

State of Vermont
Department of Public Service
112 State Street
Montpelier, VT 05620-2601
<http://www.publicservice.vermont.gov>

[phone] 802-828-2811
[fax] 802-828-2342
[tty] 800-734-8390

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August 30, 2019

Judith Whitney, Clerk
Vermont Public Utility Commission
112 State Street
Montpelier, VT 05620-2701

Re: 19-2175-PET

Department of Public Service Verification of the 2018 Efficiency Savings Claim of the Natural Gas Energy Efficiency Utility operated by Vermont Gas Systems

Dear Ms. Whitney:

The Public Service Department (Department or PSD) provides to the Public Utility Commission, this Verification Report for the 2018 Efficiency Savings Claim of the natural gas Energy Efficiency Utility (EEU) operated by Vermont Gas Systems (VGS), including an evaluation of VGS' progress toward its QPI and MPR targets for the three-year 2018 – 2020 performance period.

This report describes the result of a two-step review process undertaken by the Department to assess the performance of the EEU during the first year of the 2018 – 2020 performance period. First, with the assistance of its contractor, NMR Group, Inc. (NMR), the Department verified the reported savings of the VGS EEU for the 2018 program year (PY 2018). Using that data, the Department then assessed the degree to which the natural gas EEU operated by VGS made progress toward the three-year quantifiable performance indicators (QPIs) and minimum performance requirements (MPRs) in the PUC order of October 12, 2017 as well as qualitative obligations and included in VGS' *Process and Administration of an Energy Efficiency Utility Order of Appointment*.

The Department has determined that VGS has made satisfactory progress toward all MPRs and other non-quantifiable obligations of the October 12, 2017 order. After an independent third-party evaluation and the application of the resulting realization rates, VGS has also made satisfactory progress toward achieving the four QPIs. As evidenced by the high realization rates resulting from this third-party verification, VGS has shown noticeable improvements in program

implementation and savings estimation since being appointed an EEU that bode well for achieving all QPIs and MPRs in the current three-year performance period.

This report, which focuses on the first year of the 2018 – 2020 three-year performance period, is the fulfillment of the Department’s obligation to perform annual savings verifications of the natural gas EEU pursuant to Sections II.3.E and II.3.H (c) of the “Process and Administration of an Energy Efficiency Utility Order of Appointment,” and Section III.5.B of the “Order of Appointment for Vermont Gas Systems, Inc.,” issued by the Public Utility Commission on February 12, 2016.

To carry out these verification activities the Department retained the services of a consultant, NMR Group (NMR), to provide expert review and analysis of the VGS 2018 savings claim for the Commercial and Industrial (C&I) sector programs as well as the Residential New Construction program and Custom Residential Retrofit program. NMR also assisted Department staff in verifying the savings claim for the Residential Equipment Replacement (RER) and Low-Income Home Retrofit (RIR-LI) programs as well as the other smaller programs in the residential sector.

The objective of savings verification is to calculate annual and peak day savings realization rates (RRs) at the program and sector levels while leveraging information garnered during the verification process to inform future program design and budgeting. Evaluation activities include review of the full database of measure data and sampled project files to accomplish the following:

- Verify that savings assumptions have been applied appropriately and calculations performed correctly
- Calculate verified savings
- Establish realization rates on a program and sector level

The Department has reviewed the results from these activities with VGS staff and concurs with the findings of NMR contained in the attached report entitled: *Verification of Vermont Gas Systems’ 2018 Savings Claims*. The results of the 2018 savings verification are summarized in Table 1:

Table 1. VGS Sector- and Portfolio-Level Certified Verified Savings for PY* 2018

Sector	VGS Reported Annual Mcf	Verified Annual Mcf	2018 Annual Mcf Realization Rate	VGS Reported Peak Day Mcf	Verified Peak Day Mcf	2018 Peak Day Realization Rate
Residential Sector total	29,652	30,010	101%	290.3	295.0	102%
C/I sector total	29,819	32,498	109%	124.1	136.9	110%
Portfolio Total	59,471	62,508	105%	414.4	431.9	104%

* Program Year

The Department certifies the VGS verified savings for 2018 as shown in Table 1, above. The certified commercial and industrial (C&I) sector and residential sector verified savings at the program level are presented in Table 2, below.

Table 2. C&I and Residential PY 2018 Reported and Verified Savings

Program	2018 VGS Reported Annual Mcf	2018 Verified Annual Mcf	2018 Annual Mcf Realization Rate	2018 VGS Reported Peak Day Mcf	2018 Verified Peak Day Mcf	2018 Peak Day Realization Rate
Commercial Equipment Replacement (CER)	7,372	8,068	109%	34.7	34.3	99%
Commercial Retrofit (CSR)	14,959	15,468	103%	29.2	38.8	133%
Commercial New Construction (CNC)	7,489	8,962	120%	60.3	63.8	106%
C/I sector total	29,819	32,498	109%	124.1	136.9	110%
Program	2018 VGS Reported Annual Mcf	2018 Verified Annual Mcf	2018 Annual Mcf Realization Rate	2018 VGS Reported Peak Day Mcf	2018 Verified Peak Day Mcf	2018 Peak Day Realization Rate
Residential New Construction (RNC)	11,950	12,457	104%	132.6	138.1	104%
Residential Equipment Replacement (RER)	13,207	13,092	99%	113.6	112.7	99%
Custom Residential Retrofit (RIR)	4,495	4,461	99%	44.2	44.2	100%
Residential total	29,652	30,010	101%	290.3	295.0	102%
Portfolio total	59,471	62,508	105%	414.4	431.9	104%

The residential sector verified savings are further broken out into sub-programs in Table 3.

Table 3. VGS Residential Sector Certified Verified Savings for PY 2018

Program	2018 VGS Reported Annual Mcf	2018 Verified Annual Mcf	2018 Annual Mcf Realization Rate	2018 VGS Reported Peak Day Mcf	2018 Verified Peak Day Mcf	2018 Peak Day Realization Rate
Residential New Construction EVT (RNC-EVT)	2,200	2,200	100%	27.4	27.4	100%
Custom Multifamily Residential New Construction (RNC-MF Custom)	9,750	10,257	105%	105.2	110.7	105%
Residential New Construction (RNC) total	11,950	12,457	104%	132.6	138.1	104%
Residential Equipment Replacement (RER)	13,207	13,092	99%	113.6	112.7	99%
Residential Retrofit (RIR)	1,990	1,990	100%	26.7	26.7	100%
Residential Home Retrofit (RIR-Custom)	1,110	1,076	97%	0	0	N/A
Home Performance with Energy Star (RIR-HPWS)	237	237	100%	3.3	3.3	100%
Low Income Residential Home Retrofit (RIR-LI)	599	599	100%	8.4	8.4	100%
Residential Direct Install (RIR-SLAM)	202	202	100%	0.7	0.7	100%
Residential Retrofit Condominium (RIR-Condo)	359	359	100%	5.1	5.1	100%
Residential Home Retrofit (RIR) total	4,495	4,461	99%	44.2	44.2	100%
Residential Sector total	29,652	29,946	101%	290.3	295.0	102%

As is noted in the attached report, the high realization rates demonstrate that VGS has incorporated the recommendations from the previous two years' evaluations. Specifically, the report notes that "VGS employed a number of TRM-based and other calculators in a consistent manner," resulting in 11 of 23 projects in the commercial sample achieving realization rates between 97% and 103%. For the Residential sector, the realization rate of 102% is within the desired range on either side of the 100% target and shows continued improvement in implementing and estimating the impact of the residential programs.

The reasons for the Commercial and Industrial (C&I) sector realization rate of 110% are, for the most part, one-time only issues discovered during the evaluation rather than systematic errors. Those reasons included:

- **New construction heat recovery projects.** VGS's calculation for heat recovery project in new construction was determined to be deducting more than required for code-required baselines. Correcting this error resulted in high realization rates for three large projects.
- **Involuntary Omissions.** The evaluation team discovered significant omissions causing savings to be underreported for two large projects. Correcting these omissions resulted in high project realization rates for both projects. In one case, energy savings estimates for a controls measure were only claimed for a portion of the day but should have been applied to the entire day. This oversight stemmed from project handoff following a VGS staffing change.
- **Database Omissions.** One measure of a multi-measure project and the associated savings were inadvertently omitted from VGS's 2018 reported savings. The evaluation contractor added this measure back into the verified savings, resulting in a high realization rate for that project.

Quantifiable Performance Indicators

Section II.3.E of the *Process and Administration of an Energy Efficiency Utility Order of Appointment* requires the Department to annually certify to the Board that the natural gas EEU operated by VGS has satisfactorily achieved the performance metrics known as Quantifiable Performance Indicators (QPIs) that are designed to assess whether the EEU is meeting established savings goals on the schedule and at the levels set by the Commission in its Order of December 12, 2017 in this proceeding. Specifically, the Department is obligated to determine:

- (a) Whether VGS has made appropriate interim progress toward achieving QPIs;
- (b) Whether VGS is satisfactorily executing those of its responsibilities that are not directly measured by QPIs; and
- (c) Whether VGS' performance relative to its QPIs is consistent with the portion of the three-year budget that has been expended.

As detailed in the PUC order of October 12, 2017, entitled "*Order RE: Development and Support Service Budgets, Evaluation Budgets, Other Program Budgets, Forecasts of Expected*

Savings, and Performance Targets,” VGS is responsible for meeting six Quantifiable Performance Indicators (QPI) and seven Minimum Performance Requirements (MPR). Based on a review of VGS’ savings claims including the savings verification activities described in the attached reports, the Department concludes that VGS has made conscientious and concerted effort to meet the PUC ordered QPI targets for the three-year performance period. Tables 4, 5 and 6, below summarize VGS’ performance in 2018 with respect to QPI #1: Annual Incremental Gas Savings, QPI #2: Total Resource Benefits, and QPI #3: Peak Day Gas Savings, respectively.

Table 4. PY 2018 Performance vs. Goals – QPI #1: Annual Incremental Mcf Savings

Program	QPI #1 Annual Incremental Mcf Savings		
	2018-20 Annual Mcf Three-Year Goal	PY 2018 Verified Annual Mcf	Verified Savings Progress Toward Three-Year Goal
Residential Home Retrofit (RIR)	12,920	4,461	35%
Residential New Construction (RNC)	21,596	12,457	58%
Residential Equipment Replacement (RER)	32,849	13,092	40%
Residential Sector Total	67,365	30,010	45%
Commercial Retrofit (CSR)	49,506	15,468	31%
Commercial New Construction (CNC)	30,015	8,962	30%
Commercial Equipment Replacement (CER)	48,941	8,068	16%
C&I Sector Total	128,462	32,498	25%
Portfolio Total	195,827	62,508	32%

Table 5. PY 2018 Performance vs. Goals – QPI #2: Total Resource Benefits

Program	QPI #2 Total Resource Benefits		
	2018-20 Three-Year TRB Goal	PY2018 Verified TRB	PY 2018 Verified vs. Three-Year Goal
Residential Home Retrofit (RIR)	\$2,705,181	\$1,143,323	42%
Residential New Construction (RNC)	\$4,043,794	\$2,757,068	68%
Residential Equipment Replacement (RER)	\$6,171,197	\$2,452,692	40%
Residential Sector Total	\$12,920,172	\$6,353,083	49%
Commercial Retrofit (CSR)	\$7,905,879	\$3,035,145	38%
Commercial New Construction (CNC)	\$5,359,833	\$1,910,722	36%
Commercial Equipment Replacement (CER)	\$8,280,048	\$1,849,420	22%
C&I Sector Total	\$21,545,760	\$6,795,288	32%
Portfolio Total	\$34,465,932	\$13,148,371	38%

Table 6. PY 2018 Performance vs. Goals – QPI #3: Peak Day Mcf Savings

Program	QPI #3 Peak Day Mcf Savings		
	2018-20 Peak Day Mcf Three-Year Goal	PY 2018 Verified Peak Day Mcf	PY 2018 Verified vs. Three-Year Goal
Residential Home Retrofit (RIR)	155	44	28%
Residential New Construction (RNC)	238	138	58%
Residential Equipment Replacement (RER)	263	113	43%
Residential Sector Total	656	295	45%
Commercial Retrofit (CSR)	99	39	39%
Commercial New Construction (CNC)	60	64	106%
Commercial Equipment Replacement (CER)	98	34	35%
C&I Sector Total	257	137	53%
Portfolio Total	913	432	47%

Table 7, below, compares the progress toward the three-year performance period targets for QPIs #1-3 with the percentage of the budget expended by program and sector. For the residential sector, expenditures for the first year were 30 percent of the three-year performance period budget, while the verified performance for QPIs #1, #2 and #3 were 45%, 49% and 45% of the three-year goal, respectively. For the Commercial and Industrial sector, expenditures in 2018 were only 30% of the three-year budget and performance vs. goals for QPIs #1, and #2 were 25% and 32% of the three-year goal, respectively. PY 2018 verified Peak Day savings in the C&I sector, however, was 53% of the three-year QPI #3 goal.

Overall, expenditures for PY 2018 were slightly under budget (30% of the three-year budget after one year) while the verified performance for QPI #1 was below target for the C&I sector (25%), and well ahead of target for the Residential sector (45%). PY 2018 performance was ahead of the 2018 target for QPIs #2 and #3 in both the Residential and C&I sectors.

Table 7. PY 2018 Expenditures vs. Budget and Performance vs. Goals QPIs #1, #2 and #3

Program	Budget and Expenditures			QPI #1: Annual Incremental Mcf Savings	QPI #2: Lifetime Natural Gas Savings	QPI #3: Peak Day Mcf Savings
	2018-20 Three-Year Budget	PY 2018 Expenditures	Expenditures as % of Three-Year Budget	PY 2018 Incremental Mcf Savings as % of Three-Year Goal	PY 2018 Lifetime NG Savings as % of Three-Year Goal	PY 2018 Peak Day Mcf Savings as % of Three-Year Goal
Residential Home Retrofit	\$3,216,277	\$836,315	26%	35%	42%	28%
Residential New Construction	\$982,751	\$297,610	30%	58%	68%	58%
Residential Equipment Replacement	\$2,680,231	\$928,643	35%	40%	40%	43%
Residential Sector Total	\$ 6,879,259	\$ 2,062,567	30%	45%	49%	45%
Commercial Retrofit	\$893,410	\$268,820	30%	31%	38%	39%
Commercial New Construction	\$625,387	\$162,904	26%	30%	36%	106%
Commercial Equipment Replacement	\$536,046	\$179,479	33%	16%	22%	35%
C&I Sector Total	\$2,054,844	\$611,203	30%	25%	32%	53%
Portfolio Total	\$ 8,934,103	\$ 2,673,770	30%	32%	38%	47%

QPI #4 is intended to ensure that VGS’ residential single-family energy efficiency initiatives are designed and implemented to acquire comprehensive savings rather than just the most cost-effective measures. QPI #4 is divided into two parts. The first part sets a performance goal for conversion of energy audits into energy saving improvements. The target set by the PUC for the 2018-2020 performance period was an overall 30% conversion rate. VGS achieved a 43% conversion rate in PY 2018, which is 43% better than the goal.

The second part of QPI #4 sets a target percentage of all cost-effective measures as well as those measures recommended by the audit that are installed by the customer within 12 months of the audit. The PUC set a goal of 70% of auditor recommended cost-effective measures installed within a year of the initial audit. VGS achieved an average of 84%, which is 20% better than the target set by the PUC.

VGS’ achievements regarding QPIs #1 through #4 are summarized in Table 8, below.

Table 8. PY 2018 QPIs #1 through #4 - Verified Performance vs. Three-Year Goals

QPI #	Title	Performance Indicator	2018-2020 Three-Year Target	PY 2018 Achieved	Achieved vs. Three-Year Target
1	Natural Gas Savings	Annual incremental net Mcf savings	195,827	62,508	32%
2	Lifetime Natural Gas Savings	a. Present worth of lifetime natural gas avoided costs	\$34,465,931	\$13,148,371	38%
		b. Lifetime Mcf savings	3,248,764	1,179,274	36%
3	Peak Day Natural Gas Savings	Peak day incremental Mcf savings	913	427	47%
4	Residential Single-Family Comprehensiveness	a. Percent of home energy audits converted to a measure installation within 12 months	30%	43%	143%
		b. Average percentage of auditor-recommended cost-effective measures that are installed by the customer within 12 months	70%	84%	120%

Minimum Performance Requirements

According to the PUC order of October 12, 2017, VGS is also responsible for meeting certain Minimum Performance Requirements for the three-year performance period as described in Table 9. The Department has determined that VGS has satisfied each of these MPRs with the exception of MPR # 13 - Addison County Aggressive DSM, which thus far has not met the target of 30% participation in VGS energy efficiency programs in the Addison County expansion territory by the final year of the performance period. The Department will continue to work with VGS and monitor progress on this important metric.

Table 9. PY 2018 Performance vs. 2018-20 Three-Year Minimum Performance Requirements

MPR #	Title	Performance Indicator	2018-2020 Three-Year Requirement	2018 Verified Performance	Performance vs. Requirement
5	Long-term Market Transformation	Offer energy efficiency training for contractors.	One per year	One Completed	Satisfactory
6	Business Comprehensiveness of Savings	Diversity of measures implemented in commercial retrofit projects	A minimum 10% control-related, 20% heating systems, heat recovery or domestic hot water systems, 10% process-related and 30% shell or other-related measures installed during the prior 12 months	9% control-related, 48% heating systems, heat recovery or domestic hot water systems, 9% process-related and 34% shell or other-related measures installed	Satisfactory
7	Minimum Natural Gas Benefits (Equity for All Natural Gas Ratepayers)	Total natural gas energy efficiency benefits divided by total utility costs	Equal or greater than 1.2 cost benefit ratio	4.92	Significantly better than requirement
8	Equity for Residential Ratepayers	A minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to residential customers	\$4,291,087	\$ 2,062,568	48% of 3-year requirement
9	Equity for Low-income Customers	A minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to Low-income customers	\$116,472	\$102,332	88% of 3-year requirement
10	Equity for Small Business Customers	Percent of commercial (non-residential) installed end uses that are classified as Rate G1 or G2 (use 600 Mcf/yr. or less)	30%	44%	Significantly better than requirement
11	Administrative Efficiency	Meet determined milestones on schedule, including: * Defining all Administrative costs, incentive and other costs. * By July 31, 2018, submit a proposal on how these costs will be tracked and reported, including a metric on the ratio of incentive costs to non-incentive costs and total administrative costs as a percent of total budget for the current performance period.	Track the ratio of incentive to non-incentive costs and report as a percent of total budget by July 31, 2018	Reported	Achieved
12	Total Resource Benefits	In consultation with the Department, file a status update on the feasibility and cost/benefit analysis of tracking water and delivered fuel resource benefits	Status update by July 31, 2018	Status update filed June 28, 2019	Achieved
13	Addison County Aggressive DSM	Meet minimum energy efficiency program participation rate for customers in Addison County	Achieve 30% energy efficiency participation in Addison County by Year 3	23%	Below requirement

Satisfaction of Non-Quantifiable Responsibilities Required of the EEU

As described in its Order of Appointment, the VGS EEU is required to meet certain other responsibilities to its customers beyond QPIs or MPRs. The Department's qualitative assessment of the performance of the natural gas EEU, conducted through our review of reports and communications between staff and the EEU during 2018 and 2019, confirms that VGS is also satisfactorily meeting those responsibilities. The PSD review has concluded that VGS has met each of the following non-quantifiable responsibilities described in its Order of Appointment:

- Assist other Vermont Utilities in connection with the performance of Distributed Utility Planning and transmission planning.
- Provide technical support and training regarding the development and implementation of state energy codes and standards.
- Implement marketing to promote customer participation in and market awareness of EEU services and initiatives; increase consumer demand for energy-saving products and services; and affect consumer decision-making in consumer-driven energy efficiency choices.
- Provide: a toll-free number for its customers; a web page describing services available to customers; and effective customer response and referral.
- Provide general information to the public to:
 - Increase consumer awareness and understanding of the benefits of reducing energy use;
 - Inform consumers of the best technologies available to them; and
 - Refer consumers to information and service resources other than the EEU
- Assist the PUC and/or the Department in developing and implementing any Self-Administered or Managed Energy Efficiency Programs for eligible gas EEU customers.

2018 Proportional Budget Expenditure by Program and Section

The Department concludes that the spending by VGS on EEU activities during PY 2018 was appropriate and proportional to the goals set by the PUC. VGS has consolidated the improvements with regard to spending and performance demonstrated in the PY 2016 – 2017 Transition Period in an effort to meet the three-year goals established by the Commission for the natural gas EEU. VGS has made adjustments to program design and implementation based on recommendations from the savings verification process in 2017 and 2018 and has used the recent TRM development process to standardize analysis, which is reflected in the excellent realization rates achieved in 2018. The results of the PY 2018 Savings Verification have given the Department confidence that VGS is on track to achieve all of its three-year performance metrics within budget.

Please feel free to contact me with any questions.



Keith Levenson
Energy Programs Specialist
Department of Public Service