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Senior Counsel II

December 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-E-0423 – Proceeding on Motion of the Commission to Develop Dynamic Load Management Programs

Case 15-E-0189 – Petition by Niagara Mohawk Power Corporation to Effectuate Dynamic Load Management Programs

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID – DYNAMIC LOAD MANAGEMENT PROGRAMS ANNUAL REPORT FOR 2017 CAPABILITY PERIOD

Dear Secretary Burgess:

In accordance with the requirements first set forth in the Commission's June 18, 2015 *Order Adopting Dynamic Load Management Filings with Modifications* and as subsequently modified in the Commission's May 23, 2016 *Order Adopting Dynamic Load Management Changes with Modifications* and April 21, 2017 *Order Modifying Dynamic Load Management Filings and Making Other Findings Modifications* in Cases 14-E-0423 *et al*., Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid") hereby submits for filing its annual report addressing the assessment of National Grid's three dynamic load management ("DLM") programs for the 2017 capability period and identifying changes that are planned for the 2018 capability period.

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Thank you.

Respectfully Submitted,

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nationalgrid

Niagara Mohawk Power Corporation d/b/a National Grid

Report
on
Program Performance and Cost Effectiveness
of
Dynamic Load Management Programs

Case 15-E-0189

December 1, 2017

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INTRODUCTION

Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") submits this 2017 year-end report in compliance with the New York State Public Service Commission's ("Commission") April 21, 2017 *Order Modifying Dynamic Load Management Filings and Making Other Findings* ("Order").[1] The Order requires the Company to submit a report to the Commission by December 1 of each year assessing the Dynamic Load Management ("DLM") programs approved by the Commission.[2]

National Grid's DLM programs consist of: the Distribution Load Relief Program ("DLRP") as described in Rule 61 of the Company's PSC No. 220 Electricity – Schedule for Electric Service ("Tariff"); the Commercial System Relief Program ("CSRP") as described in Rule 62 of the Tariff; and the Direct Load Control Program ("DLC program") as described in Rule 63 of the Tariff. This report reviews 2017 capability period results from all three programs. Also described in this report are proposed changes to the implementation of these programs in 2018, as well as the cost recovery mechanism for these programs in 2018, which is described in Rule 64 of the Tariff.

National Grid offers two categories of demand response ("DR") programs. Although customers in most rate classes are eligible for all three DLM programs, National Grid considers the DLRP and CSRP to be commercial customer-focused programs, while the DLC program to be a residential and small business customer-focused program. The CSRP and the Bring Your Own Device ("BYOD") DLC program (also known as the **Connected**Solutions program) are currently offered system wide. The DLRP and the Company-Provided Thermostats ("CPT") DLC program (also known as the coolControl program) were focused in the Village of Kenmore for the 2017 season. There is also a focus on reducing load in National Grid's identified potential non-wires alternatives ("NWA") projects. Currently there are twenty-four (24) possible NWA projects in the Company's service territory where fourteen (14) are being further reviewed by National Grid's Planning Department to confirm suitability for NWA opportunities. Of the remaining ten (10) possible NWA projects, four (4) have completed the request for proposal ("RFP") process where a final determination has yet to be made and another six (6) NWA projects are expected to have RFPs issued no later than January 2018. However, should a potential DR solution result from the RFP process or should the Company pursue a DR solution independently, it would not be implemented

[1] Case 14-E-0423 *et al., Proceeding on Motion of the Commission to Develop Dynamic Load Management Programs et al.,* Order Modifying Dynamic Load Management Filings and Making Other Findings Modifications (issued April 21, 2017*)*("Order").
[2] *Id*., Ordering Clause No. 3, p. 26.

for the 2018 capability period, which begins May 1 and ends September 30.[3] Table 1 below illustrates the pricing incentives applicable to National Grid's DLM programs.

Table 1: National Grid's 2017 DLM Programs

Program Name	Program Type	Program Event Triggers and Duration	Incentives
Distribution Load Relief Program ("DLRP")	Contingency	Contingency program activated for system critical situations (*i.e.*, unforeseen distribution system emergencies wherein stressed electrical equipment may exceed established limits). Events are called with short/no advance notice ("Immediate") or at least two (2) hours advance notice ("Test" or "Contingency"). Test events last one (1) hour whereas Contingency or Immediate events may last four (4) or more hours. Includes Reservation and Voluntary participants. Focused in designated areas of the service territory with participation available to customers served at primary and secondary voltages only.	Reservation Payment Option: • Reservation Payment = $4.69/kW Month; • Performance Payment = $1.02/kWh; Voluntary Option: • Performance Payment = $1.20/kWh
Commercial System Relief Program ("CSRP")	Peak Shaving	Activated for peak shaving needs. For "Planned Events" the Company provides > 21 hours' advance notice and the Planned Event may last four (4) hours or more. For "Unplanned Events" the Company will provide < 21 hours' advance notice. Includes Reservation and Voluntary options for participants. System-wide program available to customers served from all voltages.	Reservation Payment Option: • Reservation Payment (up to four (4) events) = $2.75/kW Month; • Reservation Payment (over four (4) events) = $3.00/kW Month; • Performance Payment - Planned Event = $0.17/kWh; • Performance Payment Unplanned Event = $0.21/kWh. Voluntary Performance Payment Option: • Performance Payment Planned Event = $0.16/kWh; • Performance Payment Unplanned Event = $0.19/kWh

[3] This is because the need date for NWA projects is when the load reduction solution or traditional utility transmission or distribution capital investment must be fully operational. Although DR is a flexible solution, it will take time to ramp up as will other NWA solutions.

Direct Load Control ("DLC") program	Contingency and Peak Shaving	Activated for system critical situations or for peak shaving. National Grid has the ability to remotely adjust thermostat settings and/or cycle appliances via a smart plug load control device. Customers in designated areas may receive a free DR-ready/remote controllable thermostat ("CPT") and/or plug load controller (or other devices as applicable). Bring Your Own Device ("BYOD") program connects existing Honeywell, ecobee, or Nest Wi-Fi thermostats to National Grid's Demand Response Platform (Whisker Labs).	• One-time sign-up payment of $30 and a $20 yearly incentive - payable the second year of participation - for reducing load during 80% of called events/ hours.

Commercial Demand Response Programs—DLRP/CSRP

National Grid offers two commercial DR programs in New York: the DLRP and the CSRP. The DLRP is a contingency program wherein individual participants are required to curtail 50 kW when participating directly in these programs with the Company. Aggregators are required to deliver at least 50 kW of load relief in aggregate in order to participate in these programs. An event under the DLRP is called when identified/stressed electrical equipment exceeds certain limits. An event under the CSRP is called when the electric system is projected to exceed 92% of the Company's system.

Program Enrollment

There were no participants who signed up to participate in the DLRP during the 2017 capability period. The Village of Kenmore has a very small pool of eligible, interval-metered commercial customers capable of curtailing 50 kW or more, although customers have the option of installing interval meters at their cost if they are interested in participating in DLRP/CSRP. In contrast the CSRP had 200 participants in the 2017 capability period totaling 188.61 MW of curtailment. There were four (4) aggregators and one direct participant in this program in 2017.

Program Costs and Benefits

Table 2 below identifies the costs associated with the 2017 CSRP. Reservation and Performance Payments, Program Operations costs, and Demand Response Management System ("DRMS") costs are included below. National Grid engaged AutoGrid Systems, Inc. ("AutoGrid") as its DRMS provider in 2017 for both DLRP and CSRP participants. AutoGrid is under contract for the next two (2) years (2018-2019) to provide Software as a Service ("SaaS") functionality and these costs were paid in full upfront for the full three (3) years, with the cost shared between National Grid and the Company's affiliates in Massachusetts and Rhode Island. The costs allocated to National Grid for the AutoGrid

contract have been included in the revenue requirement of the Company's 2017 electric rate filing[4] which is pending before the Commission and are not proposed to be recovered through the DLM surcharge.

DLRP costs are identified below in Table 2. There were no customers in DLRP in 2017.

Table 2: 2017 DLRP Costs

DLRP Costs	Total Costs	DLM Surcharge Recoverable	DLM Surcharge Non-Recoverable
DRMS Charges	$1,684,338.85	$1,684,338.85	
Program Operations (internal)	$ 14,332.01		$ 14,332.01
Total	**$1,698,670.86**	**$1,684,338.85**	**$14,332.01**

Table 3 below provides the CSRP costs for 2017:

Table 3: 2017 CSRP Costs

CSRP Costs	Total Costs	DLM Surcharge Recoverable	DLM Surcharge Non-Recoverable
Reservation	$ 2,410,510.00	$ 2,410,510.00	
Performance	$ 32,064.72	$ 32,064.72	
DRMS Charges	$ 1,684,338.85	$ 1,684,338.85	
Program Operations (internal)	$ 72,457.31		$ 72,457.31
Total	**$ 4,199,370.88**	**$4,126,913.57**	**$ 72,457.31**

[4] Case 17-E-0238, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Electric Service ("2017 Niagara Mohawk Electric Rate Case Proceeding").

DLRP/CSRP Program benefits:

- Monetary Benefits
- Capacity cost reduction
- Commodity purchase reduction
- Equipment purchase deferrals
- Capital project deferrals

DLRP/CSRP Customer Benefits

- Monetary benefits above trickle down to all customers potentially lowering electric bills
- Non-traditional revenue streams from incentives and related rebates
- Demand charge reduction
- Potential ratchet avoidance
- Reduced stressed on customer electrical equipment

DLRP/CSRP Utility Benefits

- Deferred capital project costs
    - Due to reduced system stress
    - Due to direct project savings in designated areas
- Enhanced communications/connections with customers
    - Positive touch points
    - Underscores/enhances the Company's "trusted advisor" role
- Reduced commodity costs
- Reduction in system stress
    - Specific equipment
    - General system health

DLRP/CSRP Community/Societal Benefits

- Lower greenhouse gas ("GHG") emissions due to reduced need for expensive peak power plants – historically higher polluters
- Lower GHG due to energy reductions
- Potential to increase electrical reliability especially in designated areas
- Deferral of disruptive utility construction projects

Program Operations

Program operations costs for 2017 were made up of implementation activities including, but not limited to, tariff leaves preparation, program implementation, incentive setting, measurement and verification ("M&V") preparation and results calculations, aggregator communications, internal departmental outreach, coordination work with other utilities, and document preparation. Implementation activities are not recovered through the DLM surcharge.

The Company enrolled 200 customers through four (4) aggregators for the CSRP. The total amount of curtailment from these 200 customers was 187.58 MW. AutoGrid was contracted as the DRMS vendor for National Grid for the 2017 capability period and will continue to work with the Company for next two (2) years (*i.e.*, through 2019). National Grid continued to manually call events in 2017 as a precautionary measure to ensure accuracy and dependability for called DR events. However, National Grid will move to AutoGrid in 2018 for calling DR events. For the 2017 capability period, the enrolled aggregators/customers were entered into the DRMS and were then contacted for the one (1) test event that occurred on June, 13, 2017. National Grid ran the DR event process manually and will continue to do so in 2018 until all technological issues are addressed. Activities in 2017 for the CSRP included:

Checking all accounts in National Grid's customer system for:

- Accurate account numbers
- New York Independent System Operator ("NYISO") zone
- Customer service/mailing address
- Supply station/feeder/voltage
- Customer's National Grid Account Manager
- Peak load information

Aggregator/customer management:

- Cooperative discussions about process improvements
- Creation of bulk sign-up Excel file
- Identification of website improvements needed
- Event notification discussions/processes

Program Management:

- Event trigger process

- Event notification process
- Day-ahead forecast set up
- Accounting set up – CSRP payments
- Customer Base Load ("CBL") calculation
- KW reduction calculation
- Payment calculation
- Performance factor maintenance
- NYISO coordination
- General event management

DRMS Set Up and Configuration

- Customer enrollment set up in DRMS
- Settlement calculations for DRMS vendor
- Accurate reporting of DR event calculations by working with internal Technical Control Center ("TCC") and AutoGrid
- Effective internal IT integration for AutoGrid
- Event notification tests

DLRP/CSRP Event Performance and System Impacts

During the 2017 capability period National Grid's service territory experienced mild temperatures. CSRP participants contracted with National Grid through four (4) aggregators for 180.453 MW of load relief. In contrast to 2016 where only three (3) aggregators participated, Direct Energy was added as an aggregator this year, and one (1) individual participant enrolled in the CSRP with 7.124 MW of load relief. Table 4 below provides the performance factor ("PF") of each of the four aggregators and the individual participant in the 2017 capability period.

Table 4: Performance Factors

Aggregator/Individual Participant	Enrolled kW	Performed kW	PF
CPower Energy Management	132,847	27,428.00	0.96
NRG Energy	25,391	28,159.80	1.00
EnerNOC, Inc.	6,015	3,794.50	0.63
Direct Energy	16,200	18,114.00	1.00
Individual Participant	7,124	11,119.70	1.00

The curtailments benefit National Grid's electrical system. Nearly ninety percent of the load shedding came from transmission or sub-transmission customers leaving 201 MW of load shedding focused on the distribution system. In addition, the majority of the load shedding was concentrated in NYISO Load Zone A, National Grid's Western Division. National Grid's customer-facing teams mentioned above will be working toward increasing participation in other National Grid regions.

System impacts for the test event date and contracted load curtailment by NYISO zone are illustrated below in Tables 5 and 6, respectively.

Table 5: 2017 CSRP Event Results

2017 CSRP Event Results	
Test Event Date	MW Curtailed
6/13/2017	188.61 MW

Table 6: 2017 CSRP Load by NYISO Zone

NYISO Zone	**CSRP Customers**	**Load (MW)**
A	81	128.18
B	18	1.55
C	27	8.89
E	18	7.70
F	57	41.25

Program Marketing

National Grid performed outreach for the DLRP in 2017 through account managers responsible for the Village of Kenmore and anticipates an increase in this effort for 2018. For the CSRP, National Grid reached out to the NYISO aggregator pool to solicit interest. National Grid marketed the 2017 CSRP to the aggregator pool via phone calls, emails and in-person meetings.

National Grid's Market Development team, Jurisdiction Managers, and Sales teams serve as the main point of contact for "selling" commercial DLM programs due to trusted relationships that exist between larger customers and the Company's customer-facing groups. These National Grid teams are in constant contact with customers regarding issues including, but not limited to, energy efficiency measures, billing matters, energy-related projects, and addition of distributed energy resources ("DER"). The Company developed a DR information package for the jurisdiction managers and sales representatives to talk from and leave behind – those materials will be upgraded for 2018. This effort to more effectively "sell" DR will require training of National Grid sales representatives and an understanding by the energy efficiency sales team of program offerings and potential DR opportunities.

2018 DLRP/CSRP Program Changes

National Grid is proposing the following DLM program changes for the 2018 capability period.

DLRP Changes

1. *Expansion of DLRP to a system-wide program.* National Grid is currently working with Department of Public Service Staff ("Staff") in order to expand its DLRP system wide and to coordinate with Staff on pricing efforts for future years. National Grid has several NWA areas under consideration that the DLRP program may provide a solution but until those needs are fully vetted it is premature to expand the DLRP to the entire territory for the summer 2018 program period in consideration of the additional costs of such an expansion for areas that do not have identified distribution constraints.
2. *DLRP pricing changes with NWA additions.* The pricing for DLRP for the 2018 capability period will remain the same as the 2017 pricing. The 2018 pricing incentives and calculation workpapers are provided in attached Appendix A. Per the Tariff, the Company may make price incentive changes sixty (60) days prior to the start of the capability period. National Grid could add additional targeted areas and pricing for the DLRP once NWA solution proposals in response to RFPs are fully vetted, however, that need would likely be post-2018 unless circumstances were to significantly change. NWA projects are listed below in this report.
3. *DLRP Cost Recovery*. The Company proposes changes to the mechanism by which DLRP and costs are recovered from customers. Currently DLRP program costs are recovered from all customers on a kWh basis for non-demand customer classes and on a per kW basis for demand customer classes. For the 2018 program, the Company proposes to modify the cost recovery to recover DLRP costs from distribution customers only, who primarily benefit from this program, only and will exclude

subtransmission and transmission-level customers who are not currently eligible to participate in these programs.

There are twenty-four (24) potential NWA projects in the Company's service territory as identified in the *Joint Utilities' Supplemental Information on the Non-Wires Alternatives Identification and Sourcing Process and Notification Practices* filed with the Commission on May 8, 2017.[5] Currently, the Village of Kenmore is the only DLRP area benefitting from a DR solution. However, there are nine (9) NWA projects identified below for which DR may provide a potential solution. The Company will inform the Commission, Staff, aggregators, and direct customers when new designated areas are declared for the DLRP and will file revised pricing incentives at such time when new designated areas are offered.

Old Forge – The Old Forge area, including towns located on Route 28 between the Hamlets of Alder Creek and Raquette Lake in the Adirondack Region, is served from a 60 mile radial sub-transmission 46 kV line (46 kV/13.2 kV/4.8 kV) and is prone to outages. Last year there were five outages in a two-month span. This sub-transmission line is located in the Adirondack State Park and is of radial design without a back-up source. Based on a fault location, all customers located downstream of the faulted area may experience a long duration interruption. National Grid is currently evaluating proposals received in response to its RFP for NWA solutions to provide for resiliency in order to bridge the time it takes to repair damage and reenergize the line. Load relief of 13 MW is required in this region.

Brooklea Drive/Duguid Feeder Relief – This proposed project will address loading on a portion of a distribution feeder due to overloads of the step-down ratio transformer bank serving portions of the Village of Fayetteville, located just east of the City of Syracuse. Loading has increased to a level that the step-down ratio transformer bank is overloaded during peak loading days. Due to the location of the step-down ratio transformer bank there is no physical space to install a larger transformer and therefore an area voltage conversion is planned as the traditional solution. National Grid has solicited NWA proposals to reduce loading in the area and specifically on an overloaded step-down ratio transformer bank on a Duguid distribution feeder. The Company is currently evaluating the sole proposal received. There is an estimated need of 140 kW of load relief in this region.

[5] Case 16-M-0411 *et al*., *In the Matter of the Value of Distributed System Platform Implementation Plans et al*., Joint Utilities' Supplemental Information on the Non-Wires Alternatives Identification and Sourcing Process and Notification Practices (filed May 8, 2017), Appendix 3, pp. 3-8.

Gilbert Mills – Loading on the Gilbert Mills Substation serving the Towns of Schroeppel and Palermo and a portion of the Town of Hastings, located east of the City of Oswego and north of the City of Syracuse, has increased to a level at which it is projected to be loaded to 100 percent of its normal rating. A single T&D contingency results in approximately 1.7 MVA load at risk. National Grid is evaluating proposals received in response to its RFP for NWA solutions to reduce the area load in order to maintain or improve reliability performance.

VanDyke Road Station – Loading on the substations (Delmar Substation and New Krumkill Substation) serving portions of the Towns of Bethlehem and New Scotland, and portions of the City of Albany has increased to a level at which the load at risk for a single T&D contingency exceeds the risk threshold established in National Grid's Distribution Planning Criteria. Additionally, 11.5 MW of expected new commercial and industrial load in the Town of Bethlehem will cause feeder loading beyond normal ratings. National Grid expects to issue a RFP before year-end 2017 seeking NWA solutions to reduce the area load at risk to maintain or improve reliability performance. A NWA solution could be a hybrid solution in conjunction with a rebuild of the existing Delmar Substation.

Buffalo 53 – The current loading on indoor Station 53 located in the City of Buffalo has increased to a level at which the capacity of the transformers and cables feeding the substation exceed the threshold established in the National Grid Distribution Planning Criteria. The traditional project solution would involve reconductoring and/ or upgrading the substation with an additional transformer bank. National Grid expects to issue a RFP before year-end 2017 seeking NWA solutions to reduce loading on existing cables and transformers to prevent overload conditions. There is an estimated 1 MW+ of load relief needed in this area.

Golah Avon – Sub-transmission lines Golah-North Lakeville #216 and #217 have potential reliability issues. The reliability concerns are low voltage exposures during outages on the 115kV circuits. The area in need is located in a rural area south of the City of Rochester along and to the east of Interstate 390 in Livingston County. There are 4.8 kV and 13.2 kV distribution stations and circuits supplied from the 34.5 kV system. National Grid expects to issue a RFP before year-end 2017 seeking NWA solutions to defer the reconductoring of lines 216 and 217 so that the area loads would not need to be shed for outages on the 115 kV network.

Beech Ave. – This distribution feeder located in the Niagara Falls area is projected to be over 100 percent of summer normal rating. Load relief is needed on the distribution feeder. National Grid expects to issue

a RFP by January 2018 seeking NWA solutions to reduce the area load in order to maintain or improve reliability performance.

Fairdale Distribution Substation – Loading on the Fairdale substation serving the Town of Hannibal (located just outside of the City of Oswego) has increased to a level that is projected to be overloaded to 100 percent of its normal rating. National Grid expects to issue an RFP by January 2018 seeking NWA solutions to reduce the area load in order to maintain or improve reliability performance.

New Cicero Substation Distribution Substation and Distribution Line – There are significant capacity and outage exposure issues that need to be resolved in this North Syracuse area. Two major substations that need to be relieved are the Pine Grove Substation and the Bartell Road Substation. In addition to the relief needed at these two existing substations, there are existing distribution feeders with thermal overloads that need to be addressed. National Grid expects to issue an RFP by January 2018 seeking NWA solutions.

The Company will choose proposals/vendor(s) if the NWA solution is a cost-effective alternative to a traditional T&D solution.

CSRP Changes

Change in CSRP pricing incentives. National Grid has updated its pricing incentive calculations to use the marginal cost of distribution as updated in the Marginal Cost of Service Study provided in the 2017 Niagara Mohawk Electric Rate Case Proceeding. This change, along with using updated forecasts for participation, resulted in minor demand response incentive changes. For the 2018 CSRP, the performance payment incentive for a planned event under the reservation payment option has increased from $0.17/kWh to $0.18/kWh. In addition, the performance payment incentive for an unplanned event under the reservation payment option has increased from $0.21/kWh to $0.22/kWh. The 2018 demand response incentives and calculation workpapers are provided in Appendix A.

Energy Storage Export for DLM Programs

A number of issues relative to projects pairing energy storage systems with eligible resources behind the meter ("BTM") and exporting to the distribution system are currently being addressed in response to the Commission's September 14, 2017 *Order on Phase One Value of Distributed Energy Resources Implementation Proposals, Cost Mitigation Issues, and Related Matters* ("VDER Phase One

Implementation Order").[6] Those issues include establishing the appropriate mechanisms in the Standardized Interconnection Requirements ("SIR") for the treatment of such projects in the interconnection process, defining necessary technical performance and protection requirements, and determining the appropriate method for identifying the nameplate capacity of a system that combines generation and energy storage for interconnection and compensation purposes. The VDER Phase One Implementation Order directs Staff to work with NYSERDA, utilities, developers, and other stakeholders, through the Interconnection Policy Working Group and other forums, to develop a proposal for integrating storage into the interconnection process. Staff is directed to file proposed changes to the SIR and related recommendations regarding energy storage systems by December 20, 2017 for public review and comment to be followed by Commission consideration. As such, National Grid will address the integration of energy storage systems into the DLM programs once the efforts in the VDER Proceeding are concluded and the SIR revisions to address energy storage system interconnection are adopted by the Commission. At that time, in a manner that comports with the SIR, participants in National Grid's DLM programs with BTM energy storage systems capable of exporting to the primary and secondary distribution systems will be allowed to export during DR events to provide system relief.

National Grid notes that energy storage export is not eligible for SCR or EDR programs under current NYISO rules.

Website Development for DRLP and CSRP

There were also major improvements made to the DRLP and CSRP content on the National Grid website in advance of the 2017 capability period. The main page for customers to access Demand Response information for commercial businesses is at https://www.nationalgridus.com/Upstate-NY-Business/Energy-Saving-Programs/Demand-Response-Programs.

Program specific information can be found at https://dev-us-content.nationalgridus.com/Services-Rebates?filters=For%20Businesses|Upstate%20New%20York|Electric|Demand%20Response. Customers could sign up for programs and download all necessary information and forms here. Information about the NYISO programs is also listed on the Company's website.

[6] Case 15-E-0751 *et al*., *In the Matter of the Value of Distributed Energy Resources* ("VDER Proceeding") *et al*., Order on Phase One Value of Distributed Energy Resources Implementation Proposals, Cost Mitigation Issues, and Related Matters (issued September 14, 2017)("VDER Phase One Implementation Order"), pp. 38-39, 40-41.

DLRP/CSRP Conclusions

There are no DLRP participants currently in the Kenmore area but the Company is evaluating NWA opportunities which may create additional DLRP targeted areas in the National Grid service territory and improve participation in the program.

2017 CSRP results exceeded expectations and the 187.6 MW of dynamic load reduction achieved provided a benefit to National Grid's electrical system and system control operators and asset management teams while demonstrating that DR is a tool in their planning processes. The Company expects that load relief will grow in 2018, along with the number of customers and aggregators who participate in the program.

Direct Load Control ("DLC") Program

coolControl Program

Introduction

The coolControl program targeted residential and small commercial customers located in the Kenmore area of electrical stress. The program is administered by ThinkEco, Inc. The coolControl program is used to curtail electricity demand from about 19,000 residential and small business customers in North Buffalo, Kenmore, and Tonawanda. The two devices offered to customers are the Emerson Sensi™ Wi-Fi thermostats and the ThinkEco modlet controller that controls both smartAC kits provided to customers and customers' dehumidifiers, where the latter is the most recent addition to the program.

Navigant Consulting, Inc. ("Navigant") performed an impact evaluation for National Grid at the end of the 2017 capability period to evaluate the coolControl program as well as the **Connected**Solutions program. Most of the data, charts, and tables in this section of the report have been provided to the Company by Navigant. Navigant assessed participation of the Emerson Sensi™ thermostats in the program and conducted an impact analysis and evaluated demand and energy impacts. The curtailment goal for the coolControl program was 2 MW in 2017.

In 2017, enrollment increased in the program, reaching a total of 355 Emerson Sensi™ Wi-Fi thermostats by the end of the capability period. The average number of thermostats per customer was 1.03. In addition, there were 228 ThinkEco smartAC kits and 26 ThinkEco smartAC kits

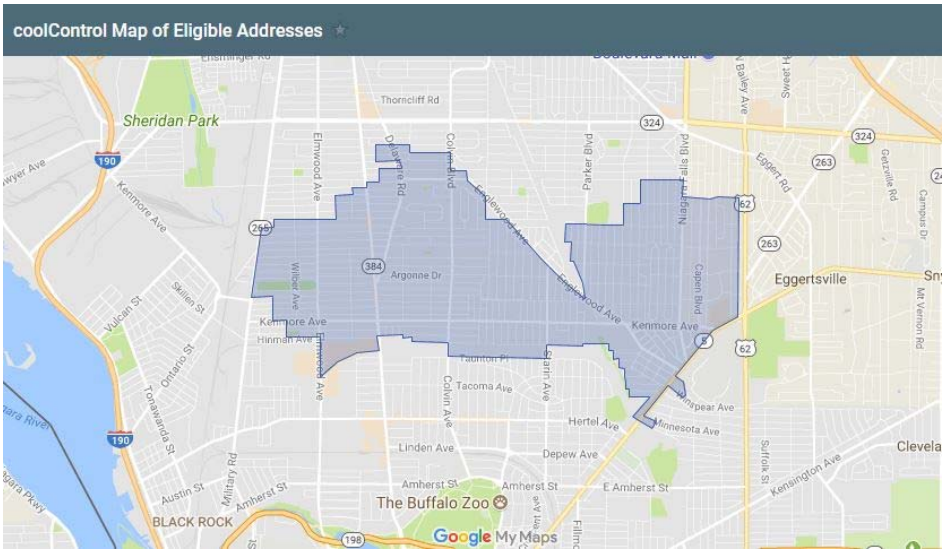
controlling dehumidifier units that were installed and in use in 2017. Table 7 below provides a coolControl program summary which shows the basic requirements for customer participation. The Emerson Sensi™ thermostats were reviewed by Navigant in detail for the evaluation study. The findings are presented below.

Table 7: 2017 coolControl Program Summary

	Emerson Sensi™
DR Season	May 1 to Sept 30
Potential Event Days	Weekdays
Potential Event Times	10 am to 8 pm
Maximum events in season	4
Maximum events in 1 week	N/A
Maximum events in 1 day	1
Event duration	2 to 4 hours
Pre-cooling temp adjustment	N/A
DR event temp adjustment	5°F
Incentive	$20
Participation Requirement	80% of events

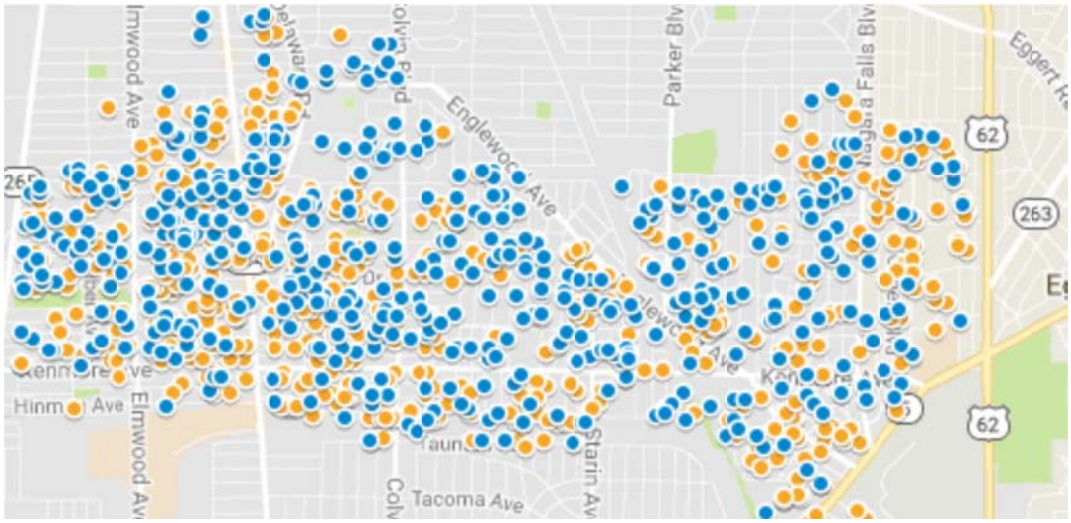
Below is a territory map for the coolControl program which is an area of electrical stress located on the outskirts of the City of Buffalo.

Figure 1: coolControl Territory Map



The map below shows the penetration rate in the territory for both Emerson Sensi® Wi-Fi thermostats (in blue) and ThinkEco SmartAC kits (in orange). This specific territory was chosen due to the need for load reduction in this area of National Grid's distribution grid.

Figure 2: coolControl Program Penetration



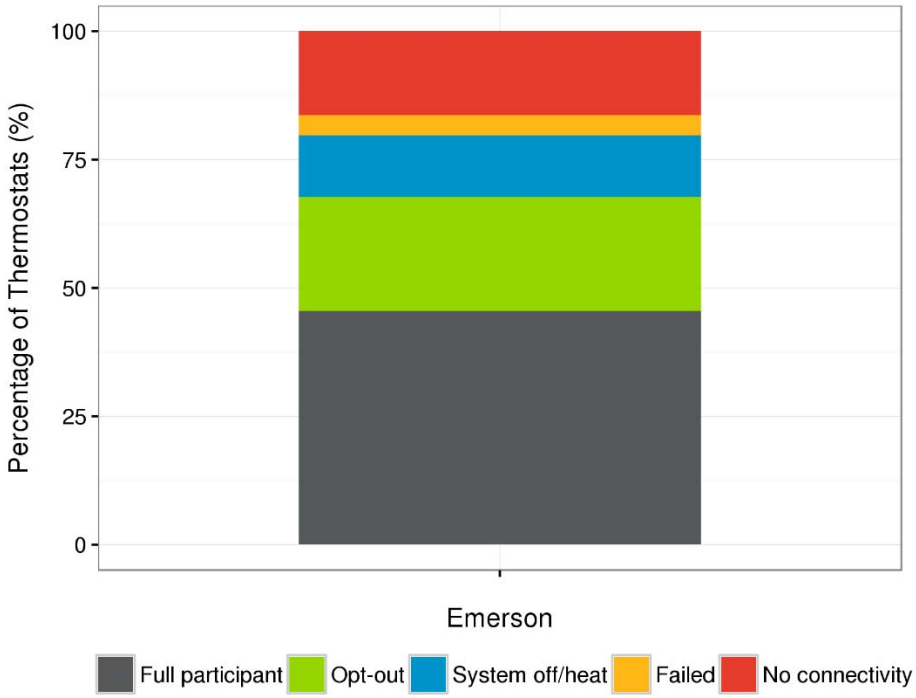
Program penetration (blue = Emerson Sensi™ thermostat, orange = ThinkEco smartAC kit)

Technology Overview and DR Events

Power reductions from Emerson Sensi™ Wi-Fi thermostats averaged 0.93 kW value in 2017. There were four (4) events held in 2017 on the following dates: June 13, July 31, August 17, and September 25. The events had an average duration of two (2) hours each. Opt-outs, connectivity issues, failure to receive a DR signal, and thermostats in "cool" mode were all factors as to why 100 percent participation was not achieved. Approximately 46% of the Emerson Sensi™ Wi-Fi thermostats participated in all DR events.

Approximately 22 percent of the Emerson Sensi™ devices opted out of DR events and 22 percent of these thermostats experienced connectivity issues. Opt-outs were the greatest on September 25 which was the hottest event date in the 2017 capability period. There was some evidence of participation fatigue for the coolControl program, with participants opting out each subsequent hour of each event. It is also apparent that opt-outs of the devices were due to higher temperatures and not precooling. Per device savings showed that precooling was an effective strategy for the 2017 capability period.

Figure 3: Average Participation for Emerson Sensi™ Wi-Fi Thermostats



The coolControl program offerings include various methods for connecting and controlling ThinkEco SmartAC kits. The program allowed the Company to control connected devices during periods of electrical stress in the 2017 capability period. Customers with room air conditioners ("RACs") that are not Wi-Fi enabled can sign up to receive a free ThinkEco smartAC kit for each of their RACs. The ThinkEco kit consists of one Wi-Fi Modlet BN *(i.e.,* smart plug) and one thermostat remote to control the Modlet/RAC. Participants can download a free smartphone app for their Android or iPhone which allows them to control and monitor their RACs remotely.

There were 228 ThinkEco SmartAC kits enrolled in the coolControl program by the end of the 2017 capability period. The highest reduction was 122 watts per SmartAC kit and the average reduction across the four (4) events was 97 watts/AC kit. The reduction and opt-out rates were highly temperature-dependent in the 2017 capability period. Cooler days resulted in low baseline usage but a high percentage of the load was reduced. Hotter days resulted in higher opt-out rates but this was outweighed by higher per-device reductions.

Incentives

Customers received a $30 sign-up incentive once their device was connected via Wi-Fi. A $20 incentive is available at the end of the second capability period (May 1 – September 30) if customers participate in 80 percent of called events/hours. Customer incentives totaled $12,680.00 for the 2017 capability period. There were 456 ThinkEco SmartAC kits set up by the end of the 2016 capability period. Of that total of 456, 145 kits were online since the beginning of the 2017 capability period. Of the 145 that were online in 2017, 66 kits participated in at least 80 percent of events and received the $20 at the end of the second year of participation (*i.e.*, 2017 capability period).

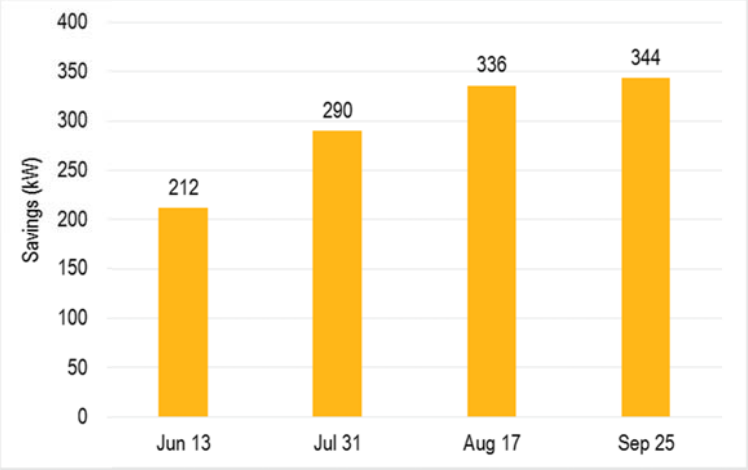
Think Eco's sign-up incentives are in the form of an electronic Tango Card®, a platform that allows customers to redeem the card at dozens of major retailers and non-profits. **Connected**Solutions also pays incentives in gift card form.

Program Costs and Savings

For the coolControl program in Kenmore, the average demand reduction per event was 296 kW in the 2017 capability period. The maximum event savings was 344 kW. The average energy savings per event was 636 kWh. In contrast, the average savings per Emerson Sensi™ Wi-Fi thermostat was 0.93 kW per event.

Savings for the Emerson Sensi™ Wi-Fi thermostat ranged from 212 to 344 kW for the 2017 capability period for the coolControl program. Figure 4 below provides event-specific savings for the four (4) events that were called. As shown, savings increased with each subsequent DR event.

Figure 4: Energy-Specific Savings per Event



Below are the expenses for the 2017 capability period with ThinkEco for the coolControl Program, including all hardware costs, marketing costs, and customer incentives:

Table 8: ThinkEco Expenses for 2017 (coolControl Program)

ThinkEco Expenses			
Description	Quantity	Unit Cost ($)	Amount ($)
Modlet BN Wi-Fi	345	$74.00	$25,530.00
SmartAC Thermostat	345	$22.00	$7,590.00
Emerson Sensi™ Hardware	105	$110.00	$11,550.00
Program Services			
Cloud Software per smartAC Kit	313	$10.00	$3,130.00
Program Management	21	$25.00	$525.00
Fulfillment	175	$12.00	$2,100.00
Recruit, Marketing, Engagement	500	$15.00	$7,500.00
Central AC Program Addition			
Cloud Software for Emerson Sensi™ Wi-Fi Thermostat (annual)	327	$12.00	$3,924.00
Installation Services	105	$150.00	$15,750.00
Recruit, Marketing, Engagement	750	$20.00	$15,000.00
Program Management	262	$25.00	$6,550.00
Customer Incentives			
Set Up	248	$30.00	$7,440.00
DR Performance	262	$20.00	$5,240.00
Total			$111,829.00

In the coolControl program, there were 355 Emerson Sensi™ Wi-Fi thermostats signed up for the coolControl program by the end of the 2017 capability period. On average, each thermostat curtailed an average of 0.93 kW per thermostat, for a total curtailment of 330.2 kW.

In total, there were 313 ThinkEco SmartAC kits participated in the coolControl program by the end of the 2017 capability period. On average each SmartAC kit curtailed 0.050 kW for a total curtailment of 15.7 kW.

The total cost for the coolControl program for the 2017 capability period was $111,829 with a corresponding total curtailment potential for the coolControl program of 345.9 kW. The cost/kW for the coolControl program for the 2017 capability period was $323.3/kW.

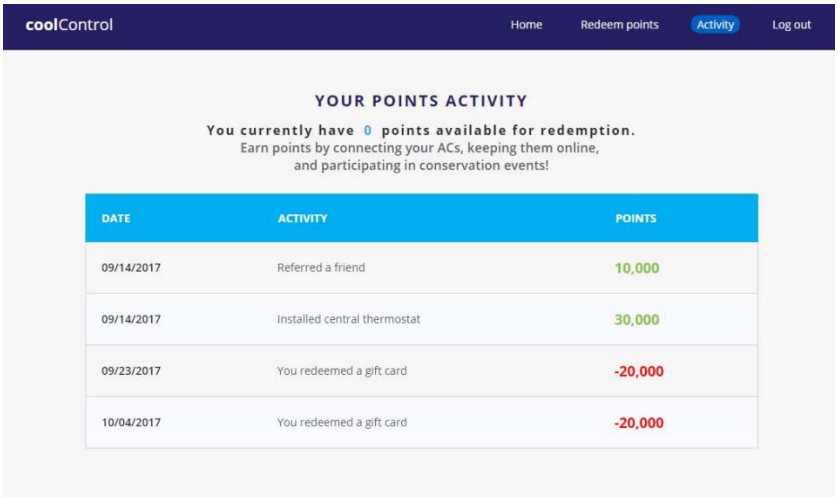
Marketing and Recruitment

ThinkEco performed market research including site visits to assess the target neighborhood. The territory is working-to-middle class suburbs, with primarily single or duplex housing built in the 1930s. Many of those living in the area had retired from an industrial plant nearby, so the population tended to be older and less tech savvy (*e.g.*, 92% of in-person installations of smartAC kits were for senior citizens).

Hardware options for the coolControl program were expanded in 2017 to include ThinkEco smart AC kits that could also control dehumidifiers. National Grid will continue to investigate other thermostat technologies and devices for 2018. The program also introduced a new points and rewards platform in 2017 on which customers could track their performance and redeem their points for a variety of gift cards.

Below is the platform ThinkEco utilized to track customers' performance during the 2017 capability period.

Figure 5: coolControl Customer Activity Page



Recruitment in 2017 began in March for Emerson Sensi™ Wi-Fi thermostats and in May the messaging shifted to encompass the ThinkEco SmartAC kit as well. Customers with RACs received up to five (5) free ThinkEco SmartAC kits (Wi-Fi smart plugs) and customers with compatible CAC systems received up to two (2) free Emerson Sensi™ Wi-Fi thermostats. The ThinkEco SmartAC kits were self-installed while the Emerson Sensi™ thermostats were installed by professional HVAC installers at no cost to the customer. Both devices have free mobile apps that put internet-of-things technology in the hands of the customer.

Enrollment and customer retention will be of utmost important for the 2018 capability period. Yearly recruitment efforts will begin in late winter/early spring with minor outreach over the winter to confirm that customers are continuing to keep their equipment for DR events for the upcoming summer.

Demand response incentives for the DLC program will remain unchanged for the 2018 capability period. Demand response and calculation workpapers for 2018 for all DLM programs are provided in Appendix A.

Throughout the 2017 capability period, a number of cost-free recruitment techniques were used, including unpaid media and social media appearances, and emails. Many of the recruitment emails also offered prizes for signing up and these proved to be the most cost-effective of the paid recruitment strategies employed in 2017. During the recruitment season in 2018, ThinkEco will

continuously review the cost effectiveness of each marketing technique and revise the marketing strategy accordingly.

Within the coolControl program territory, the aim was to maximize enrollment by contacting all residents using multiple forms of communication throughout the summer. ThinkEco utilized these methods for communication in 2017:

- Website
- Email
- Canvassing/door hangers
- Local partnerships
- Facebook
- Newspapers
- Events
- Referrals
- National Grid website
- Targeted local businesses

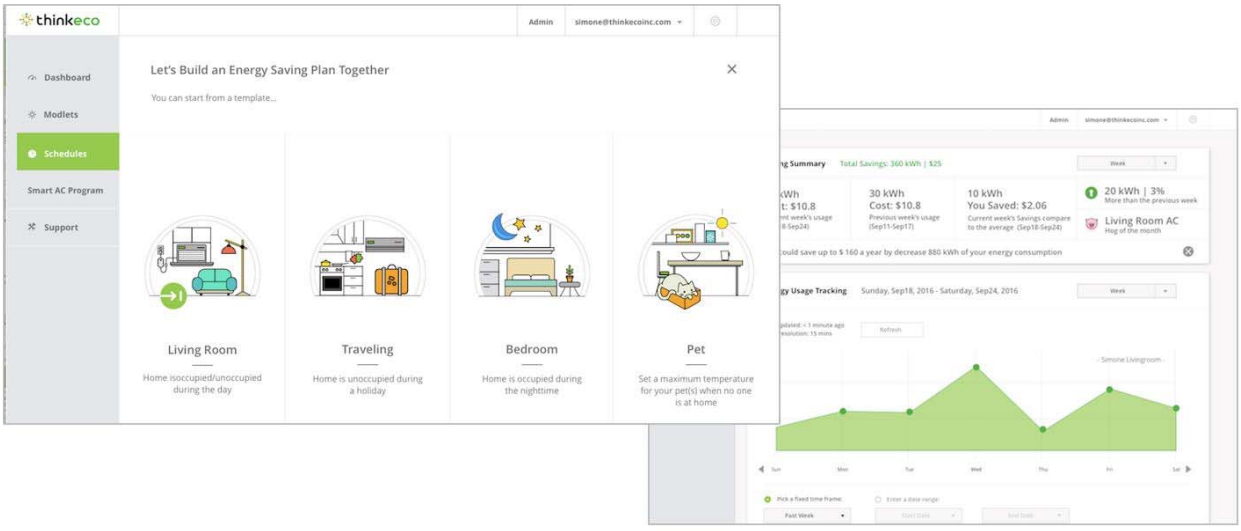
ThinkEco has also utilized other channels to market the program including email and digital marketing opportunities, and building out in-person opportunities with the program. National Grid expects to add to these methods to reach out to customers and retain them for 2018.

As mentioned earlier herein, there is an opportunity for National Grid to work on a partnership pilot program with NYSERDA and National Fuel Gas in the Kenmore area to benefit and engage low income customers. There is an overlap of territory for all three of these parties, and by working with NYSERDA through their EmPower New York Program, the coolControl program can attempt to reach many more of these low income customers. Through this partnership, customers will also be eligible for a natural gas incentive from National Fuel Gas. This will hopefully improve engagement and retention for customers throughout the 2018 capability period.

Lastly, ThinkEco plans to update the app and web portal for the 2018 capability period to enhance customers' experience with the technology, thereby increasing overall engagement. For example, a chat feature will be added to the customer support portal to make it easier for customers to access tech support, thus improving set-up rates.

Below are updated images of the customer-facing portal that ThinkEco plans to update for 2018:

Figure 6: Redesigned Customer-facing Web Portal



Website Development

To prepare for recruitment, an enrollment site was developed last year for the coolControl Program at www.ngrid.com/coolcontrol. Customers can access this New York-specific site and sign up to participate in the program.

ConnectedSolutions Program

Introduction

ConnectedSolutions is a system-wide program that began in 2016. This full-system peak shaving program was launched in partnership with Whisker Labs (formerly known as WeatherBug Home ("WBH")) and in coordination with the DR programs of National Grid's affiliates in Massachusetts and Rhode Island. **Connected**Solutions is a BYOD program using Honeywell and ecobee Wi-Fi connected thermostats controlled by National Grid via the Whisker Labs DR platform. Nest was added as a participating device in August 2017. With this recent addition, there have already been 1,215 Nest enrollments in the **Connected**Solutions program. There have been a total of 651 Honeywell thermostats and 65 ecobee thermostats enrolled in the program.

The Whisker Labs platform that works with all three (3) devices is configured such that the Company can easily move its customers to another platform should National Grid choose to work with other vendors. In aggregate, thermostat enrollment increased in 2017 from 207 total ecobee and Honeywell thermostats in 2016 to 1,931 total ecobee, Honeywell, and Nest devices, indicating that enrollment has increased over 900 percent.

Table 8 below refers to the basic requirements for the **Connected**Solutions program and shows the program summary for each of the three types of thermostats that can participate in the program. Navigant also performed an evaluation on the **Connected**Solutions program, assessing participation of all three thermostats in the program and conducting an impact analysis on both energy and demand for the program. Data and figures for this section of the report were produced by Navigant.

Table 8: 2017 ConnectedSolutions Program Summary

	ecobee	**Honeywell**	**Nest**
DR Season	May 1 to Sept 30	May 1 to Sep 30	Jun 1 to Sep 30
Potential Event Days	Weekdays	Weekdays	Weekdays
Potential Event Times	10 am to 8 pm	10 am to 8 pm	12 pm to 9 pm
Maximum events in season	40	40	15
Maximum events in 1 week	N/A	N/A	3
Maximum events in 1 day	1	1	1
Event duration	2 to 4 hrs.	2 to 4 hrs.	4 hrs.
Pre-cooling temp adjustment	N/A	1°F to 2°F	Optimized
DR event temp adjustment	2°F	2°F	3°F
Sign-up and Annual Incentive	Year 1: $30 Year 2+: $20	Year 1: $30 Year 2+: $20	Year 1: $30 Year 2+: $20
Participation Requirement	Year 1: N/A Year 2: 80% of events	Year 1: N/A Year 2: 80% of events	Year 1: N/A Year 2: 80% of events

Figure 7 below provides insight to the overall growth of the program; there were a total of 1,100 thermostats in total enrolled in the **Connected**Solutions program at the end of the 2017 capability period. The average number of thermostats per customer in this program is 1.13.

Figure 7: 2017 Thermostat Enrollment for ConnectedSolutions

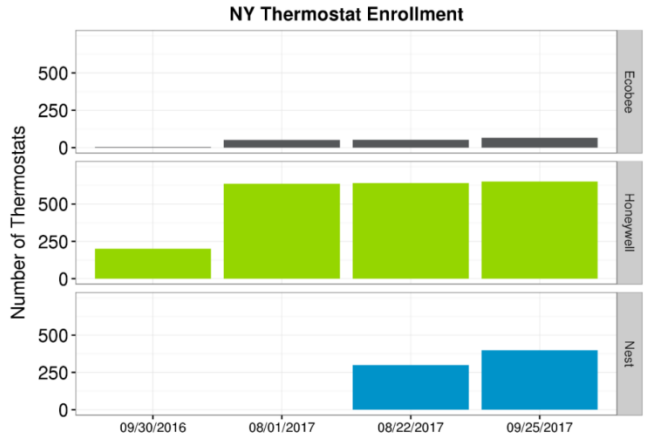
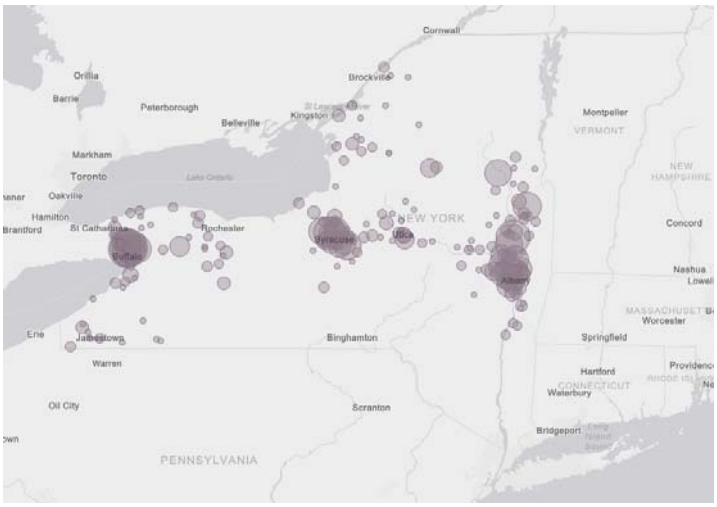


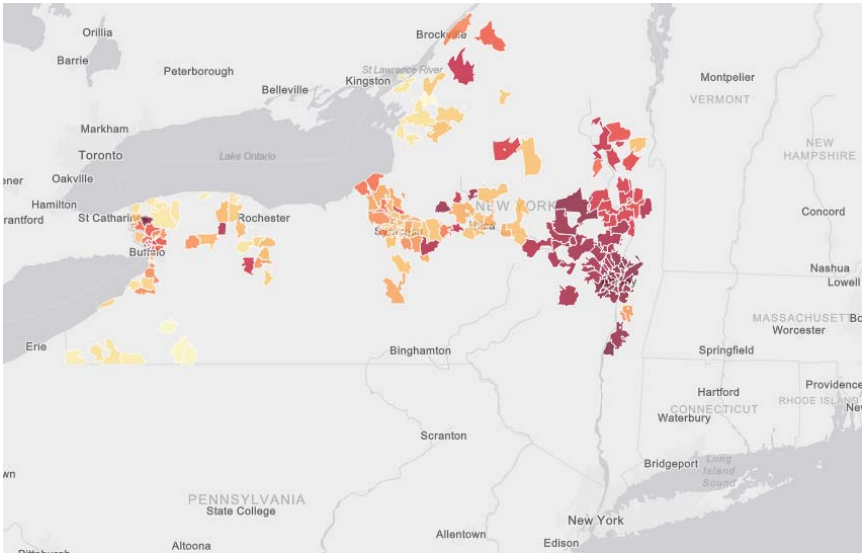
Figure 8 below shows the geographical diversity of thermostat enrollment within National Grid's service territory which will allow the Company to focus on various regions for the 2018 capability period. There are certain regions that participate more than others; the goal would be to expand marketing and recruitment efforts to target other areas of the territory for 2018.

Figure 8: Geographical Location of Thermostats in 2017



Weather during the 2017 capability period was mild and influenced the number of events and the overall performance this capability period. Figure 9 below shows the weather dispersion in Upstate New York.

Figure 9: Weather in Upstate New York in 2017



Darker regions = higher temperatures

National Grid anticipates growth of the **Connected**Solutions program in 2018, particularly with the addition of Nest thermostats. In addition, the Company is researching potential technology additions to the program, including wi-fi enabled water heaters, clothes washers and dryers, pool pumps, etc. that will increase participation in the program.

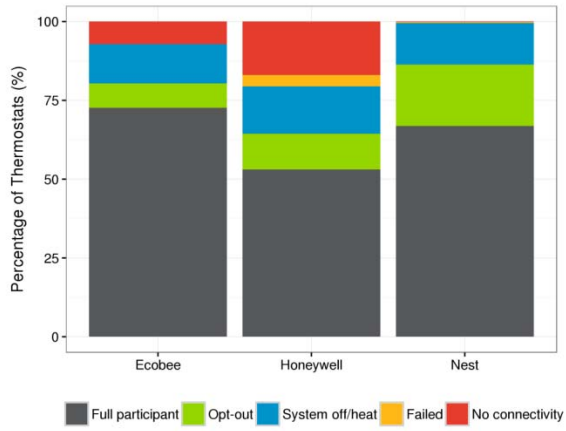
Technology Overview and DR Events

There were three (3) events held during the 2017 capability period for the **Connected**Solutions program: August 1, August 22, and September 25. Average duration of an event was three (3) hours. On average, 58 percent of thermostats fully participated in the **Connected**Solutions program. This metric can be broken down even further, with 73 percent of ecobee, 53 percent of Honeywell, and 67 percent of Nest thermostats fully participating in DR events in the 2017 capability period. Excluding Nest, ecobee has the greatest number of program participants and Honeywell has the lowest number of participants, mainly due to connectivity issues, as described below.

Honeywell thermostats experienced a large percentage of connectivity issues (17 percent per event) and Nest thermostats have a large percentage of opt-outs, at 19% per event. Honeywell remains consistent between all three events with the various degrees of participation, from opt-outs, connectivity issues, and system off/heat remaining approximately identical between all three (3)

events. For ecobee, connectivity issues decrease by event date, but system off/heat issues increased from the first event to the third. Lastly, Nest did not have any connectivity issues for the two (2) events since its inception. Opt-outs are the greatest culprit for Nest for both events. Figure 11 below shows average participation by device in the **Connected**Solutions program.

Figure 11: 2017 Average Participation in ConnectedSolutions Program by Device



Overall, it is apparent that with all three (3) thermostats in the **Connected**Solutions Program, there is no participation fatigue amongst customers. Opt-outs are consistent amongst all three (3) thermostat types, even on the September 25, 2017 event date, which was the hottest day of the capability period.

ConnectedSolutions participants simply sign up for the program. This BYOD approach enables customers and utilities to control CAC remotely through customer's existing Honeywell, ecobee, or Nest thermostats.

Incentives

Customers receive a $30 incentive for signing up for the **Connected**Solutions program through the participation of the ecobee, Honeywell, or Nest thermostats. The customers receive a $20 payment after two (2) years of participation in the program if they participate in 80 percent of the DR events called.

Program Costs and Savings

The **Connected**Solutions program had an average savings value of 0.44 kW per event for the ecobee thermostat, 0.59 kW for the Honeywell thermostat, and 0.77 kW for Nest. Some of these average savings

differences can be attributed to the differences in the thermostat participation and pre-cooling measures. In 2017, the average demand reduction per event was 593 kW, and the maximum demand reduction per event was 705 kW. The average energy savings per event is 419 kWh.

For the 2017 capability period, program savings ranged from 467 kW to 705 kW for the three (3) event dates. Savings from the ecobee and Honeywell thermostats remained consistent during all three (3) events, with savings being the least on the August 22, 2017 event date.

DLC program costs include demand response platform charges from Whisker Labs, as well as program operation, equipment, marketing, installations and other appurtenant fees. The table below illustrates program costs for **Connected**Solutions:

Table 10: ConnectedSolutions Program 2017 Costs

Total Whisker Lab (Weather Bug Homes WBH) Costs	**Total**	
Description		
Device Manufacturer Annual Fees	$	214,446.44
Honeywell Incentive Fees	$	14,910.00
Nest Incentive Fees	$	36,525.00
ecobee Incentive Fees	$	1,440.00
Total	$	267,321.44

There were 651 Honeywell, 65 ecobee Wi-Fi, and 1,215 Nest thermostats signed up for **Connected**Solutions on November 3, 2017. In aggregate, there were 1,931 devices signed up for the **Connected**Solutions program. The total curtailment potential was 1,349 kW for all three (3) devices in the 2017 capability period with a corresponding total cost of the program at $267,321.44, divided by the total kW curtailment potential, which equals $198/kW.

The total costs for the DLC Program, including coolControl and **Connected**Solutions, as well as evaluation fees and labor charges, are represented in the table below:

Table 11: Total 2017 DLC Program Costs

DLC Costs	Total Costs	DLM Surcharge Recoverable	DLM Surcharge Non-Recoverable
coolControl Total	$ 111,829.00	$ 111,829.00	
ConnectedSolutions Total	$ 267,321.44	$ 267,321.44	
Evaluation Fees	$ 193,267.00	$193,267.00	
Program Operations (internal)	$ 56,818.33		$56,818.33
Total	**$ 629,235.77**	**$ 572,417.44**	**$56,818.33**

Marketing and Recruitment

The **Connected**Solutions program outreach was undertaken exclusively by the Original Equipment Manufacturers ("OEMs") in 2017. Honeywell, ecobee, and Nest contacted customers directly for program recruitment. The Company plans to augment those channels in 2018 and beyond with direct outreach to customers who took advantage of $75 rebates available from gas utilities for installation of Wi-Fi thermostats. Other methods, such as point-of-purchase displays in retail outlets (*e.g.*, The Home Depot) may also be used as a recruitment tool in future program years. There are several other recruitment opportunities National Grid has begun to look into in order to increase participation in the **Connected**Solutions program. Currently, the program includes the Honeywell, ecobee, and Nest thermostats. The Company is investigating other residential devices for customers for 2018 and evaluating the cost effectiveness and will continue to evaluate other residential technologies to determine which devices merit addition to the program.

As we move into 2018, National Grid aims to integrate DR into existing energy efficiency program offerings. The Company is looking to integrate DR to the check-out process for the existing Ecommerce platform where customers currently purchase thermostats online. By the end of 2018, National Grid anticipates allowing customers to sign up for the **Connected**Solutions program during the Ecommerce check-out process.

Website Development

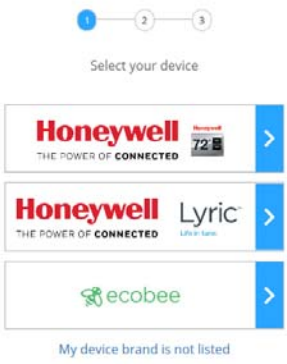
In 2017, the website for the **Connected**Solutions program was updated and includes all the relevant information for National Grid customers. With the addition of Nest to the program, there is a link to the

Rush Hour Rewards Program that can also be found on the website. These website improvements should greatly increase DR participation for the 2018 capability period. In the future, National Grid also plans to promote the **Connected**Solutions program as a part of Nest flash sales that occur periodically. Customers can participate in the Nest flash sale and will be redirected to the DR website to allow for participation in the program.

Customers can sign up and access information about the **Connected**Solutions program at www.ngrid.com/ny-connectedsolutions. (redirected to https://www.nationalgridus.com/Services-Rebates?filters=For%20Businesses|Upstate%20New%20York|Electric|Demand%20Response) for the enrollment portal through the Whisker Labs platform.

Below is a snapshot of the Whisker Labs platform for **Connected**Solutions:

Figure 12: Whisker Labs Sign-up Page for ConnectedSolutions



This year, Nest was also added to the device list and customers can access and sign up for their program at https://nest.com/energy-partners/national-grid-uny/.

Below is a screenshot from the Nest webpage for their Rush Rewards Program where customers sign up for the program:

Figure 13: Nest Rush Rewards Signup Page

The program websites serve as a central repository of information and, in several places, directed/connected customers to the sign-up form for the **Connected**Solutions program. National Grid's web marketing team has been administering and improving the website in order to make it clear and easy for customers to access all relevant information about the **Connected**Solutions Program.

2018 DLC Program Changes

1. *RFP for Residential Demand Response Management System.* National Grid is currently in the process of procuring a residential DRMS vendor for the upcoming 2018 capability period. With the addition of a residential DRMS, the Company will be in a better position to both add new residential connected devices to the **Connected**Solutions program and to manage calling DR events for the coolControl and **Connected**Solutions programs. It is National Grid's expectation that the selected DRMS would manage existing and future residential customer DR programs in all three jurisdictions (*i.e.*, National Grid as well as National Grid's affiliates in Massachusetts and Rhode Island) through proportionate allocations by each jurisdiction.

2. *Partnership pilot program for coolControl program.* In 2018, National Grid will partner with NYSERDA through their EmPower New York program and with National Fuel Gas to target more low-income customers in the Kenmore area. NYSERDA will be responsible for the installation of the Emerson Sensi™ thermostats in the course of delivering the EmPower New York program to eligible customers in Kenmore, while National Grid will provide customers with these thermostats free-of-charge. National Fuel Gas will work with NYSERDA and National Grid in order to provide customers with additional natural gas incentives. National Grid will continue to explore this

opportunity with both NYSERDA and National Fuel Gas further by investigating thermostat technologies to include in this pilot program.

3. *Cost Recovery for DLC Programs*. The Company proposes changes to the mechanism by which the DLC costs are recovered from customers. Currently the DLC program costs are recovered from all customers on a kWh basis for non-demand customer classes and on a per kW basis for demand customer classes. For the 2018 program, the Company proposes to modify the cost recovery to recover DLC program costs from distribution customers only, who primarily benefit from this program, and will exclude subtransmission and transmission-level customers, who are not currently eligible to participate in these programs.

   National Grid is proposing modifications to DLM surcharge methodology which recovers the costs associated with all DLM programs. Currently, all program costs incurred in a month are recovered on a two-month lag basis. The seasonality of these programs implies that the majority of costs are collected in the months following the capability period. This causes a noticeable increase in customer bills during those months. To smooth out the impact on customers, the Company proposes to annually calculate a fixed per kWh rate for non-demand customers and a fixed per kW monthly rate for demand customers, which would be applied to customer bills over the next year. National Grid will forecast costs for the coming year using the actual costs incurred over the prior year divided by the forecasted usage for each service class to develop a per kWh or kW rate. The Company will reconcile actual collections to actual costs incurred at the end of annual period, including interest, and include any over/under collections when determining the surcharge rates for the next annual period.

Next Steps

DRMS Implementation

National Grid USA Service Company, Inc. is planning to advertise an RFP for a residential DRMS that will take place at the end of 2017 in preparation for the 2018 capability period.

Request for Quotations ("RFQ") for Thermostat Vendors

National Grid is planning to advertise an RFQ for residential thermostat vendors for the **Connected**Solutions program for the 2018 capability period.

Sales for Demand Response

One of the major changes for 2018 will include the incorporation of DR to the sales team that currently promotes energy efficiency. National Grid sales teams can leverage existing industry relationships as an expanded means of program recruitment. Furthermore, the sales teams can target specific regions of Upstate New York to create more opportunities and promote DR in areas where energy efficiency measures have high adoption rates. There will be additional DR training available to the sales teams in early 2018 to ensure scalability.

Program Recruitment

With the assistance of aggregators and internal customer-facing personnel, National Grid will recruit customers in stressed areas and in areas where additional peak shaving needs are identified. Additional recruitment opportunities for CSRP and DLRP will include a focus on aggregator relationships and training, outreach to customers through having direct customer meetings, and the use of sales teams to promote the programs.

Non-Wires Alternatives Development

The proposals for the nine (9) NWA projects identified earlier herein will be reviewed to determine if a DR solution is a viable solution either alone or in concert with DER identified.

Conclusion

The DLM programs grew exponentially in the 2017 capability period. Through National Grid's **Connected**Solutions and coolControl programs and CSRP, 187.6 MW of DR capacity was available to National Grid's control center to reduce peak load and thereby relieve stress on the Company's electrical equipment and overall electric power system. The Company is engaging customers in a positive way - helping them understand that these programs are not only incentive or rebate programs, but community efforts that can curtail peak load, improve system efficiency and reliability, save money, and have a noticeable effect on GHG emissions.

APPENDIX A

NIAGARA MOHAWK POWER CORPORATION
STATEMENT OF DEMAND RESPONSE INCENTIVES
EFFECTIVE: MAY 1, 2018
APPLICABLE TO BILLINGS UNDER P.S.C. NO. 220 ELECTRICITY

Company Wide Pricing

COMMERCIAL SYSTEM RELIEF PROGRAM:

Reservation Payment Option:

Reservation Payment (Up to 4 Events)	$2.75/kW Month
Reservation Payment (Over 4 Events)	$3.00/kW Month
Performance Payment Planned Event	$.18/kWh
Performance Payment Unplanned Event	$.22/kWh

Voluntary Option:

Performance Payment Planned Event	$.16/kWh
Performance Payment Unplanned Event	$.19/kWh

DIRECT LOAD CONTROL PROGRAM:

One-Time Enrollment Incentive per Device	$30.00
Annual Incentive per Device	$20.00

NIAGARA MOHAWK POWER CORPORATION
STATEMENT OF DEMAND RESPONSE INCENTIVES
EFFECTIVE: MAY 1, 2018
APPLICABLE TO BILLINGS UNDER P.S.C. NO. 220 ELECTRICITY

Designated Area Pricing

Company Designated Area: Kenmore Avenue, Buffalo, New York

DISTRIBUTION LOAD RELIEF PROGRAM:

Reservation Payment Option:

Reservation Payment	$4.69/kW Month
Performance Payment	$1.02/kWh

Voluntary Option:

Performance Payment	$1.20/kWh

DIRECT LOAD CONTROL PROGRAM:

One-Time Enrollment Incentive per Device	$30.00
Annual Incentive per Device	$20.00

Niagara Mohawk Power Corporation
Summer 2018 - Dynamic Load Management Incentive Calculation
Commercial System Relief Program

Lines	Company Wide Estimates		
1	Forecasted Summer 2018 Company Wide Enrollment (kW)		222,331
2	Summer 2018 Program Months		5
3	Marginal Cost of Distribution per kW	$	89.33
4	2018 Estimated Program Costs	$	-
5	Incentive Allocated to CSRP		98.4%
6	Summer 2018 Forecasted CSRP Incentive Available	$	3,909,297.97
7	2018 Estimated Planned Events		4
8	2018 Estimated Unplanned Events		1
9	2018 Estimated Hours per Event		4
10	2018 Estimated Test Hours		1
	Estimates for 2018		
11	Forecasted Summer 2018 CSRP Enrollment (kW)		296,450
12	Forecasted Reservation Enrollment Percentage		98.0%
13	Forecasted Reservation Enrollment Capacity Percentage		79.60%
14	Forecasted Reservation Enrollment Performance Percentage		20.4%
15	Forecasted Reservation Enrollment Capacity Payment up to 4 Events Percentage		78.6%
16	Forecasted Reservation Enrollment Capacity Payment 5 or more Events Percentage		21.4%
17	Forecasted Reservation Enrollment Performance kW Percentage		73.6%
18	Forecasted Reservation Enrollment Planned Performance Percentage		76.6%
19	Forecasted Reservation Enrollment Unplanned Performance Percentage		23.4%
20	Forecasted Reservation Enrollment Planned Performance Participation Percentage		94.0%
21	Forecasted Reservation Enrollment Unplanned Performance Participation Percentage		94.0%
22	Forecasted Voluntary Enrollment Percentage		2.0%
23	Forecasted Voluntary Enrollment Performance kW Percentage		26.5%
24	Forecasted Voluntary Enrollment Planned Performance Percentage		76.0%
25	Forecasted Voluntary Enrollment Unplanned Performance Percentage		24.0%
26	Forecasted Voluntary Enrollment Planned Performance Participation Percentage		30.0%
27	Forecasted Voluntary Enrollment Unplanned Performance Participation Percentage		30.0%
28	Reservation Enrollment Available	$	3,831,112
29	Reservation Enrollment Capacity Available	$	3,049,565
30	Reservation Enrollment Performance Available	$	781,547
31	Reservation Enrollment Performance (kW)		218,039
32	Voluntary Enrollment Available	$	78,186
33	Voluntary Enrollment Performance (kW)		78,411
	Reservation Option		
34	Reservation Payment up to 4 Events	$	2.75
35	Reservation Payment over 5 Events	$	3.00
36	Planned Performance Payment	$	0.18
37	Unplanned Performance Payment	$	0.22
	Voluntary Option		
38	Planned Performance Payment	$	0.16
39	Unplanned Performance Payment	$	0.19

1 Forecasted Company Wide kW available for participation
2 2018 Summer runs from May through September
3 17-E-0238 MCOS Study
4 External program costs
5 Percentage of Company Wide Incentive Allocated to CSRP
6 ((Line 1 * (Line 3 / Line 2))* Line 5) - Line 4
28 Line 6 * Line 12
29 Line 28 * Line 13
30 Line 28 * Line 14
31 Line 11 * Line 17
32 Line 6 * Line 22
33 Line 11 * Line 23
34 (Line 29 * Line 15)/ Line 31) / 4
35 (Line 29 * Line 16)/ Line 31) / 1
36 (Line 30 * Line 18) / ((Line 31 * Line 20) * (Line 7 * Line 9) + Line 10)
37 (Line 30 * Line 19) / ((Line 31 * Line 21) * (Line 8 * Line 9)
38 (Line 32 * Line 24) / ((Line 33 * Line 26) * (Line 7 * Line 9) + Line 10)
39 (Line 30 * Line 23) / ((Line 31 * Line 27) * (Line 7 * Line 8))

Niagara Mohawk Power Corporation
Summer 2018 - Dynamic Load Management Incentive Calculation
Direct Load Control

Lines			
1	Forecasted Summer 2018 Company Wide Enrollment (kW)		222,331
2	Summer 2018 Program Months		5
3	Marginal Cost of Distribution per kW	$	89.33
4	Currently Enrolled Devices		1,490
5	Forecasted New Devices		1,100
6	Forecasted Summer 2018 DLC Reduction (kW)		2,331
7	Percentage of Incentive Dollars for One Time Enrollment Payment		52.6%
8	Percentage of Incentive Dollars for Annual Incentive Payment		47.4%
9	Incentive Allocated to DLC		1.6%
10	Summer 2018 Forecasted DLC Incentive Available	$	62,758
11	One Time Enrollment Incentive per Device	$	30.00
12	Annual Incentive per Device	$	20.00

1 Forecasted Company Wide kW available for participation
2 2018 Summer runs from May through September
3 17-E-0238 MCOS Study
10 ((Line 1 * (Line 3 / Line 2))* Line 9
11 (Line 10 * Line 7) / Line 5
12 (Line 10 * Line 8) / Line 4

Niagara Mohawk Power Corporation
Summer 2018 - Dynamic Load Management Incentive Calculation
Distribution Load Relief Program- Kenmore

Lines			
1	Forecasted Summer 2018 Enrollment (kW)		300
2	Summer 2018 Program Months		5
3	Deferred Capital Investment	$	561,001
4	Deferred Capital Investment DLRP Allocation		5%
5	Marginal Cost of Distribution per kW		
6	2018 Estimated Program Costs	$	15,200
7	Summer 2018 Forecasted DLRP Incentive Available	$	15,374.54
8	2018 Estimated Planned Events		4
9	2018 Estimated Unplanned Events		2
10	2018 Estimated Hours per Event		4
11	2018 Estimated Test Hours		1
	Estimates for 2018		
12	Forecasted Reservation Enrollment Percentage		96.0%
13	Forecasted Reservation Enrollment Capacity Percentage		53.29%
14	Forecasted Reservation Enrollment Performance Percentage		46.7%
15	Forecasted Reservation Enrollment Performance kW Percentage		93.0%
16	Forecasted Voluntary Enrollment Percentage		4.0%
17	Forecasted Voluntary Enrollment Performance kW Percentage		7.0%
18	Reservation Enrollment Available	$	14,764
19	Reservation Enrollment Capacity Available	$	7,867
20	Reservation Enrollment Performance Available	$	6,897
21	Reservation Enrollment Performance (kW)		279
22	Voluntary Enrollment Available	$	610
23	Voluntary Enrollment Performance (kW)		21
	Reservation Option		
24	Reservation Payment	$	4.69
25	Performance Payment	$	1.02
	Voluntary Option		
26	Performance Payment	$	1.20

1 Forecasted kW available for participation
2 2018 Summer runs from May through September
3 Deferred Cost of Undergound Service Upgrades
4 Allocation of Deferred Costs to DLRP
5 17-E-0238 MCOS Study
6 External program costs only
18 Line 7 * Line 12
19 Line 18 * Line 13
20 Line 18 * Line 14
21 Line 1 * Line 15
22 Line 7 * Line 16
23 Line 1 * Line 17
24 (Line 19 * Line 22)/ (Line 8 + Line 9)
25 Line 20 / (Line 21 * ((Line 8 + Line 9) * Line 10) + Line 11)
26 Line 22 / (Line 23 * ((Line 8 + Line 9 * Line 10) + Line 11)

Niagara Mohawk Power Corporation
Summer 2018 - Dynamic Load Management Incentive Calculation
Direct Load Control- Kenmore

Lines			
1	Forecasted Summer 2018 Enrollment (kW)		1,700
2	Summer 2018 Program Months		5
3	Deferred Capital Investment	$	561,001
4	Deferred Capital Investment DLC Allocation		95%
6	2018 Estimated Program Costs	$	377,904
7	Summer 2018 Forecasted DLC Incentive Available	$	152,522.21
8	Marginal Cost of Distribution per kW	$	89.33
9	Currently Enrolled Devices		837
10	Forecasted New Devices		2,941
11	Percentage of Incentive Dollars for One Time Enrollment Payment		84.0%
12	Percentage of Incentive Dollars for Annual Incentive Payment		16.0%
13	Paticipation Percentage in Events		69.0%
14	One Time Enrollment Incentive per Device	$	30.00
15	Annual Incentive per Device	$	20.00

1 Forecasted kW available for participation
2 2018 Summer runs from May through September
3 Deferred Cost of Undergound Service Upgrades
4 Allocation of Deferred Costs to DLC
5 17-E-0238 MCOS Study
14 (Line 7 * Line 11) / Line 10
15 (Line 7 * Line 12) / Line 9

Niagara Mohawk Power Corporation
Summer 2018 - Dynamic Load Management Incentive Calculation
Marginal Cost of Distribution

Niagara Mohawk Power Company (Electric) dba National Grid
Marginal Class Study ($000s)- Rate Year Ending March 31, 2019
Marginal Demand-Related Costs

			Initial Capital Cost (1)			Economic Carrying Charge Rate (2)									
Line	**Rate Class**	**Rate Code**	**Trans-mission/ Sub-transmission**	**Primary/ Secondary Distribution**	**Transformers**	**Transmission Plant**	**Primary / Secondary Plant**	**Transformers**	**Annual per kW Demand Costs**	**Monthly per kW Demand Costs**	**Pri / Sec**	**Transf**	**Total**	**1CP Factor**	**Total Cost**
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I) = (C*F) + (D*G) + (E*H)	(J) = (I)/12	(K) = (E*G)	(L) = (E*H)	(M) = (K+L)	(N)	(O) = (M*N)
			per Kw	per Kw	per Kw										
1	Residential	SC-1	$149.76	$717.56	$335.96	12.6%	14.8%	9.3%	**$156.39**	**$13.03**	$106.40	$31.10	$137.51	2,480,552	$341,092,261.25
2	Residential TOU	SC-1C	$149.76	$717.56	$58.38	12.6%	14.8%	9.3%	**$130.69**	**$10.89**	$106.40	$5.40		49,024	-
3	Small General No Dem	SC-2-ND	$149.76	$117.74	$331.90	12.6%	14.8%	9.3%	**$67.06**	**$5.59**	$17.46	$30.73	$48.19	153,951	$7,418,313.47
4	Small General Demand	SC-2-Dem	$149.76	$117.74	$327.12	12.6%	14.8%	9.3%	**$66.62**	**$5.55**	$17.46	$30.28	$47.74	874,934	$41,772,115.63
5	Large General-Sec	SC-3-S	$149.76	$153.35	$220.70	12.6%	14.8%	9.3%	**$62.05**	**$5.17**	$22.74	$20.43	$43.17	807,535	$34,862,995.04
6	Large General-Pri	SC-3-P	$149.76	$115.63	-	12.6%	14.8%	9.3%	**$36.02**	**$3.00**	$17.15	-	$17.15	311,587	$5,342,478.25
7	Large General-Tran	SC-3-T	$149.76	-	-	12.6%	14.8%	9.3%	**$18.88**	**$1.57**	-	-	-		-
8	Large General TOU-S/P	SC-3A-S/P	$149.76	$116.27	$21.38	12.6%	14.8%	9.3%	**$38.10**	**$3.17**	$17.24	$1.98	$19.22	180,455	$3,468,542.37
9	Large General TOU-U	SC-3A-U	$149.76	$113.99	-	12.6%	14.8%	9.3%	**$35.78**	**$2.98**	$16.90	-		-	-
10	Large General TOU-T	SC-3A-T	$149.76	-	-	12.6%	14.8%	9.3%	**$18.88**	**$1.57**	-	-	-	-	-
11	Lighting	SC-L	$149.76	-	-	12.6%	14.8%	9.3%	**$18.88**	**$1.57**	-	-	-	-	-
12														4,858,039	$433,956,706.03
13															**89.32754463 Weighted MCOD**

Note:

(1) Column N is the marginal cost of service revenue requirement form the 17-E-0238 MCOS Study
(1) Column N Line 12 is the sum of Column N
(2) Column O Line 12 is the sum of Column O
(2) Column O Line 13 is Column O Line 12 divided by Column N Line 12