

Final Report to the Energy Efficiency Utility

Contract Administrator

Verification of

EVT 2009 Claimed Annual MWh Savings,

Coincident Summer and Winter Peak Savings

And Total Resource Benefit (TRB)

Department of Public Service

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I. Introduction

On March 16, 2010, Vermont Energy Investment Corporation, operating under contract to the Public Service Board ("PSB") as Efficiency Vermont ("EVT"), submitted its "Year 2009 Preliminary Savings Claim" for calendar year 2009 activities. The Department of Public Service ("DPS" or "Department"), is required by the PSB to undertake a review to verify the energy, coincident peak, and Total Resource Benefit ("TRB") savings claimed by EVT. The Department contracted the services of West Hill Energy and Computing, who conducted the verification with assistance from Carole Welch, Cx Associates, GDS Associates and Lexicon Energy Consultants. This report made to Michael Wickenden, Energy Efficiency Utility Contract Administrator for the PSB, summarizes the results of that review.

The verification process is a paper review intended to identify errors in calculation, assumptions and methodology made by EVT in their savings claim. For retrofit projects, a determination is also made as to whether savings are realistic in terms of pre-installation consumption. An more rigorous review of selected projects is expected to occur within the context of the ISO-New England Forward Capacity Market ("FCM"). That review will include site visits and metering of installed equipment to provide a more robust estimate of the actual savings realized from the efficiency program implementation.

In a change to the process used in previous years, preliminary findings were provided to EVT and the contract administrator on a project by project basis as the project reports were completed. EVT provided comments on the preliminary reports for consideration by the Department's contracted engineers. This more fluid process was intended to alleviate bottlenecks and simplify the communications with EVT, and it was found to be effective for addressing the issues associated with most projects. A limited number of projects (five) were left to be resolved through negotiation among the parties. Through these two methods, agreement on savings adjustments was reached for all of the C&I projects and residential initiatives.

EVT has indicated it accepts all of the adjustments to the 2009 claimed savings recommended by the Department in this report. In some cases, EVT does not completely agree with the Department's rationale or methodology for the adjustment, and requests that the measure characterizations for 2009 be discussed more thoroughly through the ongoing DPS-EVT Technical Advisory Group (TAG) process. The Department has also identified several topics to be taken up in TAG process, as outlined in Section III. Since the parties are in agreement on the magnitude of the 2009 adjustment, the project by project issues and resolutions are only briefly described in the main report. Detailed discussion of the individual projects reviewed and the review outcomes are provided in Appendix A.

The DPS thanks the many staff members at Efficiency Vermont who coordinated the verification review, in particular, Pierre VanDerMerwe, Bill Fischer and Erik Brown.

The results of the Department's verification indicate that EVT's 2009 claimed energy savings claims are overstated by about 12.1%, or 9,762 gross annual MWh, and coincident peak savings

are overstated by 7.8%, or 1,116 winter kW and 12.2%, or 1,604 summer kW. The Department's findings are the result of numerous adjustments both upward and downward.

In addition, Efficiency Vermont identified two errors that also affected the claimed savings. Shortly after finalizing its preliminary savings claim for 2009, EVT discovered an error in its prescriptive Commercial and Industrial lighting and motors measures. A calculation error in EVT's Prescriptive Tool resulted in the Winter and Summer kW reduction values being understated for the affected measures. Upstream and custom measures were not affected. The second error involved the avoided costs used in the 2009 screening tool and affected only the TRB. EVT inadvertently included risk and renewable energy credit adders that were not part of the PSB approved avoided costs. These two adjustments are not included in the Department's realization rates. However, EVT has made these corrections and the final reported savings will include these corrections in addition to the Department's recommended adjustments.

The overstatement of savings for the overall portfolio is significantly higher than found in recent years. There are two major factors that drive the magnitude of the adjustment for 2009 projects. First, the Department and EVT reached a negotiated agreement on the characterization of CFL's purchased through the Efficient Products initiative and assumed to be installed in commercial establishments. The final assumptions substantially decreased the savings from the Efficient Products ("EP") initiative, which was heavily dependent on these commercial savings. The revised assumptions had a particularly large effect on summer kW savings. The second factor was EVT's inclusion of a large project for which incentives were paid retrospectively. After careful review of the project specifics, the Department concluded that these savings cannot be reasonably attributed to EVT's initiatives. Given the performance of EVT in past years, the Department suggests that these two adjustments are unusual and are not indicative of systemic problems in EVT's program delivery, documentation, and reporting. Of the 12% overstatement of energy savings, the eliminated large project accounts for 4% and the EP commercial lighting for 7%. Likewise, for 14% overstatement of summer peak savings, the adjustment to the large project contributes 3% and the EP commercial lighting about 8%. Thus, the Department expects future verification processes to have smaller adjustments, more consistent with recent years.

In addition to the analysis of gross energy and demand savings, this review also covers net energy and demand savings, TRB, MMBtu savings from fossil fuels, and water savings. Some of the Department's recommended energy adjustments have significant impacts on these other indicators. When EVT's savings are revised for its 2009 annual report, all of the relevant indicators will be re-calculated.

The Department is basing its recommendations on the review of a random sample of C&I projects. The sampling plan is consistent with that undertaken for the FCM evaluation and the verification sample for 2009 will also be used for the FCM evaluation. The sampling process was designed to ensure that the sample was weighted toward the larger projects that embody greater variability and more complex methods for calculating savings. Since the projects under review are reasonably representative of EVT's 2009 activity, the DPS is applying a proportional adjustment to the Business Sector (C&I) savings that were not included in the sample. This sampling and adjustment method should reflect what would result from a comprehensive savings review of all C&I projects, if resources and time permitted that approach.

Since many of the residential initiatives are primarily prescriptive in nature, the Department’s review of this sector consisted largely of verifying that the agreed-upon assumptions as compiled in EVT’s Technical Reference Manual (TRM) were correctly applied. This validation process is easily conducted for the entire data set, obviating the need for random sampling. Custom residential initiatives are relatively small in magnitude and the Department reviewed the larger residential projects with higher savings.

The adjustments to gross annual savings and coincident peak reductions for all initiatives are summarized in Table 1.

Table 1: Adjustments by Program Group

	Energy Saved		Winter kW Reduction		Summer kW Reduction	
	EVT Gross Claimed MWh	Realization rate	EVT Gross Claimed kW	Realization Rate	EVT Gross Claimed kW	Realization Rate
C&I and Multifamily						
Retrofit	23,074	79.0%	3,325	79.2%	3,869	83.0%
NC/MOP	13,321	99.4%	1,685	92.2%	2,371	96.4%
Stipulated Lighting	8,217	100.0%	1,464	100.0%	1,907	100.0%
Subtotal	44,612	89.0%	6,474	87.3%	8,147	90.9%
Residential						
Efficient Products	33,283	85.5%	7,191	96.0%	4,726	81.8%
Residential Retrofit/ LISF	1,892	99.5%	438	98.9%	159	99.9%
Residential New Construction	560	100.0%	134	100.0%	80	100.0%
Subtotal	35,734	86.4%	7,763	96.2%	4,965	82.6%
Totals	80,346	87.9%	14,237	92.2%	13,112	87.8%

The relative precision¹ for the realization rates associated with the energy savings (annual kWh) for the Business and Multifamily retrofit initiatives, and the Business and Multifamily New Construction and Market Opportunity initiatives is 4.8% and 15.4% at the 90% confidence level, respectively.

The remainder of this report is divided into four sections. Section II describes the sampling process and Section III covers the detailed project and measure-level issues that provide the basis for the adjustments shown in Table 1 above. In Section IV, we discuss specific issues with program year 2009 (PY09) projects and other concerns to be addressed on a prospective basis.

¹ Relative precision is a indicator of the variability of the estimator, in this case the realization rate, in relationship to the magnitude of the estimator. It is calculated at the 90% confidence level as 1.645 * standard deviation of the realization rate/mean realization rate.

I. Sampling

A. Overview

The sampling plan was established based on the sampling strategies used in previous years. The guidelines for the program year 2009 savings verification (SV09) sampling process are listed below.²

- The primary sampling unit is the project. All measures associated with the project were reviewed (with the exception of lighting measures with stipulated savings for the three lower stratum).
- The primary sampling variable for establishing the size strata is the higher value of the kW peak reduction, either winter or summer.
- Sampling was conducted separately for two broad categories of initiatives, i.e., retrofit and MOP/new construction. Multifamily projects were included with the C&I projects.
- The sample size for each broad category of projects was set at a level designed to exceed the minimum required to estimate savings at the 80/10 confidence/precision level, based on an error ratio of 0.50.
- Projects with stipulated lighting measures only were excluded from the sample, except for those stipulated lighting measures and projects that fell into the "very large" stratum (an additional sample of stipulated lighting projects may be selected for the FCM sample to assess the validity of the baselines and correct application of the stipulated lighting coincidence factors among the smaller projects).
- The samples were checked to ensure that lighting savings were roughly proportional to the initiatives as a whole.
- Stratification by project size was conducted, resulting in a total of four size strata for each of the two broad categories of projects.
- A census of the largest projects in the each broad category was reviewed.
- Weighting was done on the basis of the number of projects.
- The cut offs for the strata and sample sizes within each stratum were determined according to the methodology presented in the California Evaluation Framework.
- Projects with maximum kW reduction less than 0.80 kW were removed from the sampling frame.

B. Differences between the 2008 and 2009 Sampling

Overall, the sampling process was simplified for SV09, as described below.

- In program year 2008 savings verification (SV08), the primary sampling unit was the project/end use, and only measures within the selected end use were reviewed. In SV09, sampling was conducted by project, facilitating a comprehensive review of each project. This is consistent with the sampling process prior to SV08.

² The SV09 sample will also be used for PY09 FCM verification. It is possible some additional projects may be selected for the FCM evaluation. In the process of selecting the SV09 sample, all non-stipulated projects were assigned a random number and additional projects will be selected in the designated order, if necessary.

- The SV08 sampling was done in two stages, with the initial one covering the first four months of 2008 and the second stage including the remainder of the year. In addition, sampling of some retrofit projects was done prior to the completion of the project. The SV09 sampling was done once for the entire year, following the completion of the projects and EVT's end-of-the-year review.
- The SV08 sample was further stratified according to whether the kW peak was predominantly seasonal (winter v. summer/not seasonal). This SV09 sample was stratified only by broad program category and size.
- The cut offs for the strata were determined prior to the actual sample selection for SV08, resulting from the staged sampling strategy. For SV09, the cut offs were established as part of the sampling process in accordance with the California Evaluation Framework.

C. Summary of Projects

The number of projects and savings associated with each of the three major components (retrofit, MOP/NC and stipulated lighting projects) were identified and are shown in Table 2 below.

Table 2: Summary of Projects

Program	# of Projects	MWh Savings	Higher KW Reduction
Retrofit	724	23,074	3,904
MOP/NC	618	13,321	2,455
Stipulated Lighting	945	8,217	2,733
Totals	1,885	44,612	9,092

The cut offs for each stratum were calculated according to the methodology presented in the California Framework (Framework).³ The Framework recommends applying an error ratio between .40 to .60 range for programs similar to EVT's. Experience from previous years suggest the actual error ratio is likely to be substantially lower than this recommendation. For SV09 sampling, an error ratio of 0.50 was used to allow some leeway for year-to-year variations in the verification results.

Using the Framework methodology, the number of projects selected from each stratum should be equal, with some exceptions (for example, fewer actual projects in a specific stratum than the selected sample size, or sampling a census in a single stratum). Once the strata and the sample sizes were defined, the specific projects were selected randomly. No adjustments were made to the methodology laid out in the California Framework. The final sample included 39 retrofit and 34 MOP/NC projects.

³ TecMarket Works, et. al. The California Evaluation Framework. Project Number: K2033910. Prepared for the California Public Utilities Commission and the Project Advisory Group. June, 2004. Pages 327 to 339 and 361 to 384.

D. Sampling Results

An overview of the sample is shown below in Table 3. The review of the "very large" project stratum (stratum 4) includes all of the measures in the project, both stipulated and non-stipulated. Thus, the DPS review included some stipulated lighting measures and projects. The sampled custom projects account for about 40% of total energy savings and the maximum kW reduction. For the stipulated lighting projects, about 25% of the kWh and kW savings are included in the sample.

Table 3: Overview of the Sample

Program	Total # of Projects	Total MWh Savings	Total Max KW Reduction	Sample # of Projects	Sample MWh Savings	Sample Max kW Reduction
Retrofit	724	23,074	3,904	37	8,373	1,506
MOP/NC	618	13,321	2,455	34	5,086	1,006
Stipulated Lighting	945	8,217	2,733	18	3,009	674
Totals	1,885	44,612	9,092	73 ⁴	16,467	3,186

The distribution of sampled projects in terms of the size of the projects is presented below in Table 4. This analysis shows that projects vary in size from a small increase in use to 350 kW in savings. The strata reflect a reasonable grouping of projects by size.

⁴ The stipulated projects are in the "very large" project stratum and most of these projects also have non-stipulated measures associated with them. Therefore, the sum of the individual rows does not add to the total number of the projects in the sample, since some are counted in more than one row.

Table 4: Distribution of Sample by Project Size

	Size Stratum	# of Projects	Min (Higher KW Reduction)	Max (Higher KW Reduction)	Mean (Higher KW Reduction)	# Projects in Sample
Retrofit	0	321	0.006	0.799	0.228	0
Retrofit	1	251	0.801	6.077	2.646	5
Retrofit	2	88	6.104	15.162	9.402	6
Retrofit	3	43	15.910	37.245	23.364	5
Retrofit	4	23	37.338	350.045	81.787	23
Subtotal Retrofit		726	0.006	350.045	5.392	39
MOP/NC	0	315	-0.172	0.798	0.253	0
MOP/NC	1	180	0.800	4.651	2.387	5
MOP/NC	2	73	4.681	13.944	7.319	5
MOP/NC	3	32	14.088	27.925	19.260	6
MOP/NC	4	18	29.514	142.611	51.850	18
Subtotal MOP/NC		618	-0.172	142.611	3.972	34

Table 5 compares the mean and median project KW reduction for the sample and the population. This analysis does not reveal any substantial discrepancies between the population and the sample.

Table 5: Comparison of Sample and Population

	Size Stratum	Sample Mean kWh	Population Mean kWh	Sample Mean KW Max	Population Mean KW Max
Retrofit	1	12,802	18,255	2.646	2.529
Retrofit	2	46,341	42,147	9.402	9.378
Retrofit	3	113,671	87,130	23.364	20.487
Retrofit	4	434,197	434,197	81.787	81.787
MOP/NC	1	13,240	12,920	2.387	2.110
MOP/NC	2	34,082	45,980	7.319	9.504
MOP/NC	3	88,047	100,543	18.940	21.692
MOP/NC	4	266,849	266,849	51.850	51.850

The next table shows the distribution of savings by end use for the three groups. The top stratum for all three groups was removed from this analysis, since all of these projects were reviewed. Thus, the percentage of savings in Table 6 reflects only the lower tiers (strata 1 through 3 for both broad program categories).

Table 6: Comparison of Sample and Population by End Use

	Retrofit		MOP/NC	
	Sample	Population	Sample	Population
	% of kW Peak Reduction			
HVAC	7.0%	13.2%	29.8%	24.0%
LTG	62.4%	58.6%	40.7%	43.9%
REST	30.5%	28.1%	29.5%	32.0%

The sample was also checked to verify that it represented the variety of market tracks offered by EVT. The sample includes projects in nine of the tracks in the BEF, BNC and multifamily market initiatives.

The case weights were developed based on the number of projects in the sample and in the population, by broad program category and by size stratum. The case weights are given in Table 7.

Table 7: Case Weights by Stratum

	Size Stratum	Total # of Projects	# of Projects in Sample	Case Weight
Retrofit	1	251	5	50.200
Retrofit	2	88	6	14.667
Retrofit	3	43	5	8.600
Retrofit	4	23	23	1.000
MOP/NC	1	180	5	36.000
MOP/NC	2	73	5	14.600
MOP/NC	3	32	6	5.333
MOP/NC	4	18	18	1.000

II. Project and Measure-Specific Adjustments

A. Commercial & Industrial Business Sector Projects

The random sample consisted of 73 Commercial and Industrial (C&I) and multifamily projects covering the range of EVT initiatives in those sectors. The Department's adjustments are based on thirty-seven of the selected C&I and multifamily projects, i.e., issues were found with the savings claimed in half of the selected projects. Many adjustments were relatively small in magnitude. Overall, the Department found fewer substantial issues with the energy analysis of the C&I custom projects than in previous years. As found in 2008, there were more substantive issues associated with the estimation of the peak demand savings than with annual energy estimates.

Table 8: Summary of Adjusted Projects

	Total # of Projects ⁵	# of Projects in Sample	# of Projects with Project-Specific Adjustments	# Projects with kWh Adjustments >+9%
NC/MOP	405	39	22	11
Retrofit	303	34	15	9
Totals	708	73	37	20

One issue that arose in the SV09 verification process was the need to update the assumptions used to calculate the cooling bonus, i.e., additional cooling savings due to the reduction in waste heat from lighting measures in C&I applications. The 2009 TRM gives the cooling bonus factor as 1.34 for demand savings and 1.12 for energy savings, when calculating the savings for custom measures. The factors for prescriptive measures were assumed to be half of these values (i.e. 1.17 and 1.06, respectively). Through the FCM evaluation and the TAG processes, EVT and the Department became aware the assumptions used to develop these numbers were outdated. For example, the assumed efficiency of the baseline HVAC equipment was low. The factors were updated to 1.195 for demand and 1.069 for energy. The basis for these calculations is provided in Appendix B. Three of the projects with adjustments have only minor modifications associated with a change in the calculation of the cooling bonus.

⁵ There were 777 projects with the maximum coincident peak reduction less than 0.8 kW. These projects were considered to be too small to evaluate and were not included in the sample or in this table. An additional 400 projects had stipulated lighting savings greater than 0.80 max kW although the savings associated with the custom measures were under this lower threshold. These stipulated projects were also omitted from this table since the stipulated lighting projects were not sampled for the 2009 verification.

Tables 9 and 10 provide a brief summary of the projects in the sample where the savings were adjusted. Realization rates by project as well as the project stratum and reason for adjustment are provided in Table 9 for C&I retrofit projects. Table 10 provides the same information for C&I New Construction and Market Opportunity projects in the sample. A detailed project report for each project is in Appendix A.

Table 9: Realization Rates for C&I Retrofit Projects

Project ID	Title	Size	RR kWh	RR kWWin	RR kWSum	Reason for Adjustment
377126	Black River Produce - Lighting and Refrigeration	4	0.994	0.598	0.739	Coincidence Factors ("CF") adjusted for diversity, cooling bonus
377517	Bromley Mountain Resort - Snowmaking 2009	3	0.440	1.343	N/A	MOP, not retrofit; removed discount to winter kW
378201	Central Vermont Medical Center - Kitchen Retrofit	2	0.906	0.737	0.737	Baseline and hours of use adjustment, cooling bonus
380482	Clarendon Elementary School - Lighting Plus	3	0.906	1.035	0.971	Switch from vendor estimates to TRM, as agreed; cooling bonus
374774	Dave's Automotive - Lighting Plus	1	0.987	1.000	0.966	Cooling bonus only
371847	Dostal's Inn - Fuel Switch	4	0.832	0.830	0.835	Corrected base load calculation
370926	Foley Distributing Corporation - Lighting	4	0.882	0.534	0.837	Comparison to billing data indicated high diversity factor
352198	GE Healthcare - Retro-Commissioning	4	0.966	N/A	0.410	Weather normalize to TMY3
374402	GW Plastics - HVAC And Fuel Switch	4	0.758	0.670	1.004	Cooling bonus only
374150	Killington Grand - Room Lighting	3	0.697	0.724	0.646	Baseline adjustment, cooling bonus
378457	Killington Resort - Snowmaking - Pump Coating	2	0.500	0.500	N/A	Metered data does not support savings
374337	Melanson Company, Inc. - Lighting 2009.	4	0.986	0.794	0.702	Corrected input error, adjusted CF's, cooling bonus
378749	Mylan Technologies - Machine Shop Lighting	2	1.033	1.122	1.001	Corrected quantity, cooling bonus
374361	Rock Tenn Company - Steam Efficiency Improvements	4	0.000	0.000	0.000	Incentives provided retroactively, not appropriate to claim savings
376214	Rutland City Schools - High School / Stafford Tech - Lighting Pl	4	0.956	0.947	0.948	Corrected quantities, cooling bonus
216682	Shelburne Fieldhouse, The - Lighting	4	0.961	0.931	0.312	Corrected quantities, cooling bonus
374196	Shelburne Museum - Cole House Annex - Space Heat Fuel Switch - S	2	0.666	0.542	0.465	Hours of use and CF's corrected
373519	Smugglers' Notch - Village Lift Motor	4	0.332	0.000	N/A	No documentation of clutch efficiency, corrected motor and clutch efficiency

Project ID	Title	Size	RR kWh	RR kWWin	RR kWSum	Reason for Adjustment
230379	VSB - BGS - Montpelier Complex - Performance Contract	4	0.984	1.004	0.947	Corrected quantities, cooling bonus
230378	VSB - BGS - Waterbury Complex - Performance Contract	4	0.960	0.962	0.987	Adjust hours of use, cooling bonus
380603	VSB - Transportation - Traffic Signal LED Retrofit - Dist 5 GMP	3	1.021	0.680	0.680	Correct hours of use and CF's for yellow lights
380608	VSB - Transportation - Traffic Signal LED Retrofit - Dist 9 CVPS	1	1.026	0.735	0.735	Correct hours of use and CF's for yellow lights

Table 10: Realization Rates for C&I New Construction and MOP Projects

Project ID	Title	Size	RR kWh	RR kWWin	RR kWSum	Reason for Adjustment
373801	Agri-Mark - Middlebury - New Production VAT Room	3	0.774	0.255	0.451	Corrected baseline, efficient case and CF's
371352	Blue Cross Blue Shield - Heat Pumps	4	0.966	1.106	0.994	Corrected analysis
373564	Collins Perley Sports Center - Chiller	4	0.487	0.603	N/A	Corrected baseline, efficient case and hours of use
374538	Colton Enterprises - VFD	3	0.262	0.175	0.096	Corrected baseline, efficient case, efficiencies and other assumptions
376575	G Housen - Rutland - Seward Road Lighting	3	0.690	0.616	0.628	Baseline adjusted
318675	Hawthorn Suites Hotel - Renovations	2	0.890	0.594	0.796	Cooling bonus only
228880	Lowe's Home Center - Essex	4	0.897	0.945	0.791	Correct calculation method, lighting CF's and operational testing factor ("OTF") adjustment; cooling bonus
208738	Middlebury College - Proctor Hall - Gut Rehab	4	0.938	1.035	1.101	Correct calculation method and lighting CF's; cooling bonus
305072	Preci-Manufacturing - HVAC	4	0.527	0.199	0.306	Correct calculation method, quantities, HVAC part load savings
325193	Saint Michael's College - McCarthy Arts Center - HVAC	4	0.991	1.000	0.994	EVT re-calculated DCV savings; cooling bonus
210003	Stowe Mountain Resort - Spruce Camp	4	0.999	1.159	0.958	Correct baseline, limit full VFD savings to one year, cooling bonus
259968	Town Meadow Senior Housing - New Construction	4	0.813	0.817	0.595	Correct calculations, baseline change, Cx adjustment and adjust CFs; cooling bonus
285375	VSB - BGS - Vermont Veteran's Home - Phase II	4	0.998	0.767	0.733	Correct calculations; cooling bonus
334681	VSB - Castleton State College - Gymnasium Addition	4	0.979	0.603	0.615	Correct baselines; cooling bonus

Project ID	Title	Size	RR kWh	RR kWWin	RR kWSum	Reason for Adjustment
381367	Weidmann Electrical Technologies - New Refiner Motor	1	7.484	6.968	6.968	Baseline motor efficiency corrected

B. Residential Initiatives

1. Low Income Single Family/Residential Retrofit

The Department reviewed all of the measures in the residential custom programs, and generally found that the savings seemed to be within a reasonable range. The Department selected seven projects to review more closely based on high savings for electric space heating efficiency or early replacement refrigerator measures. This review consisted of analyzing billing records to determine whether the savings were reasonable in the context of the pre-installation electric consumption.

The findings of this review are described below:

- Two projects had reasonable savings.
- One project did not have current billing.
- The remaining four projects had savings ranging from 49% to 80% of pre-installation consumption.

The Department has adjusted these savings to be consistent with the actual savings found in the billing records, as shown in Table 11. This analysis allows for a 10% increase in savings from the direct pre/post savings to address normal fluctuations in residential use. The kW peak savings were adjusted proportionally to the reduction in the energy savings.

Table 11: DPS Adjustments to Custom Residential Projects

Project ID	EVT Claimed Savings			DPS Adjusted Savings		
	kWh Savings	kWWin	kWSum	kWh Savings	kWWin	kWSum
375940	2,505	0.229	0.311	670	0.061	0.083
374573	5,219	2.817	0.000	3,410	1.841	0.000
376229	4,581	2.473	0.000	2,277	1.229	0.000
378562	5,106	2.757	0.000	1,100	0.594	0.000
Totals	17,411	8.276	0.311	7,457	3.545	0.133
Total Adjustment				9,954	4.731	0.178

2. Efficient Products Program

Several measures in the Efficient Products initiative were found to be inconsistent with the TRM or agreements between the DPS and EVT. Adjustments were made to the following measures: early replacement refrigerators, efficient computer equipment and lighting. These adjustments are described in more detail below.

a. Early Replacement Refrigerators

The Department adjusted the savings to be consistent with the agreement between EVT and the Department made on December 29, 2009. EVT's and Department's adjusted values by measure are provided in Table 12 below. The Department recommends that EVT's claimed savings be adjusted to be consistent with the Department's final portfolio review.

Table 12: Comparison of EVT and DPS Early Replacement Refrigerator Unit Savings

Source	Refrigerator kWh Savings	Refrigerator kW Load Reduction	Freezer kWh Savings	Freezer kW Load Reduction
EVT's Claimed Savings	1372	0.274	1061	0.126
Agreement between EVT and DPS of 12/29/09	1238	0.248	854	0.171

The total adjustment is summarized in the table below. The recommended allowed savings are approximately 10% lower than the claimed savings.

Table 13: DPS Adjustment to Savings from Early Replacement Refrigerators

DPS Adjusted Savings	# Installed	kWh	kWWin	kWSum
Refrigerators	646	799,748	95	99
Freezers	304	259,616	31	32
ES Tier 1 Refrigerator	69	10,109	1	1
ES Refrigerator	73	4,139	0	1
ES Freezer	695	81,385	10	100
DPS Total Adjusted Savings	1,787	1,154,996	138	233
EVT Total Claimed Savings	1,787	1,304,488	155	252
Total Adjustment (Reduction)		149,492	18	19

a. Efficient Computer Equipment

The Department corrected some small deviations from the characterizations in the TRM for these measures. In addition, EVT informed the Department that the 552 data servers were miscategorized and should have been identified as servers installed in data centers. EVT also provided the invoices, showing the correct categorization. The tables below show the savings from the TRM and EVT's claimed savings by measure. The Department has corrected the savings to be consistent with the TRM and to correct the miscategorization, as shown below. Overall, these corrections result in a substantial increase in savings.

Table 14: DPS Adjustments to Savings from Computer Equipment

Measure	# Installed	kWh	kWWin	kWSum
DPS Adjusted Savings				
EPESMONCOM	1,952	97,990	13.957	22.331
EPPLUSCOM	464	41,018	3.712	5.939
EPESDESKCOM	389	60,995	5.524	8.838
EPPLUSSERV-DATA CENTERS	552	290,131	33.120	33.120
DPS Total Adjusted Savings	3,357	490,134	56.313	70.228
EVT Total Claimed Savings		366,539	46.898	59.168
Total Adjustment (Increase)		(123,595)	(9.415)	(11.060)

b. Lighting

The lighting savings match well to the TRM. The Department and EVT agreed to modify the assumptions used to determine the savings from commercial applications of EP lighting purchases, as discussed in the Introduction. The previous and modified assumptions are given in the table below.

Table 15: Comparison of EP Commercial CFL Assumptions

Assumption	Program Year 2008	Modified for Program Year 2009
% of CFL lamps installed in commercial applications	15%	10.5% ⁶
Annual Hours of Use	3,500 hours	2,800 hours
Cooling bonus for energy	6% of lighting kWh	3.2% of lighting kWh
Cooling bonus for summer peak kW	17% of lighting summer peak kW	9.2% of lighting kWh

⁶ In the process of implementing this adjustment, EVT adjusted this value to 10.36% with the Department's consent.

III. Issues to be Addressed Prospectively

1. Commercial & Industrial Sector Lighting Baseline

As noted in the Department's 2008 verification report to the Contract Administrator, the Department realizes that many of the baseline assumptions for C&I Lighting in the TRM are a number of years old. The TRM baselines for all C&I lighting measures should be updated based on the most recently applicable information and to reflect changes in the market and the new federal standards. The farm lighting TRM measures do not reflect some common situations and also need to be revisited. The Department requests that a complete review of the TRM C&I lighting baselines be conducted as part of the 2010 TAG process.

2. TRM Reliability

As noted in the Department's 2008 verification report to the Contract Administrator, the Department's savings verification process uncovered numerous errors in EVT's Technical Reference Manual ("TRM") and its application. In addition, there are a number of assumptions in the TRM that are inconsistent, outdated, or poorly supported. The TRM is an essential reference document for the Department's review. Incorrect information impedes the Department's efforts to conduct a thorough review of EVT's claimed savings. A comprehensive review of the document to identify incorrect information is needed. The Department will discuss this issue with EVT in the TAG process. The Department recommends that EVT conduct a review of the TRM to ensure that it is accurate.

3. EP Commercial Lighting

The Department reached agreement with EVT during the verification process on an appropriate percentage of EP lighting products that could be considered installed in commercial locations and an hours of use assumption for these products. These agreements were based on an initial review of studies completed in California that address this issue. The studies need to be more thoroughly reviewed by both the Department and EVT, and the assumptions agreed upon for purposes of program year 2009 savings verification should be revisited in the TAG.

4. MOP v Retrofit Baselines

A number of projects were identified as MOP and the MOP baseline was substantially less efficient than what was existing prior to the efficient upgrade, resulting in substantially higher savings than would be expected to be observed in the bills. In many cases, it is not reasonable to assume that a participant would remove fixtures and replace them with fixtures of substantially lower efficiency, and thus absorbing both the upfront cost of the installation and higher electric bills through the lifetime of the fixtures. This issue should be placed on the TAG agenda to develop a consistent approach to these situations.

5. Oversized HVAC Equipment

One of the projects in the sample had savings based on excessively oversized HVAC equipment, since the participant was planning for future expansion. EVT claimed the full savings for the life

of the equipment, resulting in savings that are much higher than would be the case for properly sized equipment. Clearly, it is not realistic to assume that these savings would persist over the measure life. This issue needs to be considered and a mutually agreeable approach developed in the TAG process.

6. Upstream HVAC

EVT established a process to prevent double counting of Tier II AC equipment that received upstream distributor incentives and could also possibly receive a customer rebate. The process involves matching specific equipment receiving end-user incentives to the upstream projects by make and model numbers at the end of the program year. The rationale for this approach was that EVT would not know the final purchaser of this equipment and that matching the equipment information was the most feasible approach.

The Department found that EVT diligently implemented this strategy. EVT removed savings for 50 measure records track 6013UPSTR. This represents a reduction of 72,656 kWh/yr to avoid double counting. However, the Department has found two issues with the method developed to address double-counting:

- The backup information from the distributors, at least for 2009, appears to contain information that allows EVT to identify the final purchaser.
- There still remains the potential for double counting across program years.

This latter situation could occur if there was a project that was not completed in the current program year and incentives were requested subsequently. For instance, in the first quarter Upstream project ID 376284, there were 85 units installed in the new hotel being built at Jay Peak. EVT has an active project at this site and has not yet claimed any savings. The savings claimed for the units in this hotel are 184,139 kWh/yr, more than twice the savings offset by the current method of matching serial numbers.

The DPS requests that these issues be address through the TAG process.

7. Performance Contracting Review

There are numerous implications to the third-party performance contracting model that EVT is pursuing. On the positive side, it has the potential to increase the number of qualified firms providing efficiency services in Vermont. If EVT applies a sufficient level of oversight when public benefit incentives are helping to fund the improvements, this becomes a likely outcome. On the other hand, if EVT relies solely on the expertise provided by the performance contractor there is a potential that the market will not perform as well and the “efficiency brand” could suffer as a result.

In the case of third party performance contracting projects, EVT should be acting as an advocate for the customer to ensure that the savings being claimed by the performance contractor is accurately calculated and is fully attributable to the performance contractor’s actions.

The Department also has concerns regarding whether freeridership and spillover are correctly characterized for these market relationships. The Department would like to discuss these issues in more detail with EVT as part of the TAG process.