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August 17, 2018

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

Re: EEU 2015-02

Department of Public Service Verification of the 2017 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, a Verification Report of the 2017 Efficiency Savings Claim of the natural gas Energy Efficiency Utility (EEU) operated by Vermont Gas Systems (VGS). This report also includes an evaluation of VGS' overall performance for the two-year 2016 - 2017 Transition Period to full EEU status, which began January 1, 2018.

This report describes the two-step review process undertaken by the Department to assess the performance of the EEU and the results of that process. First, the Department verified the reported savings of the VGS EEU for the 2017 program year (PY 2017). Using that data, along with the results of a similar study for PY 2016, the Department then assessed the degree to which the natural gas EEU operated by VGS achieved the quantifiable performance indicators (QPIs), minimum performance requirements (MPRs) and qualitative obligations proposed in the two-year Transition Period Plan (TPP) and included in the PUC order of December 23, 2015. The Department's conclusion is that VGS met all MPRs and other non-quantifiable obligations of the December 23, 2015 order. After an independent third-party evaluation and the application of the resulting realization rates, VGS did not achieve the PUC-ordered goals for three of the four QPIs, however VGS has shown noticeable improvements in program implementation and savings estimation that should form the basis for solid performance in the current three-year performance period.

This report, which focuses on the final year of the two-year Transition 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, Energy and Resource Solutions Inc. (ERS), to provide expert review and analysis of the VGS 2017 savings claim for the Commercial and Industrial (C&I) sector programs as well as the Residential New Construction program and Custom Residential Retrofit program. Department staff also verified 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 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 ERS contained in the attached report entitled: *Savings Verification of Vermont Gas Systems’ 2017 C/I and RNC Custom Programs*. The results of this evaluation are summarized in the table below:

Table 1. C&I and Custom Residential New Construction Reported and Verified Savings

Program	VGS Reported Annual Mcf	Verified Annual Mcf	2017 Annual Mcf Realization Rate	VGS Reported Peak Day Mcf	Verified Peak Day Mcf	2017 Peak Day Realization Rate
Commercial Equipment Replacement (CER)	5,877	5,669	96%	31	35	114%
Commercial Retrofit (CSR)	12,398*	6,845	55%	36*	15	41%
Commercial New Construction (CNC)	40,294*	34,922	87%	74*	56	76%
C/I sector total	58,569*	47,437	81%	140*	106	76%
Program	Tracking Annual Mcf	Verified Annual Mcf	2017 Annual Mcf Realization Rate	VGS Reported Peak Day Mcf	Verified Peak Day Mcf	2017 Peak Day Realization Rate
Custom Residential New Construction (RNC) program total	4,935	4,121	84%	54	46	85%
Custom Residential Retrofit (RIR)	769	841	109%	10	10	100%

*Numbers marked with an asterisk in this table are slightly different from the corresponding values in the savings claim filed by VGS on May 1, 2018. These discrepancies will be corrected in an amended savings claim to be filed on a future date.

Department staff also verified the savings claims for the Residential Equipment Replacement

(RER) and Low-Income Home Retrofit (RIR-LI) programs operated by VGS during 2017. The results of that review are included in the report entitled: *Savings Verification of Vermont Gas Systems' 2017 Residential Equipment Replacement and Low-Income Home Retrofit Programs*, also attached, and summarized in the following table:

Table 2. Residential Equipment Replacement and Low-Income Home Retrofit Program Reported and Verified Savings

Program	VGS Reported Annual Mcf	Verified Annual Mcf	2017 Annual Mcf Realization Rate	VGS Reported Peak Day Mcf	Verified Peak Day Mcf	2017 Peak Day Realization Rate
Residential Equipment Replacement (RER)	11,787	11,676	99%	98	97	99%
Low Income Home Retrofit (RIR-LI)	1,046	1,046	100%	15	15	100%
Total	12,833	12,722	99%	113	112	99%

The Department certifies the VGS portfolio verified savings for 2017 as shown in Tables 3 and 4, below.

Table 3. VGS Commercial and Industrial Sector Certified Verified Savings for PY*2017

Program	Reported Annual Mcf	Verified Annual Mcf	2017 Annual Mcf Realization Rate	Reported Peak Day Mcf	Verified Peak Day Mcf	2017 Peak Day Realization Rate
Commercial Equipment Replacement (CER)	5,877	5,669	96%	31	35	114%
Commercial Retrofit (CSR)	12,398	6,845	55%	36	15	41%
Commercial New Construction (CNC)	40,294	34,922	87%	74	56	76%
C/I sector total	58,569	47,437	81%	140	106	76%

* Program Year

Table 4. VGS Residential Sector Certified Verified Savings for PY 2017

Program	Reported Annual Mcf	Verified Annual Mcf	2017 Annual Mcf Realization Rate	Reported Peak Day Mcf	Verified Peak Day Mcf	2017 Peak Day Realization Rate
Residential New Construction EVT (RNC-EVT)	2,728	2,728	100%	34	34	100%
Custom Multifamily Residential New Construction (RNC-MF Custom)	4,935	4,121	84%	54	46	85%
Residential New Construction (RNC) total	7,663	6,849	89%	88	80	91%
Residential Equipment Replacement (RER) total	11,787	11,676	99%	98	97	99%

Custom Residential Retrofit (RIR-Custom)	769	841	109%	10	10	100%
Residential Home Retrofit (RIR)	2,714	1,954	72%	36	26	72%
Home Performance with Energy Star (RIR-HPWS)	411	292	71%	6	6	100%
Low Income Residential Home Retrofit (RIR-LI)	1,046	1,046	100%	15	15	100%
Residential Direct Install (RIR-SLAM)	33	33	100%	0	0	100%
South Burlington Energy Prize (RIR-SBEP)	212	212	100%	1	1	100%
Residential Retrofit Condominium (RIR-Condo)	263	263	100%	4	4	100%
Mobile Home Retrofit (RIR-Mobile Home)	77	77	100%	1	1	100%
Residential Home Retrofit (RIR) total	5,525	4,717	85%	72	62	86%
Residential Sector total	24,974	23,243	93%	259	240	93%

Table 5, below, lists the certified savings on the sector and overall portfolio level.

Table 5. VGS Sector- and Portfolio-Level Certified Verified Savings for PY 2017

Sector	VGS Reported Annual Mcf	Verified Annual Mcf	2017 Annual Mcf Realization Rate	VGS Reported Peak Day Mcf	Verified Peak Day Mcf	2017 Peak Day Realization Rate
Residential Sector total	24,974	23,243	93%	259	240	93%
C/I sector total	58,569	47,437	81%	232	176	76%
Portfolio Total	83,543	70,680	85%	491	416	85%

Quantifiable Performance Indicators

Section II.3.E of the *Process and Administration of an Energy Efficiency Utility Order of Appointment* document 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 23, 2015 in this proceeding.

- (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 2-year budget that has been expended thus far.

As detailed in the PUC order of December 23, 2015, entitled "Quantifiable Performance Indicator Targets for Vermont Gas Systems," VGS is responsible for meeting five 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 two-year Transition Period, but after its first comprehensive third party evaluation and the application of the resulting realization rates, has fallen slightly short of its goals for three out of four QPIs. Tables 6, 7 and 8, below summarize VGS' performance in 2016 and 2017 with respect to QPIs #1: Annual Incremental Gas Savings, QPI #2: Total Resource Benefits, and QPI #3: Peak Day Gas Savings.

Table 6. PY 2016 – 2017 Performance vs. Goals – QPI #1: Annual Incremental Mcf Savings

Program	QPI #1 Annual Incremental Mcf Savings				
	2016-17 Annual Mcf Two-Year Goal	PY 2016 Verified Annual Mcf	PY 2017 Verified Annual Mcf	Two-Year Total Verified Mcf	Two -Year Verified Savings vs. Goal
Residential Home Retrofit (RIR)	7,852	4,780*	4,717	9,497	121%
Residential New Construction (RNC)	17,554	5,569	6,849	12,418	71%
Residential Equipment Replacement (RER)	23,695	10,678	11,676	22,354	94%
Residential Sector Total	49,101	21,027*	23,243	44,270	90%
Commercial Retrofit (CSR)	35,687	29,287	6,845	36,132	101%
Commercial New Construction (CNC)	30,600	7,875	34,922	42,797	140%
Commercial Equipment Replacement (CER)	30,998	5,506	5,669	11,175	36%
C&I Sector Total	97,285	42,668	47,437	90,105	93%
Portfolio Total	146,386	63,695	70,680	134,375	92%

* The 2016 Savings Verification report used an incorrect value for the RIR verified annual Mcf savings. These values are the corrected annual Mcf savings for RIR in 2016.

Table 7. PY 2016 – 2017 Performance vs. Goals – QPI #2: Total Resource Benefits

Program	QPI #2 Total Resource Benefits				
	PY*2016-17 Two-year TRB Goal	PY 2016 Verified TRB	PY 2017 Verified TRB	Two-Year Verified TRB	Two-Year Verified vs. Goal
Residential Home Retrofit (RIR)	\$1,647,708	\$1,033,491	\$1,188,444	\$2,221,935	135%
Residential New Construction (RNC)	\$3,704,973	\$888,003	\$1,598,124	\$2,486,127	67%
Residential Equipment Replacement (RER)	\$4,617,641	\$2,092,582	\$2,327,783	\$4,420,365	96%
Residential Sector Total	\$9,970,322	\$4,014,076	\$5,114,351	\$9,128,427	92%
Commercial Retrofit (CSR)	\$4,808,539	\$4,476,516	\$1,110,234	\$5,586,750	116%
Commercial New Construction (CNC)	\$4,768,269	\$1,273,216	\$6,350,497	\$7,623,713	160%
Commercial Equipment Replacement (CER)	\$5,372,958	\$793,527	\$1,130,238	\$1,923,765	36%
C&I Sector Total	\$14,949,766	\$6,543,259	\$8,590,969	\$15,134,228	101%
Portfolio Total	\$24,920,088	\$10,557,335	\$13,705,320	\$24,262,655	97%

Table 8. PY 2016 – 2017 Performance vs. Goals – QPI #3: Peak Day Mcf Savings

Program	QPI #3 Peak Day Mcf Savings				
	2016-17 Peak Day Mcf Two-year Goal	PY 2016 Verified Peak Day Mcf	PY 2017 Verified Peak Day Mcf	Two-Year Verified Peak Day Mcf	Two-Year Verified vs. Goal
Residential Home Retrofit (RIR)	70	61	62	123	175%
Residential New Construction (RNC)	140	63	80	143	102%
Residential Equipment Replacement (RER)	189	91	97	188	100%
Residential Sector Total	399	216	240	455	114%
Commercial Retrofit (CSR)	70	45	15	60	86%
Commercial New Construction (CNC)	275	101	56	157	57%
Commercial Equipment Replacement (CER)	155	29	35	64	41%
C&I Sector Total	500	176	107	282	56%
Portfolio Total	899	392	347	737	82%

Table 9, below, compares the performance over the two-year Transition Period for QPIs #1-3 with the percentage of the budget expended by program and sector. For the residential sector, expenditures for the two-year period were 17 percent above budget, while the verified performance for QPIs #1 and #2 were 92% and 97% of the two-year goal, respectively. Performance for QPI #3 (Peak Day Mcf savings) was 114% of the goal for the residential sector. For the Commercial and Industrial sector, expenditures overall were only 71% of budget and performance vs. goals for QPIs #1 and #2 were 93% and 101% respectively. Two-year verified Peak Day savings, however, was only 56% of the two-year QPI #3 goal.

Overall, expenditures for the two-year Transition Period were slightly over budget (102% of the two-year budget) while QPI performance was below target for each of the three QPIs.

Table 9. PY 2016 – 2017 Expenditures vs. Budget and Performance vs. Goals QPIs #1, #2 and #3

Program	Budget and Expenditures					QPI #1: Incremental Mcf	QPI #2: TRB	QPI #3: Peak Day Mcf
	TPP 2016-17 Two-Year Budget	PY 2016 Spending	PY 2017 Spending	TPP 2016-17 Two-Year Spending	Spending as % of Two-Year Budget	Two-Year Mcf Savings as % of Goal	Two-year TRB as % of Goal	Two-year Peak Day Mcf Savings as % of Goal
Residential Home Retrofit	\$1,715,255	\$978,380	\$932,165	\$1,910,545	111%	121%	135%	175%
Residential New Construction	\$532,908	\$302,590	\$262,825	\$565,415	106%	71%	67%	102%
Residential Equipment Replacement	\$1,265,657	\$804,249	\$825,464	\$1,629,713	129%	94%	96%	100%
Residential Sector Total	\$3,513,820	\$2,085,219	\$2,020,454	\$4,105,673	117%	90%	92%	114%
Commercial Retrofit	\$597,460	\$277,672	\$225,755	\$503,427	84%	101%	116%	86%
Commercial New Construction	\$583,718	\$203,414	\$235,304	\$438,718	75%	140%	160%	57%
Commercial Equipment Replacement	\$538,742	\$147,456	\$131,506	\$278,962	52%	36%	36%	41%
C&I Sector Total	\$1,719,920	\$628,542	\$592,565	\$1,221,107	71%	93%	101%	56%
Portfolio Total	\$5,233,740	\$2,713,761	\$2,613,019	\$5,326,780	102%	92%	97%	82%

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 2016-2017 performance period was an overall 30% conversion rate. VGS achieved a 41% conversion rate, which is 37% 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 77%, which is 10% better than the target set by the PUC.

VGS’ achievements regarding QPIs #1 through #4 are summarized in Table 10, below.

Table 10. Transition Period QPIs #1 through #4 - Verified Performance vs. Goals

QPI #	Title	Performance Indicator	2016-2017 Two-Year Target	PY 2016 Verified	PY 2017 Verified	Two-Year Cumulative Verified	Achieved vs. Target
1	Natural Gas Savings	Annual incremental net Mcf expected savings	156,633	63,695	70,680	134,375	92%
2	Total Resource Benefits	Present worth of lifetime natural gas avoided costs	\$24,920,088	\$10,557,335	\$13,705,320	\$24,262,655	97%
3	Peak Day Natural Gas Savings	Peak day incremental expected savings	899	392	347	739	82%
4	Residential Single-Family Comprehensiveness	a. Percent of home energy audits converted to a measure installation within 12 months	30%	47%	34%	41%	137%
		b. Average percentage of auditor-recommended cost-effective measures that are installed by the customer within 12 months	70%	75%	80%	77%	110%

Minimum Performance Requirements

According to the PUC order of December 23, 2015, VGS is also responsible for meeting certain Minimum Performance Requirements for the two-year Transition Period as described in Table 11. The Department has determined that VGS has satisfied each of these MPRs.

Table 11. Transition Period Minimum Performance Requirements

MPR #	Title	Performance Indicator	2016-2017 Two-Year Target	2016 Verified	2017 Verified	Two-Year Cumulative Verified	Achieved vs. Target
5	Equity for all Natural Gas Ratepayers	Total natural gas energy efficiency benefits divided by total costs	Benefit cost ratio equal or greater than 1.2	3.46	5.07	4.20	Achieved
6	Equity for Residential Ratepayers	A minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to residential customers	\$2,400,000	\$2,085,219	\$2,020,454	\$4,105,673	Achieved
7	Equity for Low-Income Customers	A minimum level of overall efficiency efforts, as reflected in spending, will be dedicated to low-income customers	\$153,000	\$48,270	\$170,686	\$218,956	Achieved
8	Equity for Small Business Customers	Percent of commercial installed measures that are classified as Rate GI or G2	30%	51%	42%	47%	Achieved
9	Long-term Market Transformation	Meet milestone for proposing a QPI for 2018 - 2020 performance period	2/28/2017	Proposed 2/28/2017			Achieved
10	Business Comprehensive ness of Savings	Meet milestone for proposing a QPI for 2018 - 2020 performance period	2/28/2018	Proposed 2/28/2018			Achieved
11	Program Implementation Efficiency	Meet milestones on schedule for identifying program improvements and efficiencies	2/28/2018	Proposed 2/28/2018			Achieved

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 2017 and 2018, 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 Board and/or the Department in developing and implementing any Self-Administered or Managed Energy Efficiency Programs for eligible gas EEU customers.

2017 Proportional Budget Expenditure by Program and Section

The Department concludes that the spending by VGS on EEU activities during 2017 was appropriate and proportional to the goals set by the PUC. VGS made significant improvements compared to PY 2016 with regard to spending and performance in an effort to meet the two-year goals established by the Commission for the natural gas EEU. Although performance fell short of the targets set by the PUC in three of the four QPI metrics, VGS has made adjustments to program design and implementation based on recommendations from the savings verification process that is the basis of this report. The lessons learned through this evaluation along with the extra time afforded by the current three-year performance period should provide more flexibility to the EEU with respect to program design, budgeting and the achievement of performance metrics.

Please feel free to contact me with any questions.



Keith Levenson
Energy Programs Specialist
Department of Public Service