Janet M. Audunson, P.E., Esq.
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December 31, 2015

**VIA ELECTRONIC MAIL**

Honorable Kathleen H. Burgess
Secretary to the Commission
New York State Public Service Commission
Three Empire State Plaza, 19th Floor
Albany, New York 12223-1350

**RE: Case 07-M-0548 – Proceeding on Motion of the Commission Regarding an Energy Efficiency Portfolio Standard**
**National Grid – Quarterly Evaluation Status Report**

Dear Secretary Burgess:

Pursuant to the New York State Department of Public Service Staff Office of Energy Efficiency & the Environment Energy Efficiency Guidance Document, *EE-10: Reporting Requirements Guidance,* issued March 31, 2014, Niagara Mohawk Power Corporation d/b/a National Grid, The Brooklyn Union Gas Company d/b/a National Grid NY and KeySpan Gas East Corporation d/b/a National Grid (collectively "National Grid") hereby file the Quarterly Evaluation Status Report for the period ending September 30, 2015.

Please direct any questions regarding this filing to:

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Respectfully submitted,

/s/ *Janet M. Audunson*

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Enc.

cc: Christina Palmero, DPS Staff, w/enclosure (via electronic mail)
Kevin Manz, DPS Staff, w/enclosure (via electronic mail)
Denise Gerbsch, DPS Staff, w/enclosure (via electronic mail)
Cathy Hughto-Delzer, w/enclosure (via electronic mail)
Lisa Tallet, w/enclosure (via electronic mail)
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Ann Clarke, w/enclosure (via electronic mail)

**Niagara Mohawk Power Corporation d/b/a National Grid, The Brooklyn Union Gas Company d/b/a National Grid NY and KeySpan Gas East Corporation d/b/a National Grid**

**B. Program Evaluation Status Update Table**

| Evaluation Name | Evaluation Type | Project Kick-Off | Draft Work Plan Submitted to DPS | Workplan Approved by DPS | % of Data Collection Compete | Initial Draft Report Submitted to DPS | Report Approved by DPS | Final Report Filed with the Secretary |
|---|---|---|---|---|---|---|---|---|
| Energy Initiative - Electric - Lighting (custom and prescriptive, mid-sized and large) | Impact | Jan-13 | Sep-12 | Yes | Jul-14 | expected 11/2/2015 | expected Dec 2015 | |
| Energy Initiative - Electric - Non Lighting (custom, mid-sized and large) | Impact | Feb-13 | Jan-13 | Yes | Mar-15 | expected - 1/31/2016 | | |
| Energy Initiative - Electric - Lighting Controls (custom, mid-sized and large) | Impact | postponed | Jan-13 | Yes | postponed | postponed | postponed | |
| Energy*Wise* Electric Program | Impact | Sep-12 | Sep-12 | Yes | Mar-13 | Sep-13 | Mar-15 | |
| Electric Enhanced Home Sealing Incentives Program | Impact | None | None | None | None | None | None | |
| Residential Building Practices and Demonstration Program (Electric) | Impact | 2012 | 2012 | Yes | Mar-13 | Oct-13 | Jan-14 | |
| Residential ENERGY STAR® Electric Products and Recycling Program (Thermostats) | Impact | Sep-13 | Sep-12 | Yes | Jul-13 | Sep-13 | Mar-15 | |
| Residential ENERGY STAR® Electric Products and Recycling Program (Refrigerators and Freezers) | Impact | Sep-10 | Jun-10 | Yes | Jul-11 | Aug-11 | | |
| Residential High Efficiency Central Air Conditioning Program | Impact | None | None | None | None | None | None | |
| Small Business Services Energy Efficiency Program - Lighting | Impact | 2010 | 2010 | Yes | Summer 2013 | Dec-13 | Nov-14 | |
| Small Business Services Energy Efficiency Program - Lighting with Controls | Impact | 2013 | 2012 | Yes | Summer 2014 | postponed | postponed | |
| Energy Initiative - Multifamily, and Commercial & Industrial Gas Energy Efficiency Programs - Prescriptive | Impact | Jan-13 | Sep-12 | Yes | Summer 2014 | 3Q 2014 | 3Q 2015 | 07/06/15 |
| Energy Initiative - Multifamily, and Commercial & Industrial Gas Energy Efficiency Programs - Custom | Impact | Jan-13 | Sep-12 | Yes | 95% data collection complete | expected -1Q 2016 | | |
| Energy*Wise* Gas Program | Impact | Sep-12 | Sep-12 | Yes | Mar-13 | Sep-13 | Mar-15 | |
| Gas Enhanced Home Sealing Incentives Program | Impact | None | None | None | None | None | None | |
| Residential Building Practices and Demonstration Program (Gas) | Impact | 2012 | 2012 | Yes | Mar-13 | Oct-13 | Jan-14 | |
| Residential ENERGY STAR® Gas Products Program | Impact | Sep-13 | Sep-12 | Yes | Jul-13 | Sep-13 | Mar-15 | |
| Residential High-Efficiency Heating and Water Heating and Controls Program | Impact | Oct-12 | Statewide | Yes | [Feb-14] | Apr-14 | Aug-14 | |

**A. COMPLETED EVALUATIONS**

| | |
|---|---|
| Evaluations Finalized this Quarter | 1 |
| Total Number of Recommendations Made to Date | 75 |
| Total Number of Recommendations Implemented to Date | 55 |
| Total Number of Recommendations Rejected to Date | 1 |
| Total Number of Recommendations Currently in Progress | 19 |

**Completed Evaluations**

For each program, update the status of the process and impact evaluation recommendations for completed evaluations.

| Program Name | Evaluations Finalized this Quarter | Total Number of Recommendations Made to Date | Total Number of Recommendations Implemented to Date | Total Number of Recommendations Rejected to Date | Total Number of Recommendations Currently in Progress |
|---|---|---|---|---|---|
| **Impact Evaluations** | | | | | |
| Residential Building Practices and Demonstration Program (Electric & Gas) | | 7 | 2 | 0 | 5 |
| Small Business Services Energy Efficiency Program - Lighting | | 7 | 4 | 0 | 3 |
| Energy*Wise* Electric Program, Energy*Wise* Gas Program, Residential ENERGY STAR® Gas Products Program | | 4 | 0 | 0 | 4 |
| Prescriptive Gas Program Impact Evaluation | 1 | 10 | 3 | 1 | 5 dependent on TRM MC/DPS modifications- 1 requires future evaluation |

| Program Name | Evaluations Finalized this Quarter | Total Number of Recommendations Made to Date | Total Number of Recommendations Implemented to Date | Total Number of Recommendations Rejected to Date | Total Number of Recommendations Currently in Progress |
|---|---|---|---|---|---|
| **Process Evaluations** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

# National Grid

# Niagara Mohawk Power Corporation, Brooklyn Union Gas Company, and KeySpan Gas East Corporation

# National Grid NY Prescriptive Gas Program: Impact Evaluation Summary

*Prepared by:* DNV GL, August 3, 2015

## PROGRAM SUMMARY

Prescriptive natural gas rebates are available through several channels across National Grid's New York commercial, industrial and Multifamily program offerings, including the Commercial and Industrial Gas Energy Efficiency Program for all three companies and the Multifamily Gas Energy Efficiency Program for both Brooklyn Union Gas and KeySpan Gas East Corporations.

Although the building types targeted may differ by program, the fundamental design of the programs above is to provide prescriptive rebates for customers being served under eligible service classifications for the installation of natural gas energy efficiency measures such as boilers, furnaces and insulation.

## EVALUATION OBJECTIVE AND KEY FINDINGS

The objectives for this evaluation included the following:

- Determination of actual first year energy savings and realization rates achieved by the subject measures (furnaces, boilers and condensing boilers) for 2010–2011 programs.
- Comparison of determined savings with values derived using methodologies prescribed in the New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs ("Technical Resource Manual" or "TRM"), and/or with the deemed savings calculations that were performed for that measure, for 2010-2011 programs. This objective includes an assessment of the accuracy of the savings algorithms in the TRM, and their deemed values.
- Estimation of the free ridership and participant like and unlike inside spillover experienced for 2011 and the first half of participants in 2012.

The saving values in the table below are for condensing boilers, non-condensing boilers, and furnaces installed through the 2010 and 2011 prescriptive gas channel of National Grid's energy efficiency programs. Savings from these three measures represent roughly 59% of the program savings in 2010 and 2011. The overall estimate of net savings from these measures is 247,266 therms.

**Table 1. Prescriptive Boiler and Furnace Natural Gas Net Impacts**

| Parameter | Natural Gas (therms) |
|---|---|
| Condensing Boilers | |
| Ex Ante Tracked Savings | 436,254 |
| Evaluation Realization Rate (RR) | 83.0% |
| Evaluation Net-to-Gross Ratio (NTG) | 62.3% |
| Ex Post Net Impact | 224,472 |
| Non-Condensing Boilers | |
| Ex Ante Tracked Savings | 29,015 |
| Evaluation Realization Rate (RR) | 125.0% |
| Evaluation Net-to-Gross Ratio (NTG) | 10.1% |
| Ex Post Net Impact | 3,673 |
| Furnaces | |
| Ex Ante Tracked Savings | 59,829 |
| Evaluation Realization Rate (RR) | 44.0% |
| Evaluation Net-to-Gross Ratio (NTG) | 72.1% |
| Ex Post Net Impact | 19,121 |
| Total | |
| Ex Ante Tracked Savings | 525,098 |
| Evaluation Realization Rate (RR) | 80.6% |
| Evaluation Net-to-Gross Ratio (NTG) | 58.4% |
| Ex Post Net Impact | 247,266 |

## DETAILED FINDINGS: REALIZATION RATE AND NET-TO-GROSS

### Realization Rate:

- The final overall gross savings realization rate for condensing boilers, boilers and furnaces installed through the 2010 and 2011 prescriptive gas channel of National Grid efficiency programs is 80.6% This overall rate is comprised of a realization rate for condensing boilers of 83% with a precision of +/- 26% at the 90% confidence interval a non-condensing boiler rate of 125% with a precision of +/- 41% at the 90% confidence interval and furnaces with 44% and a precision of +/- 7%.
- The overall net to gross ratio is 58.4% with a precision of +/- 7.6% at the 90% confidence interval.

**Net-to-Gross:**

The table below presents the final NTG results by measure type and attribution variable. In this study, we assessed free ridership[1] and participant like inside spillover[2]. The overall program free ridership rate is 41.7% while the participant inside like spillover rate is <0%. The overall NTG comprising these two factors is 58.4%, with a precision of +/-7.6% at the 90% confidence interval.

**Table 2. Free Ridership and Spillover Estimates**

| Attribution Variable | Condensing Boiler | Boiler | Furnace | Building Shell | Other | Overall |
|---|---|---|---|---|---|---|
| Free ridership | 37.7% | 89.9% | 27.9% | 31.1% | 39.9% | 41.7% |
| Participant Inside spillover (Like) | 0.0% | 0.0% | 0.0% | 0.0% | 0.5% | 0.0% |
| Outside spillover | N/A | N/A | N/A | N/A | N/A | N/A |
| Non participant spillover | N/A | N/A | N/A | N/A | N/A | N/A |
| Net-to-gross factor (equals 1-FR+SO) | 62.3% | 10.1% | 72.1% | 68.9% | 60.6% | 58.4% |

**Other Results:**

Integrated into this study were interviews performed with 10 boiler contractors as well as a supplemental interview with on-site contacts and as part of the NTG survey. The core results from these efforts include:

- According to contractors, the efficiency of boilers replaced under the program averages 80%, which matches the new boiler baseline efficiency used by the program during our evaluation period.
- It is apparent that most program replaced boilers were still operational at the time of replacement, in addition to many being well beyond their expected useful life (20 years). Indeed, many existing units were reported to have been more than 30 years old at the time of replacement and were further estimated to have 2 or more years left in them at the time of replacement[3].
- The data also suggests that the decision about replacing boilers involves many complex factors. The combination of energy efficiency improvement and avoided repair costs, taken together, appear to make a strong case that some early replacement occurs consistently across all ages of equipment.
- Contractors reported that the most common installed new boiler features reported were outdoor air reset, modulating burners, multi-stage operation, and pump speed control.

[1] Free ridership is the percent of savings attributed to customers who participate in an energy efficiency program but would have, at least to some degree, installed the same measure(s) on their own if the program had not been available.

[2] Participant inside like spillover is the percent energy savings associated with energy efficient equipment that is the same as that installed through the program that is also installed in the same facility by consumers who were influenced by an energy efficiency program, but without direct financial or technical assistance from the program.

[3] This finding is consistent with a recent process evaluation performed on the New York Upstate Commercial High-Efficiency Heating and Water Heating Program that suggested that the program is making progress in getting customers to replace still operable but inefficient equipment.

- Contractors reported that a significant percentage of customers installing high-efficiency boilers do not apply for rebates. Although not quantified here, a portion of these sales may result from market transformation induced by the program, thus qualifying as spillover.

**EVALUATION METHODS AND SAMPLING**

There were four primary activities undertaken as part of this study. The bullets below provide a brief description of each.

- On-site visits supplemented with phone interviews (22 combined) to confirm the status of the energy efficiency measures associated with the site, gather performance status, basic information on measure attributes and site-specific information on equipment removals and/or other site-specific changes.
- Billing analysis to provide an empirical estimate of Equivalent Full Load Hours (EFLH) based on a normalized annual heating (NAH) load for the post-installation period.
- Boiler Contractor surveys (10) to better understand the age and conditions of the existing unit under which the decision to replace the unit was made.
- Participant surveys (130) to inform a self-report net-to-gross approach of free ridership and inside "like" spillover. The free ridership and like spillover approach utilized a core algorithm that is consistent with the standardized approach that National Grid has exercised for assessing net-to-gross in Massachusetts. The final NTG sampling methodology employed a stratified ratio estimation model that placed participants into measure types of interest and then into strata by measure size, measured in therm savings.

**RECOMMENDATIONS AND PROGRAM ADMINISTRATOR RESPONSE**

The following recommendations were made by the evaluators conducting this study. National Grid's initial response to these recommendations is also summarized below and will be tracked over time. We provide three sections of recommendations, consistent with the primary report.

The following recommendations relate to the improvement of captured tracking data related to efficiency.

**Recommendation 1:** The inclusion of Air Conditioning, Heating and Refrigeration Institute (AHRI)-rated efficiencies in the tracking data, which according to program staff has already been implemented, was going to be a primary recommendation of this evaluation. This will assure that savings are calculated at a consistent and realistic expected efficiency for each unit.

**Response to Recommendation 1:** This recommendation is already implemented as stated above.

**Recommendation 2:** To encourage more accurate tracking of savings, particularly for condensing boilers, we recommend the collection of additional information to support the determination of proper functioning of installed units (water return temperature, presence of outdoor air resets, etc.). Just as this kind of information was used to adjust saving estimates for this evaluation, they could also be incorporated into tracking savings estimates. More proactively, consider identifying ways to verify ongoing efficiency so as to maintain the savings of these units after installation.

**Response to Recommendation 2:** In its current design, the prescriptive gas program does not have a touch point where this information gathering can be performed without incurring additional program costs. In the absence of this, National Grid will work with the DPS and the Technical Manual committee to consider adjustments to the TM that would incorporate the findings from this study on condensing boiler performance into its savings estimates.

**Recommendation 3:** We recommend that National Grid and the DPS consider a coordinated statewide effort or accumulate individual utility study efforts to improve deemed EFLH values and the ensuing estimates of tracked savings.

**Response to Recommendation 3:** Further discussions would need to take place with DPS and the Joint Utilities to determine a statewide study evaluation approach for this recommendation.

**Recommendation 4:** We recommend that National Grid capture additional information about gas usage at the site on the application, including boiler primary use, heating load associated with the rebated measure and general information on other gas loads at the site. This information would enable the identification of sites with relatively simple gas consumption that are amenable to a billing analysis-based estimate of savings.

**Response to Recommendation 4:** This recommendation is largely intended to support the performance of future evaluation billing analysis work. We do not believe it is necessary to gather this information at this time given the uncertainty of future evaluations and the methods they might employ. If a billing analysis is performed on the prescriptive gas program in the future, information of this nature can be gathered as part of the evaluation effort itself.

**Recommendation 5:** We recommend considering the development of a tool, potentially for statewide use, which would produce a similar estimate of EFLH for prospective program participants. Such a tool could work with the level of information available, and would ultimately default to deemed values if data inputs were insufficient.

**Response to Recommendation 5:** Developing a tool of this nature would need to be performed at the state level to make the most economic sense. In the absence of this, National Grid will work with the DPS and the Technical Manual committee to consider adjustments to the TM that would incorporate the findings on EFLH this study into its savings estimates.

The following recommendations relate to the net to gross findings.

**Recommendation 6:** We recommend performing a review of non-condensing boiler standards and the boiler replacement market to ensure rebates are not being offered for standard or near-standard equipment.

**Response to Recommendation 6:** National Grid performs regular assessments of rebate offerings on gas boilers to be sure they are cost effective and properly incentivizing efficiency gains and will continue this process. The Company suggests consideration of a statewide baseline study to determine the typical installed efficiency of non-condensing boilers that might then be used to inform the level of efficiency rebated.

**Recommendation 7:** We recommend a review of program design to determine whether the program is finding participants or if participants are finding the program. The former is preferred as the latter is more likely to bring in customers that have already made the decision to install a particular unit and efficiency.

**Response to Recommendation 7:** The Company could assess the program design and participant involvement with a process evaluation. Further discussion would need to take place with DPS on the potential to pursue a process evaluation in the near future.

**Recommendation 8:** We recommend focusing the program on condensing boilers, where the majority of savings is being achieved. Non-condensing boiler savings in this program are relatively small (<5% in 2012) and as such an increased focus on condensing boilers is not likely to jeopardize program savings and success.

**Response to Recommendation 8:** In speaking with the evaluation contractor, this recommendation is only intended to encourage continued focus on condensing boilers as compared to non-condensing standard boilers in the program to the extent they are continued in light of recommendation 6. Currently, the majority of boiler activity is in condensing boilers and we expect this will continue to be the case. However, incentives for non-condensing boilers often target markets and replacement events that might otherwise be missed if only rebating condensing boilers.

The following recommendations relate to the contractor and on-site interview findings.

**Recommendation 9:** It does not appear that many customers are ready to replace their boiler prior to the 20 year EUL cutoff. Minimally, we recommend that National Grid and the DPS consider this finding as evidence suggesting that a higher EUL cutoff akin to 30 years may be appropriate based on the data from this study and pending further substantiation from other studies. If National Grid wanted to pursue early replacement credit, approaches for consideration might include vendor use of case studies that illustrate improved performance or perhaps marketing materials that focus on this selling point.

**Response to Recommendation 9:** Further discussions would need to take place with DPS and appropriate parties for further investigation for adoption of this recommendation to increase boiler EUL. National Grid does not currently have an early replacement program incentive.

**Recommendation 10:** Because many new boilers come with outdoor air reset capabilities, we recommend requiring or providing an additional incentive for the configuration of additional control measures according to a simple set point specification that may result in an additional savings of approximately 1-7% for installations where the contractors would not otherwise configure it.

**Response to Recommendation 10:** National Grid does currently offer a prescriptive incentive for aftermarket boiler reset controls on non-condensing heating units, as resets are typically already included on condensing boilers. Custom incentives are also offered for more comprehensive EMS equipment for large commercial units.