



Dennis Swanson
Director, Regulatory Affairs

FortisBC Inc.
Suite 100, 1975 Springfield Road
Kelowna BC V1Y 7V7
Ph: (250) 717-0890
Fax: 1-866-335-6295
dennis.swanson@fortisbc.com
www.fortisbc.com

June 8, 2010

Via Email
Original via mail

Ms. Erica M. Hamilton
Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

Re: FortisBC Inc's Semi Annual Demand Side Management Report

Please find enclosed for filing FortisBC Inc.'s Semi-Annual Demand Side Management Report to December 31, 2009. Twelve copies will be couriered to the Commission.

Sincerely,

A handwritten signature in dark ink, appearing to be "DS" followed by a long horizontal stroke.

Dennis Swanson
Director, Regulatory Affairs



FORTISBC INC.
SEMI-ANNUAL DSM REPORT
YEAR ENDED DECEMBER 31, 2009

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Report Objective

This report provides highlights of FortisBC Inc.'s ("FortisBC" or the "Company") Demand Side Management ("DSM") programs for the year ending December 31, 2009. The presentation format compares actual energy savings and costs to Plan, where applicable, and provides a statement of financial results and an estimate of the DSM incentive amount.

Overview of Results for the Year Ended December 31, 2009

Energy efficiency savings for the year ended December 31, 2009 were 28.4 GW.h, or 112 percent of Plan of 25.3 GW.h for the year. Company costs incurred were \$3,464,000 or 94 percent of the approved Plan of \$3,668,000 for the year. Adding the customers' costs yields a Total Resource Cost ("TRC") of \$5,580,000 with an overall TRC benefit/cost ratio of 1.7.

Energy Savings per Sector

Sector	Plan GW.h	Actual	% of Plan Achieved
Residential	10.7	9.3	87%
General Service	11.6	16.4	141%
Industrial	3.0	2.7	90%
Total savings (GW.h)	25.3	28.4	112%

Note: Minor differences due to rounding

For the year ended December 31, 2009, the General Service results are well above Plan at 141 percent. The Residential and Industrial results are under Plan at 87 percent and 90 percent respectively.

Detail of Energy Savings

The following sector tables provide details on the DSM energy savings in each sector, including wholesale DSM activities.

Residential Programs			
	Plan GW.h	Actual	% of Plan Achieved
Home Improvement Program	1.0	1.0	101%
New Home Program	1.2	1.7	143%
Heat Pumps (Air & Ground Source)	5.6	3.2	57%
Residential Lighting	2.8	3.3	119%
	10.7	9.3	87%

Note: Minor differences due to rounding

The Residential construction and renovation activity results were at 87 percent of Plan. All Residential programs met or exceeded Plan expectations, with the exception of the Residential Heat Pump program. In the New Home program, there were 385 projects recorded, a reduction compared to 450 in 2008. The Heat Pump program results were impacted by the energy savings write-downs imposed by the Heat Pump Monitoring & Evaluation report attached as Appendix C. This report has been reviewed extensively by FortisBC, and the recommendations contained within will be used to enhance the Company's Heat Pump program offerings going forward. The LiveSmart collaboration resulted in 0.3 GW.h of energy savings, which are recorded in the Air Source Heat Pump and Home Improvement ("HIP") programs.

General Service Programs			
	Plan GW.h	Actual	% of Plan Achieved
Lighting	5.5	7.6	139%
Building and Process Improvement	6.1	8.7	143%
	11.6	16.4	141%

Note: Minor differences due to rounding

The General Service sector recorded savings of 16.4 GW.h, or 141 percent of the 2009 Plan. Examples of Building and Process Improvement ("BIP") projects include the Mission Aquatic Centre (0.6 GW.h), as well as the Fipke Science and Student Union buildings at the University of BC Okanagan (2.5 GW.h). Lighting results continue to benefit from "at the counter" rebate

incentives offered through electrical distributors. Specific lighting projects include the Trail Canadian Tire store, and the Summerland Seniors Village (0.3 GW.h).

Industrial Programs			
	Plan	Actual	% of Plan
	GW.h		Achieved
Compressed Air	0.8	0.4	49%
Industrial Efficiencies	2.2	2.3	105%
	3.0	2.7	90%

Note: Minor differences due to rounding

The Industrial Efficiency program achieved savings of 2.7 GW.h, or 90 percent of the Plan of 3.0 GW.h. The savings were recorded for compressor projects in the Okanagan and various sawmill projects in the Kootenays, including 0.5 GWh for a new planer line. Several sawmills remained closed due to the economic turn-down, and thus industrial results fell short of plan.

The following table provides a breakdown of the Wholesale DSM results, which are included in the sector tables above.

Wholesale Activity			
	GW.h	MW	Percent
Grand Forks	0.04	0.01	0.6%
Summerland	0.57	0.11	8.6%
Nelson	0.56	0.12	8.4%
Penticton	2.19	0.36	33.0%
Kelowna	3.28	0.69	49.4%
Total (Wholesale)	6.64	1.29	100.0%

Note: Minor differences due to rounding

The total Wholesale energy savings, which were acquired within the service areas of the five municipal electric utilities served by FortisBC, were 6.64 GW.h and 1.29 MW for the year. The largest DSM savings results occurred within Kelowna, primarily in lighting and new BIP projects, followed by Penticton where the largest activity was also in the new BIP program. Small DSM projects, totalling 39 MWh, were undertaken in the Grand Forks service area.

Program Costs

The table below presents the year end actual costs incurred compared to Plan.

Summary of Costs by Sector

	Plan	Actual	% of Plan
Sector/Component:	\$000s		
Residential	1,391	1,624	117%
General Service	1,287	1,060	82%
Industrial	345	236	68%
Conservation Culture	141	141	100%
Planning & Evaluation	503	402	80%
	3,668	3,464	94%

Note: Minor differences due to rounding.

Costs amounted to \$3,464,000 or 94 percent of the approved Plan to December 31, 2009, a positive variance of \$204,000. A more detailed breakdown of utility and other costs per sector is found in Appendix A.

Costs per Sector

Residential	Plan	Actual	% of Plan
	\$000s		
Home Improvement Program	273	145	53%
New Home Program	341	496	146%
Heat Pumps (Air & Ground)	515	677	131%
Residential Lighting	263	306	117%
	1,391	1,624	117%

Note: Minor differences due to rounding.

The utility cost of Residential programs was \$1,624,000 or 117 percent of Plan. The largest cost component of Residential programs is the Heat Pumps Program followed by the New Home Program. Incentives paid to Residential participants amounted to \$969,500 to December 31, 2009, a variance of \$102,500 over Plan due to carryover projects from 2008.

General Service	Plan	Actual	% of Plan
	\$000s		
Lighting	724	422	58%
Building and Process Improvement	563	639	113%
	1,287	1,060	82%

Note: Minor differences due to rounding.

General Service program costs to December 31, 2009 amounted to \$1,060,000 or 82 percent of Plan. A LiveSmart BC contribution of \$100,000 towards small business audits was a key reason for the variance. Incentives paid during the year amounted to \$663,800 and were \$75,200 under Plan.

Industrial	Plan	Actual	% of Plan
	\$000s		
Industrial Efficiencies	274	195	71%
Compressed Air	71	41	58%
	345	236	68%

Note: Minor differences due to rounding.

Industrial sector costs were \$236,000 for the period, 68 percent of Plan. Incentives paid during the period amounted to \$94,500. A large portion of the under spend was due to enabling workshops, budgeted at \$75,000, that did not proceed due to lack of customer interest.

Conservation Culture	Plan	Actual	% of Plan
Component:	\$000s		
Conservation Culture	141	141	100%
Planning & Evaluation	503	402	80%
	644	543	84%

The Conservation Culture budget was fully expended and included successful initiatives such as the spring laundry promotion, including retractable clotheslines, and the fall 20/20 CFL give-away to celebrate the 20th anniversary of PowerSense.

The Planning & Evaluation budget was under spent primarily due to the completion, and billing of the Heat Pump report in the first quarter of 2010. Also a portion of management staff time was collected in the DSM Study deferral account.

Financial Results**FINANCIAL RESULTS for Year Ending December 31st, 2009**

by Program

Program	Program Benefits	Program Costs	Planning & Evaluation Costs	Customer Costs	Total Costs	Benefit Cost Ratio
Residential	(\$000s)					
Home Improvement program	424	145	15	148	308	1.4
New Home program	1,000	496	25	(58)	463	2.2
Heat Pumps	1,131	677	45	800	1,522	0.7
Residential Lighting	835	306	48	(57)	297	2.8
Residential Total	3,390	1,624	132	833	2,589	1.3
General Service						
Lighting	2,653	422	108	361	891	3.0
Building and Process Improvement	3,465	639	124	1,150	1,912	1.8
General Service Total	6,118	1,060	232	1,511	2,803	2.2
Industrial						
Industrial Efficiencies	829	195	33	288	515	1.6
Compressed Air	68	41	6	28	75	0.9
Industrial Total	897	236	38	316	590	1.5
Conservation Culture	-	141	-	-	141	
Total	10,405	3,061	402	2,660	6,124	1.7

Program benefits are calculated on the present value of avoided power purchases, based on BC Hydro Rate Schedule 3808 over the measure lifespan, plus a Deferred Construction factor. An overall benefit/cost ratio of 1.7 has been achieved in 2009 compared to 1.8 for 2008.

Residential Results

The Residential sector programs performance resulted in an overall benefit/cost ratio of 1.3 for the sector, down from the 1.7 result in the prior year. The benefits reduction precipitated by the Heat Pump Monitoring & Evaluation report was the primary cause of the reduction.

General Service and Industrial Results

The General Service financial result for 2009 was quite robust with a benefit/cost ratio of 2.2, up from the 1.9 result for the year 2008. The Industrial sector benefit/cost ratio was 1.5, compared to 2.3 in 2008.

Government Programs

The Company is collaborating with the provincial government on various initiatives, notably the LiveSmart BC program for residential energy efficiency retrofits and small business audits, and Public Sector Efficiency & Conservation Agreement (“PSECA”) for publicly owned or funded organizations, including schools and hospitals. In mid-August the provincial government closed the first phase of the residential LiveSmart BC program to new entrants, and although the closure sent a chill through the market a considerable base of customers who are still eligible remains.

DSM Incentive for 2009

The table below presents the calculation of the DSM incentive for 2009.

	TRC Net Benefits <i>(Thousands of Dollars)</i>			Performance	Incentive <i>(\$000s)</i>
	Actual to Dec 31st	Base 3-yr average	Eligible for Incentive		
Residential	933	2,303	879	38%	(53)
General Service	3,547	2,340	3,510	150%	140
Industrial	345	471	345	73%	(3)
Total	4,825	5,114	4,733		84

Actual TRC Net Benefits to December 31, 2009 amounted to \$4,825,000, falling short of the Base Net Benefits of \$5,114,000. The Net Benefits for each sector are compared to a 3-year rolling average baseline, to determine each sector's incentive amount. A more detailed description of the Incentive Mechanism calculation is found in Appendix B.

The General Service sector performed well, earning an incentive of \$140,000, whereas the Residential and Industrial sectors were both in the negative realm.

The calculated DSM incentive is \$84,000 for the year ended December 31, 2009.

Appendix A DSM Summary Report

FortisBC
Demand-Side Management Summary Report
Year Ending Dec 31, 2009

Sector/Program	Utility Costs			Planning Research		Total	Customer	Total	Benefit/Cost Ratios		
	Direct	Direct	Program	Planning	Research		Incurred	Resource	Total	Rate	Levelised
	Incentives	Information	Labour	& Evaluation	Adm & OH		Cost	Cost	Resource	Impact	Cost
	(\$000s)										
<u>RESIDENTIAL:</u>											
Heat Pumps	378.8	81.1	216.7	27.1	18.1	721.8	799.9	1,521.8	0.7	0.4	5.3
New Home Program	397.0	56.9	42.3	14.8	9.8	520.8	(58.2)	462.6	2.2	0.5	2.4
Residential Lighting	79.0	134.1	93.3	28.5	19.0	353.9	(56.6)	297.2	2.8	0.7	2.2
Home Improvements Program	114.8	9.4	20.7	8.8	5.9	159.5	148.1	307.6	1.4	0.6	3.0
Residential sub-total:	969.5	281.5	372.9	79.2	52.8	1,756.0	833.3	2,589.2	1.3	0.6	3.6
<u>GENERAL SERVICE</u>											
Lighting	272.7	96.6	52.5	65.0	43.3	530.2	361.1	891.3	3.0	0.5	1.5
Building and Process Improvements	391.1	122.7	124.8	74.2	49.4	762.2	1,149.6	1,911.8	1.8	0.5	2.2
General Service sub-total:	663.8	219.3	177.3	139.2	92.8	1,292.4	1,510.7	2,803.1	2.2	0.5	2.0
<u>INDUSTRIAL:</u>											
Industrial Efficiencies	76.1	39.1	79.6	19.6	13.1	227.6	287.6	515.1	1.6	0.6	2.1
Compressors	18.3	3.1	19.7	3.4	2.3	46.8	28.5	75.3	0.9	0.6	3.6
Industrial sub-total:	94.5	42.2	99.3	23.0	15.3	274.4	316.1	590.4	1.5	0.7	2.4
Conservation Culture:	54.3	80.7	5.9	-	-	140.8	-	140.8	-	-	-
<u>TOTAL:</u>	1,782.1	623.7	655.5	241.4	160.9	3,463.5	2,660.0	6,123.6	1.7	0.6	2.6
Year Ending Dec 31, 2009											
Levelised Energy Unit Cost - Cents per kWh			2.6			Energy Savings - kWh			28,358,156		
Levelised Capacity Unit Cost - Dollars per kW			172.7			Capacity Savings - kW			4,595		

Appendix B DSM Incentive Calculation

Total resource cost (TRC) Net Benefits are the gross benefits of lifecycle energy and capacity savings less the total resource cost (FortisBC program costs plus customer-incurred costs) for the energy savings measures installed.

The **Base TRC Net Benefits (Base)** are based on a yearly average of actual costs, savings and benefits for the immediately preceding three year period. The costs are escalated to the incentive year dollars and the benefits are priced at the incentive year BC Hydro Rate Schedule 3808.

The **DSM incentive mechanism** measures the variance between the actual TRC Net Benefits (Actual) and the Base TRC Net Benefits (Base) set for each sector for the year. There are different incentive or penalty levels based on the size of the variance for each of the three sectors. Incentives for the sectors are calculated for performances of 100 percent to 150 percent of Base. There is no calculation for performance between 90 percent and 100 percent of Base for all sectors. Calculations for performance of less than 90 percent of Base produce negative results. Maximum penalty is applied to performances of less than 50 percent of Base.

If the sum of the sector incentives or penalties is greater than zero, then that sum is the DSM incentive for FortisBC for the year. If the sum is less than zero, then there is no DSM incentive for FortisBC for the year and no penalty is charged.

The Residential incentive ranges from 3 percent to 6 percent, starting at the achievement of 101 percent of Base, while the penalty ranges from -3 percent to -6 percent. The incentive range for General Service is 2 percent to 4 percent and for Industrial is 1 percent to 3 percent, while the penalty ranges are -2 percent to -4 percent and -1 percent to -3 percent, respectively.

Appendix C Heat Pump Monitoring & Evaluation Report

POWERSense RESIDENTIAL HEAT PUMP PROGRAMS PROCESS, MARKET AND IMPACT EVALUATION

EXECUTIVE SUMMARY

Prepared for:

**PowerSense Dept.
FortisBC Inc.
Kelowna, British Columbia**

By:

Sampson Research Inc.

With:

Caneta Research Inc.

March 11, 2010

1543 Park Avenue
Roberts Creek, BC
V0N 2W2
Phone: 604.740.0254
Email: jsampson@sampsonresearch.com
www.sampsonresearch.com

Disclaimer

The opinions expressed in this report are the responsibility of the author, Sampson Research, and do not necessarily represent the views of FortisBC.

Currency Units

All dollar figures presented in this report, unless stated otherwise, are expressed in Canadian funds.

1 EXECUTIVE SUMMARY

1.1 Introduction

This report summarizes the findings from a process, market and impact evaluation of the PowerSense Air Source Heat Pump (ASHP) and Ground Source Heat Pump (GSHP) programs for the fiscal years 2006 to 2008. During this time, the ASHP program approved 2,509 applications, and expended \$0.644 million in rebates and \$3.960 million in loans. Total claimed energy and demand savings for the ASHP program are 18.6 GWh and 1.321 MW respectively. The GSHP program had 260 participants during this same time period, with \$0.266 million expended in rebates, and claimed energy and demand savings for the three years of 5.783 GWh and 1.608 MW respectively.

1.2 Evaluation Objectives and Methodology

The primary objectives of this evaluation were to:

- define and document the program logic model;
- evaluate the effectiveness and efficiency of program design and delivery; and,
- evaluate program gross savings, net-to-gross factors, and net program savings.

The evaluation differentiated its research and findings by program (ASHP versus GSHP), incentive type (rebate versus loan), and retrofits versus new construction. The evaluation objectives are consistent with those specified in FortisBC's *DSM Monitoring and Evaluation Plan 2009 Through 2011* (Henriques Consulting, 2008).

The evaluation objectives were addressed using data and information collected via telephone surveys of ASHP participants (n=340) and GSHP participants (n=38), site visits (n=23), interviews with contractors (n=11), interviews with program and field staff (n=4), and a review of program documentation and tracking records. A billing analysis was conducted using site visit participant electric and gas consumption records. Case studies were developed to illustrate key findings from the billing analysis.

1.3 Summary of Evaluation Findings

1.3.1 Document Review

Documentation of customers participating in the two programs was generally accurate and complete. Detailed program records for the sample of site visit participants were readily available, as were billing histories.¹ Procedures for determining program savings and the incentive amount appear to be consistently applied.

¹ Directly serviced residential customers only. No attempts were made to obtain billing records for wholesale customers.

EXECUTIVE SUMMARY

1.3.2 Program Operations

The human resource structure for the two heat pump programs consists of a program manager, a service manager, and three field representatives. All operate with minimal administrative and operations support. Improvements are needed in the amount of information provided to field representatives on current program status and activity levels.

Marketing for the programs, at present, is minimal. Marketing collateral consists primarily of the FortisBC PowerSense website. The lack of hardcopy material on the program, its qualifying technologies, and application procedures was identified by both program staff and contractors as an area for improvement.

External communications between program staff and contractors is informal and is seen as needing improvement. Indeed, some contractors interviewed for this evaluation were unaware the FortisBC was continuing to offer incentives for heat pumps.

Most importantly, the program needs an updated business case.

1.3.3 Participant Perspectives

Highlights from the surveys of ASHP and GSHP participants include:

- Sixteen percent (16%) of ASHPs and all GSHPs were installed as part of a new home construction.
- Six percent (6%) of heat pumps installed under the ASHP program replaced an existing heat pump. All others were new installations.
- The most frequently mentioned source of awareness of the PowerSense heat pump programs was the contractor, followed by word of mouth, bill inserts from FortisBC, and the local building supply or hardware store.
- The top three reasons ASHP participants installed a heat pump were to save money on their utility bill, to save energy, and to have air conditioning. GSHP participants were significantly more likely than ASHP participants to say it was also to help the environment.
- The typical GSHP participant is financially better off than the typical ASHP participant, with 63% having household incomes above \$80K compared with just 23% of ASHP participants.
- Low income ASHP participants (those with household incomes of less than \$40k) are more likely to opt for the loan option rather than the rebate (26% versus 17% respectively).
- Nearly half (45%) of ASHP participants paired their heat pump with a natural gas furnace, and another 20% use it with an electric forced air furnace.²
- Secondary heating systems for ductless (mini-split) heat pumps were typically electric resistance baseboard heaters, wood stoves, and gas fireplaces.
- The incidence of problems with heat pumps incented under the program is somewhat high with 35% and 39% of ASHP and GSHP survey respondents reporting having had some form of problem. Heat pump failures (individual parts or whole), noisy heat pump fans, difficulty maintaining the correct temperature in the home, and heat pump not working well in cold weather were the most frequently mentioned problems reported by ASHP participants. GSHP participants were most likely to report a circulating pump failure.

² Gas heated homes are no longer eligible to participate in the ASHP program.

- Despite the incidence of problems, overall satisfaction with heat pumps is high with 82% and 79% of ASHP and GSHP respondents satisfied, respectively. ASHP participants are most satisfied with the reliability of their heat pump (83% satisfied), and the least satisfied with the amount of electricity bill savings (59% satisfied). Satisfaction among GSHP participants was highest with their heat pump's reliability (76% satisfied), and lowest with their electricity bill savings (52% satisfied).
- Overall satisfaction with the ASHP and GSHP programs are high with 81% and 80% of participants from the respective programs satisfied. ASHP participants were most satisfied with application procedures (80% satisfied), and the least satisfied with information from FortisBC on energy efficient heat pumps (53% satisfied).

1.3.4 Site Visits

Site visits were completed with a sample of customers who installed either an ASHP or GSHP. The field visits confirmed that most heat pumps, with the exception of some mini-split systems, are being installed according to industry best practice. Mini-split systems observed in field had poorly situated heads and outdoor units. Capacity measurements (Btu/hr) for ASHP systems were generally below manufacturer specifications, but additional measurements and data collection is required before concluding that the units are performing below specification.

The site visits confirmed that participants of the ASHP program, as to a lesser degree, of the GSHP program, use a wide variety of heating methods to heat their homes. Some homeowners are aware they are not using their primary and secondary heating systems as efficiently as possible, and savings from their heat pump are suffering as a result. In other cases, homeowners would clearly benefit from advice and guidance on how to best operate their heat pump and secondary systems so that they fully realize their heat pump's savings potential.

1.3.5 Billing Analysis

An analysis of weather normalized billing histories was undertaken with 16 of the 23 households that participated in a site visit. Billing analysis was not possible in cases where there was insufficient billing history, significant changes to the home that were unrelated to the heat pump installation, or in new construction. Key observations from the analysis include:

- The range of savings estimates is broad and explained, in part, by the wide variety of pre- and post-retrofit heating and cooling equipment configurations.
- Heat pumps combined with a fossil fuel heating system (e.g., gas forced air furnace) typically saw electrical consumption increase and natural gas use decrease in the post-retrofit period. The effect was more pronounced in homes which previously did not have air conditioning, or where they upgraded their furnace to a high efficiency model. In extreme cases, the fossil fuel systems were removed altogether, shifting the entire heating load to electric.
- Most participants have some form of secondary heating which they use to supplement their heat pump during colder days. In some cases, it was clear that their use of secondary heating was reducing the savings potential of their heat pump.
- Many households had undertaken some degree of improvement to their home's thermal envelope (e.g., upgrading windows, etc.) or energy using equipment (e.g., furnace upgrades), which, in extreme cases made it difficult for billing analysis to isolate energy savings due to the heat pump installation.

EXECUTIVE SUMMARY

There was no documentation of what the homeowner was expected to save, energy and dollar wise, so there was no benchmark with which to compare the billing analysis results, nor to assess homeowner concerns about the lack of savings.

1.3.6 Contractor Perspectives

Contractors are generally satisfied with FortisBC and the PowerSense heat pump programs. They also support continuation of the two programs. They see room for improvement in areas of program marketing, program eligibility requirements, and incentive / loan levels. Some contractors were under the impression that the programs were no longer operating.

Information provided on heat pump sizing methods, combined with the findings from the site visits, suggests that best practices are being followed for pump sizing, installation, and with a couple of exceptions, contractor adjustments for balance point and cut-off. There is confusion among some contractors regarding the interpretation of balance point and cut-off.

FortisBC's 2009 decision to exclude customers with gas fired heating systems from the ASHP program is a contentious decision for several of the contractors. Part of decline in heat pump installations experienced in 2009 was linked by some contractors to this program change.

Contractors feel there is a need to educate consumers on the limitations and appropriate applications for mini-split heat pump systems. Several felt that the benefits of mini-split systems were being oversold by some contractors in the Okanagan.

1.4 Gross Program Savings

Measurements and observations from the site visits did not reveal any significant or systemic issues with heat pump sizing, installations, set-up, or performance that would suggest a wholesale adjustment to 2006 to 2008 gross savings estimates for the ASHP or GSHP programs. The site visits did reveal some issues with installations of mini-split ductless units, but the sample of units was too small to make inferences to the overall program population of incented mini-split pumps. Instead, these issues are referred to FortisBC for further attention.

FortisBC calculates gross energy and demand savings for both programs assuming the baseline is electric resistance heating. The baseline assumption may be legitimate for new housing as electric baseboard heating is considerably cheaper to install than a gas forced air furnace and associated ducting. To some degree, it may also be legitimate for existing dwellings where non-electric resistance space heating alternatives are limited. The relatively recent exclusion of gas heated homes from the ASHP program eligibility list has, to some degree, improved the legitimacy of the baseline assumption for retrofit situations. Whether FortisBC households would have, in absence of the PowerSense heat pump programs, chosen to heat their homes entirely using electric resistance heating needs supporting research and documentation. FortisBC may be able to draw upon their recently completed residential end use study, and their conservation potential review study. Research on new construction practices may also provide useful insight.

Demand savings for the ASHP program are calculated for the cooling season only with the baseline being an air conditioner with a SEER of 13 (2008) or 10 (2006-2007).

1.5 Net Program Savings

Based on the findings from this evaluation, estimates of energy and demand savings accruing from households participating in the ASHP and GSHP programs in the 2006 to 2008 period were adjusted for free riders only. Adjustments to energy and capacity savings based on the results of the billing analysis, and information gathered from site visits, contractors, and participants, are not recommended.

1.5.1 Net-to-Gross Adjustments

The free rider rate for the 2006-2008 ASHP program was estimated at 39%. The free rider rate for ASHP participants choosing the rebate was estimated at 46%, significantly higher than the 28% free rider estimate for participants choosing the loan option. The lower free rider rate for loan option participants is consistent with the tendency for lower income households to opt for the loan rather than the rebate.

Free riders for the 2006-2008 GSHP program are estimated at 57%. The free rider rate is based solely on the rebate option as no GSHP participants during this time period chose the loan option. The higher free rider rate for GSHP participants is consistent with the significantly higher capital cost of GSHP systems relative to the incentive, and the general tendency for GSHP systems to be installed by households with that have above average incomes.

The free rider estimates for the ASHP and GSHP programs are generally consistent with contractor estimates (30% and 50% respectively).

ASHP Program Savings

Net energy savings calculated for the 2006 to 2008 ASHP program are summarized in Exhibit 1. Run rate electricity savings attributable to the ASHP program are estimated at 11.331 GWh per annum. Capacity savings are estimated at 0.806 MW. This compares to the original program estimates of 18.577 GWh and 1.321 MW.

**Exhibit 1: Calculation of Net Program Savings (Run Rates) – ASHP Program
January 2006 to December 2008**

	GWh/yr Run Rate	MW Run Rate
Gross Program Savings (PRGM)	18.577	1.321
Free Riders (39%)	(7.245)	(0.515)
Net Program Savings (EVAL)	11.331	0.806
EVAL / PRGM Ratio	0.61	0.61

Totals may not sum due to rounding

The ratio of original program savings to evaluated savings for both energy and demand impacts is 0.61.

GSHP Program Savings

Net energy and demand savings for the 2006-2008 GSHP program are summarized in Exhibit 2. Run rate electricity savings are estimated at 2.487 GWh per annum. Capacity savings are estimated at 0.691 MW. This compares to program estimates of 5.783 GWh and 1.608 MW.

EXECUTIVE SUMMARY

Exhibit 2: Calculation of Net Program Savings (Run Rates) – GSHP Program January 2006 to December 2008

	GWh/yr Run Rate	MW Run Rate
Gross Program Savings (PRGM)	5.783	1.608
Free Riders (57%)	(3.296)	(0.917)
Net Program Savings (EVAL)	2.487	0.691
EVAL / PRGM Ratio	0.43	0.43

Totals may not sum due to rounding

The ratio of original program savings to evaluated savings for energy and demand impacts is 0.43 respectively.

1.6 Recommendations

The following recommendations are based on the findings from the evaluation and are organized by program design, marketing and communications, monitoring and tracking, and program evaluation.

Program Design

1. The ASHP and GSHP programs are in need of updated business cases. The preparation of the business cases should include a review and confirmation of each program's strategic goals, objectives, eligibility requirements (technology and customer heating characteristics) and baseline assumptions.
2. FortisBC should review and document the heat pump technologies that are eligible for program funding. The review should include a separate analysis of the relative cost effectiveness of ductless mini-split systems from both the program's and customer's perspective.
3. The program should retain its requirement that all heat pumps be Energy Star qualified. The designation is increasingly recognized by households as an indicator of energy efficiency. Current eligibility requirements for S/EER and HSPF appear adequate.

Program Marketing and Communications

4. The marketing strategy for the two heat pump programs need to be refreshed. Customers, field staff, and contractors have indicated that information and materials available on the two programs are insufficient for promoting the program and supporting program delivery. Lack of program awareness is cropping up as a barrier to program success.
5. There is a need to rebuild relationships with contractors and other trade allies. A number of contractors previously active in the program were unsure the programs were operating. A stronger relationship with residential HVAC contractors would also provide a foundation from which to address concerns raised by homeowners regarding the amount of savings realized from their heat pumps, and to address issues of best practice for heat pump installation and set-up.

6. There is a clear need for FortisBC to provide its residential customers with information on appropriate applications and the relative costs and benefits of mini-split ductless heat pumps. There is sufficient evidence that some contractors are overselling the benefits of these systems.
7. Field observations of mini-split applications also indicate a need for improved education for contractors on installation and set up of these units. FortisBC may wish to tackle this issue directly with contractors and/or through the provincial industry associations. Given the market potential of this heat pump sub-group, this need should be addressed regardless of whether FortisBC continues to offer financial incentives for ductless units.
8. Field observations also suggest a role for FortisBC to educate customers on the efficient use of heat pump systems, especially when used with other heating methods. If not already available, education materials should be prepared to help homeowners maximize energy savings from their heat pumps, addressing such topics as thermostat settings, interactions with other forms of space heating, and regular maintenance. This should help address some of the reasons why some households are dissatisfied with their heat pump savings.
9. FortisBC should consider reviewing the structure and effectiveness of its PowerSense website as it pertains to information on heat pumps, and its two heat pump programs. Some of the information is out-dated (e.g., references to LiveSmart BC, Home Renovation Tax credit), difficult to find (e.g., Q & As on heat pumps) or simply lacking (e.g., information on ductless mini-split systems).
10. FortisBC should consider developing homeowner guides that provide realistic estimates of energy and dollar savings for various pre- and post-retrofit heating and cooling systems and fuels. This material could be provided in the form of simple calculator or in hard copy and would help temper client expectations and improve satisfaction with their heat pump installations.
11. Fortis should develop and deliver information and training to contractors on calculating economic cut-off temperature settings for air source heat pumps, and the implications if set incorrectly.

Monitoring, Tracking, and Verification of Program Savings

12. Improvements are needed in the timeliness and comprehensiveness of internal communications about the program, including changes in qualifying criteria, applications procedures, and processing requirements.
13. A system should be established that helps internal staff and external stakeholders correctly identify current application forms, marketing collateral, and processing procedures.
14. FortisBC should implement a system to allow field and program staff to check on the status of the program, including region-specific activity indicators, lists of active contractors, and program savings to-date.
15. Fortis should explore opportunities to shift its largely paper based record keeping and data management for the two programs to a project management style of database, with online access for field representatives.
16. Provisions for free riders should be mandatory for all new PowerSense business cases. Free rider estimates should be periodically reviewed and updated.
17. Program energy and demand savings for the 2006-2008 ASHP and GSHP programs should be adjusted to reflect the evaluation findings.

EXECUTIVE SUMMARY


Program Evaluation


18. FortisBC should continue program market and impact evaluations at regular intervals (e.g., every three years) and allocate sufficient resources for completing these evaluations (e.g., between 1% and 3% of program budget).
19. Field visits are a useful tool for evaluating installation standards, and system performance. Suggestions for subsequent evaluations include measuring temperature at the entrance to the outdoor coil to test for re-circulation effects, and measuring power consumption of the indoor fan and outdoor unit using a portable clamp on energy metering device at the customer's circuit breaker panel. These two additional measures would allow for heat pump efficiency / COP checks.
20. A more detailed look at control settings (balance point, economic cut-off point) made on units in the field would be an important addition to future field assessments. While taking more time and requiring removal of outdoor unit access panels, these control settings have a direct impact on operating savings, if incorrectly set.

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Sampson Research

Economic research that matters to communities and business

 604.740.0254

 jsampson@sampsonresearch.com

www.sampsonresearch.com