduction Demonstration Project" to reflect the substantial revisions in scope from the original July 1, 2015 filing.
[4] For the Clifton Park REV Demonstration Project, "DER" is defined as including energy efficiency, demand response, and renewable distributed generation offerings, consistent with the Commission's definition in the REV Proceeding, Order Instituting Proceeding (issued April 25, 2014), p. 25.
[5] REV Proceeding, REV Demonstration Project Assessment Report for National Grid: Demand Reduction Town of Clifton Park (filed December 1, 2016).
[6] REV Proceeding, National Grid: Clifton Park Demand Reduction REV Demonstration Project - Implementation Plan (filed January 17, 2017).
[7] REV Proceeding, Track Two Order, p. 134.

("VTOU") rate to further enable a customer's ability to control their demand during higher price usage periods.

National Grid intends to initially pursue voice recognition technology but will continue to investigate and possibly implement other home energy management technologies that meet the intent of a SHR demonstration and could provide valuable insight as to what devices are more likely to result in residential demand reduction and energy consumption savings. The Company will revise its SHR filing(s) as appropriate should other technologies be proposed.

BUSINESS MODEL OVERVIEW

Challenges Being Addressed

As outlined in the Track Two Order,[8] SHRs must meet certain criteria which are summarized below:

1. SHRs should advance the early adoption of sophisticated home energy management technologies;
2. SHRs would unbundle price signals to incentivize different types of DER and energy management responses;
3. SHRs should be opt in for customers;
4. SHRs should be provided on a demonstration basis;
5. SHR demonstrations that are geographically concentrated will maximize both the network value and the demonstration value of the SHR;
6. SHRs should be compatible from the standpoint of DER providers;
7. SHRs should include a hold harmless provision that assures participating customers that their investments will not be stranded by superseding developments; and
8. Utilities should collaborate with the New York State Energy Research and Development Authority ("NYSERDA") and with third-party developers to identify one or more SHR demonstration projects

Proposed Solution

A. The Clifton Park Project as a Smart Home Rate

A review of the Clifton Park Project confirms that many of the SHR criteria are being met by the Project. The Project is comprised of the following components:

1. Infrastructure

- Advanced Metering Functionality ("AMF")

[8] *Id.*, pp. 134-137.

- Volt/VAR Optimization ("VVO")

2. Community Energy Supply Procurement
3. Deep Energy Insights and Actionable Information
4. Price Signals
    - Peak Time Rewards ("PTR")
    - Direct Load Control ("DLC")
    - Residential VTOU Rate
5. DER Services
6. Community Outreach and Engagement

Several of the Clifton Park Project's components meet the criteria of a SHR as identified above.

1. **SHR should advance the early adoption of sophisticated home energy management technologies** - Phase 1 of the Project will provide residential customers with a customer energy information portal, high bill alerts, enhanced home energy reports, energy savings tips, and DER offerings. Phase 2 of the Project will provide customers with advanced metering functionality ("AMF") -enabled weekly energy overview emails, AMF-enabled enhanced customer portal with data browser and rate analysis tool, and price signal communications.

2. **SHR would unbundle price signals to incentivize different types of DER and energy management responses** - There are several offerings included in the Project that will be available to customers to incentivize energy management responses and use of DER.

    a. National Grid will collaborate with Clifton Park and an independent energy manager that will seek, through competitive solicitation, an Energy Service Company ("ESCO") partner(s) to provide residents with electric and gas supply. If Clifton Park agrees to move forward, this Community Energy Supply Procurement will provide participating customers with more stable supply prices (*e.g.*, fixed price for one year), and will result in increased community input in supply selection (*e.g.*, renewable choices reflecting the community's energy goals). In addition to providing supply to participants, the ESCO partner(s) will be asked to:

- Fund a program that rewards participants for reductions in demand during peak times (*i.e.*, Peak Time Rewards)
- Propose other DER services (such as financing for solar installations) that will assist customers with managing their entire bill, including the supply portion

b. Peak Time Rewards - In the event that customers opt out of Community Energy Supply Procurement, the Company will offer its own Peak Time Rewards ("PTR") program to customers who have opted out or to all customers in the Project if the Community Energy Supply Procurement does not move forward. The PTR program will incentivize customers to reduce energy usage, potentially during peak time periods, via PTRs that provide a positive motivation to respond to energy price signals. Key elements include:

- Universal participation for all customers with AMF meters
- Rewards given based on peak event participation
- Up to 20 peak events expected to be called per year
- Actively participating customers can earn gift cards for participation

c. Direct Load Control ("DLC") - In addition to the PTR program, customers will also be able to participate in the Company's DLC program, in accordance with Rule 63 of P.S.C. No. 220 Electricity. Under the DLC program customers will be awarded incentives if they install a smart thermostat and allow their thermostats to be automatically and remotely controlled by the Company during DLC events (*i.e.*, peak times).

d. Alternative Rates – The installation of the AMF meters will allow customers to participate in alternate rate designs. The rate design to be promoted and offered will be a residential VTOU rate. This rate will provide an on-peak and off-peak delivery rates, as well as an on-peak, off-peak and super peak supply rate. The super peak supply rate will be for weekday periods (excluding holidays) between 2pm and 6pm, during the summer months of June through August, when market prices are typically highest and demand on the electric distribution system is the greatest. Customers who participate in the Community Energy Supply Procurement, in the event Clifton Park elects to move forward, will not be billed the supply portion of the residential VTOU rate, but will be billed by the ESCO provider. However, any customer opting out of the Community Energy Supply Procurement will be eligible for the supply portion of this residential VTOU rate. The residential VTOU rate will be opt in for all customers. There will be a make whole provision for the first year on the VTOU rate for those customers who have electric vehicles. The VTOU rate will provide various price signals to customers

to encourage them to manage their energy usage to reduce their costs and also to reduce demand on the distribution system during peak periods.

3. **SHR should be opt in for customers** – The residential VTOU rate will be offered as opt in only, as will the DLC program. Other services such as energy efficiency upgrades and any additional DER services will be the customer's sole choice.

4. **SHR should be provided on a demonstration basis** – The Project will be offered in the Clifton Park as a REV demonstration project.

5. **SHR demonstrations that are geographically concentrated will maximize both the network value and the demonstration value of the SHR** – The Project will be offered within the area of Clifton Park and will test the ability to maximize network and demonstration project value from the SHR.

6. **SHR should be compatible from the standpoint of DER providers** – The Company plans on partnering with DER providers to offer various DER services, such as energy efficiency upgrades.

7. **SHR should include a hold harmless provision that assures participating customers that their investments will not be stranded by superseding developments** – The Company will be utilizing the currently approved residential VTOU rate. A hold harmless provision is being offered to customers on the residential VTOU rate if they provide proof of ownership of an electric vehicle**.**

8. **Utilities should collaborate with NYSERDA and with third-party developers to identify one or more SHR demonstration projects** – The Company has had discussions with NYSERDA regarding energy vehicle tariffs and in home technologies and may pursue additional opportunities. Initially, the Company plans to integrate voice recognition technology as an additional home energy management technology offering to Clifton Park Project participants as described below.

B. Voice Recognition Technology

National Grid will enhance the Project's ability to demonstrate a SHR by introducing a voice recognition technology that will enable customers to easily turn on and off certain appliances in the home in response to the calling of peak time events by the Company under the PTR program, or via texts or emails from the Company to notify customers enrolled in the residential VTOU rate just prior to the start of the super-peak period.

National Grid proposes to use voice recognition technology to provide customers more modern paths to enable customer load reduction when the Company may need it or when customers want to save the most money. Such technology can help the utility and the customer in the following ways:

- Amazon's voice service, Alexa, for example, can read a text or e-mail that National Grid sends when the utility needs load shedding;
- Customers who receive an alert from National Grid about a peak time need can control devices remotely via a phone app or just by asking Alexa, for example, to control connected devices;
- Customers can monitor and lower their energy use during peak pricing times in response to the information provided via the voice recognition technology;
- Customers can control home devices remotely or from their couch;
- The utility can incentivize control devices that are Wi-Fi-enabled to solve specific loading problems (*e.g.*, air conditioner ("AC") units, dehumidifiers, lighting); and
- Voice recognition devices can ease the burden of participating in a behavioral demand response program

Background

National Grid considered and dismissed, at this time, several technologies to integrate into the Clifton Park Project to enhance demand response objectives. Some of these, Ice Energy's Ice Cub thermal load storage technology for residential use, and EPRI's CEA 2045 protocol, for example, are traditionally utility-controlled demand response technologies. Other technologies such as that marketed by Sense (*i.e.*, energy disaggregation/circuit breaker level controls) are not fully vetted and are also typically utility-controlled. As the Project has been designed to test customer behavior in response to high prices and the ability to deploy technology to avoid those periods of high prices, the introduction of utility controlled technology would confuse the ability to test customer behavior.

Therefore, after considering these options, the Company proposes to work with voice control technology, such as Amazon Echo/Alexa-enabled devices, to make it easier for customers to control energy usage, drive down utility bill costs, take advantage of new billing tariffs and create an easy to use in-home and remote platform to do so.

The Technology

Voice recognition technology is recognizable, understandable, easy to use and will soon become ubiquitous in homes in New York and elsewhere. Apple's Siri has been answering questions on Apple phones for years. Amazon and Google (and others) have perfected the technology for home use.

Amazon's Alexa, controlled through the Amazon Echo, is a smart speaker that can respond to voice commands. The Echo, and other devices like it, can control music, lighting, alarms, thermostats and can browse the internet for answers to questions or can order products on command. Specific to the Clifton Park Project, the Echo can provide information about energy usage, timing of a home's peak energy usage, how much energy costs at the moment, and how much the homeowner's solar panels are generating.

Echo/Alexa controls various devices via Wi-Fi/Bluetooth® including: ecobee, Nest, Honeywell and Emerson Sensi™ thermostats; plug loads via Samsung Smart Things™, TP-Link and WeMo® and lighting via Philips Hue, Insteon, and others.

Amazon's technology may be most recognizable but there are also other examples: Apple's Siri Home Kit, Google Home, Nucleus, Ivee Voice, and Microsoft's Cortana which works with Windows OS.

Amazon's Echo technology allows for "far field" voice control which means the voice control can come from across the room and Alexa will respond. With the smart phone app, the command can also come from across town.

Cost

The table below outlines the cost of popular voice recognition technologies. Amazon's Echo and Google Home functions as a speaker – Microsoft and Apple technologies are apps or functions available with specific software purchases. All of these technologies require enabling devices to control energy use. Amazon's Echo connected devices require Wi-Fi and Bluetooth® enablement.

Voice Control Unit Costs

Type	Price	Retailer
Amazon		Amazon
Echo-Black	$180	
Echo Dot	$50	
Google	$130	Best Buy, Home Depot, etc.
Microsoft	$120	Included with Windows 10
Apple Home	Free app	Siri control

The Company will competitively bid to select a technology and provide it at no cost to Clifton Park customers who enroll in the residential VTOU rate. The Company will work with the chosen vendor to enable customers to "train" devices to automatically accommodate the VTOU super peak times. Meaning, the identified devices will automatically turn off or turn down in accordance to tariff peak timeframes/predetermined economic tariff signals.

Utilities Using Voice Recognition Technologies

EDF Energy, an electric and gas utility with five million customers located in the United Kingdom, is using Amazon's Echo/Alexa to provide customers with the ability to ask billing and usage questions of Alexa. EDF is working with Amazon to develop a new Echo "skill." A skill is the method in which Alexa can answer questions or provide a service. An example of a skill would be setting up your Echo/Alexa to order pizza or an Uber. In EDF's case, the skill is enabling Alexa to answer questions about various aspects of a customer's bill/service. EDF is working on expanding the functionality to control technology.

Just Energy, an energy management solutions provider located in Texas, is using Alexa in much the same way as EDF. Just Energy has set up a skill which is found in the Alexa app. That skill provides customers with billing and usage information much like EDF. In addition, Just Energy is utilizing existing skills/services to help customers control thermostats, lighting, and other connected devices.

Hypothesis Tested

In addition to the hypotheses being tested as part of the Clifton Park Project, the introduction of voice recognition technology to the Project will allow the Company to test several SHR principles:

Statement…	**If…**	**Then…**
Infrastructure: Availability of certain technology will enable customers to respond quickly to price signals and information to reduce demand	Voice recognition technology is provided to customers in the Clifton Park Project	Clifton Park residents will reduce demand by shutting off certain appliances in the home in response to emails, texts, or other prompts when prices are high.
Price Signals: Customers enrolled in the residential VTOU rate and who have voice recognition technology available will achieve bill savings	A customer enrolls in the residential VTOU rate and has enabled voice recognition technology available	Customer will reduce load by turning off appliances during super-peak periods when bill prices are higher.

Price Signals: Clifton Park customers who participate in the PTR program will more readily reduce demand with enabled voice recognition technology	A Clifton Park resident has voice recognition technology enabled and receives notification of a peak time event from the Company	The Clifton Park resident will reduce demand by turning off appliances.
Customer Engagement: Timely, customized communications and information will enable Clifton Park residents to make energy choices that align with REV principles	National Grid provides Clifton Park residents who enroll in the residential VTOU rate with voice recognition technology	Clifton Park residents will make informed and engaged energy choices resulting in greater satisfaction from lower bills.

REV Demonstration Principles Addressed

National Grid anticipates that the addition of voice recognition technology to the Project will enhance the Project as a SHR by meeting the following SHR criteria:

- Third Party Partners: The Company will partner with a provider of voice recognition technology through a competitive bid process for Clifton Park residents.

- Advance the early adoption of sophisticated home energy management technologies – the voice recognition technology to be adopted in Clifton Park will provide further tools for the customer to enable demand response, unbundle price signals to incentivize different types of DER and energy management responses; combining the voice recognition technology with price signals from the residential VTOU rate and the PTR program will provide appropriate incentives to customers to reduce demand.

MARKET ATTRACTIVENESS

The addition of voice recognition technology to the Clifton Park Project offers a unique value proposition to customers, the community, Project partners, and National Grid:

- Customers: Customers will be offered an engaging technology experience that will both educate them on their energy usage and provide a direct correlation to high price signals and reduce demand by turning off appliances. Customers will benefit from this technology by more readily taking advantage of energy savings offered through the residential VTOU rate and the PTR program.

- Community: The community can further reach their energy goals and enable education and engagement from customers on energy issues.

- Partners: The Company will engage third-party providers of voice recognition technology, offering an opportunity for these providers to increase sales of their product and energize the market

- National Grid: The Company will benefit from the reduction of peak demand on the electric distribution system and potentially reducing or postponing future infrastructure investments.

CUSTOMER SEGMENTATION AND DEMOGRAPHICS

Channels

National Grid will provide voice recognition technology to customers in the Clifton Park Project who voluntarily enroll in the residential VTOU rate. The Company is already planning outreach and education to promote the residential VTOU in the Project implementation plan. Customers who enroll in residential VTOU will have the voice recognition technology available to them to further incent their demand response participation and will make demand response much more convenient. These customers will also be able to participate in PTR events and use the voice recognition technology for participating in demand reduction to called events.

The Company uses various outreach channels to reach customers who participate in the Dynamic Load Management Programs. Think Eco and Weather Bug Home (now Whisker Labs), our vendor partners, and reach customers through various communication channels, including Facebook, Twitter, texting, e-mail, and door-to-door engagement. Those same channels will be used to reach customers participating in Clifton Park to ensure they understand how to set up, use, and optimize the voice recognition technology to their benefit.

Scalability

National Grid will take into consideration the cost of the voice recognition technology, ease and cost of implementation, evaluation of customers' response, and evaluation of overall peak demand response to better understand if the voice recognition technology could be made available on a system-wide basis and whether customers would be expected to pay for this technology or if some arrangement for payment of the device could be offered. The Company's residential VTOU rate is available across the service territory to any residential customer, which

offers a benefit to customers who can use voice recognition technology to respond to high price signals.

DEMONSTRATION PLAN

Metrics for Success

The following will be used to assess the value derived from the Project:

Technology:

- Adoption rate of voice recognition technology via enrollment in the residential VTOU rate.

Price Signals:

- Comparison of customer participation and demand reductions in peak time rewards events for Clifton Park residential VTOU customers with voice recognition technology versus Clifton Park residents not on the residential VTOU rate and without voice recognition technology.

- Comparison of customer demands during the super peak periods, and the on peak periods of the residential VTOU rate, for Clifton Park customers both on the residential VTOU rate with voice recognition and those not on the rate.

Third-Party Services:

- Identify third party resources available through the response to the Company's request for proposal for voice recognition technology for use in demand response at Clifton Park

- Increased customer adoption rate of residential VTOU rate due to availability of voice recognition technology

Customer Engagement:

- Increased customer satisfaction due to availability of voice recognition technology

Timelines, Milestones, and Data Collection

A preliminary timeline is provided below for inclusion of voice recognition technology in the Clifton Park Project. All dates below assume approval of the inclusion of voice recognition technology in the Clifton Park Project as a SHR demo by April 1, 2017:

- National Grid issue of Request for Proposal to engage third party provide of voice recognition technology by May 15, 2017
- Selection of third-party vendor by July 15, 2017
- Availability of voice recognition technology for installation by September 1, 2017
- Customer outreach and education will be incorporated into the Clifton Park Project outreach plan

Conditions / Barriers

National Grid has and will continue to reach out to potential suppliers of this technology to partner with in the Clifton Park Project and will engage a supplier via competitive bid.

FINANCIAL ELEMENTS / REVENUE MODEL

Expense and Revenue Budgets

The estimates below are a range of budget costs using an assumption of 5% of enrollments in the residential VTOU rate by Project participants on the low end (*i.e.*, 500 customers) and an assumption of 15% of enrollments on the high end (*i.e.*, 1,500 customers). All customers who enroll in the residential VTOU rate will be provided with the voice recognition technology.

Cost Category	Per Unit Estimate	Low Estimate	High Estimate
Expense – VR Unit	$180	$90,000	$270,000
Expense – Compatible T'Stat[9]	$150	$75,000	$225,000
Customer Engagement		$200,000	$300,000
Total		$365,000	$795,000

National Grid proposes to recover these costs in the same manner as the costs associated with the Clifton Park Project, but all costs identified above for the addition of the voice recognition technology should be approved as incremental costs to the Clifton Park Project budget estimates within the Project Implementation Plan.

REPORTING

Information to be Included in Quarterly Reports to the Commission

National Grid proposes to include reporting of the voice recognition technology component within the Company's quarterly reports to the Commission on the Clifton Park Project. The quarterly reports will include an overview of the progress of including voice recognition technology in the Clifton Park Project against the timeline/plan and results as they become available.

CONCLUSION

While the Clifton Park Project has many elements that support a SHR pilot, it will further benefit by the inclusion of voice recognition technology as a tool to enable customers to more fully respond to and participate in the Company's residential TOU rate and PTR programs offered in the Project. This technology will promote a behavioral response by customers to reduce demand following real-time information via text or email and allow them to conveniently turn down or turn off devices in the home to reduce demand and provide utility bill savings.

The addition of voice recognition technology will also provide the opportunity for the Company to partner with a third party vendor and test exciting, new technology that is not yet prominent in

[9] T-stat must be compatible with ConnectedSolutions program

the home. This will provide a necessary conduit between price signals from the Company's offered rate programs in the Project and a customer's ability and desire to respond.