

Appendix 2

Ecotope's Memorandum Application of 2008 Evaluation Results to 2009 Program Savings



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Memorandum

Date: March 21, 2011
To: Lori Hermanson, Avista Corporation
From: David Baylon, Kevin Geraghty, Ecotope, Inc.
RE: Application of 2008 evaluation results to 2009 program savings

INTRODUCTION:

Ecotope completed a verification review of the 2009 gas program and an impact evaluation of the 2008 residential gas savings program. The goals and methods for the two studies differed substantially. Nevertheless, it is possible to adjust savings claims for the 2009 program to reflect the results of the 2008 evaluation. In this analysis we have used subsets of the 2009 verification and applied the total realization results.

VERIFICATION:

Ecotope completed a verification review of the 2009 gas program accomplishments. The focus of this review was to establish that the measures supported were installed in accordance with the program specifications. A second goal was to review the engineering calculations that were developed to establish gas energy savings that support energy efficiency estimates and accomplishments of the measures. This verification reviewed all the programs designed to save natural gas; including residential, commercial and several contractor based savings programs. The results of this verification were published in August 2010.

EVALUATION:

Subsequent to this work Ecotope developed an evaluation of several residential programs. This evaluation was not limited to the gas savings and included measures that saved electricity in the residential sector. The evaluation used a billing analysis and a net savings analysis to assess the impact of the Avista residential gas savings programs. The evaluation targeted the 2008 program year. In several cases the programs evaluated were the same programs which were verified for the 2009 program year.

COMPARISON:

While there was substantial overlap, there were several gas efficiency programs that were not represented in the evaluation but were included in the 2009 verification:

- All non-residential gas savings programs;
- Consumer appliance programs especially clothes washing machines and dishwashers;
- Energy Star new construction;
- UCONS multi-family weatherization.

The residential programs where the measures and measure delivery corresponded between the 2008 and 2009 programs, and where the 2008 evaluation addressed the program savings were:

- Furnace and Boiler upgrade to 90+ AFUE;
- Weatherization, insulation measures;
- Weatherization, window replacement measures;
- Low Income weatherization for gas efficiency;
- Replacement domestic hot water tanks and retrofit for demand water heaters (tankless).

The verification of the 2009 programs resulted in a verification ratio derived from a combination of engineering analysis, application review and field review. These ratios were based on initial assumptions used by Avista to estimate the impact of their programs. In some cases the verification recalculated the savings estimates based on more standard regional assumptions (especially for the weatherization measures) and in all cases the observations in the field were used to modify and inform the final verification rate.

The evaluation process addressed the observed savings in each measure category. Using a billing analysis, which estimated weather normalized consumption, savings were estimated for each program participant. Subsequently a “conditional demand analysis” (CDA) was constructed to establish the savings estimates for the separate measures. In addition, the evaluation reviewed the billing records of the participants and removed a number of applications when it was clear from the billing records that the participant did not meet the requirements for the program (such as incorrect fuel type). The evaluation realization rates savings were a combination of these two factors.

Once this evaluation was complete the CDA regressions were repeated to include a control group from non-participating customers. The result of this analysis was a significant reduction in savings estimates based on the reduction in gas consumption (especially for heating uses) seen in this control group. Using these results the realization rate calculated for the initial program review was recalculated to develop a “net” savings analysis.

COMPARISON: VERIFICATION RATES AND EVALUATED REALIZATION RATES

The application of the realization rates from the 2008 evaluation to the 2009 program claims is somewhat uncertain. The problem is that the realization rates are the product of two reviews. The first is the screening of applications and billing data that reduced the number of qualified cases. The second is the CDA analysis itself including the total realization rate from the participant billing analysis and the net realization rate from the inclusion of non-participants. The overall rates are the product of these two effects.

The most valid comparison between the verification rates and the realization rates would be a comparison using the “total” realization rate from the evaluation, since the effects of the control group were never reflected in the program verification. In effect this comparison is based on the performance of the individual homes in these programs without taking the macro-economic effects from the overall service territory into account. Since this result is specific to a specific set of economic and market conditions, a reasonable comparison would not necessarily include macro-economic effects from the 2007-2009 period (the period of analysis in the evaluation) which included a gas rate adjustment and a significant economic recession. Nevertheless, both the total and net savings are shown.

For this analysis the realization rates from the evaluation were applied to the claimed therm savings in the 2009 program. This was done using the aggregate of the methodology. To test the statistical veracity of this approach a t-statistic was calculated on the available ratios in the verification report and in the evaluation report. In three cases this test could be performed to provide some guidance as to the observed differences between these two analyses. Table 1 shows the verification rates from the 2009 program edited to include only those programs that overlap with the programs evaluated in 2008. Some small errors in calculating the claimed savings were identified in the review of the verification documents and were corrected in this and subsequent tables. These errors did not affect the overall verification ratio or the realization rates only the total and verified savings claims.

Table 1 Gas Program Verification Results (2009)

Program	Program Claimed Savings	Program Verified Savings	Verification Ratio
Limited Income Residential	95,251	64,390	0.676
Residential Weatherization	545,180	431,544	0.792
Residential Products and Appliances	51,934	46,709	0.899
Residential Heating Equipment	395,076	347,108	0.879
Evaluated Residential Programs	1,087,441	889,750	0.818
All Residential Programs	1,156,595	934,519	0.808

Table 2 shows the impacts of the total and net realization rates from the 2008 program on the 2009 savings claims. In this table the evaluation ratios have been separated between the weatherization

measures aimed at windows and all other weatherization measures. This distinction was not used in assembling the verification data so the comparison in aggregate is necessary. As shown in Table 3, the overall total realization rate for all weatherization measures was 0.56 while the overall verification ratio was 0.79. About a third of the appliance measures were included in the evaluation. These were the residential DHW measures. The remaining two-thirds of this measure category (35,619 therms) appears in the total claims from the verification of the evaluated measures but not in the total for the evaluated measures themselves.

Table 2 Gas Program 2009, Realization Rates Applied

Program Claimed Savings	Program Claimed Savings	Program Total Savings	Realization (total)	Program Net Savings	Realization (net)
Limited Income Residential	95,251	21,527	0.226	21,527	0.226
Residential Weatherization (Windows)	257,329	130,208	0.506	32,681	0.127
Residential Weatherization (Insulation)	287,851	177,028	0.615	129,245	0.449
Residential Appliances (DHW)	16,315	14,428	0.884	9,363	0.574
Residential Heating Equipment	395,076	426,682	1.080	316,456	0.801
Evaluated Residential Programs	1,051,822	769,874	0.732	509,271	0.484
Evaluated Residential Programs (Verification)	1,087,441	889,750	0.818		
All Residential Programs (Verification)	1,156,595	934,519	0.808		

Table 3 shows the T-statistics calculated where sufficient data could be constructed. This analysis was meant to provide an assessment of the statistical significance of the differences between the verification ratios and the evaluation rates. This comparison was done based on the total realization rates since no non-participant effects were reviewed in the 2009 verification analysis.

Table 3 Verification and Evaluation Ratio Comparison

Program	Verification Ratio	Realization (total)	T-stat
Limited Income Residential	0.676	0.226	4.311
Residential Weatherization	0.792	0.564	3.063
Residential Products and Appliances	0.899	0.887	*
Residential Heating Equipment	0.879	1.080	-5.121

*only part of this program was evaluated, realization rates not comparable

COMPARISON: VERIFICATION RATES AND EVALUATED REALIZATION RATES BY STATE

Tables 4 and table 5 summarize the gas savings claims and realization rates for each state. The two state have different overall results as a result of the different mix of measures applied in each state. In these tables the results of the weatherization measures have been separated so that the differing realization rate for window measures is reflected in the measures applied in each state.

The DHW appliances are also separated since the evaluation did not address the other rebated appliances. In this case only these measures were reviewed by the evaluation. The other appliances supported under the appliance rebate program were not addressed in the evaluation. Since the other appliance measures were delivered through retail sales channels, I would recommend that the verification rate be used as the comparable rate for that program.

The last two lines are provided for reference from the verification report with the corrections to the overall savings claims in each state as noted above.

Table 4 Washington Gas Program 2009, Realization Rates Applied

Program	Program Claimed Savings	Program Total Savings	Realization (total)	Program Net Savings	Realization (net)
Limited Income Residential	83,178	18,798	0.226	18,798	0.226
Residential Weatherization (Windows)	224,586	113,641	0.506	28,522	0.127
Residential Weatherization (Insulation)	193,943	119,275	0.615	87,080	0.449
Residential Appliances (DHW)	10,592	8,158	0.770	5,294	0.500
Residential Heating Equipment	269,001	290,521	1.080	215,470	0.801
Evaluated Residential Programs	781,300	550,393	0.704	355,165	0.455
Evaluated Residential Programs (Verification)	808,379	658,360	0.814		
All Residential Programs (Verification)	848,373	682,773	0.805		

Table 5 Idaho Gas Program 2009, Realization Rates Applied

Program	Program Claimed Savings	Program Total Savings	Realization (total)	Program Net Savings	Realization (net)
Limited Income Residential	12,073	2,728	0.226	2,728	0.226
Residential Weatherization (Windows)	63,118	31,938	0.506	8,016	0.127
Residential Weatherization (Insulation)	63,533	39,073	0.615	28,526	0.449
Residential Appliances (DHW)	5,723	6,270	1.096	4,069	0.711
Residential Heating Equipment	128,075	138,321	1.080	102,588	0.801
Evaluated Residential Programs	272,522	218,330	0.801	145,928	0.535
Evaluated Residential Programs (Verification)	281,062	233,998	0.833		
All Residential Programs (Verification)	310,221	254,443	0.820		

OVERALL SAVINGS CLAIMS

The combination of the evaluation realizations and the verification rates is somewhat complex. Tables 6, 7 and 8 combine all the programs evaluated and their realization rates with all the programs that were not evaluated but were verified. In all cases where a realization rate from the evaluation was available it was used. For all other cases, the verification rate was used to substitute for the realization rates. In the “Residential Products and Appliances” category the final savings were derived from an evaluation of some of the measures (DHW) while the rates for the remaining appliances and products were taken from the verification review conducted previously.

Only the total realization rate is shown here. The comparability between the verification and the realization rates is much more limited for the calculations used in developing the net realization rates. It is not likely that a control group for the 2009 program would yield the same adjustment as the control group used in the 2008 program year given the factors of recession and rate increase that characterized that period.

The results in overall savings for all the Avista natural gas savings programs are shown in the tables. These results have been separated by state with the total for all programs and all states summarized in Table 6.

Table 6 Realized Program Savings, Avista System

Program	Program Claimed Savings	Program Verified Savings	Realized Savings (total)
Limited Income Residential	95,251	64,390	21,527
UCONS Multi-Family	35,290	35,290	35,289
Residential Weatherization	545,180	431,544	303,926
Residential Products and Appliances	51,934	46,709	46,464
Residential Heating Equipment	395,076	347,272	426,682
EnergyStar New Construction	18,124	9,569	9,569
Ground Source Heat Pumps, Conversions	15,740	0	0
All Residential Programs	1,156,595	934,773	843,457
All Commercial/Industrial Programs	890,313	772,659	772,659
Total, All Program Claims	2,046,908	1,707,432	1,616,116

Table 7 Realized Program Savings, Washington

Program	Program Claimed Savings	Program Verified Savings	Realized Savings (total)
Limited Income Residential	83,178	56,228	18,798
UCONS Multi-Family	17,548	17,548	17,548
Residential Weatherization	418,529	331,292	232,915
Residential Products and Appliances	37,671	33,881	32,513
Residential Heating Equipment	269,001	236,452	290,521
Energy Star New Construction	13,002	6,865	6,865
Ground Source Heat Pumps, Conversions	9,444	0	0
All Residential Programs	848,373	682,266	599,161
All Commercial/Industrial Programs	608,004	527,747	527,747
Total, All Claims	1,456,377	1,210,013	1,126,908

Table 8 Realized Program Savings, Idaho

Program	Program Claimed Savings	Program Verified Savings	Realized Savings (total)
Limited Income Residential	12,073	8,161	2,728
UCONS Multi-Family	17,741	17,741	17,741
Residential Weatherization	126,651	100,252	71,011
Residential Products and Appliances	14,263	12,828	13,951
Residential Heating Equipment	126,075	110,820	136,161
Energy Star New Construction	5,122	2,704	2,704
Ground Source Heat Pumps, Conversions	6,296	0	0
All Residential Programs	308,221	252,507	244,296
All Commercial/Industrial Programs	282,309	245,044	245,044
Total, All Claims	590,530	497,551	489,340