

Impact Evaluation of National Grid Rhode Island C&I Prescriptive Gas Pre-Rinse Spray Valve Measure

National Grid

Final Report

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1. EXECUTIVE SUMMARY

1.1 Introduction

This report documents DNV GL's Evaluation of National Grid Rhode Island's Commercial and Industrial Pre-Rinse Spray Valve Measure of the prescriptive gas program. This impact evaluation was performed concurrent with the impact evaluation of the Massachusetts Commercial and Industrial Prescriptive Gas Program which was performed by DNV GL¹ and also focused on evaluation of the prescriptive program pre-rinse spray valve measure. This impact evaluation was completed for National Grid and includes combined National Grid Massachusetts and National Grid Rhode Island site results.

1.1.1 Program Description

The National Grid Rhode Island Prescriptive Gas Program is an existing program that reduces natural gas consumption through offering incentives for natural gas efficiency measures. National Grid includes a variety of gas efficiency measures in the prescriptive program. This evaluation focuses on the Pre-rinse spray valve (PRSV) measure.

National Grid uses a direct installation contractor for the majority of implementation of the PRSV measure. This contractor physically replaces the old valve with a "program approved" new low-flow pre-rinse spray valve at the customer's place of business. Both installation of the new valve and removal of the old valve are done by the contractor. The contractor also removes the old valve from the customer premise and either returns or recycles the old valve based upon the locational specific policy of National Grid. The same manufacture valve model industry recognized "best-in-class" valve has consistently been used as the "program approved" new valve for a period of 2011 to present. The contractor, delivery and implementation methods are identical between the National Grid Rhode Island and Massachusetts programs.

1.1.2 Purpose of Study

The research objectives of this impact evaluation of National Grid Rhode Island's Commercial and Industrial Prescriptive Gas Pre-Rinse Spray Valve Program include updating the following assumptions:

- To provide new deemed savings value recommendations that have been derived from actual field-testing for the pre-rinse spray valve measure for use in the National Grid Rhode Island Technical Resource Manual (TRM). The deemed savings value recommendations will be available for National Grid use for retrospective and future planning purposes.
- To make observations based upon actual pre-post site level monitoring that has been performed on the site level and integrate PRSV user surveys conducted on the site level focusing on PRSV user tendencies and savings. Recommendations on administration or implementation that may help to maximize the measure savings are offered.

1.2 Results, Conclusions and Recommendations

Overall, the pre-rinse spray valve program that is implemented by direct installation contractor is successfully delivering energy and water savings in Rhode Island.

¹ Impact Evaluation of the 2012 Massachusetts C&I Prescriptive Gas Program, Final Report, October 1, 2014, Prepared by DNV GL.



The annual savings associated with the spray valve measure of a sample of 23 National Grid sites monitored in Rhode Island and Massachusetts was calculated as 104 Therms per year . The energy calculation utilized pre and post metering done with in-line water meters measuring the true spray valve flows for both the new and old valves for a full 30 day pre and post monitoring period. The average calculated water savings per spray valve change-out is 5,669 gallons per year. This is the direct fresh water savings only. There is also a similar associated wastewater savings.

Survey responses from interviews conducted with spray valve users and facility owners during the site monitoring were positive for the change-out program as were opinions toward the performance of the new high efficiency valves being utilized in the program. A wide variation of calculated savings stems from dissimilarity in dish/pot washing within the food service population of the commercial sector. The sample frame of this Rhode Island evaluation included healthcare, education, grocery, both full-plate restaurants and fast food restaurants, commercial kitchens and community assembly facilities that was representative of the program population. The calculated energy savings represented a wider range of values than what was reported in other studies that did site monitoring on restaurants only. The relative precision of 48% for the Rhode Island and Massachusetts sample suggests that the adoption of pooled or aggregated average savings values of all monitored sites as advantageous since the delivery and populations are similar for National Grid programs in Rhode Island and Massachusetts.

The combined results of all site monitoring, data analysis, fieldwork and observations of the retired spray valves collected in the evaluation is combined with the results of the onsite survey to lead to a better understanding of pre-rinse spray valves.

The following are conclusions and recommendations for the program, and future evaluations of the program.

Deemed Savings Value Adjustment: The recommendation is to utilize the average calculated annual savings of 114 Therms (per pre-rinse spray valve). This average value reflects 39 total sites involved in site monitoring in Rhode Island and Massachusetts. Precision and confidence associated with the savings value is improved by pooling all site monitoring results for the largest sample. This initial evaluation determined that no discernable differences exist between the two state program implementations or C&I spray valve populations. Additional average calculated values for National Grid sites (Rhode Island only, National Grid only “pooled” are further detailed in Section 6:



results. The average savings/year calculated from site level monitoring conducted in the evaluation more accurately represents the program savings value for a prescriptive program spray valve change out than the corrected deemed savings value of 126 Therms currently being utilized in the 2012/2013 program data. The National Grid Rhode Island TRM has a corrected annual savings value of 126 Therms.

Non Energy Impact Adjustment, Water and Wastewater Savings: The evaluation measured water savings at the site level using in-line water meters for old and new spray valves (pre-post monitoring). The average annual calculated water savings of 39 total site monitored spray valves is 6,410 gallons per spray valve change-out. The same value of 6,410 gallons is identified as the annual wastewater savings.

Spray Valve Measure Lifetime Adjustment: Three factors each contribute to the spray valve measure lifetime increase from five to eight years. First, eight years is the average valve lifetime of 36 survey responses where retired spray valve lifetime was known for certain. Unsure or unknown responses were not counted. Second, forensic inspection of the spray valves taken out of service confirmed that many old valves were in service for a long period and none appeared to conflict with the survey responses. Lastly, the newer higher efficiency low-flow spray valves such as what is being used as the default program valve in Rhode Island are less prone to clogging, have more robust design mechanisms and are expected to have longer service lives than the older vintage valves being replaced by change-out programs occurring now.

Recommendations to Increase Savings: Results showed that a percentage of change-outs (approximately 20%) resulted in small energy savings because of either low spray valve use at a site or old valves already having low flow rates. Solutions to address these “small-savers” in the program population do not seem practical and are further explained:

- No practical method can be recommended to accurately identify low use sites. A free change-out program would quickly become very complex and un-manageable if simple eligibility rules changed to make it selective to certain commercial businesses. Site level monitoring proved that spray valve use remains site specific even between facility types such as healthcare, fast food and full service restaurants where there was a wide variation in savings between the same type of buildings or businesses.
- No practical method exists to stop the easy modification of older spray valve’s flow rate. Hundreds of bucket tests performed in this evaluation proved that even if a newer vintage EPACT 2005 Compliant (with flow rate <1.6 GPM) were in place at a customer site and a bucket test was performed to confirm that it’s flow rate was less than 1.6 GPM there is no way to stop it from being quickly modified in the future to a higher flow rate. The existing program implementation practice of changing all valves to the high efficiency “tamper-proof” model to assure low flow operation is maintained in the future appears to be prudent administration.

Recommendation for future Market Assessment: National Grid’s implementation of the spray valve program utilizing direct installation contractors has availed the change-out of 2-3,000 spray valves per year in the state resulting in substantial gas savings. Currently there are some synergies achieved by common program implementation occurring between two States and multiple program administrators. Further investigation of the state-wide inventory of spray valves and historic program data analysis will provide meaningful planning details for the remaining overall gas savings potential and feasible future strategies for this measure.

Figure 1: Old and New: Pre-Rinse Spray Valve Change-out

