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March 30, 2012

Via Email
Original via Mail

Ms. Alanna Gillis
Acting Commission Secretary
BC Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, BC V6Z 2N3

Dear Ms. Gillis:

**Re: *FortisBC Inc.'s (FortisBC) 2012 – 2013 Revenue Requirements and 2012
Integrated System Plan Application – Oral Hearing Undertaking 32 – Transcript
Volume 5, pages 865-866***

Please find enclosed for filing, Undertaking 32, FortisBC's Semi-Annual Demand Side Management Report to December 31, 2011.

Twelve hard copies will be couriered to the British Columbia Utilities Commission.

Sincerely,

A handwritten signature in black ink, appearing to be "DS" with a long horizontal stroke underneath.

Dennis Swanson
Director, Regulatory Affairs



FORTISBC INC.

SEMI-ANNUAL DSM REPORT

YEAR ENDED DECEMBER 31, 2011

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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, 2011. The report provides a summary of program activities and compares actual energy savings and costs to approved Plan, where applicable. A statement of financial results and a calculation of the DSM incentive amount earned are also provided. Finally, a summary of historical FortisBC DSM costs and energy savings for the past five years is included in Appendix C.

Overview of Results for the Year Ended December 31, 2011

Energy efficiency savings for the year ended December 31, 2011 were 36.3 GWh, or 91 per cent of the 39.8 GWh Plan. Company costs incurred were \$5,917,000 or 75 per cent of the approved Plan of \$7,842,000. Adding the customers' costs to the Company's program costs yields a Total Resource Cost (TRC) of \$9,383,000 with an overall TRC benefit/cost ratio of 1.6.

OVERVIEW OF PROGRAM ACTIVITIES

This section describes the program activities in each sector, including whether the program is new or an enhanced version of an existing program. A summary table that describes the program or measure and the rebate incentive structure accompanies each section.

Residential Programs

PowerSense made many changes and additions to the Residential programs in 2011. Residential rebates were enhanced for existing measures by typically doubling the incentive rate on average; for example, the incentive for a standard split or packaged Air Source Heat Pump (ASHP) of three tons¹ has increased from \$300 to \$600. The Electronics "spiff"² program targets the highest efficiency tier 5 televisions. Additional programs and measures have been introduced, including an ASHP maintenance pilot program, an Electronic Programmable Thermostat rebate, an Energy Star Appliance rebate program (which includes appliances such as clothes washers,

¹ Ton refers to refrigeration capacity, and is equal to 12,000 BTU/hour.

² "Spiff" is an incentive paid to salespeople to promote qualified products, in this case, EnergyStar electronics.

refrigerators, dishwashers, freezers, bathroom fans, etc.), a Refrigerator Take-Back program and stepped rebates for attaining EnerGuide Rating 80, 84 or 90 for new home construction.

Based on the highly successful small business direct lighting program (FortisBC LiveSmart Installation Program or FLIP), PowerSense created a direct installation lighting program for low-income multi-family homes. This was done in partnership with the Ministry of Energy and Mines with support from the British Columbia Non-Profit Housing Association. PowerSense also expanded its instant rebate program for energy efficient lighting to many big box stores (such as Home Depot, Rona, Save-On Foods, and London Drugs).

PowerSense also piloted an intensive “energy diet” residential marketing campaign to promote the LiveSmart BC and ecoEnergy rebate programs. The Rossland Energy Diet has proven successful thus far with approximately 22 percent of eligible homeowners undertaking a home energy audit, as a precursor to their energy retrofits.

The following table details the residential program offers for 2011.

2011 Residential Offers

Program/ Measure Description	Status	Rebate Incentive Rate	Type of Residence
Insulation: ICF or SIP (must be to roofline)	Enhanced	\$500 per detached house; \$300 per townhouse; \$150 per apartment	New Home
Insulation Upgrade	Enhanced	\$0.25 per square foot	Existing Home
EnergyStar air source heat pump - split or packaged space heating	Enhanced	\$200/ton	New and Existing Homes
EnergyStar air source heat pump - ductless mini-split	Enhanced	\$300/ton	New and Existing Homes
Air-source packaged terminal heat pump	Enhanced	\$100/ton	New and Existing Homes
Heat Pump Maintenance Program (pilot)	New	\$25 per tune-up	Existing Homes

Program/ Measure Description	Status	Rebate Incentive Rate	Type of Residence
Geoexchange heating system	Enhanced	\$500/ton	New and Existing Homes
EnergyStar Windows and Doors	Enhanced	\$2.50 per square foot	Existing Homes
Programmable Thermostat	New	50% up to \$20	Existing Homes
EnergyStar Refrigerator (Tier 3)	New	\$50	New and Existing Homes
Fridge Take-Back Program	New	\$20 to customer, \$35 to retailer to collect and recycle old refrigerator	Existing Homes
EnergyStar Freezer	New	\$25	New and Existing Homes
EnergyStar Clothes washer (Tier 3)	New	\$75	New and Existing Homes
EnergyStar Dishwasher (Tier 2)	New	\$25	New and Existing Homes
EnergyStar Bathroom Fan	Enhanced	\$50	New and Existing Homes
EnergyStar Television (Tier 5)	Enhanced	\$25 (paid to retailer)	New and Existing Homes
EnergyStar CFL fixture or luminaire	Enhanced	50% up to \$10	New and Existing Homes
CFL lamp (specialty)	Enhanced	50% up to \$2.50	New and Existing Homes
EnergyStar LED lamp > 10W (hardwired luminaire)	Enhanced	50% up to \$50	New and Existing Homes
EnergyStar LED lamp > 10W (screw-in)	Enhanced	50% up to \$30	New and Existing Homes
EnergyStar LED lamp < 10W	Enhanced	50% up to \$15	New and Existing Homes

Program/ Measure Description	Status	Rebate Incentive Rate	Type of Residence
ENERGUIDE 80	New	\$1,500	New Home
ENERGUIDE 84	New	\$3,000	New Home
ENERGUIDE 90	New	\$5,000	New Home
Lighting direct installation program	New	N/C for qualifying multi-family units	Low Income Multi-Family
Energy saving kits	Same	For qualifying low-income households (home owners and renters)	Low Income Homes

Commercial and Industrial Programs

In 2011 PowerSense doubled the incentive rate for custom rebates from \$0.05/kWh to \$0.10/kWh for Commercial customers.

In partnership with LiveSmart BC for Business, PowerSense introduced the FLIP program, a direct installation lighting program for businesses that use less than \$20,000 of electricity annually. The average cost per participant is \$4,300 of which FortisBC pays an incentive of \$0.10/kWh, based on the energy savings, to a maximum of \$1,000 while the LiveSmart BC Business program pays the balance.

The Building Optimization Program (BOP) provides customers with multiple premises with the tools to save energy. BOP includes an audit report and the installation of Energy Management Information System (EMIS) software to track their utility usage over time and a minimum of three years of monitoring and tracking.

2011 Commercial and Industrial Offers

Program/ Measure Description	Status	Rebate Incentive Rate
New facility assessment	Enhanced	\$0.10/kWh
Business audit	Same	Free walk through; 50% funding for comprehensive 3rd party audit
Industrial audit	Enhanced	\$0.10/kWh
Irrigation and Municipal Water Infrastructure	Enhanced	\$0.10/kWh
Partners in Efficiency	Same	On-going support and rebates
FortisBC LiveSmart BC Lighting Installation Program (FLIP)	New	\$0.10/kWh up to \$1,000
Building Optimization	New	Energy management information system and audit

Public Awareness (Conservation Culture) Programs

In the spring of 2011, PowerSense expanded its Earth Hour program's reach and participation through a heightened awareness campaign. Customers across the FortisBC service area sent in 1,604 pledges, each committing to turn their lights off for one hour. This was an 80 per cent increase in the number of pledges received compared to the prior year. The results show that electricity consumption dropped by approximately one per cent, or 3.58 MW, during Earth Hour.

In addition to participating in almost 100 community events throughout its service territory, PowerSense distributed nearly 9,000 clotheslines at more than 25 give-away events. PowerSense also hosted the annual PowerSense Awards in November in the BC Centre for Excellence at Okanagan College. Awards were presented to 15 businesses, organizations and individuals in recognition of their sound energy efficiency practices and investment in long-term sustainability.

Customer profiles and videos of installation of energy efficient measures in homes were created and added to the website, and winter heating and Christmas LED light advertising campaigns were run in the second half of the year. A Scratch ‘n’ Save campaign was run, in partnership with BC Hydro and FortisBC Energy to promote NRCan energy assessments for homeowners.

2011 Public Awareness (Conservation Culture) Offers

Program/ Measure Description	Status	Expenditure
Earth Hour promotion	Enhanced	\$25,000
Clothesline give-away and laundry information campaign	Enhanced	\$120,000
Scratch ‘n’ Save (for NRCan energy assessment)	New	\$25-150 rebate
Powerlines (customer newsletter)	Enhanced	Six issues per year with new “magazine” look

Programs in Development

The PowerSense team has been working on developing other new programs and enhancing some existing programs, including:

- Irrigation Rebate program;
- Business Signage Lighting Rebate program;
- Retail Energy Star Lighting Instant Rebate program;
- Product Option Program (fixed rebates for retro-fitting product specific lighting, pumps, fans, motors, refrigeration, controls and sensors, HVAC systems and commercial kitchen appliances);
- Commercial Kitchen program; and
- Phase 2 of the low-income direct installation lighting program (Kootenays).

ENERGY SAVINGS BY SECTOR

The energy savings for the year ended December 31, 2011, are shown in the table below.

Sector	Plan	Actual	% of Plan
	GWh		Achieved
Residential	16.4	11.4	69%
Commercial	13.9	24.2	173%
Industrial	9.4	0.8	8%
Total Savings (GWh)	39.8	36.3	91%

Note: Minor differences due to rounding

Commercial energy savings were above Plan at 173 per cent. Residential and Industrial energy savings were under Plan at 69 per cent and 8 per cent respectively. These results are discussed in more detail in the following sections.

Detail of Energy Savings

The following sector tables provide details on the DSM energy savings in each sector, including wholesale DSM activities in the service territories of the FortisBC wholesale customers.

Residential	Plan	Actual	% of Plan
	GWh		Achieved
Home Improvement Program	9.0	3.7	41%
Low Income	0.5	1.4	268%
Residential Lighting	3.4	3.3	97%
Heat Pumps	3.4	2.3	66%
New Home Program	0.1	0.7	656%
Total Savings (GWh)	16.4	11.4	69%

Note: Minor differences due to rounding

In the year ended December 31, 2011, the energy saving results from Residential construction and renovation activity were 69 per cent of Plan. The 11.4 GWh savings figure is a 2 per cent decrease from the 2010 sector results of 11.6 GWh. The Low Income and New Home programs exceeded Plan, and the Residential Lighting program came very close to meeting Plan. The Home Improvement and Heat Pump programs fell short of forecast. The LiveSmart BC collaboration resulted in 2.6 GWh of retrofit energy savings, which are recorded in the Heat Pump and Home Improvement (HIP) programs.

The New Home program savings were well above Plan and the popularity of the EnerGuide home ratings among developers likely contributed to the success. In 2011, the Low Income program distributed 960 energy saving kits and completed lighting retrofits in 45 low income multi-family buildings. Approximately 130 water saver kits and 380 low flow showerheads were distributed as part of the Home Improvement program.

The Commercial sector recorded savings of 24.2 GWh, or 173 per cent of Plan, as indicated in the table below. This result is a 65 per cent increase compared with the 2010 sector total of 14.7 GWh.

Commercial	Plan	Actual	% of Plan Achieved
	GWh		
Lighting	7.4	20.6	279%
Building and Process Improvement	3.0	1.4	46%
Water Handling and Infrastructure	3.6	2.2	62%
Total Savings (GWh)	13.9	24.2	173%

Note: Minor differences due to rounding

The majority of the Commercial sector savings are realized through the Commercial lighting programs, which include both “at the counter” product rebates and custom lighting retrofits, such as those installed at a hardware store in Penticton producing 0.1 GWh savings. Another large component of the Commercial lighting programs is the FLIP direct installation program, a collaborative effort with the LiveSmartBC Business program. FLIP was very popular in 2011 providing lighting upgrades to more than 750 small commercial customers and achieving 6.4 GWh of savings.

The Building Improvement (BIP) program incents improved building envelopes and systems, e.g. heating, ventilation and air conditioning. One such project in 2011 was the geothermal exchange system and other measures that were installed at a post-secondary educational facility resulting in 0.6 GWh of savings.

The water handling infrastructure projects completed in 2011 included a large process optimization project at the Kelowna municipal wastewater treatment facility, which contributed 2.0 GWh of savings.

The Industrial Programs achieved savings of 0.8 GWh or 8 per cent of the 9.4 GWh Plan, as detailed in the table below.

Industrial	Plan	Actual	% of Plan Achieved
	GWh		
Industrial Efficiency	9.4	0.8	8%
Integrated EMIS	0.1	0.0	0%
Total Savings (GWh)	9.4	0.8	8%

Note: Minor differences due to rounding

The Plan includes 7.2 GWh of anticipated energy savings for the Zellstoff Celgar Limited Partnership (Celgar) pulp mill project which were not realized due to regulatory proceedings that had the potential to affect the treatment of demand-side measures. If this project is excluded from the Plan, the goal for Industrial energy savings would be 2.2 GWh, and 35 per cent of this restated goal was achieved by the Industrial Efficiency Program in 2011.

Examples of Industrial Efficiency projects in 2011 included the installation of variable frequency drives on process equipment at the Princeton Co-Generation Co-op resulting in 0.1 GWh of energy savings. Further process improvement at a Princeton sawmill resulted in 0.4 GWh of savings.

Two customers were assessed for their readiness to incorporate EMIS (Energy Management Information Systems) software and sub-metering, as part of this pilot project. No savings were recorded in 2011, as these tend to be multi-year projects, where savings are realized later in the process.

The table below disaggregates the Wholesale DSM results from the sector tables above.

Wholesale Customer	GWh	MW	% of GWh
Grand Forks	0.1	0.0	1%
Summerland	0.6	0.2	7%
Nelson	0.6	0.2	6%
Penticton	2.2	0.3	24%
Kelowna	5.7	0.7	62%
Total Savings (Wholesale)	9.1	1.3	100%

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 9.1 GWh and 1.3 MW to December 31, 2011. The largest DSM savings results occurred within Kelowna and Penticton municipal utility service areas. In both these areas, the Commercial Lighting and Commercial Building Improvement programs contributed the largest amount of savings.

A reporting error was discovered in the method used to extract the wholesale results from the energy management database, which significantly understated the savings within the wholesale service areas in previous years. Wholesale energy savings results from the December 31, 2009 and 2010 yearend reports have been corrected and the tables are provided in Appendix D.

PROGRAM COSTS

The table below presents the actual costs incurred in 2011 compared to Plan.

Summary of Costs by Sector

Sector/Component	Plan	Actual	% of Plan
	(\$000s)		Achieved
Residential	3,636	1,700	47%
Commercial	2,118	2,832	134%
Industrial	613	137	22%
Supporting Initiatives	725	658	91%
Monitoring & Evaluation	308	184	60%
Planning & Admin	443	406	92%
Total	7,842	5,917	75%

Note: Minor differences due to rounding

Costs amounted to \$5,917,000 or 75 per cent of the approved Plan to December 31, 2011. Under spending is partially due to the step change in the 2011 budget and the ramp-up time necessary to build capacity and launch new programs. Specific causes of spending variances are discussed further in the sector results below. Appendix A contains a more detailed breakdown of total program costs, including the customer portion of costs.

Costs per Sector

Residential	Plan	Actual	% of Plan
	(\$000s)		Achieved
Home Improvement Program	2,145	479	22%
Low Income	305	245	80%
Residential Lighting	438	239	55%
Heat Pumps	694	532	77%
New Home Program	54	205	380%
Total	3,636	1,700	47%

Note: Minor differences due to rounding

The utility cost of Residential programs was \$1,700,000 or 47 per cent of Plan for 2011. There was uncertainty surrounding the Federal ecoEnergy home retrofit program, which was initially announced January 2011, and belatedly came into effect July 2011. This uncertainty likely contributed to decreased retrofit activity in the Heat Pumps and Home Improvement programs.

Incentives paid to Residential participants amounted to \$1,076,000, or 63 per cent of utility costs, compared to \$2,896,000 Plan, due to lower activity levels than expected.

Commercial	Plan	Actual	% of Plan Achieved
	(\$000s)		
Lighting	1,114	1,995	179%
Building and Process Improvement	572	606	106%
Water Handling and Infrastructure	432	231	54%
Total	2,118	2,832	134%

Note: Minor differences due to rounding

Commercial sector costs, to December 31, 2011 amounted to \$2,832,000 or 134 per cent of Plan. The largest cost component of Commercial programs was the Lighting program, which include incentives paid through the FLIP program in collaboration with LiveSmart BC for Business. Incentives paid to Commercial Lighting program participants in 2011 amounted to \$1,233,000 compared to \$793,000 Plan, a variance of \$440,000. The costs for this sector are commensurate with the energy savings, both of which are well above Plan.

Industrial	Plan	Actual	% of Plan Achieved
	(\$000s)		
Industrial Efficiency	603	128	21%
Integrated EMIS	10	9	90%
Total	613	137	22%

Note: Minor differences due to rounding

Industrial sector costs were \$137,000 for the period, or 22 per cent of Plan. The 2011 Industrial DSM Plan includes the \$372,000 associated with the Celgar project, which did not proceed. If the Celgar related costs are excluded, the restated plan is \$231,000 and the 2011 costs for Industrial Efficiency would be 55 per cent of the restated goal.

Portfolio Costs

Portfolio level costs, that are not specifically associated with individual programs, include Supporting Initiatives and Planning and Evaluation. These are summarized in the table below.

Components	Plan	Actual	% of Plan
	(\$000s)		Achieved
Supporting Initiatives*	725	658	91%
Monitoring & Evaluation	308	184	60%
Planning & Admin	443	406	92%
Total	1,475	1,248	85%

Note: Minor differences due to rounding

*Including Conservation Culture

The Supporting Initiative costs for 2011 were \$658,000 or 91 per cent of the \$725,000 Plan. The Conservation Culture costs included in Supporting Initiatives were \$385,000. Supporting Initiatives include programs such as: Earth Hour promotion, energy conservation awareness campaigns, Powerlines newsletters, education for multiple age groups and trade allies, employee and community engagement.

The Planning and Evaluation budget is separated into two main components “Monitoring and Evaluation” (M&E) and “Planning and Administration”. Both were under budget, particularly M&E with costs of \$184,000, or 60 per cent of Plan. This was largely due to the fact that the M&E Analyst position was not filled until May 2011. The Planning & Administration expenditure was \$406,000, 92 per cent of Plan.

In Appendix A, Program Development costs are further broken out from the Planning and Administration costs.

FINANCIAL RESULTS

Program benefits are calculated on the present value of avoided power purchase costs. In this Semi-Annual Report it is based on the blended 2011 BC Hydro Rate Schedule 3808 (RS3808) over the measure lifespan, plus a deferred construction factor. The blended RS3808 rate for 2011 amounts to a value of \$34.90/ MWh for energy and \$59.44/kW-year for capacity. The deferred construction factor contributes \$32.96/kW-year to the avoided costs. Using present value of the avoided power purchase costs over the measure lifespan, an overall benefit/cost ratio of 1.6 was achieved in 2011.

Financial Results for Year Ending December 31, 2011 by Program

Program	Program Benefits	Planning & Evaluation					Total Costs	Benefits less Costs	Benefit Cost Ratio
		Program Costs	Program Dev.	Planning & Admin.	Monitoring & Eval.	Customer Costs			
(\$000s)									
Residential									
Home Improvement	1,742	479	6	35	19	542	1,080	662	1.6
Low Income	356	245	2	14	7	93	361	(5)	1.0
Residential Lighting	857	239	5	32	17	103	396	461	2.2
Heat Pumps	1,028	532	4	22	11	513	1,082	(54)	1.0
New Home Program	480	205	1	7	3	283	500	(20)	1.0
Residential Total	4,463	1,700	18	109	58	1,535	3,419	1,044	1.3
Commercial									
Lighting	8,387	1,995	32	198	104	1,351	3,680	4,707	2.3
Building and Process Improvement	697	606	2	13	7	306	934	(237)	0.7
Water Handling Infrastructure	860	231	3	21	11	261	528	332	1.6
Commercial Total	9,944	2,832	38	233	122	1,918	5,142	4,802	1.9
Industrial									
Industrial Efficiency	388	128	1	8	4	13	154	234	2.5
Integrated EMIS	-	9	-	-	-	-	9	(9)	-
Industrial Total	388	137	1	8	4	13	163	225	2.4
Supporting Initiatives	-	658	-	-	-	-	658	-	-
Total	14,795	5,327	57	349	184	3,466	9,383	5,412	1.6

Note: Minor differences due to rounding

The benefit/cost ratios for the individual programs are also detailed in the table above. The Residential sector program performance resulted in a benefit/cost ratio of 1.3 for the sector. The Low Income program has a benefit/cost ratio of 1.0, which includes a 30 per cent benefits increase as per the DSM Regulation section 4, subsection 2(b).

The Commercial financial result for 2011 is a benefit/cost ratio of 1.9. Within this sector, the Building and Process Improvement program achieved a benefit/cost ratio of 0.7. This result is partly due to the impact of the recent Commercial Retrofit Building Improvement Program Evaluation report (see Appendix E). Steps will be implemented to use the recommendations from the report to strengthen the program.

The Industrial sector benefit/cost ratio was more robust at 2.4. While this is higher than the other sectors, this result is expected based on the 2011 Plan, where the Industrial sector had a higher benefit/cost ratio than the Residential and Commercial sectors.

Government Programs

The Company continues to collaborate with the provincial government on various initiatives in both the Residential and Commercial sectors. On March 31, 2011 the second phase of the LiveSmart BC program for residential energy efficiency retrofits came to an end. On April 1, 2011 the third phase of the residential LiveSmart BC program opened to new entrants, but the uncertainty surrounding the federal ecoEnergy Retrofit offer, which was eventually implemented in July 2011, likely dampened customer demand for home energy audits. This market uncertainty contributed to a decrease in activity in the Home Improvement and Heat Pump (Air Source) programs in 2011.

In February 2011, the FLIP direct installation lighting program, which is a collaborative project with the LiveSmart BC Business program, opened to participants. The program has been very successful and has contributed to the high activity in Commercial sector lighting.

DSM INCENTIVE FOR THE YEAR ENDED DECEMBER 31, 2011

The table below presents the calculation of the DSM incentive for the year ended Dec 31, 2011.

TRC Net Benefits (\$000s)					
	Actual to Dec 31	Base 3-year Average	Eligible for Incentive	Performance	Incentive (\$000s)
Residential	1,229	2,404	1,229	51%	(55)
Commercial	5,194	3,451	4,273	124%	171
Industrial	237	638	237	37%	(7)
Total	6,660	6,493	5,739		109

Note: Minor differences due to rounding

Actual TRC Net Benefits to December 31, 2011 amounted to \$6,660,000, compared to the Base Net Benefits of \$6,493,000. The Actual Net Benefits are curbed by any sector expenditure over 110 per cent of plan, resulting in a reduced Eligible Net Benefits for the Commercial sector. The Net Benefits for each sector are compared to a 3-year rolling average Baseline to determine each sector's incentive amount.

The Residential and Industrial sectors performed below their Net Benefits baselines, earning negative incentives of \$55,000 and \$7,000, respectively. The Commercial sector performed well above the baseline average with an incentive of \$171,000. As per FortisBC's DSM Incentive Mechanism, a negative incentive in any sector(s) is used to offset any positive incentive amount(s) in other sectors, but the sum total cannot fall below zero. Therefore, the calculated DSM incentive is \$109,000 for the year ended December 31, 2011.

A more detailed description of the Incentive Mechanism calculation is found in Appendix B.

APPENDIX A DSM SUMMARY REPORT

**FortisBC Demand Side Management Summary Report
Year Ended December 31, 2011**

Sector/Program	Utility Program Costs			Planning and Evaluation			Total Utility Costs	Customer Incurred Cost	Total Resource Cost	Program Benefits	Energy Savings MWh	Benefit/Cost Ratios		Levelised Cost ¢/kWh	
	Direct Incentives	Direct Information	Program Labour	Program Dev.	Planning & Admin.	Monitoring & Eval.						Total Resource Cost	Program Benefits		Energy Savings MWh
	(\$000s)														
Residential															
Home Improvements Program	355	34	89	6	35	19	538	542	1,080	1,742	3,692	1.6	0.5	3.2	
Low Income	142	21	82	2	14	7	268	93	361	356	1,447	1.0	0.4	6.2	
Residential Lighting	84	46	109	5	32	17	293	103	396	857	3,308	2.2	0.6	3.0	
Heat Pumps	350	36	146	4	22	11	569	513	1,082	1,028	2,257	1.0	0.4	5.2	
New Home Program	144	14	46	1	7	3	216	283	500	480	689	1.0	0.5	6.4	
Residential Total	1,076	151	473	18	109	58	1,884	1,535	3,419	4,463	11,393	1.3	0.5	4.2	
Commercial															
Lighting	1,233	338	424	32	198	104	2,329	1,351	3,680	8,387	20,577	2.3	0.5	2.4	
Building and Process Improvement	323	64	219	2	13	7	628	306	938	697	1,386	0.7	0.3	6.9	
Water Handling Infrastructure	176	19	36	3	21	11	267	261	528	860	2,199	1.6	0.4	2.4	
Commercial Total	1,731	421	680	38	232	122	3,224	1,918	5,142	9,944	24,162	1.9	0.4	2.7	
Industrial															
Industrial Efficiency	14	18	96	1	8	4	141	13	154	388	794	2.5	0.6	2.0	
Integrated EMIS	3	0	6	-	-	-	9	-	9	-	-	-	-	-	-
Industrial Total	17	18	102	1	8	4	150	13	163	388	794	2.4	0.6	2.1	
Supporting Initiatives	-	323	335	-	-	-	658	-	658			-	-	-	-
TOTAL	2,824	914	1,589	57	349	184	5,917	3,466	9,383	14,795	36,350	1.6	0.4	3.4	

Note: Minor differences due to rounding

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 per cent to 150 per cent of Base. There is no calculation for performance between 90 per cent and 100 per cent of Base for all sectors. Calculations for performance of less than 90 per cent of Base produce negative results. Maximum penalty is applied to performances of less than 50 per cent 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 sector incentive rates are determined using the following table:

Incentive Performance Level						
<50%	<70%	<90%	90-100%	>100%	>110%	>120%
DSM Sector Incentive Rates						
-6.0%	-4.5%	-3.0%	0.0%	3.0%	4.5%	6.0%
-4.0%	-3.0%	-2.0%	0.0%	2.0%	3.0%	4.0%
-3.0%	-2.0%	-1.0%	0.0%	1.0%	2.0%	3.0%

APPENDIX C HISTORICAL SUMMARY OF FORTISBC'S DSM COSTS AND ENERGY SAVINGS

Historical FortisBC DSM Costs and Energy Savings 2006-2007

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	2006 (Actual)							2007 (Actual)							
	Spend (\$000s)			Energy Savings (MWh)			TRC	Spend (\$000s)			Energy Savings (MWh)			TRC	
	Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	
1	Residential														
2	Home Improvements	63	58	5	200	500	300	2.1	98	78	20	500	500	-	1.5
3	Building Envelope*														
4	Heat Pumps	462	523	(61)	5,600	6,600	1,000	1.2	513	651	(138)	6,200	9,600	3,400	1.6
5	Residential Lighting	167	121	46	2,200	2,500	300	3.4	170	116	54	2,200	2,700	500	5.6
6	New Home Program	304	324	(20)	1,600	1,300	(300)	2.0	424	458	(34)	1,700	2,500	800	2.3
7	Appliances*														
8	Electronics*														
9	Water Heating*														
10	Low Income*														
11	Behavioural*														
12	<i>Residential Total</i>	996	1,026	(30)	9,600	10,900	1,300	1.5	1,205	1,303	(98)	10,600	15,300	4,700	1.9
13	Commercial														
14	Lighting	256	203	53	3,000	3,000	-	3.3	257	240	17	3,000	5,500	2,500	2.8
15	Building and Process Improvement	433	540	(107)	6,200	6,700	500	1.9	469	499	(30)	6,200	4,900	(1,300)	1.5
16	Computers														
17	Municipal**														
18	Irrigation**														
19	<i>Commercial Total</i>	689	743	(54)	9,200	9,700	500	2.2	726	739	(13)	9,200	10,400	1,200	2.0
20	Industrial														
21	Compressed Air	42	45	(3)	400	500	100	1.1	37	30	7	700	400	(300)	1.0
22	EMIS														
22	Industrial Efficiencies	140	114	26	1,200	2,000	800	2.4	131	153	(22)	1,300	1,800	500	1.6
24	<i>Industrial Total</i>	182	159	23	1,600	2,500	900	2.0	168	183	(15)	2,000	2,200	200	1.5
25	Programs Total	1,867	1,928	(61)	20,400	23,100	2,700	-	2,099	2,225	(126)	21,800	27,900	6,100	-
26	Supporting Initiatives	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	Planning & Evaluation	367	314	53	-	-	-	-	375	324	51	-	-	-	-
28	Total	2,234	2,242	(8)	20,400	23,100	2,700	1.8	2,474	2,549	(75)	21,800	27,900	6,100	1.9

* these programs were included in Home Improvements program

** Water Treatment and Wastewater Handling infrastructure were part of Building and Process Improvement

Historical FortisBC DSM Costs and Energy Savings 2008-2009

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	2008 (Actual)							2009 (Actual)							
	Spend (\$000s)			Energy Savings (MWh)			TRC	Spend (\$000s)			Energy Savings (MWh)			TRC	
	Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	
1	Residential														
2	Home Improvements	135	62	73	385	331	(54)	0.8	273	145	128	1,024	1,032	8	1.4
3	Building Envelope*														
4	Heat Pumps	446	682	(236)	4,889	8,444	3,555	1.4	515	677	(162)	5,642	3,188	(2,454)	0.7
5	Residential Lighting	156	151	5	1,796	2,562	766	4.1	263	306	(44)	2,822	3,349	526	2.8
6	New Home Program	286	340	(54)	1,332	1,596	265	2.8	341	496	(155)	1,216	1,735	518	2.2
7	Appliances*														
8	Electronics*														
9	Water Heating*														
10	Low Income*														
11	Behavioural*														
12	<i>Residential Total</i>	1,023	1,236	(213)	8,401	12,933	4,531	1.7	1,391	1,624	(233)	10,705	9,304	(1,401)	1.3
13	Commercial														
14	Lighting	257	375	(118)	3,000	5,960	2,960	2.4	724	422	302	5,505	7,638	2,133	3.0
15	Building and Process Improvement	497	506	(9)	6,103	5,081	(1,022)	1.6	563	639	(75)	6,095	8,713	2,618	1.8
16	Computers														
17	Municipal**														
18	Irrigation**														
19	<i>Commercial Total</i>	754	881	(127)	9,103	11,042	1,939	1.9	1,287	1,060	227	11,600	16,351	4,751	2.2
20	Industrial														
21	Compressed Air	58	22	36	700	210	(490)	1.2	71	41	30	811	398	(413)	0.9
23	EMIS														
22	Industrial Efficiencies	142	124	18	1,285	3,083	1,798	2.3	274	195	79	2,189	2,305	116	1.6
24	<i>Industrial Total</i>	200	147	53	1,985	3,294	1,309	2.3	345	236	109	3,000	2,703	(297)	1.5
25	Programs Total	1,977	2,264	(287)	19,489	27,268	7,779	-	3,023	2,920	103	25,305	28,358	3,053	-
26	Supporting Initiatives	-	-	-	-	-	-	-	141	141	0	-	-	-	-
27	Planning & Evaluation	378	419	(41)	-	-	-	-	503	402	101	-	-	-	-
28	Total	2,355	2,683	(328)	19,489	27,268	7,779	1.8	3,667	3,464	204	25,305	28,358	3,053	1.7

* these programs were included in Home Improvements program

** Water Treatment and Wastewater Handling infrastructure were part of Building and Process Improvement

Historical FortisBC DSM Costs and Energy Savings 2010

	1	2	3	4	5	6	7	
	2010 (Actual)							
	Spend (\$000s)			Energy Savings (MWh)			TRC	
	Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	
1	Residential							
2	Home Improvements	294	434	(140)	953	4,948	3,995	3.1
3	Building Envelope*							
4	Heat Pumps	624	749	(125)	6,377	3,239	(3,138)	1.2
5	Residential Lighting	243	278	(35)	2,383	2,589	206	2.4
6	New Home Program	254	247	7	1,392	477	(915)	1.1
7	Appliances*							
8	Electronics*							
9	Water Heating*							
10	Low Income*	100	131	(31)	1,000	385	615	0.7
11	Behavioural*							
12	<i>Residential Total</i>	1,515	1,838	(323)	12,105	11,638	764	1.9
13	Commercial							
14	Lighting	722	526	196	5,304	7,971	2,667	3.5
15	Building and Process Improvement	658	597	61	6,751	6,685	(67)	1.5
16	Computers							
17	Municipal**							
18	Irrigation**							
19	<i>Commercial Total</i>	1,380	1,123	257	12,055	14,655	2,600	2.1
20	Industrial							
21	Compressed Air	87	25	62	938	114	(823)	0.7
23	EMIS							
22	Industrial Efficiencies	302	216	86	2,412	2,853	441	2.1
24	<i>Industrial Total</i>	389	241	148	3,350	2,967	(383)	2.0
25	Programs Total	3,284	3,203	81	27,510	29,261	2,981	2.1
26	Supporting Initiatives	148	155	(7)	-	-	-	-
27	Planning & Evaluation	519	354	165	-	-	-	-
28	Total	3,951	3,712	239	27,510	29,261	2,981	2.0

* these programs were included in Home Improvements program

** Water Treatment and Wastewater Handling infrastructure were part of Building and Process Improvement

APPENDIX D CORRECTED WHOLESALE ACTIVITY 2009 AND 2010**2009 Wholesale Corrected Energy Savings**

Wholesale Activity	GWh	MW	% of GWh
Grand Forks	0.0	0.0	1%
Summerland	0.7	0.1	8%
Nelson	0.8	0.1	9%
Penticton	2.6	0.4	30%
Kelowna	4.7	0.9	53%
Total Savings (Wholesale)	8.8	1.6	100%

2010 Wholesale Corrected Energy Savings

Wholesale Activity	GWh	MW	% of GWh
Grand Forks	0.2	0.0	2%
Summerland	0.9	0.1	13%
Nelson	0.8	0.1	11%
Penticton	3.6	0.5	51%
Kelowna	1.6	0.2	23%
Total Savings (Wholesale)	7.0	1.0	100%

**APPENDIX E EXECUTIVE SUMMARY OF COMMERCIAL RETROFIT BUILDING
IMPROVEMENT PROGRAM MONITORING AND EVALUATION REPORT**

SAMPSON RESEARCH

Consulting Project

POWERSENSE COMMERCIAL RETROFIT BUILDING IMPROVEMENT PROGRAM EVALUATION

FINAL REPORT

Prepared for:

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

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February 29, 2012

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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 and impact evaluation of the PowerSense Retrofit Commercial Building Improvements Program (Retro BIP) for the 2008-10 period. During this time, the program processed 94 applications and spent \$303,514 in rebates. Energy and demand savings for the period totalled 6.944 GW.h and 1.1 MW respectively. The evaluation was conducted between November 2011 and January 2012.

1.2 Evaluation Objectives and Methodology

The evaluation included process, market, and impact components. Information and data were collected from program tracking records and documentation, a participant survey, participant on-site visits, interviews with program management and program delivery staff, and a desk review of randomly selected program records. Energy and demand savings were assessed for each site visit participant. Estimates of program free ridership and spillover were derived and used to develop a net-to-gross (NTG) estimate of program savings.

1.3 Summary of Evaluation Findings

Summary comments are provided on the participant perspectives (survey), review of program documents, program operations, site visits, and program savings.

1.3.1 Document Review

Documentation of Retro BIP participants needs improvement. While the participant records requested for evaluation (survey, site visits, document review) were made available, the contents of these files varied considerably in terms of project details and key assumptions supporting program savings claims. The evaluators acknowledge that many Retro BIP projects are relatively small from an energy savings perspective. However, a minimum level of documentation is required to ensure program accountability and oversight. Billing histories for the site visit participants were successfully extracted although some files were missing customer account numbers which necessitated considerable effort by FortisBC staff to cross reference and correctly identify the appropriate billing records.¹

1.3.2 Program Operations

Commercial and institutional customers of FortisBC are not required to complete an application form to participate in the Retro BIP program. No additional terms or conditions are placed on Retro BIP participants beyond those indicated as part of FortisBC's Electric Tariff.²

¹ Billing records for wholesale customers are maintained by the municipal utilities. Copies of these records were requested and obtained via FortisBC staff.

² Additional detail available through Schedule 90 - Energy Management Service, Terms and Conditions, Electric Tariff, B.C.U.C. No. 1, Sheet 73.

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A general move to improving access and standardizing the data captured electronically was underway at the time of the evaluation. Shared (common) computer hard drives are being used to improve access to tracking reports and other information by program staff. Support personnel have been added which is enabling this move to standardized electronic data capture, storage and access.

1.3.3 Barriers to Participation

Barriers to program participation highlighted through staff interviews and inferred from results of the participant survey include the lack of readily accessible information on the program (particularly via the FortisBC website), the general economic climate, and the high turnover of contacts (building and property managers) within the commercial building sector. Occasional delays in cheque processing appear to have been addressed.

1.3.4 Program Baselines

The list of technologies eligible for Retro BIP is broad. It includes HVAC technologies, brine pumps, solar DWH, controls, refrigeration, high efficiency motors, variable speed drives, and building envelope. During the 2008-10 evaluation window, the program also provided rebates for several “one-off” projects including computer monitors and server upgrades, personal electric heaters, a dip tank process, high efficiency welders, a steam-on-demand sauna, and a cable-pull elevator.

Like many commercial retrofit programs, the baseline technology for calculating energy and demand savings is the equipment being replaced. Several projects rebated equipment that was very expensive compared to the energy savings. In these cases the baseline should be current practice, not the existing equipment.

1.3.5 Participant Survey

Highlights from the participant survey include:

- The overwhelming majority (96%) of participants indicated they had installed the measures that had received an incentive from FortisBC. Only one survey respondent indicated that some of them were not installed.
- The three most frequently mentioned sources of awareness about the program were a FortisBC representative (33% of all mentions), an equipment manufacturer’s representative (30%), and FortisBC marketing materials (19%).
- The primary reasons why energy efficient measures were installed were to save energy and to save money (56% and 52% of responses respectively).
- Participants were most satisfied with communications with FortisBC staff (87% satisfied), and least satisfied with information available on the FortisBC Retro BIP program (44% satisfied).
- Overall, 88% of Retro BIP participants surveyed indicated they were satisfied with the program, 4% were neither satisfied or unsatisfied, and 8% were dissatisfied.

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1.3.6 Site Visits

Gross energy and demand savings for the program were evaluated based on walk-through site visits conducted with a sample of participant facilities (n=11) by a LEED accredited engineer. The site visits addressed issues of measure installation and persistence, building schedules / control schemes / hours-of-operation, equipment specifications (HVAC, lighting, motors), and structure or equipment changes in the post-program participation period that would affect energy savings. On-site observations were used to inform an analysis of savings using weather-normalized pre- and post-retrofit billing histories.

The site visits confirmed that rebated measures had been installed and were operating. Evaluated gross savings, however, were found to be two-thirds of that claimed by the program. Seven of the eleven sites were found to be saving less energy than program estimates, three matched program records, and two were found to be saving more than claimed. The reduction in gross savings is primarily due to discrepancies in program assumptions and observed on-site hours of operation, motor loadings and efficiencies, and baseline loads. Program documentation was found to be incomplete for some projects, limiting the engineer's ability to assess the nature of the discrepancy between program-claimed savings and those calculated using on-site information.

1.4 Evaluated Program Savings

Gross energy and demand savings were adjusted by the findings from the site visits, and then for estimates of free riders and spillover.

1.4.1 Free Riders and Spillover

Program attribution in the form of free ridership and program spillover was evaluated using a probabilistic determination methodology applied to participant survey responses. Free riders were found to represent 30% of program energy savings, and spillover was estimated at 12%. A survey of published research for comparable commercial retrofit programs found free ridership to vary from 8% to 43%. Spillover is less frequently measured in evaluation literature due to the inherent difficulties in its estimation.

1.4.2 Energy and Demand Savings

Evaluated energy and demand savings for the 2008-10 Retro BIP program are provided in Exhibit 1. After adjustments to gross savings, free riders and spillover, evaluated energy savings are equivalent to 44% of gross energy savings, and 55% of gross demand savings.

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Exhibit 1: Net Program Savings (Run Rates) FortisBC Retro BIP Program: 2008-10

	GW.h/yr Run Rate	MW Run Rate
Gross Program Savings	6.944	1.084
Unrealized Savings *	2.361	0.358
Adjusted Gross Savings	4.583	0.726
Free Riders (30%)	-1.375	-0.218
Spillover (12%)	0.550	0.087
Net Program Savings	3.025	0.595
Net Savings (%)	44%	55%

* Energy Savings * (1 – 0.66), Demand Savings * (1 - 0.67)

Totals may not sum due to rounding

1.5 Recommendations

The following recommendations are organized under program design and targeting, program operations, monitoring, tracking and verification of program savings, and program evaluation.

1.5.1 Program Design and Targeting

- Review project and technology eligibility criteria** - The scope of projects and technologies eligible for Retro BIP incentives is too broad to effectively ensure the delivery of cost-effective energy and demand savings. FortisBC should review its list of technologies and projects eligible for program assistance to manage both free ridership and the risk associated with incentivising projects where local expertise to evaluate the legitimacy of the savings estimates is lacking.
- Minimize claims of un-incentivized energy savings** - A large part of the success of program designs like the Retro BIP program stem from the advice and interventions of its technical advisors. The evaluation identified several situations where energy savings were claimed by the program but incentives were not paid because the projects had paybacks of less than two years prior to incentivising. Given the difficulty in evaluating the legitimacy of these claims in an ex-post context, the practice of claiming savings without incentive payout should be discouraged. Any future claims to energy savings when rebates are not issued need to be fully documented to validate the legitimacy of the savings claims.

1.5.2 Monitoring, Tracking, and Verification of Program Savings

- Improve the comprehensiveness and consistency of documentation of Retro BIP participants** - It is recommended that documentation on Retro BIP participants include:
 - Customer identification, including account number
 - Written description of the project including, where possible, the type of building, floor area (ft²) affected by the retrofit, specifics of equipment installed and replaced, and any other information that would impact the energy consumption or savings
 - An estimate of the pre-retrofit kWh consumption (where feasible), preferably as a printout of monthly data going back 2-3 years

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- Payment request form
 - A clear description of how savings were calculated, including copies of applicable savings calculations, third party reports, and spreadsheet printouts
 - Dates and sources of information and assumptions
4. **Improve the accuracy of Retro BIP savings estimates** - Consistent with the variety of projects, building types, and building sizes represented in the Retro BIP program, there is a wide variety of savings calculations used, from consultants' reports to simple subtraction of loads. While it is difficult to estimate savings for many of these projects without the luxury of a thorough audit and detailed calculations, the accuracy of savings estimates for the Retro BIP program can be improved by:
- *Comparing savings to existing consumption* – In particular, it is difficult to achieve savings in excess of 30% in a building and individual measures will rarely save more than 20% of consumption. While there will always be exceptions, comparing the estimated savings to the consumption will usually help avoid significant overestimation of savings.
 - *Comparing hours to bills* - If demand is billed, annual load factor for a building can be determined by dividing consumption by peak demand. Although hours of use for individual systems will vary, the building load factor can help guide the choice of operating hours in savings calculations. A list of typical operating hours for different types of buildings could also be prepared.
 - *Considering load factor* - Many calculations did not consider existing load factor or motor efficiency when converting hp into kW. Most motors are not fully loaded, with constant duty motors typically operating in the 80% range. Motor efficiency should also be considered (nominally 90% if not known).
 - *Heating/cooling savings* - These calculations were usually done with a standard spreadsheet. Although this sometimes was based on the correct type of building, in most cases it was for office space. The spreadsheet should be updated with more appropriate building types.
5. **Apply greater scrutiny to the choice of baseline used to estimate savings** – It is generally accepted in commercial retrofit programs that baseline is usually the equipment that is being replaced. However, quite a few Retro BIP projects were for equipment that was very expensive compared to the energy savings. In these cases the baseline should be current practice, not the existing equipment.
6. **Review the procedures used to set the parameters for depreciation, comfort, and process improvements.** The evaluation found several cases where the project cost was decreased by an allowance for depreciation, comfort, and process improvement of more than 50%. These assessments are extremely subjective and appear to have been done to meet TRC requirements. Arguably, cases where the cost is reduced by more than 50% suggest that energy savings did not play a significant role in the decision to replace, and the baseline energy use and equipment cost should be based on current practice not what was replaced.
7. **An estimate of free ridership should be mandatory** - Provisions for free riders should be mandatory for all new PowerSense business cases. Free rider estimates should be periodically reviewed and updated. In the case of future Retro BIP program business cases, a net-to-gross ratio of 75% is reasonable and within industry norms.

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Program Evaluation

8. FortisBC should continue program market and impact evaluations at regular intervals (e.g., every three years) and allocate sufficient resources for completing these evaluations.

* * * * *