Diane Roy
Director, Regulatory Affairs - Gas
FortisBC Energy Inc.

16705 Fraser Highway
Surrey, B.C. V4N 0E8
Tel: (604) 576-7349
Cell: (604) 908-2790
Fax: (604) 576-7074
Email: diane.roy@fortisbc.com
www.fortisbc.com

Regulatory Affairs Correspondence
Email: gas.regulatory.affairs@fortisbc.com

November 7, 2011

British Columbia Utilities Commission
Sixth Floor
900 Howe Street
Vancouver, B.C.
V6Z 2N3

Attention: Ms. Alanna Gillis, Acting Commission Secretary

Dear Ms. Gillis:

Re: FortisBC Energy Utilities[1] ("FEU") 2012 and 2013 Revenue Requirements and Natural Gas Rates Application

Response to the British Columbia Utilities Commission ("BCUC" or the "Commission") Information Request ("IR") No. 3

On May 4, 2011, the FEU filed the Application as referenced above. In accordance with the Regulatory Timetable, the FEU respectfully submit the attached response to BCUC IR No. 3.

Please note that Attachment 4.1 in response to BCUC IR 3.4.1 is provided separately on a Confidential basis to the Commission only as it contains EEC Excel working financial models which are proprietary to the FEU on behalf of customers. These models are based upon the considerable time, effort and expense of both internal resources and external contract resources which have been invested in the development of these financial models on behalf of all rate-paying customers. The Companies are concerned that public disclosure and availability could allow others to use or adapt these complex models freely, at the expense of the FEU's customers.

If there are any questions regarding the attached, please contact the undersigned.

Yours very truly,

on behalf of the FORTISBC ENERGY UTILITIES

Original signed:

Diane Roy

Attachment

cc (e-mail only): Registered Parties

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[1] Comprised of FortisBC Energy Inc. ("FEI"), FortisBC Energy Inc. Fort Nelson Service Area ("Fort Nelson"), FortisBC Energy (Whistler) Inc. ("FEW"), and FortisBC Energy (Vancouver Island) Inc. ("FEVI")

1.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 1

EEC Program Profiles

"Drawing on a combination of previous FortisBC EEC market experience, relevant technology and market studies, and, in some cases, professional estimates, FortisBC EEC managers completed Profiles for each program within their portfolio. These individual Profiles are included in the body of this report."

1.1 Each of the Program Profiles includes a forecast of Participants and Expenditures for 2012 and 2013. Did each of the EEC managers complete these forecasts for 2012 and 2013 for each program within their portfolio?

Response:

Yes, each of the FortisBC Program Managers completed the forecast for 2012 and 2013 for each program within their respective portfolios.

1.2 Please list all new programs in the 2012-2013 EEC Plan (i.e. programs that did not run in 2010 or were not forecast for 2011 in the 2010 EEC Annual Report).

Response:

The following programs are new in the 2012-2013 EEC Plan:

Residential Sector Programs

- ENERGY STAR® Domestic Hot Water "DHW" Technologies
    - Condensing Water Heaters
    - Tankless Water Heaters
- ENERGY STAR® Washers and Other Measures for DHW Conservation
- Customer Engagement Tool for Conservation Behaviours

- New Construction – EnerGuide for Homes (80 & beyond) Efficient Appliances

Commercial Sector Programs

- Commercial Custom Design Program
- Continuous Optimization Program
- Commercial Kitchens Program
- MURB Program
- Process Heat Program

Industrial Sector Programs

- Industrial Technology Retrofit Program - Lime Kiln Chain System Upgrade Program

Conservation Education and Outreach Programs

- Residential Mass Education on Conservation and Energy Literacy
- Medium-Large Commercial Education Sessions
- Home Efficiency Measures
- Behaviour Programs – Energy Specialists
- School Programs: Class and Online Curriculum

1.2.1 For all new programs, including Tankless Water Heaters, Condensing Water Heaters, ENERGY STAR Dishwashers, and Customer Engagement Tool for Conservation Behaviours, please complete the following table:

Program Name	*Example: Condensing Water Heaters*
Energy Savings per Installation (Average Annual Energy Savings per Measure) (GJ):	*5 GJ*

Energy Savings Determination Methodology	1. Give a description of the baseline and efficient technologies, their assumed efficiencies, and the data source used to derive their efficiencies. For retrofit measures, give the efficiencies and data sources of the existing unit, the efficient unit, and the standard unit. 2. Give any algorithms or engineering analyses used to determine savings. 3. List the data and sources of data (e.g. DEER, ASHRAE etc.) reviewed to determine the savings per installation. 4. List the range of savings considered. 5. List any assumptions made in choosing the energy savings per measure. 6. Provide the energy savings per installation used by other utilities including Enbridge Gas, Union Gas, BC Hydro and Manitoba Hydro (where applicable) and any other applicable utilities. 7. Provide any impact evaluations or measurement and verification studies completed by FEU on this program. 8. If a code or standard is in place for the measure, provide the calculation showing how the proposed energy savings per measure was determined.
Measure Lifetime (years)	*13*
Measure Lifetime Determination Methodology	1. List the data and sources of data reviewed to determine the measure lifetime. 2. List the range of measure lifetimes considered. 3. List any assumptions made in choosing the measure lifetime. 4. Provide the measure lifetime used by other utilities including Enbridge Gas, Union Gas, BC Hydro and Manitoba Hydro (where applicable) and any other applicable utilities.
Incremental Cost ($)	*$1,650*
Incremental Cost Determination Methodology	1. List the data and sources of data reviewed to determine the incremental cost. For retrofit measures, give the full installed cost (including labor) of both the standard unit and the efficient unit. 2. List the range of incremental costs considered. 3. List any assumptions made in choosing the incremental cost. 4. Provide the incremental cost used by other utilities including Enbridge Gas, Union Gas, BC Hydro and Manitoba Hydro (where applicable) and any other applicable utilities.

Incentive Amount	*$500 + $50 SPIF*
Incentive Amount Determination Methodology	1. List the methodology used to determine the incentive amount. 2. Provide reference to any process or other evaluation studies that have informed the determination methodology or the incentive amount. 3. List the incentive amounts offered by other utilities, including Enbridge Gas, Union Gas, Manitoba Hydro (where applicable) and any other applicable utilities.

Response:

The requested tables have been completed for all new programs in the Residential, Commercial and Industrial Sector. Due to the nature of the Education and Outreach programs, energy savings, measure lifetime, incremental costs, and incentive amount is not available.

Residential Program Sector:

The following table outlines the 2012 – 2013 Residential Area programs, their status, and a reference to the source of inputs for Cost Benefit Analysis if required. All the programs for which energy savings were claimed are either outlined in BCUC IR2.97.1 or are contained as new programs in tables that follow. All programs outlined in the 2012 -2013 EEC Plan are listed in the following chart.

Summary of Residential Programs Outlined in 2012 - 2013 EEC Report, their Status, and Source of Assumptions for Cost Benefit Analysis

2012 - 2013 Program	Status	Assumptions for Cost Benefit Analysis
ENERGY STAR Domestic Hot Water "DHW" technologies	Awaiting approval of 2012 - 2013 EEC Plan with expectations of launch in 2012 - Q1	Refer to 1.2.1
EnerChoice Fireplace Program	Ongoing	Refer to BCUC IR2.97.1 -Program 1.1
Give your Furnace / Fireplace Some TLC" Service Campaign	Awaiting approval of 2012 - 2013 EEC Plan with expectations of launch in 2012 - Q2	No energy savings claimed
Energy Efficiency Home Retrofit Programs - LiveSmart BC	Ongoing	Refer to BCUC IR2.97.1 -Program 1.4
Utility Partners Home Energy Efficiency Portal	Awaiting approval of 2012 - 2013 EEC Plan with expectations of launch in 2012 - Q1	No energy savings claimed
ENERGY STAR Washers and Other Measures for DHW conservation	Washers - Ongoing	Refer to BCUC IR2.97.1 -Program 1.3
	Dishwashers - Possible consideration in 2013 based on new regs	2010 CPR suggests TRC of 0.3. Therefore no further analysis has been conducted to date.
	Low Flow Fixtures - Collaborations with municpalities as outlined in Conservation, Education and Outreach. More research to be conducted.	More research required
Customer Engagement Tool for Conservation Behaviours	Awaiting approval of 2012 - 2013 EEC Plan with expectations of launch in 2012 - Q4	Refer to 1.2.1 for preliminary results. More research will be conducted in due diligence process.
New Construction - EnerGuide80 & Energy Efficient Appliances	Awaiting approval of 2012 - 2013 EEC Plan with expectations of launch in 2012 - Q1	Refer to 1.2.1
Efficiency Partners Program	Ongoing	No energy savings claimed

New programs that will be launched in 2012-2013 and for which a table follows in BCUCIR3.1.2.1 include the following:

- ENERGY STAR Domestic Hot Water "DHW" Tanks and Tankless Technologies
- Customer Engagement Tool for Conservation Behaviours
- New Construction - EnerGuide80

Table 1: New Residential Program Information

Residential Program 1.1	**ENERGY STAR Efficient Storage Tank Water Heaters**
Energy Savings per Installation (Average Annual Energy Savings per Measure) (GJ)	• ENERGY STAR storage tank (0.67 EF) – 3.0 GJs / year • Condensing storage tank (0.80 EF)- 5.0 GJs / year
Energy Savings Determination Methodology	1. Measure Description: a.) Baseline technology: Natural draft gas storage tank with a 0.59 Energy Factor. b.) Efficient technology: ENERGY STAR natural gas storage tank with a 0.67 Energy Factor or greater, or a condensing gas storage tank with an Energy Factor of 0.80 or greater. c.) Standard technology: The same as baseline technology. 2&3. Data Sources/Engineering analysis. a.) 2011 ACEEE Emerging Hot Water Technologies. - ENERGY STAR storage tank (0.67 EF) 2.85 GJs/year - Condensing storage tank (0.80 EF): 9.91 GJs/year b.) Habart Water Heater Market Transformation 2010. - Power vent gas storage tank (0.67 EF): 3.4 GJs/year - Condensing power vent storage tank(0.77 EF): 4.9 GJs/year c.) Caneta Research Inc. Canadian Residential Water Heater Market Assessment 2009. - 0.58 EF natural gas hot water heaters consume 29.15 GJs/year1, in comparison to 25.23 GJs/year per 0.67 EF ENERGY STAR natural gas water heaters resulting in 3.92 GJs in savings. - 0.58 EF natural gas hot water heaters consume 29.15 GJs/year, in comparison to 21.13 GJs/year per 0.80 EF

[1] Canadian Residential Water Heater Market Assessment 2009, prepared by Caneta Research Inc for MEMPR. Table 21: Natural Gas Fired Hot Water Heater Benchmark Analysis.

Residential Program 1.1	**ENERGY STAR Efficient Storage Tank Water Heaters**
	condensing gas storage tank resulting in 8.02 GJs in savings. 4. Range Considered: - ENERGY STAR storage tank: 2.85 GJs - 3.4 GJs - Condensing storage tank: 4.9 GJs – 9.91 GJs 5. Assumptions: FEU will assume applicants are replacing a 0.59EF natural draft gas water tank with an ENERGY STAR gas storage tank (0.67EF) or a condensing gas storage tank with an Energy Factor of 0.80 or greater. 6. Utility energy saving claims: a.) Black Hills Energy Iowa: - ENERGY STAR storage tank: 2.37 GJs/year - Condensing storage tank: 5.14 GJs/year b.) Xcel Energy Colorado: - ENERGY STAR storage tank: 2.81 GJs/year - Condensing storage tank: Data not available. c.) Berkshire Gas Company Massachusetts - ENERGY STAR storage tank: Data not available - Condensing storage tank: 7.8 GJs/year d.) Northeast Energy Efficiency Project (NEEP) Mid Atlantic US - ENERGY STAR storage tank: 1.48 GJs/year - Condensing storage tank: 6.22 GJs/year 7. Impact Evaluations: Currently, the FEU are conducting a pilot research study to validate energy savings claims for Hot Water technologies (0.80 EF or greater) as part of a market transformation strategy and are considering using similar protocols to conduct impact evaluation in 2012 for the ENERGY STAR 0.67 EF storage tank water heaters. 8. Codes and standards: BC Energy Efficiency Act Standards MEMPR information bulletin 09-05 RE: 0.62 EF minimum.
Measure Lifetime	• ENERGY STAR storage tank (0.67EF): 13 years • Condensing storage tank water heater (0.80 EF): 13 years
Measure Lifetime Determination Methodology	1. Data Sources: a.) ACEEE Emerging Hot Water Technologies 2011. - ENERGY STAR storage tank (0.67 EF): 13 years

Residential Program 1.1	**ENERGY STAR Efficient Storage Tank Water Heaters**
	- Condensing storage tank (0.80 EF): 13 years b.) Habart Water Heater Market Transformation 2010 study. - Power vent gas storage tank (0.67 EF): 13 years - Power vent condensing storage tank (0.77 EF): 13 years 2. Range considered: - ENERGY STAR Storage Tank (0.67 EF): 10-13 years - Condensing Storage Tank Water Heater (0.80 EF): 10-13 years 3. Assumptions: Based on water heater age profile in 2008 REUS study and feedback from manufacturers. Furthermore, the 2010 program participant average age of replaced standard efficient water heaters was 14 years. 4. Utility measure life claims: a.) Black Hills Energy Iowa: - ENERGY STAR storage tank (0.67EF): 13 years - Condensing storage tank (0.80EF): 13 years b.) Xcel Energy Colorado: - ENERGY STAR storage tanks (0.67 EF): 15 years - Condensing storage tanks: Data not available c.) Berkshire Gas Company Massachusetts - ENERGY STAR storage tanks (0.67 EF): Data not available Condensing storage tanks (94% thermal efficiency): 15 years d.) Northeast Energy Efficiency Project (NEEP) Mid Atlantic US - ENERGY STAR storage tanks (0.67 EF): 13 years - Condensing storage tanks (0.80 EF): 13 years
Incremental Cost ($)	• ENERGY STAR storage tank (0.67EF): $200 • Condensing storage tank (0.80 EF): $1,650
Incremental Cost Determination Methodology	1. Data Sources: a.) ACEEE Emerging Hot Water Technologies 2011. - ENERGY STAR storage tank (0.67 EF): $462.00 - Condensing storage tank (0.77 EF): $ 1,305.00 b.) Habart Water Heater Market Transformation 2010 study. - Power vent storage tank (0.67 EF): $385.00 - Condensing power vent storage tank (0.77 EF): $1,650.00

Residential Program 1.1	**ENERGY STAR Efficient Storage Tank Water Heaters**
	2. Range considered: - ENERGY STAR storage tank (0.67 EF): $150 - $462 - Condensing storage tank (.80 EF): $1,305 - $7,000 3. Assumptions: Based on discussions and research with trades and manufacturers 4. Utility incremental cost claims: a. Black Hills Energy Iowa: - ENERGY STAR storage tanks (0.67 EF): $400.00 - Condensing storage tanks (0.80 EF): $535.00 b. Xcel Energy Colorado: - ENERGY STAR storage tanks (0.67 EF): $230.00 - Condensing storage tanks: Data not available c. Berkshire Gas Company Massachusetts - ENERGY STAR storage tanks (0.67 EF): Data not available - Condensing storage tanks (94% thermal efficiency: $685.00 d. Northeast Energy Efficiency Project (NEEP) Mid Atlantic US - ENERGY STAR storage tanks (0.67 EF): $175 - Condensing storage tanks (0.80 EF): $1,150
Incentive Amount	• ENERGY STAR Storage Tank (0.67EF): $100 + $50 SPIFF • Condensing Storage Tank Water Heater: $500 + $50 SPIFF
Incentive Amount Determination Methodology	1. Methodology: - ENERGY STAR storage tank (0.67EF): FEU will provide a $100 consumer incentive to cover half of the incremental cost to upgrade from a standard water heater to an ENERGY STAR storage tank (0.67EF); furthermore, FEU will provide a $50 SPIFF to the retailer to ensure retailers are promoting the program on our behalf. - Condensing storage tank (.08EF): The incremental cost of a condensing storage tank reported by the ACEEE does not reflect the incremental costs FEU consumers are seeing at the retailer. The incremental cost can range between $1,350 as reported by ACEEE and upwards of $7,000 as per FEU's High Efficiency Water Heater Pilot program applicant quotes. To promote high efficiency water heater technologies and to encourage retailers to educate their customers about condensing technology, FEU will offer a $500 consumer incentive and a $50 SPIFF to the retailer.

Residential Program 1.1	**ENERGY STAR Efficient Storage Tank Water Heaters**
	2. Data sources: - ESource query and discussions with grades and utilities. 3. Utility incentives: a. Black Hills Energy Iowa: - ENERGY STAR storage tanks (0.67 EF): $75 - Condensing storage tanks (0.80 EF): $300 b. Xcel Energy Colorado: - ENERGY STAR storage tanks (0.67 EF): $90 - Condensing storage tanks: Program not available. c. Berkshire Gas Company Massachusetts - ENERGY STAR storage tanks (0.67 EF): $100 - Condensing storage tanks (94% Thermal efficiency): $500

Residential Program (1.2)	**Tankless Water Heaters**
Energy Savings per Installation(Average Annual Energy Savings per Measure) (GJ)	• Tankless non-condensing (≥ 0.82 EF): 6.5 GJs / year • Tankless condensing (≥ 0.90 EF): 6.5 GJs / year • Hybrid technology (≥ 0.90 EF): 6.5 GJs / year
Energy Savings Determination Methodology	1. Measure Description: a.) Baseline technology: Natural draft gas storage tank with a 0.59 Energy Factor. b.) Efficient technology: tankless non-condensing with an Energy Factor ≥0.82, a tankless condensing with an Energy Factor ≥0.90, or a hybrid technology (tankless with a small storage tank) with an Energy Factor ≥ 0.90. c.) Standard technology: The same as baseline technology. 2.& 3. Data Sources/Engineering analysis. a.) ACEEE Emerging Hot Water Technologies 2011. - Tankless non-condensing (0.82 EF): Data not available - Tankless condensing (0.92 EF): 9.07 GJs/year - Hybrid non-condensing: 4.22 GJs/year - Hybrid condensing: 6.86 GJs/year b.) Habart Water Heater Market Transformation 2010. - Tankless non- condensing (0.82 EF): 6.1 GJs / year - Tankless condensing (0.90 EF): 7.1 GJs / year - Hybrid technology: Data not available c.) Caneta Research Inc. Canadian Residential Water Heater Market

Residential Program (1.2)	Tankless Water Heaters
	Assessment 2009. - Tankless non-condensing: 0.58 EF natural gas water heaters consume 29.15 GJs/year, in comparison to 20.62 GJs/year per 0.82EF non-condensing tankless water heater resulting in 8.53 GJs in savings. - Tankless condensing: Data not available. - Hybrid technology: Data not available. 4. Range considered: - Tankless non-condensing (≥0.82 EF): 5.85 GJs – 8.53 GJs / year - Tankless condensing (≥0.90 EF): 7.1 GJs – 9.08 GJs / year - Hybrid technology: 4.2 GJs – 6.86 GJs / year 5. Assumptions - FEU will assume applicants are replacing a 0.59 EF natural draft gas water tank with a tankless non-condensing ≥0.82 EF, a tankless condensing ≥ 0.90 EF, or a hybrid technology water heater ≥ 0.90 EF. 6. Utility energy saving claims: a.) Black Hills Energy Iowa: - Tankless non-condensing (0.82 EF): 5.85 GJs / year - Tankless condensing (0.90 EF): Data not available b.) Xcel Energy Colorado: - Tankless non-condensing (0.82EF): 6.24 GJs / year - Tankless condensing (0.90 EF): Data not available d.) Berkshire Gas Company Massachusetts - Tankless non-condensing (0.82 EF): 8.23 GJs / year - Tankless condensing (0.90 EF): Data not available e.) Northeast Energy Efficiency Project (NEEP) Mid Atlantic US - Tankless non-condensing (0.82 EF): 6.65 GJs / year - Tankless condensing (0.90 EF): Data not available Canadian data is not available at this time. Please refer to question seven for an overview of the research currently being completed by Canadian gas utilities in partnership with Natural Resources Canada and the Canadian Gas Association. At this time FEU does not have utility energy savings data for hybrid technology water heaters. 7. Impact Evaluations: FortisBC Energy Inc., along with Enbridge, Union Gas, Gaz Metro,

Residential Program (1.2)	Tankless Water Heaters
	Sask. Energy, are currently evaluating the installation, performance and customer acceptance related to high efficiency residential natural gas water heaters through the High Efficiency Water Heater Pilot Program in partnership with Natural Resources Canada and the Canadian Gas Association. 8. Code and standards: Natural Resources Canada proposal to amend Canada's Energy Efficiency Regulations for gas and oil water heaters as per the *"Higher Efficiency Requirements for Water Heaters Bulletin on Developing and Amending Standards June 2010*." The proposed amendment will require all natural gas domestic hot water systems manufactured as early as 2016 to meet a minimum 0.80 Energy Factor (EF) rating. Personal communications with NRCan suggests the amendment will be revised to introduce 0.80 minimum efficiency standards for natural gas domestic hot water systems by 2020.
Measure Lifetime	Tankless & Hybrid Technologies: 20 years
Measure Lifetime Determination Methodology	1. Data Sources: a.) Habart Water Heater Market Transformation 2010 - Tankless non-condensing (0.80 EF): 25 years - Tankless condensing (0.90 EF): 25 years - Hybrid technology: Data not available b.) ACEEE Emerging Hot Water Technologies 2011 - Tankless non-condensing (0.80 EF): Data not available - Tankless condensing (0.90 EF): 20 years - Hybrid technology: 16.5 years 2. Range considered - Tankless non- condensing (0.82 EF): 20 -25 years - Tankless condensing (0.90 EF): 20- 25 years - Hybrid technology: 16.5 years 3. Assumptions: 20 years is the most common assumption for tankless and hybrid water heater technologies. 4. Utility measure life claims: a.) Black Hills Energy Iowa: - Tankless non-condensing (0.80 EF): 20 years - Tankless condensing (0.90 EF): Data not available b.) Xcel Energy Colorado: - Tankless non-condensing (0.80 EF): 15 years

Residential Program (1.2)	Tankless Water Heaters
	- Tankless condensing (0.90 EF): Data not available c.) Berkshire Gas Company Massachusetts: - Tankless non-condensing (0.80 EF): 20 years - Tankless condensing (0.90 EF): Data not available d.) Northeast Energy Efficiency Project (NEEP): - Tankless non-condensing (0.80 EF): 13 years - Tankless condensing (0.90 EF): Data not available At this time we do not have utility measure life data for hybrid technology water heaters.
Incremental Cost ($)	Tankless & Hybrid Technology: $1,800
Incremental Cost Determination Methodology	1. Data Sources: a.) ACEEE Emerging Hot Water Technologies 2011 - Tankless non-condensing (0.80 EF): $1,988.00 - Tankless condensing (0.90 EF): Data not available - Hybrid non-condensing: $759 - Hybrid condensing: $1,291 b.) Habart Water Heater Market Transformation 2010 - Tankless non-condensing (0.80 EF): $2,676.00 - Tankless condensing (0.90 EF): $3,006.00 - Hybrid technology: Data not available 2. Range Considered: - Tankless non-condensing (0.80 EF): $1,988 - $2,676 - Tankless condensing (0.90 EF): $3,006 - Hybrid technology: $1,291 3. Assumptions: Incremental cost based on installed cost less $1,000 as base price for standard water heater. 4. Utility incremental cost claims: a.) Black Hills Energy Iowa: - Tankless non-condensing (0.80 EF): $685.00 - Tankless condensing (0.90 EF): Data not available b.) Xcel Energy Colorado: - Tankless non-condensing (0.80 EF): $750.00 - Tankless condensing (0.90 EF): Data not available c.) Berkshire Gas Company Massachusetts: - Tankless non-condensing (0.80 EF): $1,120.00 - Tankless condensing (0.90 EF): Data not available d.) Northeast Energy Efficiency Project (NEEP):

Residential Program (1.2)	**Tankless Water Heaters**
	- Tankless non-condensing (0.80 EF): $750.00 - Tankless condensing (0.90 EF): Data not available At this time FEU does not have utility incremental cost data for hybrid technology water heaters.
Incentive Amount	Tankless & Hybrid Technology: $500 + $50 SPIF
Incentive Amount Determination Methodology	1. Methodology: - The incentive is less than 50% of incremental cost however the FEU believe that a $500 incentive is enough to drive purchase behavior to new technologies. 2. Data sources: - ESource query and discussions with trades. 3. Utility incentives: a.) Black Hills Energy Iowa: - Tankless non-condensing (0.82 EF): $300 - Tankless condensing (0.90 EF): $300 b.) Xcel Energy Colorado: - Tankless non-condensing (0.82 EF): $50 - Tankless condensing (0.90 EF): $50 c.) Berkshire Gas Company Massachusetts: - Tankless non-condensing (0.82 EF): $500 - Tankless condensing (0.95 EF): $900 At this time we do not have utility incentive data for hybrid technology water heaters.

Residential Program (1.3)	**Customer Engagement Tool for Conservation Behaviour**
Energy Savings per Installation Average Annual Energy Savings per Measure (GJ)	Average annual energy savings per gas-only household is estimated at 1.0 GJ.(to be confirmed with further analysis)
Energy Savings Determination Methodology	1. Measure Description: a. Home energy usage reports that include peer comparison feedback, targeted energy savings tips and incentives to engage customers in energy efficiency and conservation behaviour. b. Baseline – no reports Data sources a. Behavior and Energy Savings (EDF, May 2011) b. Evidence from Two Large Field Experiments That Peer

Residential Program (1.3)	Customer Engagement Tool for Conservation Behaviour
	Comparison Feedback Can Reduce Residential Energy Usage (Ayers, Sept 2009) c. Measurement and Verification Principles for Behavior-Based Efficiency Programs (The Brattle Group, May 2011) d. PSE's Home Energy Reports Program 20 Month Impact Evaluation (Kema, Oct 2010) 2. Range of savings considered: a. Annual 0.9% - 1.2% (gas savings only) 3. Assumptions in choosing the energy savings per measure: a. Annual savings b. Participants receive min. 4 paper-based home energy reports per year 4. Energy savings per installation used by other utilities: Annually a. 1.00% (NW Natural – gas) b. 1.17% (Puget Sound Energy – gas, 1st year) c. 2.00% (Portland General Electric – electricity) d. 2.07% (Connexus – electricity) 5. Impact evaluations or measurement and verification studies completed by FEU on this program: None 6. N/a
Measure Lifetime (years)	2 years reported in 2012 – 2013 EEC plan will be reduced to 1 year in formal business case
Measure Lifetime Determination Methodology	1. Data and sources of data reviewed to determine measure lifetime: a. Conversation with Bobette Wilhelm, Program Evaluation, Puget Sound Energy (Sept 2011) b. OPower 2. Range of measure lifetimes considered: a. 1 – 2 years. 3. Assumptions in choosing measure lifetime: a. Energy savings behavior modification lasts about one year 4. Measure lifetime used by other utilities: 1 year (Puget Sound Energy)
Incremental Cost ($)	$8 - $10 per participant / year depending on number of mailings $1 per participant / year for online access Note: TBC
Incremental Cost Determination Methodology	Still under evaluation
Incentive Amount	n/a

Residential Program (1.3)	**Customer Engagement Tool for Conservation Behaviour**
Incentive Amount Determination Methodology	n/a

Residential Program (1.4)	**EnerGuide 80 New Construction Program**
Energy Savings per Installation(Average Annual Energy Savings per Measure) (GJ)	EG80 Single Family Dwelling – Lower Mainland, Mid Sized – 24.6 GJ EG80 Townhome – Mid Unit – Lower Mainland, Mid Sized – 2.6 GJ EG80 Townhome End Unit – Lower Mainland, Mid Sized – 4.1 GJ
Energy Savings Determination Methodology	1. Measure Description: a.) Baseline technology: BC Building Code EG77 b.) Efficient technology: Building envelope and appliance upgrades required to meet EG80 c.) Standard technology: The same as baseline technology. 2 & 3. Data Sources/Engineering analysis. a.) Assumptions based on the following report: Energy Savings and Cost estimates based on SAR Engineering Report. "FortisBC New Home Modeling". April 12, 2011. Prepared by Ken Cooper, Richard Kadulski, Wilma Leung, Jack Habart. In collaboration with BCHydro PowerSmart. (note referred to subsequently as "New Home Modeling, SAR, 2011") b.) Other engineering studies that have been conducted for the Province of BC include the following: - Analysis of EGH80 New Home Savings Opportunities Innes Hood Consulting, February 2010 - Acceptable Assemblies and Cost Impact Assessment of Near EnerGuide 80, Constructive Home Solutions, March 2011 - Energy Efficient Housing Modeling for Building and Safety Standards, E3 Eco Group, 2010 4. Range considered: EG80 Single Family Dwelling – Ranged from 12 – 40 GJs EG80 Townhome – 3- 16 GJs These ranges were sourced from "Residential New Construction Program: Cost and Savings studies" Prepared by Dunsky Consulting for Terasen Gas November 25, 2010. This report helped identify the program design challenges due to the range of variability across multiple BC studies. Due to this factor the FEU commissioned SAR Engineering to complete the "New Home Modeling Study" above. 5. Assumptions The FEU have selected "New Home Modeling, SAR, 2011" referenced above as the definitive and most recent source of energy savings based on upgrading from current BC Building Code to EG80. 6. Utility energy saving claims:

	Due to unique climate conditions in BC, the FEU does not believe that other Canadian utility data is comparable. Ontario Energy Board, Navigant's Report Updating the DSM Technologies for 2009, cites 34 GJs for ENERGY STAR New Homes. Dunsky Consulting provided an overview of Best Practices in New Construction programs "Design of a Residential New Construction Program", November 2010 that provides insight into leading new homes programs in North America including Energy Star for New Homes (Vermont, Utah, Massachusetts, and New Jersey), the California Advanced Homes Program and Nova Scotia Performance Plus. 7. Impact Evaluations: It is difficult to conduct impact evaluations in New Construction where there is no pre-retrofit condition to use as a baseline. However, the FEU will be evaluating program participant consumption records to assess the alignment of forecasted modeled energy use with actual consumption. 8. Code and standards: The baseline building is regulated by the ***British Columbia Building Code 2006 (BCBC)*** which sets out technical provisions for the design and construction of new buildings. Builders should consult withlocal authorities regarding the application of BCBC provisions to existing buildings. More information is found here: http://www.bccodes.ca/bccode_building.htm Information Bulletin No. B11-01 issued March 10, 2011 suggests the next editions of the BCBC will be released in the spring of 2012 with an effective date in the fall of 2012. However, more recent communications with the Ministry suggests that this update has been delayed. (Please refer to BCUC IR 3.13.1 that suggests that 2013 Spring is the earliest anticipated EG80 code upgrade)
Measure Lifetime	25 year measure life was used for economic modeling of energy benefits although building envelope measures will have a much longer measure life
Measure Lifetime Determination Methodology	1. Data Sources: "New Home Modeling, SAR, 2011" In this study, capital, operational and maintenance costs are included based on a 50 year life cycle. 30 years – Residential New Construction Program – Proposed Program Design by Dunsky Consulting Nov, 2010 2. Range considered: 25 - 50 years 3. Assumptions: Sound building envelope construction will last upwards of 25 years. Appliances will be replaced as required by new models that may be more energy efficient. Utility measure life claims: Ontario Energy Board, Navigant's Report Updating the DSM Technologies for 2009, cites 25 year measure life for ENERGY STAR New Homes.

Incremental Cost ($)	EG80 Single Family Dwelling – Lower Mainland, Mid Sized – $6980 EG80 Townhome – Mid Unit – Lower Mainland, Mid Sized – $78 EG80 Townhome End Unit – Lower Mainland, Mid Sized –$142 Plus costs for energy modeling required for obtaining EnerGuide rating
Incremental Cost Determination Methodology	1. Data Sources: - Energy Savings and Cost estimates based on SAR Engineering Report. "FortisBC New Home Modeling". April 12, 2011. Prepared by Ken Cooper, Richard Kadulski, Wilma Leung, Jack Habart. In collaboration with BCHydro PowerSmart. In this study, capital, operational and maintenance costs are included based on a 50 year life cycle. - Residential New Construction Program – Proposed Program Design by Dunsky Consulting Nov, 2010 - Acceptable Assemblies and Cost Impact Assessment of Near EnerGuide 80, Constructive Home Solutions, March 2011 2. Range Considered: - EG80 Single Family Dwelling – $2667 - $18,000 (High point indicated in initial Ministry studies, December 2010) - EG80 Townhome – $78 - $1578 (Dunsky overview of available studies) 3. Assumptions: Full assumptions outlined in SAR Engineering, 2011 4. Utility incremental cost claims: Ontario Energy Board, Navigant's Report Updating the DSM Technologies for 2009, cites $4275 as incremental cost for ENERGY STAR New Homes.
Incentive Amount	For homes where natural gas is the primary heating source: - EG80 Single Family Dwelling –$2000 comprised of FEU $1500 + $500 from BCHydro - EG80 Townhome – $200 comprised of FEU $100 + $100 from BCHydro
Incentive Amount Determination Methodology	1. Methodology: - SFD - The incentive is less than 50% of incremental cost; however, the FEU believes that a $2000 incentive is attractive to builders, especially those who understand the marketing value of labeling a home as energy efficient - Townhome – The incentive covers the incremental cost seeing as energy modeling costs are also incurred by the builder. 2. Data sources: - Discussions with trades and other stakeholders - Ontario Energy Board, Navigant's Report Updating the DSM Technologies for 2009, cites $4275 as incremental cost for ENERGY STAR New Homes. 3. Utility incentives: Canadian utility data is not available at this time.

High Carbon Fuel Switching Sector:

There are no new programs to report at this time in this program area.

Commercial Program Sector:

The following five programs were described though not forecast in the 2010 EEC annual report:

1. Commercial Custom Design Program
2. Continuous Optimization Program
3. Commercial Kitchens Program
4. MURB Program
5. Process Heat Program

Of these five the Commercial Custom Design and Continuous Optimization programs are sufficiently advanced in their development for the FEU to provide some additional information in the requested format. See below for details. The Commercial Kitchen, MURB, and Process Heat Program remain at the very early stages of development, thus the Companies are unable to provide the requested level of detail at this time. Savings, incremental costs and incentive amounts presented in the 2012-2013 EEC Plan for these programs are preliminary estimates based on conversations with consultants and a review of similar programs.

Table 2: New Commercial Program Information

Commercial Program (2.1)	Commercial Custom Design Program – In Development
Energy Savings per Installation (Average Annual Energy Savings per Measure) (GJ):	Variable : Dependent upon participant proposed Energy Saving Measures
Energy Savings Determination Methodology	1. Measure Description: a.) Type: Variable - Incremental or Full Cost – Dependent upon proposed project/measure. b.) Baseline technology: Variable – as required by regulation for 'end of life' replacements; existing system for "early retirement" upgrades. c.) Efficient Technology: Variable – As proposed by program participant and reviewed/verified by FortisBC.

Commercial Program (2.1)	Commercial Custom Design Program – In Development
	d.) Efficiencies: Variable – As proposed by program participant, and reviewed/accepted by FortisBC. 2 & 3. Data Sources/Engineering analysis a.) Energy Savings: Variable - Dependent upon program participant's project/facility. As identified in participant provided energy studies, subsequently validated by FortisBC. b.) Data Sources: Participant provided energy studies, as verified by FortisBC. 4. Range Considered: Variable – project and measure specific. 5. Assumptions: Varied. a.) Each measure proposed and examined had its own set of assumptions. 6. Annual energy savings - other utilities: a.) BC Hydro: Variable b.) FortisBC Electric: Variable c.) Enbridge: Variable d.) Union Gas: Variable. e.) Manitoba Hydro: Variable f.) SaskEnergy: Not Applicable g.) Gaz Metro: Variable 7. Impact Evaluations: None available to date. Program in development. 8. Codes or Standards: There is no applicable code or standard that requires participants to upgrade to the efficient technology.
Measure Lifetime (years)	Variable : Dependent upon participant proposed Energy Saving Measures
Measure Lifetime Determination Methodology	1. Data Sources: a.) Engineer's recommendations b.) CEE recommendations/guidelines c.) ASHRAE Handbook, Service life Expectancy d.) Ontario Energy Board approved DSM assumptions e.) E-Source research 2. Range Considered: Variable. Measures lifetimes are associated with project specific measures. 3. Assumptions: Variable. Dependent upon project specific proposed energy saving measures. 4. Measure lifetimes used by other utilities: No applicable programs. a.) BC Hydro: Variable

Commercial Program (2.1)	Commercial Custom Design Program – In Development
	b.) FortisBC Electric: Variable c.) Enbridge: Variable d.) Union Gas: Variable. e.) Manitoba Hydro: Variable f.) SaskEnergy: Not Applicable g.) Gaz Metro: Variable
Incremental Cost ($)	Variable : Dependent upon participant proposed Energy Saving Measures
Incremental Cost Determination Methodology	1. Data Sources: a.) Participant supplied Energy Study b.) All data sources available via the Companies other program offerings c.) Consultant recommendations 2. Range Considered: Variable – Dependent upon project specific proposed energy saving measures. 3. Assumptions: Variable - Dependent upon proposed energy saving measures. 4. Incremental Cost used by other utilities: a.) BC Hydro: Variable b.) FortisBC Electric: Variable c.) Enbridge: Variable d.) Union Gas: Variable. e.) Manitoba Hydro: Variable f.) SaskEnergy: Not Applicable g.) Gaz Metro: Variable
Incentive Amount	Variable : Dependent upon participant proposed Energy Saving Measures
Incentive Amount Determination Methodology	1. Incentive methodology: a.) Energy Study: 100% of approved study cost to $50,000 maximum b.) Capital Incentive: 5$/GJ on the discounted stream of the expected natural gas savings, over 50% of the measure life, up to a maximum of 10 years. 2. Process or other evaluation studies: None. Internally generated after a review of other similar programs. 3. List the incentive amounts offered by other utilities: a.) BC Hydro: i. Energy Study: 100% of approved study cost

Commercial Program (2.1)	Commercial Custom Design Program – In Development
	ii. Capital Incentive: Tiered Incentive. Specific details not publically available. b.) FortisBC Electric: i. Energy Study: 50% of approved study cost ii. Capital Incentive: 10¢/kWh to a maximum of 50% of retrofit cost or 100% of incremental cost. c.) Enbridge: $0.10 per m³ of gas saved based on projected first year's natural gas savings up to $100,000 d.) Union Gas: Not Applicable e.) Manitoba Hydro: i. Feasibility study: 50% of the first $5,000, 25% of the remaining to a maximum of $10,000 ii. Capital Investments: $0.30/m3 annual natural gas savings to a maximum of $100,000 or 50% of the total project or the amount required to reach a one-year payback on incremental cost f.) SaskEnergy: Not Applicable g.) Gaz Metro: i. Energy Simulations: Tiered approach - $1,200 to $5,000 ii. Capital Investments: $0.25 per m³ of gas saved based on projected first year's natural gas savings to a maximum amount of $25,000 or 50% of the cost of the investment.

Commercial Program (2.2)	Continuous Optimization Program – In Development
Energy Savings per Installation (Average Annual Energy Savings per Measure) (GJ):	1% of pre program consumption during Baseline collection period 13.8% of Baseline consumption post re commissioning
Energy Savings Determination Methodology	1. Measure Description: a.) Type: Full Cost b.) Baseline technology: Un re commissioned building c.) Efficient Technology: Building commissioning and real time monitoring. d.) Efficiencies: Not Applicable. Savings derived from improved operations as opposed to equipment efficiency. 2 & 3. Data Sources/Engineering analysis

Commercial Program (2.2)	**Continuous Optimization Program – In Development**
	a.) Energy Savings: Variable - Dependent upon program participant's project/facility. Established and recorded by Energy Management Information System. b.) Data Sources: BC Hydro's program data; Evan Mills. 2009. "Building Commissioning: A Golden Opportunity for Reducing Energy;Costs and Greenhouse-gas Emissions" 3. Range Considered: None. Program in development. Energy monitoring will provide actual savings data. 4. Assumptions: Savings estimates provided by BC Hydro and corroborated by Evan Mills study is representative of expected savings. 6. Annual energy savings - other utilities: a.) BC Hydro: 241,087 kWh/yr b.) FortisBC Electric: Not Applicable c.) Enbridge: Not Applicable d.) Union Gas: Not Applicable e.) Manitoba Hydro: Not Applicable f.) SaskEnergy: Not Applicable g.) Gaz Metro: Not Applicable 7. Impact Evaluations: None available to date. Program in development. 8. Codes or Standards: There is no applicable code or standard that requires participants to pursue or implement the efficient technology.
Measure Lifetime (years)	As long as utility support for program is provided.
Measure Lifetime Determination Methodology	1. Data Sources: Not Applicable 2. Range Considered: None 3. Assumptions: Savings will persist so long as the utilities support the EMIS and actual building performance can be monitored. 4. Measure lifetime used by other utilities: a.) BC Hydro: As long as utility support for program is provided. b.) FortisBC Electric: Not Applicable c.) Enbridge: Not Applicable d.) Union Gas: Not Applicable e.) Manitoba Hydro: Not Applicable f.) SaskEnergy: Not Applicable g.) Gaz Metro: Not Applicable

Commercial Program (2.2)	**Continuous Optimization Program – In Development**
Incremental Cost ($)	Variable. Dependent on the findings of the re-commissioning study and the required re-commissioning interventions.
Incremental Cost Determination Methodology	1. Data Sources: BC Hydro program data. 2. Range Considered: None 3. Assumptions: None. Incremental costs will be based on actual costs associate with each participant. 4. Incremental Cost used by other utilities: a.) BC Hydro: Variable. Dependent on the findings of the re-commissioning study and the required re-commissioning interventions. b.) FortisBC Electric: Not Applicable c.) Enbridge: Not Applicable d.) Union Gas: Not Applicable e.) Manitoba Hydro: Not Applicable f.) SaskEnergy: Not Applicable g.) Gaz Metro: Not Applicable
Incentive Amount	Variable. Dependent upon the cost of the re-commissioning work. See below for description.
Incentive Amount Determination Methodology	1. List the methodology used to determine the incentive amount. a.) Incentive is the sum of expected gas meter upgrade and on-going gas meter inspection costs, EMIS installation and on-going licensing costs, and 50% of re-commissioning fees. 2. Process or other evaluation studies: None/Not Applicable 3. Incentives offered by other utilities: a.) BC Hydro: Variable. Dependent upon the cost of the re-commissioning work. b.) FortisBC Electric: Not Applicable c.) Enbridge: Not Applicable d.) Union Gas: Not Applicable e.) Manitoba Hydro: Not Applicable f.) SaskEnergy: Not Applicable g.) Gaz Metro: Not Applicable

Industrial Program Sector:

Table 3: New Industrial Program Information

Industrial Program 3.1	**Lime Kiln Chain System Upgrade Program** **Note: this is a custom pilot so much of the data is customer-supplied at this early stage of pilot development**
Energy Savings per Installation (Average Annual Energy Savings per Measure) (GJ):	42,000 GJ
Energy Savings Determination Methodology	1. Measure Description: Replacement of a chain system in a lime kiln as the chain system is used to transfer heat and accelerate the drying and preheating of the lime mud near the feed end of the kiln. The chain system works by transferring heat from the flue gas to the lime mud by direct conduction. a.) Baseline Technology: Existing 30 ft. of Garland chain system – Efficiency data unavailable. b.) Efficient Technology: Jammbco chain system – The efficiency upgrade will be dependent on the increased chain surface area as well as reduced kiln dust and reduction in energy use of CaO. 2. Engineering analysis: a.) Savings: 42,000 GJ/yr - the estimated value from Customer-commissioned study 3. Data Sources: Customer-commissioned study. 4. Range of savings: unavailable. 5. Assumptions: a.) Reduction in energy use of 0.55 GJ/ODMT of CaO (per supplier warranty) b.) 215 ODMT of CaO per day and 356 days of operation per year. c.) Current energy use expressed in GJ/ODMT of CaO will be determined in the time leading up to the project. d.) Current estimation method assumes a constant recycle rate and is inaccurate. A separate project is being proposed to install new instrumentation to measure the recycle and allow calculation of lime production.

Industrial Program 3.1	**Lime Kiln Chain System Upgrade Program** **Note: this is a custom pilot so much of the data is customer-supplied at this early stage of pilot development**
Measure Lifetime (years)	10 Years
Measure Lifetime Determination Methodology	1. Data sources: a.) Manufacturer: Jammbco (J.O Bernt & Associates Ltd.) b.) Customer: Discussions with other users, based on manufacturer's reports and conversations with the manufacturer. Also based on customer's previous experience with the current chain systems (installed about 1978). 2. Range of measure life: a.) As provided by the customer: 15 years. However as this is a pilot, the FEU went with a more conservative measure life range and used 10 years. 3. Impact Evaluation: Not applicable – program too new/ in pilot stage 4. Code and Standard: Not applicable - no energy efficiency standard for this equipment
Incremental Cost ($)	$1,000,000 CDN (+, - 20%), according to the proposal to the customer prepared by J.O Bernt & Associates Ltd.
Incremental Cost Determination Methodology	1. Data sources: a.) The incremental cost for the project was provided by the customer 2. Range of incremental cost: 3. From $1,000,000 to $1,400,000 CDN Other utilities: Not applicable – custom initiatives
Incentive Amount	Up to $500,000 depending on the savings amount.
Incentive Amount Determination Methodology	1. The general guideline behind the FEU's incentive structure is to provide funding of no more than 50% of the customers' incremental cost based on the amount of natural gas saved, for projects equal to or greater than $500,000. 2. BC Hydro calculates the available incentive based on projected savings of the upgrade over its entire 10 years lifespan: [incentive rate] x [annual savings] x [lifespan] = maximum incentive* *This is capped at 100 per cent of the project cost (according to BC Hydro project incentives transmission). 3. BC Hydro transmission incentives amount for projects costing $1 million or less is up to 100 per cent. Those costing more than $1 million are eligible for incentives up to 75 per cent.

1.2.2 For all other programs listed in the 2012-2013 EEC Plan (i.e. those programs that were included in the 2010 EEC Annual Report) please confirm that the energy savings per installation, the measure lifetimes, the incremental costs, the incentive amounts, and the assumptions and determination methodologies used to determine those amounts are the same as described in the 2010 EEC Annual Report and in responses to previous Information Requests, including BCUC IR 2.97.1. If not, please update the tables provided in these past filings. Unless an updated figure is provided the Commission will use the figures provided in the 2010 EEC Annual Report and responses to previous Information Requests in this proceeding.

Response:

Please see Attachment 1.2.2.

1.3 Please confirm Savings per Participant is an annual energy savings figure (i.e. Savings/Participant/Year).

Response:

Yes, the Savings per Participant is an annual energy savings figure (i.e. GJ/yr.). These are the savings that will occur on an annual basis for the duration of the lifetime of each of the measures/programs.

2.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 2; Exhibit B-1, Appendix K-2, p. 29

EEC Program Profiles

"While the completed CPR [Conservation Potential Review] 2010 did not recommend specific programs or targets both the technology and market priorities as well as the scope of achievable savings potential identified in the study have assisted FortisBC's program managers in the design of the program portfolios included in this EEC plan."

2.1 Please provide specific examples of how the CPR assisted program managers in the design of the program portfolios. For example, Exhibit 23, page 29 of the CPR indicates that Small Commercial measures and multiple end uses represent nearly 28% of the cumulative savings. How did FEU take the potential study results to develop a comprehensive suite of energy efficiency programs designed to address the small commercial market sector?

Response:

To date, the CPR has assisted program managers in the design of their program profiles to following extent:

Residential Sector Programs

In developing the 2012-2013 Residential Program portfolio, the FEU cross-references the Economic Potential and Achievable Potential targets identified within the CPR Residential Sector Report to ensure that program prioritization is in alignment. For example, the Economic Potential section highlights the following areas as major contributors to overall potential gas savings in 2030 (see CPR Residential Sector Report Exhibit 7). Programs are in place to take advantage of these savings opportunities as outlined below:

- Gas Fireplaces (33%) is addressed through the EnerChoice program.
- Basement and Attic Insulation (22%) is addressed through LiveSmart BC incentives, training initiatives for the trades and consumer outreach.
- Showerheads (5%) is addressed through DHW conservation strategies, home efficiency measures, and energy saving kits (low income).

Furthermore, the Most Likely Achievable Scenario (see CPR Residential Sector Report Exhibit 46) outlines economic measures that will provide opportunities to attain the target of annual savings of 3.3 million GJs by 2030. Programs are in place or are under development to support

this scenario. Of note, CPR Residential Sector Report Exhibit 46 highlights the significant opportunity presented by the Furnace Scrap-It Program (51%) requested in New Initiatives program funding. New DSM regulations, allowing the introduction of additional measures (for example ENERGY STAR water heater technologies) not considered cost-effective at the time of writing the CPR, may assist in reaching or going beyond the 2030 Achievable Savings goal of 3.3 million GJ's.

In developing individual programs, the residential section of the CPR provides FEU with cost benefit inputs including annual gas savings per measure, incremental costs comparisons and measure life data which is broken down further into individual housing types. The residential model database is frequently used as a guideline source of information and then validated with additional sources. The database was a resource in developing the following programs:

- EnerChoice Fireplace Program
- ENERGY STAR Water Heater Program
- Home Efficiency Measures Program (low-flow showerheads etc.)
- ENERGY STAR Clothes Washer Program
- LiveSmart BC confirmation per individual measure
- Behaviour Programs estimated savings claims (Section 6)

To ensure the energy savings reported within the working models in the residential section of the CPR are reasonable, the FEU compares the CPRs annual energy saving claims to the average annual energy consumption per end use presented in the 2008 Residential End Use Survey and further reported in the CPR Residential Sector Report. For example, in developing savings estimates for ENERGY STAR washers, clothes washing accounts for 22% or 4.6 of the average 21 GJs consumed in the DHW end use (see CPR Residential Sector Report Exhibit A12). Since ENERGY STAR washers consume less energy and 35-50% less water than conventional models (2010 EnerGuide Appliance Directory, NRCan) it is not unreasonable to assume that select Tier 3 washers, eligible for the washer incentive, save 2-3 GJs of energy. Based on research into other utility programs, 1.5 GJs was used in the 2012 – 2013 DSM plan.

Low Income Programs

The CPR was useful in that it provided an expert and independent review of measures commonly used in low income programs such as pipe insulation, low flow shower heads, faucet aerators, and attic insulation as detailed in the CPR Residential report. The results of the study will be used to adjust the assumptions (i.e. energy savings, lifetime, etc.) attributed to the

Energy Savings Kits (in market) and the Energy Conservation Assistance Program (in development) which are described on page 25 and 26 of the 2012-13 EEC Plan respectively.

Commercial Sector Programs

The commercial program area uses the insight into potential energy saving market opportunities and technology solutions provided by the CPR to help guide program design. For example, Page v of the CPR Commercial Sector Report identifies that Multi Unit Residential Buildings (MURBs) represent 24.1% of total savings. Page vi of the CPR Commercial Sector Report also indicates that there are 4 technology options that significant exceed all others in terms of savings potential; Operations & Maintenance, building automation systems and retrocommissioning, high efficiency boilers, and low-flow plumbing fixtures make up at least 45.1% of the likely achievable savings by 2030. As a result of this, the FEU's commercial program staff is currently:

1. Revising the Efficient Boiler program in view of increasing its market penetration.

2. Developing a partnership agreement with BC Hydro to collaborate on the Continuous Optimization Program, a program primarily aimed at Operations & Maintenance, and retrocommissioning activities. Please refer to page 38 of the EEC Plan 2012/2013 for additional information.

3. Developing a business case for a low flow showerheads and faucet aerator program, to be implemented first in the MURB sector. Please refer to page 40 of the EEC Plan 2012/2013 for additional information.

The FEU are both aware of and interested in the potential for savings offered by the small commercial sector. Enthusiasm based on the magnitude of the potential savings must be tempered, however, by consideration of the barriers to accessing these savings. The small commercial segment is a diverse market. It includes such varied customers as laundries, restaurants, retail stores of all varieties, professional offices, pet groomers, small theatres, automobile mechanics, food processors, gas stations, etc. The number of communication channels, industry association relationships and potential program partners are equally diverse, while the number of individual customers is even more so. In recognition of this diversity no specific DSM measures, nor any cost benefit analysis were provided in the CPR relative to small commercial customers. Instead the CPR makes clear on pages vi and 11 of the Commercial Sector Report that individual measures were not applied in the "Small Commercial" sub sectors. Rather, potential savings in this subsector are estimated based on results of detailed modeling and analysis in other subsectors. Section 3.1 of the CPR Commercial Sector Report provides a description of the treatment of this sub sector. As such only the magnitude of

the potential savings is offered. A significant expenditure of time, financial and human resources will be required to unlock these potential savings.

The FEU are taking steps to address this segment given the magnitude of the potential savings. The Efficient Commercial Water Heater and Spray N' Save programs are available and highly relevant to small commercial customers. Additional details are provided on pages 33 and 35 in the EEC Plan 2012/2013. In terms of program development the upcoming Commercial Kitchen Program, described on page 39 of the EEC Plan 2012/2013, will further enhance the FEU's reach in this segment, at least in so far as restaurant sub sector is concerned. Similar to water heaters, condensing rooftop units could be broadly applicable to the majority of small commercial customers, however this technology has only recently become available. FEU are currently conducting a prefeasibility study to quantify the performance of these units in a MURB setting and are interested in the potential of these units for small commercial applications. Please refer to the response to BCUC IR 1.197.3 for more information concerning this prefeasibility study. The FEU have formed a partnership with the Ministry of Energy and Mines' LiveSmart BC: Small Business program. Initially this partnership will provide enhanced, government funded incentives to participants in the FEU's current product incentive programs. However additional program initiatives are likely to be developed and/or delivered via this partnership.

Conservation Education & Outreach Programs

The FEU's Conservation Education and Outreach (CEO) program staff referred to the behavior section in the CPR as a guide in prioritizing the behaviours to promote throughout the CEO program area through our activity related to Residential Home Shows and Community Events Outreach, Energy Champion Program, Conservation Assistance – Education and Outreach, and all the School Programs: Class and Online Curriculum, K-12 In-Class Programs and Presentations, K-12 Home Efficiency Measures, and Post Secondary. In addition, CEO, in collaboration with the Residential Programs, referred to the Residential Sector Energy-Efficiency Technology Measures in the CPR as a guide when developing the Home Efficiency Measures and K-12 Home Efficiency Measures programs.

In addition to program development, Section 6 of the CPR provides measure assessments for customer behavior programs. Exhibits 23 and 24 are used by the Conservation Education and Outreach team and Residential team to provide a method for assigning savings estimates for these initiatives. Space heating initiatives under consideration include temperature setback, zone heating, weather stripping, and closing blinds and shades. Water heating initiatives include minimizing hot water wash and reduced shower length.

The exhibits also identify the significant opportunity that could be realized through behavior programs in that space heating annual "waste" is identified as 3.7 million GJs and DHW "waste" is identified as 2.5 million GJs.

Industrial Sector Programs

The CPR Industrial Sector Report provides information on a variety of industrial processes which require large amounts of natural gas, such as coal driers, pulp lime kilns and lumber kilns. The CPR has assisted in determining that the most appropriate program for these processes would be a custom program, which would involve an incentive on a per GJ basis. FEU initiated pilot programs in 2011 such as the Heat Exchanger pilot and the Lime Kiln Chain Upgrade pilot as a result of a series of suggestions in the CPR Industrial Sector Report in sections 5.4.6 and 5.4.10. FEU is currently reviewing the back-up engineering study for these pilot programs.

The CPR Industrial Sector Report also uncovered a number of heat recovery opportunities which involve heat exchangers of one type or another. There are efficient heat exchanger designs and equipment commercially available. The CPR Industrial Sector Report has indicated that opportunities exist is in the equipment or process upgrades. For instance, switching out older, less efficient energy conversion devices with newer more efficient technology is a straightforward approach to energy conservation. Also, modifications to the existing equipment can also increase efficiency. Examples would be burner and control upgrades, heat recovery off of the exhaust or boiler blowdown, and insulation of the device. FEU has initiated a pilot for the Burner Management System Program for one of FEU's customers to investigate this opportunity.

For larger boilers, the CPR Industrial Sector Report has assisted in determining that it is important to consider not only upgrading the boiler but upgrading the complete steam or hot water system. For example, the CPR Industrial Sector Report on page 40 indicated that with many steam systems, large amounts of steam are often wasted due to poor condensate return systems. The CPR Industrial Sector Report in section 5.4.8, indicates that savings can be obtained in any large system by conducting a detailed audit followed by repair and replacement of system components where required. Therefore, FEU has initiated the Energy Audit Funding Program to determine existing opportunities in the industrial manufacturing process that could help reduce the amount of natural gas used at individual customer sites, as well as to look for opportunities in such a way that customer projects can also be pilot projects for each industrial sector.

Innovative Technology Programs

The CPR generally provided an expert and independent review of some innovative technology measures applicable within the residential, commercial and industrial sectors. More specifically,

reviewing results from the Commercial Economic Potential Forecast, Pg. 47, one technology that passed the cost benefit analysis was condensing rooftop units. As this technology has only become recently available to British Columbia, it is not widely adopted and lacks industry data. Therefore the FEU are currently conducting a prefeasibility study on this technology which is described in response to BCUC IR1.197.3 and on pg. 74 of the 2012-13 EEC Plan.

3.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 4

EEC Portfolio Results

3.1 Please confirm whether "annual gas savings for 2013" in Exhibit 1 are incremental gas savings to 2012 (e.g. 1,012,996 GJ for FEI, 80,398 GJ for FEVI) or whether reported 2013 savings are cumulative savings.

Response:

The "annual gas savings for 2013" are based on the following two components:

- In cases where the lifetimes of the energy savings measures are greater than one year, gas savings that persist from program participants in 2012; and
- Gas savings from new program participants in 2013.

As such, the "annual gas savings for 2013" in Exhibit 1 are incremental to the gas savings that occurred in 2012. However, since the "annual gas savings for 2013" are not all necessarily based on 2013 program participants, a form of "cumulative savings" is being reported.

It should be noted that the "incremental gas savings" in Exhibit 1 are gross savings. Net savings are shown below.

Indicator		Service Territory		Total
		FEI	FEVI	
Annual Gas Savings, Net (GJ/yr.)	2012	746,255	77,378	823,633
	2013	1,671,607	156,707	1,828,315
NPV of Gas Savings, Net (GJ)		12,805,025	1,296,486	14,101,510

The Benefit/Cost ratios shown in Exhibit 1 in Appendix 1 to Exhibit B-25 are based on net energy savings.

3.2 Please provide all 2011 year-to-date participation and expenditure figures for every EEC program. Where appropriate please include commitments to participate and define what the commitment is, such as whether an agreement has been signed.

Response:

Please see Attachment 3.2

4.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 4

EEC Program Portfolio Results by Program Area

4.1 Please provide a working copy of the EEC Program Portfolio results by Program Area table in electronic format (Excel), along with any supporting details, algorithms and assumptions not already filed in this Proceeding.

Response:

Confidential Attachment 4.1 is provided separately to the Commission only on a confidential basis as they contain the EEC Excel working financial models which are proprietary to the FEU on behalf of customers. These models are based upon the considerable time, effort and expense of both internal resources and external contract resources which have been invested in the development of these financial models on behalf of all rate-paying customers. The Companies are concerned that public disclosure and availability could allow others to use or adapt these complex models freely, at the expense of the FEU's customers.

The models were used to produce the results listed in the exhibits cited above:

- Fortis Cost Effectiveness Tool, ALL, Current.xlsm
- Fortis Cost Effectiveness Tool, ALL, Societal Test, Current.xlsm
- Fortis Database, ALL, Current.xlsx
- Fortis Database, ALL, Societal Test, Current.xlsx

Note that the files listed above are split into two sets of files, one set for the current benefit/cost tests utilized by FEU and one set for the Societal Cost Test.

The current scenario can be seen by opening the file, "Fortis Cost Effectiveness Tool, ALL, Current.xlsm" and then loading the corresponding database file, "Fortis Database, ALL, Current.xlsx".

The second set of files for the Societal Test scenario can be seen by opening the file, "Fortis Cost Effectiveness Tool, ALL, Societal Test, Current.xlsm" and then loading the corresponding database file, "Fortis Database, ALL, Societal Test, Current.xlsx".

4.1.1 For each Program Area listed in the table, provide the first year cost of saved energy ($/GJ saved) in 2012.

Response:

Please refer to the Attachment 4.1.1 for the first year cost of saved energy. Exhibit-2 Portfolios (Column R) illustrate the first year cost of saved energy ($/GJ) by program area. All the supporting calculations and algorithms are provided in the Confidential Attachment 4.1 in the response to BCUC IR 3.4.1.

4.1.2 For each Program Area listed in the table, provide the levelized cost of saved energy ($/GJ saved). Include assumptions with respect to the discount rate and average measure/program life used to calculate levelized costs.

Response:

Please see the response to BCUC IR 3.4.1.1, Attachment 3.4.1.1. Column R provides the levelized cost by program area. The assumptions for the measure life are on a program by program basis and are summarized under the "program profiles" section of each program area in Appendix 1 to Exhibit B-25. A discount rate of 7.38% has been applied to the FEI service territory, while a discount rate of 6.87% has been applied to the FEVI service territory consistent with current utility practices of estimating discount rates as accepted by the BCUC.

4.1.3 In table format (Excel) compare, to the extent feasible, FEU's first year cost of saved energy and levelized costs by Sector/program to similarly situated natural gas efficiency programs such as those of Enbridge, Union Gas, Manitoba Hydro, and Gaz Metro.

Response:

This response is also intended to respond to BCUC IR 3.6.1.3. The level of program detail required to provide this information is not readily available from other natural gas utilities, so the

FEU are unable to provide the requested information. Further, an "apples to apples" comparison would be challenging as all utilities have different program designs. In addition, as noted in the response to BCUC IR 1.191.2:

> *"In the Company's respectful view, the first year cost of saved energy is not a particularly useful metric as the first year cost of saved energy is determined by dividing the savings in year one by the total costs incurred in the first year. As such, this can be a very misleading metric. Different programs, which may have the same TRC or SCT will have very different ratios by this metric as the first year cost of saved energy metric is skewed by factors such as program life, the relationship of advertising and promotion expenses (which tend to be front end loaded) to incentives etc. As such, the FEU rely on lifecycle metrics and it is inappropriate to rely on "first year" metrics."*

Finally, as noted in the response to BCUC IR 1.194.2, all utilities surveyed operate in different climates, building envelopes, age of housing stock, price for energy and political environments. This means that not only are energy savings results going to differ from utility to utility, program design and delivery mechanisms, and therefore program costs will also vary significantly from utility to utility, rendering the value of the analysis requested minimal.

5.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 5; Exhibit B-17, BCUC IR 2.90.1

Residential Program Area

5.1 FEU is requesting approval for the Joint Initiatives to be amalgamated into the Residential Program Area. In 2011 FEU budgeted $3.572 million for the Residential Program Area and $1.648 million for the Joint Initiatives Program Area for a combined total of $5.22 million. FEU is requesting approval for the Residential Program Area for $9.514 million in 2012 which is an increase of $4.294 million over 2011. In response to BCUC IR 2.90.1 FEU reported an incremental increase in funding for the Residential Program Area of $5.928 million. Please reconcile these figures.

Response:

To clarify, the FEU are requesting approval of $9.5 million of each of 2012 and 2013 for the Residential Program Area. The incremental ask for the 2012 FEU Residential Program Area is $4.28 million over the 2011 budget. The reference in the Information Request for funding for 2012 of $9.514 million is to the 2012 EEC Plan for the Residential Program Area, which is comprised of a number of initiatives outlined in Section 3 of Appendix 1 to Exhibit B-25. Budgets for the Residential programs for 2012 do not exactly match the 2012 funding ask of $9.5 million; rather the combined budgets for the 2012 Residential programs are $14,000 over the 2012 Residential funding ask, or 0.15%.

BCUC IR 2.90.1 requested that the FEU provide a table "with the amounts for Residential, Commercial, Joint Initiatives and CEO Programs as separate line items." [Emphasis added.] The tables in the response to BCUC IR 2.90.1 display incremental spending of $5.928 million for the Residential Program Area, but also a credit of $1.648 million in the Joint Initiatives line item. While clearly displayed in the tables, this fact is also noted in footnotes 17 and 20 of the IR response. By consolidating these line items, it can be seen that the incremental spend in the Residential Program Area is $4.294 million in alignment with the 2011 FEU budget. This reconciliation is summarized in the figure below.

2012 Amalgamation of Residential Program Area and Joint Initiatives

Reconciliation of 2011 FEU Budgeted Amount with BCUC IR 2.90.1

($000's)	Residential	Joint Initiatives	2011 Total	2012 Ask	2012 Increment
2011 FEU Budget	3,572	1,648	5,220	9,500	4,280
BCUC IR 2.90.1	3,572	1,648	5,220	9,500	4,280

6.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Exhibits 3-9, pp. 8, 19, 23, 29, 47, 69, 76

EEC Program Portfolio Results by Sector

6.1 For each exhibit noted above, please provide a working copy of the Program level results table in electronic format (Excel), along with any supporting details, algorithms and assumptions not already filed in this Proceeding.

Response:

Please refer to the response to BCUC IR 3.4.1 and Confidential Attachment 4.1.

6.1.1 For each program listed in the exhibits, please provide the first year cost of saved energy ($/GJ saved) in 2012.

Response:

Please see the response to BCUC IR 3.4.1.1, Attachment 4.1.1

6.1.2 For each program listed in the exhibits, please provide the levelized cost of saved energy ($/GJ saved). Include assumptions with respect to the discount rate and average measure/program life used to calculate levelized costs.

Response:

Please see the response to BCUC IR 3.4.1.1, Attachment 4.1.1. The assumptions for the measure/program lifetimes are summarized in the detailed program profiles as found in each of the respective program area sections of the 2012-13 EEC Plan. In addition, a discount rate of 7.38% has been applied to the FEI service territory, while a discount rate of 6.87% has been applied to the FEVI service territory.

6.1.3 In table format (Excel) compare , to the extent feasible, FEU's first year cost of saved energy and levelized costs for each program to similarly situated natural gas efficiency programs such as Enbridge, Union Gas, Manitoba Hydro, and Gaz Metro.

Response:

Please see the response to BCUC IR 3.4.1.3.

6.2 For every EEC program listed in the 2012-2013 EEC Plan, please provide a breakdown of the budgeted Administration and Communication expenditures. Please specify all line items planned for these budget categories (such as printing costs for bill inserts, postage, salaries, etc.) and the associated cost.

Response:

This level of detail cannot be provided at this time. The budgeted Administration and Communication expenditures listed in the 2012-2013 EEC Plan are estimates and are based upon the FEU's EEC program managers' professional judgement, based on their experience with other similar programs. The Companies have provided an example of an administration and communication program budget for the 2011 EnerChoice Fireplace Program.

EnerChoice 2011 - Forecasted Non-Incentive Expenditures

Non Incentive Spending Initiative - 2011 Forecast	FEI	FEVI	Total
ADMINISTRATION*			
Rebate Administration (Consumer Response Marketing)	$ 17,280	$ 4,320	$ 21,600
Staff Travel and Expenses	$ 1,278	$ 632	$ 1,910
MARKETING			
Co-op Advertising to Fireplace Dealers	$ 20,000	$ 5,000	$ 25,000
Print Advertisements	$ -	$ -	$ -
Bill Insert (portion split with other programs)	$ 2,541	$ 635	$ 3,176
Dealer Mail-out	$ 2,140	$ 535	$ 2,675
Point of Sale Materials	$ 2,000	$ 470	$ 2,470
HPBA Breakfast Launch to Dealers	$ 13,440	$ 3,360	$ 16,800
HPBA Sponsorship of Dealer event	$ 4,000	$ 1,000	$ 5,000
Contract Creative Services	$ -	$ -	$ -
EVALUATION			
Dealer and Consumer Survey	$ 10,000	$ 2,500	$ 12,500
EnerChoice Impact Evaluation - Deposit	$ 25,000	$ 5,000	$ 30,000
Projected 2011 Total Spend	**$ 97,679**	**$ 23,452**	**$ 121,131**
Forecasted Non Incentives Expenditure Total (2010 EEC Report)**	**$ 117,000**	**$ 29,000**	**$ 146,000**

*For purposes of this example, Dealer SPIFs are not included within the administration spend.

** Note that these are slightly revised expenditures from what was originally listed in the 2010 EEC Report.

6.3 Please explain why FEU is requesting inclusion of spillover effects when the 2012-2013 EEC Plan lists the Spillover Rate and Source for most of its EEC Programs as "Not available".

Response:

Please see the response to BCUC IR 1.210.1 (Exhibit B-17), which states:

> *"the FEU do not have a specific proposal to quantify additional energy savings from spillover effects. The FEU would evaluate program results on a program-by-program*

basis, using consultants to conduct surveys of program participants and non-participants, to determine both free rider rates and spillover rates."

While estimates of spillover effects could be prepared based on experience in other jurisdictions, an evaluation of spillover effects is customarily done based on a history of actual program results which are not available for the 2012-13 programs. The FEU were also cautious about expending resources to evaluate spillover effects before the Commission endorsed its use. For these reasons, the spillover effects for the 2012/2013 have not been evaluated for this 2012/2013 EEC Plan.

If the Commission were to endorse the use of spillover effects in its decision on this Application, in the way that it endorsed the use of the TRC test in its April 2009 Decision on TGI and TGVI's EEC Application, then the FEU would seek to evaluate spillover effects as it gained more experience with its programs. In future applications, the FEU would then be in a position to provide estimates of free riders and spillover effects for consideration by the Commission.

6.3.1 Please file any decisions of commissions or regulatory boards in other jurisdictions that have expressly approved or rejected spillover inclusion in cost effectiveness tests.

Response:

In the time available, the FEU have found three examples.

California

California utilities do not include spillover in cost-effectiveness testing. The California Public Utilities Commission established in Decision 08-07-047,[2] dated July 31, 2008, a move to a total market gross savings measurement beginning in 2009. Evaluations still estimate free ridership, and sometimes assess spillover, but final evaluation reports report ex-post gross savings and do not apply a NTG ratio.

[2] Online at: http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/128879-04.htm#P274_50425

Massachusetts

The Massachusetts Department of Public Utilities Decision D.P.U. 09-121[3] approved the three-year plans (from 2010 through 2012) for energy efficiency for gas utilities in Massachusetts, stating (at PDF page 130):

> *"In D.P.U. 08-109, at 16, the Department directed all gas Program Administrators to account for the effects of free ridership and spillover when calculating the cost-effectiveness of energy efficiency programs."*

The 2011 Massachusetts Technical Reference Manual[4] verifies that net savings calculations should include spillover (PDF page 18).

Ontario

According to the Ontario Energy Board's Demand Side Management Guidelines for Natural Gas Utilities,[5] dated June 30, 2011 (at PDF page 22):

> *"The TRC test should be performed at the program level only. … At the program level, the TRC test takes into account the following: avoided costs, net equipment and program costs, and adjustments to account for free ridership, spillover effects, and persistence of savings and costs, as applicable."*

These guidelines (at PDF page 28) also include the following, which elaborates on how Ontario utilities should address spillover:

> *"All adjustment factors considered, including free ridership and spillover effects, should be assessed for reasonableness prior to the implementation of the multi-year plan and annually thereafter, as part of each natural gas utility's ongoing program evaluation and audit process. The natural gas utilities should always provide information on free ridership for all their applicable programs. In contrast, the natural gas utilities have the option to request the inclusion of spillover effects for any of their programs.*
>
> *Any request for the Board to consider the spillover effects, needs to be supported by comprehensive and convincing empirical evidence, which clearly quantify the spillover effects that of a specific program has had on program savings and the natural gas utilities' revenue.*

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[3] Online at: http://www.env.state.ma.us/dpu/docs/gas/09-121/12810dpuord.pdf
[4] Online at: http://www.ma-eeac.org/docs/MA%20TRM_2011%20PLAN%20VERSION.PDF
[5] Online at: http://www.ontarioenergyboard.ca/OEB/_Documents/EB-2008-0346/DSM_Guidelines_for_Natural_Gas_Utilities_20110630.pdf

For their custom projects, the natural gas utilities should propose common free ridership rates and spillover effects, if applicable, that are differentiated appropriately by market segment and technologies."

Please also see the response to BCUC IR 1.210.2 (Exhibit B-17).

7.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 9

ENERGY STAR Domestic Hot Water Technologies

7.1 Please confirm that the ESTAR Water Heater program will provide incentives for water heaters with an EF rating of 0.67 and greater.

Response:

The ENERGY STAR Domestic Hot Water "DHW" Technologies program will promote the replacement of standard efficiency water heaters (~0.57 EF) with efficient ENERGY STAR models (≥ 0.67 EF). As part of a longer term market transformation strategy, the EEC team is evaluating the following technologies for inclusion in the incentive offering for retrofit and new construction markets:

- ENERGY STAR storage tanks – ≥0.67 EF
- Condensing Water Heater storage tanks– ≥ 0.80 EF
- Non-Condensing Tankless– 0.82 EF – 0.88 EF
- Condensing Tankless – 0.91 EF – 0.98 EF
- Hybrids – ≥0.90 EF

Note: The EF values for product categories were obtained from the NRCan Energy Efficiency Appliance Directory. New products may be added from time to time.

Natural gas water heater directory:

http://oee.nrcan.gc.ca/residential/business/manufacturers/search/gas-water-heaters-search.cfm?attr=4

Tankless water heater directory:

http://oee.nrcan.gc.ca/residential/business/manufacturers/search/tankless-water-heaters-search.cfm?attr=4

7.2 In 2012-2013 will FEU provide incentives for 0.62 EF water heaters?

Response:

No, there will be no incentives for 0.62EF water heaters in 2012 or 2013. The Efficient Residential Water Heater Program that provides a $50 incentive to homeowners for the purchase of 0.62 EF water heaters and a $50 Dealer SPIF will terminate December 31, 2011. This program will be replaced by the ENERGY STAR water heater program as outlined in BCUC IR 3.7.1 as part of a longer term DHW market transformation strategy.

7.3 Please explain why the Dealer Sales Promotion Incentive Fund (SPIF) is included in the Admin portion of expenditures and not in the Incentives category or in a separate category.

Response:

The Dealer Sales Promotion Incentive Funds are captured as non-incentive expenditures in the administration portion of expenditures in the 2012-2013 EEC Plan as well as the 2010 EEC Annual Report. The reason is that in the TRC planning model, "incentives" are defined as only being provided to the participant. Since the Dealer Sales Promotion Incentive Fund (SPIF) are provided to the dealer, and not the participant per se, they are added to the administration portion of expenditures. In this way, the dealer incentives are treated the same as marketing and promotion expenditures in the TRC Calculation. If, in the TRC planning model, the dealer incentive was included in "incentives", the participant cost would be reduced accordingly, thus an upward bias on the TRC.

Because the 2012-2013 EEC Plan is produced as a high level document with a structure that works across all program areas, dealer incentives are not defined as a separate category. The contribution to dealer incentives will be highlighted in the 2011 EEC Annual Report where greater program detail will be provided.

8.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 9; and Exhibit B-1, Appendix K-4, p. 32

ENERGY STAR Domestic Hot Water Technologies

8.1 Please explain why the 2010 EEC Annual Report included a 20% free rider rate for the Residential Hot Water Storage Tank Program while the 2012-2013 EEC Plan uses a 10% free rider rate for the ENERGY STAR Domestic Hot Water Technologies.

Response:

The different Free Rider Rates ("FRR's") for these water heater programs reflect different technologies and therefore different market penetrations of the products being considered for inclusion in the program.

In developing the business case for the 2010-2011 Residential Hot Water Storage Tank Program, it was determined that the market share for 0.62 EF and higher technologies was about 18% market share according to the Canadian Residential Water Heater Market Assessment (a Caneta Research Report for MEMPR, March 31, 2009) and personal communications with manufacturers and distributors. In fact, when the program launched in the summer of 2010, some manufacturers and retailers were just starting to introduce the 0.62EF technologies which were required by the BC Efficiency Act Standard introduced September 1, 2010.

In developing the business case for the 2012-2013 ENERGY STAR Domestic Hot Water Technologies a 10% Free Rider Rate was used to reflect the market penetration of the 0.67 EF technologies that will be included in the incentive offering. To date, very few 0.67 EF storage tanks and condensing storage tanks are available in the market and many are currently only available for special order. According to the Emerging Hot Water Technologies and Practices for Energy Efficiency (ACEEE Report A112, October 2011) tankless water heaters in the United States have reached a 5% market share in 2009. Therefore it is reasonable to assume that 10% is a realistic and conservative FRR for a 0.67 EF program based on the current market share of 0.67 EF ENERGY STAR water heating technologies that will be considered for this 2012/2013 program.

9.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 11; and Exhibit B-1, Appendix K-4, p. 29

Give your Furnace/Fireplace some TLC Service Campaign

"Incentive expenditure accounts for the fact that FEI gift cards received an 8% discount while the FEVI gift cards received a 6% discount." (Exhibit B-1, Appendix K-4, p. 29).

9.1 Please confirm the percentage discount FEU currently receives on purchases of $25 grocery gift cards.

Response:

The 2010 "Give Your Furnace some TLC" furnace service campaign was launched January 2010 in the FEVI service area as a pilot to determine customer response to the $25 grocery gift card incentive. Since a smaller quantity of gift cards was forecasted for the FEVI program, a 6% discount was negotiated. Due to the success of the pilot, the program was expanded across the province in May 2010, at which time an 8% discount was negotiated. Similarly, an 8% discount was negotiated for the 2011 program for FEI and FEVI. This will be reported in the 2011 EEC Report to be filed the end of March, 2012.

9.1.1 Are these discounts passed on to ratepayers in the 2012-2013 EEC plan? If not, why not?

Response:

If gift cards are used for the 2012-13 programs, the discounts will be passed on to ratepayers, as they have been in previous years.

The 2012 "Give your Furnace / Fireplace some TLC" appliance service campaign for 2012 will launch in about May of 2012. Program design is still under way for the 2012 program, and the FEU are considering providing $25 FEU bill credits rather than gift cards. Al though the gift cards have been very well received by the vast majority of our customers, bill credits may have some advantages such as the following:

- The new Customer Information System, launching in January 2012 will enable more flexibility with offering bill credits. Therefore a cost benefit analysis will be undertaken to determine the bottom line costs associated with gift card fulfillment versus bill credits.

- Since we are reliant on gas contractors to promote the program, there may be less customer confusion associated with a FortisBC bill credit than a grocery gift card. A small number of customers were confused as to who provided the incentive.
- A small number of contractors were claiming credit for providing the grocery gift card in their marketing initiatives. Therefore, a FortisBC bill credit incentive may add more credibility and less customer confusion for the promotion.

If gift cards are utilized in the 2012 program, the incentive cost less discount will be reflected in the 2012 EEC report that will be filed the end of March, 2013. The 8% discount will be reflected in the 2011 EEC Report that will be filed the end of March, 2012.

9.1.2 If FEU no longer receives discounts on the grocery cards please explain why this is the best incentive to provide customers under the TLC program.

Response:

Please refer to BCUC IR 3.9.1.1 that discusses the advantages of bill credits as an alternative to gift cards. A 2011 participant survey and cost benefit analysis that will be conducted as part of the internal controls prior to program launch will determine whether or not gift cards or bill credits will be used for the 2012 program. The 2012 EEC report to be filed the end of March 2013 will indicate the incentive type selected and account for the discount if one was received.

9.2 This program expects to enroll 17,500 customers in 2012. While FEU or a contractor is servicing the customer's furnace or fireplace will FEU also be making efforts to directly install any low cost efficiency measures such as low flow showerheads, heater blankets or pipe insulation? If not, why?

Response:

Because the TLC program is so successful in engaging a large number of customers, it would seem to be beneficial to have other efficiency measures installed at the time of service.

However, the appliance servicing is done by a large number of independent gas contractors and businesses. The hourly rates of gas contractors would likely make this cost-prohibitive. In addition, coordinating the logistics of a direct install initiative with this large number of diverse gas contractor businesses would be a major project and not in scope at this time. However, the FEU are investigating the possibility of providing retailer discount coupons for customers to take advantage of low cost measures in 2012.

9.3 Please provide the 2010 TLC participant survey.

Response:

The 2010 Participant Survey is provided in Attachment 9.3.

9.4 Please confirm that to receive the gift card the customer can choose the BC Safety Authority registered gas contractor they wish and then apply for the incentive after the furnace or fireplace has been serviced. If so, how can FEU be sure the gas contractor is aware of opportunities to upgrade appliances to more efficient models?

Response:

In order to receive the gift card, the customer can choose the BC Safety Authority registered gas contractor they wish, and then apply for the incentive after the furnace or fireplace has been serviced.

One of the key benefits of appliance service is to have a professionally trained gas contractor inform customers about safety concerns, installation issues, or under-performing appliances in need of replacement. Due to furnace efficiency regulations, standard-efficiency furnaces can only be replaced by high-efficiency models. In fact, the 2010 TLC Participant evaluation determined that 15 per cent of customers were advised to either upgrade or replace their appliance. No data is yet available for the 2011 furnace and fireplace service program.

Since the contractor community is one of the primary delivery pathways for the TLC and all other Residential programs, the following steps are typically undertaken to inform contractors about new program launches:

- A contractor information package is sent to all contractors registered with the BC Safety Authority prior to the launch of a residential program. The package includes: a letter of introduction; a 'Quick guide,' which outlines program details; a copy of the application form; sample collateral, and information regarding how a contractor can obtain additional collateral for distribution to customers.
- Web or print tile ads are made for co-promotional opportunities.
- A quarterly newsletter published specifically for the contractor community is mailed to all natural gas contractors registered with the BC Safety Authority. The newsletter includes information on new and existing programs and initiatives, plus stories, testimonials, and news and events targeting this group.
- New program launch announcements are emailed directly to members of the FortisBC Contractor Program.
- Information sessions are held for contractors, such as co-sponsored training sessions, including a segment on in-market programs, plus make related program collateral available.
- All program and rebate information is available on Fortisbc.com.

The Efficiency Partners Program is also creating awareness of EEC programs and efficiency training opportunities in contractors. BCUC IR 3.9.4.1 provides greater detail on the role of the Efficiency Partners Program.

9.4.1 Does the TLC program rely on the Efficiency Partners program to educate the gas contractors?

Response:

The TLC program relies on gas contractors, through the Efficiency Partners program, to promote the program to our customers. A number of initiatives are undertaken to ensure natural gas contractors are educated and aware of our programs, including those developed and

administered through the Efficiency Partners program. (Please see the response to BCUC IR 3.9.4)

Through the Efficiency Partners program, information is disseminated directly to contractors by way of:

- The FEU's 'Contractor Newsletter,' published quarterly, to all natural gas contractors registered with the BC Safety Authority;
- Emailing members of the FortisBC Contractor Program with information related to program(s) or initiative(s);
- Hosting information sessions for contractors where program initiatives are discussed as part of the overall session;
- Co-sponsoring events, information, and training sessions with trade associations;
- Participating in trade association meetings and events;
- Placing ads in trade publications;
- Posting information in the 'Trades and partners' section of www.fortisbc.com;
- Collaborating with Ministry of Energy and Mines and electric utilities on contractor training opportunities. Examples of these initiatives include providing subsidies for select Thermal Environmental Comfort Association (TECA) Quality First courses and FEU financial support of the Certified Installation incentive in LiveSmart BC which resulted in a significant increase in the number of contractor participants enrolled in training.

In addition, the FEU are in the developmental stages of creating a number of training sessions geared to the natural gas contractor community whereby additional opportunities to educate and inform this vital stakeholder group of our efficiency programs will be available in 2012.

9.5 In 2010 and 2011 what FEU EEC program(s) offered incentives for customers to upgrade their furnace to a more efficient model? For all the programs identified please specify the dates during which the program offered incentives.

Response:

In 2010 and 2011 there were no FEU programs that offered incentives for customers to upgrade their natural gas furnace to a more efficient model. In the 2010 EEC report, energy savings are identified for the program which ended December 31, 2009 but for which applications were not received until 2010. In addition, the 2010 and 2011 EEC Report will include energy savings for LiveSmartBC participants who had their furnaces installed prior to December 31, 2009. The FEU are not contributing to the LiveSmartBC heating system incentives past December 31, 2009 due to furnace minimum efficiency regulations. The only FEU heating system upgrade program currently in market is "Switch 'N Shrink", the high carbon fuel switching program described on page 20 of Appendix 1 to Exhibit B-25, which sees older inefficient oil and propane heating equipment replaced with minimum 90% efficient natural gas equipment.

10.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 13

Home Energy Efficiency Web Portal

10.1 Please describe the content of the Home Energy Efficiency Web Portal. Will it include online energy savings calculators to assist customers?

Response:

For the first phase of the Home Energy Efficiency Web Portal the primary focus will be the rebate engine and some basic home efficiency content. The rebate engine refers to a database of all home energy efficiency rebate offers for the Province of BC. These offers include those from the FEU, FortisBC PowerSense, BCHydro, LiveSmart BC, federal programs and, in time, municipal offers. The FEU believe it is prudent to launch the foundational platform, measure customer uptake, monitor stakeholder feedback, develop cost effective processes for site maintenance, and add more functionality over time. At this stage, an energy savings calculator is not planned; however, the FEU are conducting a feasibility study as the first step in developing the requirements for a natural gas calculator for the Fortisbc.com website.

11.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 14

ENERGY STAR Washers and Other Measures for DHW Conservation

"Low flow fixtures (also covered in Section 7 Conservation Education and Outreach) as well as other potential initiatives remain under consideration at this time. Consequently, the program inputs provided below are only for clothes washers at this time."

11.1 Please confirm that the total participant forecast of 8,500/year and the total expenditure forecast of $525,000/year are for the ENERGY STAR Washing Machines program only and not for Other Measures for DHW Conservation.

Response:

Yes, the 8,500 participant count and $525,000 expenditure in the 2012-2013 DSM Plan only includes the ENERGY STAR washer program. The expenditure forecast of $525,000 per year was based on 2011 program to date participation. Other measures for DHW conservation will be addressed in consultation with the Conservation Education and Outreach team and electric utility partners. These initiatives will likely not be in market until fall of 2012, based on available budget as 2012 program participation rates are clarified.

11.2 If FEU implements incentives for ENERGY STAR Dish Washers and Low Flow Fixtures under this program, what will the forecast participation and expenditures be for 2012 and 2013 or will the funding for these incentives be included in the $525,000/year total?

Response:

The $525,000 expenditure in the 2012-2013 EEC Plan only includes the ENERGY STAR washer program. The expenditure forecast of $525,000 per year was based on 2011 program to date participation. Other measures for DHW conservation will be addressed in consultation with the Conservation Education and Outreach team and electric utility partners. These initiatives will likely not be in market until fall of 2012, based on available budget as 2012 program participation rates are clarified. Therefore, participation forecasts and expenditures are not available at this time.

12.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, pp. 8 and 15

Customer Engagement Tool for Conservation Behaviours (OPOWER)

12.1 Has FEU signed a contract with OPOWER to provide its service to FEU customers? If so, when was it signed and for how long is it effective?

Response:

No, the FEU have not signed a contract with OPOWER. The FEU are still in the preliminary assessment stage of determining the best solution for a Customer Engagement Tool. At the time of writing, the FEU are performing due diligence on the costs and benefits of such a system, vendor options, IT considerations in potentially integrating into the new online billing system, an implementation strategy and resource requirements. An EEC business case outlining a potential pilot in the Fall of 2012, has yet to be put forward for management approval. Many of the responses to BCUC IR 3.12 series refer to OPOWER due to their substantial market presence and the availability of credible third party research into the effectiveness of these types of tools. OPOWER is one example of a conservation behavior tool that the FEU are currently evaluating to provide their customers with assistance in driving an incremental decrease in consumption. In the event the FEU move forward with such a tool, they will ensure that the program conforms with the established EEC program principles and will provide updates in the established accountability mechanisms as accepted by BCUC.

12.2 Please provide a sample copy of the energy consumption report that FEU will be sending to participants.

Response:

As the FEU are still in the preliminary phase of implementing a Customer Engagement Tool , an energy consumption report for program participants is not available at this time. The program is not yet designed, and no vendor has been selected for the program.

12.2.1 Will FEU also offer participants the option to access energy consumption reports online? If not, why not?

Response:

As part of the assessment process, the FEU are evaluating the costs and benefits of enabling their customers to access energy consumption reports online. Web accessibility will likely require integration into online- billing and therefore this is a decision that crosses over other functional areas and needs to be considered within an overall corporate online strategy. OPOWER research indicates that although online access to energy consumption reports has advantages, it is also important to maintain a paper-based option for those customers who either do not have access to the web or are not comfortable using online tools.

12.2.2 Will the energy consumption reports be strictly limited to natural gas consumption, or will the report also include electricity consumption?

Response:

As part of the assessment process, the FEU are in preliminary discussions with FortisBC (electric) regarding the feasibility of dual fuel home energy reporting in its shared service territory for the Fall 2012 pilot. Until further internal due diligence is completed, the FEU have not discussed a collaboration in BC Hydro's service territory. The FEU understand that like all other such collaborative initiatives there may be cost sharing benefits to the utilities and greater engagement by customers who can view their overall energy use in relation to their neighbours. However, the FEU recognize the need for a great deal of diligence related to privacy concerns that may arise from a dual fuel home energy reporting initiative across two utilities.

12.3 Will FEU make available to customers any online tools to determine how they can save energy cost effectively?

Response:

It is not known at this early stage exactly what will comprise the online web portal or tools for this customer engagement initiative. The vision is that in addition to online access to energy consumption reports, cost effective conservation tips and energy saving rebate offers will be

provided. In addition to this customer engagement tool initiative, the FEU are assessing other online tools such as an energy calculator for inclusion on the FortisBC website. (Please refer to the response to BCUC IR 3.10.1).

12.4 FEU expects to record savings of 122,500 GJ in 2013. To accomplish this level of savings, will it be necessary for FEU to enroll 105,000 customers in the month of January. If FEU does not enroll 105,000 customers in January, please explain how this program will achieve savings of 122,500 GJs in 2013.

Response:

The chart below explains the methodology that was employed to develop the preliminary energy savings calculation for the Customer Engagement Tool in Exhibit B-25. Please note that this proposed implementation plan was provided for budgeting purposes in developing a 2012 – 2013 EEC Plan and that all energy savings assumptions and implementation strategy are under review and will be refined over the course of program development.

Annual energy savings per participant are estimated to be one GJ per year based on approximately 1% savings for natural gas only programs (based on OPOWER research). The plan, as suggested above, was not to enroll 105,000 customers in January, but rather to roll out in phases based on budget and program success. The proposed plan was based on a Fall 2012 pilot of 70,000 participants. It is not unreasonable to assume that participants receiving their first mailing in the fall will capture ¼ GJ within that year and 1 GJ in the following year. This pilot group then accounts for 17,500 GJs in 2012 and 70,000 GJs in 2013.

Only if it were successful would the pilot be extended to a proposed additional 140,000 participants in the Fall of 2013. This accounts for an additional 35,000 GJs in 2013. In adding the annual savings from the 70,000 pilot participants, and one-quarter of a GJ for 140,000 participants in the fall of 2013 results in the 105,000 GJs, which we believe is referred to in this IR. The combined savings from 2012 and 2013 participation results in 122,500 GJs by the end of 2013.

The table below explains the proposed estimates of energy savings in a table format. The FEU wishes to emphasize that these numbers were provided for illustrative purposes only in developing an outlook for 2012 and 2013 Residential Program Area activities. The decision whether or not to employ a Customer Engagement tool, and an implementation plan for doing so, will be provided in the 2011 EEC report to be submitted in March, 2012.

2012 - 2013 Energy Savings Estimates for Customer Engagement Tool

Note: these estimates provided for budgeting purposes only and will be revised upon further research

Customer Engagement Tool Implementation	# of Participants	2012 Savings (GJ/yr)	2013 Savings (GJ/yr)	Cumulative Savings (GJ/yr)
Fall 2012 Pilot	70,000	17,500	70,000	
Fall 2013 Launch	140,000	-	35,000	
Program Total	210,000	17,500	105,000	122,500

12.4.1 To the extent that FEU revises its expectations with respect to the rate of program participation, please recalculate the Benefit Cost Ratios for 2012 and 2013.

Response:

Please refer to BCUC IR 3.12.4 for an explanation of the methodology used to estimate 122,500 GJs for the 2012-2013 proposed implementation of a Customer Engagement Tool such as OPOWER. The FEU believe that the methodology put forward in estimating 122,500 GJ's is consistent with the assumptions outlined. As additional data becomes available through ongoing research, the FEU will update its results accordingly.

12.5 Please provide documentation in support of the 2 year measure life.

Response:

Further research conducted since the time of writing the 2012-2013 EEC Plan suggests that behaviour-based programs attribute a one year rather than two year measure life as presented in the 2012-2013 EEC Plan. Full cost-benefit analysis is being conducted as part of the business case currently under development. If the FEU decide to move forward with such a Customer Engagement Tool, cost benefit results and the assumptions associated with those results will be presented in the 2011 EEC Report that will be submitted March 2012.

12.6 In what other jurisdictions has OPOWER been implemented for natural gas utilities? How long have these programs been available?

Response:

OPOWER has been implemented in numerous natural gas utilities and jurisdictions across North America. The FEU will be monitoring the success of these other programs in developing their program design and if the decision is to proceed with this program, benchmark the success of their program with these utilities. The following list describes the utility and the launch date:

Gas only

- New Jersey Natural Gas – February 2011
- NW Natural – January 2011
- Southern California Gas - 2009

Dual fuel

- Constellation/Baltimore Gas and Electric – November 2010
- Central Hudson Gas and Electric – April 2011
- City of Palo Alto Utilities – October 2010
- Gainesville Regional Utilities – May 2010
- National Grid – October 2009
- NSTAR Pacific Gas and Electric – September 2010
- Puget Sound Energy – October 2008
- Sacramento Municipal Utilities District – March 2008
- San Diego Gas and Electric – currently in deployment
- Xcel Energy – November 2009

12.6.1 Please provide copies of impact and process evaluations of natural gas OPOWER programs.

Response:

The following documents provide an overview of the extent to which the OPOWER tool has been evaluated by third parties and approved by regulatory bodies in many jurisdictions in North America. The FEU will be examining available impact and process evaluations as part of the due diligence in developing their business case and in developing a program design that will ensure success.

Included in Attachment 12.6.1 are the following documents:

- Summary of OPOWER Measurement and Evaluation – "Summary of support for OPOWER's approach to behavioural energy efficiency"
- Summary of independent evaluations of OPOWER Measurement and Evaluation – "Independent evaluations of OPOWER's M & V methodology and program results"
- M&V study from Puget Sound Energy as sample of third party process evaluation of a program that includes natural gas entitled "Puget Sound Energy's Home Energy Reports Program".

13.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 16

New Construction – EnerGuide for Homes and Energy Efficient Appliances

Incentive Amount*	FEI: $442 + $198 BCH** / FEVI: $517 + $219 BCH**

13.1 Please confirm that the BC Building Code comes into effect in fall 2012 and mandates construction to the EnerGuide 80 level.

Response:

Based on communications with the provincial government, as recently as October 2011, it is unlikely that the Province will adopt new housing energy requirements in the Fall of 2012 nor mandate construction to the EnerGuide 80 level at that time. One option the Province is considering is the adoption of the national approach to housing energy currently under development. If this is the path chosen, the new national energy requirements for housing are expected to be published before the end of 2012 and the Province would provide for an implementation preparation period that is likely to be between 9 and 12 months. From this information it would be reasonable to assume that the earliest the EnerGuide 80 mandate would be in market is the middle of 2013.

13.1.1 If the code comes into effect in fall 2012, why is FEU funding incentives to new home builders to attain the EnerGuide 80 level in 2013?

Response:

Please refer to BCUC IR 3.13.1 for information from the Ministry regarding the delay in the EnerGuide 80 mandate assumed to be mid-2013 at the earliest. The FEU will be working with BCHydro and FortisBC to set the stage for this upcoming legislation through incentives, support for builder education and consumer outreach on the benefits of energy efficient homes. The FEU will be monitoring updates to the BC building code and will take appropriate measures to ensure that program design is consistent with building code updates. When budgeting for new construction programs, program entry is based on building permit date but incentives are paid

out after measures are installed. This process can take anywhere from six months to more than a year for some developments. This creates challenges in forecasting budgets within a calendar year. Analysis is under way to determine energy savings and other assumptions for the introduction of the next EnerGuide levels for future program design.

13.2 For which energy efficient appliances will incentives be provided for under this program?

Response:

There are three energy efficient appliance programs that are being evaluated for inclusion in the New Construction program:

- ENERGY STAR water heater technologies including 0.67 EF storage tanks, and new technologies including condensing tanks, and tankless systems;
- EnerChoice fireplace products; and
- ENERGY STAR washers for homes with natural gas water heating systems.

These program offerings will be funded within the appliance specific programs but they will be marketed to builders and developers under the banner of the New Construction program.

Although these appliance programs are in market for retrofit situations, FEU is currently researching assumptions for the new construction market. Energy savings claims and measure life will likely be the same; however, appliance costs may be lower when builders are able to purchase in volume quantities.

13.2.1 Why are these appliances not funded under other appliance specific programs such as the ENERGY STAR Domestic Hot Water Technologies program or the EnerChoice Fireplace Program?

Response:

As stated in the response to BCUC IR 3.13.2.1, the energy efficient appliance programs for the new construction market will be funded within the appliance specific programs, but they will be marketed to builders and developers under the New Construction program. The 2012-2013 EEC plan includes funding for new construction within these individual program areas.

13.3 Please explain the difference in incentive funding provided by FEI and FEVI versus that provided by BC Hydro.

Response:

The EnerGuide 80 incentive payment is $2,000 per Single Family Dwelling (SFD) and $200 per Townhome unit. The utility contributions are outlined in the table below based on the primary fuel source of the dwelling. The utility contribution is based on their respective energy savings claims achieved when builders move from the base line of current BC Building code to EG80.

Fortis BC New Construction Program in collaboration with BCHydro PowerSmart New Homes Program
Contribution to EnerGuide 80 Incentive

Dwelling Type	Total EG80 Builder Incentive	Natural Gas Heated Home Utility Contribution			Electrically Heated Home Utility Contribution		
		FEU	BCH	Total	FEU	BCH	Total
EnerGuide 80 Single Family Dwelling	$2,000	$1,500	$500	**$2,000**	$0	$2,000	**$2,000**
EnerGuide 80 Townhome (per mid and/or end unit)	$200	$100	$100	**$200**	$0	$200	**$200**

For ease of developing an overview of the TRC for the EnerGuide 80 New Construction program, Appendix 1 to Exhibit B-25, Section 3.3.8 provides an aggregate view of program inputs for single family homes and townhomes weighted by the proportion of Single Family Dwellings and Townhomes in the two regions. Further detail about the program will also be provided in the 2011 EEC report that will be submitted at the end of March 2012.

The FEU are in initial discussions with Fortis BC on integrating an EnerGuide 80 offer in their shared service territory in 2012.

14.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 17; Reasons for Decision, TGI/TGVI EEC Application, p. 24

Efficiency Partners Program

"This Program will develop and manage a contractor network to promote EEC programs and energy efficiency messaging…but may be expanded to include equipment manufacturers, distributors, and retailers."

"The Trade Relations program area is aimed at the support and education of skilled trades, equipment manufacturers, distributors, suppliers and retailers, appliance and equipment salespeople and Realtors." (Reasons for Decision, TGI/TGVI EEC Application, p. 24)

14.1 Please specify when the Program Manager for the Efficiency Partners program was hired.

Response:

The Program Manager for the Efficiency Partners program joined the group in September 2010.

14.1.1 Given the date of hire of the Program Manager please explain why the Efficiency Partners program "will develop and manage a contractor network". Why has the network not been formed?

Response:

Forming a contractor network takes time. The Program Manager first evaluated the existing Qualified Dealer network that existed on Vancouver Island, researched other trade ally programs, conducted research with contractors, designed the FEU's Efficiency Partner program, wrote the internal business case for same, had it approved, developed program collateral, travelled throughout the service territory conducting contractor registration drives, collected and verified contractor applications, developed a database of contractors, and established an on-line customer-facing portal for finding a contractor which was launched in September 2011. To the extent that all this work has been conducted, the network has been formed. The network will be refined as the Companies gain more experience working with the contractor group.

14.2 Please provide a breakdown of the forecast $500,000/year expenditure in each of 2012 and 2013.

Response:

The following table is a breakdown of forecast expenditures ($000's) for the Efficiency Partners Program in each of 2012 and 2013.

Service Region	Administration	Training	Communication	Co-op	Evaluation	Total
FEI	44.5	133.5	89	133.5	44.5	$445
FEVI	5	15	10	15	5	$50
FEW	0.5	1.5	1	1.5	0.5	$5
Total	**$50**	**$150***	**$100***	**$150***	**$50**	**$500**

To date, 327 natural gas contractors registered with the BC Safety Authority have applied to join the FortisBC Contractor program. Establishing an Efficiency Partners program builds a foundation from which to deliver the support and education necessary to those who can directly influence end-use customers in support of EEC programs.

Highlights of planned 2012 Efficiency Partners program activities are as follows:

- Develop training sessions that support EEC activity;
- Continue to collaborate with Ministry of Energy and Mines, electric utilities, industry, regulators / enforcement and compliance bodies, and post-secondary institutions on activities that support contractor education and training;
- Execute a communication plan in support of the Contractor program and EEC activities that extends to various efficiency partner groups such as manufacturers, distributors, suppliers and retailers;
- Implement strategies to increase uptake of co-op advertising opportunities available to Contractor program members;
- Evaluate the potential for a a Contractor program sub-brand; and
- Establish evaluation tools utilizing TrakSmart (evaluation and reporting tool).

In 2013, it is expected that focus will remain on supporting trade allies by continuing to provide education and training opportunities, communication and outreach activity directed to our efficiency partners, and offering co-op funding opportunities.

The ability to analyze contractor engagement through the implementation of an evaluation tool will provide insights that allow us to explore introducing a contractor recognition element to the program to encourage contractor participation in our EEC initiatives.

While evaluation of Efficiency Partner program activity in 2012 will guide efforts and direction in 2013, it is forecast that spending levels will remain at $500,000 in 2013. As well, it is forecast that the breakdown of expenditures will remain in roughly the same categories as noted in the table above, but figures may vary between categories.

14.3 Will this program provide contractors with information about the various FEU EEC incentive offers?

Response:

Yes, please refer to the response to BCUC IR 3.9.4.1. While this response is directed specifically at how the TLC program relies on the Efficiency Partners program to educate gas contractors, similar methods are deployed to inform the contractor community of the various FEU's EEC incentive offers, as applicable.

14.4 In the Reasons for Decision issued concurrently with Order G-36-09, the Trade Relations program is described as "the support and education of skilled trades, equipment manufacturers, distributors, suppliers and retailers, appliance and equipment salespeople and Realtors." Please explain how the Efficiency Partners program is different than the Trade Relations program.

Response:

The intent of the Efficiency Partners program is the same as the intent of the Trade Relations program outlined in the original EEC Application. The Efficiency Partners program is currently focused first on "skilled trades" and will eventually expand to include the other market players

described in the excerpt above. This initiative was described in detail in Appendices K-3 (Sections 4.8.3 and 5.13.4) and K-4 (Sections 11.2.1.4, 11.2.2 and 11.3.2) to Exhibit B-1. In the original EEC Application, the FEU applied for approximately $1.5 million of discrete funding over the time period 2008-2010 for a Trade Relations initiative. The Commission Decision in Section 2.4.2 of the Reasons for Decision cited above states that, "The Commission Panel considers that the Trade Relations program area expenditures [emphasis added] represent a significant duplication of the Residential and Commercial Energy Efficiency programs' non incentive costs…and accordingly, this area of expenditure is rejected." The Companies interpreted the Commission's comments in this regard such that the discrete expenditure request for Trade Relations was rejected, as funding for "the support and education of skilled traides, equipment manufacturers, distributors, supplier and retailers, appliance and equipment salespeople and Realtors" was contained within the Residential and Commercial Energy Efficiency program areas. It can be seen in Exhibit 3 of Appendix 1 to Exhibit B-25 that the Efficiency Partners funding for 2012 and 2013 has been allocated from within the Residential Energy Efficiency Program Area budget for 2012 and 2013.

14.5 In the Reasons for Decision issued concurrently with Order G-36-09 the Trade Relations program expenditures were rejected because they "represent a significant duplication of the Residential and Commercial Energy Efficiency programs' non-incentive costs" and the Commission found the level of information about the Program to be insufficient. Please explain how the Efficiency Partners program does not duplicate activities funded under other Program Areas such as Residential, Commercial, Industrial, and, Conservation Education and Outreach.

Response:

The work being done in the Efficiency Partners program outlined for 2012 and 2013 is only being done in that program; work related to developing and training a network of gas contractors is not being done in any other Program Area. Significant detail concerning the activities within the Efficiency Partners program area for 2011 was provided in Appendix K-4 to Exhibit B-1, in Section 11.3.2. It is anticipated that these activities will continue in 2012 and 2013.

15.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 20; Exhibit B-1, Appendix K-4, p. 100

Switch N Shrink Program

15.1 Please specify the AFUE level of furnace eligible for a $1,000 incentive under this program.

Response:

The Switch 'N Shrink program provides incentives for ENERGY STAR heating systems including furnaces that have an AFUE Rating ≥ 0.90 and boilers with an AFUE Rating ≥ 0.85. Since the propane and oil heating equipment being replaced is older, it is of lower efficiency than the new natural gas heating equipment will be. The program benefits include lower energy bills for participants and significant GHG emissions reductions.

15.2 At page 100 of the 2010 EEC Annual Report FEU states "[b]y building on 2010 program awareness, program participation is expected to more than double for a total of 420 participants as outlined in Table 5-2 for the 2011 forecast. The 2011 program cost effectiveness is higher than 2010 due to decreased marketing expenditures." Did the Switch N Shrink program achieve the forecast 420 participants in 2011 with decreased marketing expenditures?

Response:

The 2011 Switch N Shrink program participation is approaching 420 participants based on program to date participation. 2011 program participation relied on contractor engagement and outreach activities that promoted the entire residential program offering. The FEU was planning a fall promotion, however with uncertainty in funding, the initiative was postponed until there is certainty that the program will be extended in 2012. The chart below illustrates the program participation in 2010 and a 2011 forecast.

Switch 'N Shrink

2010 versus 2011 Program Participation and Communications Expenditures

Program Reporting Period	Participant Counts			Communications Expenditures - ** ($000s)		
	FEI	FEVI	Total	FEI	FEVI	Total
2010 EEC Report & BCUC IR 1.191.2	29	149	178	45	68	113
2011 Forecast in 2010 EEC Report	100	320	420	19	77	96
Actual as of Sept 30, 2011	66	237	303	-3	11	8
2011 Forecasted as of Oct 25, 2011*	88	314	402	-3	11	8

* Based on average of 34 participants per month; 22% FEI:78%FEVI

**Negative value represents a net value after a credit for media purchased in 2010

15.3 Does the 2012 and 2013 Communication budget for the Switch and Shrink program replace the previous year's marketing expenditures? If so, what were the 2010 and 2011 marketing expenditures?

Response:

Please refer to BCUC IR 3.15.2 for a summary chart that presents 2010 marketing expenditures ($113,000) and forecasted 2011 marketing spend ($8,000 plus outreach activities). The 2012 and 2013 projected $100,000 annual communications budget is in alignment with 2010 expenditures. The 2011 Fall campaign was postponed while the Companies awaited an interim decision on the 2012-2013 Revenue Requirements Application. That decision was received October 21, and given the lead time that such a campaign would take, the Companies decided to launch a campaign in early 2012 and again in the fall 2012 heating season.

15.4 What data is FEU relying on to forecast that participation in the Switch N Shrink program will increase in 2012-2013 to 500 participants per year?

Response:

Based on past performance of the program with increased participation over time, the FEU believe it is reasonable to assume that Switch N Shrink participation will continue to increase. Marketing will be undertaken to coincide with the announcement of the 2012 extension to increase program awareness. The marketing message will include the availability of government programs that support furnace replacements, savings on heating costs, and GHG emission reduction. Outreach through the Efficiency Partners Program will engage contractors in program promotion. Over time, the FEU Energy Solutions Managers are identifying opportunities for conversions in the Interior. In summary, the FEU believe that with some dedicated marketing initiatives and ongoing outreach activities, 500 program participants is achievable.

16.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 31; Exhibit B-17, Attachment 118.1 to BCUC IR 2.118.1, p. 7

Efficient Boiler Program

	Retrofit	New Construction
Incremental Measure Cost*	$35,834	$65,711
Incentive Amount*	$13,517	$24,687
Savings per Participant*	510 GJ	1069 GJ

> According to respondents, if FortisBC had not offered the Efficient Boiler Program to the customers that participated in the survey, 69% would still have completed the retrofit, often due to old equipment needing upgrades. Those who would not have undertaken a retrofit project indicated that the "[FortisBC] incentives persuaded them to do it, [because otherwise] financial cost would have been a barrier."

16.1 FEU estimates 510 GJ savings/participant for retrofit installation and 1069 GJ/participant for new construction installation. Since the baseline technology is the same under both scenarios under what specific circumstances would the energy savings per installation in new construction be more than under the retrofit scenario?

Response:

If in any given year, the new construction participants have buildings that are on average larger or more energy intensive than the retrofit participants, the average absolute (ie GJ) savings per new construction participant will be higher. The opposite also holds true.

This difference is captured by the methodology employed by the FEU in tracking and claiming energy savings for participants in the Efficient Boiler Program. The FEU determine the savings in GJs for each participant[6], and subsequently aggregate all savings to produce both a total program savings and, when divided by the number of participants, an average per participant savings specific to any given year. This exercise is performed independently for each utility, as well as for both retrofit and new construction markets. As such the reported average savings may vary between years, regions and markets. Note that the new construction data is prone to greater variance as there are a very limited number of participants in any given year; thus, any one particular new construction participant may have a significant impact, either raising or

[6] Please refer to BCUC IR 2.97.1 for additional details.

lowering, the average new construction savings. Conversely retrofit data tends to be more stable as the significantly greater rate of participation restricts the impact that any one participant may have on the retrofit average savings.

16.2 If measure costs are incremental, not full cost, under what specific circumstances would the cost of a new construction efficient boiler exceed the cost of a retrofit boiler measure (when programs typically pay the full incremental cost)?

Response:

The difference between the cost of a retrofit and new construction shown on page 31 of the EEC Plan is based on collected actual cost data from all program participants in 2010. The FEU determine the incremental cost for each participant, based on participant reported costs, and divide all incremental costs by the number of participants for an average per participant incremental cost specific to any given year.[7] This exercise is performed independently for each utility, as well as for both retrofit and new construction markets, since the reported Incremental Measure Cost may vary between years, regions and markets. Note that the new construction data is prone to greater variance as there are a very limited number of participants in any given year; thus, any one particular new construction participant may have a significant impact, either raising or lowering, the average new construction Incremental Measure Cost. Conversely retrofit data tends to be more stable as the significantly greater rate of participation restricts the impact that any one participant may have on the retrofit Incremental Measure Cost.

16.3 FEU estimates an 18% free rider rate for this program in the 2012-2013 EEC Plan yet the Analysis of Energy Savings from FortisBC Efficient Boiler Program from August 5, 2011 (Attachment 118.1 to BCUC IR 2.118.1) found that 69% of customers would have completed the retrofit if FortisBC had not offered the Efficient Boiler Program. Please explain the discrepancy in these numbers. If the 18% is a blended rate for new construction and retrofit, please explain exactly how it was derived and provide the survey data to support it.

[7] Please refer to BCUC IR 2.97.1 for additional details.

Response:

The estimate of 18% free rider rate (FRR) is derived from an Efficient Boiler Program (EBP) Savings Evaluation prepared for BC Gas by Jack Habart & Associates, dated June 12, 2003. The FEU continue to use the 18% FRR which they consider to be at least as conservative as the FRR used by comparable utilities. Refer to the Response to BCUC IR 3.16.3.1 for further details.

The FEU have not used the 69% figure from the Efficient Boiler Program (EBP) Savings Evaluation in Attachment 118.1 to BCUC IR 2.118.1 due to limitations in the participant survey which generated this figure. The participant survey asked the following question of survey participants:

> *"Q10. Please imagine that your organization had not been offered a financial incentive to participate in the Efficient Boiler Retrofit program. In that scenario, based on what you know about your organization, would you have completed the retrofit?"*

While the response to the quoted question provides some insight the results should not be considered authoritative. In particular, the question does not properly capture participants' intentions relative to the selection of high versus standard efficiency boilers when performing a boiler replacement. While it is clear that, regardless of the availability of an incentive, customers must replace boilers which have reached the end of their useful life, it is not at all clear that high efficiency boilers would be selected.

More generally the limitations of the participant survey must also be recognized. As indicated in section 4.1, page 7 of the EBP Savings Evaluation, the survey was only able to collect responses pertaining to 49 out of the total of 135 sites studied. Responses for these 49 sites were obtained from 32 individuals. In several cases these individuals were in the employ of relatively sophisticated organizations and were responsible for the operations of multiple buildings. These customers may be better positioned to perceive the benefits, and in consequence insist on the use of high efficiency boilers from the outset. In any case less sophisticated customers are not well represented in the data set as these customers typically delegated responsibility for boiler replacements to their contractor, and were thus unfamiliar with the details and unable to answer the survey questions. The data set and associated responses therefore cannot be considered representative of the market as a whole.

The FEU intend to update the EBP Savings Evaluation on an annual basis, and will likely continue to survey program participants. Subsequent participant surveys will be revised to better capture the relevant data.

The FEU are actively engaged in revising the Efficient Boiler Program to streamline administration and ensure that incentive levels, and incented technologies are appropriate. All of the key TRC input assumptions are under review and in several cases, including the FRR, subject to further investigation.

16.3.1 Is the company concerned that a subsequent evaluation of the program will substantially reduce actual net savings due to free riders? If not, why not?

Response:

The Companies do not anticipate significant changes to the FRR as the currently used 18% FRR for boiler programs is in line with the FRR used by other utilities as shown in the following table:

Utility	Measure	FRR
Union Gas	Condensing Boilers	5%
Enbridge Gas	Near Condensing Boilers (Commercial/MURB)	12% / 20%
	Condensing Boilers (Small Comm/Large Comm/MURB/New Const)	10% / 12% / 20% / 26%
Gaz Metro	Near Condensing Boilers	22%
	Condensing Boilers	6%
Manitoba Hydro	Condensing Boilers	Varies annually per participant survey:
	Near Condensing Boilers	4% in 2010
Sask Energy	Condensing Boilers	Not Reported
	Near Condensing Boilers	Not Reported

Note however that the Companies are currently engaged in a comprehensive overhaul of the Efficient Boiler Program to ensure it adheres to industry best practices in terms of both program design and administration, and is in line with the objectives of the EEC initiative. Included within the scope of work for the overhaul is a critical review and evaluation of the TRC input assumptions including the Free Rider Rate. Should free ridership ultimately be found to be so significant that support for high efficiency boiler upgrades is no longer cost effective, the

Companies will consider the market to have been transformed and thus prepared for more stringent regulation of minimum boiler efficiency performance standards. The programs may then be closed out and resources re-tasked to other areas of need.

17.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 34; Exhibit B-1, Appendix K-4, p. 24

Commercial Energy Assessment Program

17.1 Why will FEU claim savings for these assessments? Will energy assessors be directly installing measures at facilities in order to claim savings? Will energy assessors retro-commission building systems and controls in order to claim savings?

Response:

This response will address BCUC IRs 3.17.1 and 3.17.1.1.

The FEU are claiming savings for this program as a portion of the program participants, most notably manufacturers, do in fact implement at least one of the recommended energy conserving measures (ECM) outlined in their energy assessment report. The implementation of recommended ECMs generated actual energy savings which were demonstrated by first performing a billing analysis of past program participants to quantify the reduced natural gas consumption of these participants. A participant survey subsequently sought to identify and account for factors other than the implementation of a recommended ECM to which any savings may be attributable. For additional details please refer to the Commercial Energy Assessments Program Evaluations for both 2008 and 2010, submitted as attachments to BCUC IR 1.212.1. While we can never be certain that any particular individual receiving an energy assessment will implement a recommended ECM, many programs participants do implement ECMs as a result of the energy assessment. The two program evaluation studies demonstrate a clear and direct link between participation in the program and the generation of tangible natural gas savings for program participants in the aggregate.

17.1.1 What is the direct correlation between an energy assessment report and actual energy savings acquired?

Response:

Please refer to the Response to BCUC IR 3.17.1.

17.1.2 If the program funds an energy assessment or audit and directs participants to available incentive programs, why are the savings not counted under the incentive programs?

Response:

This response will address BCUC IRs 3.17.1.2 and 3.17.1.3

The FEU agree that savings derived from customers who participate in programs encouraging the implementation of specific energy conserving measures (ECMs) should be attributed to those programs. Note that to date, the ECMs which Energy Assessment program participants have implemented have generally not been measures for which the FEU have had an incentive program in-market. For example, the greatest savings occur among manufacturing sector participants, typically derived from the replacement of boilers used in manufacturing processes. The FEU, however, have not as yet provided incentives towards improved natural gas efficiency in process (i.e. manufacturing) loads.

The FEU's approach to reporting natural gas savings attributable to this program has been to develop a reasonable estimate of average participant savings and apply this value to the participant total in a given year to yield a reasonably representative estimate of savings attributable to the Commercial Energy Assessment program specific to that year. In the estimation of average savings for the Commercial Energy Assessment program, participation in other programs is factored out. More specifically the FEU cross referenced all participants in the 2010 Evaluation Study's data set for participation in other commercial incentive programs. Two participants were found to have also participated in the Efficient Boiler Program (EBP). Of these two, one was found to have participated in the EBP prior to participating in the Commercial Energy Assessment Program and adjustments to the study baseline consumption were made in consequence.

The Evaluation Studies established a clear link between participation in the program and energy savings, thus the Companies believe that attributing some savings to the program is reasonable. In view of the variable nature of the recommended and implemented ECMs, however, the FEU also thought it prudent to use a highly conservative 1 year measure life. While the method does not perfectly represent the savings achieved by any one participant in the Commercial Energy Assessment program, the FEU believe it provides a reasonable and conservative representation of the overall program savings and benefit cost scores. Future evaluation studies will no doubt serve to refine the average savings per participant estimate, further enhancing the Companies' reporting accuracy.

17.1.3 How does FEU ensure savings are not double counted between the Commercial Energy Assessment Program and the other programs under which incentives are provided?

Response:

Please refer to the response to BCUC IR 3.17.1.2.

17.2 Is it correct that neither Enbridge nor Union Gas claim savings associated with their Energy Assessment programs?

Response:

Per the FEU's response to BCUC IR 2.97.1 which lists the energy savings from similar commercial programs run by other select Canadian utilities, both Enbridge and Union Gas do not report energy savings from their respective energy assessment programs.

17.3 FEU is estimating 488 GJ of savings per participant. Yet, the average for 2010 actuals is roughly 317 GJ. Please explain this discrepancy.

Response:

The estimate of 488 GJ savings per participant on page 34 of Appendix 1 to Exhibit B-25 in the program profile for the Commercial Energy Assessment program is value for the gross savings per participant. Page 24 of Appendix K-4 to Exhibit B-1 is the first page of the Energy Star® Heating System Upgrade Program. For the purposes of this response, the FEU would refer the reader to pages 71 – 74 of Appendix K-4 to Exhibit B-1, where the Commercial Energy Assessment is discussed. The average energy savings for the 2010 actuals have had the free rider effect netted out. In the case of the Commercial Energy Assessment Program the FEU use a Free Rider Rate of 35% as identified on page 32 of the 2010 Program Evaluation, and provided in Table 4-11, page 72 of the 2010 EEC Annual Report.

A reconciliation of the two values is provided below:

Estimated average savings per participant = 488 GJ
Total 2010 participants (FEI & FEVI) = 68
Free Rider Rate = 35%
Gross Annual program savings = 68 participants x 488 GJ/participant-yr
Gross Annual program savings = 33,184 GJ
Net Annual Program Saving = Gross Annual Program Savings less savings from free riders
Net Annual Program Savings = 33,184 GJ x (1-0.35) = 21,569.6 GJ/yr
Average Net Participant Savings = 21569.6 GJ/yr / 68 participants
Average Net Participant Savings = 317.2 GJ/yr

17.3.1 Since actual results are highly dependent on the number and size of participating customers, would a weighted-average (based on customer GJ throughput/actual GJ billings) yield a more accurate estimate of future savings per participating customer?

Response:

The FEU agree that a weighted average methodology is a more accurate means of estimating savings per participating customer. More precisely the FEU weighted the average savings in each sector (ie. MURBs, Offices, Care Homes) by the number of participants in each sector[8] to assess the average savings per customer. This method assigns greater weight to the average savings of sectors with higher participation, as opposed to simply those with greater average savings. The weighted average determined as described above was combined with the average reported previously[9] to generate a number more consistent with a reasonable long term average. The FEU believe that this provides a reasonable estimate of per participant average savings attributable to this program. The FEU are not sure what is meant by weighted average as it relates to the following text in the Information Request: "based on customer GJ throughput/actual GJ billings".

[8] As provided in the "Energy Savings" section, pgs. 13-26, of the 2010 Energy Assessment Program Evaluation Study

[9] Average savings from 2008 Program Evaluation: 299 GJ / participant.

18.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 35

Spray Valve Program

18.1 The Spray Valve Program is expected to enroll 366 participants in 2012. While FEU is installing low flow spray valves will FEU also be making efforts to directly install any other low cost efficiency measures? If not, why not?

Response:

No, the FEU do not currently have plans to directly install additional ECMs while installing low flow pre-rinse spray valves. The focus of the Spray Valve program is food service establishments and there are not many other readily-installable low cost natural gas energy efficiency measures in the food services industry.

19.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 44

Energy Specialist Program

"This Program will create Energy Specialist positions, whose key priority is to identify opportunities for their organization to participate in FortisBC's EEC programs. The Energy Specialist reports to and supports the Energy Manager on holistic energy reduction projects, while also focusing on identifying opportunities to use natural gas more efficiently."

19.1 Please confirm that FEU plans to continue to fund Energy Solutions Manager positions in 2012-2013 as well as the Energy Specialist positions. Please confirm under what Program budget the Energy Manager positions are funded.

Response:

The FEU plan to continue to fund Energy Solutions Manager positions in 2012-2013 in addition to the Energy Specialist positions. The Energy Specialist positions are assigned to large commercial and institutional customers, while the Energy Solutions Manager positions are FEU's staff that work on increasing participation in commercial programs for smaller and medium sized organizations. Thus, the budget for the Energy Solution Manager positions falls to the Commercial Program Area generally and the Energy Solutions Managers allocate time spent on working on customer participation in specific programs to those programs.

19.2 Why has FEU not attributed energy savings to this program?

Response:

The Energy Specialist Program is an enabling program and therefore does not have any energy savings directly attributed to it. Energy savings associated with increased client organization participation in the FEU's EEC programs as a result of Energy Specialist activity are attributed to the appropriate FEU EEC program in order to prevent double-counting of these energy savings. As cited in the response to BCUC IR 2.122.2, the Energy Specialist Program is "… considered to be an enabling activity and therefore supports FEU's EEC program development and delivery …" As indicated in the Program Description (Exhibit B-25, Appendix 1, p. 44), "This Program will be funded as an enabling program."

Gigajoule savings incurred as a result of Energy Specialist placements are currently self-reported by the Energy Specialists. The FEU are exploring how the energy savings incurred through each Energy Specialist placement could be verified and reported on. Currently, the tentative plan is to hire an independent consultant to conduct selective audits on Energy Specialist projects to verify reported proposed gigajoule savings. These audits would begin in 2012. Once this auditing process is established and results are reported, it is feasible that FEU could begin attributing energy savings to this program for those projects the Energy Specialists undertake where energy savings are not already attributed to another EEC program.

19.3 What specific tools will the Energy Specialist use to assist participating customers with identifying and assessing energy efficiency projects? For example, will the Energy Specialist have available any project cash flow tools to demonstrate the cash flows and payback of energy efficiency projects?

Response:

The Energy Specialist works with the BC Hydro funded Energy Manager to develop and implement a Strategic Energy Management Plan. This is the business case that moves energy management projects forward within the organization. The Energy Specialist assists the Energy Manager with completing a centralized project list which captures the opportunities available within the organization's facilities to take advantage of the FEU's and BC Hydro's respective energy efficiency incentives and other opportunities for more efficient energy use. The Energy Specialist utilizes the FEU's EEC incentives where applicable to reduce the proposed payback period on energy efficiency projects. After project approval, the Energy Specialist facilitates the implementation of the new equipment as well as the application process for the incentives.

At this time, the FEU have not provided the Energy Specialists with any specific FEU designed tools to demonstrate cash flows and paybacks of energy efficiency projects. However, the current version of the Energy Specialist Program includes a requirement that all Energy Specialists must have either a BCIT Sustainable Energy Management Associate Certificate or have completed the UBC Masters in Clean Energy degree. Both of these programs contain curriculum that covers an introduction to financial analysis which includes education on net present value and payback of energy efficiency projects.

19.4 Will FEU's energy specialist program be integrated with BC Hydro's Energy Manager programs? If yes, please provide specific examples of how the two programs will be integrated from the customer's perspective. If not, how can FEU claim to provide participating customers with "holistic energy reduction projects"?

Response:

The FEU's Energy Specialist Program will continue to be integrated with BC Hydro's Energy Manager Program, although there will not be one person within an organization handling both gas and electricity conservation projects. The Energy Specialist reports to the Energy Manager, and these two positions then constitute the client organization's Energy Management Team. This team works together to accomplish the following:

- Develop a 2-3 year Strategic Energy Management Plan
- Identify and execute projects that take a holistic approach to energy efficiency in order to maximize both natural gas and electricity energy savings
- Maximize utility energy efficiency incentives
- Deliver quarterly presentations to their organization's executives to outline the energy usage picture and seek endorsement on projects
- Provide joint educational workshops to facility management staff and building occupants
- Develop and deliver employee awareness campaigns to influence energy usage behaviour

Please note, however, that there may be instances where an organization does not have the electrical consumption to warrant a BC Hydro funded Energy Manager but consumes a large amount of natural gas and possesses significant natural gas saving opportunities. In these cases, the FEU may decide to fund an Energy Specialist within the organization assuming that investigation into the organization confirms these natural gas saving opportunities and reveals a culture which would be supportive of energy management.

19.5 What are the specific Energy Specialists' sales, energy savings and participation targets?

Response:

The Energy Specialists are not presented with specific sales, energy savings or participation targets. Establishing specific targets for the Energy Specialists would be difficult and time-consuming as each organization is different with regards to their natural gas saving opportunities.

Energy Specialists' incentive to perform and return results is based on the continuation of their funding. The performance of an Energy Specialist is assessed based on their project plan and subsequent quarterly reports. Energy Specialists are required to submit a report every three months detailing how they have progressed on the natural gas projects in their project plan. This report must be submitted to the FEU's satisfaction before their quarterly funding is paid. An assessment report on this project update is then produced for the Energy Specialist by the FEU. This assessment report is subjective in nature in that it does not benchmark against preset goals but instead comments on the progress made on the projects listed in the project plan and provides direction to the Energy Specialist regarding any energy efficiency opportunities that may have been missed. If an Energy Specialist shows little to no progress on their project plan through their quarterly report, they are at risk of having their funding discontinued or not renewed.

19.6 Will Energy Specialists be paid a bonus or commission based on program performance (i.e. exceeding participation and energy savings goals vs. load building programs)?

Response:

No bonuses or commissions will be paid to Energy Specialists. In order to maintain fairness and equitability across participating customers, all participating Energy Specialist organizations receive $60,000 per year to fund their Energy Specialist positions.

Please note that an Energy Specialist is considered to be a full-time employee of the organization that they are positioned with. The $60,000 funding allotment is considered to be sufficient to partially cover the standard salary and benefits associated with this position. However, although they are not considered to be employees of the FEU, the Energy Specialists

are required to supply the FEU with regular reports detailing their energy efficiency projects in order to warrant continued funding for their position.

19.7 How will the Energy Specialists' savings goals be treated vis-à-vis increased participation in fuel switching or Thermal Energy Services or Alternative Energy Services?

Response:

Please see the response to BCUC IR 3.19.5. Energy Specialists are not provided with specific natural gas energy savings goals. Energy Specialist performance is evaluated on a case-by-case basis.

19.7.1 Will their compensation/bonus/annual reviews consider these competing goals equally or will GJ savings be afforded greater weight?

Response:

Please see the response to BCUC IRs 3.19.5 and 3.19.7. Energy Specialists are evaluated based on the total EEC program incentive dollars they are able to qualify their organization for and on the natural gas savings they are able to attribute to their other energy efficiency projects. Energy Specialists are only asked to report on any fuel switching or thermal energy solutions projects generally. They are not evaluated on these projects.

20.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 45; Exhibit B-1, Appendix K-4, pp. 142, 144

Conservation Outreach and Education Programs

20.1 In the 2010 EEC Annual Report FEU described 13 programs under the CEO Program Area. The 2012-2013 EEC Plan lists 18 programs under the same Program Area. Please explain why FEU has expanded its CEO programs.

Response:

As the CEO program area only started in 2009, it is a growing program area which needs to be flexible in order to educate additional customers accessing energy conservation information and to also supplement the other growing program areas of the EEC portfolio. As discussed in response to BCUC IR 1.216.3, many of the programs in the 2012-2013 EEC Plan are expansions of the programs listed in Table 8-1 in the 2010 EEC Annual Report to include additional customers. The CEO Programs listed in the EEC Plan still target the same audiences as listed in the 2010 EEC Annual Report: Residential and General Public, Commercial Customers, Conservation for Affordable Housing, and School Outreach. In the EEC Plan, specific initiatives targeting each of those audiences are listed to provide greater transparency on CEO initiatives. The new CEO programs planned for 2012-2013 that were not directly listed on the Annual Report include: Commercial Multi Family, K-12 School Efficiency Measures, Residential Mass Education on Conservation and Energy Literacy, Medium-Large Commercial Education Sessions, and Behaviour Programs – Energy Specialists. The Commercial Multi Family and K-12 Home Efficiency Measures are really an expansion of the Home Efficiency Measures Program (targeting single family dwellings), but expanded to the multi-family and student audiences. In addition, in 2011 some educational needs were identified as lacking from the CEO program area, such as Residential Energy Literacy, training sessions for commercial building operators on natural gas equipment efficiency in the Medium-Large Commercial Education Sessions, and Behaviour Programs – Energy Specialists, to supportprograms delivered by FEU Energy Specialists in their respective client organizations, and these were therefore added into the EEC Plan.

20.1.1 Has FEU considered consolidating CEO programs and streamlining the delivery of outreach and education programs? If so, please provide supporting details of such efforts.

Response:

The FEU have not yet considered consolidating the CEO programs as many of the programs were only developed in 2009 and 2010. The CEO program area will continue to grow into 2012-2013 in order to reach various customer groups and segments, such as residential (including low income and ethnic customers), commercial customers, and students. In addition, the CEO program area needs to supplement the other growing program areas of the EEC portfolio, for instance, supporting the FEU's Energy Specialists and the education initiatives they undertake in their respective organizations. On the other hand, the FEU have started streamlining the delivery of outreach and education programs. One example is the partnerships with the BC Lions, Vancouver Giants and Prince George Cougars which all form part of the Energy Champion Program. This program affords the FEU the opportunity to promote energy conservation through online activities, and by having the teams' players deliver energy conservation in-school assembly presentations, as well as during games. This allows the FEU to present a consistent message in and outside of the classroom thereby increasing message retention among students. The K-12 Home Efficiency Measures is another example of streamlining CEO programs. Beyond Recycling, for instance, is enhancing its 2011-2012 school program on energy from a theory to an applications-based program by distributing efficient low-cost fixtures for students to bring home and install. Additionally, students act as the conservation ambassador at home to reinforce their parents' behaviours, and also ensure that low-flow fixtures are installed as they will also have homework related to the content and installed fixtures, such as home energy audits, and calculating consumption and energy saved.

20.2 Is FEU aware of any studies which show the energy savings attributable to general conservation education, including the persistence of savings? If so, please file them.

Response:

Some programs within the CEO program area will never have attributable energy savings such as home/trade shows and community events, in-class school presentations, Energy Champion promotions, and public education campaigns. This follows a similar practice by other utilities, such as BC Hydro and FortisBC Inc., in treating general conservation education as portfolio level support activity that supplements and supports the incentive based programs.

Low cost efficiency measures, such as low flow showerheads and low flow faucet aerators, are a growing area in the CEO program area. As these programs are being developed, the

Companies' CEO staff is working with the Residential and Commercial Program areas to ensure that any attributable energy savings are captured within the EEC portfolio. These measures were identified in the Conservation Potential Review ("CPR") study in 2010, the summary for which was filed as Appendix K-2 to Exhibit B-1.

Another growing area within the CEO program area is the behavior-based programs which the FEU are currently piloting. Behavioural actions with the potential for energy savings can also be found in the CPR in Chapter 6. Depending on the behavioural program, some utilities claim 0-15% in energy savings, where the lower end of the scale represents program with no feedback on usage, while the higher end of the scale involves with real time feedback. There are several studies on various behaviour programs with energy savings; however, very few (if any), have the persistence of energy savings. There are several factors which make the persistence of savings difficult to sustain in a program. Individuals each have different barriers and motivations to adopting a particular behaviour. Successful behaviour change programs require frequent reminders and ongoing messaging to motivate participants to continue engaging in conservation behaviour. Included in Attachment 20.2 is the study entitled, "Residential Energy Use Behavior Change Pilot Researcher," conducted by Franklin Energy, which notes that savings will be made permanent when individuals develop new habits, usually over the course of 3 months with sustained feedback as they adjust to their new routine, as opposed to, when reward incentives were used to achieve the energy savings. The FEU, when developing behaviour change programs, must look for a balance between pursuing persistence of energy savings, educating participants, and the communication costs associated with sustaining frequent feedback to those participants.

20.3 Please provide a comparison of FEU's planned spending on CEO with spending on CEO activities by utilities in other jurisdictions. Please include all the utilities listed in the table provided in response to BCUC IR 2.113.1.

Response:

The FEU do not have information on CEO activity spending by utilities in other jurisdictions. The table below provides a comparison of CEO's 2012-2013 planned spending compared with other utilities in BC. The specific activities under BC Hydro's and FortisBC Inc.'s equivalent of "CEO activities" may differ slightly from the FEU's; however, all play a similar role supporting the programs and initiatives in their respective energy efficiency portfolio.

The table below is a comparison of CEO Activities in Utilities in BC ($ millions). As can be seen below, it is the view of the Companies that the FEU spending on CEO activities is reasonable when compared to other utilities in British Columbia.

	2012 ($ million)	2013 ($ million)	Approximate Number of Customers
FEU			
Conservation Education and Outreach	**5**	**5**	950,000
BC Hydro*			
Public Awareness and Education	8.8	9	
Community Engagement	7.5	7.6	
Total	**16.3**	**16.6**	1,800,000
FortisBC Inc.**			
Supporting Initiatives	0.725	0.725	
Behavioural Programs	0.28	0.28	
Total	**1.005**	**1.005**	161,000

*BC Hydro's 2008 LTRP, Appendix K

**FortisBC Inc. 2012-2013 Capital Expenditure Plan

20.4 Is FEU aware of any commission or utility guidelines from other jurisdictions that govern utility spending on CEO-type activities? If so, please file them.

Response:

The FEU have research from Washington on CEO-type activities. In Washington State, the Public Utilities Commission differentiates between behavioural programs with measurable and quantifiable energy savings, and outreach and educational programs with non-quantifiable energy savings. The guidelines for Avista utilities are:

1. Avista is allowed to spend up to 10% of its energy efficiency budget on efficiency programs such as education and outreach, which do not have approved evaluation measurement & verification protocol, as long as the overall portfolio of conservation passes the Total Resource Cost (TRC) test.

2. Avista will only claim savings on an educational program behaviour-type program if it can quantitatively run a study that will hold up to regulatory scrutiny (must have approved evaluation measurement & verification protocols).

3. In light of 2, a utility will put its budget toward claimable savings, and unless protocols for quantifying savings are cemented, utilities may not put as much budget towards educational programs

The guidelines are includeded in Attachment 20.4. Please see section 7, Program Design Principles; bullet "D" (pages 20-21).

20.5 Does FEU collaborate on any of the CEO activities with other British Columbia utilities?

Response:

Yes, the FEU do collaborate with other British Columbia utilities, namely FortisBC Inc. and BC Hydro, on CEO activities. With FortisBC Inc., collaboration and cost sharing is sought on several activities that take place in the South Okanagan and Kootenay regions, such as: the school programs Destination Conservation, Beyond Recycling, Environmental Mind Grind, Class and Online Curriculum; event tracking research; magazine/newspaper advertising costs; home shows and community events; brochures/signage costs; and giveaways such as 5 minute shower timers.

With BC Hydro, collaboration has been sought on the Sears Home Energy Tune-Up Pilot Program and the BC Green Games school program. The FEU and BC Hydro are currently seeking additional collaboration opportunities for CEO activities, but have first commissioned SDR Survey Ltd. to conduct a study, which is still in the preliminary stages, on joint outreach, to determine the public's appetite for both utilities to work together at public events.

20.5.1 If not, given that a goal of the Program Area is to foster and develop a culture of conservation within the province, wouldn't it be an efficient use of ratepayer funds to publish a coordinated message

rather than having multiple utilities providing information on energy conservation?

Response:

Please see the response to BCUC IR 3.20.5.

21.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 50; Reasons for Decision, TGI/TGVI EEC Application, p. 21

Residential Mass Education on Conservation and Energy Literacy

21.1 Please provide a breakdown of the specific evaluation activities that will be funded by the planned $70,000 per year.

Response:

The Residential Mass Education on Conservation and Energy Literacy is intended to utilize print and online communications, including bill inserts, newspaper advertising, as well as, ethnic media channels, radio, and television.

An advertisement tracking study conducted by a third party researcher is estimated to be about $35,000 with an overall sample size of 1500, spread over 5 waves. This is based on a previous advertisement tracking study for another department in the FEU in 2011. In addition, the FEU's CEO team would also look to advertisement testing which is estimated to be $12,000 to evaluate the effectiveness of the audience's knowledge from the key messages from the advertisements. Lastly, with the remaining $23,000, the FEU's CEO team is exploring the opportunity to conduct in-language research studies with Chinese and South Asian audiences to understand their awareness and knowledge of energy conservation messaging to better target this growing population group in BC. The studies are recommended for both 2012 and 2013 as tracking and testing should be seen as a continual process which provides a feedback loop back to the FEU to help shape future campaigns and messages.

21.1.1 How will FEU determine whether this mass education campaign has been effective? Does the program aim to increase knowledge or does it aim to have residential customers make smart energy choices? How will FEU evaluate whether consumers have made smart energy choices or taken action as a result of the mass education campaign?

Response:

The program aims to both increase knowledge, and encourage residential customers to make smart energy choices. A good conservation education campaign requires repetition,

consistency of messages, complements the Residential Programs in the EEC portfolio, and has a long term strategy that first builds on increasing awareness and knowledge, and then second, focuses on action. As some energy literacy messages may be more complex in nature than general home energy savings tips, the program will require the use of multiple media. The FEU are exploring a variety of methods to evaluate whether consumers have made smart energy choices or have taken action as a result of the mass education campaign. One method is through advertising testing as described in the response to BCUC IR 3.21.1. Another is through web analytics, for example, pages viewed and time spent on the website. Furthermore, the FEU will collect anecdotes noting common customer inquiries, comments, and complaints through event evaluations from all the home shows and community events, as well as through gas contractors' feedback. The evaluations and feedback will act as a guide for future customer messaging and events. Lastly, CEO will also work with the Residential Program group to determine through residential program evaluation whether the energy literacy campaign influenced customers to participate in an EEC program, or raised their awareness of EEC programs.

21.2 Please discuss the efficiencies and effectiveness of a mass education campaign run jointly by all utilities in British Columbia or by LiveSmartBC versus a mass education campaign run by FEU alone.

Response:

A mass education campaign run jointly by all utilities in British Columbia or by LiveSmartBC may further the promotion of a conservation culture in the Province by unifying a general conservation message. It may also lead to cost efficiencies as the utilities or LiveSmart share in the media costs. According to SDR Survey Ltd.'s preliminary research study on BC Hydro and the FEU's joint outreach opportunities, many consumers view the overall energy conservation message from both utilities as being the same.

However, that same study also indicated there was a notable difference in the conservation marketplace between BC Hydro and the FEU, such as ownership with BC Hydro being a Crown corporation and the FEU being an investor-owned utility. From the study, and discussions with customers at outreach events, there is the potential for customer and public misconception as to the reason why an investor-owned utility would want to reduce consumption of its product. This leads the FEU to believe that greater education is required on natural gas energy efficiency and how the management of this resource can affect peak usage. In addition, as the equipment and most end uses for gas and electricity are different, each utility will have different energy

conservation behaviour priorities. The FEU's conservation messaging focuses on reducing natural gas usage related to space and hot water heating. Equipment related to space and hot water heating can be more difficult for an individual to directly control, or sometimes even access. For instance, in a single family dwelling the furnace and hot water tank are frequently found in the basement or crawlspace, and in multifamily buildings or other commercial facilities, heating equipment are usually found in a locked room. As the equipment is "out of sight", customers may also perceive it to be "out of mind", which in turn, requires greater emphasis on gas conservation education and bringing customers' attention to this equipment. Residential electricity conservation messaging, on the other hand, focuses mainly on lights, electronics, and appliances – energy end uses for which customers have easier access to controlling their individual usage by, for example, turning off the lights or unplugging electronics. Furthermore, capital investment amounts in space and hot water heating equipment are greater than capital investments in the cost of lighting and Energy Star electronics (e.g. TVs) and appliances (e.g. dishwashers) and so, again, increased education on natural as capital investment and payback is required. Finally, efficiency labeling and testing on natural gas equipment also differ, for example, Energy Star ratings and Annual Fuel Utilization Efficiency testing is for furnaces, EnerChoice and EnerGuide for gas fireplaces, and Energy Factor for hot water storage tanks. There may be some end uses and labeling where the conservation message is similar between natural gas and electricity, such as Energy Star for dishwashers and building envelope; however, those topics should be looked at on a case by case basis. In summary, the advantage for the FEU to deliver a mass education campaign is to address the unique aspects of natural gas equipment and end uses.

21.2.1 Please discuss the impact of a mass education campaign on conservation and energy literacy on general brand awareness of FortisBC and FortisBC Energy.

Response:

The mass education campaign is aimed at increasing conservation and energy literacy as described in the EEC Plan. Increased "general brand awareness" may result from the campaign, but the objective is to educate consumers on energy efficiency and not to increase awareness of the FEU "brand." This is no different than virtually any activity undertaken by the FEU, such as safety messaging.

21.3 In the 2009 Reasons for Decision on the TGI/TGVI EEC Application the Commission directed Terasen "to review the CEO program with a view to:…altering the program to allocate funds away from the mass media campaign and to include other initiatives, with particular attention paid to conservation education within the school system and affordable housing initiatives". Please explain, given the direction to Terasen in 2009, why has FEU budgeted funds to a mass media campaign for 2012 and 2013?

Response:

In the 2008 EEC Application, the CEO program area had requested approximately $13 million, and about half of that budget was weighted towards mass media. With $6.9 million for Conservation Education and Outreach approved by the Commission, in 2010, FEU directed $175,116 of the $1.616 million CEO spend towards mass media. This was print and online advertising, and did not pursue television or radio advertising. The specifics of the 2010 and January to June of 2011 print and online advertising campaigns can be found in the response to BCUC 2.121.2. The FEU have looked for other methods to engage with customer groups such as increased outreach events, school programs, and other partnerships. In the 2012-13 EEC Plan, the mass media program constitutes only 13% of spending in the CEO program area. This is a minimal increase from the 2010 and 2011 (estimated) total CEO spending. The FEU are proposing increased print and online advertising, and adding radio within the media mix to educate on topics such as: differences in energy efficiency ratings (e.g. Annual Fuel Utilization Efficiency ("AFUE") and Energy Factor ("EF"), rating percentages, and efficiency labeling (e.g. Energy Star, EnerChoice, and EnerGuide). The CEO program area will also continue to allocate more funds to initiatives other than mass media.

There is a need today to educate all customers, with increased consistency and frequency, using a variety of channels; a mass media campaign is part of that mix. There are still significant knowledge gaps in British Columbia on the topic of energy literacy. Further, the energy landscape has changed in BC since 2009 with new efficient technologies in the marketplace, municipal building codes on new construction, new provincial policies that require newly constructed homes be solar ready, provincial regulation in 2010 on new energy efficiency standards for gas hot water tanks, and an increased emphasis on greenhouse gas emission reductions from public sector organizations under the Greenhouse Gas Reduction Targets Act. With new technologies, new efficiency ratings, and increased regulation coming from all areas, the average customer lacks a full understanding of their options. A mass media campaign is the best way to reach the broad spectrum of the FEU's customers to communicate the needed information.

The energy literacy campaign proposed in the EEC Plan is a specific campaign to address this lack of understanding, and to promote energy literacy. As indicated in the response to BCUC IR 3.21.2, conservation messaging on efficient natural gas equipment and end uses, as well as some efficiency ratings, are different from other energy fuel sources such as electricity, and need to be communicated to the FEU's customers.

22.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 54

Energy Champion Program

22.1 Please specify the level of partnership (i.e. Premier Partner level) FEU funds with each of the sports organizations listed – the Vancouver Canucks, the BC Lions, the Western Hockey League, and the BC Hockey League.

Response:

The activities that the FEU conduct with the Vancouver Canucks and BC Lions were mutually designed and are unique to the FEU with a strong educational component. With the Vancouver Canucks, for example, the FEU ran an "ugly sweater" campaign to encourage fans to conserve energy and also an online Energy All Star Promotion based on making conservation commitments. As for the BC Lions, the FEU were able to deliver 75 energy conservation-themed elementary school assemblies throughout the province, launch an online "Energy Champion" contest for children and youth, and reinforce the conservation message through in-game activations which included conservation videos. These activities are also described in response to BCUC 1.216.1.

Currently, no partnership agreements have been signed for the 2012-2013 season with the Vancouver Canucks, BC Lions, Western Hockey League BC teams, and the BC Hockey League. It should be noted that the FEU's partnership with the Western Hockey League is with certain BC teams within the Western Hockey League. The 2012-2013 figures referenced on page 54 of the 2012-13 EEC Plan are based on a level similar to the 2011-2012 season. In each case, the partnership with the sports organization is based upon services provided by the organization that have been developed unique to the FEU's program with the organization, based upon the FEU's requirement for that program, which are in turn somewhat unique to the particular aspects of each organization.

Please see response to BCUC IR 3.22.1.1 on the partnership costs for the 2011-2012 season.

22.1.1 For each of the sports organizations please provide the cost of the partnership and the other corporations/organizations/partners that support the same level of partnership for the sports organization as FEU.

Response:

Please see also the response to BCUC IR 3.22.1. Currently, no partnership agreements have been signed for the 2012-2013 season with the Vancouver Canucks, BC Lions, Western Hockey League BC teams, and the BC Hockey League. The 2012-2013 figures in the EEC Plan are based on a level similar to the 2011-2012 season. The table below lists the cost of partnership with each of the sports organizations for the 2011-2012 season and provides some information about other corporate entities that are partnered with sports organizations; however, sports organizations are highly reluctant to, or prevented by confidentiality agreements from, revealing funding levels and the activities that each corporate partner is paying the sports organization to undertake on their behalf. The FEU do not have any information about other corporate partners' funding levels of the club, nor about the activities that the corporate partner has contracted to have the sports organization undertake for the corporate partner.

Sports Organization	2011-2012 Season FEU Commitment	Other Corporations/Organizations at Approximate Same Level of Partnership
Vancouver Canucks	$250,000	N/A – confidentiality agreements
*BC Lions	$250,000	Rona, Scotiabank, Telus, Nissan, and Budweiser (source: www.bclions.com)
*Vancouver Giants (Western Hockey League)	$40,000	Bank of Montreal, Canadian Direct Insurance, Nintendo of Canada, Post Media Community Publishing, Subway, Tim Hortons
*Prince George Cougars (Western Hockey League)	$8,600	N/A
Kootenay Ice (Western Hockey League)	$2,950	N/A
Kamloops Blazers (Western Hockey League)	-	still in discussions
Victoria Royals (Western Hockey League)	-	still in discussions

*includes energy conservation school program delivery

In the case of the BC Hockey League, Subway, Kal Tire, BC Hydro, Rogers Sportsnet, RBK and Labatts are all at higher partnership levels than the FEU.

The partnerships between the FEU and local sports organizations are custom designed for the FEU specifically with a goal of educating customers on energy conservation. The FEU are not privy to the details of the partnerships between the sports organizations and other entities with

whom those organizations might be partnered and therefore of the view that any attempt at comparison is not relevant due to lack of information.

22.2 Please provide a breakdown of the $20,000 planned expenditure on Evaluation.

Response:

The $20,000 planned expenditure on Evaluation is based on surveying attendees at 5 game days with the various sports organizations where the FEU have set up a booth presence and activation. The surveys will be conducted by a third-party researcher. This expenditure is based on a 2011 quote with an estimated cost of $3,500 to $4,000 per event from a research company for a similar study conducted with the FEU.

22.3 Please provide any evaluations done by other utilities or in other jurisdictions on the effectiveness of a utility partnering with local sports organizations on energy conservation knowledge or behaviours.

Response:

The FEU are not aware of any evaluations done by other utilities and in other jurisdictions on the effectiveness of a utility's overall partnership with sports organizations on energy conservation knowledge or behaviours based on a search of the following list of energy efficiency resources:

- Natural Resources Canada – Office of Energy Efficiency;
- Ontario Energy Board;
- Canadian Energy Efficiency Alliance;
- Northwest Energy Efficiency Alliance;
- American Council for an Energy Efficient Economy;

- Consortium for Energy Efficiency; and
- Lawrence Berkeley National Laboratory.

However, the table below provides a sample of utilities that do partner with local sports organizations on energy conservation campaigns. It appears that the utilities' evaluation is based on a specific campaign promotion versus their overall partnership with a sports organization.

Utility	**Sports Organizations**	**Campaign**	**Evaluation Metric**
BC Hydro	Vancouver Canucks, Vancouver Whitecaps, Vancouver Canadians, BC Hockey League	Team Power Smart	Number of Team Power Smart sign ups
FortisBC Inc.	Kelowna Rockets (hockey)	various energy conservation messaging	Event evaluations
Baltimore Gas and Electric Co.	Baltimore Ravens (football)	Peak Rewards air conditioning recycling	Number of program sign ups and referrals
Laclede Gas	St. Louis Rams (football)	Green Week	Number of homes weatherized and staff awareness projects
PECO Energy Co.	Philadelphia Flyers (hockey)	Go Green Promotion	Website traffic
Duke Energy Corp	Carolina Panthers (football)	Gross' Green Team School Outreach Program	Number of schools

23.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, pp. 55, 60, 66

Home Efficiency Measures and Commercial Multi Family and K-12 Home Efficiency Measures

23.1 What efficient, low-cost measures will be distributed under the Home Efficiency Measures Program? Where will the efficient, low-cost measures be distributed?

Response:

Low flow faucet aerators, low flow showerheads, weatherstripping, and hot water pipe insulation are items under consideration for distribution under the Home Efficiency Measures Program. These measures will be distributed through partnerships, such as with municipalities and regional districts as they also have energy and costs savings goals to achieve, as well as local sites for distributing the measures to customers. The CEO program area is working closely with the Residential program area to ensure any related energy savings from these programs would be captured.

23.2 What efficient, low-cost measures will be distributed under the Commercial Multi Family Program? Where will the efficient, low-cost measures be distributed?

Response:

Low flow faucet aerators and low flow showerheads are items under consideration for distribution under the Commercial Multi Family Program, with the potential to include additional measures in the future. These low-cost measures will be distributed in collaboration with industry associations, such as BC Apartment Owners and Managers Association or Condo Home Owners Association of B.C. in order to locate appropriate multi-family sites. The CEO program area is working closely with the Commercial program area to ensure any related energy savings from these programs would be captured.

23.2.1 How are the Home Efficiency Measures and the Commercial Multi Family CEO Programs different?

Response:

The measures for the Home Efficiency measures are directed at single family dwellings, while multi family housing, such as apartment and condominiums, are the target of the Commercial Multi Family program.

23.3 What efficient, low-cost measures will be distributed under the K-12 Home Efficiency Measures Program?

Response:

Low flow faucet aerators, low flow showerheads, weatherstripping, and hot water pipe insulation are items under consideration for distribution under the K-12 Program. In the EEC Plan, energy savings were not included in the CEO program section; however, on all programs with low cost measures, the CEO program area is working closely with the Residential program area to ensure any related energy savings are captured.

23.4 How can FEU be sure that the measures will be installed? Has FEU learned any lessons on ensuring that free low cost measures are actually installed by the recipients from the distribution of Energy Savings Kits?

Response:

The FEU have learned lessons from the recipients of the distribution of Energy Savings Kits (ESK) and from 2 pilot programs in 2011 that were directed at non-low-income residential customers (the District of Saanich Low Flow Water and Weatherization Pilot Program and Sears Home Energy Tune-up Pilot Program, which are described in sections 8.3.1.4.1 and 8.3.1.4.2, respectively, of the 2010 EEC Annual Report (Appendix K-4 to Exhibit B-1)).

The ESK program assumed that not every measure would be installed, and the savings were discounted by an amount to reflect that. Interim reports from both pilots showed that the District of Saanich program included a component of both self install and direct install, both with high

participation uptake. The Sears Home Energy Tune Up also showed that some customers, even with the technician available to install directly, preferred to consult with their partner before installing some of the measures. From these programs, the FEU conclude that while customers are keen to use home efficiency measures, they would like an option to choose which measures to install, instead of acquiring a whole kit. The FEU will consider this in further development of its Home Efficiency Measures and Commercial Multi Family and K-12 Home Efficiency Measures programs.

In addition, in the 2010-2011 school year, the CEO program provided a classroom with a set of low flow showerheads as part of the energy unit delivered by Beyond Recycling to a participating elementary school in the Kootenay region. Students were then assigned a task to track the change in water use with these measures and then participated in family challenges to commit to energy saving behaviours for a month. Students act as the ambassador of the program and will have influence on ensuring it is installed in the home, especially since the curriculum homework is tied to applications used in the home. As CEO has found this to be a successful form of streamlining programs, the FEU intend to expand the offering with Beyond Recycling, and potentially other school programs, starting in the 2011-2012 school year. As stated in the response to BCUC IR 3.23.3, CEO will be working with the Residential program area to track those energy savings and include them in the EEC portfolio.

24.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 61

Behaviour Programs – Online Community Site

24.1 Please describe what content or functionality health authority staff members can access on the online site.

Response:

The health authority staff members can access the site with a login for the following content pages: the Dashboard, Green Care Hub, and Community Discussion page.

The Dashboard is the main page and compiles the most relevant and popular content currently available on the site. Here a user can commit to conservation actions, compare their commitment results among their peers, invite colleagues to join, read trending topics and the newsfeed, and join in Community Discussion by responding to users' posts.

The GreenCare Hub is made-up of ten different topic areas: Energy, Travel, Food, Climate Action Fund, Green+ Leaders, Green Buildings, Materials and Waste, Water, Toxics and Chemicals, and Carbon and Sustainability Reporting. Each topic includes stories related to the health authorities or sustainability and all are written by health authority staff.

The C3 Community includes community discussions, where users can post, comment, and 'like' stories from their peers; a News section, for relevant news stories related to the health authorities and sustainability; case studies, and an events calendar.

24.1.1 Please provide screen shots of the site to illustrate the functions staff can engage in.

Response:

Please refer to Attachment 24.1.1.

24.2 Please provide all web analytic data FEU has collected for this site.

Response:

Web analytics have been compiled on a monthly basis starting in March 2011 when the program was launched to the Health Authorities. Please refer to Attachment 24.2 for analytics from March 2011 to September 2011.

24.3 Is this program redundant with the Home Energy Efficiency Web Portal? If not, why not?

Response:

No, the Online Community Site is not redundant with the Home Energy Efficiency Web Portal. The Online Community Site was built as a conservation learning tool for large commercial/institutional customers to engage with their employees. The Site was built based on several of the Community Based Social Marketing principles of competition and rewards, recognition, and making public commitments. As it is targeted to employees of these large commercial/institutional customers, access is limited through the organization's intranet, or a login via an externally hosted site. Engagement with the site is encouraged through user dialogue and sharing case studies and resources on energy efficiency related topics.

The Home Energy Efficiency Web Portal is designed as an information based website on home energy renovation for BC residents. The main objective is to offer a "One Stop Home Energy Efficiency Shop" for homeowners by gathering all home energy efficiency rebates from the utilities onto one site. It will be a stand-alone website, but with direct links to utility partners websites. The site will be scalable to include additional partners, such as municipalities with rebate programs, and functions, such as search ability by postal code for available rebates in their respective region.

25.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, pp. 64-67

School Programs

25.1 Has the Class and Online Curriculum course been accepted as part of the provincial school curriculum? If so, for what grade levels?

Response:

The Class and Online Curriculum is a new initiative and currently being developed by Kidzsmart specifically for the FEU to deliver to elementary schools and is not part of the provincial school curriculum; however, it will complement the provincial curriculum. The online component will also include an additional web resource for parents and teachers.

25.1.1 How many school districts and individual schools offered the EEC in-class modules or online modules in 2010 and 2011?

Response:

The Class and Online Curriculum is a new program and was not offered at school districts and individual schools in 2010 and 2011. For detailed information about Conservation Education and Outreach activities conducted in schools in 2010 and planned for 2011, please refer to Appendix K-4 to Exhibit B-1, sections 8.2.4 and 8.3.4.

25.2 FEU states "[t]his [Post Secondary] Program will develop and administer post secondary programs/competitions and initiatives…directed at students living on campuses. These programs will encourage post secondary students to make energy saving choices." Please explain why FEU will target students living on campuses only. What percentage of total post secondary students in BC live on campus?

Response:

It should be noted that the excerpt in its entirety should read, "This Program will develop and administer post secondary programs/competitions and initiatives, *such as goBEYOND*, [emphasis added] aimed at students living on campuses." The FEU's Post Secondary Program will indeed include programs for all post secondary students. In the EEC Plan description of this Program area, the phrase about students living on campus was meant to apply only to the goBEYOND initiative, rather than the whole Post Secondary Program. A revised description of this Program is listed below:

> *"This Program will develop and administer post secondary programs/competitions and initiatives throughout the Province. goBEYOND is one initiative in this Program area, and it encourages students living on campuses to make energy saving choices."*

goBEYOND ran a conservation campaign in 2010 at approximately 10 campuses in BC, and so, has already built the program foundation and structure to support an expanded program in 2011 to include gas conservation. The EEC Plan assumes goBEYOND will likely run their program again in 2012 and 2013. The FEU are not aware of the percentage of total post secondary students in BC living on campus. For the goBEYOND program, the FEU estimate that 1,500 students will be directly engaged in the challenge this year and that close to 4,000 people at approximately 9 campuses will be exposed to conservation messaging. As students living on campus are generally first time 'renters,' they will be learning about the various aspects of living on their own, such as managing their energy use. The FEU have another program currently in development with Northwest Wildlife Preservation Society targeting all post secondary students, including post secondary students not living on campus, with a goal to launch in the 2012-2013 school year.

25.3 Please discuss how much control students living on campuses have over their natural gas energy use given that most students would presumably live in multi-unit buildings owned and managed by the post secondary institution.

Response:

Students living on campuses generally have minimal control over their natural gas energy use; however, this situation is similar to residents in multi-family buildings and home renters in the FEU service territories who may pay strata fees or rent, where the building is managed by a

strata, property management company, or landlord, and access to heating equipment/controls are limited. Nonetheless, there are universal conservations behaviours to reduce gas consumption that are applicable to all types of customer groups, including post secondary students living on campus, such as taking shorter showers to save on hot water, washing clothes in cold water to save on hot water, and putting on a (extra) sweater/blanket instead of turning up the temperature.

26.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 70

Industrial Technology Retrofit Program

26.1 Please confirm that FEU has not offered this program in years prior to 2012 but that FEU ran a Heat Exchanger Pilot, a Heat Exchanger Pulp and Paper Mills and a Burner Management Control Program for Industrial customers for the first time in 2011.

Response:

The FEU confirm that incentives were not offered in years prior to 2012 for measures such as heat exchangers or burner management controls currently under the Industrial Technology Retrofit Program. The Industrial Technology Retrofit Program is a customized program that is geared to provide financial incentives for the retrofit of specific eligible technologies that improve process efficiencies resulting in a reduction in gas consumption which is further described in Appendix 1 to Exhibit B-25 on p. 70. Some eligible technologies (measures) represented under that program are high efficiency heat exchangers, burner management controls, lime kiln chain systems and boiler upgrades. All of the existing measures will be evaluated based on performance of the upgrades that is the savings amount achieved with that specific improvement. Should those measures prove to be successful in reducing overall process gas consumption, the FEU may launch a full prescriptive program for that measure. For example, if the heat exchanger pilot were to be successful, the FEU intend to launch a "Heat Exchanger Pulp and Paper Mills Program" for the pulp and paper industry in B.C. either in late 2013 or in 2014 when the information becomes available. Please refer to 2010 Annual Report Table 9-1: 2011 Industrial Program Area Outlook" p.168. The FEU anticipate that additional technologies will be added over time as future opportunities present themselves.

26.1.1 Please provide the evaluation studies that were completed on the 2011 Industrial Programs to support the expansion of the Industrial Technology Retrofit Program in 2012 and the planned expenditures of $1.7 million per year in 2012 and 2013.

Response:

As stated in response to BCUC IR 3.26.1, the measures in the Industrial Technology Retrofit Program were initiated for the first time in 2011. Therefore, there is no evaluation data currently available. The planned expenditures are not for the expansion of the Industrial Technology Retrofit Program but they are for the development of planned measure pilots under the Industrial Technology Retrofit Program.

On April 16, 2009, the Commission issued its Decision and Order No. G-36-09 ("Decision") on the Companies' Energy Efficiency and Conservation ("EEC") application and stated that:

> *"The Commission Panel considers that the omission of an industrial sector program in Terasen's EEC Application is a significant and unfortunate shortcoming in Terasen's stated efforts to support the BC Energy Plan ("Energy Plan") Policy Actions (Exhibit B- 1, Appendix 6) with respect to Energy Efficiency in the industrial sector."*

In order to respond to this, the FEU initiated the pilots in the Industrial Technology Retrofit program in 2011.

26.2 Please explain how the incentive amounts were determined. Are there guidelines or a formula?

Response:

The incentive guidelines and the methods for the incentive amount calculations are under development, and the Companies' counterparts' such as BC Hydro and Enbridge Inc. in Ontario incentive methods is being researched. However, the general guideline behind the FEU's incentive structure is to provide funding of no more than 50% of the customers' incremental cost based on the amount of natural gas saved, up to $1 million for projects equal to or greater than $500,000. For projects less than the $500,000 threshold, the Companies' intention is to provide funding of up to 75% of the incremental cost, based on the amount of natural gas saved.

Currently, the EEC Industrial Sector program area has four pilots under the heading "Industrial Technology Retrofit Program" and all of these pilots are under development. The Heat Exchanger Pilot, and the Lime Kiln Chain Upgrade Pilot for the pulp and paper industry are above the $500,000 threshold. Therefore, the upper incentive limit for both of these pilots is $1 million or 50% of the project cost whichever is lower. More specifically, for the Heat Exchanger pilot, the estimated cost of the project is said to be around $2 million by various customer

reports and the maximum incentive amount will not exceed $1 million (50% of the project cost). For the Lime Kiln Chain Upgrade pilot, the estimated project cost is $1 million and FEU's maximum incentive amount will be $500,000 which is 50% of the project cost. The Burner Management Control Upgrade and Boiler Replacement and Boiler Component Upgrades are below the threshold. The Burner Management System Upgrade pilot currently underway has an estimated project cost of around $13,000 to $14,000. Therefore, the upper incentive limit for this program is roughly $10,000 which is 75% of the project cost. For the Boiler Replacement and Boiler Component Upgrade pilot, currently there is no project related cost estimation figures and the incentive amount is subject to change as this pilot continues to develop. The Companies believe that the results of these pilots will lay the foundations of our incentive structure in the future.

For further clarity, currently there is no single incentive formula proposed for the Companies' industrial programs. The FEU's initial Energy Efficiency and Conservation (EEC) Programs application on May 2008 indicated that the Companies' industrial customers typically have diverse needs that may not be met by a generic EEC program. Individualized EEC programs may be required to meet specific customer requirements.[10] Therefore, an industrial Demand Side Management (DSM) program needs to recognize the uniqueness of individual sites. The recently completed Conservation Potential Review (CPR) Industrial Sector Report confirmed this analysis and indicated that there are a number of cost-effective energy efficiency measures suitable for the industrial sector. It is also important to note that other utilities, such as BC Hydro, have designed their industrial DSM programs to accommodate the ability to offer custom incentives.

[10] Terasen Gas Inc. and Terasen Gas (Vancouver Island) Inc. Energy Efficiency and Conservation Programs Application, May 2008, page 78

27.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1, p. 73-75

Innovative Technologies Program

27.1 FEU is requesting approval of $4 million per year for a Solar Thermal incentive program. Is the Innovative Technologies Solar Air Heating System program redundant with parts of the Solar Thermal program? If not, why not?

Response:

No, the Innovative technologies Solar Air Heating System program is not redundant with parts of the Solar Thermal program.

The funding requested for solar thermal activity within New Initiatives is a separate funding envelope. Should a program within Innovative Technologies around solar thermal air heating system prove to be viable following a review of the pilot and evaluation results andshould New Initiatives funding be approved, funding would then be available for a full program for solar thermal air heating system.

As solar thermal air can be installed for a variety of uses and applications from solar heating buildings, to agricultural and manufacturing process drying, the FEU may need to conduct several pilots/evaluation studies to gather data required to analyze those opportunities. As such the FEU have broken down the solar air heating opportunity within Innovative Technologies into two areas, industrial/agriculture and commercial/institutional, as the measure data varies for each such as the energy savings, incremental cost and measure life estimates.

Under the industrial/agricultural area, the FEU are currently working with the Ministry of Agriculture to develop a scope of work for a prefeasibility study geared to determine the solar air heating opportunity for the agriculture sector. In completion of the study, the FEU would evaluate the feasibility of launching a pilot. This opportunity pertaining to the agriculture sector is indicated as the Solar Air Heating System pilot referenced in Exhibit B-25, Appendix 1, p. 78, 9.4.2 Solar Air Heating System Pilot.

Under the commercial/institutional area, the FEU committed funds for the Solar Air Heating PSECA Program for 6 schools and hospitals in 2011. The FEU are currently awaiting proof of system commissioning and is expecting impact evaluations late 2013. Further details on the evaluation timing can be found in response to BCUC IR 2.114.2.

28.0 Reference: Energy Efficiency and Conservation

Exhibit B-25, Appendix 1

Regulatory Process

28.1 Please explain why FEU filed its 2012-2013 EEC Plan on September 26, 2011 when the Oral Hearing for the Companies' 2012-2013 RRA was scheduled to start October 3, 2011.

Response:

See Exhibit B-25, Rebuttal Evidence of FortisBC Energy Utilities, page 2. The 2012-2013 EEC Plan was prepared and filed as rebuttal evidence to the evidence of Mr. Plunkett.

The FEU stated in response to BCUC IR 1.191.2 (Exhibit B-9) that "Program details for 2012 and 2013 will be developed over the course of 2011, and will be presented to the EEC Stakeholder group for their feedback in November 2011." Based on the regulatory timetable at that time, the FEU did not believe the plan would be available before the close of the evidentiary record in the proceeding. Subsequent to the procedural conference, the regulatory timetable was extended and, upon reviewing the evidence of Mr. Plunkett filed on August 23, the FEU accelerated its preparation of the detailed plan in order to reply to Mr. Plunkett.

28.2 How can the Commission react to FEU's 2012-2013 EEC plan in a constructive manner when it was filed just over three months before planned program implementation?

Response:

Given that the Commission has the jurisdiction to accept or reject the FEU's EEC expenditure schedules as proposed in the FEU's Application and can set the regulatory agenda for review of the FEU's proposals, the FEU do not understand the intent of the question. The relevant issue is whether the Commission will be in a position at the close of the regulatory agenda to make a determination with respect the FEU's EEC proposals. The FEU note that they are not seeking acceptance of expenditures on a program by program basis, but are seeking acceptance of expenditures at the Program Area level. Please see the response to BCSEA 3.25.2. Nonetheless, as discussed below, the Commission has set out a fair and reasonable schedule that provides ample to time for review and examination of the EEC Plan.

The FEU first note that the EEC Plan was not filed in a vacuum. The FEU have filed detailed evidence in the Application and in responses to information requests with respect to its EEC proposals. This evidence includes the FEU's high-level plans and budgets for EEC spending in 2010 and 2011, the 2009 and 2010 Annual Reports which describe at length the FEU's existing programs and report on the various test results and the Conservation Potential Review which estimated the EEC savings potential in the Province. The Commission and intervenors have had the opportunity to consider this evidence since the filing of the Application on May 4th and has asked hundreds of information requests to which the FEU have provided thorough responses.

The EEC Plan, containing details on the 2012 and 2013 EEC plan for existing Program Areas, was filed on September 26, 2011. The Commission extended the regulatory timetable to provide ample time for review of the EEC plan with minimal delay to the ultimate timing of the proceeding. In accordance with the regulatory timetable, the Commission staff had three weeks to review the EEC plan and have filed over 120 detailed information requests. The intervenors had a fourth week to consider any information requests that they wished to file. The oral hearing will recommence on November 14 at which time the Commission and intervenors will have opportunity to cross examine the FEU's witnesses on the EEC evidence filed to date, including the EEC Plan and the FEU's responses to the information requests on the EEC Plan. After the close of the evidentiary record, there will be an exchange of argument, which will provide an opportunity for the FEU to set out its position and intervenors theirs. With the benefit of the entire body of evidence on the FEU's proposal for EEC funding, responses to information requests, cross-examination, and argument, there will have been ample regulatory process and the Commission will be in a position to make a determination on the FEU's EEC proposals.

28.2.1 How can Interveners react to this filing in a constructive manner?

Response:

The FEU believe that the regulatory timetable set out by the Commission will provide intervenors with ample opportunity to review the evidence, submit information requests, cross-examine the FEU's witnesses and file argument in this proceeding. Please see the response to BCUC IR 3.28.2.

Attachment 1.2.2

(Provided in electronic format only)

Updated Programs				Notable Updates Provided in 2012-2013 EEC Plan																
Program Area	Program Name	Utility	Market	Energy Savings (GJs) 2010 Annual Report	Energy Savings (GJs) BCUC IR 2.97.1	Energy Savings (GJs) DSM Plan	Energy Savings verdict	Measure Life (years) 2010 Annual Report	Measure Life (years) BCUC IR 2.97.1	Measure Life (years) DSM Plan	Measure Life Verdict	Incremental Cost 2010 Annual Report	Incremental Cost BCUC IR 2.97.1	Incremental Cost DSM Plan	Incremental Cost Verdict	Incentive Amount 2010 Annual Report	Incentive Amount BCUC IR 2.97.1	Incentive Amount DSM Plan	Incentive Amount Verdict	Assumptions / Determination Methodologies
Residential	EnerChoice Fireplace Program	FEI & FEVI	Retrofit	7.75	7.8	7.75	no change	15	15	15	no change	$ 150.00	$150-$250	$ 150.00	no change	$300	N/A	$300 + $50 Dealer SPIF (in admin)	no change	No change
		FEI & FEVI	New Construction	N/A	N/A	7.75	More information gathered	15	15	15	no change	N/A	N/A	$500-$1000 TBC	$500-$1000 TBC	In new construction assume a larger incremental cost since builders generally purchase cheapest on the market, whereas homeowners will pay for quality.	N/A	$300 to builder	More information gathered	In new construction assume a larger incremental cost since builders generally purchase cheapest on the market, whereas homeowners will pay for quality.
Residential	Give Your Furnace / Fireplace some TLC service campaign	FEI & FEVI	Retrofit	0	0	TBD if energy savings can be claimed in 2011 EEC report	no change	1	N/A	1.5	More information gathered	N/A	N/A	$ 150.00	More information gathered	$25 gift card less discount = $23	N/A	$25 gift card or bill credit	2012 payment decision TBC	No change
Residential	Energy Efficient Home Retrofit Programs - LiveSmart BC - Launched April 1, 2011 iteration	FEI & FEVI	Retrofit	N/A	N/A	N/A	no change	N/A	N/A	N/A	no change	N/A	N/A	N/A	no change	N/A	N/A	N/A	no change	Assumptions per measure did not change however weighted averages may vary by participant counts
Residential	ENERGY STAR Tier 3 Washers	FEI & FEVI	Retrofit	3.0	3.0	1.5	Reduced from 3 GJs to 1.5 GJs	14	14	14	no change	$ 350.00	$ 350.00	$ 325.00	More information gathered	$50 from FEU + $25 from electric utility for homes with ng water heating	$50 from FEU + $25 from electric utility for homes with ng water heating	$50 from FEU + $25 from electric utility for homes with ng water heating	no change	Savings claims reduced from 3.0 to 1.5 GJ. In 2010 EEC report savings claims included natural gas dryer savings. These were excluded in the 2012 DSM plan since they are only 8% of the penetration.
Residential	ENERGY STAR Washers	FEI & FEVI	New Construction	N/A	N/A	N/A	TBC	14	14	14	no change	N/A	N/A	N/A	TBC	N/A	N/A	$25	More information gathered	FEU contribution to this measure in Power Smart New Homes appliance package still under discussion.
Commercial	Efficient Boiler Program	FEI	New Construction	1,069	1,069	1,069	No Change	20	20	20	No change	$ 65,711.00	$ 65,711.00	$ 65,711.00	No change	$ 24,687.00		$ 24,687.00	No change	No Change
		FEVI		125	1,069	1,069	FEI new construction savings used as a proxy for FEVI new construction savings in 2.97.1 and DSM plan	20	20	20	No change	$ 9,652.00	$ 65,711.00	$ 65,711.00	savings in 2.97.1 and DSM plan. Limited FEVI new construction participants (ie 1) means FEI data is likely more representative for planning purposes.	$ 5,770.00		$ 24,687.00	FEI new construction incentive used as a proxy for FEVI new construction incentive in DSM plan. Limited FEVI new construction participants (ie 1) means FEI data is likely more representative for planning purposes.	No Change
		FEI	Retrofit	510	510	510	No Change	20	20	20	No change	$ 35,834.00	$ 35,834.00	$ 35,834.00	No change	$ 13,517.00		$ 13,517.00	No change	No Change
		FEVI		445	510	510	FEI retrofit savings used as a proxy for FEVI retrofit savings in 2.97.1 and DSM plan	20	20	20	No change	$ 34,787.00	$ 35,834.00	$ 35,834.00	FEI retrofit cost used as a proxy for FEVI retrofit cost in 2.97.1 and DSM plan.	$ 12,176.00		$ 13,517.00	FEI retrofit incentive used as a proxy for FEVI retrofit incentive in DSM plan	No Change
Commercial	Light Commercial Energy Star Boiler Program	FEI	New Construction	111	111	296	FEI retrofit savings used as a proxy for new construction savings in DSM plan due to low (ie 1) participants for new construction.	20	20	20	No change	$ 18,695.00	$ 2,047.00	$ 18,695.00	This one is weird. I need more time to look into it. Although it is clear to me that for the purpose of the DSM plan we used the FEI retrofit costs as a proxy value for all markets.	$ 3,462.00		$ 3,462.00	No Change	No Change
		FEVI		-	111	296	FEI NC savings used as proxy for FEVI NC savings in 97.1. FEI retrofit savings used as a proxy for new construction savings in DSM plan due to low (ie 1) participants for new construction	20	20	20	No change	$ -	$ 2,047.00	$ 18,695.00		$ -		$ 3,462.00	No participants foreseen in Annual report, however some limited participation in DSM plan.	No Change
		FEI	Retrofit	296	296	296	No Change	20	20	20	No change	$ 18,695.00	$ 18,695.00	$ 18,695.00	No change	$ 3,462.00		$ 3,462.00	No Change	No Change
		FEVI		197	296	296	FEI retrofit savings used as a proxy for FEVI retrofit savings in 2.97.1 and DSM plan	20	20	20	No change	$ 17,833.00	$ 18,695.00	$ 18,695.00	FEI retrofit cost used as a proxy for FEVI retrofit cost in 2.97.1 and DSM plan.	$ 2,905.00		$ 3,462.00	FEI retrofit incentive used as a proxy for FEVI retrofit incentive in DSM plan	No Change
Commercial	Efficient Commmercial Water Heater Program	FEI	New Construction	-	89	89	No change, however there were no new construction participants in 2010. Response to IR 2.97.1 and the DSM plan used the retrofit savings as a proxy value	12	12	12	No change	$ 5,378.00	$ 5,378.00	$ 5,378.00	No Change	$ 2,206.00		$ 2,206.00	No Change. Note: FEI retofit value used as a proxy.	No Change
		FEVI		-	89	89	No change, however there were no new construction participants in 2010. Response to IR 2.97.1 and the DSM plan used the retrofit savings as a proxy value	12	12	12	No change	$ 5,378.00	$ 5,378.00	$ 5,378.00	No Change	$ 2,206.00		$ 2,206.00	No Change. Note: FEI retofit value used as a proxy.	No Change
		FEI	Retrofit	89	89	89	No Change	12	12	12	No change	$ 5,378.00	$ 5,378.00	$ 5,378.00	No Change	$ 2,206.00		$ 2,206.00	No Change	No Change
		FEVI		76	89	89	FEI retrofit savings used as a proxy for new construction savings in 2.97.1 and DSM plan. FEI value seen ase more representative given relatively low FEVI participants	12	12	12	No change	$ 6,023.00	$ 5,378.00	$ 5,378.00	No Change	$ 1,493.00		$ 2,206.00	FEI retrofit incentive used as a proxy in DSM plan.	No Change
Commercial	Energy Assessment Program	FEI	Retrofit	488	488	488	No Change	1	1	1	No change	$ 1,200.00	$ 1,200.00	$ 1,250.00	Consultant's fee increased	$ 1,200.00		$ 1,250.00	Consultant's fee increased	No Change
		FEVI	Retrofit	488	488	488	No Change	1	1	1	No change	$ 1,200.00	$ 1,200.00	$ 1,250.00	Consultant's fee increased	$ 1,200.00		$ 1,250.00	Consultant's fee increased	No Change
Commercial	PSECA Initiative	FEI	Retrofit	30,830	Variable	N/A	No change. Note that the number used in the 2010 annual report was an estimate of the total savings. IR 2.97.1 indicated that individual measure savings were variable. PSECA is not included in the 2012-2013 DSM Plan	20	Variable	N/A	No change. IR 2.97.1 indicated that individual measure lives were variable. PSECA is not included in the 2012-2013 DSM Plan	$ 2,559,434.00	Variable	N/A	No change. Note that the number used in the 2010 annual report was an estimate of the total incremental cost. IR 2.97.1 indicated that individual measure cost was variable. PSECA is not included in the 2012-2013 DSM Plan	$ 800,000.00		N/A	No change. Note that the number used in the 2010 annual report was an estimate of the total incentive. PSECA is not included in the 2012-2013 DSM Plan	No Change
		FEVI	Retrofit	5,497	Variable	N/A		Variable	Variable	N/A		$ 742,262.00	Variable	N/A		$ 207,730.00		N/A		No Change
Commercial	Fireplace Timers Pilot Program	FEI	Retrofit	3	3	3	No Change	5	5	5	No Change	$ 50.00	$ 50.00	$ 50.00	No Change	$ 50.00		$ 50.00	No Change	No Change
		FEVI	Retrofit	3	3	3	No Change	5	5	5	No Change	$ 50.00	$ 50.00	$ 50.00	No Change	$ 50.00		$ 50.00	No Change	No Change
Commercial	Radiant Tube Heaters Pilot Program	FEI	Retrofit	275	275	N/A	No Change. This program is not included in the 2012-2013 DSM Plan	20	20	N/A	No Change. This program is not included in the 2012-2013 DSM Plan	$ 11,390.00	$ 4,368.00	N/A	EEEPI ... incremental cost was correct in the response to IR 2.97.1. The 2010 Annual report appears to have used the full measure cost.	$ 3,057.60		N/A	No Change. This program is not included in the 2012-2013 DSM Plan	No Change
		FEVI	Retrofit	N/A	N/A	N/A	No change	N/A	N/A	N/A	No change	N/A	N/A	N/A	No change	N/A		N/A	No change	No Change
Commercial	Spray Valve Program	FEI	New Construction	9	9	9	No Change	5	5	5	No Change	$ 85.00	$ 130.00	$ 130.00	Annual report appears to have missed the partner contribution of $45.00. Should have been $130.	$ 85.00		N/A	No NC participants foreseen	No Change
		FEVI		9	9	9	No Change	5	5	5	No Change	$ 130.00	$ 130.00	$ 130.00	No Change	N/A		N/A	No Change	No Change
		FEI	Retrofit	9	9	9	No Change	5	5	5	No Change	$ 130.00	$ 130.00	$ 130.00	No Change	$ 130.00		$ 130.00	No Change	No Change
		FEVI		9	9	9	No Change	5	5	5	No Change	$ 130.00	$ 130.00	$ 130.00	No Change	$ 130.00		$ 130.00	No Change	No Change
Industrial	Heat Exchanger Upgrade Pilot	FEI	Retrofit	70,000	70000	70000	No Change	undetermined	10	10	No Change	undertermined	$ 2,000,000.00	$ 2,000,000.00	No Change	$ 500,000.00		up to $869,591	Further market analysis determined an incentive amount of up to $869,591	In the 2010 Annual Report the total incentives for this program was stated as $500,000 depending on the savings amount. This amount was as initial estimate. Since that time, the program manager has gained further insight and information from the market and therefore has adjusted the projected incentive amount to the $869,591 stated in the 2012-13 EEC Plan. The general guideline behind FEU's maximum incentive structure here is to provide funding of no more than 50% of the incremental cost up to $1 million for projects equal to or greater than $500,000 CDN. The funding requirements for implementing a particular measure for small to mid-sized facilities generally do not tend to require extensive amount of pre-engineering and infrastructure works and are less costly when compared to large size facilities and have smaller business risks. Therefore, the FEU's intention is to provide funding of up to 75% of the incremental cost for projects less than $500,000 CDN.
		FEVI																		

NOT REPORTED IN BCUC IR 2.97.1

Attachment 3.2

Residential and Joint Initiative Program	Participant Counts as of Sept 30, 2011			Program Expenditures as of Sept 30, 2011 ($)			2011 Remaining Commitment Forecast ($)			2011 Year-End Total Expenditures Forecast ($) (H+K)	Commitment Status
	FEI	FEVI	Total	FEI	FEVI	Total	FEI	FEVI	Total	Total	
Efficient residential storage tank water heater	1,899	112	2,011	222,837	18,977	241,814	89,300	7,000	96,300	338,114	Business Case Approved.Program ends December 31, 2011.
EnerChoice Fireplace Program	1,272	290	1,562	250,910	59,332	310,242	205,469	81,520	286,989	597,231	Business Case Approved. Current version of program in market until June 1, 2012.
"Give Your Furnace / Fireplace some TLC" Service	4,695	522	5,217	154,107	23,304	177,411	570,393	57,196	627,589	805,000	Business Case Approved.Program ends October 31, 2011.
LiveSmart BC - Iteration April 1 2010 - Mar 31 2011	1,371	66	1,437	631,397	52,600	683,997	50,000	2,000	52,000	578,060	Program ended March 31, 2011 however invoices are still outstanding with Ministry of Energy and Mines. Placeholder of $52k in this forecast.
LiveSmart BC - Iteration April 1 2011 - Mar 31 2012	0	0	0	0	0	0	329,628	29,997	359,625	517,562	Program ends March 31, 2012 with forecasted contribution of $3 Million.
New Construction - EG80 Development	n/a	n/a	n/a	18,079	3,835	21,914	35,921	3,116	39,037	60,951	Commitment pending approval.
ENERGY STAR Washers (with Bchydro and FortisBC)	1,215	120	1,335	64,750	7,000	71,750	299,750	28,200	327,950	399,700	Business Case Approved. Current program ends December 31, 2011.
Switch N Shrink	33	237	270	34,857	254,651	289,508	57,000	87,000	144,000	433,508	Business Case Approved. Current program ends December 31, 2011.
Total	**10,485**	**1,347**	**11,832**	**1,376,937**	**419,699**	**1,796,636**	**1,637,461**	**296,029**	**1,933,490**	**3,730,126**	

Commercial Program	Participant Counts as of Sept 30, 2011			Program Expenditures as of Sept 30, 2011 ($)			2011 Remaining Commitment Forecast ($)			2011 Year-End Total Expenditures Forecast ($) (H+K)	Commitment Status
	FEI	FEVI	Total	FEI	FEVI	Total	FEI	FEVI	Total	Total	
Efficient Boiler Program	82	15	97	1,078,907	223,019	1,301,926	396,084	74,976	471,060	1,772,986	Commitments not made until application is being approved. Application forecast based on historical participation data between Sept.31 to Dec.31.
Light Commercial Boiler Program	14	3	17	26,657	5,709	32,366	8,200	2,769	10,969	43,335	
Efficient Commercial Water Heater Program	30	9	39	66,475	9,680	76,155	5,212	2,238	7,450	83,605	
Commercial Energy Assessment Program	118	50	168	166,304	66,469	232,773	0	0	0	232,773	
Spray N' Save Program	1	0	1	85	0	85	15,000	2,000	17,000	17,085	Program partner has committed to getting 200 valves installed by end of year.
Commercial Custom Design Program	4	2	6	533,292	35,633	568,925	0	0	0	568,925	Letter commitments made to program participants. Note: Retrofit program is in developmental Beta Testing to gather feedback on program processes and documentation in view of correcting bugs prior to full scale launch.
PSECA Initiative	1	2	3	116,700	207,730	324,430	0	0	0	324,430	Signed partnership agreement with the government. Commitments made.
Fireplace Timers Pilot Program	27	0	27	1,350	0	1,350	6,500	0	6,500	7,850	Forecasted participation between September 31 to December 31. Commitment not made.
Radiant Tube Heaters Pilot Program	1	0	1	5,800	0	5,800	0	0	0	5,800	Singed Agreement - commitment fulfilled.
Energy Specialist Program	14	2	16	576,000	70	646,000	200,000	35,000	235,000	881,000	Agreements signed with all participants that commit FEU to pay funding up to December 31, 2011.
Total	**292**	**83**	**375**	**2,571,570**	**548,310**	**3,189,810**	**630,996**	**116,983**	**747,979**	**3,937,789**	

Affordable Housing Program	Participant Counts as of Sept 30, 2011			Program Expenditures as of Sept 30, 2011 ($)			2011 Remaining Commitment Forecast ($)			2011 Year-End Total Expenditures Forecast ($) (H+K)	Commitment Status
	FEI	FEVI	Total	FEI	FEVI	Total	FEI	FEVI	Total	Total	
Residential Energy and Efficiency Works Training Program (REnEW)	20	0	20	69,084	0	69,084	1,500	0	1,500	70,584	The final REnEW session for 2011 is currently underway. Expenses for current session are committed by Agreement but not yet realized.
Energy Savings Kits (ESK)	12,797	2,591	15,388	270,266	51,898	322,164	80,000	15,000	95,000	417,164	Business Case Approved. Commitment forecast is based on recent months participation in the program.
Energy Conservation Assistance program (ECAP)	n/a	n/a	n/a	74,295	17,404	91,699	24,000	6,000	30,000	121,699	Business Case Approved. Anticipated costs associated with completing a pilot phase of the ECAP program.
Non-Profit Heating Upgrade Initiative	3	0	3	67,760	0	67,760	0	0	0	67,760	Committed in writing (email) but not yet paid out.
Total	**12,820**	**2,591**	**15,411**	**481,405**	**69,302**	**550,707**	**105,500**	**21,000**	**126,500**	**677,207**	

Education and Outreach Program	Participant Counts as of Sept 30, 2011			Program Expenditures as of Sept 30, 2011 ($)			2011 Remaining Commitment Forecast ($)			2011 Year-End Total Expenditures Forecast ($) (H+K)	Commitment Status
	FEI	FEVI	Total	FEI	FEVI	Total	FEI	FEVI	Total	Total	
Residential and General Public	n/a	n/a	n/a	670,571	79,685	750,256	142,400	34,600	177,000	927,256	Committed in sign-off forms for scheduled home shows/events. Bill inserts booked, videos for website in production.
Home Efficiency Measures: Sears Home Energy Tune Up (FEI) and District of Saanich Pilot (FEVI)	476 homes	52 homes, 815 multi-family units	528 homes, 815 multi-family units	21,000	26,155	26,155	0	0	0	26,155	Signed partnership agreements with both Sears and City Green (District of Saanich). Commitment fulfilled.
Commercial Customers	n/a	n/a	n/a	40,761	14,959	55,720	33,500	11,000	44,500	100,220	Committed in signed agreement for ClimateSmart education, energy specialist/other behavior campaigns and Trade events.
Low Income Customers	n/a	n/a	n/a	5,436	1,678	7,114	21,000	2,000	23,000	30,114	Committed in writing (Email) for sponsoring BC Non Profit Housing Association conference. Contract signed for BC Housing tenant engagement,
School Outreach	n/a	n/a	n/a	145,760	23,648	169,408	100,050	35,450	135,500	304,908	Written commitments in contracts and emails for School programs: Project Change, Beyond Recycling, Post Secondary development, goBEYOND, Destination Conservation, and Prince George/Vancouver WHL delivery.
Energy Champion Program	n/a	n/a	n/a	340,712	18,420	359,132	79,650	7,000	86,650	445,782	Signed written contracts for sponsoring Vancouver Canucks, BC Lions, BCHL, WHL.
Commercial Online Community Site: Health Authority	n/a	n/a	n/a	206,883	n/a	206,883	40,000	90,050	130,050	336,933	Signed written contracts with the Health Authority.
Total	**n/a**	**n/a**	**n/a**	**1,431,123**	**164,545**	**1,574,668**	**416,600**	**180,100**	**596,700**	**2,171,368**	

Innovative Technology Program	Participant Counts as of Sept 30, 2011			Program Expenditures as of Sept 30, 2011 ($)			2011 Remaining Commitment Forecast ($)			2011 Year-End Total Expenditures Forecast ($) (H+K)	Commitment Status
	FEI	FEVI	Total	FEI	FEVI	Total	FEI	FEVI	Total	Total	
Solar Air Heating PSECA Program	n/a	n/a	n/a	0	0	0	73,000	0	73,000	73,000	Committed in writing (Email).
SolarBC Schools Incentive Program	n/a	n/a	n/a	12,262	2,692	14,954	9,877	2,168	12,045	26,999	Committed in writing (Email).
Solar Residential Hot Water - Pilot	n/a	n/a	n/a	30,000	0	30,000	46,000	0	46,000	76,000	Committed in writing (letter).
City of Vancouver MURB - Pilot	n/a	n/a	n/a	0	0	0	405,000	0	405,000	405,000	Business Case Approved - Verbal Commitment made to customer.
City of Courtenay Solar Pool Demonstration Project	n/a	n/a	n/a	0	29,572	29,572	0	5,428	5,428	35,000	Committed in signed Legal Agreement.
Lumber Kiln Energy Management Controls Study	n/a	n/a	n/a	0	0	0	25,000	0	25,000	25,000	Committed in writing (Email).
Occupancy Sensors - Unit Ventilator	n/a	n/a	n/a	0	0	0	30,000	0	30,000	30,000	Committed in writing (Email).
Total	**n/a**	**n/a**	**n/a**	**42,262**	**32,264**	**74,526**	**588,877**	**7,596**	**596,473**	**670,999**	
Industrial Program	**Participant Counts as of Sept 30, 2011**			**Program Expenditures as of Sept 30, 2011 ($)**			**2011 Remaining Commitment Forecast ($)**			**2011 Year-End Total Expenditures Forecast ($) (H+K)**	**Commitment Status**
	FEI	**FEVI**	**Total**	**FEI**	**FEVI**	**Total**	**FEI**	**FEVI**	**Total**	**Total**	
Industrial Energy Audit Program	1	n/a	1	20,000	0	20,000	0	0	0	20,000	Committed in signed agreement.
Industrial Energy Analysis Program	12	n/a	12	559	0	559	111,316	0	111,316	111,875	Committed in signed agreement with 12 participants and 3 more by the end of 2011.
Burner Management Control program	1	n/a	1	0	0	0	2,125	0	2,125	2,125	Committed in signed agreement.
Total	**14**	**n/a**	**14**	**20,559**	**0**	**20,559**	**113,441**	**0**	**113,441**	**134,000**	
Enabling Program	**Participant Counts as of Sept 30, 2011**			**Program Expenditures as of Sept 30, 2011 ($)**			**2011 Remaining Commitment Forecast ($)**			**2011 Year-End Total Expenditures Forecast ($) (H+K)**	**Commitment Status**
	FEI	**FEVI**	**Total**	**FEI**	**FEVI**	**Total**	**FEI**	**FEVI**	**Total**	**Total**	
Efficiency Partners	n/a	n/a	n/a	98,000	33,000	131,000	102,000	27,000	129,000	260,000	Committed in signed agreements.
Codes and Standards	n/a	n/a	n/a	16,000	4,000	20,000	5,000	2,000	7,000	27,000	Committed in signed agreements.
Total	**n/a**	**n/a**	**n/a**	**114,000**	**37,000**	**151,000**	**152,000**	**29,000**	**136,000**	**287,000**	Committed in signed agreements.
Grand Total	**n/a**	**n/a**	**n/a**	**6,037,857**	**1,271,120**	**7,308,977**	**3,644,875**	**650,708**	**4,295,583**	**11,608,490**	

Attachment 4.1

REFER TO LIVE SPREADSHEETS

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Attachment 4.1.1

Indicator		Service Territory		Total
		FEI	FEVI	
Annual Gas Savings, Gross (GJ/yr.)	2012	849,976	85,764	935,740
	2013	1,862,972	166,162	2,029,134
NPV of Gas Savings, Gross (GJ)		14,412,588	1,325,457	15,738,045
Annual Gas Savings, Net (GJ/yr.)	2012	746,255	77,378	823,633
	2013	1,671,607	156,707	1,828,315
NPV of Gas Savings, Net (GJ)		12,805,025	1,296,486	14,101,510
Utility Expenditures, Incentives ($1000s)	2012	22,174	3,439	25,614
	2013	22,174	3,447	25,621
	Total	44,348	6,886	51,234
Utility Expenditures, Non-Incentives ($1000s)	2012	11,127	1,536	12,662
	2013	11,021	1,541	12,563
	Total	22,148	3,077	25,225
Utility Expenditures, Total ($1000s)	2012	33,301	4,975	38,276
	2013	33,195	4,988	38,183
	Total	66,496	9,963	76,459
Cost of Saved Energy ($/GJ)	2012	44.62	64.29	46.47
	Levelized	5.05	8.94	5.42
Benefit/Cost Ratios	TRC	1.28	1.27	1.28
	Utility	2.08	1.35	1.97
	Participant	2.47	2.52	2.48
	RIM	0.60	0.53	0.58
	Societal	3.14	2.59	3.07

Note: Whistler (FEW) is included in the FEI service territory

Portfolio and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
Residential Sector																						
FEI	178,683	434,822	3,409,352	154,366	388,599	2,934,413	5,613	5,224	10,838	2,794	3,263	6,057	8,407	8,487	16,895	54.46	5.56	0.95	1.92	1.74	0.57	2.42
FEVI	22,363	42,369	448,891	18,908	36,025	382,219	809	718	1,527	298	279	577	1,107	997	2,104	58.56	5.34	0.92	2.03	2.15	0.45	2.28
Total	201,045	477,191	3,858,243	173,274	424,624	3,316,632	6,422	5,942	12,365	3,092	3,542	6,634	9,514	9,484	18,999	54.91	5.56	0.94	1.93	1.79	0.55	2.40
High Carbon Fuel Switching																						
FEI	-4,300	-8,600	-87,292	-2,150	-4,300	-43,646	100	100	200	26	26	52	126	126	252	-58.60	-16.32	1.67	0.00	1.73	0.91	1.71
FEVI	-17,200	-34,400	-361,302	-8,600	-17,200	-180,651	400	400	800	104	104	208	504	504	1,008	-58.60	-16.16	1.68	0.00	1.28	1.04	1.71
Total	-21,500	-43,000	-448,593	-10,750	-21,500	-224,297	500	500	1,000	130	130	260	630	630	1,260	-58.60	-16.64	1.68	0.00	1.35	1.02	1.71
Low Income																						
FEI	27,169	54,338	393,473	22,825	45,649	337,980	2,752	2,752	5,504	1,698	1,698	3,395	4,450	4,450	8,899	194.95	25.43	0.54	0.40	1.96	0.27	1.00
FEVI	3,019	6,038	44,708	2,536	5,072	38,425	306	306	612	214	214	427	519	519	1,039	204.77	26.16	0.52	0.39	2.34	0.24	0.95
Total	30,188	60,376	438,181	25,361	50,721	376,405	3,058	3,058	6,116	1,911	1,911	3,822	4,969	4,969	9,938	195.93	25.56	0.54	0.40	2.00	0.27	0.99
Commercial Sector																						
FEI	447,358	887,671	7,004,449	388,295	788,909	6,191,933	10,824	11,388	22,212	1,713	1,135	2,848	12,537	12,523	25,060	32.29	3.91	1.44	2.67	2.59	0.61	3.60
FEVI	76,466	135,699	1,079,518	63,418	116,354	942,851	1,834	1,801	3,635	149	176	325	1,983	1,977	3,960	31.27	4.07	1.71	2.58	4.20	0.44	4.15
Total	523,824	1,023,370	8,083,967	451,713	905,263	7,134,784	12,658	13,189	25,847	1,861	1,312	3,173	14,520	14,500	29,020	32.14	3.94	1.47	2.66	2.78	0.58	3.67
Conservation, Education, and Outreach																						
FEI	0	0	0	0	0	0	0	0	0	4,281	4,284	8,564	4,281	4,284	8,564			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	720	717	1,436	720	717	1,436			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	5,000	5,000	10,000	5,000	5,000	10,000			0.00	0.00		0.00	0.00
Industrial Sector																						
FEI	172,758	402,486	2,879,123	155,482	362,237	2,591,211	1,840	1,840	3,679	258	258	516	2,098	2,098	4,195	13.49	1.56	3.73	6.49	5.34	0.78	9.00
Innovative Technologies																						
FEI	19,598	74,835	610,000	19,598	74,835	610,000	1,046	870	1,916	358	358	716	1,404	1,228	2,632	71.62	4.18	1.81	2.57	2.79	0.78	4.25
FEVI	1,116	16,456	113,641	1,116	16,456	113,641	90	222	312	52	52	104	142	274	416	127.24	3.51	2.00	2.96	4.19	0.55	4.38
Total	20,714	91,291	723,641	20,714	91,291	723,641	1,136	1,092	2,228	410	410	820	1,546	1,502	3,048	74.62	4.09	1.84	2.62	2.99	0.73	4.27
ALL PORTFOLIOS																						
FEI	849,976	1,862,972	14,412,588	746,255	1,671,607	12,805,025	22,174	22,174	44,348	11,127	11,021	22,148	33,301	33,195	66,496	44.62	5.05	1.28	2.08	2.47	0.60	3.14
FEVI	85,764	166,162	1,325,457	77,378	156,707	1,296,486	3,439	3,447	6,886	1,536	1,541	3,077	4,975	4,988	9,963	64.29	8.94	1.27	1.35	2.52	0.53	2.59
Total	935,740	2,029,134	15,738,045	823,633	1,828,315	14,101,510	25,614	25,621	51,234	12,662	12,563	25,225	38,276	38,183	76,459	46.47	5.42	1.28	1.97	2.48	0.58	3.07

Note: Whistler (FEW) is included in the FEI service territory

Program and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
ENERGY STAR® Domestic Hot Water “DHW” Technologies																					
FEI	20,250	40,500	394,677	18,225	36,450	355,209	1,215	1,215	2,430	393	393	785	1,608	1,608	3,215	88.20	8.74	0.50	1.22	1.03	0.50	1.27
FEVI	2,250	4,500	45,327	2,025	4,050	40,795	135	135	270	44	44	87	179	179	357	88.15	8.47	0.52	1.26	1.33	0.41	1.27
Total	22,500	45,000	440,004	20,250	40,500	396,004	1,350	1,350	2,700	436	436	872	1,786	1,786	3,572	88.20	8.71	0.50	1.23	1.06	0.49	1.27
EnerChoice Fireplace Program																					
FEI	22,599	35,154	327,467	17,175	26,717	248,875	875	486	1,361	347	266	612	1,221	752	1,973	71.11	7.72	2.37	1.36	8.69	0.52	5.87
FEVI	5,301	8,246	79,069	4,029	6,267	60,092	205	114	319	82	63	144	287	177	463	71.16	7.52	2.44	1.39	11.39	0.42	5.86
Total	27,900	43,400	406,535	21,204	32,984	308,967	1,080	600	1,680	428	328	756	1,508	928	2,436	71.11	7.70	2.38	1.36	8.96	0.51	5.87
“Give your Furnace/Fireplace Some TLC” – Service Campaign																					
FEI	0	0	0	0	0	0	394	394	788	169	169	338	563	563	1,126			0.00	0.00	0.17	0.00	0.00
FEVI	0	0	0	0	0	0	44	44	88	19	19	38	63	63	126			0.00	0.00	0.17	0.00	0.00
Total	0	0	0	0	0	0	438	438	875	188	188	376	626	626	1,251			0.00	0.00	0.17	0.00	0.00
Energy Efficient Home Retrofit Programs																					
FEI	84,240	168,480	1,797,316	69,077	138,154	1,473,799	2,147	2,147	4,293	576	576	1,152	2,723	2,723	5,445	39.41	3.57	1.62	3.05	2.88	0.64	4.21
FEVI	9,360	18,720	207,221	7,675	15,350	169,921	239	239	477	64	64	128	303	303	605	39.41	3.45	1.68	3.17	3.85	0.49	4.21
Total	93,600	187,200	2,004,538	76,752	153,504	1,643,721	2,385	2,385	4,770	640	640	1,280	3,025	3,025	6,050	39.41	3.56	1.62	3.06	2.97	0.62	4.21
Home Energy Efficiency Web Portal																					
FEI	0	0	0	0	0	0	0	0	0	90	90	180	90	90	180			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	10	10	20	10	10	20			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	100	100	200	100	100	200			0.00	0.00		0.00	0.00
ENERGY STAR® Washers and Other Measures for DHW Conservation																					
FEI	22,950	45,900	406,907	21,803	43,605	386,562	383	383	765	90	90	180	473	473	945	21.67	2.36	0.94	4.42	1.44	0.69	2.25
FEVI	2,550	5,100	46,496	2,423	4,845	44,171	43	43	85	10	10	20	53	53	105	21.67	2.30	0.96	4.54	1.90	0.53	2.25
Total	25,500	51,000	453,403	24,225	48,450	430,733	425	425	850	100	100	200	525	525	1,050	21.67	2.35	0.94	4.44	1.49	0.68	2.25
Customer Engagement Tool for Conservation Behaviours																					
FEI	17,500	122,500	222,644	17,500	122,500	222,644	0	0	0	500	1,050	1,550	500	1,050	1,550	28.57	6.64	1.38	1.38		0.50	3.11
New Construction – EGH 80 & Beyond and EE Appliances																					
FEI	11,144	22,288	260,341	10,587	21,173	247,324	601	601	1,201	180	180	360	781	781	1,561	73.74	6.10	0.44	1.84	0.90	0.52	1.20
FEVI	2,902	5,803	70,778	2,757	5,513	67,239	144	144	288	20	20	40	164	164	328	59.58	4.73	0.48	2.38	1.14	0.45	1.25
Total	14,045	28,091	331,119	13,343	26,686	314,563	745	745	1,490	200	200	400	945	945	1,890	72.33	5.96	0.45	1.89	0.92	0.52	1.20
Efficiency Partners Program																					
FEI	0	0	0	0	0	0	0	0	0	450	450	900	450	450	900			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	50	50	100	50	50	100			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	500	500	1,000	500	500	1,000			0.00	0.00		0.00	0.00
ALL PROGRAMS																					
FEI	**178,683**	**434,822**	**3,409,352**	**154,366**	**388,599**	**2,934,413**	**5,613**	**5,224**	**10,838**	**2,794**	**3,263**	**6,057**	**8,407**	**8,487**	**16,895**	**54.46**	**5.56**	**0.95**	**1.92**	**1.74**	**0.57**	**2.42**

FEVI	**22,363**	**42,369**	**448,891**	**18,908**	**36,025**	**382,219**	**809**	**718**	**1,527**	**298**	**279**	**577**	**1,107**	**997**	**2,104**	**58.56**	**5.34**	**0.92**	**2.03**	**2.15**	**0.45**	**2.28**
Total	**201,045**	**477,191**	**3,858,243**	**173,274**	**424,624**	**3,316,632**	**6,422**	**5,942**	**12,365**	**3,092**	**3,542**	**6,634**	**9,514**	**9,484**	**18,999**	**54.87**	**5.56**	**0.94**	**1.93**	**1.79**	**0.55**	**2.40**

FEI	FEVI
90%	10%

Program and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
Switch N Shrink																						
FEI	-4,300	-8,600	-87,292	-2,150	-4,300	-43,646	100	100	200	26	26	52	126	126	252	-58.60	-16.32	1.67	0.00	1.73	0.91	1.71
FEVI	-17,200	-34,400	-361,302	-8,600	-17,200	-180,651	400	400	800	104	104	208	504	504	1,008	-58.60	-16.16	1.68	0.00	1.28	1.04	1.71
Total	-21,500	-43,000	-448,593	-10,750	-21,500	-224,297	500	500	1,000	130	130	260	630	630	1,260	-58.60	-16.64	1.68	0.00	1.35	1.02	1.71
ALL PROGRAMS																						
FEI	**-4,300**	**-8,600**	**-87,292**	**-2,150**	**-4,300**	**-43,646**	**100**	**100**	**200**	**26**	**26**	**52**	**126**	**126**	**252**	**-58.60**	**-16.32**	**1.67**	**0.00**	**1.73**	**0.91**	**1.71**
FEVI	**-17,200**	**-34,400**	**-361,302**	**-8,600**	**-17,200**	**-180,651**	**400**	**400**	**800**	**104**	**104**	**208**	**504**	**504**	**1,008**	**-58.60**	**-16.16**	**1.68**	**0.00**	**1.28**	**1.04**	**1.71**
Total	**-21,500**	**-43,000**	**-448,593**	**-10,750**	**-21,500**	**-224,297**	**500**	**500**	**1,000**	**130**	**130**	**260**	**630**	**630**	**1,260**	**-58.60**	**-16.64**	**1.68**	**0.00**	**1.35**	**1.02**	**1.71**

Note: Whistler (FEW) is included in the FEI service territory

Program and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
Residential Energy Efficiency Works (REnEW)																						
FEI	0	0	0	0	0	0	0	0	0	145	145	290	145	145	290			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	40	40	80	40	40	80			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	185	185	370	185	185	370			0.00	0.00		0.00	0.00
Energy Saving Kit (ESK)																						
FEI	14,164	28,328	172,845	10,340	20,680	126,177	165	165	329	135	135	270	300	300	599	28.98	4.59	3.29	2.16	7.80	0.60	5.92
FEVI	1,574	3,148	19,539	1,149	2,298	14,264	18	18	37	16	16	32	34	34	69	29.86	4.65	3.22	2.13	10.54	0.46	5.71
Total	15,738	31,476	192,385	11,489	22,977	140,441	183	183	366	151	151	302	334	334	668	29.07	4.59	3.28	2.16	8.07	0.58	5.90
Energy Conservation Assistance Program (ECAP)																						
FEI	13,005	26,010	220,628	12,485	24,970	211,803	2,588	2,588	5,175	1,418	1,418	2,835	4,005	4,005	8,010	320.79	36.52	0.38	0.28	1.59	0.21	0.71
FEVI	1,445	2,890	25,168	1,387	2,774	24,162	288	288	575	158	158	315	445	445	890	320.79	35.65	0.39	0.29	1.82	0.20	0.71
Total	14,450	28,900	245,796	13,872	27,744	235,965	2,875	2,875	5,750	1,575	1,575	3,150	4,450	4,450	8,900	320.79	36.43	0.38	0.28	1.61	0.21	0.71
ALL PROGRAMS																						
FEI	**27,169**	**54,338**	**393,473**	**22,825**	**45,649**	**337,980**	**2,752**	**2,752**	**5,504**	**1,698**	**1,698**	**3,395**	**4,450**	**4,450**	**8,899**	**194.95**	**25.43**	**0.54**	**0.40**	**1.96**	**0.27**	**1.00**
FEVI	**3,019**	**6,038**	**44,708**	**2,536**	**5,072**	**38,425**	**306**	**306**	**612**	**214**	**214**	**427**	**519**	**519**	**1,039**	**204.77**	**26.16**	**0.52**	**0.39**	**2.34**	**0.24**	**0.95**
Total	**30,188**	**60,376**	**438,181**	**25,361**	**50,721**	**376,405**	**3,058**	**3,058**	**6,116**	**1,911**	**1,911**	**3,822**	**4,969**	**4,969**	**9,938**	**195.93**	**25.56**	**0.54**	**0.40**	**2.00**	**0.27**	**0.99**

Note: Whistler (FEW) is included in the FEI service territory

Program and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
Efficient Boiler Program																						
FEI	99,145	207,058	2,205,531	81,299	169,788	1,808,536	2,537	2,762	5,298	124	234	358	2,660	2,995	5,656	32.72	3.01	1.71	3.61	2.57	0.72	4.46
FEVI	11,367	23,244	257,112	9,321	19,060	210,832	290	304	594	14	26	40	304	330	634	32.63	2.91	1.78	3.75	3.97	0.48	4.46
Total	110,512	230,302	2,462,644	90,620	188,848	2,019,368	2,827	3,066	5,892	138	260	397	2,965	3,325	6,290	32.71	3.00	1.71	3.63	2.71	0.69	4.46
Light Commercial Boiler Program																						
FEI	8,288	16,872	179,875	6,796	13,835	147,498	97	100	197	32	5	36	128	105	233	18.90	1.53	1.82	7.10	2.54	0.79	4.74
FEVI	1,184	2,368	26,213	971	1,942	21,494	14	14	28	4	1	4	17	14	32	17.87	1.43	1.90	7.62	4.04	0.51	4.78
Total	9,472	19,240	206,088	7,767	15,777	168,992	111	114	225	35	5	40	146	119	265	18.77	1.52	1.82	7.15	2.69	0.77	4.74
Efficient Commercial Water Heater Program																						
FEI	7,031	14,062	113,502	6,679	13,359	107,827	174	174	349	26	26	51	200	200	400	29.91	3.58	1.33	2.87	2.13	0.68	3.25
FEVI	1,157	2,314	19,143	1,099	2,198	18,186	29	29	57	5	5	9	33	33	66	30.19	3.53	1.36	2.91	3.21	0.46	3.23
Total	8,188	16,376	132,645	7,779	15,557	126,013	203	203	406	30	30	60	233	233	466	29.95	3.57	1.33	2.88	2.23	0.65	3.24
Commercial Energy Assessment Program																						
FEI	55,632	55,632	107,441	36,161	36,161	69,836	143	143	285	45	45	90	188	188	375	5.19	5.19	2.25	1.66	5.16	0.54	5.32
FEVI	18,544	18,544	35,896	12,054	12,054	23,332	48	48	95	15	15	30	63	63	125	5.19	5.19	2.25	1.66	7.78	0.38	5.32
Total	74,176	74,176	143,336	48,214	48,214	93,169	190	190	380	60	60	120	250	250	500	5.19	5.19	2.25	1.66	5.42	0.53	5.32
Spray Valve Program																						
FEI	2,961	5,922	24,923	2,606	5,211	21,932	43	43	86	3	3	5	45	45	91	17.45	4.00	2.67	2.38	4.43	0.63	6.20
FEVI	333	666	2,834	293	586	2,494	5	5	10	0	0	1	5	5	10	17.44	3.97	2.70	2.40	6.58	0.43	6.20
Total	3,294	6,588	27,758	2,899	5,797	24,427	48	48	95	3	3	6	51	51	101	17.45	4.00	2.67	2.38	4.64	0.61	6.20
Commercial Custom Design Program																						
FEI	122,464	218,647	2,024,865	110,218	196,782	1,822,379	4,262	3,326	7,588	954	375	1,328	5,216	3,700	8,916	47.32	4.75	1.74	2.21	3.11	0.63	4.36
FEVI	32,061	58,342	555,991	28,855	52,508	500,392	1,109	937	2,045	58	85	143	1,167	1,022	2,189	40.44	4.24	1.92	2.48	4.62	0.45	4.66
Total	154,525	276,989	2,580,857	139,073	249,290	2,322,771	5,371	4,262	9,633	1,012	460	1,472	6,383	4,722	11,105	45.89	4.70	1.76	2.24	3.26	0.61	4.39
Continuous Optimization Program																						
FEI	103,635	236,880	1,438,891	103,635	236,880	1,438,891	1,760	2,453	4,213	216	239	455	1,976	2,692	4,668	19.07	3.12	0.98	3.19	2.18	0.47	2.32
FEVI	4,230	9,870	60,979	4,230	9,870	60,979	72	104	176	14	16	30	86	120	206	20.22	3.24	0.98	3.06	2.94	0.35	2.28
Total	107,865	246,750	1,499,870	107,865	246,750	1,499,870	1,832	2,557	4,389	230	255	485	2,062	2,812	4,874	19.12	3.13	0.98	3.17	2.25	0.46	2.32
Commercial Kitchen Program																						
FEI	1,404	3,300	26,498	1,334	3,135	25,173	60	81	141	2	2	5	62	83	146	46.76	5.56	1.09	1.85	1.90	0.60	2.67
FEVI	140	351	2,885	140	351	2,885	6	9	15	2	2	3	8	11	18	53.40	6.00	1.03	1.72	2.76	0.41	2.44
Total	1,545	3,651	29,383	1,475	3,486	28,058	66	90	156	4	4	8	70	94	164	47.39	5.61	1.08	1.84	1.99	0.58	2.64
MURB Program																						
FEI	19,800	50,400	210,495	17,820	45,360	189,446	371	574	945	28	28	56	399	602	1,001	22.41	5.07	2.07	1.89	3.64	0.59	4.81
FEVI	4,950	12,150	51,390	4,455	10,935	46,251	93	135	228	7	7	14	100	142	242	22.41	5.03	2.09	1.90	5.30	0.41	4.80
Total	24,750	62,550	261,886	22,275	56,295	235,697	464	709	1,173	35	35	70	499	744	1,243	22.41	5.06	2.07	1.89	3.81	0.57	4.81
Process Heat Program																						
FEI	26,250	52,500	560,061	21,000	42,000	448,049	525	525	1,050	14	14	27	539	539	1,077	25.64	2.32	2.11	4.69	3.02	0.75	5.51
FEVI	2,500	5,000	55,348	2,000	4,000	44,278	50	50	100	2	2	3	52	52	103	25.75	2.25	2.19	4.84	4.71	0.49	5.49
Total	28,750	57,500	615,409	23,000	46,000	492,327	575	575	1,150	15	15	30	590	590	1,180	25.65	2.31	2.12	4.70	3.19	0.73	5.50
Fireplace Timers Pilot Program																						
FEI	0	25,650	104,109	0	25,650	104,109	0	428	428	68	23	90	68	450	518		4.67	2.07	2.09	4.00	0.62	4.79
FEVI	0	2,850	11,726	0	2,850	11,726	0	48	48	8	3	10	8	50	58		4.63	2.09	2.11	5.89	0.43	4.78

Total	0	28,500	115,835	0	28,500	115,835	0	475	475	75	25	100	75	500	575		4.67	2.07	2.09	4.19	0.60	4.79
Radiant Tube Heaters Pilot Program																						
FEI	748	748	8,258	748	748	8,258	12	0	12	8	0	8	20	0	20	26.62	2.41	3.71	4.45	7.71	0.74	9.64
Energy Specialists Program																						
FEI	0	0	0	0	0	0	840	780	1,620	195	144	339	1,035	924	1,959			0.00	0.00	1.00	0.00	0.00
FEVI	0	0	0	0	0	0	120	120	240	22	16	38	142	136	278			0.00	0.00	1.00	0.00	0.00
Total	0	0	0	0	0	0	960	900	1,860	217	160	377	1,177	1,060	2,237			0.00	0.00	1.00	0.00	0.00
ALL PROGRAMS																						
FEI	**447,358**	**887,671**	**7,004,449**	**388,295**	**788,909**	**6,191,933**	**10,824**	**11,388**	**22,212**	**1,713**	**1,135**	**2,848**	**12,537**	**12,523**	**25,060**	**32.29**	**3.91**	**1.44**	**2.67**	**2.59**	**0.61**	**3.60**
FEVI	**76,466**	**135,699**	**1,079,518**	**63,418**	**116,354**	**942,851**	**1,834**	**1,801**	**3,635**	**149**	**176**	**325**	**1,983**	**1,977**	**3,960**	**31.27**	**4.07**	**1.71**	**2.58**	**4.20**	**0.44**	**4.15**
Total	**523,824**	**1,023,370**	**8,083,967**	**451,713**	**905,263**	**7,134,784**	**12,658**	**13,189**	**25,847**	**1,861**	**1,312**	**3,173**	**14,520**	**14,500**	**29,020**	**32.14**	**3.94**	**1.47**	**2.66**	**2.78**	**0.58**	**3.67**

Program and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
Residential Mass Education on Conservation and Energy Literacy																					
FEI	0	0	0	0	0	0	0	0	0	590	590	1,179	590	590	1,179			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	66	66	131	66	66	131			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	655	655	1,310	655	655	1,310			0.00	0.00		0.00	0.00
Residential Home Shows and Community Events Outreach																					
FEI	0	0	0	0	0	0	0	0	0	320	320	639	320	320	639			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	76	76	151	76	76	151			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	395	395	790	395	395	790			0.00	0.00		0.00	0.00
Canadian Home Builders' Association Promotions and Support																					
FEI	0	0	0	0	0	0	0	0	0	153	153	306	153	153	306			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	17	17	34	17	17	34			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	170	170	340	170	170	340			0.00	0.00		0.00	0.00
Residential Outreach Education Tools																					
FEI	0	0	0	0	0	0	0	0	0	180	180	360	180	180	360			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	20	20	40	20	20	40			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	200	200	400	200	200	400			0.00	0.00		0.00	0.00
Energy Champion Program																					
FEI	0	0	0	0	0	0	0	0	0	688	688	1,376	688	688	1,376			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	162	162	324	162	162	324			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	850	850	1,700	850	850	1,700			0.00	0.00		0.00	0.00
Home Efficiency Measures																					
FEI	0	0	0	0	0	0	0	0	0	405	423	828	405	423	828			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	45	47	92	45	47	92			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	450	470	920	450	470	920			0.00	0.00		0.00	0.00
Municipal Partnerships - Other																					
FEI	0	0	0	0	0	0	0	0	0	135	144	279	135	144	279			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	15	16	31	15	16	31			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	150	160	310	150	160	310			0.00	0.00		0.00	0.00
Medium-Large Commercial Education Sessions																					
FEI	0	0	0	0	0	0	0	0	0	63	63	126	63	63	126			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	7	7	14	7	7	14			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	70	70	140	70	70	140			0.00	0.00		0.00	0.00
Small Commercial Education and Outreach																					
FEI	0	0	0	0	0	0	0	0	0	80	80	160	80	80	160			0.00	0.00		0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	20	20	40	20	20	40			0.00	0.00		0.00	0.00
Total	0	0	0	0	0	0	0	0	0	100	100	200	100	100	200			0.00	0.00		0.00	0.00
Commercial Trade Shows and Association Events																					

FEI	0	0	0	0	0	0	0	0	0	130	130	259	130	130	259	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	31	31	61	31	31	61	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	160	160	320	160	160	320	0.00	0.00	0.00	0.00
Commercial Multi-Family																			
FEI	0	0	0	0	0	0	0	0	0	297	297	594	297	297	594	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	33	33	66	33	33	66	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	330	330	660	330	330	660	0.00	0.00	0.00	0.00
Behaviour Programs - Online Community Site																			
FEI	0	0	0	0	0	0	0	0	0	200	216	416	200	216	416	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	50	54	104	50	54	104	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	250	270	520	250	270	520	0.00	0.00	0.00	0.00
Behaviour Programs - Energy Specialists																			
FEI	0	0	0	0	0	0	0	0	0	180	180	360	180	180	360	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	20	20	40	20	20	40	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	200	200	400	200	200	400	0.00	0.00	0.00	0.00
Conservation Assistance - Education and Outreach																			
FEI	0	0	0	0	0	0	0	0	0	216	216	432	216	216	432	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	54	54	108	54	54	108	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	270	270	540	270	270	540	0.00	0.00	0.00	0.00
School Programs: Class and Online Curriculum																			
FEI	0	0	0	0	0	0	0	0	0	40	0	40	40	0	40	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	10	0	10	10	0	10	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	50	0	50	50	0	50	0.00	0.00	0.00	0.00
School Programs: K-12 In-Class Programs and Presentations																			
FEI	0	0	0	0	0	0	0	0	0	227	227	454	227	227	454	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	53	53	106	53	53	106	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	280	280	560	280	280	560	0.00	0.00	0.00	0.00
School Programs: K-12 Home Efficiency Measures																			
FEI	0	0	0	0	0	0	0	0	0	216	216	432	216	216	432	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	24	24	48	24	24	48	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	240	240	480	240	240	480	0.00	0.00	0.00	0.00
School Programs: Post Secondary																			
FEI	0	0	0	0	0	0	0	0	0	162	162	324	162	162	324	0.00	0.00	0.00	0.00
FEVI	0	0	0	0	0	0	0	0	0	18	18	36	18	18	36	0.00	0.00	0.00	0.00
Total	0	0	0	0	0	0	0	0	0	180	180	360	180	180	360	0.00	0.00	0.00	0.00
ALL PROGRAMS																			
FEI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4,281**	**4,284**	**8,564**	**4,281**	**4,284**	**8,564**	**0.00**	**0.00**	**0.00**	**0.00**
FEVI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**720**	**717**	**1,436**	**720**	**717**	**1,436**	**0.00**	**0.00**	**0.00**	**0.00**
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5,000**	**5,000**	**10,000**	**5,000**	**5,000**	**10,000**	**0.00**	**0.00**	**0.00**	**0.00**

Note: Whistler (FEW) is included in the FEI service territory

Program and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
Industrial Technology Retrofit Program																						
FEI	181,468	362,936	2,689,407	163,321	326,642	2,420,466	1,487	1,487	2,974	223	223	446	1,710	1,710	3,420	10.47	1.36	3.90	7.47	5.51	0.79	9.48
Industrial Energy Audit and Analysis Program																						
FEI	0	56,970	393,198	0	51,273	353,879	353	353	705	35	35	70	388	388	775		2.11	2.78	4.86	4.02	0.75	6.69
ALL PROGRAMS																						
FEI	**172,758**	**402,486**	**2,879,123**	**155,482**	**362,237**	**2,591,211**	**1,840**	**1,840**	**3,679**	**258**	**258**	**516**	**2,098**	**2,098**	**4,195**	**13.49**	**1.56**	**3.73**	**6.49**	**5.34**	**0.78**	**9.00**

Note: Whistler (FEW) is included in the FEI service territory

Program and Service Territory	Annual Gas Savings, Gross (GJ/yr.)		NPV Gas Savings, Gross (GJ)	Annual Gas Savings, Net (GJ/yr.)		NPV Gas Savings, Net (GJ)	Utility Expenditures ($1000s)									Cost of Saved Energy ($/GJ)		Benefit/Cost Ratios				
							Incentives			Non-Incentives			All Spending					TRC	Utility	Participant	RIM	Societal
	2012	2013		2012	2013		2012	2013	Total	2012	2013	Total	2012	2013	Total	2012	Levelized					
Thermal Curtains																						
FEI	6,990	20,970	191,080	6,990	20,970	191,080	131	261	392	51	51	101	181	312	493	25.94	2.47	1.98	4.28	3.09	0.74	4.96
FEVI	0	6,990	64,190	0	6,990	64,190	0	131	131	17	17	34	17	148	164		2.41	2.05	4.43	4.82	0.49	4.99
Total	6,990	27,960	255,270	6,990	27,960	255,270	131	392	523	68	68	135	198	460	658	28.35	2.46	1.99	4.30	3.26	0.71	4.96
Solar Air Heating Systems																						
FEI	2,564	6,410	78,404	2,564	6,410	78,404	105	158	263	93	93	185	198	250	448	77.03	5.49	1.31	2.09	2.78	0.63	3.66
Occupancy Sensors/Controls																						
FEI	10,044	10,044	74,438	10,044	10,044	74,438	810	0	810	77	77	153	887	77	963	88.26	12.87	1.17	0.77	1.47	0.85	2.16
FEVI	1,116	1,116	8,427	1,116	1,116	8,427	90	0	90	9	9	17	99	9	107	88.26	12.63	1.20	0.79	1.82	0.70	2.16
Total	11,160	11,160	82,866	11,160	11,160	82,866	900	0	900	85	85	170	985	85	1,070	88.26	12.84	1.18	0.77	1.51	0.83	2.16
Condensing Make Up Air (MUA) Units																						
FEI	0	1,444	12,842	0	1,444	12,842	0	6	6	24	24	48	24	30	54		4.04	2.46	2.64	18.44	0.67	6.10
FEVI	0	361	3,315	0	361	3,315	0	2	2	6	6	12	6	8	14		3.93	2.54	2.73	29.76	0.46	6.09
Total	0	1,805	16,157	0	1,805	16,157	0	8	8	30	30	60	30	38	68		4.03	2.47	2.65	19.57	0.65	6.10
Advanced Control of Lumber Drying Using an Energy Management System																						
FEI	0	19,050	77,320	0	19,050	77,320	0	75	75	23	23	45	23	98	120		1.47	6.98	6.67	8.73	1.04	13.65
FEVI	0	6,350	26,127	0	6,350	26,127	0	25	25	8	8	15	8	33	40		1.45	7.07	6.73	12.72	0.73	13.64
Total	0	25,400	103,448	0	25,400	103,448	0	100	100	30	30	60	30	130	160		1.46	6.99	6.67	9.13	1.01	13.65
Catalytic Radiant Burner Technology																						
FEI	0	4,917	33,936	0	4,917	33,936	0	195	195	39	39	79	39	234	274		7.59	0.79	1.36	1.64	0.54	1.89
FEVI	0	1,639	11,581	0	1,639	11,581	0	65	65	13	13	26	13	78	91		7.45	0.80	1.38	2.36	0.39	1.89
Total	0	6,556	45,518	0	6,556	45,518	0	260	260	53	53	105	53	313	365		7.58	0.79	1.36	1.71	0.52	1.89
Ceramic Manufacturing Using Microwave Assist Technology																						
FEI	0	12,000	141,979	0	12,000	141,979	0	175	175	53	53	105	53	228	280		1.86	3.61	6.22	6.74	0.77	10.25
ALL PROGRAMS																						
FEI	**19,598**	**74,835**	**610,000**	**19,598**	**74,835**	**610,000**	**1,046**	**870**	**1,916**	**358**	**358**	**716**	**1,404**	**1,228**	**2,632**	**71.62**	**4.18**	**1.81**	**2.57**	**2.79**	**0.78**	**4.25**
FEVI	**1,116**	**16,456**	**113,641**	**1,116**	**16,456**	**113,641**	**90**	**222**	**312**	**52**	**52**	**104**	**142**	**274**	**416**	**127.24**	**3.51**	**2.00**	**2.96**	**4.19**	**0.55**	**4.38**
Total	**20,714**	**91,291**	**723,641**	**20,714**	**91,291**	**723,641**	**1,136**	**1,092**	**2,228**	**410**	**410**	**820**	**1,546**	**1,502**	**3,048**	**74.62**	**4.09**	**1.84**	**2.62**	**2.99**	**0.73**	**4.27**

Note: Whistler (FEW) is included in the FEI service territory

Attachment 9.3

Terasen TLC Furnace & Boiler Study
December, 2010

Study Background

The Terasen TLC Furnace survey was used to measure how much importance residents place on annual furnace inspections; on the long-term benefits of appliance efficiency; on the resulting energy and cost-savings from such efficiencies; and, on Customer-Contractor dialogue about the benefits achieved by upgrading to high-efficiency space and water heating appliances.

Other specific objectives of the research include the following:

- Determine how many participants replaced, or were recommended to replace, their furnace due to issues identified during servicing;
- Determine how often leaks or maintenance issues were identified during servicing;
- Identify how many participants would have serviced their furnace regardless of the Service Gift Card offered by the TLC Program;
- Identify any strengths or weaknesses of the TLC Program; and,
- Determine how often Contractors took the opportunity to educate customers about energy efficiency during service visits.

Methodology

A total of 375 telephone surveys were completed between November 22 and December 4, 2010 with Terasen customers who participate in the TLC Furnace Program. Participants surveyed were 18 years of age or older.

Highlights

Overall Satisfaction

There does not appear to be any weaknesses in the TLC Program. A high majority of program participants were extremely satisfied with the outcome of their service visit overall.

- The $25 Gift Card has a strong appeal and is considered a bonus.
- The promotion of the Program serves as a welcomed reminder that it is servicing time again.
- The application form is quite easy to fill out.

Key Findings

Although highly appealing, the Gift Card is not strong driver of participation in the program. Slightly more than 80% of participants would have proceeded with their servicing with or without the Gift Card. It is, however, a value-added feature.

Ten percent of participants reported that Contractors found leaks or other problems during their inspection. Additionally, nine percent of participants were advised to replace their furnace or boiler and six percent were advised to upgrade. Most of these participants had already complied or are going to comply with the advice. Compliance rates were higher if the recommendation was to replace the furnace or boiler (as opposed to upgrading it). Of the participants who do not intend to follow through with the advice given, the high cost of an upgrade or replacement was their number one reason for not doing so.

Recommended Actions

The TLC Program is viewed as a valuable initiative and will continue to be embraced by homeowners with furnaces or boilers in the future. However, the program can be extended to include the promotion of programmable thermostats and their benefits.

TLC Furnace Services: Telephone Study – 2010

Terasen Gas

December 2010

(R1709)

Table Of Contents

Objectives

The TLC Furnace Servicing Program's overall objectives are to promote the importance of annual furnace servicing, to encourage Terasen customers to understand the long-term benefits of appliance efficiency and the resulting energy and cost savings, and to promote Customer-Contractor dialogue about the benefits achieved by upgrading to high-efficiency space and water heating appliances.

The specific objectives of this study are to:

- Determine how many participants replaced—or were recommended to replace—their furnace due to issues identified during servicing;
- Determine how often leaks or maintenance issues were identified during servicing;
- Identify how many participants would have serviced their furnace regardless of the Service Gift Card offered by the TLC Program;
- Identify any strengths or weaknesses of the TLC Program; and,
- Determine how often Contractors took the opportunity to educate customers about energy efficiency during service visits.

The survey interviewed Terasen customers with home-heating furnaces or boilers.

Methodology

A total of 375 telephone surveys were completed between November 22 and December 4, 2010 among Terasen customers who are participants in the TLC Furnace Program. Participants surveyed were 18 years of age or older.

The results of this report are unweighted.

For a more complete description of the research methodology, please refer to the Appendix to the Methodology section.

NOTE OF CAUTION

Data derived from sample populations are subject to variance. In order not to imply an unwarranted degree of precision, all percentage figures in the General Summary have been rounded to whole numbers; therefore, percentages may not total 100.

Throughout the General Summary, bold underlines have been used to denote unusually high figures at the 95% confidence level.

Further, it should be noted that percentages derived from “actual” bases of less than 100 respondents should be interpreted with caution, while percentages derived from “actual” bases of less than 50 should be interpreted with extreme caution.

December, 2010

Executive Summary

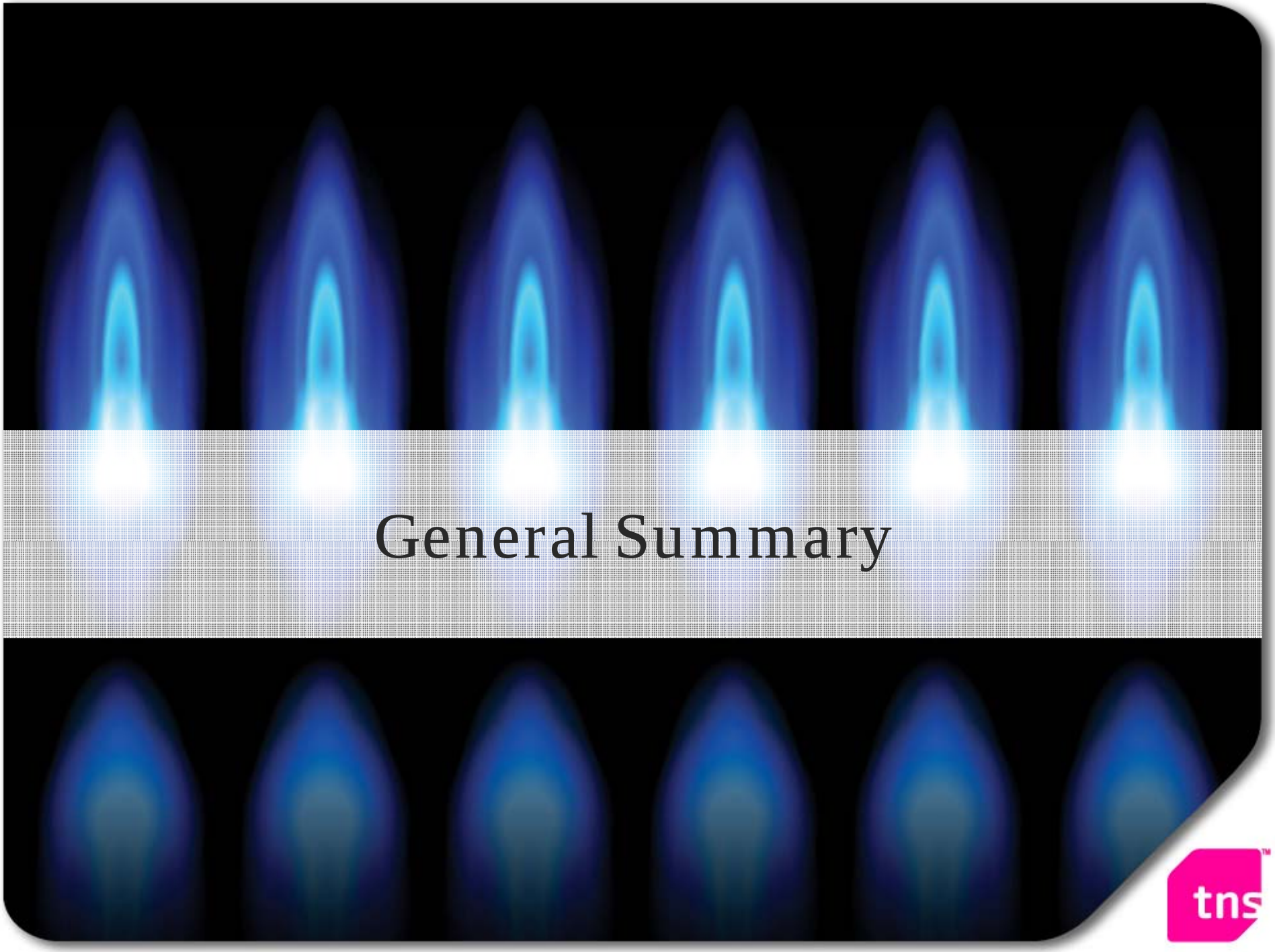
There does not seem to be any weaknesses in the TLC Program. A high majority of program participants were extremely satisfied with the outcome of their service visit overall. Similarly, feedback on the components of the program were also very positive:

- The $25 Gift Card appealed strongly to participants;
- The promotion of the Program provided a valuable reminder to people that it was servicing time again; and,
- Most found the application form quite easy to fill out, but a small percentage of participants had difficulty filling in the registration, model and rating numbers.

Although highly appealing, the Gift Card is not strong driver of participation in the program. Slightly more than 80% of participant would have proceeded with their furnace or boiler servicing with or without the Gift Card. It is, however, a value-added feature.

Ten percent of participants reported that Contractors found leaks or other problems during their inspection. Additionally, nine percent of participants were advised to replace their furnace or boiler and six percent were advised to upgrade. Most of these participants had already complied or are going to comply with the advice. Compliance rates were higher if the recommendation was to replace the furnace or boiler (as opposed to upgrading it). Of the participants who do not intend to follow through with the advice given, the high cost of an upgrade or replacement was their number one reason for not doing so.

We believe the high appeal of the Gift Card promotion and the high satisfaction rating of service visits suggests the TLC Program is both valuable and will continue to be embraced by homeowners with furnaces or boilers in the future. However, the program can be extended to include the promotion of programmable thermostats and their benefits.



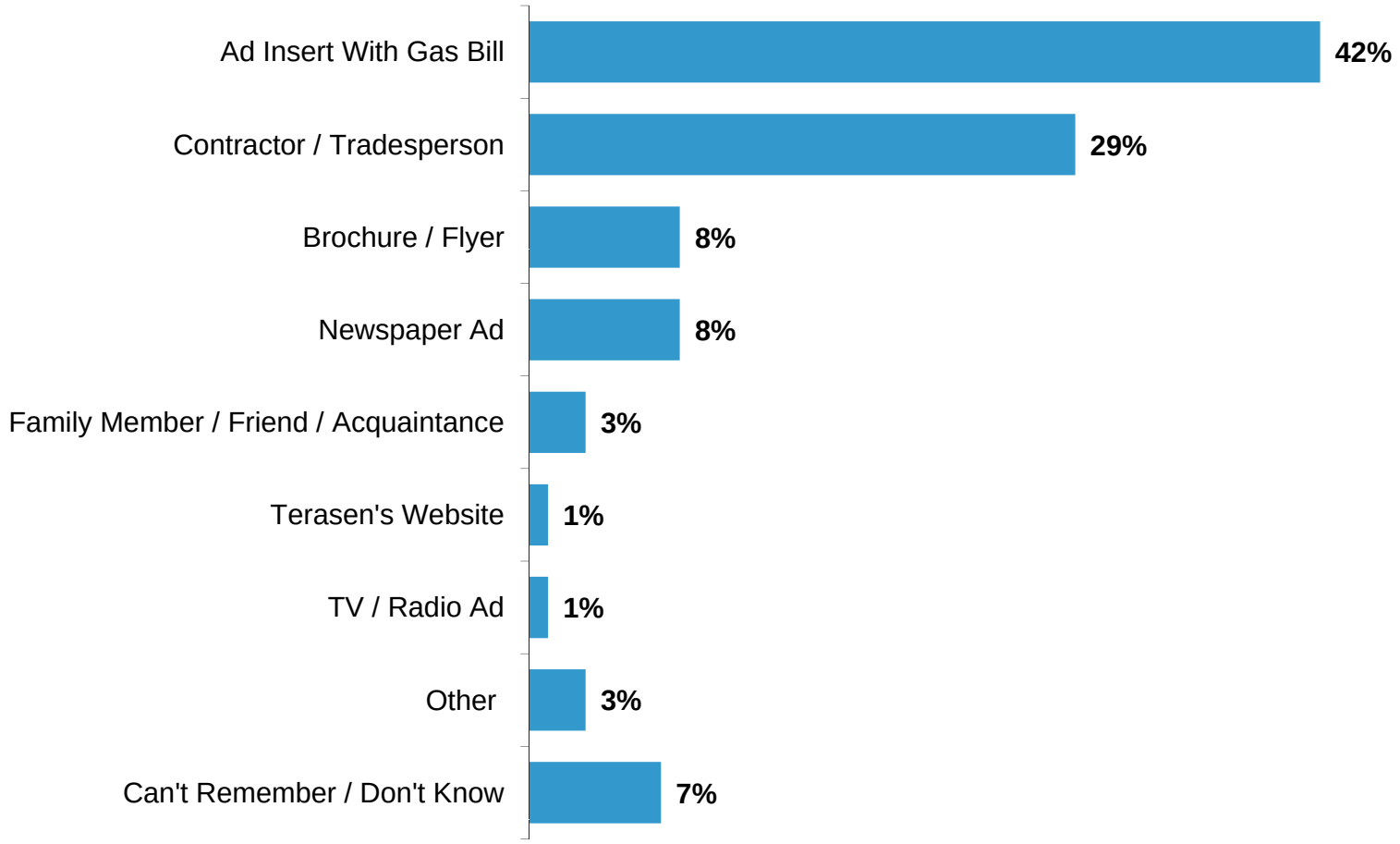
General Summary

The Gift Card Promotion

Hearing About The TLC Program

Bill inserts have been the most engaging channel in promoting the TLC Program thus far. Another common avenue for participants to learn about the program is through word-of-mouth with tradespersons or contractors.

Where Participants Heard About The TLC Program

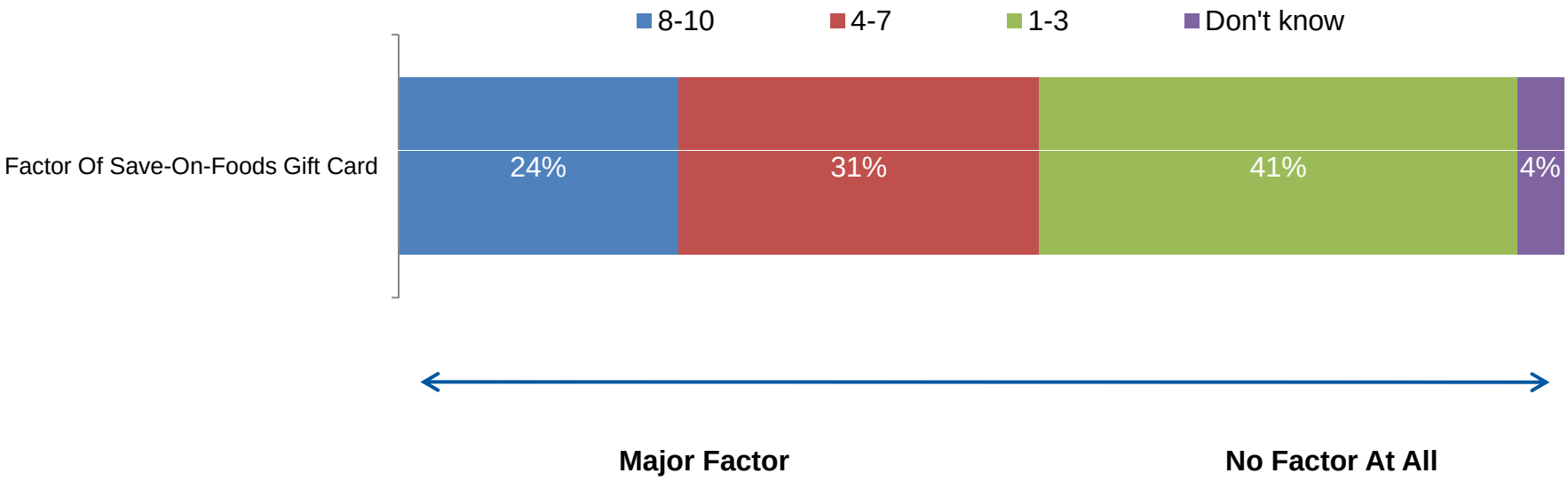


Base: Total TLC participants (n= 375)

Q1: First, I'd like you to tell me how you originally heard about the Terasen Gas TLC Program. This is the Program where you received a $25 gift certificate for having your furnace or boiler inspected.

Importance Of The Gift Card In TLC Participation

The $25 Save-On-Foods Gift Certificate had a major influence on approximately one-quarter of the TLC participants in signing on to the Program. However, for the majority of participants, the Gift Card was a small or non-factor.

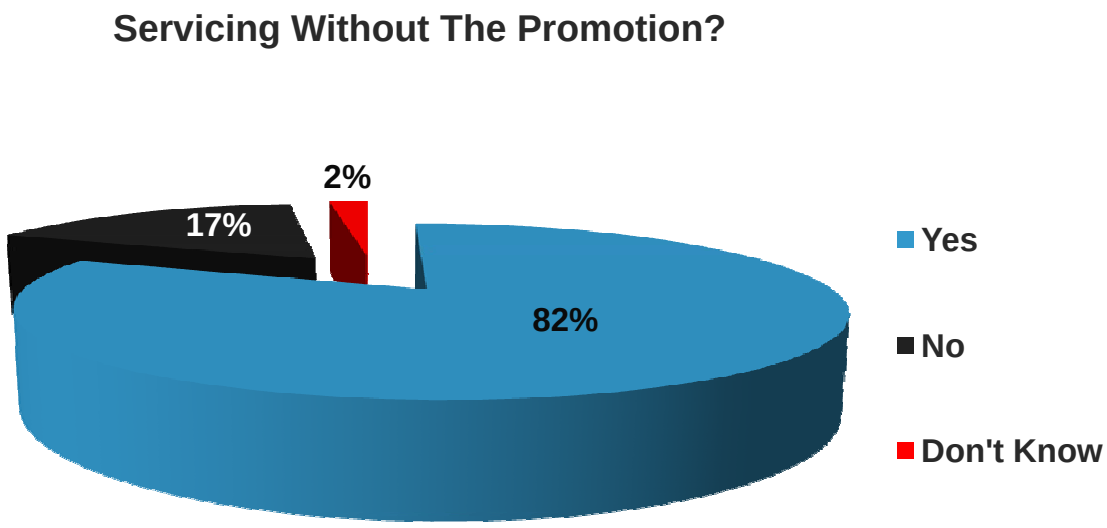


Base: Total TLC participants (n= 375)

Q2: How much of a factor was the $25 Save-On-Foods Gift Card in your decision to sign up for the TLC Program? Rate your decision using a 10-point scale where "10" means the Gift Card was a “major factor” in signing up and "1" means it was "No factor at all".

Would You Have Called A Contractor Anyway?

More than 8-in-10 TLC participants stated they would have had their furnace or boiler serviced despite the promotion. Therefore, the Gift Card serves as a deal sweetener or value-add, instead of a driver.

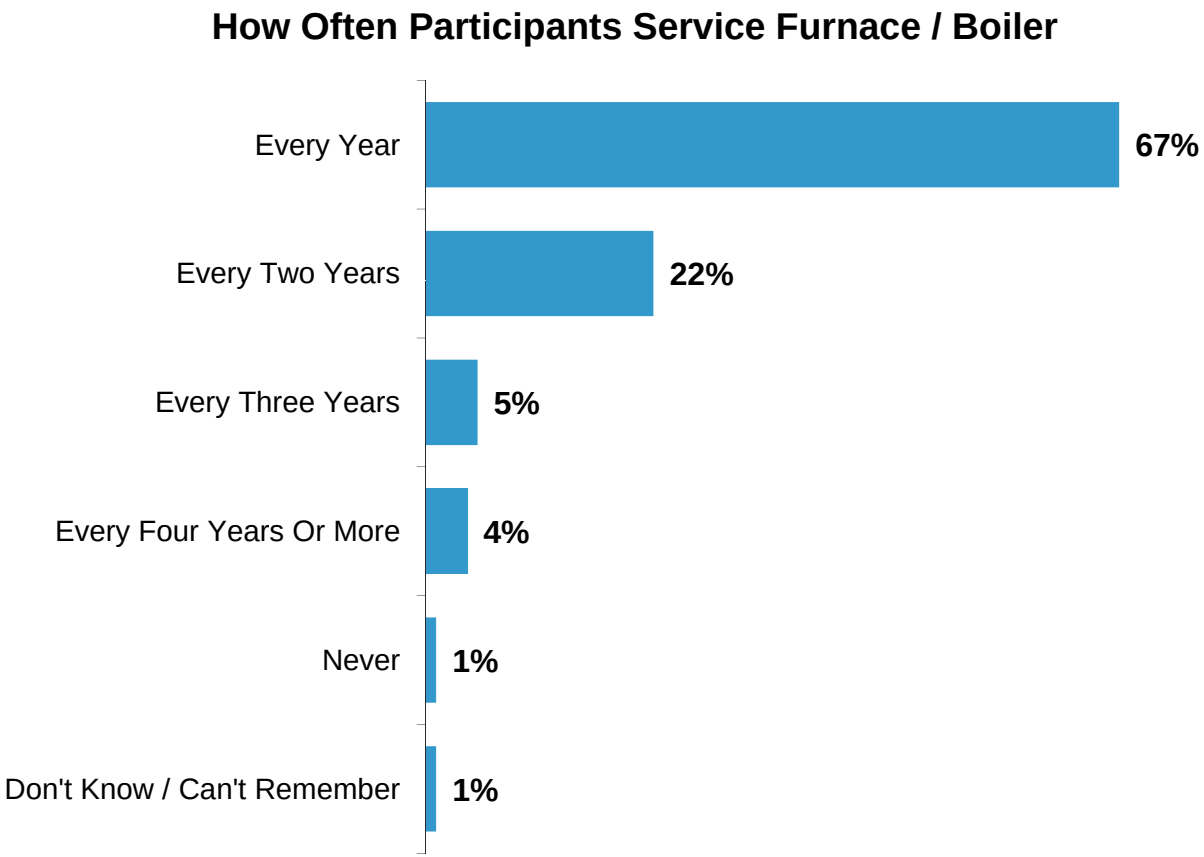


Base: Total TLC participants (n= 375)

Q3A. Would you have called a Contractor to service your furnace or boiler if you had not heard about the gift-card promotion?

Frequency Of Servicing

Two-thirds of participants—who said they would proceed with servicing if they had not heard of the gift-card promotion—service their furnace or boiler regularly. Another 22% service this appliance every two years.

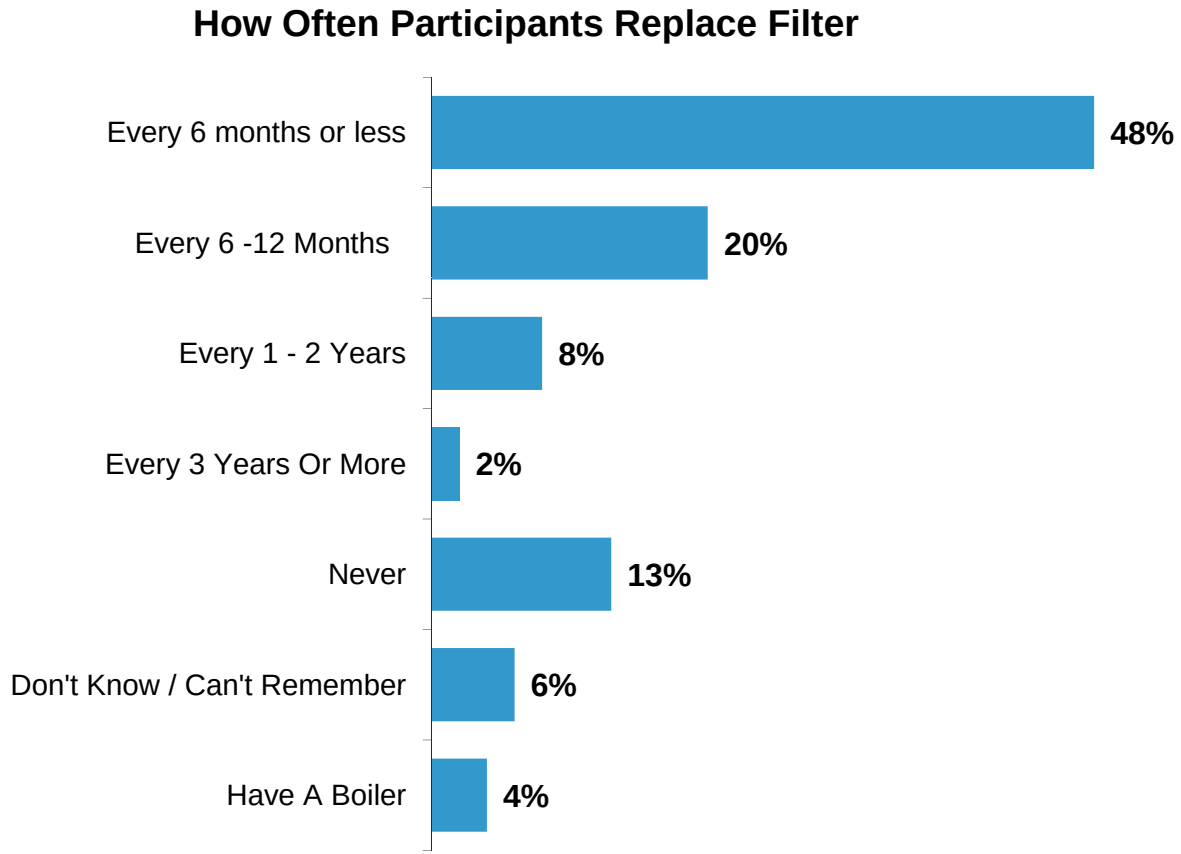


Base: TLC participants who would service furnace / boiler regardless (n= 306)

Q3B: How often do you have your furnace or boiler serviced?

Frequency Of Furnace Filter Replacement

Nearly half of all participants replace their filter every six months or less. Another 20% replace the filter every six to twelve months and 8% replace the filter before two years has passed. Significantly, 13% of TLC participants do not replace the furnace filter at any time.

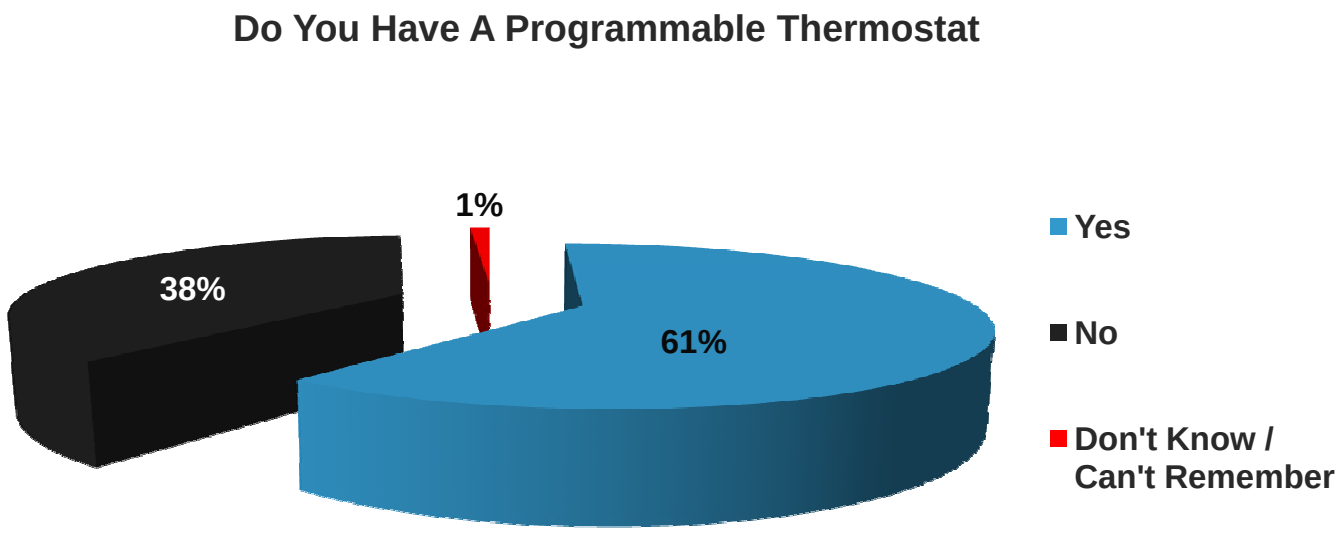


Base: Total TLC participants (n= 375)

Q4: How often do you replace your furnace filter?

Programmable Thermostats

Sixty-one percent of TLC participants have Programmable thermostats, which could represent one feature that more households can invest in to improve their energy efficiency. This could be incorporated into the TLC program to promote efficiency and cost savings.

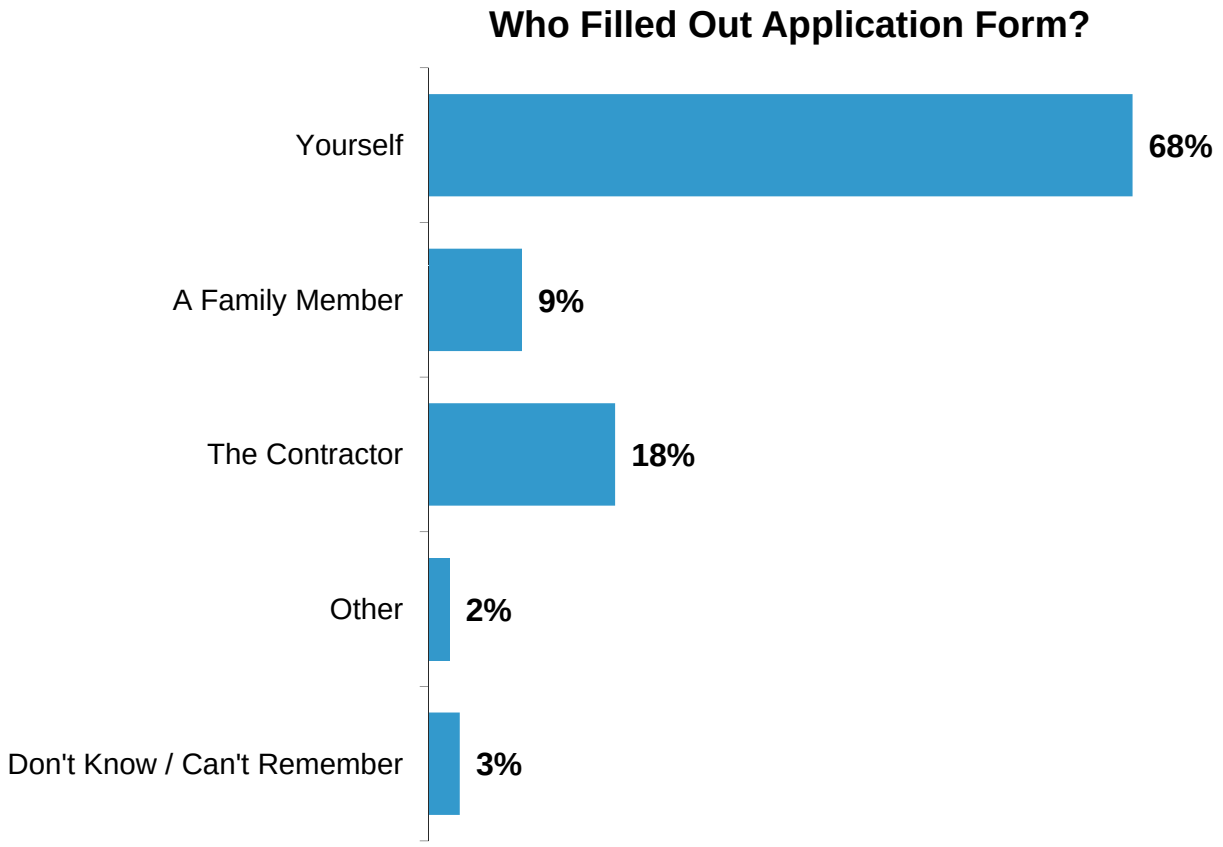


Base: Total TLC participants (n= 375)

Q5. Do you have a Programmable thermostat?

Completing The TLC Application Form

The majority of participants signed up for the Gift Cards themselves, while a small number reported that their Contractor filled out the form on their behalf.

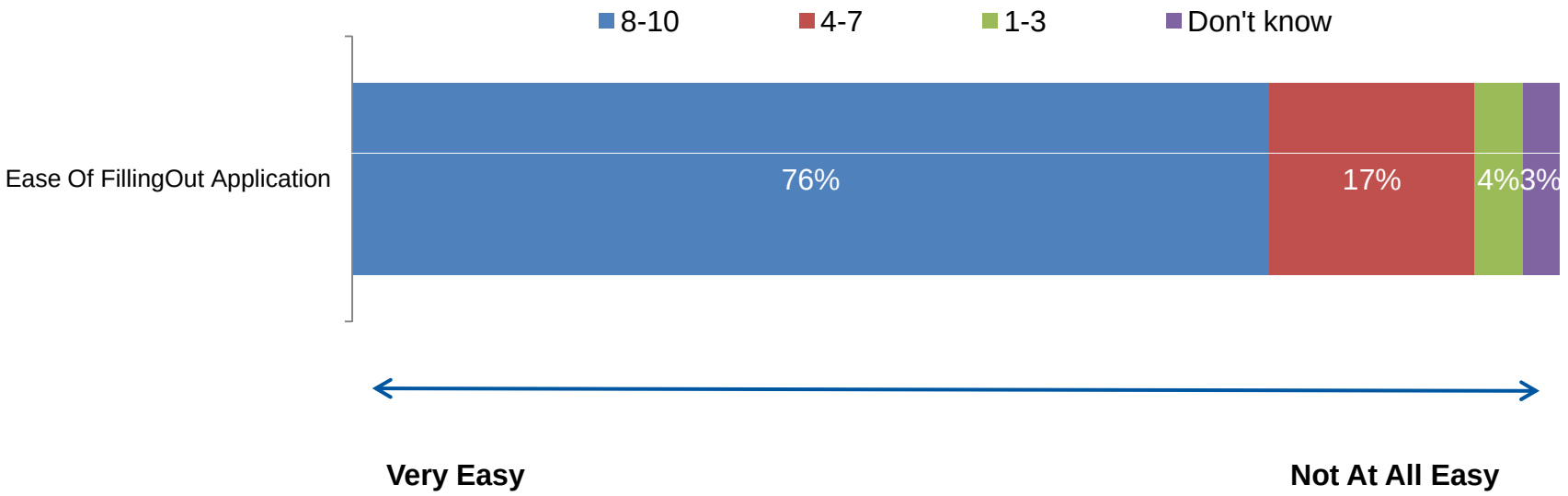


Base: Total TLC participants (n= 375)

Q6: When you signed up for the Gift Card promotion, who filled out the application on the Gift Card?

Rating The Application Form

The Gift Card application is said to be quite easy to complete. Very few participants had issues with the form.



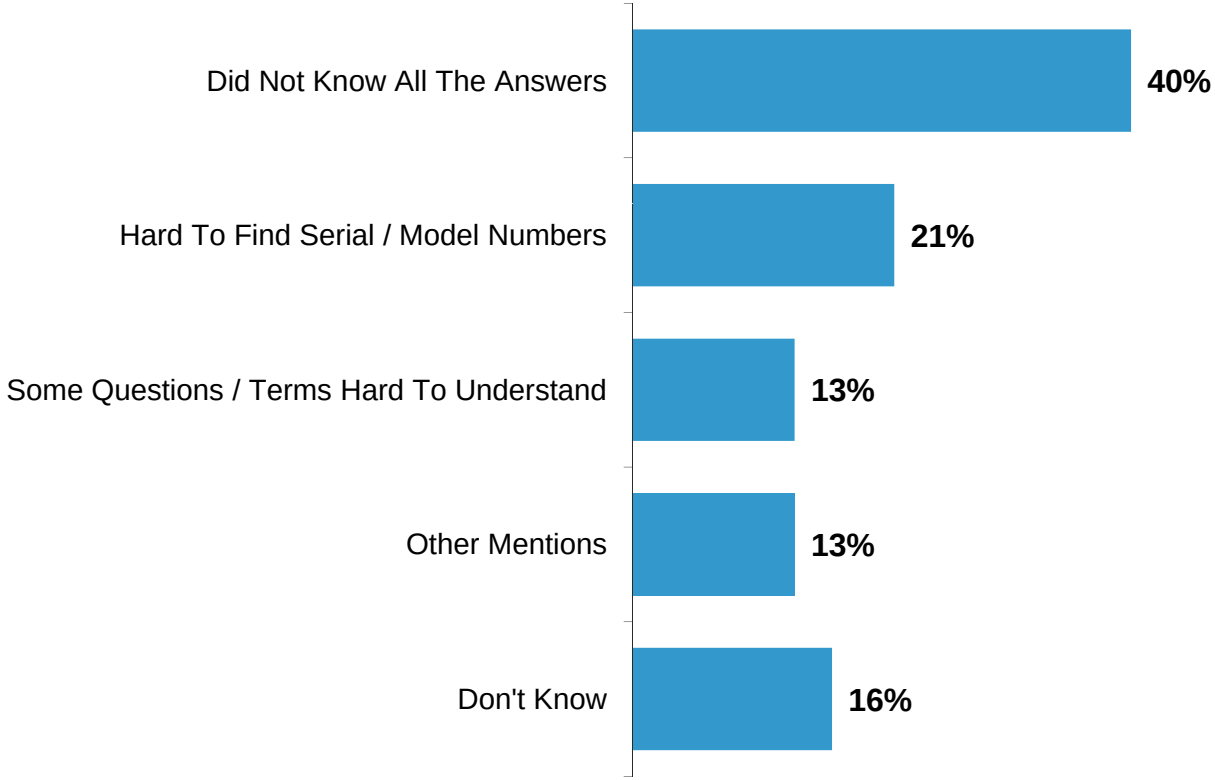
Base: TLC participants who filled out the form themselves (n= 256)

Q7: Next, I'd like you to think about the application form you filled out. Using a 10-point scale where "10" means the TLC application form was "Very easy" to fill out and "1" means it was "Not at all easy", how would you rate the ease of filling out the application form?

Those Who Had Difficulty With The Application

The one piece of information that will help mitigate some of the difficulties in filling out the form is to point participants to where they need to look for the serial or model numbers requested in the form. This was a problem raised by those who said the application form was not easy to complete.

Why Was The Application Difficult To Fill Out?



Base: TLC participants who had difficult with the form (n= 38) ††

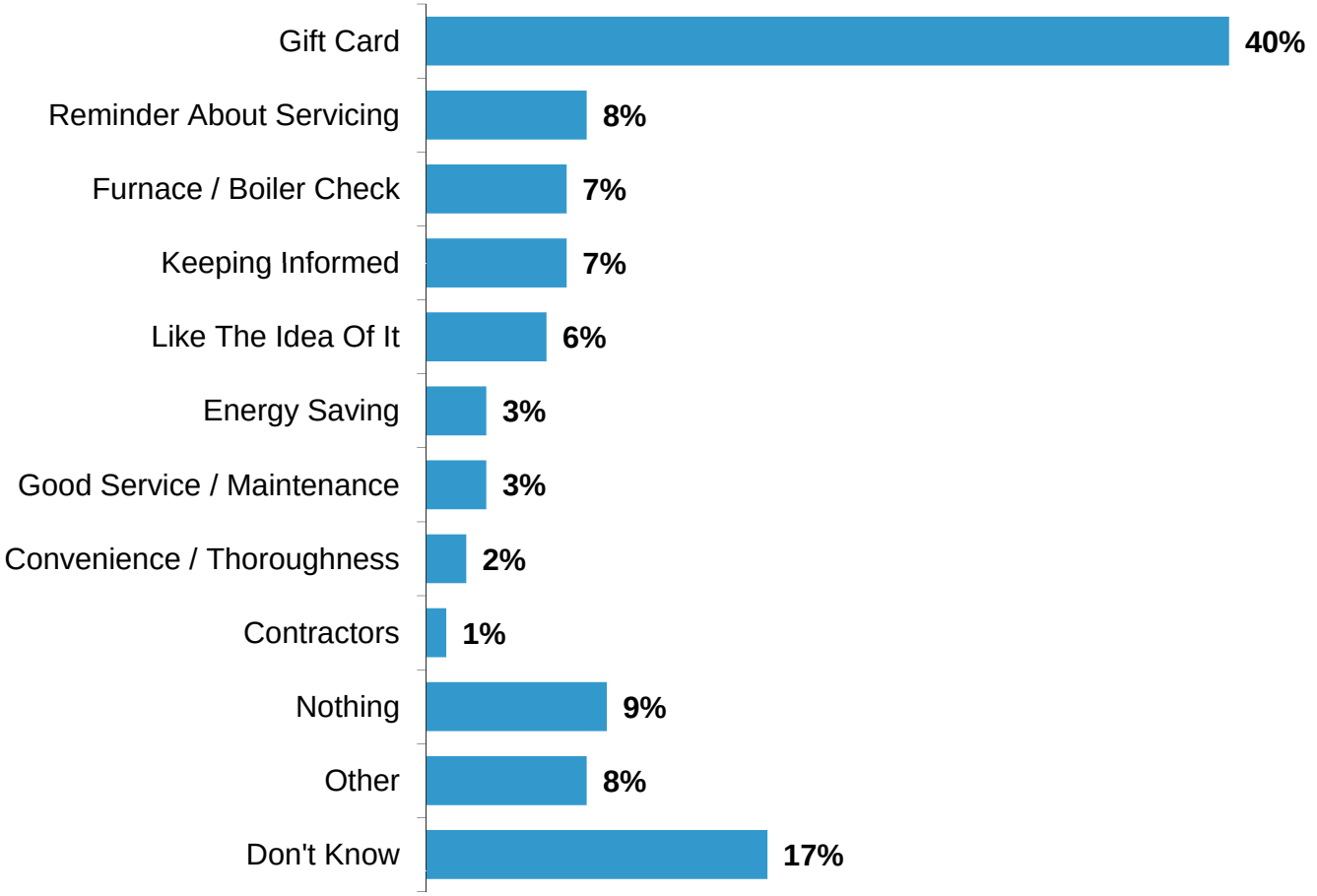
†† Data based on sample sizes of less than 50 should be interpreted with extreme caution.

Q8: Why was the TLC application not that easy to fill out?

Appeal Of The TLC Program

The $25 Save-On-Foods Gift Card (40%) appealed much more to TLC participants than any other aspect of the Program. Although some participants liked being reminded about the need for furnace or boiler servicing (8%) or the actual furnace or boiler check itself (7%).

What Do You Like About The TLC Program?

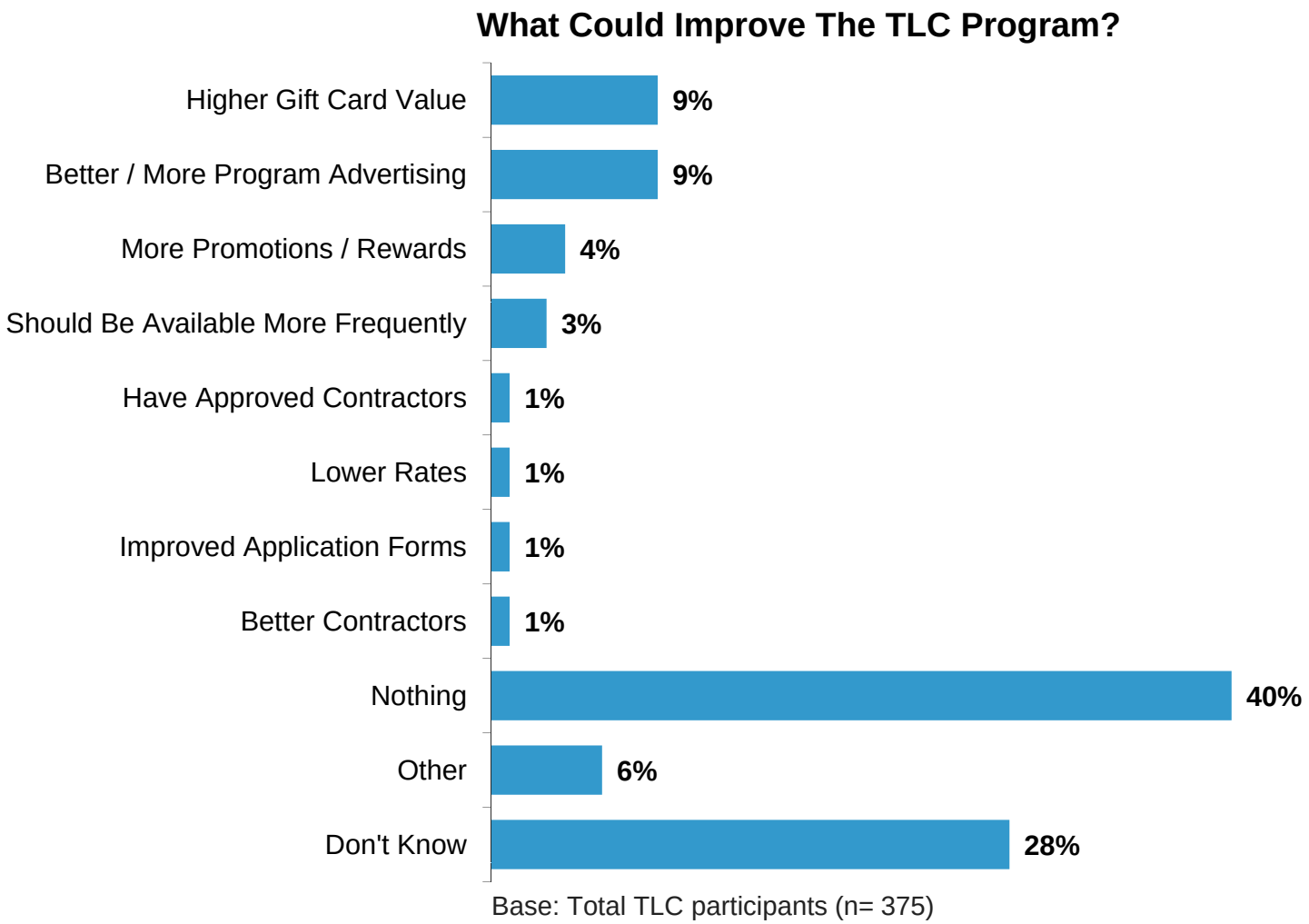


Base: Total TLC participants (n= 375)

Q17: What do you specifically like about the TLC Program?

Improvements To The TLC Program

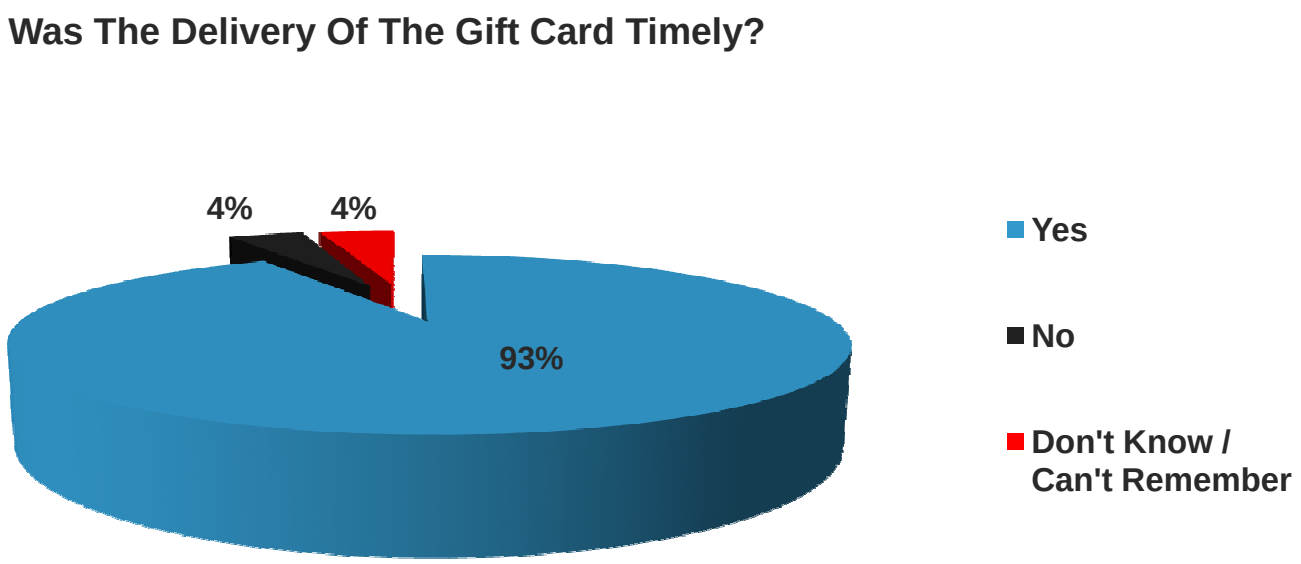
Forty percent of TLC participants like the Program as it is today. However, a higher dollar value for the Gift Card (9%) and better and broader advertising of the Program (9%) should be considered according to some participants.



Q18: What do you think could be improved about the TLC Program?

Delivery Of The Gift Card

The timing of when the Gift Card was delivered is not an issue at all. Over 9-of-10 participants felt they received the Gift Card expeditiously.



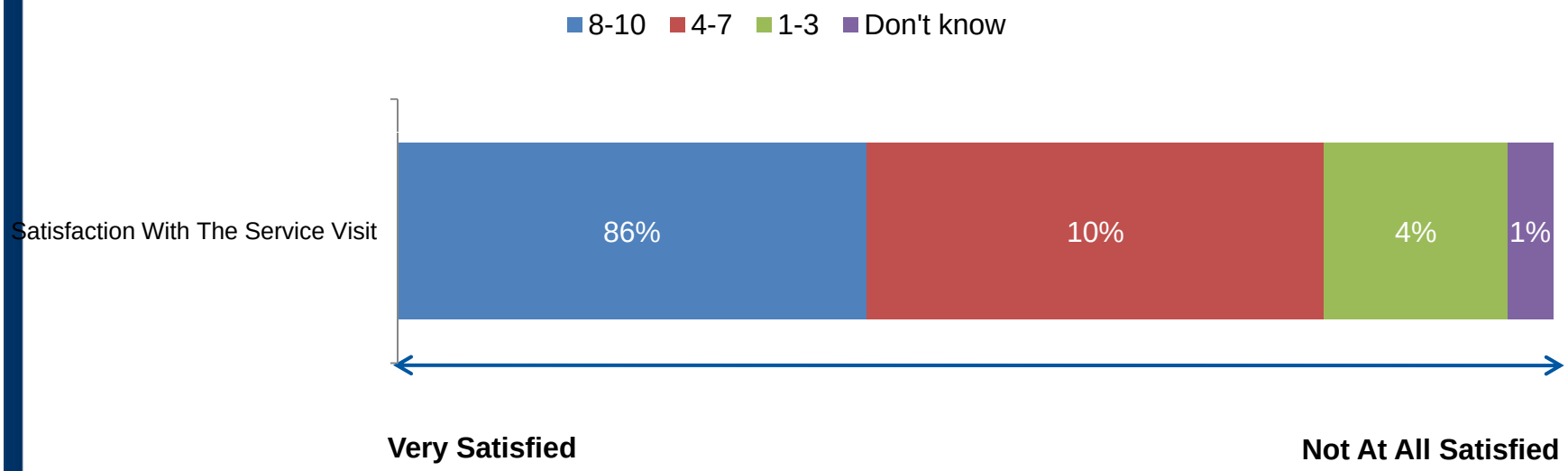
Base: Total TLC participants (n= 375)

Q19. Did you receive your $25 Save-On-Foods Gift Card in what you think is a timely fashion?

The Service Visit

Rating The Service Visit

The vast majority of TLC participants (86%) were very satisfied with the outcome of the service visit by the Contractor.

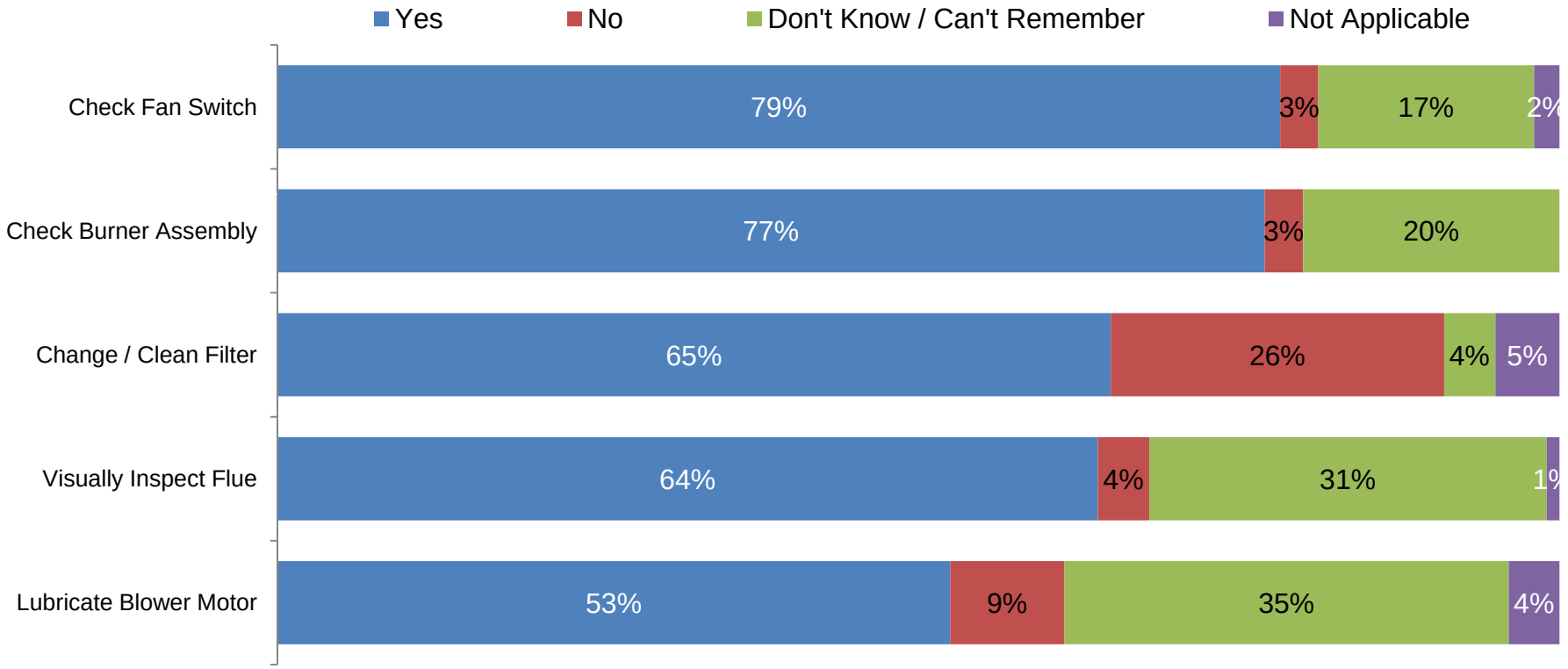


Base: Total TLC participants (n= 375)

Q9: Now thinking about the Contractor who came to your home to inspect your furnace or boiler, how satisfied are you with the outcome of the service visit? Using a 10-point scale where "10" means "Very satisfied" with the service and "1" means "Not at all satisfied", how would you rate the service?

Completion Of Service Visit Tasks

Most participants elect to have an extensive servicing of their furnace or boiler. One thing that stands out is the high percentage of participants who state the filter wasn't changed or cleaned during the service visit (26%). This suggests that they themselves do this task when required.

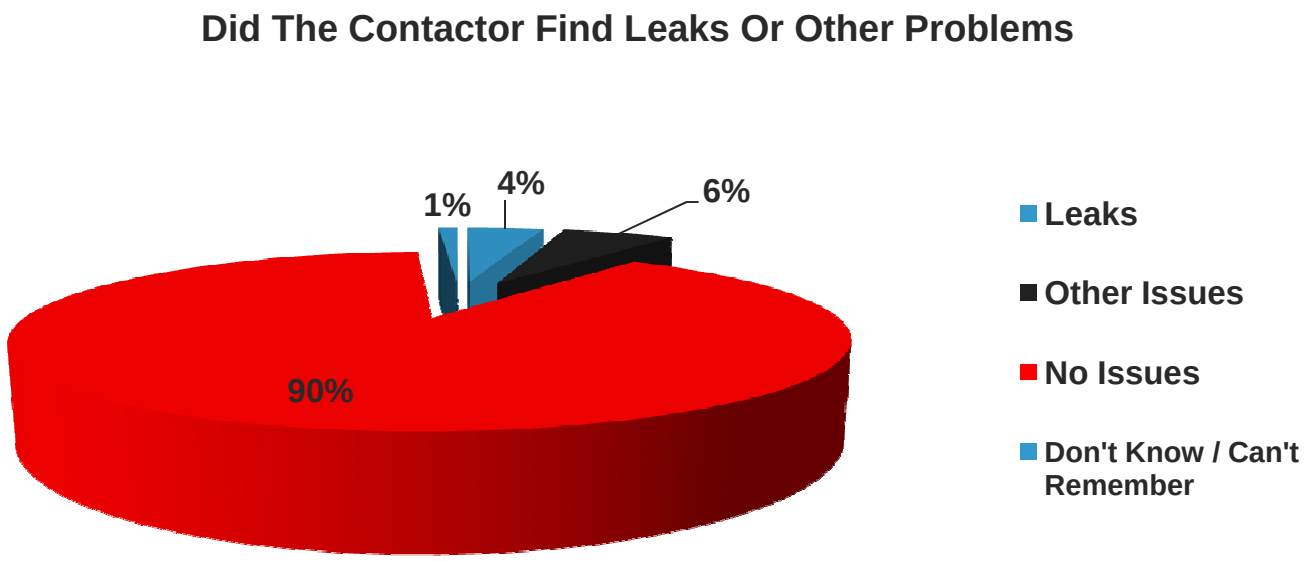


Base: Total TLC participants (n= 375)

Q10A-E: During the servicing of your furnace or boiler, did the Contractor complete any of the following tasks?

Very Few Problems On The Service Visit

Nine-in-ten TLC participants had no leaks or other problems with their furnaces or boilers pointed out to them by the Contractor. Only 4% reported leaks.

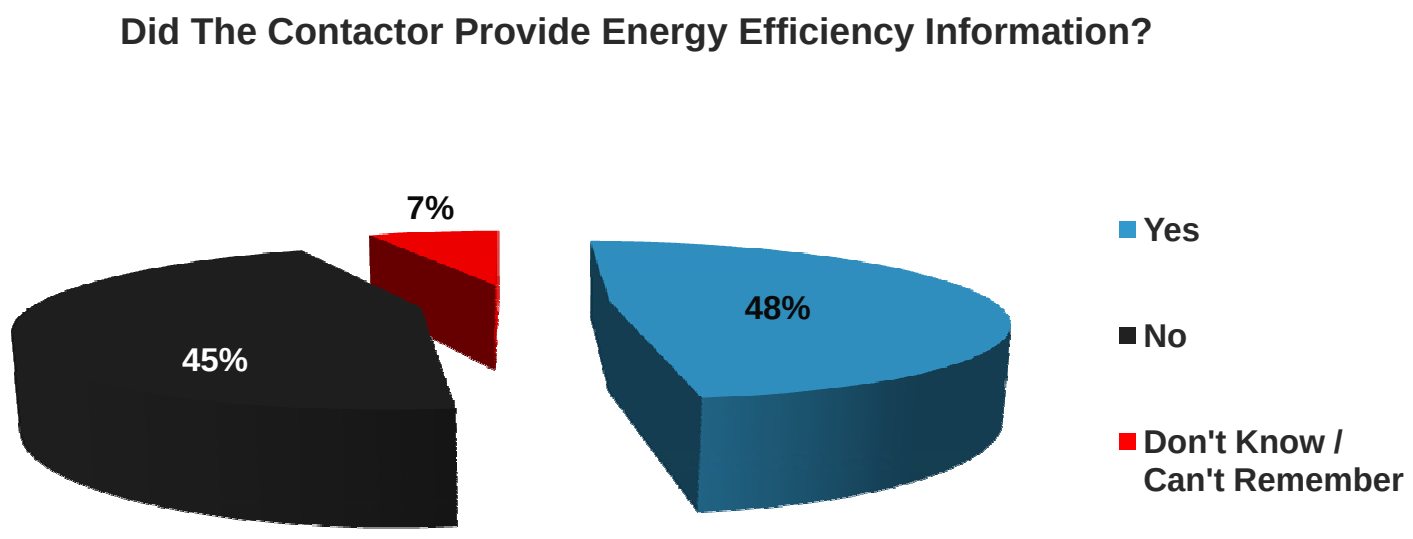


Base: Total TLC participants (n= 375)

Q11. During the service visit, did the Contractor discover any leaks or other problems with your furnace or boiler?

Providing Energy Efficiency Information

Approximately half of TLC participants report receiving energy efficiency information from their Contractor during the maintenance visit.



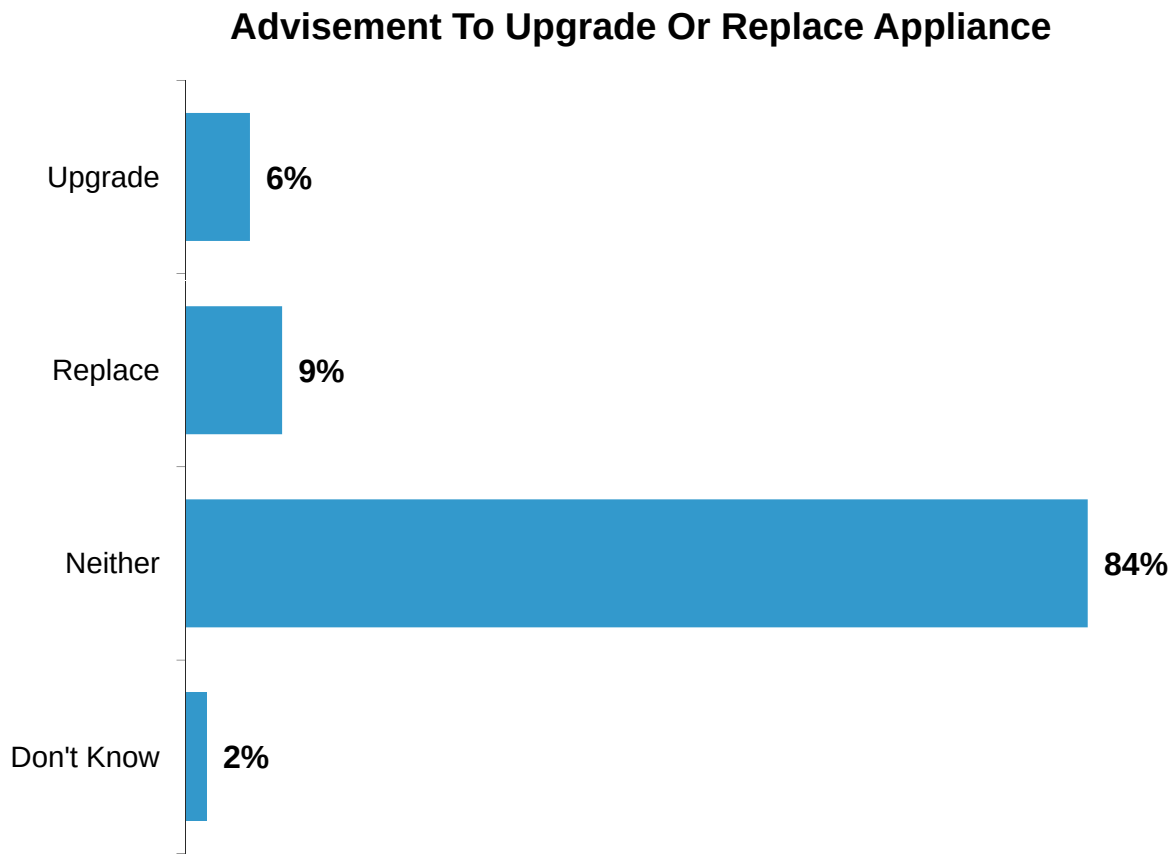
Base: Total TLC participants (n= 375)

Q12. Did the Contractor provide information about energy efficiency, furnace or boiler safety or maintenance during their service visit?

Upgrades / Replacements

Upgrade Or Replacement Advisement

A total of15% of TLC participants were advised by service Contractors to either upgrade (6%) or to replace (9%) their major heating appliance.



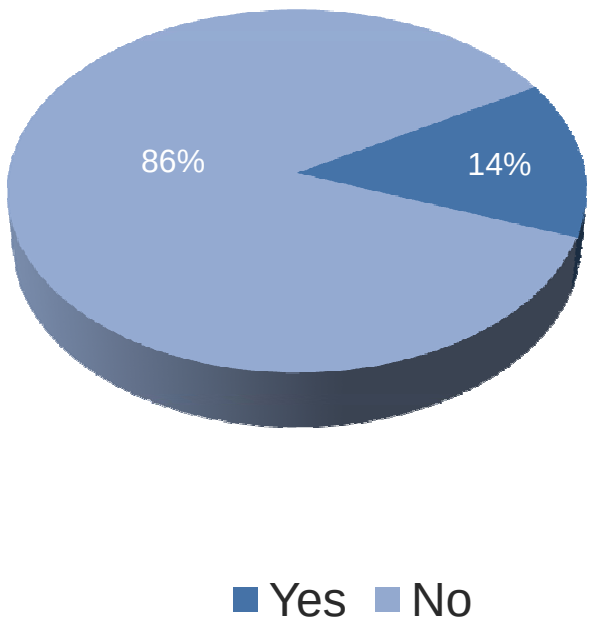
Base: Total TLC participants (n= 375)

Q13: Did the Contractor advise you to replace your furnace or boiler, or upgrade to a high-efficiency model?

Upgrading Furnaces And Boilers

Of the 21 TLC participants who were advised to upgrade their furnace or boiler, only three followed through with the upgrade.

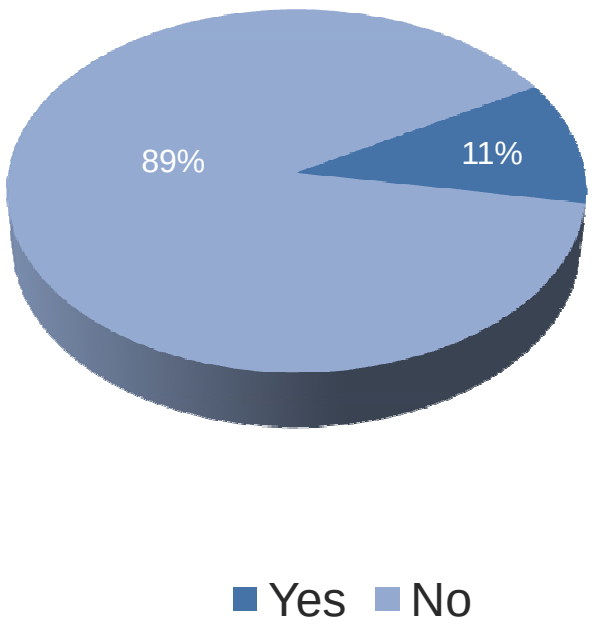
Following Through On Advice To Upgrade



Base: TLC participants advised to upgrade (n= 21) ††

Of the 18 remaining TLC participants who did not upgrade their furnace or boiler, only two said that they would upgrade in the future.

Planning To Upgrade In The Future



Base: TLC participants who did not upgrade (n= 18) ††

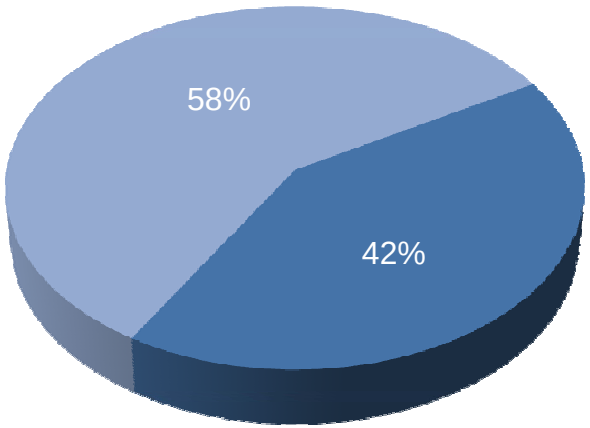
†† Data based on sample sizes of less than 50 should be interpreted with extreme caution.

Q14A: Did you follow through on the advice and upgrade your furnace or boiler to a high-efficiency model?
Q14B: Are you planning to upgrade your furnace or boiler in the near future?

Replacing Furnaces And Boilers

Of the 33 TLC participants who were advised to replace their furnace or boiler, 14 followed through with the replacement.

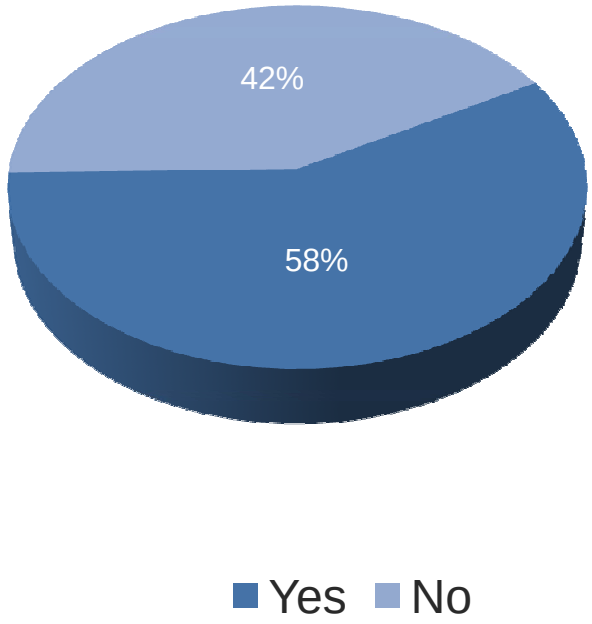
Following Through On Advice To Replace



Base: TLC participants advised to replace (n= 33) ††

Of the 19 remaining TLC participants who did not replace their furnace or boiler, 11 said that they would do a replacement in the future.

Planning To Replace In The Future



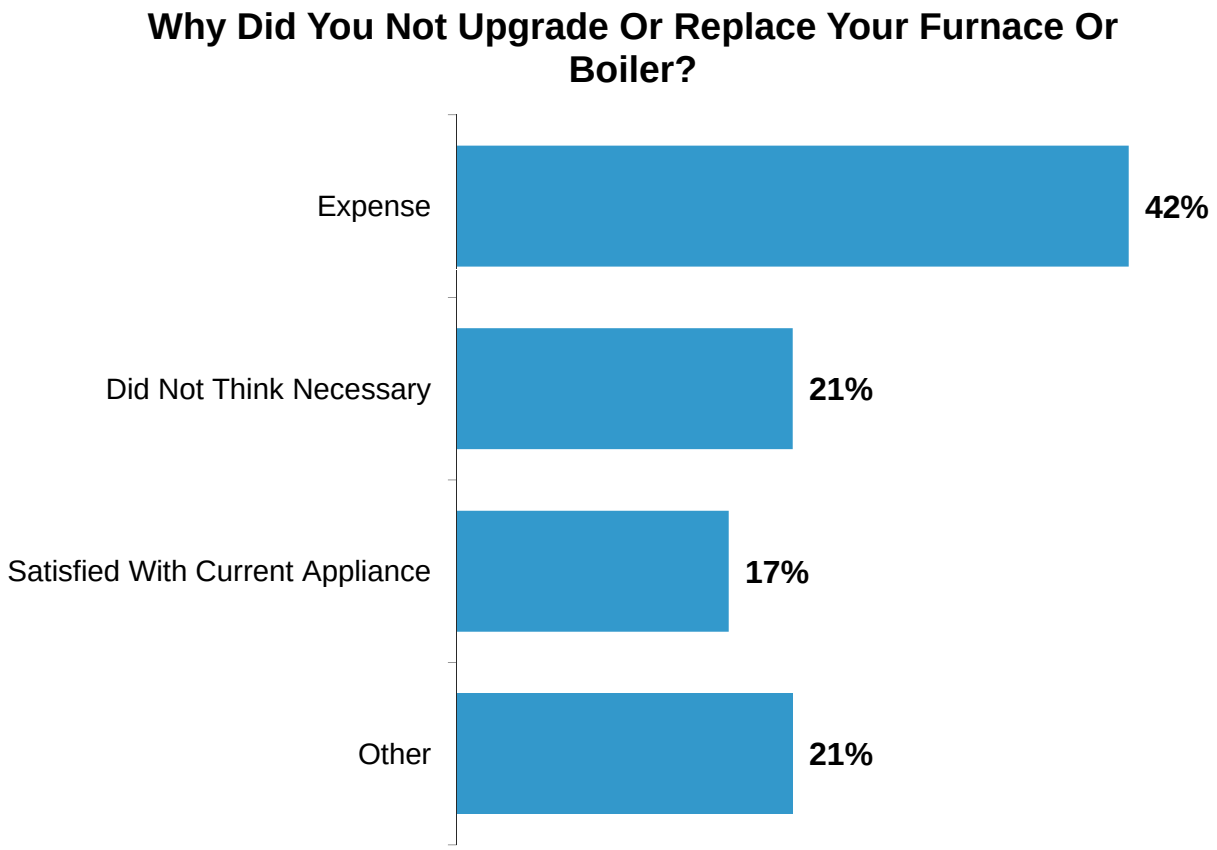
Base: TLC participants who did not replace (n= 19) ††

†† Data based on sample sizes of less than 50 should be interpreted with extreme caution.

Q15A: Did you follow through on the advice and have your furnace or boiler replaced?
Q15B: Are you planning to replace your furnace or boiler in the near future?

Reasons For Not Upgrading Or Replacing Appliances

Cost was cited as the greatest impediment for not upgrading or replacing this major heating appliance.



Base: TLC participants who did not upgrade or replace appliance (n= 24) ††

†† Data based on sample sizes of less than 50 should be interpreted with extreme caution.

Q16: Why did you decide not to upgrade or replace your furnace or boiler?

Demographics

Demographics (1)

	Total	18-24	25-34	35-44	45-54	55-64	65-74	75+
	(375) %	(2) %	(10) %	(24) %	(40) %	(92) %	(96) %	(110) %
FILLING OUT THE APPLICATION:								
Yourself	68	100	80	88	70	71	64	64
A Family Member	9	-	10	-	18	8	8	10
The Contractor	18	-	10	13	5	14	23	24
Other	2	-	-	-	5	3	1	-
Don't Know / Can't Remember	3	-	-	-	3	4	4	3

Note: "-" denotes "0".

Demographics (2)

	Total	18-24	25-34	35-44	45-54	55-64	65-74	75+
	(375) %	(2) %	(10) %	(24) %	(40) %	(92) %	(96) %	(110) %
EDUCATION:								
Elementary school	1	-	-	-	-	-	-	2
Some high school	8	-	-	-	3	3	9	14
High school graduate	22	50	-	8	25	13	29	26
Some college or technical school / CEGEP	7	-	10	4	3	12	4	6
College or technical school / CEGEP Graduate	16	50	20	17	18	16	14	16
Some university	7	-	10	-	5	10	7	7
University Graduate	22	-	50	54	18	27	20	12
Post Graduate Studies (Masters / Doctoral)	13	-	10	13	28	14	13	9
Refused	5	-	-	4	3	4	4	8

Note: “-” denotes “0”.

Demographics (3)

	Total	18-24	25-34	35-44	45-54	55-64	65-74	75+
	(375) %	(2) %	(10) %	(24) %	(40) %	(92) %	(96) %	(110) %
INCOME:								
Less than $35,000	16	-	10	8	5	8	18	26
$35,000 to less than $55,000	16	-	30	4	13	19	20	13
$55,000 to less than $75,000	15	-	20	21	10	16	15	14
$75,000 to less than $100,000	11	50	30	21	20	10	12	5
$100,000 to less than $125,000	7	-	10	13	18	12	1	3
$125,000 or more	7	50	-	21	20	9	3	2
Don't know	2	-	-	-	3	-	3	5
Refused	26	-	-	13	13	27	29	34
GENDER:								
Male	53	50	80	50	43	51	55	56
Female	47	50	20	50	58	49	45	44

Note: "-" denotes "0".

Appendix To The Methodology

Appendix To The Methodology (1)

DATA COLLECTION

A total of 375 telephone surveys were completed between November 22 and December 4, 2010 among Terasen customers who are participants in the TLC Furnace Program. Participants surveyed were 18 years of age or older.

The results of this report are unweighted.

INTERVIEWING

Prior to the start of interviewing, a briefing session was held. In this session, the project director provided interviewers with the background and objectives of this study, as well as other important interviewing instructions. The purpose of the briefing is to increase interviewers' knowledge of the topic under study and to minimize any potential interviewing error.

All telephone interviews were conducted by trained, experienced interviewers working from TNS Canadian Facts' call centre facility in London, Ontario. Interviews were conducted using the TNS FACTS Network (Fully Automated Computer Telephone Surveys).

Up to five calls were made to each sample listing in an attempt to obtain a completed interview, thus increasing the possibility of contacting those individuals who are frequently busy or not at home. All calls were placed between 4:30 p.m. and 9:30 p.m. on weekdays and between 10:00 a.m. and 4:00 p.m. on Saturdays. No calling was done on Sundays to conform to Terasen calling policies. Validation consisted of call centre supervisors monitoring 10% of the interviews "live," either partially or completely. The data were edited and processed using TNS' in-house computer facilities.

The results of the last call attempts made are detailed in the record of call following.

Appendix To The Methodology (2)

Exhibit: Record of Call

	Number	Percent
Total Sample -	(4,045)	(100) %
Not in Service	52	1
Non-Residential	19	*
Sample in Frame	3,948	98
Net Sample in Frame** -	(3,948)	(100) %
Completed Interviews	377	10
Disqualified	17	*
Refusals	376	10
Respondent Ill/Never Available	19	*
Language Barrier	13	*
Appointment for Callback	1,080	27
No Reply	638	16
Engaged	2	*

* Equals less than one-half of one percent.

** Sample in frame is the total number of usable telephone numbers. It is calculated by subtracting the not in service, non-residential and FAX/Modem numbers from the total sample.

Appendix To The Methodology (3)

DATA PROCESSING

The resultant data were edited, coded and processed by TNS. No weights were applied.

SURVEY MARGIN OF ERROR

The reader is cautioned that the survey results are subject to margins of error. The overall sampling error for 375 total interviews at the 95% confidence level is approximately ± 5.1%. For example, if 50% of all residents surveyed stated that they prefer Terasen as a company, then we can be sure, nineteen times out of twenty, that if the entire population had been interviewed, the proportion would lie between 44.9% and 55.1%.

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Attachment 12.6.1

Summary of support for OPOWER's approach to behavioral energy efficiency

In 2010, GDS Associates approved a protocol for evaluation, measurement, and verification (EM&V) of energy savings from behavior-based energy efficiency programs to be administered by PPL Electric Utilities. This decision made Pennsylvania the fourth state to accept behavior-based programs as an efficiency resource—joining Minnesota, Massachusetts, and California—and the first to approve a specific protocol for counting these savings. Key elements include:

- ***Ex-post*** measurement methodology: The results from OPOWER's program will be measured only after the savings have been incurred.
- Rigorous random **experimental design**, including statistically equivalent test and control populations, to ensure integrity of results.
- **No limits on type or size** of deployment: Utilities are able to count the savings from both residential and non-residential deployments, at any size.

These three requirements create an environment that rewards rigor while encouraging innovation. *Ex-post* evaluation ensures that ratepayer dollars are spent wisely, while unlimited deployment capacity leaves Pennsylvania's utilities free to choose the most cost-effective efficiency resources.

This PPL protocol is consistent with the guidelines in the Brattle Group's independent report, "Measurement and Verification Principles for Behavior-Based Efficiency Programs." As the industry leader in this space, Brattle's principles, confirming experimental design and *ex-post* measurement, are further verification of this methodology.

Though PPL's protocol and Brattle's principles were written independently, these guidelines are consistent with Opower's approach to EM&V in deployments with over fifty utilities nationwide. A comparison of principles from PPL, Brattle and Opower demonstrates this consistency, and, in turn, the extent to which Opower's approach is recognized as industry best practice.

Along with approval of its approach to EM&V, Opower has enjoyed considerable support across the twenty-four states in which its program has been filed and from the nine independent evaluations that have verified Opower's results — as described below.

50+ **Utilities with whom OPOWER works to deliver behavioral savings**

⇒ Representative sample of clients: APS, BGE, CenterPoint, ComEd, Connexus, CP&L, DTE, First Choice Power, Gulf Power, National Grid, NIPSCO, NSTAR, PG&E, PPL, Progress, Puget Sound Energy, SDGE, SMUD, SoCalEdison, Xcel

21 **States in which OPOWER has been filed**

⇒ Arizona, Arkansas, Colorado, Connecticut, Florida, Hawaii, Illinois, Indiana, Kentucky, Massachusetts, Maryland, Minnesota, Missouri, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Utah

9 **Independent evaluations that have verified OPOWER's results**

⇒ Includes verification from Environmental Defense Fund, Power System Engineering, Navigant, KEMA, and economists from Harvard, MIT, and Yale

Independent evaluations of OPOWER's M&V methodology and program results

Evaluations related to OPOWER M&V Methodology

A. Faruqui, Ahmad and Sanem Sergici, May 2011. "Measurement and Verification Principles for Behavior-Based Efficiency Programs." *The Brattle Group*.

- *Context:* As an increasing number of utilities deploy behavior-based efficiency programs, this analysis hopes to provide a set of best practice principles for the design of rigorous measurement and verification of these program results.
- *Results:* These principles include the recommendation of experimental design characterized by randomized control and test groups, *ex-post* measurement, and billing analysis.

B. GDS Associates, November 2010. "Custom Measure M&V Protocol: PPL Electric's OPOWER Energy Education Program." *GDS Associates.*

- *Context:* In connection with PPL Electric's OPOWER energy education program, statewide evaluator GDS Associates approved a custom measure protocol for evaluating behavior-based energy efficiency programs, making PA the fourth state to accept behavior-based energy efficiency as a resource.
- *Results*: Key elements of this protocol include *ex-post* measurement, experimental design with randomized control and test groups, and no limits on the size or type of deployment.

Evaluations of OPOWER results

A. Davis, Matt, May 2011. "Behavior and Energy Savings: Evidence from a Series of Experimental Interventions." *Environmental Defense Fund.*

- *Utility (State):* Report verifies results from 11 different gas and electric utilities covering urban and suburban communities in 6 states in the Northeast, Midwest, and West. Specific utility names are not released for confidentiality purposes.
- *Results:* Reports have driven electricity savings ranging from 1.1-2.9% across the 11 deployments, and, if fully deployed in the US, OPOWER programs would lead to $3 billion in annual savings
- *Contact:* Matt Davis, mdavis@edf.org

C. Cooney, Kevin, February 2011. "Evaluation Report: OPOWER SMUD Pilot Year 2." *Navigant Consulting*.

- *Utility (State):* Sacramento Municipal Utility Department (CA)
- *Results:* (i) 2.89% savings in the second year, 22% increase over first year; (ii) Highest savings—3.56% savings in July/August of 2009—occurred during peak season; and (iii) only signs of impact stability over the first 30 months of the program
- *Contact:* Kevin Cooney, 312-583-5700

D. October 2010. "Puget Sound Energy's Home Energy Reports Program." *KEMA*.

- *Utility (State):* Puget Sound Energy (Washington)
- *Results:* The savings rate of the most recent 12 months was significantly greater than for the first 12 months – improving from 1.87% to 2.28% average electric savings
- *Contact:* Bobbi Wilhelm, 425-462-3432, bobette.wilhelm@pse.com

E. Ivanov, Chris, July 2010. "Measurement and Verification Report of OPOWER Energy Efficiency Pilot Program." *Power System Engineering*.

- *Utility (State):* Connexus (MN)
- *Results:* With 99% confidence, the program demonstrated an average of 2.07% savings across three distinct approaches to measuring and verifying the results
- *Contact:* Chris Ivanov, 608-268-3516, ivanovc@powersystem.org

F. Macke, Rich, June 2010. "Measurement and Verification Report of Lake Country's OPOWER Energy Efficiency Pilot Program." *Power System Engineering*.

- *Utility (State):* Lake Country Power (Minnesota)
- *Results:* With 99% confidence, the program demonstrated an average of 2.77% savings in the first year
- *Contact:* Rich Macke, 763-783-5349, macker@powersystem.org

G. Allcott, Hunt and Sendhi Mullainathan, March 2010. "Behavior and Energy Policy." *Science*. Vol. 327

- *Utility (State):* This article is a literature review
- *Results:* Using randomized, controlled trials with hundreds of thousands of utility customers across the United States, these [OPOWER] reports have been shown to reduce electricity consumption in the average household by over 2%
- *Contact:* Hunt Allcott, allcott@mit.edu

H. Allcott, Hunt, February 2010. "Social Norms and Energy Conservation." *Working Paper, Massachusetts Institute of Technology*s *Center for Energy and Environmental Policy Research*.

- *Utility (State):* Connexus (Minnesota)
- *Results*: Using data from a randomized natural field experiment at 80,000 treatment and control households in Minnesota, it is estimated that the monthly program reduces energy consumption by 2.3 – 2.4% relative to baseline
- *Contact:* Hunt Allcott, allcott@mit.edu

I. Ayres, Ian, et al., September 2009. "Evidence From Two Large Field Experiments That Peer Comparison Feedback Can Reduce Residential Energy Usage." *NBER Working Paper*.

- *Utility (State):* Sacramento Municipal Utility Department (California) and Puget Sound Energy (Washington)
- *Results:* There is evidence of a reduction in the early years of the program of 1.2% (natural gas) and 2.1% (electric) participants
- *Contact:* 203-415-5587, ian.ayres@yale.edu

J. Klos, Mary, September 2009. "Impact Evaluation of OPOWER SMUD Pilot Study." *Summit Blue Consulting, LLC*.

- *Utility (State):* Sacramento Municipal Utility Department (California)
- *Results:* Summit Blue (d/b/a Navigant) verified an average of 2.2% savings in the first year, as well as a bump to 2.8% average savings in the first four months of the year two
- *Contact:* Mary Klos, 608-807-0083, mklos@summitblue.com

Puget Sound Energy's Home Energy Reports Program

20 Month Impact Evaluation - DRAFT

Madison, Wisconsin, October 26, 2010

Table of Contents

Table of Contents

List of Exhibits:

1. Executive Summary

1.1 Program Background

In 2008, Puget Sound Energy (PSE) became the second utility in the U.S. to implement an innovative program designed to conserve energy, called the Home Energy Reports Program (HER). The program utilizes a social marketing campaign, with normative messaging techniques to encourage responsible energy behavior and choices. The campaign, administered by OPOWER, achieves intended conservation by providing Home Energy Reports to nearly 40,000 households in PSE's combined gas and electric service territory. Reports compare the receiving household's energy usage with that of neighboring homes, essentially using peer pressure to achieve energy savings. At the present time of this evaluation, all participating homes were dual fuel, single family structures. The intent of this evaluation is to present results of program savings over the first 20 months of the program.

1.2 Evaluation Overview

A billing analysis was used to estimate energy savings for the HER Program. The 20 month evaluation utilized monthly billing data for both a test and control group from July 2007 through June 2010 with the program in operation November 2008 through June 2010.

The program was organized in a randomized experimental design. This approach randomly assigns the potential program population to either treatment or control group. Only the treatment group received the reports. The evaluation results are based on differences in energy consumption both pre- to post-reports and between treatment and control group. This approach effectively removes the possibility of biased results. In addition, the size of the treatment and control groups assures highly precise estimates of the savings attributable to HER program.

The evaluation also included an examination of tracking data from other PSE energy efficiency programs. The Home Energy Reports encourage participants to take advantage of other PSE energy efficiency programs and there is the potential for double counting if this proves an effective way to enroll participants in other programs. Taking advantage of the randomized experimental design, we examined whether there appeared to be any systemic increase in participation among the treat group relative to the control group.

1.3 Results

1.3.1 Full Program Annual Savings

Evaluation Results indicate a positive and increasing electric and gas savings for households which participated in the Home Energy Reports Program. We report average savings for three different timeframes:

- The first 12 months of the program, November, 2008 – October, 2009,
- All 20 months the program has been in existence, November, 2008 – June, 2010, and
- The last 12 months of the program, July, 2009 – June, 2010.

For both electric and gas the average savings increase as the timeframe includes more recent data. Figure 1-1 provides a visual representation of the electric and gas savings for the three different timeframes.

Figure 1-1
Full Program Electric and Gas Average Annual Savings, Three Timeframes

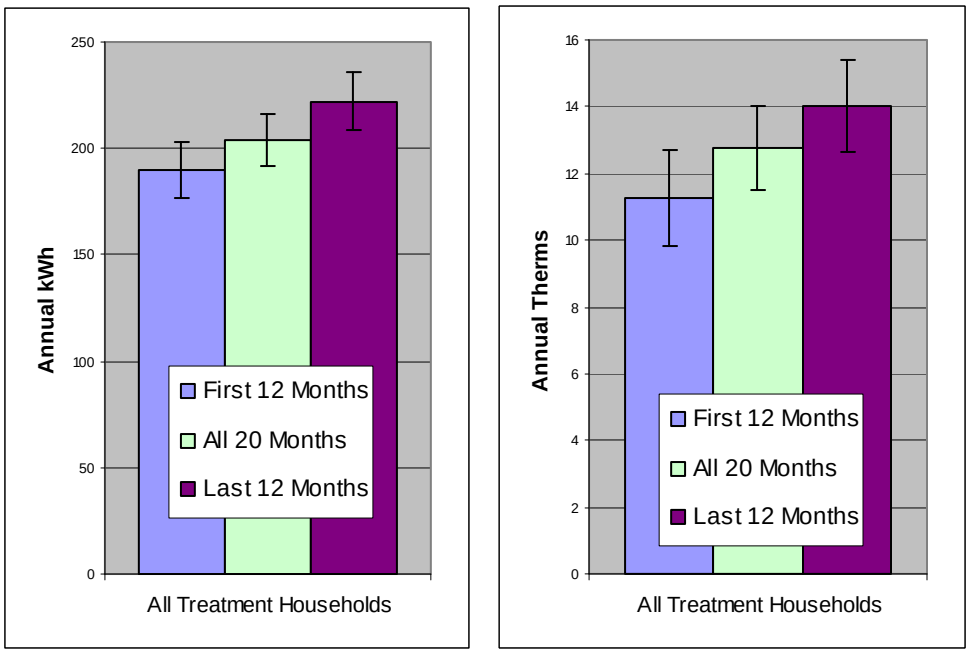


Table 1-1 shows the first year results and their associated 95 percent confidence intervals in tabular form. First year savings are estimated at 189.8 kWh and 11.3 therms per household for household receiving the reports. The table also reports average savings in percentage terms

with respect to pre-report consumption and total savings for the 31,618 household for whom we can estimate savings.

Table 1-1
First Year Average Annual Savings (November, 2008 – October, 2009)

Consumption	kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	189.8	13.5	1.71%	0.12%	6,001.7	425.5
Gas (Therms)	11.3	1.4	1.17%	0.15%	356.1	44.9

*95 percent confidence level

Table 1-2 shows that the average annual savings over the 20 months of post-report data available average savings are estimated at 204.2 kWh and 12.8 therms.

Table 1-2
All Month Average Annual Savings (November, 2008 – June, 2010)

Consumption	kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	204.2	12.2	1.84%	0.11%	6,455.6	385.4
Gas (Therms)	12.8	1.3	1.33%	0.13%	404.2	40.0

*95 percent confidence level

Finally, Table 1-3 provides the average annuals savings for the most recent 12 months for which data are available. Averages savings are estimated at 222.1 kWh and 14.0 therms.

Table 1-3
Last Year Average Annual Savings (July, 2009 – June, 2010)

Consumption	kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	222.1	13.6	2.00%	0.12%	7,021.5	430.4
Gas (Therms)	14.0	1.4	1.46%	0.14%	443.1	43.9

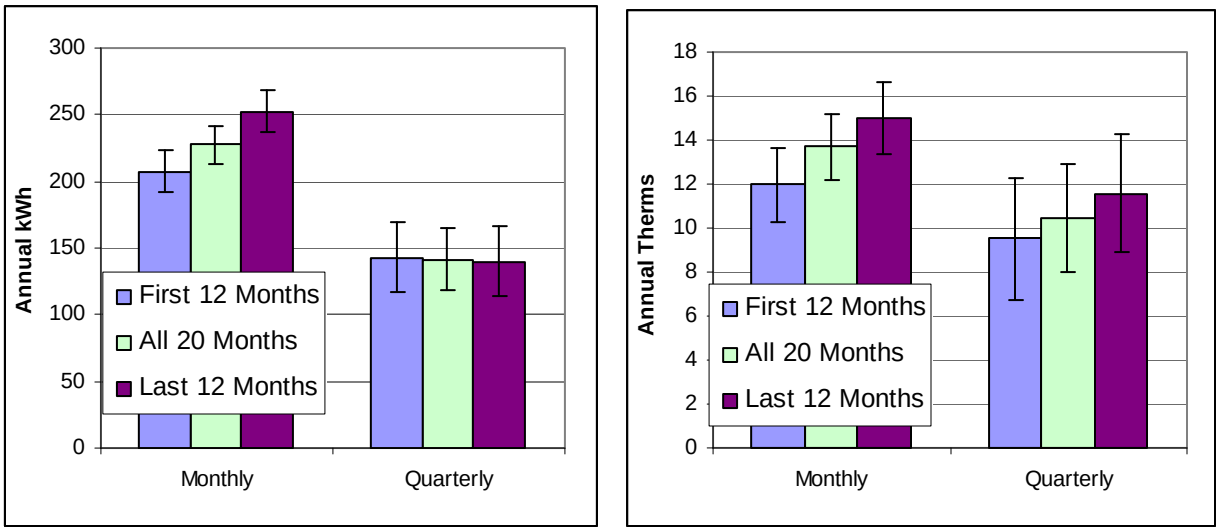
*95 percent confidence level

1.3.2 Annual Savings, Monthly vs Quarterly Mailings

The PSE HER program also tested two different mailing schedules for the Home Energy Reports. A subset of 25 percent of the treatment group received a report every three months, while the remainder received reports on a monthly basis.

Figure 1-2 provides a comparison of monthly and quarterly electric and gas savings for the three different timeframes. Both bar graphs show that quarterly reports generated lower savings than the monthly reports. The difference is statistically significant for all timeframes for electric savings at 95 percent confidence. For gas, the differences in the later time frames are significant at the 90 percent confidence level.

Figure 1-2
Monthly vs Quarterly Electric and Gas Average Annual Savings, Three Timeframes



1.3.3 Potential for Double Counting

Preliminary examination of tracking data from other PSE Energy Efficiency programs offered no evidence that the Home Energy Reports have increased participation among treatment group households. We examined PSE Energy Efficiency programs tracking data from November 2008 to the present and identified program participants from both the treatment and control group. Comparing the participation levels between the treatment and control groups, there was no clear pattern of increased adoption of PSE energy efficiency programs among the treatment group. At this stage of the program, then, there appears to be no grounds for concern regarding double counting of savings. This dynamic could change over time. A more effective way to ascertain participation in other PSE programs would be through direct interviews with members of both the treatment and control groups.

2. Introduction and Background

2.1 Program Information

PSE's Home Energy Report Program provides a monthly or quarterly Home Energy Report to nearly 40,000 households in its combined gas and electric service territory. The reports are designed to provide recipients with feedback on their household energy use, how their usage compares with that of neighboring homes, and custom tips on how a household can reduce their energy consumption.

The program is designed with two delivery mechanisms: a monthly report and a quarterly report. Participating households are assigned to either the monthly group or the quarterly group; never to both groups. Each month, three quarters of the households in the treatment group receive a Home Energy Report which provides details on their household energy usage and tips on using energy wisely. Once every quarter, the remaining quarter of the treatment group households receives a report.

2.2 Report Overview

Appendix B contains a copy of a monthly report generated though the HER program. The reports contain an individualized bar graph of the household's gas and electric usage, from the prior month. The reports also contain a rolling twelve month average of the electric and gas usage in separate graphs, as well as plots of the receiving household's gas and electric usage compared to usage of neighboring homes. During the months the receiving home uses less energy than the average usage of their defined neighbor group, a emoticon of a smiling face is displayed on the report; when the receiving household's energy usage is higher than the average usage of the defined neighbor group, the report indicates that the receiving home's usage is above average.

In addition to the usage information, the report provides customized tips that give recipients the information needed to make more informed decisions regarding their energy use. For example, the sample report in Appendix B provides the homeowner tips on lowering their household usage by doing a variety of things from small behavior changes to taking advantage of retrofit opportunities.

Each month, reports provide three tips, which are different from tips received in prior months. Tips almost always include a no-cost behavior modification, a low-cost equipment change, and

a medium cost appliance upgrade. Sample tips include: lowering the temperature of the water heater serving the home, installing a programmable thermostat, installing a high-efficiency furnace, installing compact fluorescent lighting, and upgrading to a more efficient furnace. Tips also direct recipients to a website (www.pse.opower.com) that provides other useful tips, tools and forums for conserving energy.

When the report provides a tip that is supported by a PSE rebate program, the report provides additional details about the rebates PSE offers. The premise of the tips, along with the rebate information, is to increase participation in PSE programs. Therefore, these reports serve the dual purpose of both encouraging people to save energy through behavior modification and through participation in other PSE programs.

3. Methodology

3.1 Experimental Design

Before the program launched, a group of 83,811 single family homes, located in PSE's combined gas and electric service territory, were selected to participate in the test and control group based on the following criteria:

- Dual Fuel (home uses both natural gas and electricity, which are both provided to the service address by Puget Sound Energy)
- Single family residential home
- Uses more than 80 MBtu of energy per year
- Home does not utilize a Solar PV system
- Address must be available with parcel data from the county assessor
- Has a bill history that starts on or before January 1, 2007
- Home must have 100 similar sized homes (neighbors) within a two mile radius
- Home must have automatic daily meter reads

After selection of the participating households was complete, 39,755 homes were randomly assigned to participate in the test group and the remaining homes serve as a control group. Of the selected test homes, 9,949 (25%) were randomly selected to receive Home Energy Reports on a quarterly basis, while the remaining 29,806 (75%) homes are participating as monthly report recipients. The random assignment of monthly and quarterly reports allows both Puget Sound Energy and OPOWER to test the effect of report frequency on energy savings.

3.2 Data Collection

Data for this study includes: household energy usage data, frequency of report delivery, household square footage and other household characteristic data. Household usage data was collected by automated CellNet meters for each home included in the participant and control groups, and the data were gathered on daily intervals. County assessor data were used to identify home values, household square footage, and identify neighboring homes.

Table 3-1 provides a disposition of the data received from PSE. Three kinds of households were removed from the analysis. A small number of households did not have usable zip codes. One zip code was included the treatment group without being included in the randomized experimental design. Finally, roughly ten percent of the households moved or changed accounts

in the twenty months since the program began. All of these households were removed from the final analysis sample.

Table 3-1
Consumption Data Disposition

Fuel	Group	Accounts Received	No zipcode found	Zipcode with No Control	Initial Analysis Sample	Movers	Final Analysis Sample
	Treatment			-4,856	34,817	-3,199	31,618
	Control				44,027	-4,020	40,007
Electric	Total	83,806	-106	-4,856	78,844	-7,219	71,625
	Treatment			-4,856	34,815	-3,196	31,619
	Control				44,031	-4,024	40,007
Gas	Total	83,811	-109	-4,856	78,846	-7,220	71,626

Tests were performed on the final analysis sample to confirm that the sample was, in fact, balanced as would be expected from a true, randomized sample. The tests were performed both at the overall level and at the monthly and quarterly subgroups. The tests confirmed that the analysis was balanced. Details of the test are provided in Appendix A.

Weather data for use in modeling were provided by PSE. Both historical and normal weather series for the location of the program were provided.

PSE rebate program participation information was gathered for all homes serving in the participant and control group for the HER program. Rebate information was gathered from January 1, 2007 through June 2010. This rebate information was used to address concerns regarding double counting of savings between the pilot and PSE's other programs.

3.3 Impact Analysis

Billing analyses were utilized to provide an estimate of savings resulting from the Home Energy Reports program. The evaluation utilized two approaches: a difference-of-differences technique to measure annual and month by month savings and a time series, cross-sectional approach to measure annual impacts.

3.3.1 Difference-of-Differences Approach

The difference-of-differences approach is a simple, robust approach to measuring program-related savings in a randomized experimental design framework. The approach compares mean energy consumption between the pre- and post-report periods for both the treatment and the control groups. For the treatment group, the assumption is that consumption will drop in the post-report period due to the effect of the reports. For the control group, the assumption is that no change will take place. However, there are systemic effects (economic factors, fuel prices, etc) that affect all households' consumption patterns at some level all the time. It's possible that these systemic effects will increase or decrease consumption in the post-report period unrelated to the effects of the reports. The control group, pre-post difference provides a robust estimate of the non-program, systemic effects on consumption that are observed in the post-report period. Because the control group was randomly assigned, the control group response to the systemic effects is representative of the treatment group response. The name "difference-of-differences" refers to the removal of the of the control group difference (systemic effects) from the treatment group difference (program effects and systemic effects).

The difference-of-differences approach has two shortcomings. First, the approach does not allow for weather-normalizing so results are not on a typical year basis. Second, the approach does not leverage the large sample sizes to produce the highest level of precision possible. Our approach to this analysis uses the difference-of-differences approach results in two important ways. The results provide a basis of comparison for the model results. The approach also provides the most straightforward way to look at monthly effects. We show plots of the difference between treatment and control monthly consumption for 16 months before and 20 months after the first report. The plots illustrate the monthly savings effect in the post period.

3.3.2 Pooled Model

The primary impact estimates for this evaluation are based on a pooled regression approach to modeling the monthly consumption data. We estimated multiple specifications within a fixed effects framework. The basic fixed effects regression approach models all household monthly consumption as a combination of a household-specific baseload, average heating and cooling trends and monthly time-series effect. The model specification is structured to effectively replicate, in the regression framework, the difference-of-differences approach discussed above. The relevant output of the model is the modeled pre-post difference in the treatment group, net of the pre-post difference of the control group.

The pooled, fixed effects approach improves on the difference-of-differences approach by allowing final savings estimates that are derived with normalized weather. This means savings estimates represent expected savings in a typical weather year. The pooled approach also produces heteroscedasticity-robust estimates of savings standard error. The pooled model approach produces results with precision better than ten percent at a 95 percent confidence level.

A full discussion of the pooled model approach can be found in Appendix B.

4. Results

4.1 Full Program Savings

4.1.1 Full Program Annual Savings

Evaluation Results indicate a positive and increasing electric and gas savings for households which participated in the Home Energy Reports Program. We report typical year, average savings for three different timeframes

- The first 12 months of the program, November, 2008 – October, 2009,
- All 20 months the program has been in existence, November, 2008 – June, 2010, and
- The last 12 months of the program, July, 2009 – June, 2010.

For both electric and gas the average savings increase as the timeframe includes more recent data. Figure 4-1 provides a visual representation of the electric and gas savings for the three different timeframes.

Figure 4-1
Full Program Electric and Gas Average Annual Savings, Three Timeframes

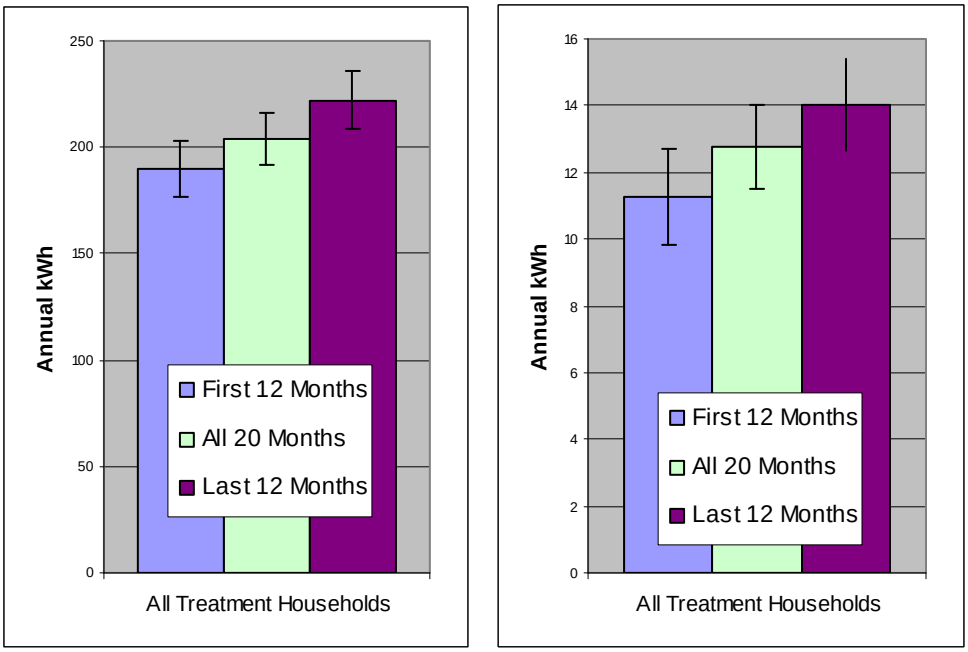


Table 4-1 shows the first year results and their associated 95 percent confidence intervals in tabular form. First year savings are estimated at 189.8 kWh and 11.3 therms per household for household receiving the reports. The table also reports average savings in percentage terms with respect to pre-report consumption and total savings for the 31,618 household for whom we can estimate savings.

Table 4-1
First Year Average Savings (November, 2008 – October, 2009)

Consumption	kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	189.8	13.5	1.71%	0.12%	6,001.7	425.5
Gas (Therms)	11.3	1.4	1.17%	0.15%	356.1	44.9

*95 percent confidence level

Table 4-2 shows that the average annual savings over the 20 months of post-report data available average savings are estimated at 204.2 kWh and 12.8 therms.

Table 4-2
All Month Average Savings (November, 2008 – June, 2010)

Consumption	kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	204.2	12.2	1.84%	0.11%	6,455.6	385.4
Gas (Therms)	12.8	1.3	1.33%	0.13%	404.2	40.0

*95 percent confidence level

Finally, Table 4-3 provides the average annuals savings for the most recent 12 months for which data are available. Averages savings are estimated at 222.1 kWh and 14.0 therms.

Table 4-3
Last Year Average Savings (July, 2009 – June, 2010)

Consumption	kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	222.1	13.6	2.00%	0.12%	7,021.5	430.4
Gas (Therms)	14.0	1.4	1.46%	0.14%	443.1	43.9

*95 percent confidence level

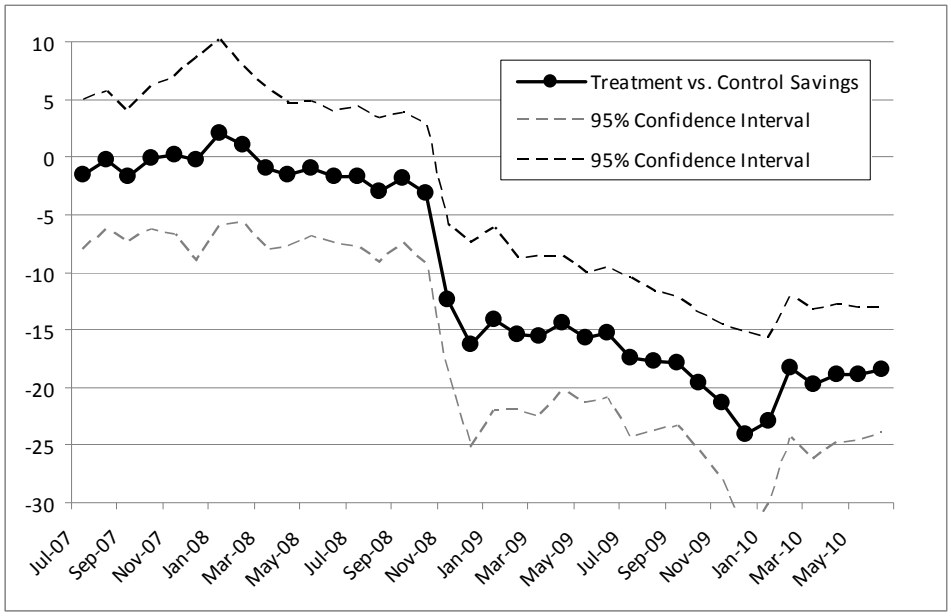
The results provided in these tables are model-based results that have been weather normalized. They reflect expected annual savings in typical weather year for the average household in the control and treatment samples.

4.1.2 Full Program Monthly Savings

The annual savings estimates indicate a program that continues to show increasing savings for both electric and gas consumption. This is also evident in the monthly savings estimates.

Figure 4-2 shows the average monthly difference in electric consumption between the control and treatment groups[1]. The figure shows that prior to November, 2008, the difference between the two groups was close to zero. Starting in November, 2008, when the first mailings were received, the treatment group consumption dropped relative to the control group. Through the first 12 months after November, 2008, the average treatment group household used at least 15 kWh less per month less than average control group household. Importantly during the second year, starting in November, 2009, the differences are consistently greater than the same month during the first year of the program. The data indicate that, at the 20 month mark, savings continue to increase for the HER program, year over year.

Figure 4-2
Average Monthly Electric Differences, Control vs Treatment



[1] For this figure we show the difference-of-differences monthly effects.

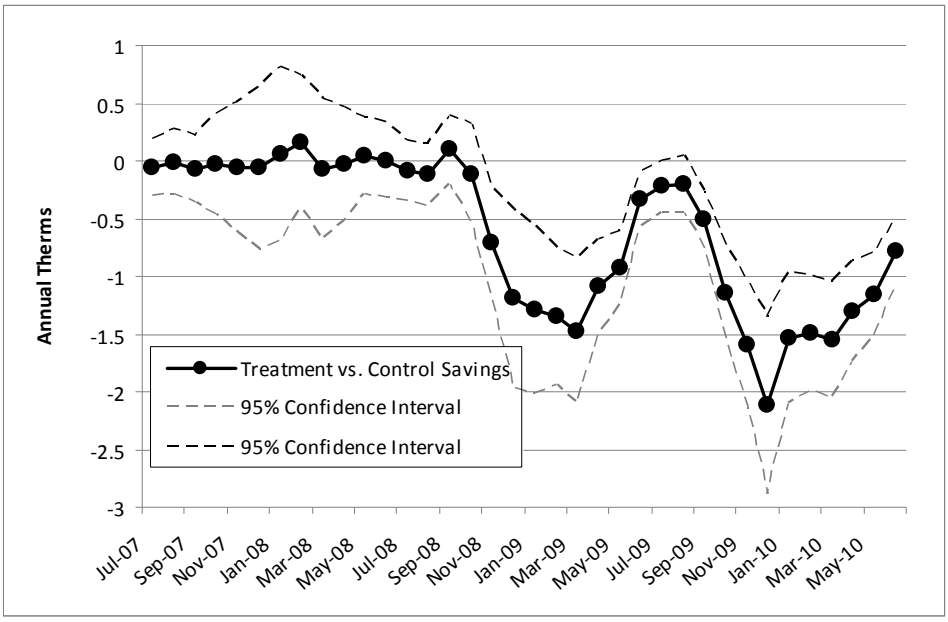
The electric monthly differences provide evidence that the majority of electric savings are generated through reductions in baseload consumption. Savings are relatively constant throughout the year. If heating or cooling were a source for substantial savings, there would be more consistent seasonality to the savings.

Despite the winter of 2009-2010 being a relatively mild winter, there was increased electric savings during the period. This could indicate an increase in heating-related savings as the program matures. The additional winter savings could also reflect savings from replacing or reducing lighting. Lighting (though considered part of a household's baseload) does have a seasonal pattern.

Figure 4-3 shows the average monthly difference in gas consumption between the control and treatment groups[2]. Once again, in the pre-report period, the treatment and control group are statistically identical. In the post-report period, the plot of monthly differences shows the clear seasonality of gas savings. The savings in the summer of 2009 give a rough indication of the water heat-related savings produced by the program. The remainder of the substantial savings is primarily from gas space heat. There is a clear increase in gas savings in the second winter. This is despite the winter of 2009-2010 being relatively mild. The normalized, annual savings estimates reported above indicate a 24 percent increase in savings between the first 12 months and the last 12 months. While these two periods overlap in the summer and fall, the difference is driven by different winter savings patterns.

[2] For this figure we show the difference-of-differences monthly effects.

Figure 4-3
Average Monthly Gas Differences, Control vs Treatment



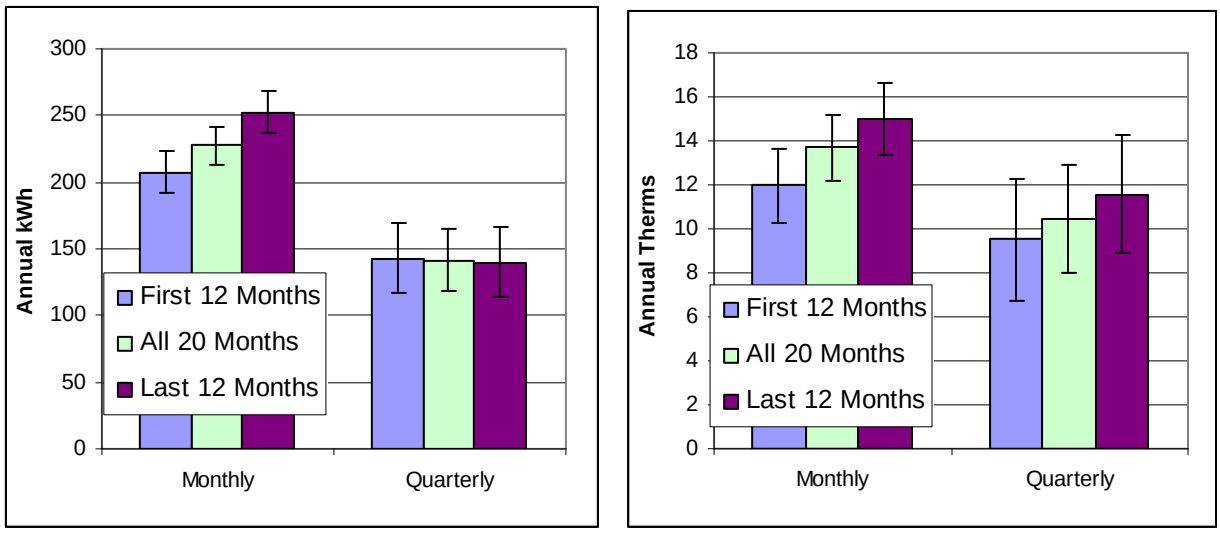
4.1.3 Program Annual Savings, Monthly vs Quarterly Mailings

The PSE HER program tested two different mailing schedules for the Home Energy Reports. A subset of 25 percent of the treatment group received a report every three months, while the remainder received reports on a monthly basis[3].

Figure 4-4 provides a comparison of monthly and quarterly electric and gas savings for the three different timeframes. Both bar graphs show that quarterly reports generated lower savings than the monthly reports. The difference is statistically significant for all timeframes for electric savings at 95 percent confidence. For gas, the differences in the later time frames are significant at the 90 percent confidence level.

[3] The average annual savings reported in 4.1.1 and 4.1.2 above represent the overall savings for the program given this mix of monthly and quarterly reports.

Figure 4-4
Monthly vs Quarterly Electric and Gas Average Annual Savings, Three Timeframes



There's an apparent difference between electric and gas savings for households receiving the quarterly reports. Gas savings were lower for household receiving quarterly reports but they increased through the timeframes in a manner similar to the monthly reports. To the contrary, electric savings for households receiving quarterly reports was effectively flat through the twenty months. Without survey data from program participants it is not possible to know for sure what is driving this difference. Gas savings are primarily related to reductions in heating consumption. It's possible that participants are lowering their thermostat setpoints and that these changes are more likely to be retained over the three month period. To the extent that electric savings are based on behavioral changes like turning lights and other plug loads off, it's possible that such behaviors are not retained as effectively over the three month period between reports.

Table 4-4, Table 4-5, and Table 4-6, provide the household annual savings for monthly reports versus quarterly reports in tabular form.

Table 4-4
First Year Average Savings (November, 2008 – October, 2009)

Consumption		kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	Monthly	207.7	15.7	1.87%	0.14%	6,566.7	497.9
	Quarterly	143.2	26.0	1.28%	0.23%	4,527.0	822.5
Gas (Therms)	Monthly	12.0	1.7	1.24%	0.17%	378.6	52.4
	Quarterly	9.5	2.7	0.99%	0.29%	300.4	86.9

*95 percent confidence level

Table 4-5
All Month Average Savings (November, 2008 – June, 2010)

Consumption		kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	Monthly	227.6	14.3	2.05%	0.13%	7,196.3	450.6
	Quarterly	141.6	23.6	1.27%	0.21%	4,478.4	745.6
Gas (Therms)	Monthly	13.7	1.5	1.42%	0.15%	433.1	46.6
	Quarterly	10.5	2.5	1.09%	0.26%	331.7	77.7

*95 percent confidence level

Table 4-6
Last Year Average Savings (July, 2009 – June, 2010

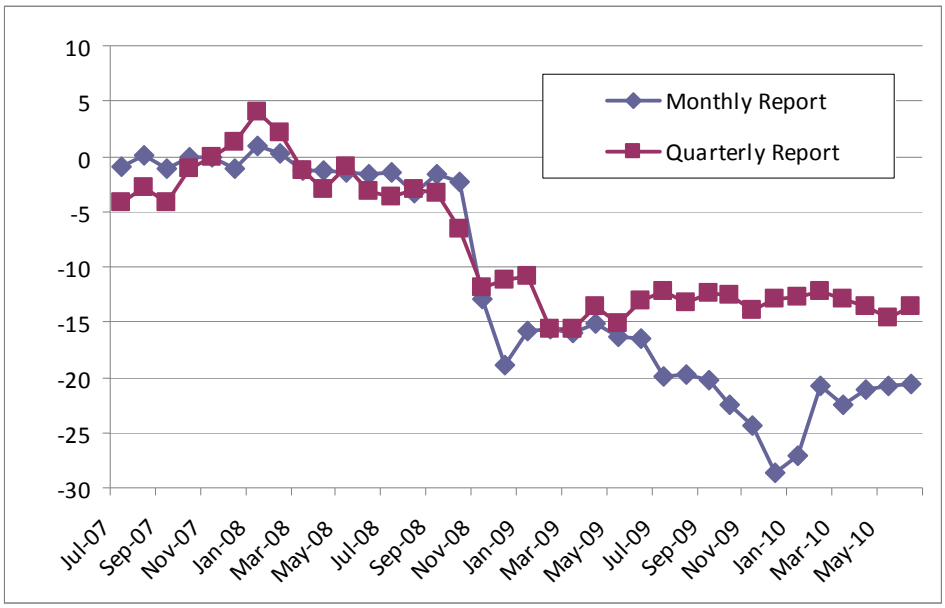
Consumption		kWh/Therms	+/-*	Percent	+/-*	MW/ 1000 Therms	+/-*
Electric (kWh)	Monthly	252.5	15.9	2.28%	0.14%	7,984.0	503.4
	Quarterly	139.8	26.3	1.25%	0.24%	4,420.2	831.6
Gas (Therms)	Monthly	15.0	1.6	1.56%	0.17%	473.8	51.2
	Quarterly	11.6	2.7	1.21%	0.28%	366.3	85.7

*95 percent confidence level

4.1.4 Monthly vs Quarterly Report Monthly Savings

Figure 4-5 provides separate monthly plots for the households receiving monthly and quarterly reports. The monthly savings for the households receiving monthly reports has a similar pattern to the overall monthly savings pattern in Figure 4-2 above.. This is expected because there are more treatment group members receiving the monthly reports.

Figure 4-5
Monthly vs Quarterly Reports,
Average Monthly Electric Difference, Control vs Treatment

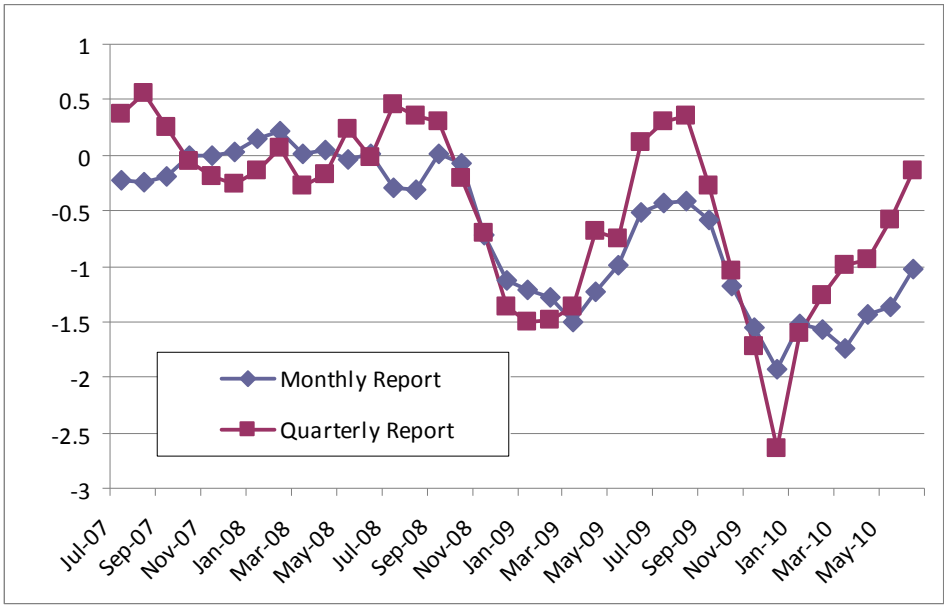


The monthly savings for the households receiving quarterly reports are different in two important ways. First, early in the program, those households receiving quarterly reports appear to have a three month pattern consistent with the quarterly delivery of the reports. The first, fourth and seventh months show increases in savings which then dissipate over the ensuing two month. This is consistent with the hypothesis that report-related savings will not be retained completely in the absence of the report. Interestingly, though, in the second year of the program, the three month pattern is not as evident and overall, the households receiving the quarterly reports appear to maintain at a consistent level. This is the second important difference between the households receiving monthly and quarterly reports – while early in the program the two groups generated similar savings, the quarterly report household savings leveled off while the monthly report household savings increased substantially in the second year. This is the pattern that was evident in trend of annual savings across timeframes in Figure 4-4, above.

Figure 4-6 provides the difference in gas savings between households receiving monthly and quarterly reports. The difference in gas savings between households receiving monthly and quarterly mailings is more variable than was the difference for electric savings. Quarterly report households saved as much as, if not more than, monthly report households in the coldest months of both winters. During the remaining months, however, the monthly report households consistently saved more than the quarterly report households. The plots show the basis for the

trends in annual savings across timeframes in Figure 4-4. Both monthly and quarterly report households increased savings through the period, though the quarterly households show substantially more variability in their savings behavior.

Figure 4-6
Monthly vs Quarterly Reports,
Average Monthly Electric Difference, Control vs Treatment



4.1.5 Potential for Double Counting

Preliminary examination of tracking data from other PSE Energy Efficiency programs offered no evidence that the Home Energy Reports have increased participation among treatment group households. We examined PSE Energy Efficiency programs tracking data from November 2008 to the present and identified program participants from both the treatment and control group. Comparing the participation levels between the treatment and control groups, there was no clear pattern of increased adoption of PSE energy efficiency programs among the treatment group. At this stage of the program, then, there appears to be no grounds for concern regarding double counting of savings. This dynamic could change over time. An alternative way to ascertain participation in other PSE programs would be through direct interviews with members of both the treatment and control groups.

5. Recommendations

This report provides an impact evaluation for the PSE HER program. The tight time schedule of the evaluation precluded a full process evaluation incorporating participant and program staff interviews, etc. The impact results do provide the basis for some recommendations related to the ongoing evaluation of the program as well as extensions of the program's scope.

5.1 Evaluation Recommendations

The HER program is best served by ongoing evaluation. As the monthly savings plots indicate, the savings generated by the HER program are dynamic. Regular evaluation would allow program administrators to keep track of trends as they happen as well as estimate annual savings as soon as the most recent month's data become available.

There are two important roles for the outside consultant in an ongoing evaluation of this type. First, to the extent that independent affirmation of the results is required, the outside consultant must be involved in the calculation of monthly estimates of savings. The range of options for this role include KEMA providing complete monthly program updates to KEMA providing validation of PSE savings calculations. The kinds of estimates required for the monthly summaries will determine KEMA's level of involvement.

Second, on a bi-annual or annual basis, the consultant must perform a more general analysis of the sample design to confirm that the experimental sample remains balanced and appropriate for the estimation of un-biased savings estimates. Additionally, these bi-annual or annual summaries should provide an opportunity for improvements of long term estimates as additional data are available.

The present evaluation provides a solid point of departure for an ongoing monthly evaluation of the PSE HER program. The SAS programs that produced the results in this report can be adjusted to facilitate ongoing reports – both monthly estimates of savings and bi-annual analysis of the experimental sample. Having completed this analysis, KEMA can provide ongoing evaluation support at a fraction of cost of this initial evaluation.

5.2 Areas of Concern

This evaluation has provided high precision, unbiased estimates of annual program savings for the PSE HER program. This has been done despite the substantial challenge of estimating

savings that are small compared to total consumption. The fundamental reason for these successful evaluation results is the experimental design that was put in place at the outset of the program. Without a similar experimental design, the likelihood of incorrect, biased results increases dramatically.

The importance of a randomized control group cannot be overstated as the PSE HER program expands. The control group provides key information on what would have happened in the absence of the program. Without a control group it is impossible to control for the effect of economic effects, fuel price and other systemic factors. These factors can move consumption up or down by magnitudes similar to the overall effect of the program.

Alternatives to randomized experimental designs may be proposed for programs like the HER program. It is possible to create non-randomized control groups. The techniques use all available characteristics data to produce a matched sample of non-participant households that are, based on those characteristics, approximately representative of the treatment group. These kinds of control groups are appropriate for standard energy efficiency evaluations were:

- No true randomized alternative exists.
- Savings are a high percentage of consumption – bias will be a smaller percentage of the estimated savings.
- The program is small relative to the potential population – the group for the potential control group is large,
- Key driver characteristics about the populations are known

The HER program both in its present form and in the ongoing expansions does not exhibit any of the characteristics that make a non-randomized control group a feasible option.

Finally, there are situations where the success of a randomized experimental design is not guaranteed. At one extreme, smaller communities may be too small to avoid cross contamination between the treatment and control samples. At the other extreme, multi-family housing may be so variable in configuration, geographical locations and occupancy patterns, that even a randomized experimental design would be challenged to produce a stable, balanced analysis sample. Despite these concerns, the randomized experimental design still offers a best option for conclusive evaluation result. In these kinds of cases, the choice is between not expanding the program into these areas or accepting the best possible savings estimates from the randomized experimental design.

Appendix A: Experimental Design Tests

This section provides the results of the tests of the randomized experimental design. The tests conclude that the design is balanced between the treatment and control groups.

This analysis tests the assumption that the treatment and control group samples are balanced, or randomly drawn from the same population. The two samples are assumed to be independent. The combined standard error is the square root of the sum of the two squared standard errors. There are a total 31620 treatment households, however, electricity has one less, and gas has two less. Income is a categorical variable, with categories 1 – 9. Fireplace and Owned are 0, 1 dummies.

There are multiple comparisons of treatment and control group characteristics. If at least one of the comparisons is significantly different between treatment and control group, then the assumption that the experiment design is balanced between treatment and control is violated. A Bonferroni correction is used to address these multiple comparisons. That is, if the significance level is 0.05, to maintain the familywise error rate 0.05, the statistical significance level of each individual is 0.05/n, where *n* is 41. If any p-value is greater than 0.05/41, then we reject the null hypothesis of a balanced experiment design between treatment and control at the significance level of 0.05. All the reported *p*-values are greater 0.05/41 (pr>|t| < 1-(.05/41)). Thus, the experiment design is balanced between treatment and control group. This result is repeated for comparisons including the monthly and quarter mailing subsets.

Table A-1
Testing for a Balance Treatment/Control Sample, Individual Characteristic T-Tests

Characteristic	Treatment			Control			Difference	Pr > |t|
	Count	Mean	SE	Count	Mean	SE		
elecuse01JUL07	31,618	853.3	2.4657	40,006	854.8	2.2023	1.5136	0.6472
elecuse01AUG07	31,618	823.3	2.2955	40,006	823.6	2.0527	0.3203	0.9172
elecuse01SEP07	31,618	818.4	2.1534	40,006	820.1	1.927	1.7035	0.5558
elecuse01OCT07	31,618	920	2.3835	40,006	920.1	2.1152	0.1114	0.9721
elecuse01NOV07	31,618	998.1	2.6461	40,006	997.9	2.3092	-0.1528	0.9652
elecuse01DEC07	31,618	1217.8	3.3869	40,006	1218.1	2.9601	0.2409	0.9572
elecuse01JAN08	31,618	1105.8	3.0973	40,006	1103.8	2.6998	-2.0404	0.6187
elecuse01FEB08	31,618	947.2	2.6114	40,006	946.1	2.2945	-1.0043	0.7723
elecuse01MAR08	31,618	979.5	2.6819	40,006	980.5	2.3549	1.0055	0.7778
elecuse01APR08	31,618	877	2.3715	40,006	878.6	2.1034	1.5232	0.6308
elecuse01MAY08	31,618	838.1	2.2139	40,006	839.1	1.9748	1.0093	0.7338
elecuse01JUN08	31,618	810.7	2.169	40,006	812.5	1.9421	1.744	0.5495
gasuse01JUL07	31,619	18.931	0.093	40,007	18.9908	0.0848	0.0598	0.6358
gasuse01AUG07	31,619	20.0447	0.1074	40,007	20.0577	0.0965	0.0129	0.9287
gasuse01SEP07	31,619	32.4092	0.1128	40,007	32.4774	0.0954	0.0682	0.6426
gasuse01OCT07	31,619	76.1233	0.1676	40,007	76.1525	0.1481	0.0292	0.8959
gasuse01NOV07	31,619	110.7	0.2154	40,007	110.8	0.1898	0.0586	0.838
gasuse01DEC07	31,619	143.8	0.2686	40,007	143.9	0.2382	0.0627	0.8613
gasuse01JAN08	31,619	157.4	0.2879	40,007	157.4	0.2542	-0.0533	0.8895
gasuse01FEB08	31,619	114.7	0.2178	40,007	114.5	0.1915	-0.1657	0.5673
gasuse01MAR08	31,619	119.3	0.2304	40,007	119.4	0.2036	0.072	0.8146
gasuse01APR08	31,619	92.2053	0.189	40,007	92.2316	0.1674	0.0263	0.917
gasuse01MAY08	31,619	50.0173	0.1288	40,007	49.9791	0.112	-0.0383	0.822
gasuse01JUN08	31,619	41.1993	0.1248	40,007	41.1959	0.1091	-0.00343	0.9835
age	31,620	30.9307	0.0887	40,007	30.9408	0.0797	0.0101	0.9325
bedrooms	31,583	3.5499	0.00404	39,941	3.5449	0.0036	-0.00496	0.3595
bathrooms	31,620	2.2814	0.00329	40,007	2.2842	0.00293	0.00278	0.5281
fireplace	31,620	0.9569	0.00114	40,007	0.9549	0.00104	-0.00199	0.1975
house_value	31,614	347022	956.6	40,003	348235	869.5	1213.5	0.3491
income1	31,620	0.013	0.000636	40,007	0.012	0.000544	-0.00097	0.2452
income2	31,620	0.00794	0.000499	40,007	0.00787	0.000442	-0.00006	0.923
income3	31,620	0.0165	0.000716	40,007	0.0162	0.000631	-0.00028	0.7692
income4	31,620	0.0252	0.000881	40,007	0.0235	0.000758	-0.00163	0.1597
income5	31,620	0.0307	0.00097	40,007	0.0307	0.000862	-0.00001	0.9915
income6	31,620	0.1087	0.00175	40,007	0.1064	0.00154	-0.00228	0.3269
income7	31,620	0.1254	0.00186	40,007	0.1248	0.00165	-0.00062	0.8042
income8	31,620	0.1267	0.00187	40,007	0.1254	0.00166	-0.00131	0.5987
income9	31,620	0.4222	0.00278	40,007	0.4261	0.00247	0.0039	0.2944
num_occ	27,706	2.2168	0.00638	34,924	2.2287	0.00573	0.0118	0.1674
owned	27,706	0.9749	0.00094	34,924	0.9751	0.000834	0.000238	0.8495
sqft	31,620	2150.8	3.5589	40,007	2151.9	3.191	1.1429	0.8112

Appendix B: Methodology

This evaluation uses two analysis approaches. The first is the basic difference-of-differences approach. The difference-of-differences approach leverages the experimental design of the HER program to produce an intuitive estimate of program impacts. The primary strength of the approach is its simplicity. The approach avoids potential specification issues that confront regression approaches. The limitation of the difference-of-differences approach is that it is limited to producing impact estimates that reflect observed temperatures as opposed to typical year (normalized) weather conditions[4]. On a related issue, the difference-of-differences approach is period dependent. Savings are not necessarily evenly distributed across the year. To obtain a true annual estimate of savings, calculations should be done on twelve month period whether that is achieved by limiting to 12 months or creating average monthly values where multiple month are available.

For the second analysis approach, KEMA uses a pooled, fixed effects model. The pooled model explicitly accounts for both individual household baseload. By controlling for individual effects, monthly effects and weather, the pooled approach reduces the standard error. Of equal importance, the model makes it possible to normalize consumption the estimates of program savings to reflect typical weather conditions. The final reported aggregate impact estimates are produced with this model.

KEMA estimates separate household-level models to explore the relationship between consumption impacts and the characteristics of individual households. This approach uses typical weather and differences the pre-and post-report consumptions to calculate a normalized household-level impact. We regress these normalized, household-level impacts on all available household characteristics to determine the effects of these characteristics on impacts.

Difference-of-Differences

The difference-of-differences approach is the most direct and simple way of leveraging the experimental design of the HER program. The approach compares the difference in treatment group average consumption between pre- and post-report period with the same difference for

[4] It's standard in the energy efficiency evaluation field to present impact estimate in normalized terms. For no apparent reason, other evaluations do not address this issue.

the control group. The treatment group pre-post difference captures all changes between the two periods including those related to receiving the reports. The control group captures all changes with the exception of those related to the report, because the control group did not receive the reports. The random selection of the treatment and control groups ensures that, on average, the control group will appropriately reflect the non-report related changes experienced by treatment and control group alike between the pre-and post-report periods. Removing the non-report differences, as represented by the control group difference, from the treatment difference produces an estimate of the report's isolated effect on consumption.

It's extremely important to remember that impacts are unlikely to be evenly distributed across the year, so it is essential that pre- and post-report periods cover the same number of months and the same months of the year. Furthermore, some portion of impact is likely to be weather-correlated. Despite the presence of the control group, difference-of-differences impact estimates reflect the observed weather during the analysis period. This is one of the two primary limitations of the difference of difference approach – it always reflects actual weather.

The average consumption of energy for the treatment group in the pre-report period is calculated with the equation

$$\overline{E}_{Trmt\,\mathrm{Pre}} = \frac{1}{n_{Trmt}} \sum_{i \in Trmt} E_i$$

$\overline{E}_{Trmt\,\mathrm{Pre}}$	=	Average energy consumption in the pre-report period for the treatment group;
n_{Trmt}	=	Count of households in the treatment group;
E_i	=	Energy consumption for household *i*;

Using this equation structure, average energy consumption is calculated for both treatment and control groups in both the pre- and post-report periods. The difference of difference is then produced with the following equation.

$$\Delta E = \left(\overline{E}_{Trmt\,\mathrm{Pre}} - \overline{E}_{TrmtPost}\right) - \left(\overline{E}_{Cont\,\mathrm{Pre}} - \overline{E}_{ContPpost}\right)$$

The difference-of-differences approach can be applied on a monthly or seasonal basis. As long as time periods are balance in the pre- and post-report periods the savings estimate will be consistent for that time period.

Pooled Model

General Pooled Specification

The primary impact estimates for this evaluation are based on a pooled approach to modeling the monthly consumption data. We estimated multiple specifications within a fixed effects framework. The basic fixed effect specification has the following equation:

$$\begin{aligned} E_{it} = \mu_i + \lambda_t &+ \beta_2 T_i + \beta_3 P_t + \beta_4 T_i P_t \\ &+ \beta_{H1} H_{it}(\tau_H) + \beta_{H2} H_{it}(\tau_H) T_i + \beta_{H3} H_{it}(\tau_H) P_t + \beta_{H4} H_{it}(\tau_H) T_i P_t \\ &+ \beta_{C1} C_{it}(\tau_C) + \beta_{C2} C_{it}(\tau_C) T_i + \beta_{C3} C_{it}(\tau_C) P_t + \beta_{C4} C_{it}(\tau_C) T_i P_t \\ &+ \varepsilon_{it} \end{aligned}$$

Equation 1

Where

E_{it}	=	Energy consumption per day during month *t* for customer *i*;
$H_{it}(\tau_H)$	=	Average heating degree-days at the heating base temperature τ_H during month *t*, based on daily average temperatures, for customer i's meter reading period;
T_i	=	One for households in the treatment group, 0 Otherwise;
P_t	=	One for time periods in the post-report period, 0 Otherwise;
μ_i	=	Household-specific base consumption estimate for customer i;
λ_t	=	Month-specific time period effect for month *t*;
β_H	=	Heating coefficients, determined by the regression;
τ_H	=	Heating degree-day base temperature, determined by choice of the optimal regression; and
ε_{it}	=	Regression residual.

The household fixed effect, μ_i in this model, captures the unique household level baseload consumption. The time period fixed effect, λ_t in this model, captures systematic monthly effects

shared by all households. These fixed effects control for correlation of residual errors over time for an individual customer, and across customers for a given time period.

The experimental design is a simple 2x2 design: treatment and control by pre-and post-report. In the regression framework, the 2x2 design is represented by a base level (intercept), a treatment effect, a post-report effect and a combined treatment and post-report effect. Estimated together,

- the intercept represents average control group consumption in the pre-report period.
- the treatment effect captures the difference between treatment and control across all time periods,
- the post-report effect captures the difference between pre-and post-report periods for both treatment and control groups, and
- The combined treatment and post-report effect captures the marginal effect in the post-report period for the treatment group alone.

This basic structure applies to all weather and characteristic effects included in the model. In the pooled model specification provided above, the treatment effect, the post-report effect and the combined treatment and post-report effect are clearly evident in the base, heating and cooling portions of the model (T_i, P_t, and T_iP_t, respectively).

All four combinations are evident in the interactions with heating and cooling degree days. For the non-weather effects, the base level is represented by the household effect μ_i which is a unique intercept for each household.

Including degree-day terms is important to control for weather effects over time, and to make tracking of treatment effects over time more meaningful. Though the presence of the control group controls for weather effects between the pre- and post-report period, the estimated savings from the post-report period is still a function of the weather during the evaluation period. As with any energy efficiency impact estimate, the savings should be put on a typical year basis, so that savings do not reflect consumptions pattern from an evaluation timeframe defined by atypical weather.

Absorbed Pooled Specification

For an analysis sample the size of the PSE HER program, a fixed effect model strains the limits of most statistical computer programs. The household fixed effect enters the model as a matrix of dummy variables with dimensions equal to the number of customer in both the treatment and

control groups. The inversion of a matrix of this magnitude is computationally challenging. Fortunately, for the linear fixed effects model, there is a way to transform the data that removes the matrix of dummy variables from the computation. Simply put, the same model is run with all variables de-meaned -- that is, all variables are replaced by their difference from the household level mean of that variable.

The de-meaned equation is

$$\begin{aligned}\tilde{E}_{it} = \lambda_t & + \beta_3\tilde{P}_t + \beta_4\tilde{T}_i\tilde{P}_t \\ & + \beta_{H1}\tilde{H}_{it}(\tau_H) + \beta_{H2}\tilde{H}_{it}(\tau_H)\tilde{T}_i + \beta_{H3}\tilde{H}_{it}(\tau_H)\tilde{P}_t + \beta_{H4}\tilde{H}_{it}(\tau_H)\tilde{T}_i\tilde{P}_t \\ & + \beta_{C1}\tilde{C}_{it}(\tau_C) + \beta_{C2}\tilde{C}_{it}(\tau_C)\tilde{T}_i + \beta_{C3}\tilde{C}_{it}(\tau_C)\tilde{P}_t + \beta_{C4}\tilde{C}_{it}(\tau_C)\tilde{T}_i\tilde{P}_t \\ & + \tilde{\varepsilon}_{it}\end{aligned}$$

Where all variables with tildes represent that piece of data differenced from that houshold's mean. For example, for the consumption variable

$$\tilde{E}_t = E_t - \sum_t E_t \big/ n(t)$$

And for the treatment variable

$$\tilde{T}_t = T_t - \sum_t T_t \big/ n(t) .$$

In the process of de-meaning, the participant effect variable is absorbed into the intercept. Otherwise, the marginal effects, the parameter estimates remain the same. The one remaining consideration is the correction of the estimate standard errors on the parameters. The de-meaned parameter standard errors need to be adjusted to account for the ~72,000 parameters that are implicitly estimated in the model.

Savings are estimated by fitting the absorbed pooled model parameters associated with the combined treatment (T_i) and the post (P_t) effects. For estimates of normalized savings, the degree days should be fit to degree days calculated using normal temperatures and the optimal degree day based determined for the model.

$$\Delta E = \quad 365\hat{\beta}_4 \; + \hat{\beta}_{H4}\breve{H}(\hat{\tau}_H) + \hat{\beta}_{C4}\breve{C}(\hat{\tau}_C)$$

Where

ΔE	=	Estimated annual energy savings;
$\breve{H}(\hat{\tau}_H)$	=	Normal annual heating degree-days at the optimal heating base temperature;
$\breve{C}(\hat{\tau}_C)$	=	Normal annual cooling degree-days at the optimal cooling base temperature;
$\hat{\beta}_4, \hat{\beta}_{H4}, \hat{\beta}_{C4}$	=	Estimated parameters from the absorbed, pooled model;

Absorbed Pooled Specification with Monthly Effects

The monthly effects of the HER program are of particular interest because the long term behavioral effects of these kinds of programs are unknown. The monthly effects model is identical to the absorbed pooled specification with the exception that the treatment variable, $\tilde{\tilde{T}}_t$. In the basic absorbed pooled specification, the treatment variable is a single dummy variable - one in the post-report period, zero in the pre-report period. For the monthly effects model, this variable becomes a series of monthly dummy variables – one in the post-report period for that month, zero elsewhere. Each monthly treatment variable interacts with all variables with which the single treatment variable interacts. The equation for the monthly effects is:

$$\begin{aligned}\tilde{\tilde{E}}_{it} = \lambda_t &+ \beta_3\tilde{\tilde{P}}_t + \beta_4\tilde{\tilde{T}}_i\tilde{\tilde{P}}_t \\ &+ \beta_{H1}\tilde{\tilde{H}}_{it}(\tau_H) + \sum_{t=2}^{30}\beta_{H2}\tilde{\tilde{H}}_{it}(\tau_H)\tilde{\tilde{T}}_i + \beta_{H3}\tilde{\tilde{H}}_{it}(\tau_H)\tilde{\tilde{P}}_t + \sum_{t=2}^{30}\beta_{H4}\tilde{\tilde{H}}_{it}(\tau_H)\tilde{\tilde{T}}_i\tilde{\tilde{P}}_t \\ &+ \beta_{C1}\tilde{\tilde{C}}_{it}(\tau_C) + \sum_{t=2}^{30}\beta_{C2}\tilde{\tilde{C}}_{it}(\tau_C)\tilde{\tilde{T}}_i + \beta_{C3}\tilde{\tilde{C}}_{it}(\tau_C)\tilde{\tilde{P}}_t + \sum_{t=2}^{30}\beta_{C4}\tilde{\tilde{C}}_{it}(\tau_C)\tilde{\tilde{T}}_i\tilde{\tilde{P}}_t \\ &+ \tilde{\tilde{\varepsilon}}_{it}\end{aligned}$$

As is indicated by the index on the summation operators, one of the monthly dummy variables must be omitted for the regression to be estimable. In practical terms, this makes the estimated monthly effects the marginal monthly effect relative to the first month of the pre-report period. These monthly effects accurately track the relative month to month trends in differences

between the treatment and control group, despite being relative to the difference in the first month.

The monthly effects include heating and cooling effects. In addition to reporting overall monthly effects, we will also show the monthly baseload, heating and cooling effects.

Appendix C: Additional Results Tables

This section provides additional results tables.

Table C-1, Table C-2, and Table C-3 provides full program, monthly and quarterly results for both the pooled model and the difference of differences approach. The difference of differences approach results are based on actual weather and are consistent with pooled model results fit to actual weather. The pooled model results fit to normalized weather put savings estimates on a typical year basis.

Table C-1
Full Program Results, Comparison of Model and Difference-of-Differences Results

Fuel	Period	Pooled, Normalized		Pooled, Actual		Difference of Difference	
		kWh/Therms	+/-	kWh/Therms	+/-	kWh/Therms	+/-
Electric	First 12 Months	189.8	13.5	188.3	14.7	183.2	26.3
	All 20 Months	204.2	12.2	201.7	13.2	204.5	28.3
	Last 12 Months	222.1	13.6	217.7	13.9	225.4	33.6
Gas	First 12 Months	11.3	1.4	11.0	1.4	10.7	1.8
	All 20 Months	12.8	1.3	12.3	1.2	12.1	1.9
	Last 12 Months	14.0	1.4	13.0	1.3	13.4	2.3

Table C-2
Monthly Reports Results, Comparison of Model and Difference-of-Differences Results

Fuel	Period	Pooled, Normalized		Pooled, Actual		Difference of Difference	
		kWh/Therms	+/-	kWh/Therms	+/-	kWh/Therms	+/-
Electric	First 12 Months	207.7	15.7	206.2	17.2	199.0	30.8
	All 20 Months	227.6	14.3	224.9	15.4	228.2	33.2
	Last 12 Months	252.5	15.9	247.2	16.2	256.8	39.4
Gas	First 12 Months	12.0	1.7	11.7	1.6	11.3	2.1
	All 20 Months	13.7	1.5	13.2	1.4	13.1	2.2
	Last 12 Months	15.0	1.6	14.0	1.6	14.5	2.7

Table C-3
Quarterly Reports Results, Comparison of Model and Difference-of-Differences Results

Fuel	Period	Pooled, Normalized		Pooled, Actual		Difference of Difference	
		kWh/Therms	+/-	kWh/Therms	+/-	kWh/Therms	+/-
Electric	First 12 Months	143.2	26.0	142.2	28.5	142.8	50.7
	20 Months	141.6	23.6	140.3	25.6	140.7	64.9
	Last 12 Months	139.8	26.3	137.9	26.9	141.5	54.5
Gas	First 12 Months	9.5	2.7	9.2	2.7	9.1	3.5
	All 20 Months	10.5	2.5	10.0	2.4	9.8	3.6
	Last 12 Months	11.6	2.7	10.5	2.6	10.5	4.4

Table C-4 and Table C-5 provide the model-based estimates of monthly differences for electric and gas models. These monthly differences closely track the differences provided in plot form in the body of the report (Figure 4-2 and Figure 4-3). Because of the limitations of regression specification, these monthly effects are relative to the first pre-report month.

Table C-4
Electric Model-based Monthly differences

Month	Monthly Difference (kWh)*	95 Percent Confidence Interval
Nov-08	-12.4	10.8
Dec-08	-16.3	11.8
Jan-09	-14.2	11.5
Feb-09	-15.4	10.3
Mar-09	-15.7	11.3
Apr-09	-14.5	10.8
May-09	-15.8	11.2
Jun-09	-15.3	10.9
Jul-09	-17.4	11.6
Aug-09	-17.8	11.4
Sep-09	-17.9	10.9
Oct-09	-19.6	11.2
Nov-09	-21.4	10.9
Dec-09	-24.1	11.9
Jan-10	-23.1	11.4
Feb-10	-18.3	10.3
Mar-10	-19.7	11.3
Apr-10	-18.8	10.9
May-10	-18.9	11.2
Jun-10	-18.4	10.9

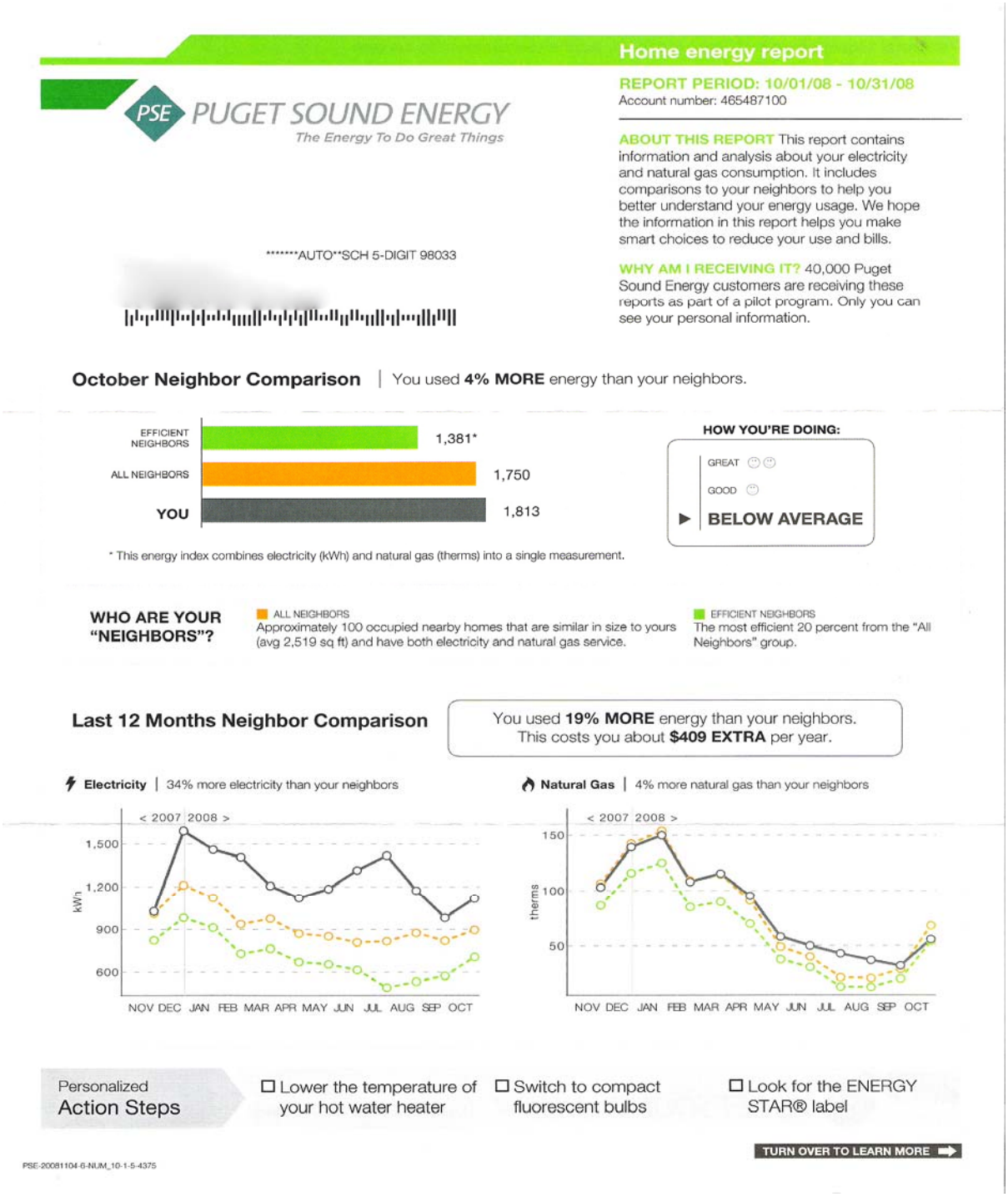
*Relative to first month of pre-report period

Table C-5
Gas Model-based Monthly differences

Month	Monthly Difference (Therms)*	95 Percent Confidence Interval
Nov-08	-0.7	0.4
Dec-08	-1.2	0.6
Jan-09	-1.3	0.5
Feb-09	-1.4	0.5
Mar-09	-1.5	0.5
Apr-09	-1.1	0.4
May-09	-1.0	0.4
Jun-09	-0.4	0.5
Jul-09	-0.2	0.5
Aug-09	-0.2	0.5
Sep-09	-0.5	0.4
Oct-09	-1.2	0.4
Nov-09	-1.6	0.4
Dec-09	-2.1	0.6
Jan-10	-1.5	0.5
Feb-10	-1.5	0.4
Mar-10	-1.6	0.4
Apr-10	-1.3	0.4
May-10	-1.2	0.4
Jun-10	-0.8	0.4

*Relative to first month of pre-report period

Appendix D: OPOWER Home Energy Report Example



Home energy report

PUGET SOUND ENERGY
The Energy To Do Great Things

REPORT PERIOD: 10/01/08 - 10/31/08
Account number: 465487100

ABOUT THIS REPORT This report contains information and analysis about your electricity and natural gas consumption. It includes comparisons to your neighbors to help you better understand your energy usage. We hope the information in this report helps you make smart choices to reduce your use and bills.

WHY AM I RECEIVING IT? 40,000 Puget Sound Energy customers are receiving these reports as part of a pilot program. Only you can see your personal information.

*******AUTO**SCH 5-DIGIT 98033

October Neighbor Comparison | You used 4% MORE energy than your neighbors.

EFFICIENT NEIGHBORS 1,381*
ALL NEIGHBORS 1,750
YOU 1,813

HOW YOU'RE DOING:
GREAT
GOOD
BELOW AVERAGE

* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

WHO ARE YOUR "NEIGHBORS"?

ALL NEIGHBORS
Approximately 100 occupied nearby homes that are similar in size to yours (avg 2,519 sq ft) and have both electricity and natural gas service.

EFFICIENT NEIGHBORS
The most efficient 20 percent from the "All Neighbors" group.

Last 12 Months Neighbor Comparison

You used 19% MORE energy than your neighbors.
This costs you about $409 EXTRA per year.

Electricity | 34% more electricity than your neighbors

< 2007 2008 >
kWh
1,500
1,200
900
600
NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT

Natural Gas | 4% more natural gas than your neighbors

< 2007 2008 >
therms
150
100
50
NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT

Personalized Action Steps

☐ Lower the temperature of your hot water heater
☐ Switch to compact fluorescent bulbs
☐ Look for the ENERGY STAR® label

TURN OVER TO LEARN MORE

PSE-20081104-6-NUM_10-1-5-4375

Personal Comparison | How your energy use this year compares to last year.

About This Graph
This section shows how much energy you've used so far this year and compares that amount to the same period last year.

As the months go by you can see how your progress compares to last year.

Your Progress
So far this year, you've used **16% MORE** energy than last year.

* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

Action Steps | **Personalized tips chosen for you based on your energy use and housing profile**

Quick Fixes
Things you can do right now

☐ **Lower the temperature of your hot water heater**
Lowering the water heater temperature from 140°F to 120°F can result in a 10% savings in hot water costs.

Most households find 120°F to be sufficient for their needs. As an added benefit, this temperature is helpful for preventing scalding.

Note that if your dishwasher does not have a booster heater, a water temperature of 130°F to 140°F may be necessary—consult your owner's manual for information.

SAVE UP TO $25 ANNUALLY

Smart Purchases
Save a lot by spending a little

☐ **Switch to compact fluorescent bulbs**
Compact fluorescent light bulbs (CFLs) use 75% less energy and last up to 10 times longer than standard incandescent light bulbs. Replace a few 100-watt incandescent bulbs and start saving money now.

Today's CFLs provide high-quality light and are available in a variety of sizes and shapes.

PSE offers a discount of up to $3 on certain bulbs—find participating retailers at PSE.com.

SAVE $60 OR MORE SAVED OVER THE LIFE OF A BULB

Great Investments
Big ideas for big savings

☐ **Look for the ENERGY STAR® label**
The Department of Energy tests the energy efficiency of many home appliances and electronics, and the best earn the official ENERGY STAR® label. In 2007 Americans saved $16 billion on their energy bills thanks to this program.

The ENERGY STAR label can be found on efficient models of clothes washers, refrigerators, televisions, computers and many other products.

Visit www.energystar.gov for more details.

SAVE UP TO 40% ON APPLIANCE ENERGY COST

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PSE-20081104-6-NUM_10-1-5-4375

Home energy report

PUGET SOUND ENERGY
The Energy To Do Great Things

REPORT PERIOD: 09/01/08 - 09/30/08
Account number: 465487100

ABOUT THIS REPORT This report contains information and analysis about your electricity and natural gas consumption. It includes comparisons to your neighbors to help you better understand your energy usage. We hope the information in this report helps you make smart choices to reduce your use and bills.

WHY AM I RECEIVING IT? 40,000 Puget Sound Energy customers are receiving these reports as part of a pilot program. Only you can see your personal information.

*******AUTO**SCH 5-DIGIT 98033

September Neighbor Comparison | You used 17% MORE energy than your neighbors.

EFFICIENT NEIGHBORS 749*
ALL NEIGHBORS 1,181
YOU 1,382

HOW YOU'RE DOING:
GREAT
GOOD
BELOW AVERAGE

* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

WHO ARE YOUR "NEIGHBORS"?

ALL NEIGHBORS
Approximately 100 occupied nearby homes that are similar in size to yours (avg 2,519 sq ft) and have both electricity and natural gas service.

EFFICIENT NEIGHBORS
The most efficient 20 percent from the "All Neighbors" group.

Last 12 Months Neighbor Comparison

You used 18% MORE energy than your neighbors.
This costs you about $397 EXTRA per year.

Electricity

< 2007 2008 >
1,500
1,200
900
600
kWh
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP

Natural Gas

< 2007 2008 >
150
100
50
therms
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP

Personalized Action Steps

☐ Find more ways to save
☐ Install a programmable thermostat
☐ Choose an ENERGY STAR® furnace

TURN OVER TO LEARN MORE

PSE-20081009-5-NUM_10-1-7-3060

Attachment 20.2

Research Study:

Residential Energy Use Behavior Change Pilot

(CMFS project code B21383)

Presented to:

Joe Plummer

Minnesota Department of Commerce

Office of Energy Security

April 20, 2009

Ed Carroll – Franklin Energy

Eric Hatton – Franklin Energy

Mark Brown – Greenway Insights

Table of Contents

Research Objective

This project was funded through an applied conservation research and development grant from the Minnesota Office of Energy Security (OES).[1] The objective of this research study is to gather, analyze, and present the information necessary for OES and state utilities to move forward with a solid plan for piloting residential energy use behavior change programs as part of their Conservation Improvement Program (CIP) efforts. The end goal of this effort is to help Minnesota utilities better understand how to accelerate energy savings from changes in residential energy-use behavior. This goal includes recognizing the implementation challenges of these programs as well as their cost effectiveness on a dollar per kWh saved basis.

The programs that are the subject of this research report aim to generate energy savings by impacting the behavior habits of individuals in their households. While many traditional utility-sponsored energy efficiency and conservation programs aimed at the residential sector focus on incentives to encourage and enable weatherization, appliance upgrades, and the installation of compact fluorescent light bulbs (CFLs) to generate energy savings, the programs we examine in this report seek to give information and feedback to influence customers' motivations related to the use of energy in their daily lives. They go beyond educating consumers on ways to decrease energy consumption by providing tools for individuals to better understand the nature of how their actions relate to their energy consumption and compare their consumption activities over time and to their neighbors.

As this report will discuss, there are a wide variety of approaches for utilities to address residential energy-use behavior. Some approaches involve sending customers more useful information on their energy consumption patterns and how they compare to their neighbors or similar households in terms of size or number of occupants. Others seek to recruit customers to install monitoring devices that provide real-time feedback on energy use in terms of dollars and kilowatt hours. These monitors highlight how different behaviors consume energy and drive costs allowing consumers to learn through experimentation. As some utilities have demonstrated, investments in advanced metering infrastructure can create a 2-way communication channel that gives utilities the ability to influence behavior by offering direct incentives in the form dynamic energy prices.

This report outlines the nature of these programs and provides real-world examples of how these approaches and technologies have been evaluated and piloted by various utilities around the country and beyond. It illustrates the advantages and disadvantages of different approaches, and the magnitude of the impacts realized and anticipated with respect to energy savings. Importantly, it offers insights gained from the program managers that have been involved in these efforts. Hopefully the lessons learned and critical success factors identified through their experiences can help to ensure that utility decision makers taking on similar initiatives increase their likelihood of success in achieving cost effective, persistent energy savings.

[1] The grant was initially provided to Glacier Consulting Group whose lead staff on this research project later became part of Franklin Energy. Despite the change in corporate authorship, the project scope remained the same as originally drafted, identified with CFMS code B21383.

Executive Summary

By evaluating published studies on energy-use behavior change interventions and in conversations with industry participants, the research team was able to identify evidence as to the variety and effectiveness of behavior change programs and pilots:

- The team identifies three broad categories of programs and solutions implemented to generate energy savings through residential consumer behavior change: 1) In-home devices and displays providing real-time feedback, 2) Customized, regular feedback delivered to customers, and 3) Dynamic pricing and rate design programs, typically involving smart meter technology. The last category, given infrastructure investment requirements, is considered to be outside of the scope of the pilot design goals of this study.

- Research suggests that direct feedback interventions such as in-home energy use monitors can generate electricity savings of 5% to 15% on average. Indirect feedback on energy use such as information reports delivered to customers can motivate residents to lower energy use from 0% to 10%. A high variability of reported energy savings speaks to the influence that participant selection, feedback provision methods, and program execution can all have on outcomes.

- While empirical evidence from utility pilot programs investigating direct and indirect feedback interventions is somewhat limited, several recent examples provide insight into the viability and savings potential of these approaches:

    - The experiences of Hydro One and NSTAR with the PowerCost Monitor devices in addition to findings from in-home display studies in Nevada and Florida, suggest that average savings of 3% to 7% with a midpoint of around 5% are likely to be achieved for participants of these kinds of direct feedback programs. It is important to stress that this savings opportunity exists for a self-selected population that is motivated enough to install the feedback device in their home.

    - Positive Energy's electricity use reports offering neighbor comparisons have motivated SMUD's customers to make changes to energy use, lowering demand by 2% in a broad non-targeted population. A powerful finding from behavior science is at the core of this program; individuals are motivated much more by their perceptions of what other people do and find acceptable than they are by other factors such as the opportunity to save money or conserve resources, contrary to even their own perceptions of motivation.

    - BC Hydro has found the use of personal commitments, incentives, and online information tools to be an effective means to drive behavior changes. The Canadian utility has enrolled more than 60,000 customers in the first few months of this effort.

- One important distinction in program reach is whether the approach requires program participants to opt into the program (e.g., agreeing to purchase a device) or whether feed back is distributed broadly to a larger group (e.g., mailing energy use reports to a large population of customers). While direct feedback programs may achieve higher savings per participant, they are only likely to attract a single-digit percentage of self-selected utility customers. On the other hand, indirect feedback programs may have more than four times the potential savings opportunity because of their opt-out nature.

- Interview respondents offer a number of valuable lessons learned and critical success factors to utility managers considering and embarking on their own behavior change program efforts. An orientation to customer motivation as the essential ingredient to program effectiveness and engagement to collect customer input into program design were stressed by multiple respondents. Program managers are also encouraged to seek out a diverse program team, take an iterative and continuous approach to piloting solutions, and be mindful of their measurements and objectives.

- The cost effectiveness of behavior change programs depend heavily on the achieved reduction in kilowatt hours and the cost to provide feedback. The savings achieved from Positive Energy's program with SMUD are reported to have around a 3¢ per kWh cost to the utility for first year savings. On the other hand, utility cost of first-year savings from real-time feedback monitor programs is more likely on the order of 30¢ per kWh. This is a function of the high cost of devices relative to customer willingness to pay as well as the substantially high drop-out rate (around a third of participants within 3 months) among participants.

- Research studies show that the reductions in energy demand achieved by behavior change programs persist as individuals have developed new habits with respect to energy use. Utility-scale pilot programs confirm these findings, showing savings persisting over periods as long a 18 months, though robust empirical evidence is somewhat lacking due to the recent nature of many of these initiatives.

- Given Minnesota's energy-use profile, it is likely that savings potential would match the average of results from programs across the country. The region has annual household electricity (11,500 kWh) and natural gas consumption (~70k cf) that is very close to the national average. While the percentage of homes with electric space and/or water heating in a particular area may influence the savings potential from in-home electricity-use monitors, many of the behaviors cited as leading to energy savings in the various utility studies conducted to date – turning off lights, laundry/dishwashing habits, and use of electronics – highlight that the impact of these programs is likely to be somewhat location-independent. Furthermore, a program's savings potential is much more a function of success in creating customer motivation than the sum of factors driven by regional differences.

Based on results of the team's research, three behavioral change program models are outlined for consideration by Minnesota utility managers. The models present concepts for implementing the types of feedback interventions reviewed in the study. A model overview is provided along with a program plan to define the necessary process steps, associated actions and outcomes, and their link to the key lessons related by study respondents. To the extent possible, reasonable savings and persistence estimates for planning purposes are provided. These models focus on interventions that can be implemented without the need for existing smart meter infrastructure (i.e., they do not consider third category of behavior change interventions such as dynamic pricing programs).

Program Models	Model 1: In-Home Energy Use Monitor	Model 2: Indirect/Comparative Feedback on Home Energy Use	Model 3: Hybrid Approach – Comparative and Direct Feedback
Program Basics	Participants receive a monitor that provides real-time feedback on home energy use in order to track and experiment with their energy use behavior	Participants receive regular reports in the mail that will compare their energy use with neighbors in similar homes. Targeted energy saving tips will also be communicated.	Participants receive regular comparative feedback reports and energy tips. Participants will be encouraged to make use of real-time power monitors that can be purchased or borrowed for several months at a time.
Customer Engagement Method	Opt-in	Opt-out	Opt-out (reports) Opt-in (in-home device)
Targeted participant household savings (as % of total kWh)	5% (mid of 3% to 7% range) Valid among self-selected participant population	2% Average in total customer population; targeted segments would have significantly higher savings (e.g., in the 5% to 10% range)	2%+ Average in total customer population; targeted segments would have significantly higher savings (e.g., in the 5% to 10% range)
Big Advantage	Real-time feedback for participants	Cost effective approach with broader reach	Hybrid approach maximizes savings potential
Big Disadvantage	Significantly higher cost per kWh saved	Requires integration with system data	Greater complexity/ resource requirements

Research Methodology

To accomplish the research objective outlined above, the research team collected input from available published research and through interviews with experienced program managers, consultants, and researchers. The team sought to identify major pilots and program efforts undertaken in recent years by utilities aimed at influencing residential energy-use behavior.

Published literature as cataloged by researchers at institutional resources including the Precourt Institute for Energy Efficiency at Stanford University (Precourt), the American Council for and Energy-Efficient Economy (ACEEE), and the Electric Power Research Institute (EPRI) served as a starting point for the team's investigation. Through these efforts, findings from experimental studies and behavioral science research going back over several decades provided valuable benchmarks on potential savings opportunities and the theory behind behavior change. Several of the more comprehensive studies are discussed in greater detail later in this report.

Based on the references in these publications, through conversations with knowledgeable individuals at key associations and team member contacts, the team approached a number of utility program managers, consultants, and researchers that had completed pilot studies and experiments or were evaluating options for their utility to apply various behavior change intervention solutions. More than 15 respondents agreed to participate in informational interviews and the sharing of published materials. Participants had varying degrees of engagement in behavior change programs ranging from oversight responsibility for utility pilot programs providing to those involved in more preliminary research and program evaluation.

The interviews and collection of publications were conducted with the end goal in mind of developing recommendations on worthwhile pilot programs to pursue with respect to residential behavior change in Minnesota. Such programs would be able to achieve real savings that could persist and be verified through appropriate control group studies or other methods of measurement and verification. Specifically the research aimed to provide input across a number of dimensions that would be of concern to program managers:

- Program objectives
- Program pilot action plan
- Target customer market
- Customer education activities
- Savings goals and assumptions
- Marketing/incentive strategy
- Quality control plan
- Key lessons learned and applied

Literature Review

The research team encountered numerous published studies on various aspects of energy-use behavior change. Some reports documented specific field studies and experiments conducted to evaluate the impact of different interventions, some served to provide an outline of behavior change theory and insights provided by the field of behavioral science, others are review studies assessing the implications of, in cases, dozens of prior studies.

Three publications in particular were found to be most useful in summarizing the findings from research in this field:

Sarah Darby at the Environmental Change Institute at the University of Oxford in England is identified in literature and through conversations with multiple interview participants to as a thought leader in the field of behavior change programs. Her publication: *The effectiveness of feedback on energy consumption: a review for DEFRA of the literature on metering, billing, and direct displays* was published in 2006. The author's conclusions are widely cited, notably that energy savings from direct feedback (e.g., in-home displays showing meter data in terms of cost and consumption) average from 5% to 15% while indirect feedback (e.g., providing energy use information with customer billing statements) has been shown to achieve 0% to 10% reduction in energy consumption depending on the context and quality of information given. It is noted that feedback is useful as a self-teaching tool to help consumers understand and adjust their habits with respect to energy consumption. (Darby 2006)

Corinna Fischer's paper: *Feedback on household electricity consumption: a tool for saving energy?* was published in February 2008. This paper reviewed 21 original studies and 5 review studies across 10 countries to investigate the effect of feedback on electricity consumption. The paper concludes that feedback stimulates energy savings with "usual" savings of 5% to 12%, though its author notes that the studies reviewed range in savings from 0% to 20%. The nature and frequency of feedback, study design, and sample size all create challenges in drawing conclusions. The author concludes that giving feedback frequently and over a long period improves its effectiveness. Also the ability to give appliance-specific information is helpful, as is communicating information in a clear and appealing way. Computerized and interactive tools are also found to engage users in energy saving behaviors (Fischer 2008).

A 2005 study from Wokje Abrahamse and other colleagues: *A review of intervention studies aimed at household energy conservation* is another helpful study in investigating research conducted over the last thirty years. The paper reviews thirty-eight field studies aimed at encouraging households to reduce energy consumption. In general, it is found that the large majority of studies addressing feedback find it to be an effective means to generate energy savings, with more frequent feedback leading to greater effectiveness. The authors express some skepticism of the conclusions drawn from many studies, noting that many have lacked the appropriate experimental conditions such as significant sample sizes or appropriate control groups to validate findings (Abrahamse et al. 2005).

These papers emphasize major themes that are useful for utility program managers considering behavior change programs. First, it is apparent that "feedback" is the primary mechanism by which

behavior change is accomplished (the theory of which will be discussed later in this paper) and can generate meaningful savings. Secondly, the manner in which feedback is provided – its medium, frequency, content, and appeal – can have significant impact on the results that are achieved (Fischer 2008; Darby 2006). Additionally, as highlighted by all of the authors cited above, the methodology with which pilots or experiments are conducted – with respect to sample selection, data collection, and the use of control groups – can impact both the ability to interpret results and draw conclusions about the groups tested as well as the ability to extend these findings to broader populations. These takeaways emphasize the need for utility program managers to be careful in designing intervention programs and the methods by which they will be tested and implemented in their customer populations.

While the studies cited above provide some of the most relevant foundational research into the design and effect of behavioral change programs for residential energy use, there is an enormous volume of academic and professional research that further helps to illuminate the relationship between behavior and energy and the specific programs and approaches taken to influence it. Appendix 5 lists many of the materials collected and reviewed for the research study; where possible, links are provided. It is also worth noting that several institutional resources can serve as valuable resources. In particular, the Precourt Institute for Energy Efficiency at Stanford University has established a Behavior & Energy Cluster that provides a bibliographic database in addition to other valuable online tools. The site can be accessed at http://piee.stanford.edu/cgi-bin/htm/Behavior/behavior.php?ref=nav4. Other organizations that provided useful guidance and content to our team include the Electric Power Research Institute (EPRI), the American Consortium for an Energy-Efficient Economy (ACEEE), and the Consortium for Energy Efficiency (CEE).

It is important to note that the studies and experiments covered in the literature on energy-use behavior change are more often than not conducted for research purposes outside of utility demand-side management program activities. In fact, the amount of empirical reporting on behavior change programs conducted by/for utilities in the context of pilot programs and with an intent to discover program cost effectiveness and scalability - particularly outside of dynamic pricing programs which are not intended to be the focus of this study - was found by the research team to be somewhat limited. Much of the remainder of the report will focus of the recent programs that target behavior change in utility customer populations. Our team has also included a detailed listing of methodologies and findings for the utility behavior change pilots and programs encountered in the team's research in Appendix 2 of this report.

Summary of Interview Activity

A major goal of this research study was to conduct primary research into the experience of researchers and industry professionals that have meaningful perspectives to share on their involvement in evaluating energy-use behavior change interventions. Conversations with these individuals helped to inform our understanding of the practical challenges of introducing these programs to a utility customer base and their potential for energy savings at reasonable costs. Perspectives were gathered from researchers, utility program managers, and expert consultants.

Our team is grateful for the participation and insights provided by these individuals:

<u>Utilities/Administrators</u>

Austin Utilities	Kelly Lady, Energy Services Consultant
Baltimore Gas & Electric	Ruth Kiselewich, Director of DSM Programs
BC Hydro	Arien Korteland, Program Manager, PowerSmart
Connexus Energy	Bruce Sayler, Project Lead
City Utilities (Springfield, MO)	Cara Shaefer, Director, Residential Energy Management
Energy Trust of Oregon	Kendall Youngblood, Residential Sector Manager
Pacific Gas & Electric	Joanne Medvitz, Program Manager
SMUD (Sacramento, CA)	Ali Crawford, Project Manager

<u>Consultants/Vendors</u>

Comverge/ComEd	Kelly Papadimitriu, ComEd RRTP Program Manager
The Brattle Group	Ahmad Faruqui, Principal
Paragon Consulting	Bruce Jackson, Senior Consultant
Positive Energy	Alex Laskey, President
Van Denburgh Consulting	Elizabeth Van Denburgh, Founder

<u>Researchers</u>

Energy Center of Wisconsin	Ingo Bensch, Senior Project Manager
Florida Solar Energy Center	Danny Parker, Senior Research Scientist
SenterNovem (The Netherlands)	Henk van Elburg, Program Manager

Research Findings

Behavior Change Theory

Before reviewing specific solutions and findings with respect to behavior change programs, it is worthwhile to spend some time considering the mechanics by which these programs achieve their end goals. First, it is important to consider that the intent of these programs is to influence human behavior, much of which when it comes to energy use is habitual behavior.

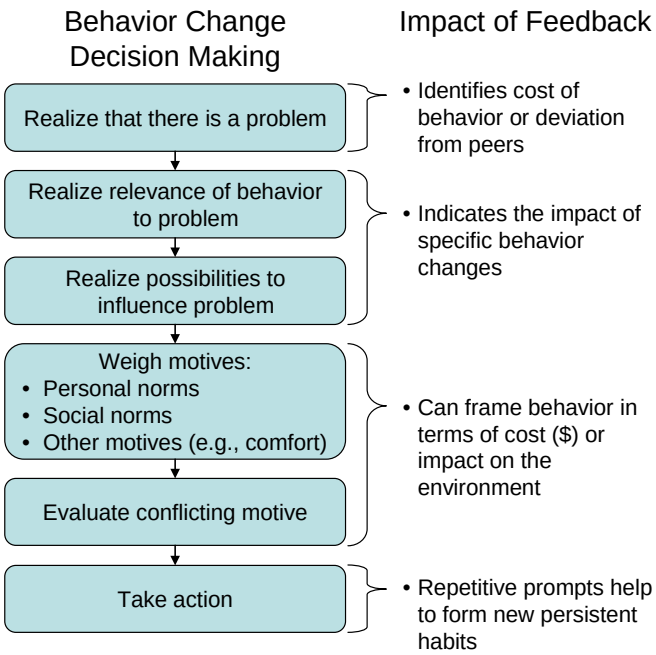
Many of the ways in which consumers use energy at home are the result of behaviors like how and when we turn on and off lights and televisions in the rooms we use, how we set and adjust our thermostats, our practices in doing laundry and running our dishwasher, the frequency with which we replace furnace filters, even the length of the showers we take and whether we unplug our cell phone chargers when they are not in use. Impacting these habits is difficult for a number of reasons. First it is important to recognize that electricity is an enabling product – consumers don't turn on the television or the lamp to use energy, they want to be entertained and they want to see. Electricity is an intangible necessity that, as BC Hydro identifies, like toilet paper is a dissatisfier we take for granted until it is missing (BC Hydro 2008). This is the first challenge if any behavior change program; they must get people to notice and care about their energy use.

- Turning on/off lights
- Use of appliances
- Setting the thermostat
- Use of hot water

Secondly, behavior programs are largely focused on changing old habits. The benefit of habits, as Corinna Fischer relates, is that habitual behavior is functional because it allows us to avoid expending the time and effort making decisions on issues that re-occur frequently and for which we have developed a means of addressing. The challenge is to break this cycle and protocol in order to get individuals to adopt more energy efficient habits.

The adjacent figure outlines the decision-making process an individual must follow in order to take action with respect to their energy consumption behavior. Also noted are the ways in which feedback interventions can influence an individual at various steps in this process. The first three steps, sometimes referred to as norm activation, include becoming aware that a problem exists,

Figure 1: Behavior Change Process



understanding how one's behavior relates to the problem, and recognizing that there are possible options to address the problem. Feedback can be useful in these steps because it can identify the cost of behavior or suggest a deviation in an individual's behavior with respect to their peers (so called social norming). The information provided through experimentation with direct feedback or through information such as energy saving tips indicate the impact of specific behavior changes.

Next, an individual will have to weigh the various motives, personal and social, including the benefits of comfort and convenience or the opportunity to realize cost savings. Some of these motives may be in conflict, and how the individual resolves these conflicts will determine the action they will take. Feedback can be helpful in framing behavior in terms of dollar costs, impact on the environment, or what other people are doing in order to play on different norms. Repetitive prompting from the feedback helps as this process will need to repeat itself over and over again in order for new habits to form and old habits to be abandoned (Fischer 2008).

Categorization of Interventions

The research team identifies three broad categories of programs and solutions implemented to generate energy savings through residential consumer behavior change:

1. First, there are direct feedback programs that aim to provide real-time feedback to customers on their energy use, typically by devices that interface with the customer's home electric meter (no evidence of gas use feedback devices/programs was identified by the team's research activities). Examples of these interventions include the PowerCost Monitor pilots at Hydro One in Ontario, Canada and NSTAR in Massachusetts (in progress).

2. Second, there are the approaches that engage in indirect feedback, where information on consumers energy use is provided to customers in a processed manner, often through the mail or online interfaces. Examples of programs in this category include Positive Energy's home electricity reports first implemented by SMUD and the Team Power Smart program at BC Hydro.

3. Finally, there are programs based on advanced metering infrastructure, or 'smart metering' that often involve dynamic pricing protocols and are enabled by two-way communication between the utility and the residential customer.

All of these approaches have both merits and shortcomings. All are being pursued, in some cases by the same utility (Crawford 2008), as a means to achieve energy savings. In investigating these approaches and talking with individuals about their own experiences, the advantages and disadvantages of these approaches became clearer and are useful to articulate.

Category 1 - In-home devices and displays providing real-time feedback

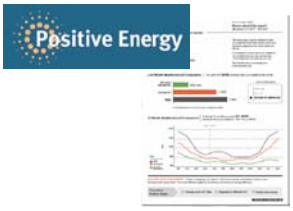
Pros:

- Users are able to receive real-time feedback (i.e., instantly, or in a very short period of time) from their meter via a mobile monitor.
- Real-time feedback allows users to experiment and see the impact of their behavior (e.g., turning on/off lights and appliances, changing routines from day-to-day, etc.).
- Multiple utilities have demonstrated the savings achieved by customers using these devices. For example, a 3% annual energy savings is reported in an ongoing NSTAR pilot (MacLellan 2008), and a 6.5% annual savings was observed in a 500-home pilot by conducted with Hydro One's residential customers in Ontario (Mountain 2006).

Cons:

- The opt-in nature of these programs (e.g., soliciting customers to purchase and install devices) leads to low adoption rates and limited potential for scaling programs (Bensch 2008; MacLellan 2008; Energy Trust of Oregon 2008).
- Several programs have documented significant drop-out rates among participants as the novelty of the device wears off, monitors are put away, or batteries die; this raises questions about persistence and cost effectiveness of the $130+ devices (MacLellan 2008).
- Some observers have noted that the remote communications between the meter element of the device and the handheld display (particularly in the case of the Power Cost Monitor) is not 100% reliable, leading to gaps in the captured consumption. Program managers express concerns about potential conflicts with billing data (Kiselewich 2008, Parker 2008).

Category 2 – Customized, regular feedback delivered to consumers



Pros:

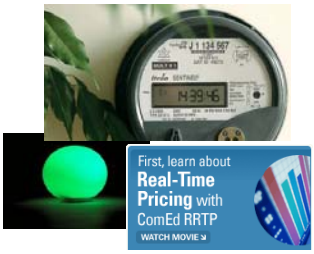
- The opt-out (vs. opt-in) nature of reports sent at the discretion of the utility to customers, allows utilities to design and conduct rigorous large-scale pilots and target entire populations in desired segments (Laskey 2008).
- Utilities have the opportunity to provide comparative feedback, showing a customer's performance relative to their neighbors, taking advantage of the power of social norms.
- Reports can be customized based on housing, demographic, and psychographic factors to provide relevant feedback and customized energy-savings tips that are found to have the greatest appeal.

- Does not require advanced metering infrastructure (AMI) to be effective, though enhanced reporting such as appliance-specific feedback through signal analysis and peak/baseload distinction is made possible in an AMI environment.
- Evidence from Positive Energy's work with SMUD is found to show savings achieved at attractive cost effectiveness – on the order of 3¢ per kilowatt hour saved on a first-year (non-levelized) cost/savings basis (Laskey 2008).

Cons:

- Indirect feedback will not match the real-time and (unless coupled with AMI-enabled technology) use-specific feedback that direct feedback devices provide, making it more difficult to see the impact of discrete behavior and individual appliances.
- Comparative feedback can have the unintended consequence of consumers who learn they are low energy consumers relative to their peers deciding to increase their energy consumption. This is more of a hypothetical as results from Positive Energy show the opposite – efficient users further decreasing their usage. Utilities must be careful in targeting and crafting their messaging in order to minimize potential negative effects.

<u>Category 3 – Dynamic pricing / rate designs (e.g., smart metering)</u>



Pros:

- Dynamic pricing provides direct monetary incentives for consumers to modify consumption behavior.
- Utilities are better able to match prices to energy production/purchase costs.
- Advanced metering infrastructure provides significant flexibility in rate design (e.g., time-of-use, real-time, critical-peak).
- Solutions typically require in-home displays that typically have much of the feedback functionality advantages (real-time and cumulative cost and energy consumption) of direct feedback displays like the PowerCost Monitor, but have the advantage of permanent installation/use.

Cons:

- AMI programs are costly infrastructure investment programs requiring substantial resources to install meters and develop integrated IT platforms.
- Programs costs are typically justified by returns from operational efficiency and capacity (i.e., peak load) management and savings; energy efficiency/conservation savings are typically secondary benefits and not primary drivers.

Direct Feedback – PowerCost Monitor Pilot Programs

Direct feedback displays allow for real-time feedback captured by sensors attached to analog meters or connected to power lines in circuit panels. Information is relayed by wireless radio transmission or through the home's power lines to display units that can be portable or wall-mounted. After collecting data from the meter, the devices display both instantaneous and cumulative power usage and cost (based on programmed $/kWh rates). Some devices also show other home diagnostic data such as temperature, humidity, and estimated greenhouse gas emissions.

Though direct feedback displays, known also as in-home displays (IHDs) or home energy displays (HEDs), of various forms have been available for some time, it is only in the last five years that they have received significant interest from utilities for use on a wide scale. A 2008 report from Pacific Gas and Electric Company notes that the stand alone IHD market is in its infancy with no more than 50,000 to 100,000 of the devices installed in North America (Green 2008). The two most noted stand alone models – not designed for use with smart meter technology – are the PowerCost Monitor (PCM) from BlueLine Innovations and The Energy Detective (TED) from Energy, Inc. Both units are currently available in the price range of $130-$140 (Source: www.powermeterstore.com). The PowerCost Monitor is more oriented for user installation while the TED device requires some technical competency to safely interface with the electrical panel. The TED device is noted to have a greater level of resolution, detecting changes of as little as 10 watts, while the PCM is unlikely to detect changes below 300 watts (Parker 2008). The PCM does have the advantage of wireless portability, while the TED requires connection to a wall outlet to receive a signal from the transmitter through the powerline.

Profiles of the PCM, TED, and other direct feedback devices are listed in Appendix 3.

Outside of a number of dynamic pricing pilots that use IHDs for facilitating price signaling and control, there have been only a handful of utility pilots for direct feedback displays. The two most notable are a two-year study in 500 homes conducted by Ontario utility Hydro One completed in 2006 (Mountain 20006) and an ongoing pilot undertaken by Massachusetts-based NSTAR (in cooperation with National Grid and WMECO) that began in May of 2008 (MacLellan 2008). Both studies utilized the PowerCost Monitor.

Findings from the Hydro One Pilot (Mountain 2006):

- Impact measured based on historical comparison
- 6.5% aggregate reduction in electricity (kWh) consumption
- 8% reduction in non-electrically heated homes
- 5% reduction in non-electric heat/hot water homes
- 16% reduction in non-electric heat homes with electric hot water
- 1% reduction in electrically heated homes
- "income and demographic factors had no impact on the responsiveness to the monitor"
- 60% of participants felt the monitor made a difference; 35% planned to stop using after pilot

(Preliminary) Findings from the NSTAR Pilot (MacLellan 2008):

- Pilot began May 2008
- 3,100+ units sold at (subsidized) prices up to $50
- Media coverage (TV, print) coincided with significant rise in sales
- 2.9% savings for monitor users (~$64/year)
- 66%-75% installation rate
- 33% of initial users stopped using the monitor during the study period
- 63% of participants indicate behavior change
- 60% noticed savings in their bill

The differences in savings achieved in the Hydro One pilot based on whether heat was from an electric source (1% savings) as compared to non-electrically heated homes (8% savings) was significant. In explaining this deviation, the study's authors indicate that it appears that because the electric heating load "completely overwhelms (maybe as much as 80% of the load in the winter) the rest of the dwelling's electricity load, the participant is probably unable to detect any of their non-heating conservation actions" (Mountain, 2006). This suggests that behaviors related to home heating were not significant altered through the use of the monitors. Only 11% of Hydro One's customers have electric heat (Green 2008). The significantly higher savings achieved in homes with electrically-heated hot water (~17% savings) would suggest that behaviors related to hot water generation (e.g., water heater thermostat stetting, insulation) and use (laundry, bathing, dish-washing) became a major focus of study participants.

While the NSTAR study did not provide segmentation of savings achieved, the overall savings of 2.9% is significantly lower than that seen in the Hydro One study. It is worth noting that the data for this study (taken from a November 2008 presentation report) represents *no more than six months of data and may not be reflective of final study outcomes* (MacLellan 2008).

One notable result in both studies is the challenge of adoption and persistence seen in both studies. In the Hydro One study, one in three participants plan to discontinue using the monitor at the study's conclusion. This percentage is similar to the proportion that discontinued using the monitors in the NSTAR study. The NSTAR study also notes that more than a quarter of participants that received or purchased the device carried out installation.

Additional feedback from interview participants echoes the findings of these pilots with respect to the energy savings potential. Danny Parker at the Florida Solar Energy Center has published several papers documenting his results in small-scale pilots of the TED device. In a 17-home study conducted with a full year of pre and post data, an average savings of 7% was found in the self-selected test group (Parker 2008). A broader study supported by Bill Jackson of Paragon Consulting looking at various IHDs for Nevada homes found an average savings of 5.5% for the participant population (Jackson 2008).

The Power of Social Norms – Positive Energy's Success with Indirect Feedback at SMUD

Positive Energy, a Virginia-based company with a mission to engage Americans who are "in the dark about their energy use," seeks to leverage the power of social norms by providing comparative feedback to energy consumers (www.positiveenergyusa.com). The company, founded in 2007, has gained attention for the success of its work with the Sacramento Metropolitan Utility District (SMUD) among others and has begun work with a number of Minnesota utilities including Connexus Energy, Austin Utilities, and Owatonna Public Utilities (Laskey 2008).

Positive Energy's approach to generating residential energy savings through feedback is guided by a foundation of behavioral science research, notably the work of Dr. Robert Cialdini, the company's Chief Scientist and one of the foremost researchers in the field of influence and persuasion. Dr. Cialdini's work has provided strong evidence that individuals are motivated much more by their perceptions of what other people do and find acceptable than they are by other factors such as the opportunity to save money or conserve resources, contrary to even their own perceptions of motivation.

Illustrating the power of these concepts is a study published in 2007 Dr. Cialdini and his colleagues conducted an experiment involving hundreds of San Diego area residents as part of their investigation of conservation behavior. The study team placed door hangers on the doors of subjects once a week for a month. The door hangers had one of four messages informing residents, as described by Dr. Cialdini "that (1) they could save money by conserving energy, or (2) they could save the earth's resources by conserving energy, or (3) they could be socially responsible citizens by conserving energy, or (4) the majority of their neighbors tried regularly to conserve energy—information we had learned from a prior survey." As he explains, "Even though our prior survey indicated that residents felt that they would be least influenced by information regarding their neighbors' energy usage, this was the only type of door hanger information that led to significantly decreased energy consumption, almost 2 kWh/day" (Cialdini 2007).

The findings of behavioral science research from this study and many others form the foundation for Positive Energy's approach to providing indirect feedback to utility customers. The company partners with its clients to inform residential customers of their energy consumption as it relates to their neighbors, providing comparative feedback, along with comparisons to the customers' historical energy use and customized recommendations for reducing energy consumption. These home energy reports combine simple messaging and graphical illustrations of how an individual consumer's consumption compares to the average of neighbors in similar homes, their most efficient neighbors, and their own demand from previous periods. The company uses different housing and demographic factors in proprietary algorithms to segment the customers for the appropriate comparisons and suggest relevant improvement opportunities (Laskey 2008).

The experience of the Sacramento Metropolitan Utility District (SMUD) as described by project manager Ali Crawford has more than met expectations. The pilot program, Positive Energy's first major utility customer, was launched in April of 2008 with 35,000 customers receiving reports either monthly or quarterly. A control group of 55,000 homes (actually more than 10% of the utility's total customer base)

allows the team to have robust data with which to compare population and understand the impact of targeted tips along a number of factors such as housing size, age, fuel type, and energy consumption amount and patterns as well as customer demographics such as income, age, length of residence, and whether the customer is know to be a do-it-yourself or even green-oriented consumer.

The results have been significant. In the randomly selected treatment group (receiving the reports), the program is on pace to save about 250 kilowatt hours per household per year relative to a representative control group (not receiving the reports). This represents savings around or in excess of 2% of annual consumption (the average SMUD residential customer uses approximately 9,000 kWh). The 2% estimate is based on comparing the average energy use for the control group over the study period to that of the treatment group receiving the energy reports (Crawford 2008; Laskey 2008). Prior to the reports introduction there was no difference in average energy consumption between the control and test groups.

Positive Energy's findings show that energy savings among monthly report recipients are greater than those among customers receiving the reports quarterly (Kavazovic 2009). This finding supports the assertion from the literature review that more frequent feedback leads to higher savings. Additionally, through the first 12 months of the pilot program, the impact has been found to be consistent on a month-over-month basis. In other words, it is not the case that a significant amount of savings was observed in the initial months with a slow deterioration over the course of the program. The sustained reduction in energy consumption points to the persistence of the savings achieved.

The cost of these savings is on the order of 3 cents per kilowatt hour saved in the first year. This calculation does not reflect the potential for these savings to persist beyond the first year and therefore lower the levelized cost of conserved energy. Both the SMUD's manager and Positive Energy's anticipate that this performance can be sustained on a year-over –year basis. Furthermore they point out that these results are from a non-targeted population. The cost effectiveness of the program would be even more attractive in pursuing targeted groups such as higher energy consumers.

Given the large size of the pilot population, the program team has the opportunity to conduct any number of experiments in fine-tuning and evaluating the performance of this group over time. They have the opportunity to find out what happens when they stop sending the report to see if they drop back to historical patterns or maintain the savings achieved. They can run experiments to understand what aspects of the feedback (neighbor comparisons, historical comparisons, types of graphical displays, specific tips and recommendations for energy savings) have the most influence on energy savings in different population segments.

Figure 2: Sample Positive Energy Report (Source: ACEEE)

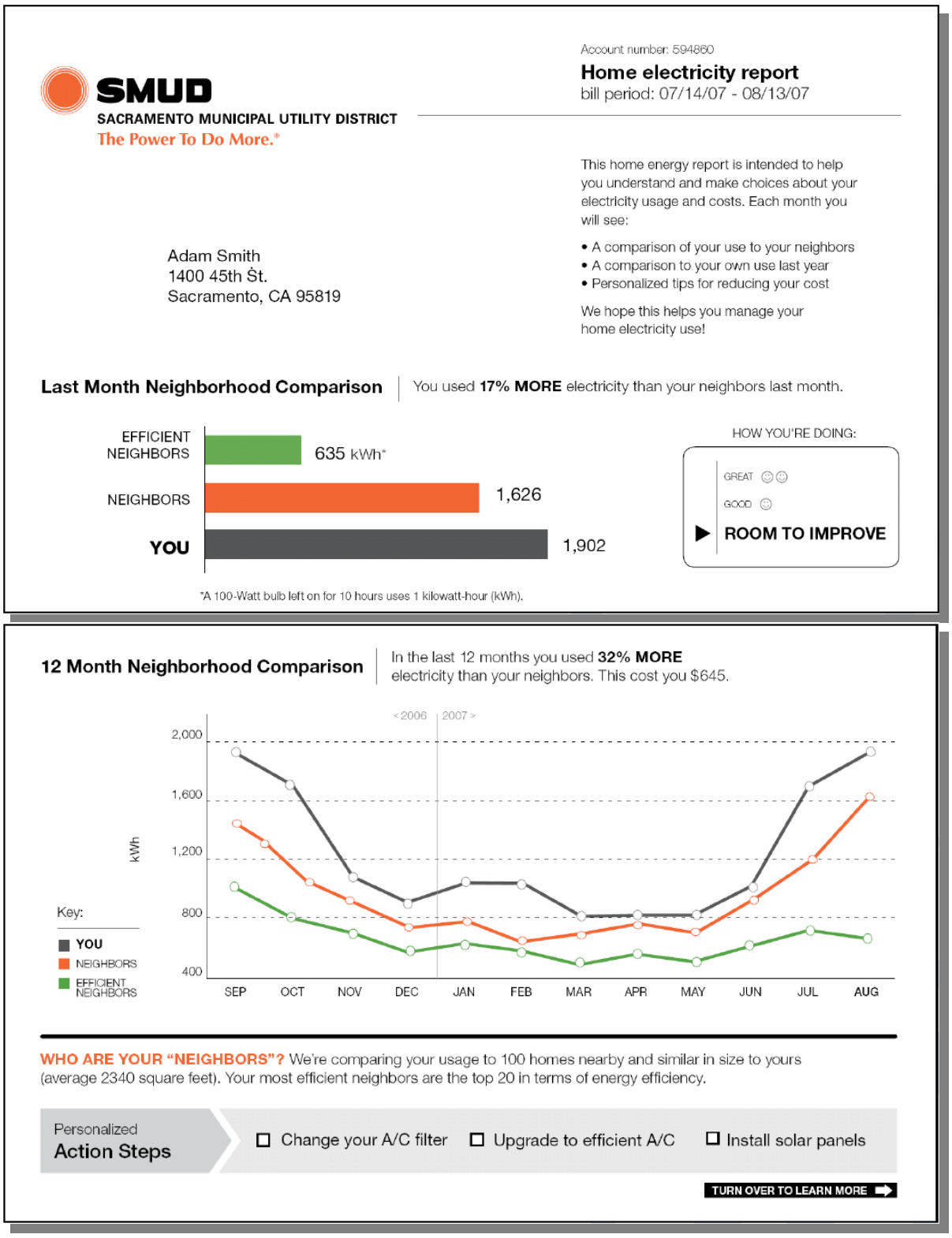


Figure 3: Sample Positive Energy Report, Continued (Source: ACEEE)

Goal Setting – BC Hydro's Team Power Smart Residential Behavior Program

In early 2007 Canada's third largest electric utility, BC Hydro, launched a market test program with the employees of their largest customer. Employees were recruited to participate by committing to a given electricity reduction target. The company provided an online tool to track and compare their consumption over time (another form of indirect feedback), measure their performance against their goal, and receive tips and education to reduce consumption. As an incentive, participants received a cash rebate for achieving their goal at the end of the year.

The test involved targeting participants with four different levels of reward:

Figure 4: BC Hydro Power Smart Pilot Study Incentive Levels (Source: BC Hydro)

OFFER	DESCRIPTION
20/20	Participants who reduced their electricity consumption by 20% received a monetary incentive, equivalent in value to the 20% electricity reduction (paid out as a rebate)
10/5	Participants who reduced their electricity consumption by 10% received a monetary incentive, equivalent to half of the 10% reduction (paid out a rebate)
5/5	Participants who reduced their electricity consumption by 5% received a monetary incentive, equivalent in value to the 5% electricity reduction (paid out a rebate)
10/prize	Participants who reduced their consumption by 10% were entered into a drawing for an ENERGY STAR® labeled appliance package
'control'	Participants chose their electricity savings target (5, 10, 15, or 20%), and were encouraged to reduce consumption strictly through education and information sharing

BC Hydro summarized the findings from the market test with the following table:

Figure 5: Results of BC Hydro Pilot (Source: BC Hydro)

%	All	5/5	10/prize	20/20	Control	10/5
% meeting target ("winners")	20%	41%	15%	7%	14%	19%
% lower kWh, not target ("savers")	32%	20%	36%	44%	32%	33%
% with higher kWh ("gainers")	47%	39%	49%	49%	55%	48%
Avg. % reduced by winners	15.0%	11.2%	17.0%	27.0%	16.9%	18.3%
Avg. kWh reduced by winners	2378	1777	3404	4666	2545	1847
Avg. % reduced by savers	4.8%	2.0%	4.2%	8.8%	4.4%	4.6%
Avg. kWh reduced by savers	781	282	758	1483	845	395
Avg. % reduced by gainers	-8.3%	-7.1%	-8.2%	-7.4%	-9.6%	-9.0%
Avg. kWh reduced by gainers	-1297	-869	-1463	-1325	-1641	-1025

BC Hydro concluded that the reduction target had significant impact on recruitment success, with participants finding the 20% target to be somewhat intimidating. The 5% target level succeeding in attracting participants, but was found to have a high free-rider rate of people achieving the goal without making efforts at changes. The 10% target was found to be an optimal level that struck a balance between being an achievable target yet requiring participants to work in order to reach the goal. The cash reward was found to be more appealing to customers than a prize drawing (BC Hydro 2008).

The use of an electronic newsletter was found to be an important tool for reminding participants of their commitment and drawing visitors to the feedback site. Furthermore a correlation was found between the magnitude of energy savings and the frequency of participant visits to a login access portion of the site where users could track their own consumption and compare to the previous year. Similar to the direct and indirect approaches reviewed above, this program served as a means for motivating participants to engage in evaluating their energy-use behaviors and making changes to reduce consumption. The rebate provided a reward beyond the reduction in energy costs and also appealed to participants' competitive nature. It is worth noting that literature suggests that these types of direct incentive programs are found to have effects that are short-lived once the rewards are removed (Darby 2006).

Among the behaviors participants noted were: 1) turning off unnecessary lights, 2) changing laundry habits, 3) unplugging chargers, 4) taking shorter showers, 5) turning down the thermostat, and 6) making investment changes with respect to energy efficient light bulbs and appliances.

The findings from this market test have helped to shaped BC Hydro's Team Power Smart behavior change program. Team Power Smart started as an advertising campaign in October of 2007, but has transformed into a relational strategy to engage customers in monitoring and reducing their energy consumption. The program has a strong focus on online tools, but also includes offline tools to reach customers and make the intangible product of electricity more tangible. Anyone in British Columbia can enroll in the program by committing to use 10% less electricity over one year. BC Hydro account holders that join Team Power Smart have the ability to track their consumption, compare consumption year-over-year, and compare their consumption to similar households. Through billing analysis and behavioral surveys, electricity savings can be quantified and claimed toward the savings goal. Non-customers, such as tenants whose electricity bill is included in their rent, are also encouraged to enroll in the program to show their support for energy conservation, though billing analysis and savings calculation are not possible for this population (Korteland 2009).

In addition to the use of online tools, Team Power Smart membership benefits include special offers and opportunities to win prizes in drawings and contests. Members receive a monthly eNewsletter and other communications through both online and print media. Participants who achieve their savings goal will receive a non-monetary incentive reward (to be determined). The program is supported by a roster of Team Power Smart Leaders including celebrity athletes and community leaders that serve as examples in their commitment to save energy.

The program leverages the power of social norms by providing tools to allow participants to compare their consumption to households with similar size, occupancy, and heating types. Members are also given visibility to their community's participation and performance as compared to others, fostering a degree of healthy competition among communities. A broader theme of environmental conservation and provincial identity that BC Hydro calls "Pride of Province" has been found to resonate well with many population segments in encouraging participation.

BC Hydro expects that 17% of first-year participants will achieve their goal with an average savings of 21%. Another group, referred to as savers, making up 24% of the participant population is anticipated to fall short of the goal but reduce consumption by 4.3% average. Finally, non-achievers, making up an anticipated 59% of the population are expected to not save electricity (BC Hydro 2008). As attrition occurs, the proportion of retained participants achieving their energy savings goals in subsequent years is anticipated to be significantly higher (Korteland 2009).

The company is targeting the program largely at the psychographic segment of the market it dubs "stumbling proponents," those with positive attitudes toward conservation and protecting the environment, but who are not currently acting on their beliefs. BC Hydro estimates that this segment accounts for around 20% of its residential customers. In order to involve these customers, the program leverages the key elements of the social marketing construct to promote customer acquisition, engagement, and retention. In particular, customer engagement is viewed as critical to affect behavior change, form new habits, and prevent savings 'slide-back.' BC Hydro seeks to engage customers through setting targets, providing feedback, gaining commitment, and rewarding progress. Engagement success is measured by the utility through 'interactivity' metrics such as the number of site logins and the response rate to promotional offers. The program includes both instructional aspects such as its Power Smarts Tips and Personal Energy Planner tools, as well as motivational dimensions including its home energy use comparisons, incentive rewards, membership exclusivity, and forums for members to exchange their stories.

With respect to messaging, BC Hydro has developed a matrix that cross references behavioral actions along the lines of both utility-focused categories (e.g., home heating, appliances, and lighting) as well as more 'emotive' or motivational categories in order to better fit with the interest of participants. BC Hydro has identified six emotive categories: Health+Wellness, Food+Drink, Life+Leisure, Family+Friends, Home+Garden, and Gadgets+Technology. By approaching its content creation in the context of these associations, BC Hydro is able to more effectively connect with its customers to address the barriers and motivators of behavior change (Korteland 2009).

Joining Team Power Smart provides permissive marketing opportunities to cross promote the utility's other rebate and incentive programs (e.g., lighting, appliance rebate, and fridge buy back programs). According to BC Hydro's program managers, research has shown that individuals starting with behavioral changes to address energy consumption are more likely to later follow up with investment changes than the other way around (i.e., people starting with investment changes are less likely to continue on with behavioral changes).

As of April 2009, BC Hydro's Team Power Smart Program claimed to have already enrolled more than 74,000 members (representing over 4% of its 1.7 million customers) toward their goal of 210,000 members by 2010. (See: https://wwwa1.bchydro.com/profiler/ProfileStartExternal.do for more information).

The Team Power Smart program is part of a BC Hydro's multi-pronged approach to behavior change which also includes the use of a 2-step inclining block rate structure for residential customers and the implementation of smart meters and in-home displays. These elements are central to the utility's goals to make British Columbia electricity self-sufficient by 2016, acquire 50% of incremental resource needs through conservation, and promote a broad culture of conservation.

Figure 6: Screen Shots of BC Hydro's Team Power Smart Online Tools (Source: BC Hydro)

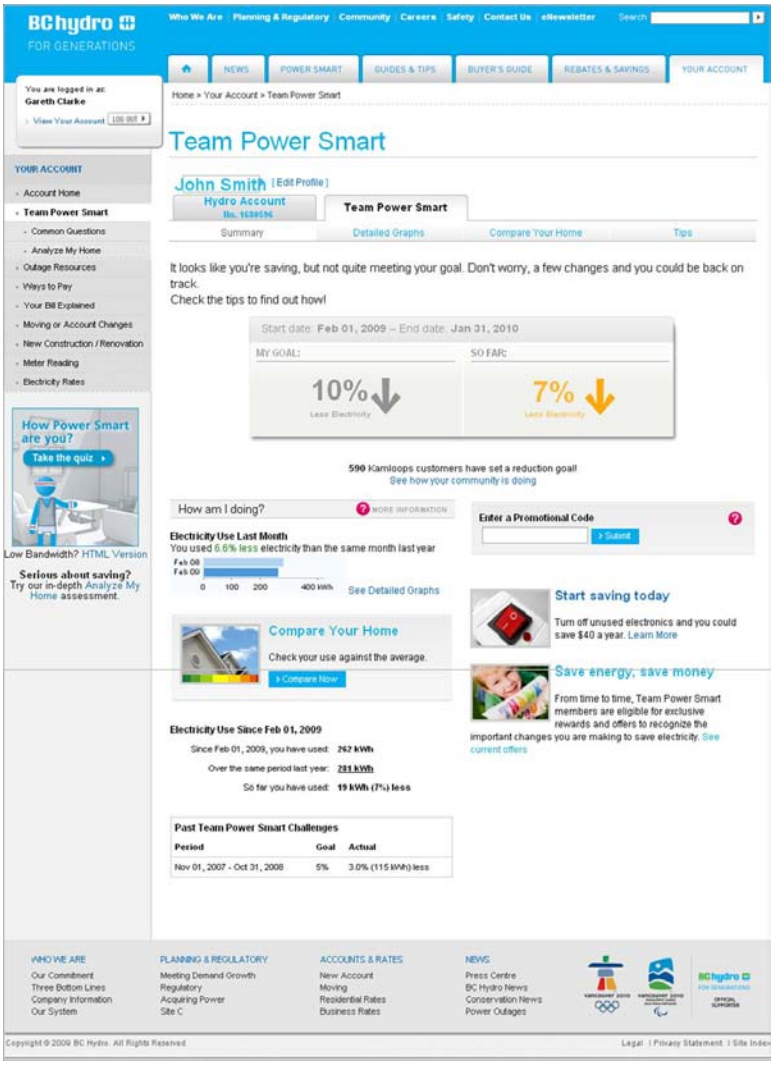
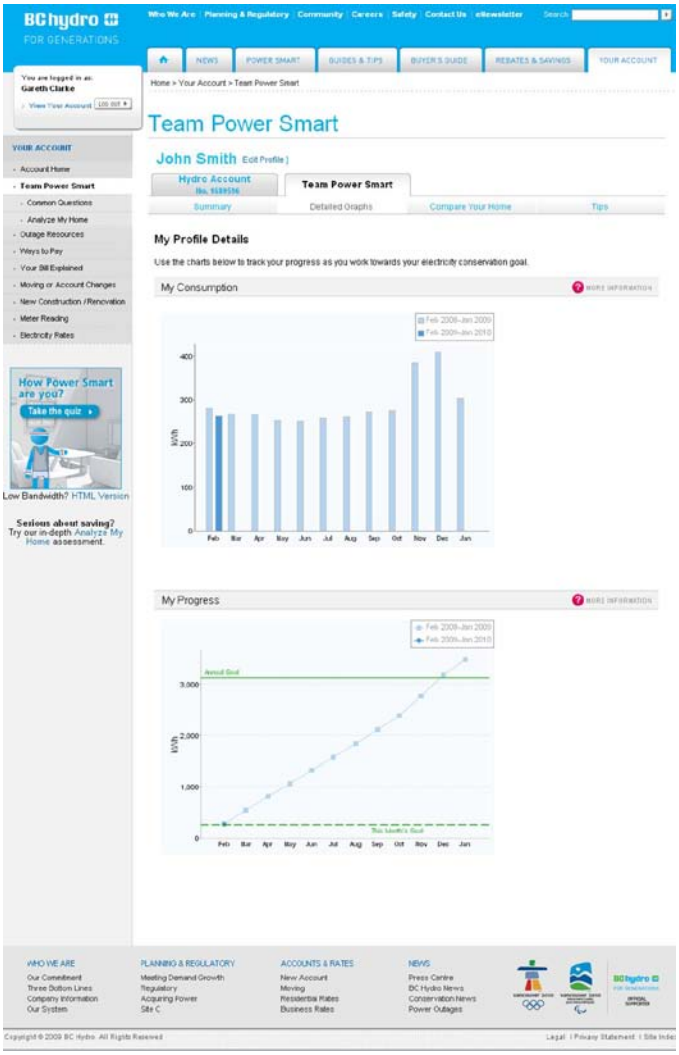
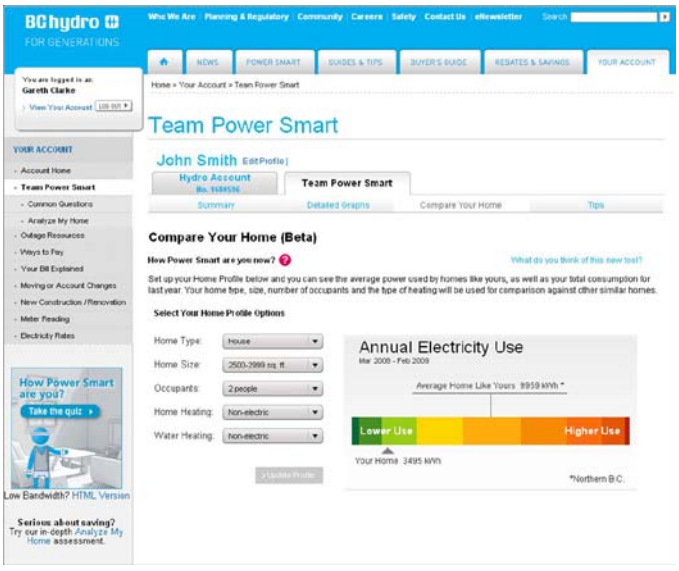


Figure 7: Screen Shots of BC Hydro's Team Power Smart Online Tools, Continued (Source: BC Hydro)





Key Lessons Learned

Opt-In vs. Opt-Out

One important aspect of the behavior programs reviewed in this study is the implication of how participants come to be engaged in programs. In programs such as the in-home display pilots and BC Hydro's reward incentive program, participants have to be recruited to agree to participate – they have to opt-in. Conversely, in the case of the home energy reports from Positive Energy sent to customers, a much greater proportion of those targeted were exposed to the feedback – they had to opt-out to stop receiving the reports. In fact, of the 35,000 customers targeted in SMUD's pilot, only 800 (around 2%) had asked to be removed from the distribution (Crawford 2008). Such high participation stands in contrast to the single digit percentages of residential customers that opt to participate in marketed programs (MacLellan 2008).

Take for example the following table based on the NSTAR PowerCost Monitor pilot:

Figure 7: Marketing Approaches Evaluated in the NSTAR PowerCost Monitor Pilot

Offering	Unit Price	Adoption Rate
Direct install during energy audit	Free	95%
Offering previous audit customers free PCM	Free	14%
Direct Mail Solicitation/ Media Promotion	$9.99	6%
	$29.99	5%
	$49.99	0.3%

Source: NSTAR, (MacLellan 2008)

The table shows the various approaches to soliciting participation in the PowerCost Monitor program. In the first case, customers were offered a free direct install in the course of a home energy audit (essentially an opt-out offer) – 95% accepted. This contrasts with the remaining populations that were asked to opt-in at various costs of participation (as NSTAR investigated customers' willingness to pay for the monitor, which retails for around $140). Around 5 in every 100 households responded positively to pay for the device and only 3 in every 1000 at a $50 cost (MacLellan 2008).

There are a couple of important implications to the nature of program recruitment under these models. First, there is the limit to program adoption posed by the low response rates achieved by opt-in programs. Even if Sarah Darby's numbers are correct, and direct feedback yields 10% savings on average, if only 5% of the population can be successfully recruited, marketing the program to all of the utility's customers may only result in a half of a percentage point reduction in system-wide consumption. On the flip side, a program like Positive Energy, which is found to achieve high single digit percentage savings in targeted populations, is already found by SMUD's example to achieve a system-wide consumption reduction in excess of 2% (Crawford 2008; Laskey 2008). Such a program has in effect more than four times the potential savings, not to mention the cost effectiveness.

Secondly, a point stressed by Positive Energy's President, Alex Laskey, is that utility program managers must have reliable means to conduct measurement and verification of savings. It is incumbent upon them to demonstrate that savings were achieved and came as a result of the programs actions. In the case of opt-in programs there is an inherent self-selection bias on the part of participants. They are by their actions showing how they are a different population from other customers that would not serve as an appropriate control group. Program managers are left to prove savings based on weather-normalized historical comparisons, calling into question the drivers of observed changes of energy consumption including difference in climate, economic factors, social marketing influences, or the actual changes in behavior from the direct feedback.

This problem does not exist in the case of opt-out programs like indirect feedback reports. The program managers can have a high degree of confidence that the population receiving information is representative of the same population as the similarly selected control group. Furthermore they can be sure that the groups were exposed to the same weather, media advertising, and economy.

Critical Lessons in Pilot Program Design

Through the course of the research team's review of published materials and in interviews with program managers and industry experts, a number of valuable lessons learned and critical success factors were identified that can serve as useful guidelines to utility managers considering and embarking on their own behavior change program efforts.

Here are 15 lessons that made an impression on our team and our interview participants:

1. Motivation is the essential ingredient

   Multiple respondents note that the real determinant of the savings achieved by participants is their own personal level of motivation and engagement. In multiple studies, a significant range of savings achieved by individual participants was explained not only by the characteristics of their home or energy use level, but also by their level of enthusiasm and commitment to taking action (Jackson 2008; Parker 2008). By understanding the mechanisms and associations causing participants to engage and sustain their motivation, utilities can discover levers to increase their program's effectiveness.

2. Upfront customer input provides invaluable guidance for successful program design

   Bruce Sayler of Connexus Energy was among those that stressed the need to get customer input early in the process of evaluating solutions and designing pilots. Your customers are the best judge of what will and will not work. In-person interaction in forums such as focus groups may provide insight that input from survey responses may not bring to light.

3. Taking an iterative approach to piloting solutions ensures consistency with goals

   With each step of the pilot process, utilities should have clear goals as to what they hope to measure and learn with their actions. Pilot activities should begin on a small scale to investigate feasibility and then roll out to a wider scale as the need for more data requires. As Ahmad Faruqui of The Brattle Group points out, you need to be clear as to whether your objective is to a) demonstrate the technology, b) test the feasibility of customer use and acceptance, c) evaluate customer interest, or d) measure the magnitude of savings. Different objective will dictate different approaches.

4. A diverse pilot team helps to ensure success

   Having perspectives from a variety of team members with a diverse set of functional backgrounds will lead to better understand of the project risks and opportunities. Having input from marketing, finance, technical and operational viewpoints will identify challenges and help to strengthen the business case to convince management and or regulators of the program's value (Kiselewich 2008; Van Denburgh 2008).

5. Be sensitive to the program's impact on customer satisfaction

   Comparative feedback programs in particular have a tendency to rub a small minority of customers the wrong way; they feel it is unacceptable to be judged against their neighbors. Having internal processes (e.g., call center resources, communications protocols) ready to addresses issues immediately as they arise will allow unhappy customers to have their needs addressed, including removing them from participation as appropriate. Energy use monitors also have the potential for customer satisfaction issues if billing data is not consistent with the monitor data. Program managers stress that it is important to be able to show that despite these instances, for 99%+ of the population, their satisfaction either increased or stayed the same (Crawford 2008).

6. Leveraging the experience of peer utilities improves chances of success

   To the extent utilities can avoid repeating the mistakes of previous endeavors and benefit from new insights, their chances of success will improve dramatically. Networking through industry associations such as Precourt, EPRI, CEE and ACEEE can put program managers in touch with others with relevant experience. The Consortium for Energy Efficiency (CEE) recently formed a Behavior Interest Group.

7. Pre-pilot surveys can establish baselines for analysis

   Ali Crawford at SMUD stresses the importance of collecting data and feedback from test and control group subjects prior to pilot execution. Having a baseline understanding of attitudes will indicate how participant's perceptions and awareness have changed as a result of the feedback intervention.

8. Incorporate a control group that is representative of the underlying population and sufficiently large to allow for the necessary precision and confidence in drawing conclusions about specific sub-segments of the population.

   A well designed experiment incorporating representative control and test groups will lay the foundation for definitive comparisons in later analysis. Studies that rely on comparisons to historical performance introduce a significant number of variables for which it may very difficult to control. A robust design with test and control groups will allow for comparison of two equivalent populations that were subject to identical environmental factors. Furthermore, a sufficiently large sample population with adequate segment representation will lead to more robust and flexible analytics.

9. The novelty of the feedback will wear off

   Particularly in the case of real-time in-home displays that tend to have participants excited and engaged to experiment with their new gadget early on, there is a tendency for participant's interest in feedback to wane over time. Utilities need to look for ways to remind and motivate their program participants to stay involved. Engaging customers through ongoing messaging and education helps to ensure persistence of savings.

   In the case of BC Hydro, an electronic newsletter sent by email was shown to drive traffic to the online feedback tool. For the PowerPlayer being piloted in the Netherlands the concept is to extend the functionality of the in-home display device. They have prototype models that in addition to providing real time energy-use feedback also double as a digital photo frame or media player. Software on the device can disable or enable the entertainment functionality based on a user's energy consumption performance. Given that the user also gets the benefit of viewing photos, videos, or listening to audio files, they are more likely to interact with the energy feedback as well (van Elburg 2008).

10. Interfacing with meters for in-home devices can present barriers

    At least three interview respondents noted problems that presented themselves in considering or attempting to use IHDs with sensors that connected to the utility meter. 2 of the 5 investor owned utilities had to be dropped from an Energy Center of Wisconsin pilot of the PowerCost Monitor because of incompatibility with a particular automatic meter reading device and one utility's policy against devices interfacing with the meter (Bensch 2008). Florida utilities were also reported to be uncooperative in allowing devices to be placed on top of analog meters (Parker 2008). Finally, in Nevada, slimline circuit breaker panel boxes on a segment of new construction homes prevented the installation of current transducers used with certain devices (Jackson 2008).

11. In-home display devices are known to be hampered by low installation rates

    NSTAR found that between one quarter and one third of participants that purchased or received a PowerCost Monitor did not install the device (MacLellan 2008). An ongoing study at the Energy Center of Wisconsin found from its first follow-up that fewer than half of the subsidized devices were installed weeks after delivery (Bensch 2008). In some cases people had not found time, in other cases people had run into trouble with the installation. Utilities should look for ways to follow-up with program participants and provide assistance to aid customers in the installation process. Otherwise, the cost of uninstalled devices will have to be carried by the savings generated from those successfully installed.

12. Ensure that the solution is well suited to the customer population

    Several utilities have run into trouble with customer acceptance of different interventions. For example, Bruce Sayler of Connexus Energy relates the disappointing results from a PowerCost Monitor pilot geared toward the low income population. In hindsight, it is viewed as a difficult match as the elderly population is prioritized in addressing the low income population. Many of the program participants recruited struggled to understand the operation and functionality of the wireless handle monitors. As a result of these user acceptance issues, there has been little impact on behavior change and energy savings.

13. Look beyond traditional customer segmentation models to find messages that resonate with particular groups

    A customer's psychographic attributes including attitudes toward conservation and energy-use behaviors can present powerful levers for utilities to appeal to their core values. BC Hydro is one utility that has made great progress in psychographic segmentation models and applications.

14. Validating the functionality of new technology can avoid headaches down the road

    One program manager stressed the need to run new technologies through user acceptance tests to identify potential technical issues. Her team was able to catch an issue with a new smart thermostat, but only after several dozen units had been installed in the field (Kiselewich 2008). Making sure technologies worked as anticipated will avoid any potential for customer satisfaction issues.

15. Utilities might want to consider making in-home displays available on a short-term basis and to specific customers

    Elizabeth Van Denburgh of Van Denburgh Consulting highlighted discussion in southern California among utilities that debated providing PowerCost Monitors or similar IHDs as an item to be borrowed by consumers as they have a demand for the service. It was suggested that devices could be kept at local libraries and checked out for a defined period. Another respondent suggested that deployment of in-home devices could be used as a means to address

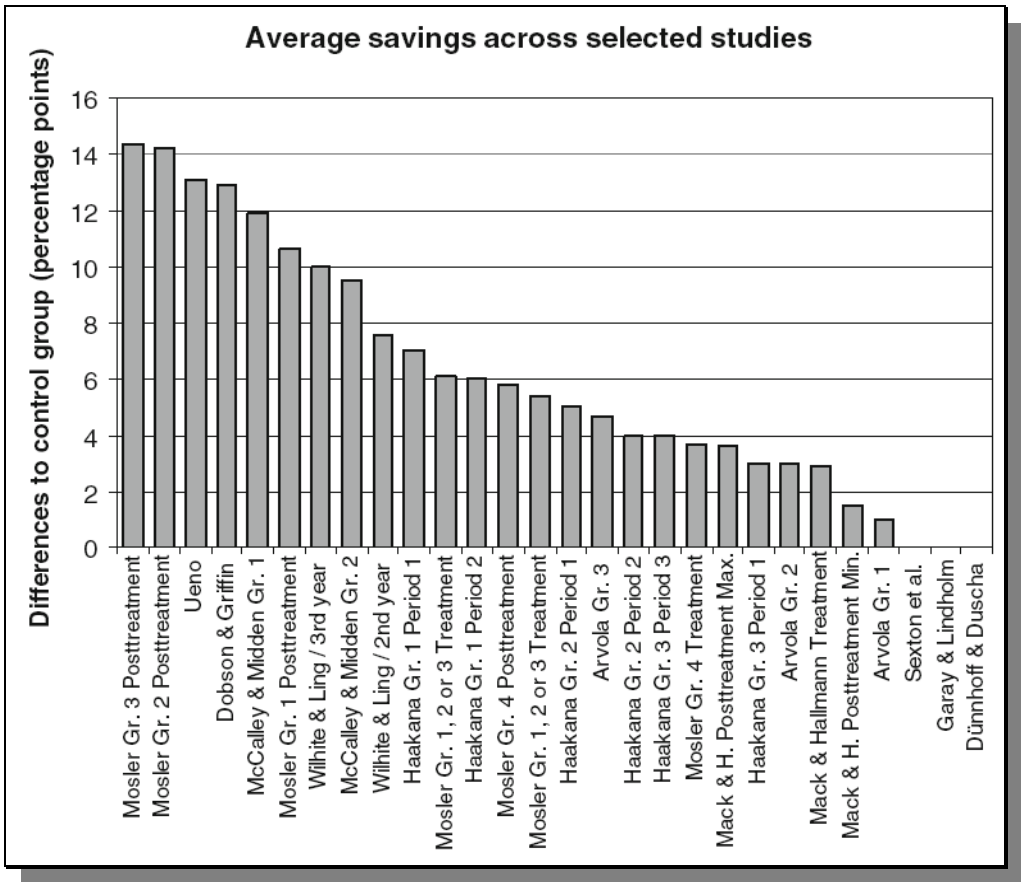
customer complaints and concerns about their bills, loaning the devices for customers to investigate their home energy consumption patterns. Such ideas would allow for device costs and benefits to be spread over multiple users, avoiding the problem of devices being unused and reducing utility costs per kilowatt hour saved.

Savings and Cost Effectiveness

As documented in literature and in the above discussion, savings from feedback programs range from study to study, across different feedback intervention types, geographies, and population samples.

The following chart come from Corinna Fisher's 2008 review study of 21 individual studies and 5 review studies:

Figure 8: Range of Savings from Feedback Programs



(Fischer 2008)

The impact from feedback interventions is found to range from 0% to more than 14%, leading the author to conclude that "usual savings" are in the range of 5% to 12% (Fischer 2008). This concurs with the research of Sarah Darby who states that direct feedback leads to savings from 5% to 15% while indirect feedback can generate average savings of 0% to 10%. It is worth noting that a significant portion of the data supporting these conclusions is taken from studies in the UK, Europe, Australia, and Japan which raises the question as to the impact of cultural norms and values in applying these assumptions to U.S.-based programs. For example, if the residents of Norway have different attitudes about the need for energy conservation than residents of Massachusetts, findings from the use of feedback interventions may not necessarily apply to the other.

Savings in large scale North American pilot programs at Hydro One and NSTAR have found average savings of 6.5% (Mountain 2006) and 2.9% (MacLellan 2008) respectively (though it is worth noting the Hydro One savings range from 1% to 16% depending on the housing characteristics, for example whether electric water heating is present). Findings from study interviews show other in-home display pilots in Nevada and Florida achieved average savings of 5.5% (Jackson 2008) and 7.4% (Parker 2008). From these data points, it seems reasonable to conclude that in-home display programs at utilities will likely result in average savings of 3% to 7% with a midpoint of around 5%. Again it is important to stress that this savings opportunity exists for a self-selected population that is motivated enough to install the feedback device in their home. These estimates can not be extended to the broader customer population.

To evaluate cost effectiveness, data is supplied from reports in both the NSTAR and Hydro One pilots. Taking NSTAR as an example, company materials indicate a 2.9% energy savings, which are equated to a $64 annual savings (MacLellan 2008). Based on a $.197/kWh average retail price for Massachusetts residential customers (Source: EIA Oct. 2008), this would translate to around 320 kilowatt hours saved. The stated $145 retail price of the monitor was largely subsidized, with the majority of customers paying around $30. Assuming NSTAR received somewhat of a price break, the utility-borne cost portion can be estimated at around $100 per meter delivered. In terms of raw first year savings this would work out to around 30 cents per kilowatt hour.

However the energy savings realized are likely to persist, assuming behavior habit changes are maintained. The following table provides a levelized cost per kilowatt hour across a number of assumed time periods over which these savings might theoretically persist. The estimates use a standard cost of conserved energy calculation that assumes a 5% discount rate:

$$\text{Cost of Conserved Energy} = \frac{1}{\Delta E} \times \frac{d}{1-(1+d)^{-n}}$$

where ΔE is the energy savings (kWh) per year, d is the real discount rate, and n is the lifetime of the measure in years (see: http://www.bookrags.com/research/conservation-supply-curves-mee-01/ for more information on the calculation).

Levelized Cost for 320 kWh of Savings Sustained over Various Time Periods - $100 Program Cost

	Assumed Persistence of Savings Realized from Use of the PowerCost Monitor							
	1 Year	2 Years	3 Years	4 Years	5 Years	10 Years	15 Years	20 Years
Cost of Conserved Energy ($/kWh)	$0.33	$0.17	$0.11	$0.09	$0.07	$0.04	$0.03	$0.03

Source: authors' calculation

A similar approximation can be developed for the Hydro One pilot and extended to other utilities based on different assumptions. For example, Pacific Gas & Electric recently published a report looking back at the data from the Hydro One study. A table of some high level comparisons is provided below.

Figure 9: Comparison of PG&E and Hydro One Customers

Table 2 – Comparing Hydro One pilot with PG&E Customers

	PG&E Service Territory*	HydroOne Sample
Avg Annual kWh	6,265	16,184
Avg Heating Degree Days	2,421	7,912
Avg Cooling Degree Days	735	201
Appliance Saturation - Electric Heating	10%	11%
Appliance Saturation - Electric Hot Water	9%	24%
Appliance Saturation - Central A/C	39%	36%
Avg Residents per Household	2.89	3.01
Avg Dwelling Size (sf)	1,525	2,155

* California Statewide Residential Appliance Saturation Study, Volume 2, Study Results Final Report, June, 2004

Source: PG&E, (Green 2008)

The PG&E analysis concluded that the savings potential for their customers was likely not as high as Hydro One's 6.5% given the lower penetration of electric hot water heat in PG&E's service territory, though it was stated that achievable saving would likely be above 5%. The cost effectiveness observed in applying these savings percentages is highly influenced by the average annual kWh for the population. The average consumption for the Hydro One pilot participants is more than 2X the average annual KWh for PG&E's service territory.

Levelized Cost of Savings for 6.5% of 16,184 kWh Sustained over Various Time Periods - $100 Initial Program Cost

	Assumed Persistence of Savings Realized from Use of the PowerCost Monitor							
	1 Year	2 Years	3 Years	4 Years	5 Years	10 Years	15 Years	20 Years
Cost of Conserved Energy ($/kWh)	$0.100	$0.051	$0.035	$0.027	$0.022	$0.012	$0.009	$0.008

Levelized Cost of Savings for 5% of 6,265 kWh Sustained over Various Time Periods - $100 Initial Program Cost

	Assumed Persistence of Savings Realized from Use of the PowerCost Monitor							
	1 Year	2 Years	3 Years	4 Years	5 Years	10 Years	15 Years	20 Years
Cost of Conserved Energy ($/kWh)	$0.335	$0.172	$0.117	$0.090	$0.074	$0.041	$0.031	$0.026

Source: authors' calculation

The Hydro One scenario shows that the program would translate to a 5 cent per kilowatt hour cost assuming savings persist for at least two years. In the case of the PG&E assumptions, savings would have to be sustained for well over five years for this level of cost effectiveness to be reached.

With respect to the indirect feedback programs such as Positive Energy, we know from program managers that energy savings for a non-targeted population are on the order of 2%, or 250 kWh per household per year in Sacramento. The cost per kilowatt hour is given to be around 3 cents per kilowatt hour of first year savings (Laskey 2008), which indicates an annual cost for the program to send out the home energy reports roughly $7.50. The program managers feel confident that incremental savings will recur each year to continue justifying the annual cost, though they are also quick to point out that as soon as cost effectiveness begins to deteriorate, there is always the option to cease sending the reports and eliminate the variable cost of the program (Crawford 2008). If the savings from the first year were to persist, the implied levelized cost over various horizons is much more attractive to any of the direct feedback program scenarios previously evaluated.

Levelized Cost for 250 kWh of Savings Sustained over Various Time Periods - $7.50 Program Cost

	Assumed Persistence of Savings Realized from Use of the Home Energy Reports							
	1 Year	2 Years	3 Years	4 Years	5 Years	10 Years	15 Years	20 Years
Cost of Conserved Energy ($/kWh)	$0.032	$0.016	$0.011	$0.008	$0.007	$0.004	$0.003	$0.002

Source: authors' calculation

Persistence

Various research studies have addressed the persistence of savings resulting from feedback interventions. In commenting on the persistence of the effect, researcher Sarah Darby notes that savings will be made permanent when individuals develop new habits. To encourage this transformation, successful behavior change programs will incorporate sustained feedback and advice for individuals to make adjustment to their routines. It is noted that where reward incentives are used as means to achieve energy savings, behavior may change but the changes are likely to fade away when the incentive is taken away. Darby offers a rule of thumb that "a new type of behavior formed over a three-month period or longer seems likely to persist – but continued feedback is needed to help maintain the change and, in time, encourage other changes" (Darby 2006).

A three year trial of informative billing in Norway found that the reduced energy effect lasted throughout the trial. Researchers note that interviews of the customers involved did not present any uniform pattern of behavior changes or investment decisions to account for the savings. In fact, it is noted that interviewees rarely remembered any specific changes without prompting. The authors of the study concluded that, "Our impression from the interviews is that after three years the changes people made had become so routine that they had trouble identifying them" (Wilhite and Lang 1995).

Unfortunately, many of the most relevant utility programs have not had the time to bear any definitive conclusions with respect to the persistence of savings. The Hydro One PowerCost Monitor pilot, lasting for 18 months, found no evidence of a drop-off of savings. Other studies with the device in British Columbia and Newfoundland and Labrador also showed a persistence of savings beyond one year (Mountain 2006). However, Positive Energy's first program is still within its first twelve months of existence. Though program managers feel confident that savings will persist, and in-fact continued year-over-year improvements are expected, there is no empirical evidence to prove it.

One concern that has become apparent with many a number of the U.S. studies of the PowerCost monitor is an issue with participant retention. In an ongoing NSTAR pilot of the device, among the more than 3,000 participants, more than 1,000 had stopped using the device within the first six months (MacLellan 2008). Likewise, a pilot at the Energy Trust of Oregon also found that 34% of participants had stopped using the device within a few months (Energy Trust of Oregon 2008). While this does not suggest that the overall savings achieved by the participant population will not persist, it does suggest that there is a tendency for participants to become disengaged and fail to utilize the device to pursue energy savings. To the extent that utility program managers can maintain participation and engagement, they increase the savings likely to be produced by the program.

Applicability to Minnesota Housing Stock

In considering the applicability of behavior change programs to Minnesota's unique residential market, it is important to stress that these programs have universal application. Many of the behaviors cited as leading to energy savings in the various utility studies conducted to date – turning off lights, laundry/dishwashing habits, use of electronics – highlight that the impact of these programs is likely to be somewhat location-independent. Studies using feedback on customer populations in Ontario, California, Florida, Nevada, Massachusetts, British Columbia, and Norway all have found significant opportunity for energy savings.

While well executed behavior change programs are likely to have an impact in any customer population, a number of location and population-specific factors can influence the potential for energy savings. Factors some as home sizes, heating fuel sources, the average age of homes, the penetration of different appliances, and the number of heating and cooling degree days in a particular region can all influence the total amount of energy used and the corresponding opportunity for savings by modifying the behaviors driving that energy use.

One useful starting point in evaluating the opportunity for savings is to consider the average electricity consumption per household across different geographies. The following table from the Energy Information Administration (EIA) provides household consumption data for a number of energy types segmented by region.

Figure 10: Energy Use by Region

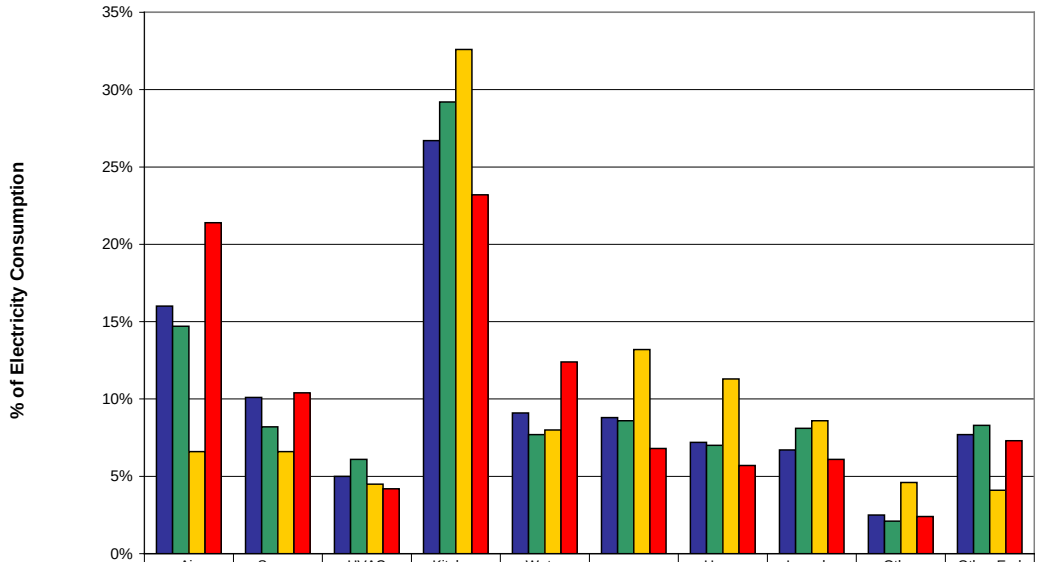
Table US8. Average Consumption by Fuels Used, 2005
Physical Units per Household

	U.S. Households (millions)	Fuels Used (physical units of consumption per household using the fuel)					
		Electricity (kWh)	Natural Gas (thousand cf)	Fuel Oil (gallons)	Kerosene[4] (gallons)	LPG (gallons)	Wood (cords)
Total	111.1	11,480	67	742	76	457	1.5
Census Region and Division							
Northeast	20.6	8,227	82	798	54	387	2.5
New England	5.5	7,432	88	855	62	450	1.6
Middle Atlantic	15.1	8,514	80	762	Q	364	2.9
Midwest	25.6	10,790	83	528	Q	652	1.8
East North Central	17.7	10,479	89	535	Q	650	2.1
West North Central	7.9	11,493	70	Q	Q	654	1.4
South	40.7	14,895	52	569	80	381	1.2
South Atlantic	21.7	14,721	57	576	85	343	1.1
East South Central	6.9	15,928	56	Q	61	451	1.7
West South Central	12.1	14,619	46	N	N	382	1.0
West	24.2	9,230	53	566	Q	435	1.2
Mountain	7.6	10,855	60	Q	N	501	1.6
Pacific	16.6	8,492	50	673	Q	365	0.9
Four Most Populated States							
New York	7.1	6,882	71	803	Q	374	3.9
Florida	7.0	15,862	28	N	Q	Q	Q
Texas	8.0	15,149	44	N	N	291	0.9
California	12.1	6,992	45	Q	N	376	0.8
All Other States	76.9	11,829	75	723	81	493	1.5
Urban/Rural Location (as Self-Reported)							
City	47.1	9,896	62	711	41	317	0.6
Town	19.0	10,982	73	806	45	333	1.1
Suburbs	22.7	12,598	74	808	Q	308	0.7
Rural	22.3	14,108	61	700	103	525	2.3

The data shows that West North Central states (including Minnesota) have electricity (~11,500 kWh) and natural gas consumption (~70k cf) that is very close to the national average. California, at less than 7,000 kWh per household is on the lower end of the spectrum. Certainly this difference is the result of a number of factors including the state's milder climate, the relative age distribution of its housing stock (and related appliance efficiency), the population's attitude toward conservation, and the amount of resources going toward energy efficiency and conservation programs. On the other end of the spectrum are states like Florida with nearly 16,000 kWh per household, a number comparable to the magnitude of energy used by Ontario households in Hydro One's service territory (Green 2008). Much of this difference can be attributed to differences in climate, with Ontario requiring much greater resources for space heating and Florida having the same to keep homes cool.

Another way to look at the energy savings potential is to look at the activities driving energy consumption. Data on electricity consumption end use across regions was compiled by the EIA in a 2001 survey. The following chart shows the percentage of electricity demand accounted for by different end uses across selected regions covered by the survey (note: survey data is not available for the West region, including California).

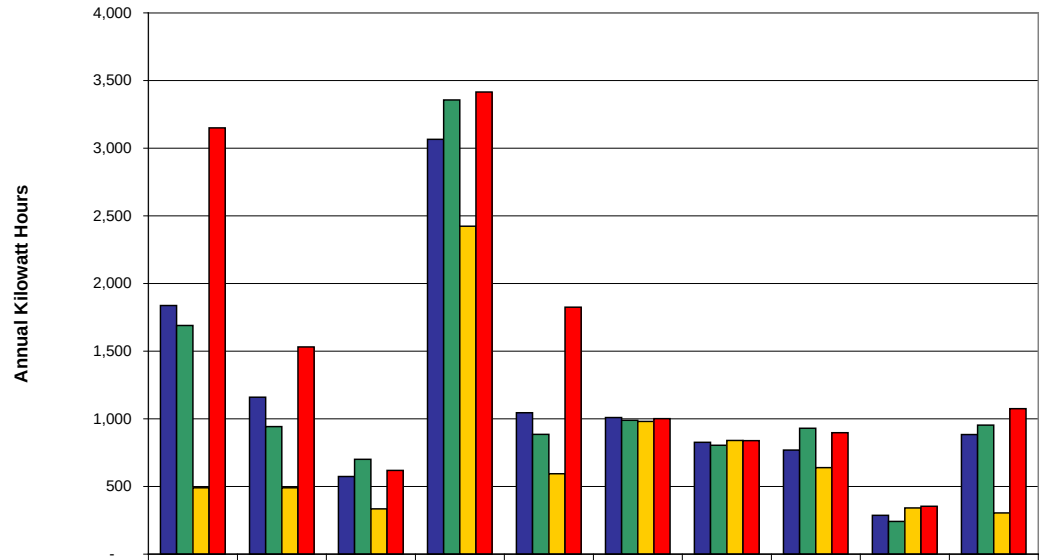
Figure 11: Residential End Use Share of Electricity Consumption by Region (Source: EIA)



	Air Conditioning	Space Heating	HVAC Appliances	Kitchen Appliances	Water Heating	Lighting	Home Electronics	Laundry Appliances	Other Equipment	Other End Uses
U.S. Avg.	16.0%	10.1%	5.0%	26.7%	9.1%	8.8%	7.2%	6.7%	2.5%	7.7%
West North Central	14.7%	8.2%	6.1%	29.2%	7.7%	8.6%	7.0%	8.1%	2.1%	8.3%
New England	6.6%	6.6%	4.5%	32.6%	8.0%	13.2%	11.3%	8.6%	4.6%	4.1%
South Atlantic	21.4%	10.4%	4.2%	23.2%	12.4%	6.8%	5.7%	6.1%	2.4%	7.3%

Using the data on average household electricity consumption yields:

Figure 12: Average Household End Use Electricity Consumption by Region (Source: EIA)



	Air Conditioning	Space Heating	HVAC Appliances	Kitchen Appliances	Water Heating	Lighting	Home Electronics	Laundry Appliances	Other Equipment	Other End Uses
U.S. Avg.	1,837	1,159	574	3,065	1,045	1,010	827	769	287	884
West North Central	1,689	942	701	3,356	885	988	805	931	241	954
New England	491	491	334	2,423	595	981	840	639	342	305
South Atlantic	3,150	1,531	618	3,415	1,825	1,001	839	898	353	1,075

This analysis illustrates several important points that influence the level of opportunity for behavior change programs in a particular area, including Minnesota. Though there are a number of areas in which there is variability across regions, the chart of kWh shows that there is uniformity in the number of kilowatt hours the average household consumes for lighting and home electronics whether you are looking at the Minnesota's West North Central region, New England or the South Atlantic. These uses are independent of climate and location. To the extent that behavior change programs benefit from changes in these uses, the expectation would be that they are directly transferable to another state or region.

Secondly, there are differences in home heating and cooling energy consumption that reflect differences in climate and fuel types. For example, South Atlantic states use much more electricity on air conditioning because of the warmer climate, but they also use more electricity on space heating than even the cooler states in the North, likely the result of greater use of electric heating. The greater reliance on natural gas and oil in New England states for home heating and cooking is also shown by the lower electricity consumption.

In considering the implications for savings potential in Minnesota, the following are important points to consider:

- In general, the West North Central's electricity use profile closely matches the national profile. Therefore, it is likely that the savings potential would match the average of results from programs across the country.

- With respect to lighting, home electronics, and appliance use (kitchen, laundry, etc.), the state's electricity consumption profile meets or exceeds other regions on an average kWh basis. Given that these uses involve frequent behavioral interaction, they are likely to be major sources of the savings achieved by behavior change programs.

- The region is slightly below the national average for electricity consumption used for space heating and cooling. This is primarily a function of climate and the use of natural gas as a fuel source. To the extent that air conditioning and/or home heating are major sources of behavior change savings, Minnesota households may see a slightly smaller opportunity for electricity savings.

- Generally homes in the West North Central region also use slightly less electricity for water heating on average (~900 kWh per household annually) than is typical for the U.S. (~1,050 kWh per household annually), likely a result of the penetration of natural gas water heaters. As a result, there is slightly less opportunity for savings in this category than in other regions. However, there are regions within Minnesota that have very high saturations of electric water heating (80%+ of homes) and utilities serving in these regions have a much greater opportunity for targeting savings tied to a behavior change effort.

Additional factors, such as the population's attitudes toward conservation and willingness to pay for devices such as in-home displays would have to be taken into consideration in order to estimate the savings potential. Income and demographic differences could be reasoned to have an impact on the success of behavior change efforts, though the Hydro One study as an example concluded that there was none (Mountain 2006).

Perhaps even more important, as covered in the literature review section, is the level of savings achieved can vary significantly depending on the medium, frequency, and format of feedback. The means in which programs are marketed, and the specific segments that are pursued can influence the results achieved. As many of the interview respondents in the study stressed, the key to success is motivation. If customers feel motivated to act and are given the knowledge to know what actions can be taken, they will find ways to curb their energy use. A program's savings potential is much more a function of success in this dimension than the sum of the factors driven by regional differences.

Program Models to Consider

Based on results of the team's research, three behavioral change program models are outlined for consideration by Minnesota utility managers. The models present concepts for implementing the types of feedback interventions reviewed in the study. A model overview is provided along with a program plan to define the necessary process steps, associated actions and outcomes, and their link to the key lessons related by study respondents. To the extent possible, reasonable savings and persistence estimates for planning purposes are provided. These models focus on interventions that can be implemented without the need for existing smart meter infrastructure (i.e., they do not consider third category of behavior change interventions such as dynamic pricing programs).

Program Models	Model 1: In-Home Energy Use Monitor	Model 2: Indirect/Comparative Feedback on Home Energy Use	Model 3: Hybrid Approach – Comparative and Direct Feedback
Program Basics	Participants receive a monitor that provides real-time feedback on home energy use in order to track and experiment with their energy use behavior	Participants receive regular reports in the mail that will compare their energy use with neighbors in similar homes. Targeted energy saving tips will also be communicated.	Participants receive regular comparative feedback reports and energy tips. Participants will be encouraged to make use of real-time power monitors that can be purchased or borrowed for several months at a time.
Customer Engagement Method	Opt-in	Opt-out	Opt-out (reports) Opt-in (in-home device)
Targeted participant household savings (as % of total kWh)	5% (mid of 3% to 7% range) Valid among self-selected participant population	2% Average in total customer population; targeted segments would have significantly higher savings (e.g., in the 5% to 10% range)	2%+ Average in total customer population; targeted segments would have significantly higher savings (e.g., in the 5% to 10% range)
Big Advantage	Real-time feedback for participants	Cost effective approach with broader reach	Hybrid approach maximizes savings potential
Big Disadvantage	Significantly higher cost per kWh saved	Requires integration with system data	Greater complexity/ resource requirements

Model 1 Program Overview: In-Home Energy Use Monitor

Program Objective

The objective of this pilot behavior change program is to assist utility customers in lowering their energy use through feedback from in-home energy use monitors. Through execution of the pilot study, the utility will be able to verify the achieved savings and determine the cost effectiveness of the program on a $ per kWh basis. Furthermore, utilities would be able to measure if these customers participated to a greater extent in other utility offerings (e.g., ENERGY STAR, lighting, home insulation/weatherization, and high efficiency HVAC equipment).

Target Customer Market

Given the opt-in nature of this program, a large customer population would need to be solicited in order to have a significant number of participants recruited. Previous utility experiences suggest that around 5% of customers would respond to offers provided costs to the customer are well under $50 (i.e., a utility subsidy of at least $100 on the cost of a device like the Power Cost Monitor). Feedback from program managers suggests that some population segments - elderly low income customers was one example given - may have more difficulty making use of the feedback devices, limiting their ability to generate meaningful savings. Customers with a 'techie' bent are among the most likely to have success. Homes with electric water heat are also among those that should be prioritized for marketing efforts (to the extent they can be readily available) given the substantially higher electricity savings achieved in the homes in other utility studies.

Program Logistics

The program will promote a discounted sale of one or more in-home feedback displays. Examples of available devices (Power Cost Monitor, Kill-A-Watt, etc.) are provided in Appendix 3. Depending on the device design, customers may need assistance with installation (e.g., The Energy Detective). Distribution could be carried out via a utility mail order system or through retail partners (e.g., local hardware stores, online retailers). Device prices, as listed in Appendix 4 may be as low as $35 (Kill-A-Watt) to more than $200 for other energy monitors.

Customer Education

Participants would be provided with education materials that identify behavior change recommendations to accompany purchase of the device. Experience suggests a small number of measures likely to be relevant to the home are more effective than an overwhelming list. Utility program managers should also consider providing case studies and results from select customers that have had success with the device. To the extent that (online) community forums can be facilitated, the program has the potential to also benefit from the power of social norms as participants seek to model the behavior of other participants and share in their success.

Enhancements

The utility should raise awareness and promote associated devices that can aid the customers' behavior changes. Some examples could include promoting devices such as the centralized Green Switch/Energy Hub – which shuts off multiple outlets from one centralized location, or the Smart Strip power strip that automatically shuts off power to devices in home office / theater systems. See Appendix 6 for more information.

Trade Ally Plan	It is recommended the utility make provisions for some type of technical assistance be made available from the utility or local electricians for the installation of more involved devices (e.g. TED) given safety concerns.
Savings Goals and Assumptions	Savings estimates for planning purposes fall in the range of 3% to 7%, with a midpoint of 5% based on prior utility program experiences. These percentages can be applied to average energy consumption to approximate unit (e.g., kWh) quantities. These numbers are based on electricity-focused programs as the feedback devices measure power use in kilowatts. Though there are likely to be natural gas savings as a direct result of changes to thermostat settings and customer hot water use, the current stand-alone devices being marketed provide only feedback on metered electricity. Savings can be conservatively estimated to last at least one year, with 18 months of persistence having been shown in the Hydro One pilot. Though behavior change programs are found in research studies to typically persist for perhaps several years (Darby 2006), the issues of customer defection documented previously suggest that a cautious approach may be warranted until more robust data from utility programs is available.
Marketing/Incentive Strategy	Two primary incentives can be offered including 1) a utility subsidy/rebate on the cost of the device (as discussed earlier) and 2) discounted technical assistance for the installation of certain devices (e.g., TED). Thought can be give to promotion of associated devices (e.g., Green Switch) over time based on results of the program and evidence of savings from the use of those technologies to contribute toward energy savings. The program will require a multi-media campaign approach to promotion. Though direct mail brochures and company Web site promotion will be central recruitment channels, other utilities (MacLellan 2008) have experienced significant spikes in demand when stories are picked up in local newspapers, Web sites, radio and television programs.
Quality Control Plan	Ensuring program success will depend on robust pilot design, ongoing data tracking, and customer satisfaction and engagement. Having adequate pilot scale and measurement systems will ensure that cost effectiveness can be accurately quantified. Following participants over a multi-year period will uncover the true persistence of savings. Anticipating and addressing customer needs will help to limit participant defection. A critical aspect of accountability will be the ability to avoid double counting savings when customers participate in utility energy efficiency programs beyond the behavior change program (e.g., they get a rebate on a new furnace). To address such cases, mechanisms must exist to adjust kWh consumption to account for the new appliance/load profile.
Program Budget Considerations	The large majority of monitor device costs will need to be paid for (e.g., $100 of the $130 Power Cost Monitor) by the utility. Additional resources will be needed to develop and deliver educational materials, respond to customer needs, and oversee the program.

Model 1 – In-Home Energy Use Monitor – Behavior Change Pilot Program Plan

Process Step	Inputs	Actions	Outputs	Critical Success Factors (Applicable Lessons Learned)
Identify Team/Objectives	• Available internal resources • Potential implementation partners	• Identify required program pilot team with cross functional (operational, finance, technical, customer service) capabilities to address all aspects of program execution and business case assessment • Define project timeline and specific pilot learning objectives (e.g., quantify savings potential and $/kWh for program) • Quantify resource and budget requirements	• Project team • Project plan • Define pilot program outcome measures • Pilot program budget	• A diverse pilot team helps to ensure success
Prepare for Customer Engagement	• Identification of feedback devices to include	• Review work of peer utilities; engage in dialog • Engage manufacturers to obtain devices for trial and evaluate program logistics • Test internally (i.e., have team members install at homes) • Develop list of items on which to collect customer input	• Identified device manufacturers/terms for pilot • Identified pitfalls with device trials • Customer input objectives	• Taking an iterative approach to piloting solutions ensures consistency with goals • Validating the functionality of new technology can avoid headaches down the road • Leveraging the experience of peer utilities improves chances of success
Collect Customer Input	• Small customer (e.g., focus group) population • Customer input objectives	• Solicit customer engagement • Collect feedback from a focus group (or survey) • Collect feedback on key aspects of program marketing and execution: o Receptivity to application of in-home device o Willingness to pay o Attitudes toward conservation	• Identified barriers to customer response • Identified barriers to user acceptance of device • Key themes to incorporate in customer targeting and messaging • Identified population segments to target/avoid	• Upfront customer input provides invaluable guidance for successful program design • Ensure the solution is well suited to customer population • Interfacing with meters for in-home devices can present barriers

Process Step	Inputs	Actions	Outputs	Applicable Lessons Learned
Define Program Parameters	• Available data on customer energy use and segmentation parameters: o Level of energy use o Age o Income o Home size/type/age • Device purchase and installation cost estimates	• Establish desired customer segments on which to determine program impact • Calculate required program sample size (in each population) to allow for adequate precision/confidence in program outcomes measurement* • Determine if there are any viable means to establish a control group for comparison that is representative of the treatment group (e.g., has the same selection biases) • Develop marketing and customer education plans to maximize participation and ensure • Determine device cost to customer/utility subsidy	• Necessary program treatment group size • Identified customer segment representation desired in pilot group • Viability of establishing a control group • Customer marketing plan • Customer education plan • Program cost (to utility, to customer)	• Incorporating a control group that representative of the underlying population and sufficiently large allows for the necessary precision and confidence to draw conclusions about specific sub-segments of the population • [device cost to customer will likely need to be <$50 to attract meaningful response >1%]
*Note: See Appendix 1 for discussion of sample size determination. The selection bias of device user population requires historical data comparison to evaluate savings.				
Recruit and Educate Participants	• Customer contact/ information	• Solicit customers to participate through direct mail (e.g., bill inserts) and/or telephone recruitment • Utilize available customer interactions (e.g., Web site, home energy audits, customer service/billing calls) to promote the program – consider implications to pilot sample bias • Provide materials to educate customers about the functionality and benefits of the device(s)	• Pilot program participant population of adequate size • Customer understanding of program	• Motivation is the essential ingredient • Look beyond traditional customer segmentation models to find messages that resonate with particular groups
Conduct Pre-Pilot Survey	• Customer focus group feedback • Example surveys from past programs and other utilities	• Define survey to capture: o Home characteristics (e.g., appliances) o Demographics o Energy use behaviors/patterns o Attitudes toward conservation o History of participation in utility energy efficiency programs (e.g., rebates, etc.) • Collect feedback from a representative sample of the pilot program participants • Collect feedback from a representative sample of customer population	• Baseline profile of customer characteristics • Identified meaningful differences in participant population vs. total customer population (e.g., skews toward customer with affinity for conservation, higher/lower income, etc.)	• Pre-pilot surveys can establish baselines for analysis

Process Step	Inputs	Actions	Outputs	Applicable Lessons Learned
Execute Pilot Study	• Identified committed program participant population • Resources to support device distribution/installation • Resource to field customer calls, questions, issues • Customer communications	• Collect customer payment • Distribute energy display devices (and provide installation assistance if needed) • Assist/respond to customer questions/issues with device installation/operation • Provide customer communication/education materials as appropriate to identify savings opportunities and encourage engagement • Consider offerings customer the opportunity to establish an energy reduction goal	• Pilot program participation • Addressed customer concerns • Motivated and educated participants	• Ensure pilot execution allows for measurement of cost effectiveness • Be sensitive to program's impact on customer satisfaction
Collect Participant Feedback	• Pilot program participation	• Develop survey instruments to evaluate: o Customer adoption rates (install, use rate) o Level of device use/persistence o Perceptions of device utility o Perceptions of savings o Behavior changes made/tested o Investments made o Participation in other utility energy efficiency programs (e.g., rebates/incentives) – Important for savings adjustments/avoid double-counting o Conservation attitudes • Collect feedback from pilot participants	• Ability to adjust savings for concurrent efficiency program participation • Survey data/feedback on participant experience and satisfaction	• In-home display devices are known to be hampered by low installation rates
Evaluate Program Results/Savings Cost Effectiveness	• Energy consumption data • Quantification of pilot program costs • Data from participant feedback survey	• Obtain measures of actual consumption over treatment period for treatment, control (if any), and population (sample) • Compare to normalized historical consumption or control group data to determine impact of the devices on energy conservation	• Measurement of participant energy savings • Determination of program cost effectiveness ($ per kWh of savings)	• The novelty of the feedback will wear off
Continue monitoring	• Pilot program participation	• Execute customer surveys and data collection to determine persistence of energy savings	• Data on device use pattern • Data on persistence	• [Limited data on persistence of savings from existing programs]

Model 2 Program Overview: Indirect/Comparative Feedback on Energy Use

Program Objective

The objective of this pilot behavior change program is to leverage the power of social norming to motivate residential customers to take action to address their energy-use behaviors. Through execution of the pilot study, the utility will be able to verify the achieved savings and determine the cost effectiveness of the program on a $ per kWh basis. Utilities would be able to measure if these customers participated to a greater extent in other utility offerings (e.g., ENERGY STAR, lighting, home insulation/weatherization, and high efficiency HVAC equipment).

Target Customer Market

This is an opt-out program in which the utility has flexibility to decide which households will receive information and which will not, creating significant opportunity for collecting information on which customer segments should receive the most attention. Targeting specific customer segments is likely to be an important means to optimize the program, though initially it will likely be best to target a broad population cross section. Data from a broad-based pilot will allow program managers to characterize the relative performance of different segments (home size, age, income, etc.) and analyze the biggest opportunities to maximize cost effectiveness. As a cautionary note, a program manager who currently runs this type of program notes a small, but vocal minority of customers that take offense to the message of neighbor comparisons. Utilities must be quick in responding thoughtfully to these libertarian individuals to avoid customer satisfaction issues.

Program Logistics

In order to produce the home energy reports, utilities will need to have either their own internal IT system for report generation or contract for the services of a third party such as Positive Energy. Robust data on houses and homeowners will be necessary to systematically identify the comparable homes for a given report. Likewise, a means to attach relevant energy savings tips to each customer's report will need to be automated. An operation to generate and mail the reports will need to be defined and a protocol for addressing customer concerns will need to be articulated.

Customer Education

The nature of this behavior change program is one of customer education. Each report represents another opportunity to engage customers in understanding their energy use profile and helping them to know where they rank amongst neighbors. Importantly, the limited targeted tips give customers ideas to take action. The monthly report will include 2 to 4 targeted energy savings recommendations that are particularly relevant for the specific customer based on a detailed analysis of load patterns, the housing stock, and available demographic data. For example, fixed income customers, or renters may receive messages that are no or low cost. Customers in older homes may receive air sealing recommendations while customers with higher summer use than their neighbors may receive suggestions related to cooling measures. Coupons and other promotional items will be included with the report to encourage persistent participation.

Savings Goals and Assumptions

Though the nascent nature of the neighbor comparison programs leaves limited opportunity for quantification of expected savings, the robust nature of the SMUD/Positive Energy pilot that began in April 2008 (N=35,000) creates a fairly high degree of certainty that savings are real and meaningful. The 2% average savings found among customers

receiving the energy reports seems modest until it is considered that these savings can be realized on the entire customer population at a vary affordable cost. This number is on the lower end of the 0% to 10% range for indirect feedback noted in research literature (Darby, 2006).

Savings have persisted in these programs over the first year and are expected to remain indefinitely as a result of changes to underlying behavior habits as noted by Darby and others. Program managers are likely to find that even using a one-year savings basis yields attractive cost effectiveness, though assuming 2 or 3 years may still be conservative. As program managers also point out, the cost of sending the reports can be eliminated at any time.

Ongoing measurement of performance for the pilot group is recommended to establish baselines for long term impact of the home energy report intervention.

Marketing/Incentive Strategy

The program will be operated as an opt-out effort, meaning that all customers selected will be considered participants unless they specifically opt out of the program. All customers will receive a monthly report with a very clear and easy-to-understand normative message which is a comparison of their electricity consumption to similarly sized homes in their neighborhood/area. Treatment and control groups should be sufficiently large in order to allow for precise estimation of the difference in population means (i.e., statistical power to detect the 2% difference). The size of the required sample will be a function of the savings target, the desired statistical confidence, and the variability home energy use levels in the underlying population.

In addition to the feedback and recommendations in the report, additional measures can help to enhance the customer experience. For example, integrated an online community discussion forum may help to emphasize the social norming message (i.e., being more like others, competing) while also providing customers with additional energy saving ideas.

Quality Control Plan

Ensuring program success will depend on robust pilot design, ongoing data tracking, and customer satisfaction and engagement. Having adequate pilot scale and measurement systems will ensure that cost effectiveness can be accurately quantified. Following participants over a multi-year period will uncover the true persistence of savings. Anticipating and addressing customer needs will help to limit participant defection.

A critical aspect of accountability will be the ability to avoid double counting savings when customers participate in utility energy efficiency programs beyond the behavior change program (e.g., they get a rebate on a new furnace). To address such cases, mechanisms must exist to adjust kWh consumption to account for the new appliance/load profile.

Program Budget Considerations

Reports from Positive Energy's work with SMUD suggest that the annual cost per customer to generate and distribute the home energy reports can be less than $10 per household, but this is largely dependent on the scale of the effort given the fixed costs involved in setting up the IT infrastructure and processing operations.

Model 2 – Indirect/Comparative Feedback – Behavior Change Pilot Program Plan

Process Step	Inputs	Actions	Outputs	Critical Success Factors (Application of Lessons Learned)
Identify Team/Objectives	• Available internal resources • Potential implementation partners	• Identify required program pilot team with cross functional (operational, finance, technical, customer service) capabilities to address all aspects of program execution and business case assessment • Define project timeline and specific pilot learning objectives (e.g., quantify savings potential and $/kWh for program) • Quantify resource and budget requirements	• Project team • Project plan • Define pilot program outcome measures • Pilot program budget	• A diverse pilot team helps to ensure success
Prepare for Customer Engagement	• Identification of potential program partners (e.g., Positive Energy)	• Review work of peer utilities; engage in dialog • Engage program partners (if necessary/desired) • Develop IT integration plan to enable generation of home energy use reports • Develop list of items on which to collect customer input	• Determination of program partner engagement • Identified challenges to report generation • Customer input objectives	• Taking an iterative approach to piloting solutions ensures consistency with goals • Leveraging the experience of peer utilities improves chances of success
Collect Customer Input	• Small customer (e.g., focus group) population • Customer input objectives	• Solicit customer engagement • Collect feedback from a focus group (or survey) • Collect feedback on key aspects of program marketing and execution: o Receptivity to comparative feedback o Desired report information elements, format/graphics o Attitudes toward conservation	• Identified customer concerns with reports • Key themes to incorporate in customer targeting and messaging	• Upfront customer input provides invaluable guidance for successful program design • Ensure the solution is well suited to customer population

Process Step	Inputs	Actions	Outputs	Applicable Lessons Learned
Define Parameters for Customer Comparison	• Available data on customer energy use and segmentation parameters: o Level of energy use o Age o Income o Home size/type/age	• Establish desired customer segments on which to determine program impact • Calculate required program sample size to allow for adequate precision/confidence in program outcomes measurement* • Establish a control group of (at least) similar size for comparison that is representative of the treatment group • Develop customer education plans to maximize awareness and satisfaction • Determine means/parameters to group customer homes for energy use comparisons (e.g., 100 homes of similar size in neighborhood) • Determine program budget	• Necessary program treatment and control group size • Identified customer segment representation desired in pilot group • Customer education plan • Program budget	• Incorporating a control group that representative of the underlying population and sufficiently large allows for the necessary precision and confidence to draw conclusions about specific sub-segments of the population
*Note: See Appendix 1 for discussion of sample size determination. Control and treatment groups should be defined to observe impact of feedback.				
Develop Energy Report Content	• Customer segmentation data	• Develop energy use reports to communicate customer energy use in comparison to neighbors and historical consumption • Develop/obtain comprehensive lists of energy savings measures to potentially recommend • Establish means to select customized energy savings tips for customers based on known segmentation parameters	• Template for home energy use report • Means to determine customized savings tips to include (may come from program partner)	• Motivation is the essential ingredient • Look beyond traditional customer segmentation models to find messages that resonate with particular groups
Conduct Pre-Pilot Survey	• Customer focus group feedback • Example surveys from past programs and other utilities	• Define survey to capture: o Home characteristics (e.g., appliances) o Demographics o Energy use behaviors/patterns o Attitudes toward conservation o History of participation in utility energy efficiency programs (e.g., rebates, etc.) • Select pilot treatment and control groups (likely random/stratified sample) • Collect feedback from customers across treatment, control, and total population	• Baseline profile of customer characteristics and attitudes • Confirmation that treatment and control samples are representative and unbiased	• Pre-pilot surveys can establish baselines for analysis

Process Step	Inputs	Actions	Outputs	Applicable Lessons Learned
Execute Pilot Study	• Selected treatment population • Resources to support report generation and distribution • Resource to field customer calls, questions, issues • Customer communications	• Distribute customer education materials describing program/reports • Regularly generate and distribute home energy use reports to treatment group customers o More frequent feedback has been shown to lead to greater energy savings • Assist/respond to customer questions/issues with device installation/operation • Consider offerings customer the opportunity to establish an energy reduction goal	• Pilot program participation • Addressed customer concerns • Motivated and educated participants	• Ensure pilot execution allows for measurement of cost effectiveness

Collect Participant Feedback	• Pilot program participation	• Develop survey instruments to evaluate:
		  o Perceptions of home energy use reports
		  o Impact on motivation
		  o Behavior changes made
		  o Investments made
		  o Participation in other utility energy efficiency programs (e.g., rebates/incentives) – Important for savings adjustments/avoid double-counting
		  o Conservation attitudes
		• Collect feedback from pilot treatment/control groups
			• Ability to adjust savings for concurrent efficiency program participation
			• Survey data/feedback on participant experience and satisfaction
				• Be sensitive to program's impact on customer satisfaction

Evaluate Program Results/Savings Cost Effectiveness	• Energy consumption data • Quantification of pilot program costs • Data from participant feedback survey	• Obtain measures of actual consumption over treatment period for treatment, control (if any), and population (sample) • Compare to normalized historical consumption and control group data to determine impact of the feedback intervention on energy conservation	• Measurement of participant energy savings • Determination of program cost effectiveness ($ per kWh of savings) • Determination of differences across segments (e.g., savings for high energy users)	• Opt-out nature of program allows for results to be more reasonably extended to potential for savings in entire population • Specific customer segments (e.g., higher energy users) are likely to see different levels of savings
Conduct ongoing monitoring	• Pilot program participation	• Execute customer surveys and data collection to determine persistence of energy savings and customer involvement	• Data on device use pattern • Data on savings persistence	• [Limited data exists on persistence of savings from utility programs]

Model 3 Program Overview: Hybrid - Comparative and Direct Feedback

Program Objective

The objective of this pilot behavior change program is to assist residential utility customers in lowering their energy use through feedback from both indirect reports sent regularly to compare performance with neighbors and also give opportunity to utilize in-home monitors. While the comparative feedback aspect of the program would target all customers, participants would have to request the use of real-time feedback devices that could be managed with a temporary use lending model.

Target Customer Market

The program would combine the broad reach of the opt-out home energy report model with the ability to enhance the experience of targeted and self-selected segments through the provision of tools for real-time feedback monitoring. The utility can use data from the broad indirect feedback program to identify the customer segments with the greatest potential to benefit from direct feedback and target marketing of the devices to these groups.

Program Logistics

In order to produce the home energy reports, utilities will need to have either their own internal IT system for report generation or contract for the services of a third party such as Positive Energy. Robust data on houses and homeowners will be necessary to systematically identify the comparable homes for a given report. Likewise, a means to attach relevant energy savings tips to each customer's report will need to be automated. An operation to generate and mail the reports will need to be defined and a protocol for addressing customer concerns will need to be articulated

For the supplementary provision of in-home devices such as the Power Cost Monitor, The Energy Detective, or the Kill-A-Watt, the utility can consider the same subsidized purchase model as proposed in Model 1 or a temporary device check-out model in which customers take home devices to use for several months to learn about their consumption patterns. Sharing the benefits of the monitor across a number of customers has the dual benefit of spreading costs over a greater number of kWh savings and also helps to curb the problem of devices going uninstalled or unused.

Customer Education

In addition to providing energy-use feedback and conservation tips, the utility could use the home energy report as a platform to promote the availability of the in-home monitors.

Enhancements

As with the other models, the utility can raise awareness and promote associated devices that can aid the customers' behavior changes such as Green Switch or the Smart Strip.

Trade Ally Plan

In the case of devices tying into panels and using current transducers, the utility should arrange for technical/installation assistance to be made available from the utility or local electricians.

Savings Goals and Assumptions

The savings estimates would mirror the 2% savings target identified for Model 2 for the entire participant population. The sub-segment of participants that elects to make use of a real-time monitor to aid in tracking progress and identifying behavior change modifications would be expected to realize even higher savings, pushing the population total above 2%.

Similar to the persistence estimate identified for Model 2, savings have persisted in these programs over the first year and are expected to remain indefinitely as a result of changes to underlying behavior habits as noted by Darby and others. Program managers are likely to find that even using a one-year savings basis yields attractive cost effectiveness, though assuming 2 or 3 years may still be conservative.

Ongoing measurement of performance for the pilot group is recommended to establish baselines for long term impact of the home energy report intervention.

Marketing/Incentive Strategy

The utility can weigh whether a device renting/borrowing program is feasible. Otherwise, providing major subsidies for customer purchases would, as with Model 1, be necessary. To the extent device installation requires technical expertise, discounts on electrician services would also be necessary.

The monthly energy use report can serve as the primary medium for promoting the real-time power monitors.

As with other models, challenging participants to make a commitment to achieving a personal energy savings goal serves to maintain involvement and motivation. Feedback on goal progress can be incorporated into the monthly report.

Quality Control Plan

Ensuring program success will depend on robust pilot design, ongoing data tracking, and customer satisfaction and engagement. Having adequate pilot scale and measurement systems will ensure that cost effectiveness can be accurately quantified. Following participants over a multi-year period will uncover the true persistence of savings. Anticipating and addressing customer needs will help to limit participant defection.

A critical aspect of accountability will be the ability to avoid double counting savings when customers participate in utility energy efficiency programs beyond the behavior change program (e.g., they get a rebate on a new furnace). To address such cases, mechanisms must exist to adjust kWh consumption to account for the new appliance/load profile.

Program Budget Considerations

Depending on the device distribution model chosen, the utility may have to bear most, if not all, of the cost of the in-home display device. The cost effectiveness of the device program may be greater under a rental/temporary checkout model as a larger number of customers benefit from the same device.

Program cost on a per household basis for the home energy reports would be, as described under Model 2, dependent on the scale of the operation.

Model 3 – Hybrid of Comparative and Direct Feedback – Behavior Change Pilot Program Plan

Process Step	Inputs	Actions	Outputs	Critical Success Factors (Application of Lessons Learned)
Identify Team/Objectives	• Available internal resources • Potential implementation partners	• Identify required program pilot team with cross functional (operational, finance, technical, customer service) capabilities to address all aspects of program execution and business case assessment • Define project timeline and specific pilot learning objectives (e.g., quantify savings potential and $/kWh for program) • Quantify resource and budget requirements	• Project team • Project plan • Define pilot program outcome measures • Pilot program budget	• A diverse pilot team helps to ensure success
Prepare for Customer Engagement	• Identification of potential program partners (e.g., Positive Energy)	• Review work of peer utilities; engage in dialog • Engage program partners (if necessary/desired) • Develop IT integration plan to enable generation of home energy use reports • Develop list of items on which to collect customer input • Obtain real-time feedback devices and test internally	• Determination of program partner engagement • Identified challenges to report generation • Identified device preferences • Customer input objectives	• Taking an iterative approach to piloting solutions ensures consistency with goals • Leveraging the experience of peer utilities improves chances of success • Validating the functionality of new technology can avoid headaches down the road
Collect Customer Input	• Small customer (e.g., focus group) population • Customer input objectives	• Solicit customer engagement • Collect feedback from a focus group (or survey) • Collect feedback on key aspects of program marketing and execution: o Receptivity to comparative feedback o Desired report information elements, format/graphics o Attitudes toward conservation o Interest in real-time feedback devices o Interest in device distribution/rental arrangements	• Identified customer concerns with reports • Key themes to incorporate in customer targeting and messaging • Identified barriers to user acceptance of device	• Upfront customer input provides invaluable guidance for successful program design • Ensure the solution is well suited to customer population • Interfacing with meters for in-home devices can present barriers

Process Step	Inputs	Actions	Outputs	Applicable Lessons Learned
Define Parameters for Customer Comparison	• Available data on customer energy use and segmentation parameters: o Level of energy use o Age o Income o Home size/type/age	• Establish desired customer segments on which to determine program impact • Calculate required program sample size (in each population) to allow for adequate precision/confidence in program outcomes measurement* • Establish a control group of (at least) similar size for comparison that is representative of the treatment group • Develop customer education plans to maximize awareness and satisfaction • Determine means/parameters to group customer homes for energy use comparisons (e.g., 100 homes of similar size in neighborhood) • Determine program budget	• Necessary program treatment and control group size • Identified customer segment representation desired in pilot group • Customer education plan • Program budget	• Incorporating a control group that representative of the underlying population and sufficiently large allows for the necessary precision and confidence to draw conclusions about specific sub-segments of the population
*Note: See Appendix 1 for discussion of sample size determination. Control and treatment groups should be defined to observe impact of indirect feedback. The selection bias of device user population requires historical data comparison to evaluate savings.				
Develop Energy Report Content	• Customer segmentation data	• Develop energy use reports to communicate customer energy use in comparison to neighbors and historical consumption • Develop/obtain comprehensive lists of energy savings measures to potentially recommend • Establish means to select customized energy savings tips for customers based on known segmentation parameters	• Template for home energy use report • Means to determine customized savings tips to include (may come from program partner)	• Motivation is the essential ingredient • Look beyond traditional customer segmentation models to find messages that resonate with particular groups
Develop Real-Time Feedback Device Distribution Model	• Device preferences • Identified barriers to user acceptance of device	• Identify plan for device lending/rental program (e.g. distribution through mail, library checkout, etc.) • Purchase adequate number of devices to support pilot • Develop necessary customer education materials to facilitate device lending program	• Device lending program resources	• Real-time feedback gives users the opportunity to experiment in finding energy saving behaviors

Process Step	Inputs	Actions	Outputs	Lessons Learned
Conduct Pre-Pilot Survey	• Customer focus group feedback • Example surveys from past programs and other utilities	• Define survey to capture: o Home characteristics (e.g., appliances) o Demographics o Energy use behaviors/patterns o Attitudes toward conservation o History of participation in utility energy efficiency programs (e.g., rebates, etc.) • Select pilot treatment and control groups (likely random/stratified sample) • Collect feedback from customers across treatment, control, and total customer populations	• Baseline profile of customer characteristics and attitudes • Confirmation that treatment and control samples represent the underlying population	• Pre-pilot surveys can establish baselines for analysis
Execute Pilot Study	• Selected treatment population • Resources to support report generation and distribution • Device distribution/ collection model • Resource to field customer calls, questions, issues • Customer communications	• Distribute customer education materials describing program/reports • Regularly generate and distribute home energy use reports to treatment group customers o More frequent feedback has been shown to lead to greater energy savings • Promote opportunities for participants to obtain real-time feedback devices to aid in their efforts to save energy • Facilitate distribution and collection of real-time feedback devices • Assist/respond to customer questions/issues with device installation/operation • Consider offerings customer the opportunity to establish an energy reduction goal	• Pilot program participation • Addressed customer concerns • Demand for real-time feedback devices • Motivated and educated participants	• Ensure pilot execution allows for measurement of cost effectiveness
Collect Participant Feedback	• Pilot program participation	• Develop survey instruments to evaluate: o Perceptions of home energy use reports/devices o Impact on motivation o Behavior changes made o Investments made o Participation in other utility energy efficiency programs (e.g., rebates/incentives) – Important for savings adjustments/avoid double-counting o Conservation attitudes • Collect feedback from pilot treatment/control groups	• Ability to adjust savings for concurrent efficiency program participation • Survey data/feedback on participant experience and satisfaction	• Be sensitive to program's impact on customer satisfaction

Process Step	Inputs	Actions	Outputs	Lessons Learned
Evaluate Program Results/Savings Cost Effectiveness	• Energy consumption data • Quantification of pilot program costs • Data from participant feedback survey	• Obtain measures of actual consumption over treatment period for treatment, control (if any), and population (sample) • Compare to normalized historical consumption and control group data to determine impact of the feedback intervention on energy conservation	• Measurement of participant energy savings • Determination of program cost effectiveness ($ per kWh of savings) • Determination of differences across segments (e.g., savings for high energy users)	• Opt-out nature of program allows for results to be more reasonably extended to potential for savings in entire population • Specific customer segments (e.g., higher energy users) are likely to see different levels of savings
Conduct ongoing monitoring	• Pilot program participation	• Execute customer surveys and data collection to determine persistence of energy savings and customer involvement	• Data on device use pattern • Data on savings persistence	• [Limited data exists on persistence of savings from utility programs]

Appendix 1 – Note on Sample Size Determination

An important objective of the pilot program is to quantify achieved energy savings in order to evaluate program cost effectiveness and determine an appropriate plan for larger roll-out.

Opt-In Device Programs:

Due to the self-selected nature of the treatment population in the case of an opt-in program such as the purchase and use of an in-home energy monitor, it is difficult to have a control group that is representative of the treatment group. Therefore the device's impact must be using a comparison to historical consumption. There are two approaches that may be used to determine the program's impact:

Approach #1: Comparing the change in energy consumption of the program participants following installation of the monitor device to their consumption in prior periods can be used to measure the impact of the feedback intervention. In order to account for climate differences, data would need to be weather-normalized to adjust for the additional cooling or heating requirements. Comparisons should be made to the same time periods to best match seasonal differences (e.g., daylight hours, etc.). The mean change in energy consumption in the weather-normalized analysis can provide a central measure to assess program impact. Statistically significant results could be demonstrated by comparing the confidence interval around the mean to conclude, for example, that a meaningful impact was observed (e.g., confidence interval does not include zero) or that the average energy savings was greater than a certain limit. The larger the selected sample size the tighter the confidence interval on the mean as defined by:

$$C.I. = \overline{X} \pm z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$$ for 95% confidence, $z_{\alpha/2} = 1.96$: $C.I. = \overline{X} \pm 1.96\frac{\sigma}{\sqrt{n}}$

Approach #2: Comparing the mean % change in energy consumption for the treatment group to the mean % change in energy consumption among a sample of the overall population would be another approach to deal with adjusting for changes in climate, technology, and the overall economic environment. In this case a weather-normalized adjustment of the data would not be necessary as both groups would be subject to these exogenous variables. In this case, the formula to determine the appropriate minimum sample size required to test the difference in two population means, μ_1 and μ_0, with common variance, σ^2, is:

$$n = \frac{2\left(z_{1-\alpha/2} + z_{1-\beta}\right)^2}{\left(\frac{\mu_0 - \mu_1}{\sigma}\right)^2}$$ Rule of thumb: $$n = \frac{16}{\left(\frac{\mu_0 - \mu_1}{\sigma}\right)^2}$$

For $\alpha = 0.05$ (95% confidence) and $\beta = 0.20$ (80% power) the values of $z_{1-\alpha/2}$ and $z_{1-\beta}$ are 1.96 and 0.84, respectively; and $2(z_{1-\alpha/2} + z_{1-\beta})^2 = 15{:}68$, which can be rounded up to 16, producing the rule of thumb above. For example, if the standard deviation for the % change in energy consumption over a given period (e.g., one year) is 10% and the hypothesis is that there will be a 5% difference in the means between the treatment and control groups, than a sample size of 64 would suffice in illustrating if the difference in means was statistically significant.

Opt-Out Indirect Feedback Programs:

In the case of an opt-out program in which the treatment group is not self-selected, but rather selected by the program administrator (utility), a sample that is representative of the overall population with respect to energy consumption, demographics, and housing characteristics can be targeted. As a result, the impact of the feedback intervention can be determined by observing the difference in average energy consumption between the treatment and control groups in the current period. This approach avoids the problem of comparing changes in

usage from one period to another that are subject to macro factors such as weather patterns, economic conditions, and media messaging as well as individual household factors such as tenant changes, occupancy, renovations, etc.

Based on the above calculation for testing the difference in means, the following table provides examples of the required sample size to draw conclusions given the variability of average energy consumption within the population and the hypothesized level of energy savings to be detected:

		Hypothesized Annual Energy Savings (to Test)			
		1%	2%	5%	10%
		100 kWh	200 kWh	500 kWh	1000 kWh
Std. Dev. of Annual Energy Consumption	1000 kWh	1,600	400	64	16
	2000 kWh	6,400	1,600	256	64
	3000 kWh	14,400	3,600	576	144
	4000 kWh	25,600	6,400	1,024	256
	5000 kWh	40,000	10,000	1,600	400

In most cases it is unlikely that a single population sample will provide a satisfactory program design as program managers would likely want to evaluate program effectiveness for different population segments such as households of different types (e.g., single vs. multi-family), sizes, ages, or energy consumption strata. The program may also aim to test the impact different reporting formats and the frequency of feedback delivery. In this case an analysis of the required sample size from each segment, with consideration for segment overlap, may be appropriate to ensure adequate data to have statistical validation of findings.

Appendix 2 - Summary Table of Behavioral Programs Reviewed

Hydro One – PowerCost Monitor Pilot Program

Timing: Pilot study conducted from June 2004 to September 2005

Program Design/Research Methodology	Results/Findings
• Pilot conducted beginning in June 2004; ran through September 2005 • Stratified random sample of participants was designed to cover different geographic regions and electricity demand levels • Participants received real-time monitoring device – the PowerCost Monitor from Blue Line Innovations at no cost • Historical data was adjusted for weather and appliances in order to evaluate energy savings • 500 participants and 52 control customers included • Study excluded customers that lived in apartments, condominiums, town homes, and row homes or were renters • Study period >1 year • 400+ participants • Sample across wide variation of climate and geography • Impact measured based on historical comparison	• 6.5% aggregate reduction in electricity (kWh) consumption across program participants o Study concludes an average reduction of 7% to 10% is "feasible" • 8% reduction in non-electric heat homes o 5% reduction in non-electric heat and non-electric hot water homes o 16% reduction in non-electric heat homes w/ electric hot water • 1% reduction in electrically heated homes o Study concludes that separating out feedback from the electric heating load for the rest of the load would be required to encourage saving in this segment o Suggests that home heating may not be a major opportunity area for behavior change • "income and demographic factors had no impact on the responsiveness to the monitor" • 60% of participants felt the monitor made a difference in their homes • Rating the usefulness of the monitor on a scale from zero (not useful) to 5 (very useful) participants responded in the following proportions: o Zero – 5% o 1 – 14% o 2 – 19% o 3 – 24% o 4 – 21% o 5 – 17% • 39% of participants reported consulting the monitor either daily (24%) or multiple times per day (15%) • 65% of participants planned to continue using the monitor once the pilot study was complete

Source:

- *The Impact of Real-Time Feedback on Residential Electricity Consumption: The Hydro One Pilot*, Dean Mountain Ph.D., Mountain Economic Consulting and Associates Inc., March 2006

NSTAR – PowerCost Monitor Pilot

Timing: Pilot study initiated in May 2008

Program Design/Research Methodology	Results/Findings

• Pilot began May 2008
• 3,100+ units sold
• Coordinated effort between National Grid, NSTAR, and WMECO
• Targeted audit participants and general customer population (via media promotion and direct mail)
• Selected PowerCost Monitor from Blue Line Innovations, identifying following attributes:
  o Compatibility
  o Wireless display
  o Instant real-time display
  o Self-install by customer
  o Cumulative kWh and usage
	• 2.9% savings for customers who used the monitor; equated to annual savings of ~$64
	• 63% of participants indicate behavior change
	• 60% noticed savings in their bill
	• Self-identified savings amount from customer survey (e.g., "How much are you saving?"):
	  o 17% - saving <5%
	  o 48% - saving 5% to 10%
	  o 18% - saving 10% to 15%
	  o 8% - saving 15% to 20%
	  o 4% - saving >20%
	  o 5% - don't know
	• 29% of customers receiving the PowerCost Monitor did not install the unit (62% had not gotten to it, 28% had trouble installing the transmitter, 14% had difficulty programming the monitor)
	• 33% of initial users stopped using the monitor during the study period; reasons cited:
	  o 40% - monitor did not work well
	  o 23% - battery died
	  o 22% - unit broke
	  o 9% - don't need anymore; know what they use
	• Three distribution models to measure adoption and willingness to pay:
	  o Free device direct install offered during home energy audit - 95% adoption rate
	  o Free device for previous audit customers (solicited by mail) – 14% adoption rate
	  o Direct mail solicitation (with media marketing) at different user price levels to subsidize the ~$140 cost of the monitor
	  ▪ $9.99 customer price – 6% adoption rate (National Grid)
	  ▪ $29.99 customer price – 5% adoption rate (NSTAR)
	  ▪ $49.99 customer price – 0.3% adoption rate (National Grid)
	• Identified source raising awareness:
	  o 58% - television news
	  o 16% - direct mail
	  o 12% - newspaper/web
	  o 10% - word of mouth
	  o 4% - no answer
	• Media coverage (TV, print) coincided with significant rise in sales

Source:

- *PowerCost Monitor Pilot*, David MacLellan, NSTAR, Presentation to BECC conference November 2008

SMUD – Positive Energy Pilot

Timing: Ongoing; Pilot study initiated in April 2008

Program Design/Research Methodology	Results/Findings
• First large-scale pilot of Positive Energy's Home Electricity Reports • Pilot program launched in April 2008 • 35,000 customer treatment group; 25,000 receive report monthly, 10,000 receive quarterly • 55,000 customer control group • Treatment group receives reports that provide a comparison of the customer's energy consumption pattern to similar neighbors (e.g., 100 homes in their area of similar size); also provides comparison to customers' own historical consumption • Report includes a limited number (3) of targeted tips that are customized based on the known demographic and housing factors • Savings basis determined by comparing treatment and control groups (i.e., not a historical comparison); ensures confidence that populations are subject to same weather, economic conditions, and media messaging • Proprietary algorithms for customer segmentation, messaging • Founded on principles of behavioral science research including work of Dr. Robert Cialdini, the company's chief scientist	• 2.5% energy savings achieved across total population (non-targeted) o On pace to save 250 kWh per household, per year o Could target program to achieve significantly higher savings, but would be applicable to fewer people • 3¢ per kWh savings cost average • Significantly higher savings achieved by: o Higher energy consumers o Greenergy (renewable energy) customers • Indication of correlation of higher savings for lower income population • 800 of 35,000 decided to opt out, demonstrating the broad reach of this type of program (as compared to opt-in programs such as customer purchase/installation of in-home feedback monitors) • <1% of 35,000 responded to set personal goal • Positive customer feedback o Program manager reports increased customer engagement, requests for additional tips o Taps into competitiveness (e.g., "I'm closing the gap between me and my neighbors") o E.g., "this is the best thing SMUD has ever done" • Few very negative reactions from customers that take offense to the comparative feedback o E.g., "you don't have the right to tell me" o Protocols to respond immediately to address customer concern and mitigate dissatisfaction (e.g., explain program, address concerns, discontinue reporting to customer, etc.) • Large treatment sample will allow for hypothesis testing in subsequent years (e.g., impact of changing report format, persistence of energy savings, potential for additional incremental savings) • Pre-survey used to establish a baseline of customer attitudes toward SMUD, energy efficiency o Will be used to measure difference in attitudes between pilot group and control group after the program • Survey planned for end of program (after 12 months) o Importance of avoiding double-counting of savings associated with other utility energy efficiency programs • In addition to Positive Energy, SMUD also has an AMI project underway with plans to roll out 2-way meters over the next 4-5 years • SMUD is also piloting the use of the PowerCost Monitor for real-time direct feedback

Sources:

- Interview with Ali Crawford, Program Manager at SMUD, December 2008
- Interview with Alex Laskey, President, Positive Energy, November 2008

BC Hydro – Power Smart Behavior Change Program

Timing: Pilot study initiated in early 2007

Program Design/Research Methodology	Results/Findings
• Pilot conducted to test cash incentive program for customers achieving energy savings goal • 1-Year pilot launched early 2007 • Recruited employees of BC Hydro's largest customer • Participants commit to a given electricity reduction target • Use online tool to track/compare consumption • Participants received cash rebate for achieving target (e.g. 5% electricity rebate for achieving • 4 Different incentive rewards tested	• 52% of pilot program participants reduced their energy consumption; 20% achieved their savings goal • 10% energy savings goal found to strike best balance between providing an achievable stretch target while not incurring too many free riders • 19% of participants for the 10% reduction target reached their goal with an average kWh reduction of 1,847 kWh • 33% of participants for the 10% reduction target saved energy despite not reaching the goal; an average of 395 kWh was saved by this group • 48% of participants for the 10% reduction target did not save energy with an average increase in consumption of 1,025 kWh (9% increase) • 20% savings goal found to be intimidating to customers • 5% savings target had hid free-rider rate (i.e., people achieving the goal without making effort) • Cash rewards more motivating than prize drawings • Quarterly eNewsletter was effective in driving traffic to the online feedback and education tool • Cash rewards more appealing than prize draw rewards • eNewsletter drove online visits • More frequent visitors to online tool achieved higher electricity savings • Reported behavior changes included: o Turning off lights, changing laundry habits, shorter showers, unplugging chargers, turning down the thermostat • Based on pilot, BC Hydro launched an engagement program for 2009 that allows customers to commit to a 10% energy reduction in hopes of receiving a reward incentive o 17% of participants are expected to become 'Achievers' reaching the goal o 24% are expected to be 'Savers' that fall short of the goal but reduce energy consumption by around 4% on average o 59% of participants are expected to be 'Non-Achievers' that do not save electricity • Program target market is the "stumbling proponents" psychographic segment – customers with attitude toward efficiency and conservation, but who are not acting on their beliefs – believed to be around 20% of the customer population • Inclining block rates and smart meters also being pursued by BC Hydro

Sources:

- *BC Hydro's Approach to Behavior Change*, company publication
- *Power Smart Residential Behavioural Program Overview*, company presentation, December 2008
- Interview with BC Hydro program manager Arien Korteland, December 2008

Nevada Power – In-Home Energy Display (HED) Study

Timing: Pilot study conducted in 2008

Program Design/Research Methodology	Results/Findings
• Involved Nevada Power and Sierra Pacific Power Company customers • Seven basic and specialized devices deployed across residential households in the Reno and Las Vegas communities • ~200 customers targeted for trial • Sampled from energy use tiers based on kWh/month • No control group (i.e., "results not statistically projectable") • Goal to identify and validate role of HEDs among Sierra Pacific Resources' programs; prepare for AMI infrastructure • Did not provide additional messaging beyond manufacturer literature • Aim to identify incremental value of particular design over alternatives • Past year month-to-month bill comparisons • Recruiter and installer surveys • Periodic participant surveys to profile households, record reports of changed behavior • Concluding conjoint survey to assess feature/function impact	• Devices included o Kill-A-Watt (P3 International) o PowerCost Monitor (Blue Line Innovations) o The Energy Detective -TED (Energy, Inc.) o Whole House Energy Monitor (Energy Monitoring Technologies) o The Energy Joule (Consumer Powerline) o In-Home Display (AzTech) o Power Cost Display Monitor (ECSI)(multifamily) • Significant number of program drop-outs – "I'm not doing this anymore" – created issue of survivor bias • Savings found to be on the "lower end" of the manufacturers' stated expectations for the entire population and in the middle for the study survivors o 5.5% savings for entire population o 9% for those that survived through the entire market test and saved energy in at least four of the six months • Savings ranged from 0% to 48% among participants • Savings persisted for 85% of participants during 6-month study • Third energy tier (1251 to 2500 kWh per month) demonstrated the highest savings • Savings in comparing against the different types of devices were fairly consistent, a surprising study finding o Kill-A-Watt device, was reviewed positively for its appliance-specific feedback and achieved savings similar to the whole-house energy monitors • Encountered issues with installation of devices that require use of current transducers because of slim-line panel boxes in many new homes (e.g., couldn't put the cover back on) • Report due to Nevada Utility Commission to detail outcomes

Sources:

- Interview with Bill Jackson, Senior Consultant, Paragon Consulting, November 2008
- *Home Energy Displays: The Nevada Product Trials*, Craig Boice, Boice Dunham Group and Bill Jackson, Paragon Consulting, Southwest Energy Efficiency Project, Albuquerque, New Mexico, November 16, 2007

Baltimore Gas & Electric – Smart Energy Savers Program

Timing: Ongoing; Program portfolio filed in 2007

Program Design/Research Methodology	Results/Findings
• Filed comprehensive BGE Smart Energy Savers Program in January 2007 spanning energy efficiency and demand response • Current efforts aimed at behavior change consist mainly of broad-based media campaign • Evaluating the use of email to target specific segments with customized messages (e.g., purchasing data on customer psychographics to target customers with a greater propensity to save) • Conducted Smart Energy Pricing pilot in summer of 2008 • Tested different technologies and pricing levels across different segments; included use of control group • Subsequent Smart Energy pricing pilot planned for summer 2009	• Smart Energy Pricing program under development ties with Peak Rewards air conditioning cycling program o "Carrot" approach found to be more affective than penalty ("stick") approach • Includes feedback to customers on their energy savings (e.g., "you saved $20 this week") via email or mailings separate from billing statements • Found that use of an energy "orb" to signal pricing changes to customers to allow voluntary action, in combination with automatic AC cycling switches resulted in increased savings for customers and reduced energy demand • Still evaluating technologies that provide actual data as opposed to the flashing colored lights of the energy orb • One driver of second pilot for dynamic pricing program is that initial studies showed smaller energy savings than expected; peak demand reductions were excellent, but overall energy savings were low o "Carrot" approach found to be more affective than penalty ("stick") approach

Source:

- Interview with Ruth Kiselewich, Director, Demand Side Management, Baltimore Gas & Electric Company, December 2008

British Columbia, Newfoundland and Labrador – PowerCost Monitor Pilots

Timing: Pilot studies initiated in 2005

Program Design/Research Methodology	Results/Findings
• Pilot conducted beginning in the spring and summer of 2005 • Pilot participants and control customers followed over a 3.5 year period • Involved ~200 customers of Newfoundland Power and BC Hydro • Stratified sample spread across diversity of geography, weather regions, demographics, and appliance configurations • No price or conservation incentives were give to sample participants	• Real-time feedback of energy consumption found to be effective in promoting conservation • 18.1% overall aggregate reduction in electricity consumption (kWh) across the study sample for Newfoundland • 2.7% aggregate reduction for the British Columbia sample o Reductions in the winter months in British Columbia were much higher than the rest of the year – "as high as 9.3%" • Response was found to be persistent and was not found to decrease over the study period • Within the Newfoundland sample, the electric water heating households had higher savings than non-electric water heating households • Education level was a significant variable affecting responsiveness in British Columbia sample • Positive attitudes toward conservation were found to have correlation with the reduction in electricity consumption • Senior citizens were found to achieve lower savings

Source:

- *Real-Time Feedback and Residential Electricity Consumption: British Columbia and Newfoundland and Labrador Pilots*, Dean C. Mountain, PhD, Mountain Economic Consulting and Associates Inc., June 2007

Energy Trust of Oregon – Home Energy Monitor Pilot

Timing: Pilot study initiated in 2008

Program Design/Research Methodology	Results/Findings
• Use of PowerCost Monitor from BlueLine Innovations • Two types of programs: direct-install at home energy review (HER) at no cost (N=200) vs. self-install early adopters (EA) purchase for $29.99 (N=170) • Home Energy Review sample stratified by region (Northern, Southern, Eastern), age of home (1959 & earlier, 1960-1989, 1990 & later) and primary heat source (gas or electric) • Early Adopter segmented by region (N, S, E)	Survey #1 - one week post-installation: • 64% of HER group report they look at the display unit 3 or more times per day; 32% indicate 1-2 times per day • Willingness to pay is low:: o HER group: 65% would pay $0-$40, 29% would pay $41-$80 o Early adopter group: 60% would pay $0-$40, 37% would pay $41-$80 • Actions identified as leading to lower energy consumption for 71% of HER group, 58% of early adopter group. % of respondents citing: o Indoor lighting – 71% (HER) / 56% (EA) o Outdoor lighting – 25% / 19% o Television – 23% / 20% o Electric cooking range – 18% / n.p. o Oven – 22% / n.p. o Computer – 31% / 37% o Computer monitor – 33% / 39% o Electric space heating – 26% / 19% o Electric water heating – 19% / n.p. o Electric clothes drying – 40% / 47% (*n.p. indicates "not provided"*) • 20% of early adopter households had trouble with installation; 18% had trouble programming the monitor Survey #2 – 6 months after install • Survey response rate: 45% (HER) / 63% (EA) • 64% (HER) / 66% (EA) still using the monitor • 27% (HER) / 20% (EA) report monitor no longer functional • 8% (HER) / 14% (EA) report functional monitor, but no longer using • 65% (HER) / 73% (EA) believe monitor has changed use of energy • 78% (HER) / 90% (EA) indicate satisfaction with the monitor • Identified useful features: o Instantaneous consumption o Instantaneous costs o Temperature and clock display • Identified participant suggestions for improvement o Simplification of programming o Home computer interface (trending) o Sensitivity – doesn't read usage below .3kW o Signal strength o Batter life o Ability to pinpoint specific end uses Calculation of actual energy savings not yet completed

Source:

- Energy Trust of Oregon, presentation at BECC Conference, Nov. 2008

Connexus Energy – Residential Behavior Change Programs

Timing: Ongoing; launched initiatives in 2008

Program Design/Research Methodology	Results/Findings
• Three separate pilot programs launched in 2008 to evaluate behavior change: • Smart metering pilot; ~1,000 homes • Use of in-home displays (Aztech display) for low income segment; 60-customer pilot • Positive Energy home energy reports (not yet underway); 40,000 customer pilot • Cost per kWh saved will be the benchmark for determining which programs to pursue on a larger scale • Conservation programs currently achieving a cost of around 10 to 19 cents per kilowatt hour saved • Customer focus group helped to reveal customer preferences	• Due to ongoing nature of programs, achieved savings estimates are not currently available • Key message from preliminary customer focus group: "keep it simple" • Preliminary findings: In-home display pilot in low income population: • No specific targets for energy savings • Current results have been below expectations • Aztech display chosen over PowerCost Monitor because it was an "under-glass" solution on the meter that metering technicians preferred to the external reader used with the PowerCost Monitor • Provide Kill-A-Watt meter in addition to Aztech device • Program funded out of state mandated spending requirement • Finding problems with customer acceptance; elderly customers prioritized for the program report confusion and issues with utilizing device technology • Cost to put a display unit in a customer's home found to be ~$250 • Anticipates program may be a niche program for the "techie" demographic Positive Energy: • Targeting 3% to 5% savings at a cost of about 4 to 5 cents per kWh • Includes 40,000 customer control group Smart Meters: • Customer focus groups show that customers would expect greater savings in order to be attracted to a critical-peak pricing program • Emphasis shifting to more of an energy education home display unit (i.e., achieving savings through feedback) • Still working on rate structure details

Source:

- Interview with Bruce Sayler, Program Manager, Connexus Energy, December 2008

Florida Solar Energy Center – Residential Energy Feedback Device Pilot

Timing: Pilot conducted from June 2006 to May 2007

Program Design/Research Methodology	Results/Findings

• 2-year pilot
• 22 homes in Florida participated
• No cost to study participants for use of ($140) device
• Average energy use data from 2 million homes in the territory used as a control to adjust for differences in historical periods when making comparisons on the treatment group's observed energy use
• The Energy Detective device selected over PowerCost Monitor
  o Resolution of 10W vs. 100W for PowerCost Monitor
• One-page survey sent to homeowners at the end of the study
	• Study author admits selection bias of sample – "not a statistical sample (the participants were self-selected"
	• 7% average reduction in energy use among participants vs. weather-normalized historical consumption
	  o 18,396 kWh/year average pre-installation consumption among participants (range from 6,000 to 41,000 kWh per year)
	  o 3.7 kWh per day average normalized savings; equates to ~1350 kWh in annual savings
	• Among the 17 homes in the final analysis group, normalized savings ranged from an increase of 9.5% to a decrease of 27.9%
	• Home with the largest consumption generally experienced larger savings
	• Identified behavior modifications among large savers:
	  o Changes to household lighting
	  o Reduction of pool-pump hours
	  o Replacement of older AC unit (one home)
	• Significant variation in amount of attention paid to the device among households
	• Households reporting greater interest and actions achieved higher savings
	• Since interest and motivation were found to be large factors in determining savings, author suggests that consumers worried about high bills or otherwise interested in lowering their energy use could be the best candidates for using the technology
	• Study author notes that the execution of a protocol to help users develop an inventory of individual loads by switching off circuits and appliances could be a powerful means to reduce energy use

Sources:

- *Pilot Evaluation of Energy Savings from Residential Energy Demand Feedback Devices*, Parker, D., Hoak, D., Cummings, J., Florida Solar Energy Center, January 2008
- Interview with Danny Parker, Principal Research Scientist, Florida Solar Energy Center, November 2008

Appendix 3 - Summary Table of Feedback Devices/Service Providers

Product/Service	Vendor	Features/Installation
PowerCost Monitor 	Blue Line Innovations Inc. 1st Floor, ICON Building 187 Kenmount Rd. St. John's, Newfoundland and Labrador Canada A1B 3P9 Phone: 709.579.3502 http://www.bluelineinnovations.com	• $110-140 retail price • Optical sensor connection to read analog meter or pulse of automatic meter • real-time display of moment-to-moment and total electricity costs in dollars and cents and kilowatt hours; also displays peak energy cost within the last 24 hours • Resolution of 100W down to 0.3 kW • Wireless display refreshes once per minute • 30,000+ deployed to Hydro One (Ontario) • 3,000+ unit pilot at NSTAR (MA) • 200+ unit pilot at Energy Trust of Oregon • Pilot at SMUD (CA)
The Energy Detective (TED) 	Energy, Inc. 3297 Pacific Street, Charleston, SC 29418 Phone: 843.766.9800 http://www.theenergydetective.com Founded: 2002	• $140 retail price • Current transducer clips on to powerline at electrical panel (may require electrician) • Display unit plugs into any outlet to communicate with sensor via powerline • Instantaneous display of $, kW; cumulative display of day/month-to-date/monthly $ and kWh; displays peak demand $and kW • Programmable alarm can be set if cost/hour or kW/hour exceed limit, if $ or kWh per day or month-to-date or monthly projection exceed limit • Resolution of 10W; true power every second • TED Footprints software package; download data from device for storage and analysis • Florida Solar Energy Center 20-home pilot • Featured in Popular Mechanics, REDBOOK, AOL's Energy Saving Tips

Product/Service	Vendor	Features/Installation
Positive Energy Home Energy Reports 	Positive Energy 1911 Ft Myer Drive Suite 702 Arlington, VA 22209 Phone: (703) 778-4544 www.positiveenergyusa.com	• Industry's first behavioral science driven, customer-centric, data analysis and communications software platform – the Home Energy Reporting System • Utility clients securely transfer energy consumption data to Positive Energy's software system (programs usually target 50,000 - 100,000 homes in the initial year) • Demographic data elements are combined with this consumption data • Energy profiles are created for each household, using rigorous segmentation and analysis • Reports are generated detailing how each residential customer is doing relative to similar households ("neighbor benchmarking") with respect to energy consumption, and specific recommendations on how to continue to reduce consumption are packaged with this benchmarking to residential customers both in the mail, online, and through a CSR tool • Savings are measured using rigorous M & V • Achieving 2% energy savings for random population sample of 35,000 customers at SMUD at cost of around 3 cents per kWh
Kill-A-Watt 	Aztech Associates Inc. 213-215 Main St. Annapolis, Maryland USA 21401 Tel: +1 (613) 384-9400	• $40 retail price • Monitor placed between outlet and appliance to monitor appliance-specific energy use • Calculate electrical expenses by the day, week, month, even an entire year • Cumulative kWh monitor • Also displays volts, amps, watts, Hz, VA • 0.2% Accuracy

Product/Service	Vendor	Features/Installation
Cent-A-Meter  	Manufactured by : Clipsal Australia Pty Ltd http://cacms.clipsal.com/consumer/products/cent-a-meter U.S. Distribution Contact: Intrec Services LLC 191 University Blvd, #850 Denver CO 80206-4613 United States of America Tel: 858 674 2555	• $140 retail price • Licensed electrician installs the Clip-On Sensor by attaching it to the main active or phase cable at the switchboard • Wireless hand-held Receiver Unit can be taken from room to room or placed in a central location • Displays the instantaneous $, kWh, temperature, humidity, greenhouse gas emissions • Does not record cumulative kWh or electricity cost • 11,000+ installed in Australia and New Zealand • For sale in U.S.
Aztech In-Home Display  	AzTech Associates Inc. 213-215 Main St. Annapolis, Maryland USA 21401 Tel: +1 (613) 384-9400	• Completely wireless connection to smart electrical meters. No retrofits required • Readings can be in kW/kWh or dollars, or both; instantaneous and continuous • Arched light pipe color for easy viewing of Time-Of-Use/Peak rate • 24 hour and 30 day histogram graphical output • Optional computer connectivity via USB • Optional intelligent thermostat control • Expandable to display water and gas readings

Product/Service	Vendor	Features/Installation
EML 2020-H 	Brultech Research Inc 79 Crestdale Ave St Catharines, ON, Canada L2T 3B4 Phone: 905-228-0755 http://www.brultech.com/	• $230 retail price • View the amount (KWh) and cost of energy used. • Display the average daily, weekly and monthly cost of energy. • Set and track a desired target electricity budget. • Determine the power required by individual appliances or loads by using a "tare power" method. There is no connection required to those loads. • Record, chart and print the energy usage. • Export records to other applications such as spreadsheets
MEA (Mobile Energy Assistant) 	San Vision Energy Technology Inc. 12170 Via Milano San Diego, CA 92128 Phone: (858) 405-6827 http://www.svetinc.com	• In-home display picks up wireless information from compatible smart meters • Records and displays energy consumption and cost data • Incorporates 2-way communication functionality for the administration of utility dynamic pricing programs • Uses zigbee wireless protocol to connect to home area network • Connects to Internet to communicate with MEA hosted servers and provide remote access to information (e.g., web, mobile phone) • Not currently available for purchase; “under pilot studies at several utilities and national laboratories”

Product/Service	Vendor	Features/Installation
EMS – 2020 	USCL Corporation 2433 Garfield Ave. Carmichael, CA 95608 Phone: 916-482-2000 http://www.usclcorp.com/	• Integrates with smart meter technology • Budget screen allows the user to configure parameters for the user to manage their utility budget (billing period, rate-type, rate, dynamic pricing options) • Can view daily budget cost, monthly budget cost, percent of daily/monthly, alarm limits • Monthly usage displays total accumulated kWh and cost; separated by tier/TOU period • Incorporates 2-way communication functionality for the administration of utility dynamic pricing programs • Mobile in-home display • Cost dependent on scale of installation
PowerPlayer 	Home Automation Europe Joan Muyskenweg 22 1096 CJ Amsterdam The Netherlands Phone: +31 (0)20-4621680 www.homeautomationeurope.com	• Color-rich touch screen energy monitor concept • Wireless RF connectivity to utility meter w/ transmitter • Designed to incorporate entertainment media functionality (e.g., digital photo display, audio/video file viewing) to increase user interaction • Can display instantaneous and accumulated electric, gas, and water consumption in units (kWh) and dollars • Accommodates dynamic pricing • Programmable to set budget/goal parameters and link entertainment functionality to energy consumption • Deployment anticipated in 2009 with prices targeted from $75 up

Appendix 4 - Comparison of Energy Use Meters

(Source: http://www.powermeterstore.com/c550/power_use_monitors.php)

	Power Cost Monitor	Cent-a-Meter	The Energy Detective	EML 2020-H
				
	In Stock Qualifies for Qwik-Ship		In Stock Qualifies for Qwik-Ship	In Stock Qualifies for Qwik-Ship
Price	$109.00	$141.62	$144.95	$229.00
Ratings				
Popularity				
Comments				
Install	User install	Recommend electrician	Recommend electrician	Recommend electrician

	Power Cost Monitor	Cent-a-Meter	The Energy Detective	EML 2020-H
Measure				
Max Volts AC	no	120V / 240V	120V / 240V	120V / 240V
Temperature	yes	yes	no	no
Humidity	no	yes	no	
Running Cost	yes	yes	yes	yes
Average Monthly Cost	yes	No data	yes	yes
Cummulative Cost	yes	No data	yes	yes
Greenhouse Gas Emissions	no	yes	no	no

	Power Cost Monitor	Cent-a-Meter	The Energy Detective	EML 2020-H
Power & Energy				
kWh / Kilowatt hours	yes	no	yes (total, projected)	yes
Watts / Kilowatts	yes	yes	yes (instantaneous, max)	yes

	Power Cost Monitor	Cent-a-Meter	The Energy Detective	EML 2020-H
Feature				
Memory	none	none	12months	13000 records
Recording	no	yes	yes	yes
Screen	Remote LCD	Remote LCD	Remote LCD	LCD
Windows Software	no	no	Yes	Basic version included
Communication	n/a	n/a	USB	USB
Alarm	no	yes	yes	no
Warranty	1year	1year	1year	1year
Batteries Required	yes	yes	no	no
Adustable Energy Rate	yes	yes	yes (true energy bill emulation)	yes

Appendix 5 – References

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Appendix 6 – Additional Intervention Measures

Product/Service	Vendor	Features/Installation
Smart Strip Power Strips 	BITS Ltd. 2101 Starkey Rd. #Q-2 Roger's Business Park Largo, FL, 33771 http://bitsltd.net/ConsumerProducts/index.htm	• $30 - $45 retail price depending on model • Includes control outlet (e.g., for computer, television) that is used to determine if power is supplied to automatically switched outlets o Example: if computer goes into sleep mode, peripherals (e.g., printers, chargers, etc.) are switched off to avoid use in standby mode or phantom power loss • Constant hot outlets for devices that are meant to be left on (e.g., fax)
GreenSwitch Products 	Green Earth Global 1636 Smithfield way Suite 1150 Oviedo, FL 32765 1-877-407-2244 http://minnesota.greenswitch.tv/	• GreenSwitch Master Switch sends a protected radio frequency signal to other GreenSwitch components throughout the home, shutting off power to selected lights, outlets, and signaling a programmable thermostat • Individual switches, outlets, and programmable thermostats are available for purchase/install that allow customizable design of what components are controlled by the master switch • $500 to $1000 estimated cost to outfit most homes • Payback calculator available on Web site

Attachment 20.4

BEFORE THE WASHINGTON STATE
UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of AVISTA CORPORATION'S	)	DOCKET UE-100176
	)	ORDER 01
Ten-Year Achievable Conservation Potential And Biennial Conservation Target Under RCW 19.285.040 and WAC 480-109-010	)	ORDER APPROVING AVISTA'S TEN-YEAR ACHIEVABLE CONSERVATION POTENTIAL AND BIENNIAL CONSERVATION TARGET SUBJECT TO CONDITIONS

BACKGROUND

The Energy Independence Act

1 Washington voters approved Initiative 937, the Energy Independence Act, in the 2006 general election. Now codified in Chapter 19.285 of the Revised Code of Washington, it requires electric utilities with 25,000 or more customers to set and meet energy conservation targets, among other things.

2 Under RCW 19.285.040(1)(a) and (b), utilities are required to do the following:

> (1) Each qualifying utility shall pursue all available conservation that is cost-effective, reliable, and feasible.
>
> (a) By January 1, 2010, using methodologies consistent with those used by the Pacific Northwest electric power and conservation planning council in its most recently published regional power plan, each qualifying utility shall identify its achievable cost-effective conservation potential through 2019. At least every two years thereafter, the qualifying utility shall review and update this assessment for the subsequent ten-year period.

> (b) Beginning January 2010, each qualifying utility shall establish and make publicly available a biennial acquisition target for cost-effective conservation consistent with its identification of achievable opportunities in (a) of this subsection, and meet that target during the subsequent two-year period. At a minimum, each biennial target must be no lower than the qualifying utility's pro-rata share for that two-year period of its cost-effective conservation potential for the subsequent ten-year period.

3 "Conservation" is defined in RCW 19.285.030(4) to mean "any reduction in electric power consumption resulting from increases in the efficiency of energy use, production, or distribution." This definition is substantially similar to the definition of "conservation" in the Pacific Northwest Electric Power Planning and Conservation Act of 1980 ("Northwest Power Act"), 16 U.S.C. § 839a(3).

4 "Cost effective" is defined in RCW 80.52.030(7) to mean "a project or resource is forecast:

> (a) To be reliable and available within the time it is needed; and
>
> (b) To meet or reduce the electric power demand of the intended consumers at an estimated incremental system cost no greater than that of the least-cost similarly reliable and available alternative project or resource, or any combination thereof."

5 System cost is defined in RCW80.52.030(8) to mean "an estimate of all direct costs of a project or resource over its effective life, including, if applicable, the costs of distribution to the consumer, and, among other factors, waste disposal costs, end-of-cycle costs, and fuel costs (including projected increases), and such quantifiable environmental costs and benefits as are directly attributable to the project or resource."

6 RCW 19.285.040(1)(a) requires utilities to use "methodologies consistent with those used by the Pacific Northwest electric power and conservation planning council" when identifying their achievable cost-effective conservation potential. The Pacific Northwest Electric Power and Conservation Planning Council ("Council") is a regional multistate

agency established under the Northwest Power Act.[1] The Council prepares and adopts a regional conservation and electric power plan for the Pacific Northwest region south of Canada every five years.[2] The Council's plans include regional targets for conservation. The Council adopted its Sixth Northwest Power Plan in February 2010.

7 RCW 19.285.080(1) authorizes the Washington Utilities and Transportation Commission ("Commission") to "adopt rules to ensure the proper implementation and enforcement of this chapter as it applies to investor-owned utilities." The Commission adopted such rules in Docket UE-061895, *In the Matter of Adopting Rules to Implement the Energy Independence Act*, General Order R-546 (Nov. 26, 2007). The rule adoption order is published in issue 08-1 of the Washington State Register as Wash. St. Reg. 07-24-012. The rules are codified at Chapter 480-109 of the Washington Administrative Code.

8 WAC 480-109-010 guides investor-owned utilities' compliance with RCW 19.285.040(1). WAC 480-109-010(1) requires each utility, by January 1, 2010, to project its cumulative ten-year conservation potential. WAC 480-109-010(3) requires each utility, beginning January 2010, to establish a biennial conservation target. WAC 480-109-010(3) directs that, "On or before January 31, 2010, . . . each utility must file with the commission a report identifying its ten-year achievable conservation potential and its biennial conservation target." WAC 480-109-010(4) describes the process for review by the Commission. Under WAC 480-109-010(4)(c), upon conclusion of that review, "the commission will determine whether to approve, approve with conditions, or reject the utility's ten-year achievable conservation potential and biennial conservation target."

9 Under RCW 19.285.040(1)(a), utilities are to use "methodologies consistent with those used by the [Council]" when identifying their achievable cost-effective conservation potential. The Commission's rules do not describe the Council's methodology for assessing conservation potential. The Washington Department of Commerce has adopted rules to guide consumer-owned utilities' compliance with RCW 19.285.040, including a rule that briefly describes the methodology. Though the Department of Commerce rule does not bind the Commission or investor-owned utilities, it provides a useful abbreviated summary of the Council's methodology.

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[1] 16 U.S.C. § 839b(a); *see* RCW 43.52A (state participation in the Council).
[2] 16 U.S.C. § 839b(d)(1); *see* 16 U.S.C. § 839a(14) (definition of "regional").

10 The Department of Commerce rule, WAC 194-37-070(6)(a), provides:

> The [Council's] analytical methodology for establishing the conservation resource potential and conservation targets for the Northwest power system is outlined in procedures (a)(i) through (xv) of this subsection. . . :
>
> (i) Analyze a broad range of energy efficiency measures considered technically feasible;
>
> (ii) Perform a life-cycle cost analysis of measures or programs, including the incremental savings and incremental costs of measures and replacement measures where resources or measures have different measure lifetimes;
>
> (iii) Set avoided costs equal to a forecast of regional market prices, which represents the cost of the next increment of available and reliable power supply available to the utility for the life of the energy efficiency measures to which it is compared;
>
> (iv) Calculate the value of the energy saved based on when it is saved. In performing this calculation, use time differentiated avoided costs to conduct the analysis that determines the financial value of energy saved through conservation;
>
> (v) Conduct a total resource cost analysis that assesses all costs and all benefits of conservation measures regardless of who pays the costs or receives the benefits. The [Council] identifies conservation measures that pass the total resource cost test as economically achievable;
>
> (vi) Identify conservation measures that pass the total resource cost test, by having a benefit/cost ratio of one or greater as economically achievable;
>
> (vii) Include the increase or decrease in annual or periodic operations and maintenance costs due to conservation measures;
>
> (viii) Include deferred capacity expansion benefits for transmission and distribution systems in its cost-effectiveness analysis;

(ix) Include all nonpower benefits that a resource or measure may provide that can be quantified and monetized;

(x) Include an estimate of program administrative costs;

(xi) Discount future costs and benefits at a discount rate based on a weighted, after-tax, cost of capital for utilities and their customers for the measure lifetime;

(xii) Include estimates of the achievable customer conservation penetration rates for retrofit measures and for lost-opportunity (long-lived) measures. The [Council's] twenty-year achievable penetration rates, for use when a utility assesses its twenty-year potential, are eighty-five percent for retrofit measures and sixty-five percent for lost opportunity measures achieved through a mix of utility programs and local, state and federal codes and standards. The [Council's] ten-year achievable penetration rates, for use when a utility assesses its ten-year potential, are sixty-four percent for nonlost opportunity measures and twenty-three percent for lost-opportunity measures; the weighted average of the two is a forty-six percent ten-year achievable penetration rate;

(xiii) Include a ten percent bonus for conservation measures as defined in 16 U.S.C. § 839a of the Pacific Northwest Electric Power Planning and Conservation Act;

(xiv) Analyze the results of multiple scenarios. This includes testing scenarios that accelerate the rate of conservation acquisition in the earlier years; and

(xv) Analyze the costs of estimated future environmental externalities in the multiple scenarios that estimate costs and risks.

11 An outline of the major elements of the Council's methodology, downloaded from the Council's Internet Web site,[3] was provided to the Commission as Attachment 1 to the April 29, 2010 Staff Memo and as Appendix B to the March 5, 2010 Staff Comments in

[3] The outline is available at http://www.nwcouncil.org/energy/powerplan/6/supplycurves/I937/CouncilMethodology_outline%20_2_.pdf (last visited May 13, 2010).

this Docket. The Council's methodology is generally described in Council document 2007-13, "Achievable Savings: A Retrospective Look at the Northwest Power and Conservation Council's Conservation Planning Assumptions" (August 2007).[4]

Avista's Filings

12 On December 31, 2009, Avista Corporation ("Avista" or "Company") documented its compliance with the January 1, 2010 deadline of RCW 19.285.040(1)(a) and WAC 480-109-010(1) by filing with the Commission a document entitled "Projected 'Cumulative Ten-Year Electric Conservation Potential'." The filing was assigned docket number UE-091983. In the December 31 filing, Avista identified a ten-year conservation potential of 873,302 megawatt-hours.

13 On January 29, 2010, in accordance with WAC 480-109-010(3), Avista filed with the Commission a Ten-Year Achievable Conservation Potential and Biennial Conservation Target Report ("Initial Report"), pursuant to RCW 19.285.040(1). That filing initiated this Docket UE-100176. Avista identified a ten-year conservation potential of 873,302 megawatt-hours and a biennial 2010-11 conservation target of 128,603 megawatt-hours. In its 20-page Initial Report, Avista explained that it had used Option 1 in the Sixth Plan Target Calculator interactive spreadsheet posted on the Council's Web site to guide its development of these numbers,[5] with modifications applicable to Avista's conservation programs. Avista filed more than 350 pages of supporting materials, including Council documents, correspondence with stakeholders and advisors, draft protocols for evaluating elements of Avista's conservation programs, and a 218-page document entitled "2010 DSM DSM Business Plan," which provided substantial details about Avista's energy efficiency programs.

14 On February 2, 2010, the Commission issued a Notice of Opportunity to Comment on Avista's Initial Report by March 5, 2010, and a notice that Avista's Initial Report would be considered at the Commission's Open Meeting on March 11, 2010. During the

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[4] Council document 2007-13 is available at http://www.nwcouncil.org/library/2007/2007-13.pdf (last visited May 13, 2010).

[5] The Sixth Plan Target Calculator interactive spreadsheet is available on the Council's Web site at http://www.nwcouncil.org/energy/powerplan/6/supplycurves/I937/UtilityTargetCalc_v2.0_6thPlan.xls (last visited May 13, 2010). According to the Introduction section of the spreadsheet, its purpose is "to provide utilities with a simple means to compute 'their share' of the Northwest Power and Conservation Council 6th Plan's regional conservation target." For utilities such as Avista whose service territory is in more than one state, the Calculator computes a separate output for each state in which the utility provides electric service.

comment period, the Commission received written comments from Public Counsel, the Northwest Energy Coalition, the Washington Department of Ecology, and Commission Staff. The Commission heard additional oral comments at the March 11, 2010, Open Meeting from the Sierra Club, Climate Solutions, the Northwest Energy Efficiency Alliance, the Energy Project, Public Counsel, the Northwest Energy Coalition, the Company, and Commission Staff.

15 RCW 19.285.040(1)(e) authorizes the Commission to "rely on its standard practice for review and approval of investor-owned utility conservation targets." The Commission has codified some of its standard practice in WAC 480-109-010(4). Under the rule, the Commission will consider all comments on a utility's ten-year achievable conservation potential and biennial conservation target, may determine that additional scrutiny is warranted, and may establish an adjudicative proceeding or other process to fully consider appropriate revisions. Upon conclusion of its review, the Commission will approve, approve with conditions, or reject the utility's ten-year conservation potential and biennial conservation target.

16 The Commission decided at the March 11 Open Meeting to defer its consideration of Avista's filing to a later open meeting so that Commission Staff, Avista, and other interested persons could engage in additional discussion. Staff sought input from interested persons on a draft list of conditions for approval of Avista's ten-year conservation potential and biennial conservation target. Staff convened a conference call on March 19, 2010, in which Avista and interested persons participated.

17 As a result of those conversations, Avista filed a Revised Ten-year Achievable Conservation Potential and Biennial Conservation Target Report ("Revised Report") on April 16, 2010. In the April 16 filing, Avista identified a ten-year conservation potential of 873,302 megawatt-hours and a biennial 2010-11 conservation target of 128,603 megawatt-hours. The overall numbers were the same as those identified in the Initial Report, but Avista clarified that its biennial conservation target included a minimum of 125,982 megawatt-hours from conservation measures that do not rely on electric-to-natural gas fuel switching. The main body of the Revised Report described how Avista involved the public in developing its biennial target; how the Company established its ten-year achievable conservation potential and biennial conservation target; what measures the Company will use to achieve that target; and how acquisition will be measured. The Revised Report also described how Avista will work with stakeholders

during the initial (2010-2011) compliance period, as well as the Company's expectations for future compliance periods. The 21-page Revised Report was supported by three attachments totaling over 350 pages, and included some information that had not been filed with the Initial Report. Public Counsel and the Northwest Energy Coalition submitted written comments on the Revised Report.

18 Staff reviewed the Revised Report, and was satisfied with the changes made by the Company. Staff presented a memo at the April 29, 2010, Open Meeting recommending approval with conditions.

19 The Commission considered Avista's Revised Report at its April 29, 2010 Open Meeting, and heard additional oral comments from Public Counsel, the Northwest Energy Coalition, the Company, and Commission Staff. The comments indicated general agreement among the participants, but revealed the need for further discussion regarding the details of a final order. The Commission approved Avista's Ten-Year Achievable Conservation Potential and Biennial Conservation Target subject to conditions to be worked out through additional discussion, with a final order to be presented to the Commission at its May 13, 2010 Open Meeting.

SUMMARY AND DISCUSSION OF COMMENTS FROM INTERESTED PERSONS

Commission Staff

20 Commission Staff evaluated whether Avista had complied with RCW 19.285.040(1) and WAC 480-109-010 by reviewing the following aspects of its Initial and Revised Reports:

- The Company's methodology for identifying its ten-year conservation potential and whether it was consistent with the Council's methodology for assessing conservation potential.
- Details about the Company's programs and whether they supported the ten-year conservation potential and biennial target.
- The extent to which the Company included public participation in the development of the ten-year conservation potential and biennial target.

21 Staff was pleased with Avista's Initial Report and found it to be well-supported but incomplete, with additional information needed about a few items, as follows:

- Assurance that Avista would not rely disproportionately on electric-to-gas fuel switching to achieve conservation savings;
- Avista's rationale for excluding irrigation pumping load from its ten-year conservation potential; and
- Clarification about Avista's methodology for counting distribution efficiency savings.

22 In addition, Staff objected to Avista's proposal to set future biennial conservation targets on a cumulative basis, rather than a biennial basis. Finally, Staff recommended that some issues that had implications for all investor-owned utilities in Washington, such as the collection of interest on tariff rider fund balances, be deferred to a "Washington Conservation Collaborative" for broader discussion.

23 **Fuel Switching**. Avista used the output from Option 1 of the Council's Sixth Plan Target Calculator and then made adjustments to account for Avista's programs that encourage residential customers to switch from electric furnaces and appliances to those that use natural gas. Under the Council's view of its legal mandate, the Council has not included electric-to-gas fuel switching in its menu of conservation measures, but it recognizes that fuel switching can result in case-specific energy savings. Staff urged that fuel-switching that saves energy should be recognized as "conservation" under RCW 19.285, noting that the Commission conducted a workshop on switching from electricity to natural gas for direct end use in Docket UG-080750.

24 Staff was initially concerned, however, that Avista's inclusion of electric-to-gas fuel switching could result in undue reliance on that measure. In its Revised Report, Avista clarified that its 2010-11 biennial conservation target of 128,603 megawatt-hours includes a minimum of 125,982 megawatt-hours from conservation measures that do not rely on fuel-switching. Staff was satisfied with that clarification.

25 **Irrigation Pumping Load.** Avista's Initial Report did not mention irrigation pumping as a potential source for reductions in electric power consumption. Staff found no support for that omission. In its Revised Report, Avista stated that irrigation pumping loads accounted for only 2.5% of usage and 2.3% of revenue, and provided supporting documentation for those numbers. The Revised Report explained that Avista pursues pumping efficiency opportunities as part of its site-specific conservation program, in

which conservation measures are individually tailored for each customer. Staff was satisfied with the explanation.

26 **Distribution Efficiency.** Staff was unable to determine from Avista's Initial Report whether the Company's methodology for counting distribution efficiency savings was consistent with the Council's conservation potential assessment methodology. In its Revised Report, Avista included additional information about its distribution efficiency potential, explaining that the Company had relied on the methodology established by the non-profit Northwest Energy Efficiency Alliance (NEEA), as published in a 2008 NEEA report on the Utility Distribution Efficiency Initiative. Staff was satisfied with the explanation.

27 **Other Issues.** In its Final Report, Avista deleted its proposal to set future biennial conservation targets on a cumulative basis. Staff agreed with the deletion.

28 Staff concluded that Avista had provided the public and Staff with sufficient opportunities for participation in the development of its ten-year conservation potential and biennial conservation target under WAC 480-109-010(3)(a).

29 Staff concluded that Avista's methodology for identifying its ten-year conservation potential was consistent with the Council's methodology. Staff concluded that Avista's use of the Council's Sixth Plan Target Calculator for deriving its ten-year conservation potential and biennial target, as modified to include electric-to-gas conversions, was consistent with WAC 480-109-010(1)(b)(ii) and WAC 480-109-010(2).

30 Staff recommended that the largely voluntary guidelines under which Avista had previously operated its conservation programs be incorporated into an order in this Docket. The rationale is that RCW 19.285.040(1)(e) authorizes the Commission to "rely on its standard practice for review and approval of investor-owned utility conservation targets," and the Commission's "standard practice" for reviewing and approving utility practices includes program details. Avista agreed to entry of an order that includes program details.

31 Staff proposed a condition that Avista spend between three and six percent of its conservation budget on evaluation, measurement, and verification activities to determine whether its programs result in actual energy savings. During the April 29 Open Meeting,

Staff explained that three to five percent is consistent with budget allocations in other jurisdictions. Staff also proposed that Avista be permitted to spend up to ten percent of its conservation budget on programs whose energy savings has not yet been measured, so long as the Company's overall portfolio of conservation measures passes the Total Resource Cost test as modified by the Council.[6] Avista agreed to both conditions.

32 Avista's Initial and Final Reports contained proposals for addressing future opportunities for pursuing energy savings. Staff proposed conditions requiring Avista to file additional information in the future regarding such opportunities if it elects to pursue them. Avista agreed to that condition.

33 In the Staff Comments of March 5, 2010, Staff identified a possible inconsistency between a provision in a prior Avista rate-making order and RCW 19.285. The provision in question addresses interest on conservation tariff rider fund balances.[7] Staff proposed that the Commission establish a Washington Conservation Collaborative as a forum for coordination and development of issues and solutions related to the implementation of RCW 19.285, including the issue of interest on rider fund balances. In a related matter, on April 6, 2010, the Commission filed with the Washington Code Reviser a Preproposal Statement of Inquiry "to examine if [the Commission] should adopt new or modified regulations to address declines in revenue as a result of utility promoted conservation."[8] The Commission assigned docket number U-100522 to the proceeding and invited interested parties to submit statements of issues. Included on the list that Avista submitted on April 23, 2010, was the issue of whether a utility should be allowed to accrue interest on tariff rider fund balances. In the Staff Memo dated April 29, 2010, Staff proposed that the issue be addressed in Docket U-100522 and need not be addressed in this Docket.

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[6] A summary of the Total Resource Cost test as applied by the Council is contained in Item 3(a) in Attachment 1 to the Commission Staff Memo dated April 29, 2010 and Appendix B to the Staff Comments dated March 5, 2010. The document is also available on the Council's Web site at http://www.nwcouncil.org/energy/powerplan/6/supplycurves/I937/CouncilMethodology_outline%20_2_.pdf (last visited May 13, 2010).

[7] *Wash. Utils. & Transp. Comm'n v. Avista Corp.*, Docket Nos. UE-991606/UG-991607, Third Supplemental Order ¶ 422 (Sept. 29, 2000).

[8] Wash. St. Reg. 10-08-075. A preproposal statement of inquiry is the first step in rule making under the Washington Administrative Procedure Act, RCW 34.05.310.

Public Counsel

34 In written comments dated March 5, 2010, Public Counsel stressed that utility conservation programs should be cost-effective and well-designed. Public Counsel questioned whether Avista's proposal to count energy savings from electric-to-natural gas conversions as "conservation" was consistent with the Council's conservation potential assessment methodology. Public Counsel expressed concern about Avista's proposal to include in the Company's assessment of conservation potential quantifiable behavioral efficiencies, distribution efficiencies, regional efficiency measures "beyond utility program intervention," the acquisition of NEEA savings, and projects funded under the American Reinvestment and Recovery Act. Public Counsel thought it premature to treat such items as qualifying measures without further clarification and scrutiny. Like Staff, Public Counsel objected to Avista's proposal to set future biennial conservation targets on a cumulative basis, rather than a biennial basis, believing the Company's proposal to be inconsistent with RCW 19.285. Public Counsel was also concerned that Avista's Demand Side Management savings estimates may not be consistent with those of the Council's Regional Technical Forum. Public Counsel urged that Avista had not provided adequate documentation to show how it developed its biennial target from its ten-year conservation potential. Finally, Public Counsel stated that interested parties had not had a meaningful opportunity to engage in the development of Avista's proposed biennial target.

35 Public Counsel recommended a rule making or other process to address certain topics such as the savings estimates used to calculate conservation acquisition and the development of standard Demand Side Management reporting requirements. Public Counsel also recommended that the Commission approve only Avista's specific numerical biennial target and ten-year potential and not Avista's entire Initial Report.

36 In written comments dated April 23, 2010, Public Counsel expressed disappointment that Avista's Revised Report did not adopt many of the revisions and clarifications Public Counsel had requested. Public Counsel recommended, however, that the Commission approve Avista's proposed ten-year conservation potential and biennial target, subject to conditions. First, Public Counsel recommended that Avista be required to submit annual budgets, with program details, to its energy efficiency advisory group. Second, Public Counsel recommended that the Commission specifically list approved strategies for

Avista's selection and evaluation of energy conservation savings. Avista agreed to both conditions.

37 Public Counsel reiterated that conservation measures should be quantifiable and verifiable. Public Counsel recommended that, in future filings, Avista should explain the relationship between its Integrated Resource Plan and its biennial conservation target under RCW 19.285.040(1), and should document the relationship between its ten-year conservation potential and its biennial target.

38 Public Counsel submitted additional written comments on April 29, 2010. Public Counsel recommended that Avista should review the rebates it offers to customers to make sure they are not directed predominantly to customers who would have invested in efficiency measures anyway.

39 In oral comments presented during the Commission's April 29, 2010 Open Meeting, Public Counsel expressed concern about Commission Staff's proposal that Avista be permitted to spend up to ten percent of its conservation budget on programs whose energy savings has not yet been measured.

Northwest Energy Coalition

40 In written comments dated March 5, 2010, the Northwest Energy Coalition ("NWEC") recommended that the Commission approve with conditions Avista's biennial conservation target. NWEC recommended that Avista be required to use consistent methods of calculating conservation potential and savings in all future filings. NWEC supported Avista's proposal to count energy savings from electric-to-natural gas conversions as "conservation," but only to the extent that such conversions install high-efficiency natural gas equipment. NWEC recommended that installation of new distribution system equipment should qualify as a conservation measure only if the new equipment meets high efficiency standards. NWEC joined with Commission Staff and Public Counsel in objecting to Avista's proposal to set future biennial conservation targets on a cumulative basis, rather than a biennial basis. NWEC stated that Avista's level of stakeholder involvement was adequate, but encouraged greater outreach in the future. NWEC asked the Commission to consider consolidating Avista's various conservation filings into a single docket, at least in even-numbered years.

41 In written comments dated April 23, 2010, NWEC again recommended that installation of new distribution system equipment should qualify as a conservation measure only if the new equipment meets high efficiency standards. NWEC reiterated that electric-to-natural gas conversions should count as "conservation" only to the extent that such conversions install high-efficiency natural gas equipment. During the Commission's April 29, 2010, Open Meeting, Avista suggested that it would reduce its biennial conservation target if that condition were imposed. Commission Staff suggested that a possible solution could be a condition requiring Avista to phase out incentives for customers to convert electric equipment to standard-efficiency natural gas equipment.

42 In oral comments presented during the Commission's April 29, 2010, Open Meeting, NWEC agreed with Commission Staff's proposal that Avista be permitted to spend up to ten percent of its conservation budget on programs whose energy savings has not yet been measured.

Washington Department of Ecology

43 The Washington Department of Ecology (Ecology) submitted written comments dated March 5, 2010. Ecology's comments were made as one comment on the filings of all three of the investor-owned electric utilities. Ecology expressed support for Avista's use of the Council's Sixth Plan Target Calculator as a basis for developing its biennial conservation target, and generally encouraged utilities to invest in cost-effective electricity conservation measures.

FINDINGS AND CONCLUSIONS

44 (1) The Washington Utilities and Transportation Commission is an agency of the state of Washington vested by statute with the authority to regulate the rates, rules, regulations, practices, accounts, securities, transfers of property and affiliated interests of public service companies, including electric companies. *RCW 80.01.040, RCW 80.04, RCW 80.08, RCW 80.12, RCW 80.16, RCW 80.28.*

45 (2) Under RCW 19.285.040(1)(a) and (b), electric utilities that serve more than 25,000 customers in the State of Washington are required to do the following:

(1) Each qualifying utility shall pursue all available conservation that is cost-effective, reliable, and feasible.

(a) By January 1, 2010, using methodologies consistent with those used by the Pacific Northwest electric power and conservation planning council in its most recently published regional power plan, each qualifying utility shall identify its achievable cost-effective conservation potential through 2019. At least every two years thereafter, the qualifying utility shall review and update this assessment for the subsequent ten-year period.

(b) Beginning January 2010, each qualifying utility shall establish and make publicly available a biennial acquisition target for cost-effective conservation consistent with its identification of achievable opportunities in (a) of this subsection, and meet that target during the subsequent two-year period. At a minimum, each biennial target must be no lower than the qualifying utility's pro-rata share for that two-year period of its cost-effective conservation potential for the subsequent ten-year period.

46 (3) As used in RCW 19.285.040(1), "'Conservation' means any reduction in electric power consumption resulting from increases in the efficiency of energy use, production, or distribution." *RCW 19.285.030(4)*.

47 (4) The Washington Utilities and Transportation Commission has authority to determine investor-owned utilities' compliance with RCW 19.285.040(1). *RCW 19.285.060(6)*. The Commission has authority to review and decide whether to approve investor-owned utility conservation targets. The Commission may rely on its standard practice in exercising that authority. *RCW 19.285.040(1)(e)*. The Commission has adopted WAC 480-109-010 to implement RCW 19.285.040(1).

48 (5) Avista is an electric company and a public service company subject to Commission jurisdiction. Avista is a qualifying investor-owned electric utility under RCW 19.285.030.

49 (6) Avista timely identified its ten-year achievable conservation potential and biennial conservation target, and timely submitted a Ten-Year Achievable Conservation Potential and Biennial Conservation Target Report to the Commission under WAC 480-109-010.

50 (7) To guide the development of its 2010-2019 achievable conservation potential and 2010-2011 biennial conservation target, Avista used Option 1 in the Sixth Plan Target Calculator interactive spreadsheet prepared by the Pacific Northwest Electric Power and Conservation Planning Council. Using the Sixth Plan Target Calculator as a starting point, Avista made modifications applicable to its conservation programs. After considering Avista's Revised Report and supporting documentation, comments received, and Staff's analysis, the Commission concludes that the Ten-Year Achievable Conservation Potential that Avista identified is consistent with RCW 19.285.040(1) and WAC 480-109-010(1). The Commission concludes that the 2010-2011 Biennial Conservation Target that Avista established is consistent with RCW 19.285.040(1) and WAC 480-109-010(2).

51 (8) The Commission concludes that Avista has satisfied the staff and public participation requirements of WAC 480-109-010(3) in developing its ten-year conservation potential and biennial conservation target.

52 (9) Avista agreed to the Conditions described in this Order. The Conditions memorialize the Commission's standard practice with respect to investor-owned utility conservation programs and facilitate the Commission's ability to determine Avista's compliance with the provisions of RCW 19.285. *RCW 19.285.040(1)(e)*; *RCW 19.285.060(6); RCW 80.28.303(1).*

53 (10) Avista's Ten-Year Achievable Conservation Potential of 873,302 megawatt-hours and Biennial Conservation Target of 128,603 megawatt-hours, including at least 125,982 megawatt-hours of conservation resources not derived from electric-to-natural gas conversions, are appropriate subject to the Conditions included in this Order.

54 (11) After reviewing Avista's Revised Ten-Year Achievable Conservation Potential and Biennial Conservation Target Report filed on April 16, 2010, and giving due consideration to all relevant matters and for good cause shown, the Commission finds it is in the public interest to approve with conditions Avista's Ten-Year Achievable Conservation Potential and Biennial Conservation Target identified in the Company's Revised Report, as authorized by RCW 19.285.040 (1)(e) and WAC 480-109-010(4).

55 (12) The Commission finds that it is not appropriate to consider Staff's proposal for a conservation collaborative until after the Commission has completed review of the pending conservation target filings of the other investor-owned utilities. When those reviews are complete, Staff may renew its proposal, taking into account the other demands on Commission staff resources.

56 (13) This matter came before the Commission at its regularly-scheduled meeting on April 29, 2010. The Commission orally approved Avista's ten-year conservation potential and biennial conservation target at that time. This final Order was presented to the Commission for consideration at its regularly-scheduled meeting on May 13, 2010.

ORDER

THE COMMISSION ORDERS:

57 (1) Avista Corporation's Ten-Year Achievable Conservation Potential and Biennial Conservation Target, as identified in the Company's Revised Report filed on April 16, 2010, are approved with conditions pursuant to RCW 19.285.040(1)(e) and WAC 480-109-010(4)(c). This approval is subject to the Conditions described in Paragraphs (2) through (11) below.

58 (2) **Company Retains Responsibility.** Nothing within this Order relieves Avista of the sole responsibility for complying with RCW 19.285, which requires Avista to use methodologies consistent with those used by the Pacific Northwest Electric Power and Conservation Planning Council ("Council"). Specifically, the Conditions regarding the need for a high degree of transparency, and communication and consultation with external stakeholders, diminish neither

Avista's operational authority nor its ultimate responsibility for meeting the biennial conservation target approved herein.

59 (3) **Advisory Group**.

(a) Avista must maintain and use an external conservation Advisory Group of stakeholders to advise the Company on the topics described in subparagraphs (i) through (x) below. To meet this condition, Avista may continue to use its External Energy Efficiency Board created under Docket UE-981126, and its Integrated Resource Planning Technical Advisory Committee created under WAC 480-100-238. The Advisory Group shall advise on the following:

(i) Development and modification of protocols to evaluate, measure, and verify energy savings in Avista's programs.

(ii) Development of conservation potential assessments under RCW 19.285.040(1)(a) and WAC 480-109-010(1).

(iii) Guidance to Avista regarding methodology inputs and calculations for updating cost-effectiveness.

(iv) Review of data sources and values used to update supply curves.

(v) Consideration of the need for tariff modifications or mid-course program corrections.

(vi) Review appropriate level of and planning for:

(1) Marketing conservation programs.

(2) Incentives to customers for measures and services.

(vii) Consideration of issues related to conservation programs for customers with limited income.

(viii) Comparing program achievement results with annual and biennial targets.

(ix) Review of conservation program budgets and actual expenditures compared to budgets.

(b) The Advisory Group should meet quarterly at a minimum. Avista must permit any member to request an additional meeting of the Advisory Group with reasonable notice.

60 (4) **Annual Budgets and Energy Savings**.

(a) Avista must submit annual budgets to the Advisory Group and to the Commission no later than November 1 of each year. The submissions

must include reasonable program detail that shows planned expenses and the resulting projected energy savings. In odd-numbered years, the annual budget may be submitted as part of the Biennial Conservation Plan required under Paragraph 8(f) below. In even-numbered years, the annual budget may be submitted as part of the DSM Business Plan required under Paragraph 8(b) below.

(b) Avista must provide its proposed budget in a detailed format with a summary page indicating the proposed budget and savings levels for each electric conservation program, and subsequent supporting spreadsheets providing further detail for each program and line item shown in the summary sheet.

61 (5) **Program Details**. Avista must maintain its conservation tariffs, with program descriptions, on file with the Commission. Program details about specific measures, incentives, and eligibility requirements must be filed as tariff attachments or as revisions to the Company's DSM Business Plan. Avista may propose other methods for managing its program details in the Biennial Conservation Plan required under Paragraph 8(f) below, after consultation with the Advisory Group as provided in Paragraph 9(b) below.

62 (6) **Approved Strategies for Selecting and Evaluating Energy Conservation Savings.**

(a) Avista has identified a number of potential conservation measures as qualifying measures in its Revised Report filed on April 16, 2010, in this Docket. The Commission is not obligated to accept savings identified in the Revised Report for purposes of compliance with RCW 19.285. Avista must demonstrate the prudence and cost-effectiveness of its conservation programs to the Commission after the savings are achieved. *See RCW 19.285.040(1)(d).*

(b) Except as provided in subparagraph (6)(c), Avista must use the Council's Regional Technical Forum's ("RTF's") "deemed" savings for electricity measures. As of the date of this Order, the RTF maintains a Web site at http://www.nwcouncil.org/energy/rtf/.

(c) If Avista utilizes savings amounts for prescriptive programs that have not been established by the RTF, such estimates must be based on a rigorous

impact evaluation that has verified savings levels, and be presented to the Advisory Group for comment.

(d) When Avista proposes a new program, it must present it to the Advisory Group for comment with program details fully defined. After consultation with the Advisory Group in accordance with Paragraph 3 above, Avista must file a revision to its DSM Business Plan in this Docket. The revision may be acknowledged by placement on the Commission's No Action Open Meeting agenda.

(e) Avista must provide opportunities for the Advisory Group to review and assist with the development of evaluation, measurement and verification protocols for conservation programs. See Paragraph 3(a)(i) above.

(f) Avista must spend between three (3) and six (6) percent of its conservation budget on evaluation, measurement, and verification (EM&V), including a reasonable proportion on independent, third-party EM&V. Avista must perform EM&V annually on a multi-year schedule of selected programs such that, over the EM&V cycle, all major programs are covered. The EM&V function includes impact, process, market and cost test analyses. The results must verify the level at which claimed energy savings have occurred, evaluate the existing internal review processes, and suggest improvements to the program and ongoing EM&V processes. An annual independent, third-party EM&V report involving analysis of both program impacts and process impacts must be part of the Annual Report on Conservation Acquisition described in Paragraphs 8(c) and (g) below. Avista may ask the Commission to modify this spending band following full Advisory Group consultation.

63 (7) **Program Design Principles**

(a) All Sectors Included — Avista must offer a mix of tariff-based programs that ensure it is serving each customer sector, including programs targeted to the limited-income subset of residential customers. Modifications to the programs must be filed with the Commission as revisions to tariffs or as revisions to Avista's DSM Business Plan, as appropriate.

(b) Outreach on Programs — Avista must establish a strategy and proposed implementation budget for informing participants about program opportunities in the relevant market channels for each of its energy efficiency programs. Avista must share these strategies and budgets with

the Advisory Group for review and comments, and provide updates at Advisory Group meetings.

(c) Incentives and Conservation Program Implementation — Avista must offer a cost-effective portfolio of programs in order to achieve all available conservation that is cost-effective, reliable, and feasible. Programs and incentives may be directed to consumers, retailers, or trade allies, as appropriate for measures that save energy. Incentive levels and other methods of encouraging energy conservation need to be periodically examined to ensure that they are neither too high nor too low. Incentive levels and implementation methods should not unnecessarily limit the acquisition of all achievable energy conservation.

(d) Conservation Efforts without Approved EM&V Protocol — Avista may spend up to ten (10) percent of its conservation budget on programs whose savings impact has not yet been measured, as long as the overall portfolio of conservation passes the Total Resource Cost (TRC) test as modified by the Council. These programs may include educational, behavior change, and pilot projects. The Company may ask the Commission to modify this spending limit following full Advisory Group consultation. As of the date of this Order, an outline of the major elements of the Council's methodology for determining achievable conservation potential, including the Total Resource Cost test, is available on the Council's Web site at http://www.nwcouncil.org/energy/powerplan/6/supplycurves/I937/CouncilMethodology_outline%20_2_.pdf.

64 (8) **Required Reports and Filings**

Avista must file the following:

(a) Six-Month Report on Conservation Acquisition, comparing budgeted to actual kWh's and expenditures, by August 15, 2010.

(b) 2011 DSM Business Plan, containing any changes to program details and an annual budget by November 1, 2010.

(c) 2010 Annual Report on Conservation Acquisition, including an evaluation of cost effectiveness and comparing budgets to actual, by March 31, 2011.

(d) Revisions to cost recovery tariff by May 1, 2011, with requested effective date of July 1, 2011.

(e) Six-Month Report on Conservation Acquisition, comparing budget to actual kWh's and dollar activity, by August 15, 2011.

(f) Biennial Conservation Plan including revised program details and program tariffs, together with identification of 2012-2021 achievable conservation potential, by November 1, 2011, requesting effective date of January 1, 2012. This filing will satisfy the requirement in WAC 480-109-010 to file 10-year Achievable Conservation Potential and Biennial Conservation Target on or before January 31.[9]

(g) 2011 Annual Report on Conservation Acquisition, including an evaluation of cost-effectiveness, by March 31, 2012.

(h) Two-year report on conservation program achievement by June 1, 2012. This filing is the one required in WAC 480-109-040(1) and RCW 19.285.070, which require that the report also be filed with the Washington Department of Commerce.

65 (9) **Required Public Involvement in Preparation for the 2012-2013 Biennium**

(a) By July 1, 2011, Avista must consult with the Advisory Group to facilitate completion of a 10-year conservation potential analysis by November 1, 2011. *See* RCW 19.285.040(1)(a); WAC 480-109-010(1). This must be based on a current conservation potential assessment study of Avista's service area within Washington State. This may be conducted within the context of Avista's integrated resource plan. If Avista chooses to use the supply curves that make up the conservation potential in the Council's Northwest Power Plan, the supply curves must be updated for new assumptions and measures.

(b) Avista must consult with the Advisory Group between July 1, 2011, and October 31, 2011, to identify achievable conservation potential for 2012-2021 and set annual and biennial targets for the 2012-2013 biennium, including necessary revisions to program details. *See* RCW 19.285.040(1)(b); WAC 480-109-010(2) and (3).

(c) During the consultation described in subparagraph 9(b) above, Avista must review with the Advisory Group whether standard-efficiency fuel

[9] The Commission recognizes that this deadline is not the same as the rule. This is acceptable because Avista has agreed to the earlier deadline. A change to Chapter 480-109 WAC may be considered after we complete our evaluation of the conservation filings by Pacific Power & Light Company and Puget Sound Energy.

conversion savings should be included in the 2012-2013 Biennial Conservation Target.

66 (10) **Cost Effectiveness Test is the Total Resource Cost Test**

(a) The primary cost effectiveness test IS the Total Resource Cost (TRC) test as modified by the Council. The Council-modified calculation of TRC includes quantifiable non-energy benefits, a risk adder, and a 10 percent conservation benefit adder that increases the avoided costs by 10 percent. The Council does not include a net-to-gross adjustment. As of the date of this Order, an outline of the major elements of the Council's methodology for determining achievable conservation potential, including the Total Resource Cost test, is referenced in paragraph (7)(d).

(b) In addition to the Council-modified TRC, Avista must provide calculations of the Program Administrator Cost test (also called the Utility Cost test), Ratepayer Impact Measure test, and Participant Cost test described in the National Action Plan for Energy Efficiency's study "Understanding Cost-effectiveness of Energy Efficiency Programs." As of the date of this Order, the study is available on the Web site of the United States Environmental Protection Agency at http://www.epa.gov/cleanenergy/documents/cost-effectiveness.pdf.

(c) Overall conservation cost-effectiveness must be evaluated at the portfolio level. Costs included in the portfolio level analysis include conservation-related administrative costs. Avista must continue to evaluate measure and program level cost tests.

67 (11) **Recovery Through an Electric Tariff Rider**

(a) Annual Filing — Avista's annual tariff rider filing, required under paragraph (8)(d), will recover the future year's budgeted expenses and any significant variances between budgeted and actual income and expenditures during the previous period.

(b) Scope of Expenditures — Funds collected through the rider must be used on approved conservation programs and their administrative costs.

(c) Recovery for Each Customer Class — Rate spread and rate design must match Avista's underlying base volumetric rates.

DATED at Olympia, Washington, and effective May 13, 2010.

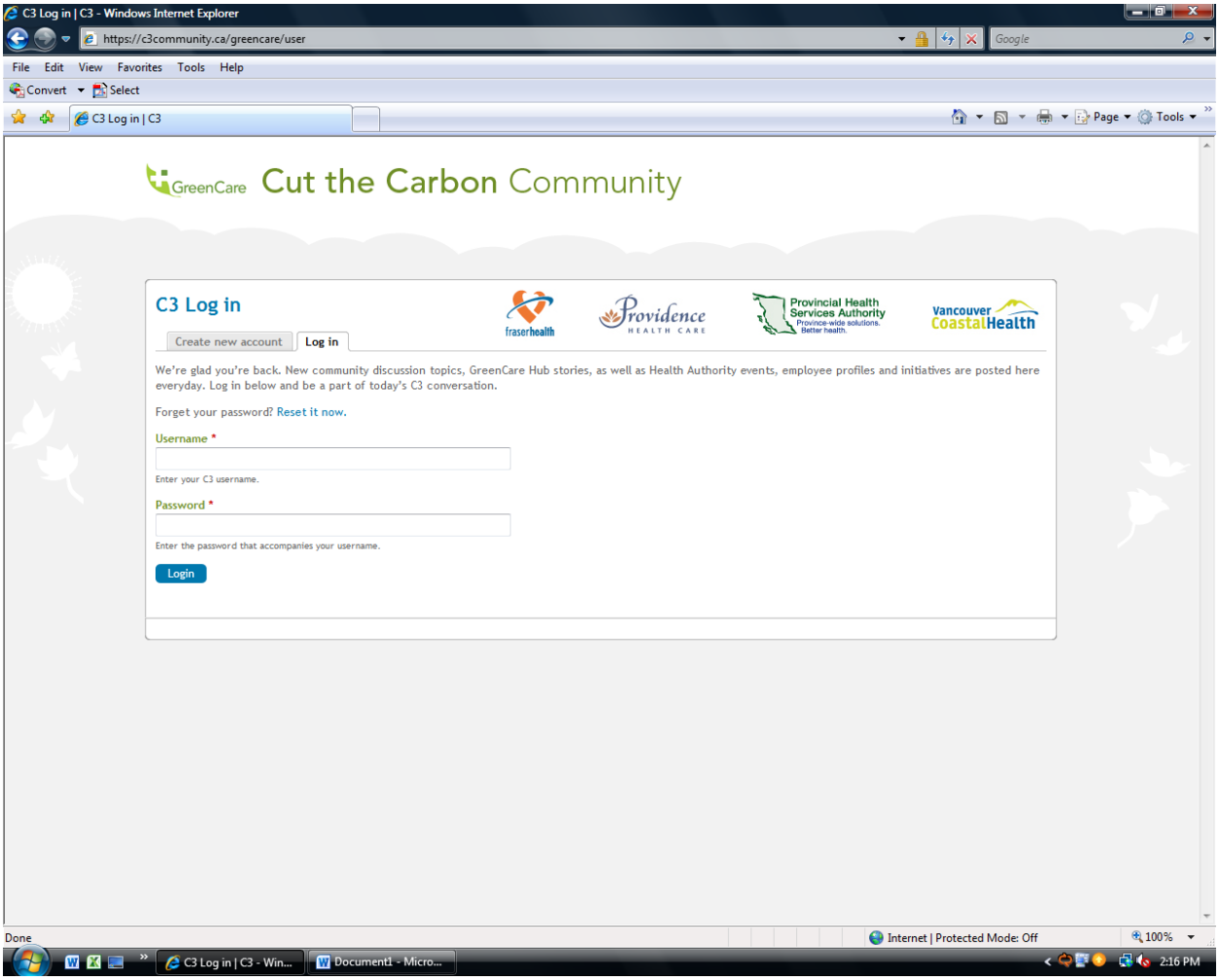
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

JEFFREY D. GOLTZ, Chairman

PATRICK J. OSHIE, Commissioner

PHILIP B. JONES, Commissioner

Attachment 24.1.1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https://c3community.ca/greencare/user
File Edit View Favorites Tools Help
Convert Select
C3 Log in | C3
Page Tools
GreenCare Cut the Carbon Community
C3 Log in
fraserhealth
Providence HEALTH CARE
Provincial Health Services Authority
Province-wide solutions. Better health.
Vancouver CoastalHealth
Create new account
Log in
We're glad you're back. New community discussion topics, GreenCare Hub stories, as well as Health Authority events, employee profiles and initiatives are posted here everyday. Log in below and be a part of today's C3 conversation.
Forget your password? Reset it now.
Username *
Enter your C3 username.
Password *
Enter the password that accompanies your username.
Login
Done
Internet | Protected Mode: Off
100%
C3 Log in | C3 - Win...
Document1 - Micro...
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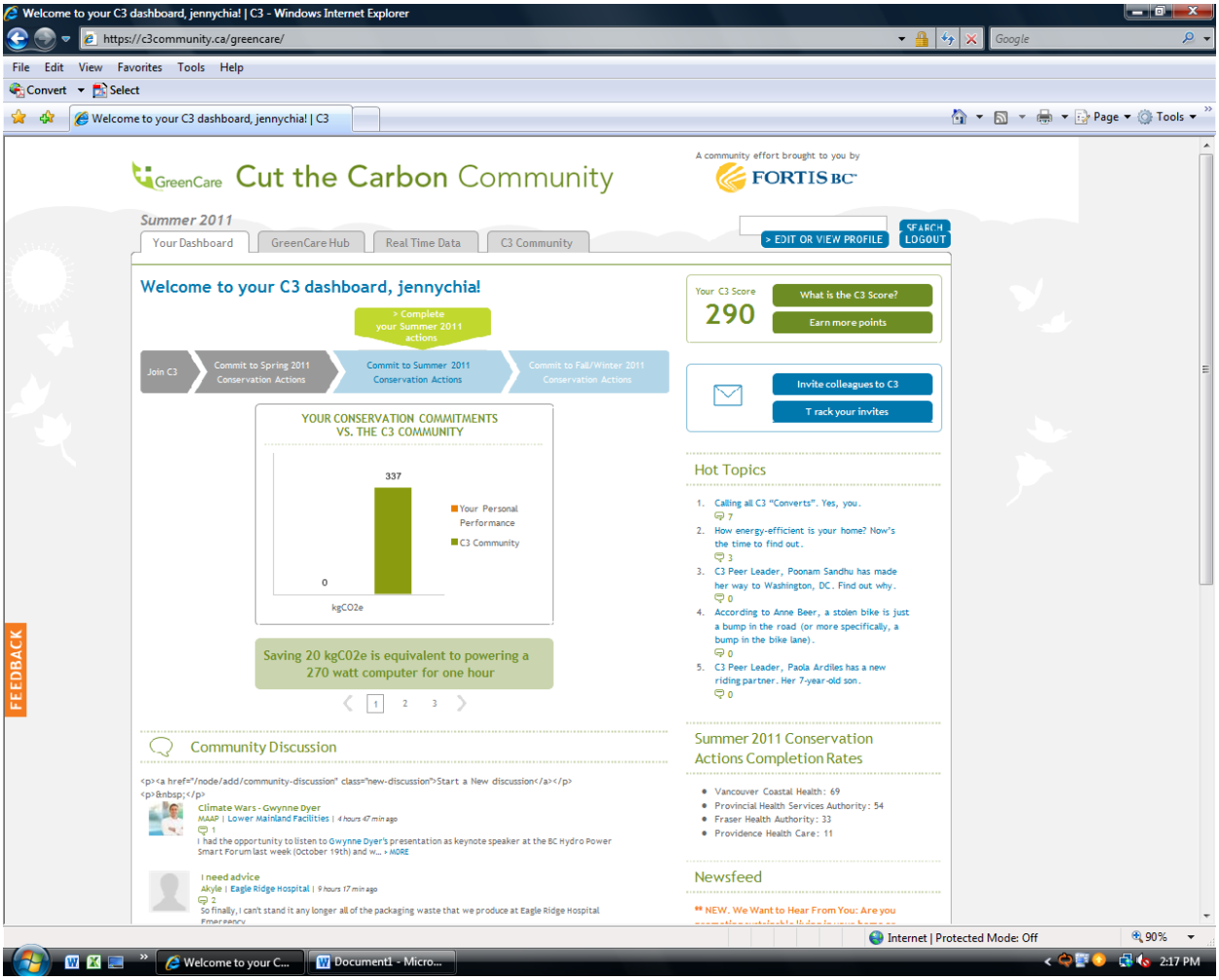
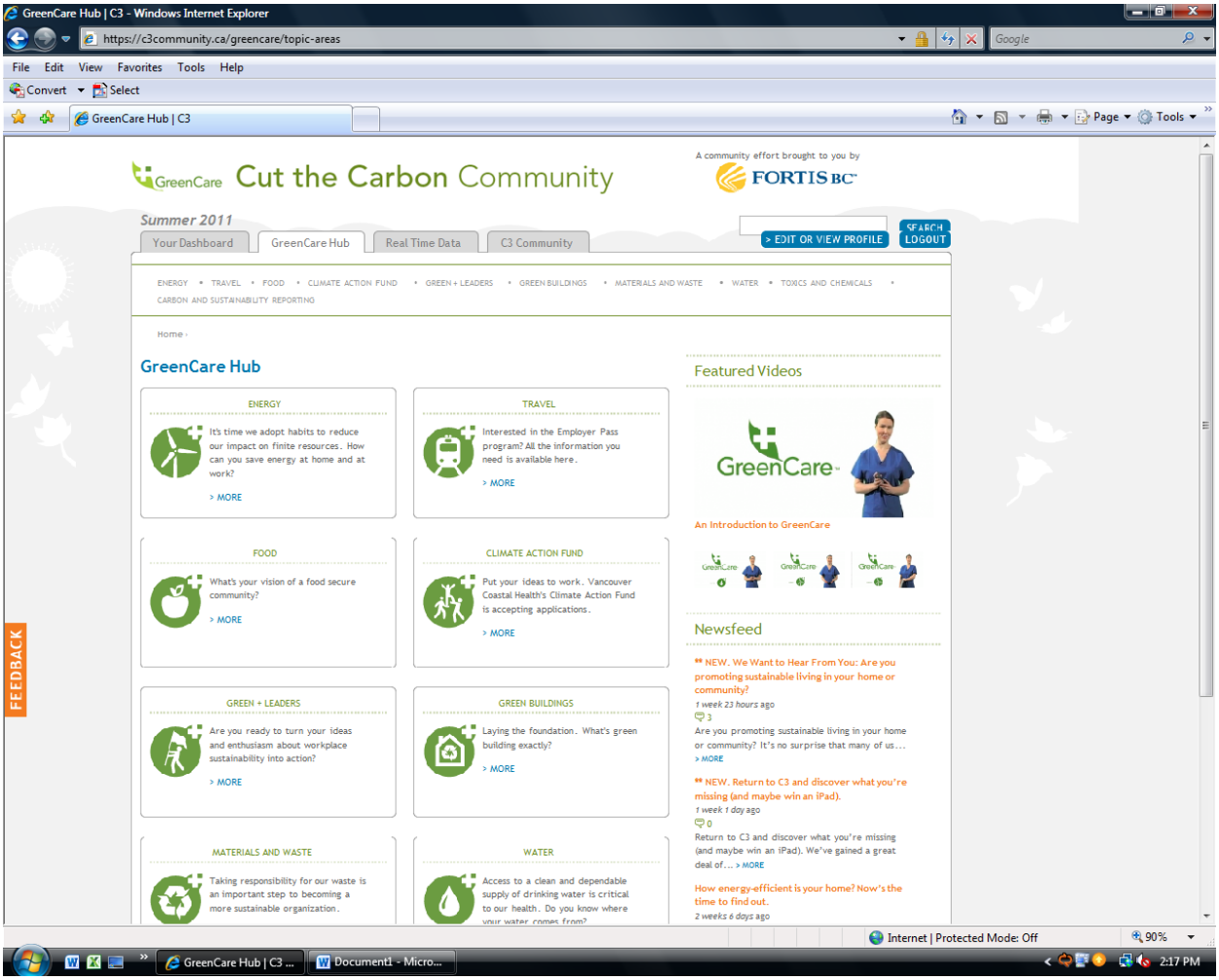

Welcome to your C3 dashboard, jennychia! | C3 - Windows Internet Explorer
https://c3community.ca/greencare/
File Edit View Favorites Tools Help
Convert Select
Welcome to your C3 dashboard, jennychia! | C3
Page Tools
GreenCare Cut the Carbon Community
A community effort brought to you by FORTIS BC
Summer 2011
Your Dashboard
GreenCare Hub
Real Time Data
C3 Community
> EDIT OR VIEW PROFILE
SEARCH
LOGOUT
Welcome to your C3 dashboard, jennychia!
> Complete your Summer 2011 actions
Join C3
Commit to Spring 2011 Conservation Actions
Commit to Summer 2011 Conservation Actions
Commit to Fall/Winter 2011 Conservation Actions
YOUR CONSERVATION COMMITMENTS VS. THE C3 COMMUNITY
337
0
kgCO2e
Your Personal Performance
C3 Community
Saving 20 kgC02e is equivalent to powering a 270 watt computer for one hour
1 2 3
Community Discussion
Start a New discussion

Climate Wars - Gwynne Dyer
MAAP | Lower Mainland Facilities | 4 hours 47 min ago
1
I had the opportunity to listen to Gwynne Dyer's presentation as keynote speaker at the BC Hydro Power Smart Forum last week (October 19th) and w... > MORE
I need advice
Akyle | Eagle Ridge Hospital | 9 hours 17 min ago
2
So finally, I can't stand it any longer all of the packaging waste that we produce at Eagle Ridge Hospital
Your C3 Score
290
What is the C3 Score?
Earn more points
Invite colleagues to C3
Track your invites
Hot Topics
1. Calling all C3 "Converts". Yes, you.
7
2. How energy-efficient is your home? Now's the time to find out.
3
3. C3 Peer Leader, Poonam Sandhu has made her way to Washington, DC. Find out why.
0
4. According to Anne Beer, a stolen bike is just a bump in the road (or more specifically, a bump in the bike lane).
0
5. C3 Peer Leader, Paola Ardiles has a new riding partner. Her 7-year-old son.
0
Summer 2011 Conservation Actions Completion Rates
Vancouver Coastal Health: 69
Provincial Health Services Authority: 54
Fraser Health Authority: 33
Providence Health Care: 11
Newsfeed
** NEW. We Want to Hear From You: Are you
FEEDBACK
Internet | Protected Mode: Off
90%
Welcome to your C...
Document1 - Micro...
2:17 PM


GreenCare Hub | C3 - Windows Internet Explorer
https://c3community.ca/greencare/topic-areas
File Edit View Favorites Tools Help
GreenCare Hub | C3
GreenCare Cut the Carbon Community
A community effort brought to you by FORTIS BC
Summer 2011
Your Dashboard
GreenCare Hub
Real Time Data
C3 Community
> EDIT OR VIEW PROFILE
LOGOUT
ENERGY • TRAVEL • FOOD • CLIMATE ACTION FUND • GREEN + LEADERS • GREEN BUILDINGS • MATERIALS AND WASTE • WATER • TOXICS AND CHEMICALS • CARBON AND SUSTAINABILITY REPORTING
Home ›
GreenCare Hub
ENERGY
It's time we adopt habits to reduce our impact on finite resources. How can you save energy at home and at work?
> MORE
TRAVEL
Interested in the Employer Pass program? All the information you need is available here.
> MORE
FOOD
What's your vision of a food secure community?
> MORE
CLIMATE ACTION FUND
Put your ideas to work. Vancouver Coastal Health's Climate Action Fund is accepting applications.
> MORE
GREEN + LEADERS
Are you ready to turn your ideas and enthusiasm about workplace sustainability into action?
> MORE
GREEN BUILDINGS
Laying the foundation. What's green building exactly?
> MORE
MATERIALS AND WASTE
Taking responsibility for our waste is an important step to becoming a more sustainable organization.
WATER
Access to a clean and dependable supply of drinking water is critical to our health. Do you know where
Featured Videos
GreenCare
An Introduction to GreenCare
Newsfeed
** NEW. We Want to Hear From You: Are you promoting sustainable living in your home or community?
1 week 23 hours ago
3
Are you promoting sustainable living in your home or community? It's no surprise that many of us...
> MORE
** NEW. Return to C3 and discover what you're missing (and maybe win an iPad).
1 week 1 day ago
0
Return to C3 and discover what you're missing (and maybe win an iPad). We've gained a great deal of... > MORE
How energy-efficient is your home? Now's the time to find out.
2 weeks 6 days ago
FEEDBACK
Internet | Protected Mode: Off
90%
GreenCare Hub | C3 ...
Document1 - Micro...
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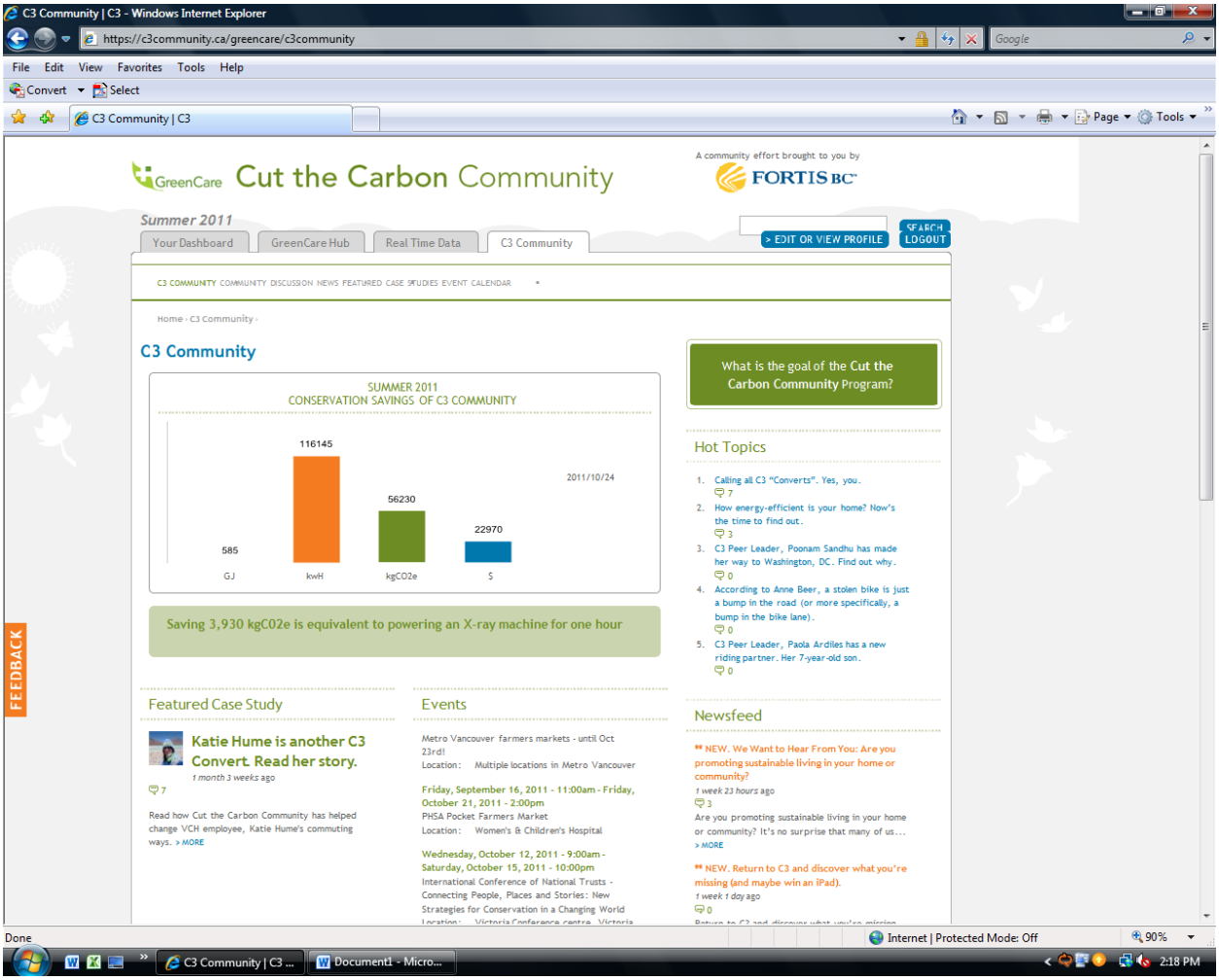
C3 Community | C3 - Windows Internet Explorer
https://c3community.ca/greencare/c3community
File Edit View Favorites Tools Help
Convert Select
C3 Community | C3
Page Tools
GreenCare Cut the Carbon Community
A community effort brought to you by FORTIS BC
Summer 2011
Your Dashboard
GreenCare Hub
Real Time Data
C3 Community
> EDIT OR VIEW PROFILE
SEARCH
LOGOUT
C3 COMMUNITY COMMUNITY DISCUSSION NEWS FEATURED CASE STUDIES EVENT CALENDAR
Home › C3 Community ›
C3 Community
SUMMER 2011
CONSERVATION SAVINGS OF C3 COMMUNITY
116145
56230
22970
585
2011/10/24
GJ
kwH
kgCO2e
$
Saving 3,930 kgC02e is equivalent to powering an X-ray machine for one hour
What is the goal of the Cut the Carbon Community Program?
Hot Topics
1. Calling all C3 "Converts". Yes, you.
7
2. How energy-efficient is your home? Now's the time to find out.
3
3. C3 Peer Leader, Poonam Sandhu has made her way to Washington, DC. Find out why.
0
4. According to Anne Beer, a stolen bike is just a bump in the road (or more specifically, a bump in the bike lane).
0
5. C3 Peer Leader, Paola Ardiles has a new riding partner. Her 7-year-old son.
0
Featured Case Study
Katie Hume is another C3 Convert. Read her story.
1 month 3 weeks ago
7
Read how Cut the Carbon Community has helped change VCH employee, Katie Hume's commuting ways. > MORE
Events
Metro Vancouver farmers markets - until Oct 23rd!
Location: Multiple locations in Metro Vancouver
Friday, September 16, 2011 - 11:00am - Friday, October 21, 2011 - 2:00pm
PHSA Pocket Farmers Market
Location: Women's & Children's Hospital
Wednesday, October 12, 2011 - 9:00am - Saturday, October 15, 2011 - 10:00pm
International Conference of National Trusts - Connecting People, Places and Stories: New Strategies for Conservation in a Changing World
Newsfeed
** NEW. We Want to Hear From You: Are you promoting sustainable living in your home or community?
1 week 23 hours ago
3
Are you promoting sustainable living in your home or community? It's no surprise that many of us...
> MORE
** NEW. Return to C3 and discover what you're missing (and maybe win an iPad).
1 week 1 day ago
0
FEEDBACK
Done
Internet | Protected Mode: Off
90%
C3 Community | C3 ...
Document1 - Micro...
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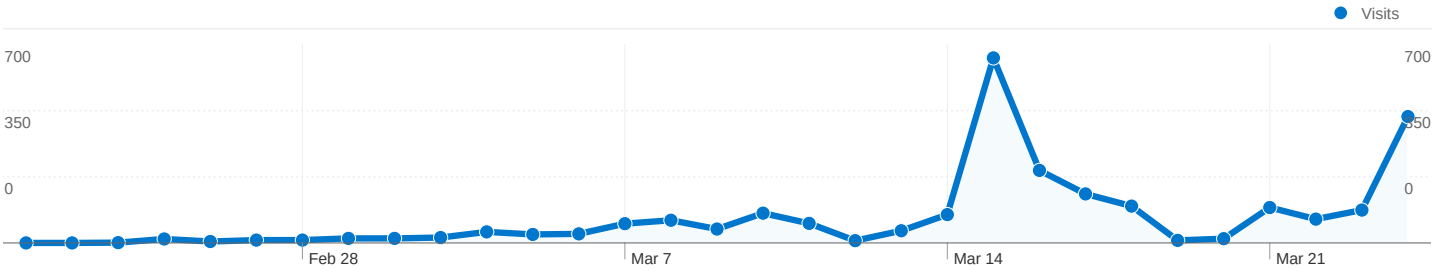
Attachment 24.2

c3community.ca/greencare

Dashboard

Feb 22, 2011 - Mar 24, 2011

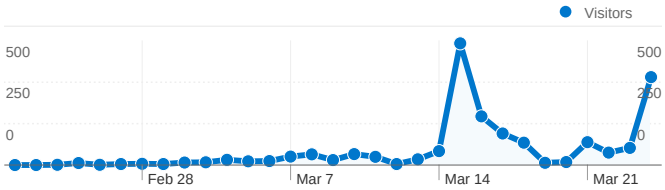
Comparing to: Site



Site Usage

2,721 Visits	26.06% Bounce Rate
21,608 Pageviews	00:08:47 Avg. Time on Site
7.94 Pages/Visit	49.50% % New Visits

Visitors Overview



Visitors
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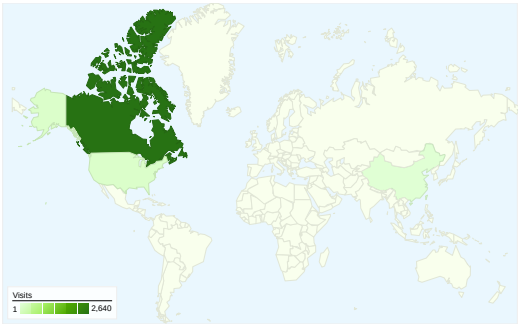


Traffic Sources Overview

Direct Traffic
2,104.00 (77.32%)

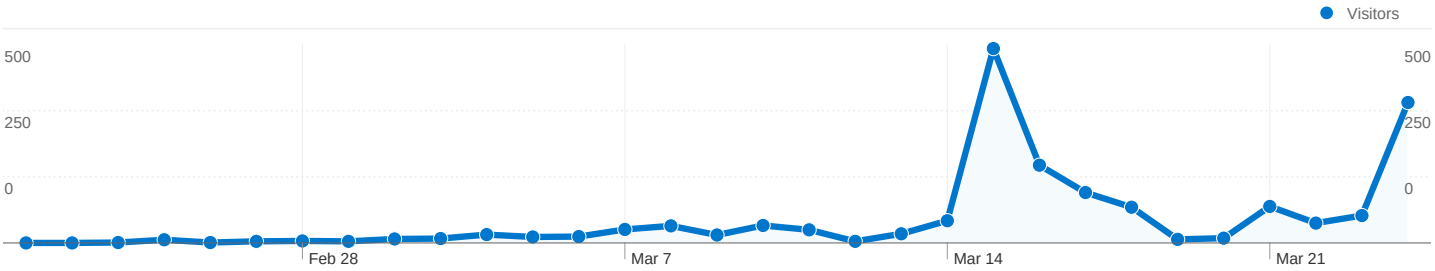
Referring Sites
617.00 (22.68%)

Content Overview

Pages	Pageviews	% Pageviews
/greencare/user/login?destinati	3,969	18.37%
/greencare/	1,640	7.59%
/greencare/user/register	1,391	6.44%
/greencare/user	1,314	6.08%
/greencare/dashboard	1,207	5.59%

Visitors Overview

Feb 22, 2011 - Mar 24, 2011
Comparing to: Site



1,399 people visited this site

2,721 Visits

1,399 Absolute Unique Visitors

21,608 Pageviews

7.94 Average Pageviews

00:08:47 Time on Site

26.06% Bounce Rate

49.50% New Visits

Technical Profile

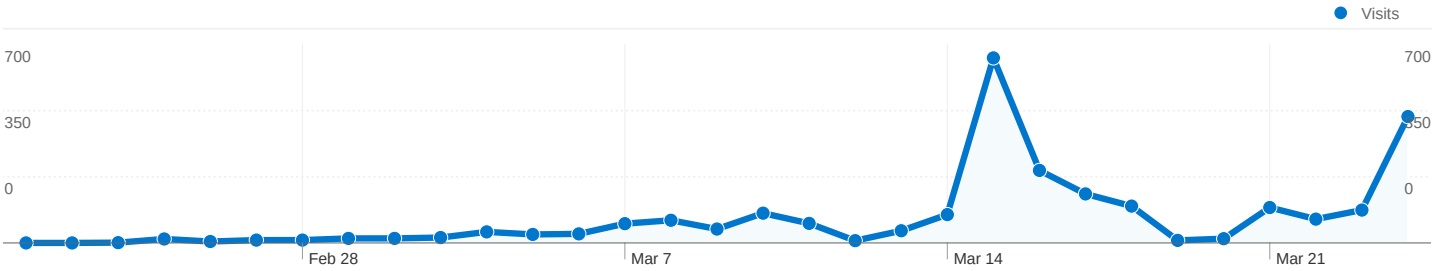
Browser	Visits	% visits
Internet Explorer	1,894	69.61%
Safari	346	12.72%
Chrome	231	8.49%
Firefox	226	8.31%
Mozilla Compatible Agent	13	0.48%

Connection Speed	Visits	% visits
Unknown	2,720	99.96%
Cable	1	0.04%

c3community.ca/greencare

Traffic Sources Overview

Feb 22, 2011 - Mar 24, 2011
Comparing to: Site



All traffic sources sent a total of 2,721 visits

77.32% Direct Traffic

22.68% Referring Sites

0.00% Search Engines

Direct Traffic
2,104.00 (77.32%)

Referring Sites
617.00 (22.68%)

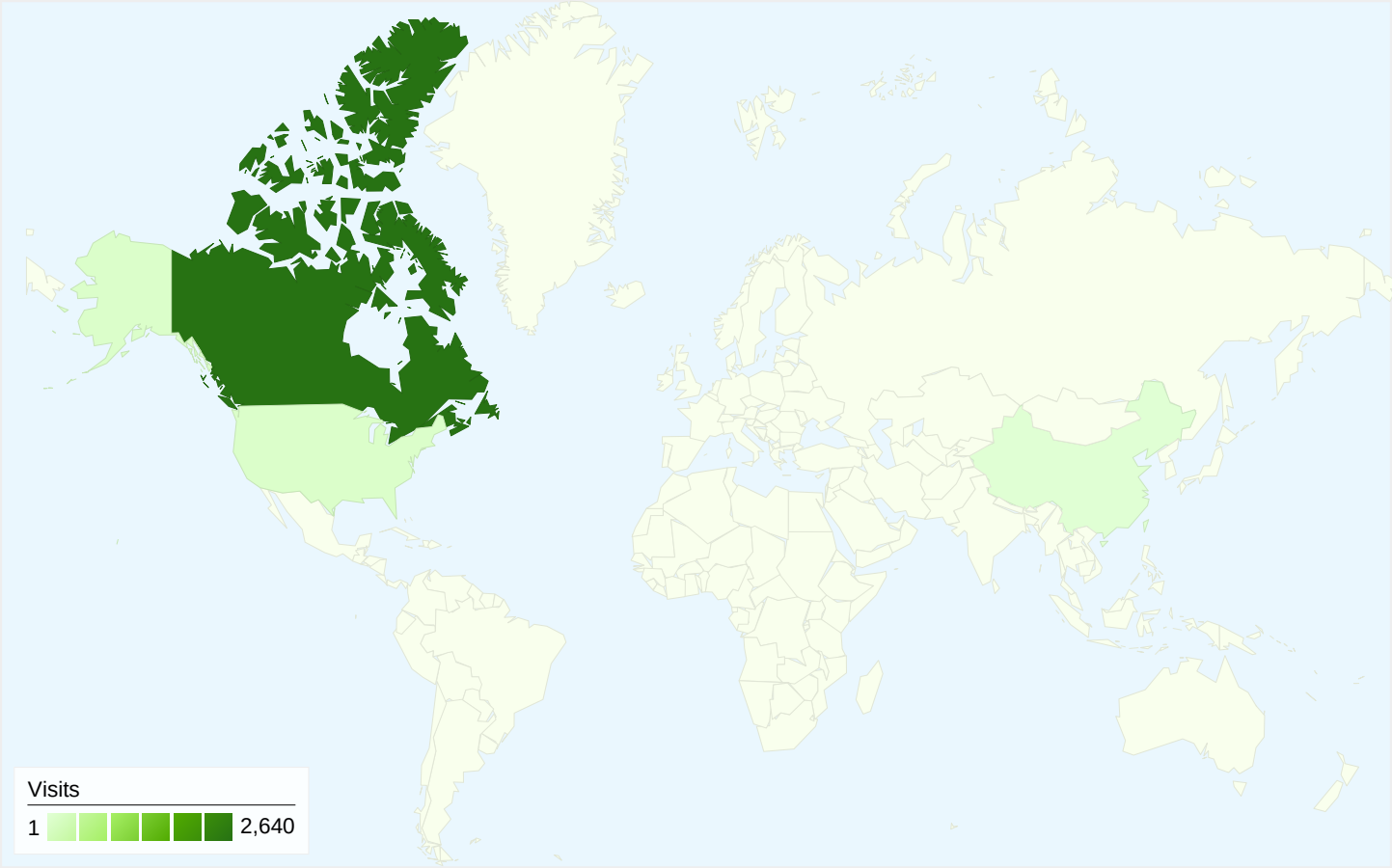
Top Traffic Sources

Sources	Visits	% visits
(direct) ((none))	2,104	77.32%
pod (referral)	146	5.37%
vchconnect.vch.ca (referral)	92	3.38%
c3community.ca (referral)	74	2.72%
fhpulse (referral)	67	2.46%

Keywords	Visits	% visits
There is no data for this view.		

Map Overlay

Feb 22, 2011 - Mar 24, 2011
Comparing to: Site



2,721 visits came from 3 countries/territories

Site Usage

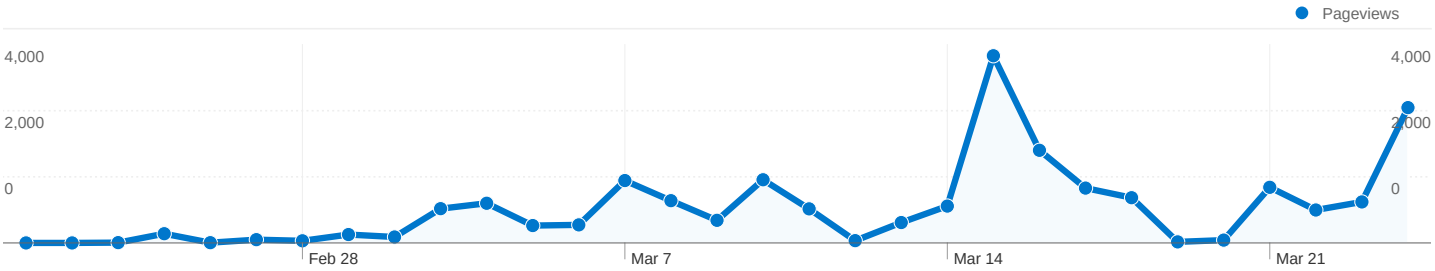
Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
2,721 % of Site Total: 100.00%	7.94 Site Avg: 7.94 (0.00%)	00:08:47 Site Avg: 00:08:47 (0.00%)	49.50% Site Avg: 49.50% (0.00%)	26.06% Site Avg: 26.06% (0.00%)

Country/Territory	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
Canada	2,640	8.04	00:08:47	50.64%	25.30%
United States	80	4.71	00:08:26	11.25%	50.00%
China	1	1.00	00:00:00	100.00%	100.00%

1 - 3 of 3

Content Overview

Feb 22, 2011 - Mar 24, 2011
Comparing to: Site



Pages on this site were viewed a total of 21,608 times

21,608 Pageviews

11,719 Unique Views

26.06% Bounce Rate

Top Content

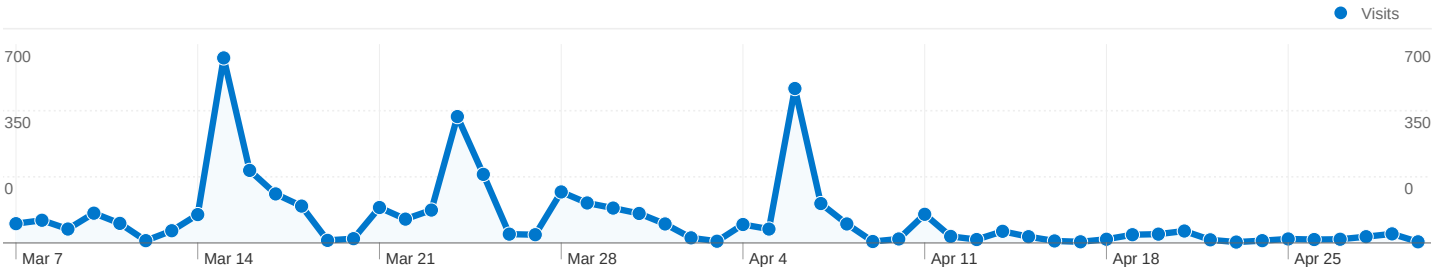
Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard	3,969	18.37%
/greencare/	1,640	7.59%
/greencare/user/register	1,391	6.44%
/greencare/user	1,314	6.08%
/greencare/dashboard	1,207	5.59%

c3community.ca/greencare

Dashboard

Mar 7, 2011 - Apr 30, 2011

Comparing to: Site



Site Usage

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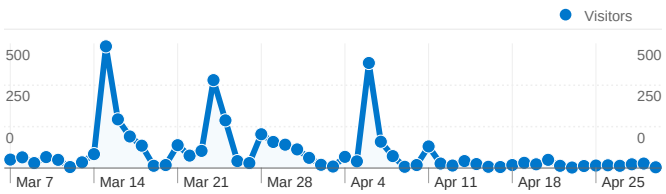
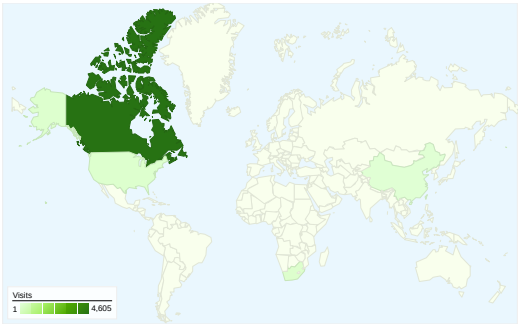
33,321 Pageviews	00:07:40 Avg. Time on Site
6.94 Pages/Visit	48.37% % New Visits

Visitors Overview

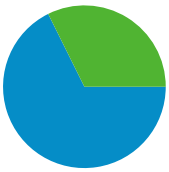


Visitors
2,352

Map Overlay



Traffic Sources Overview



- Direct Traffic
  3,246.00 (67.65%)
- Referring Sites
  1,552.00 (32.35%)

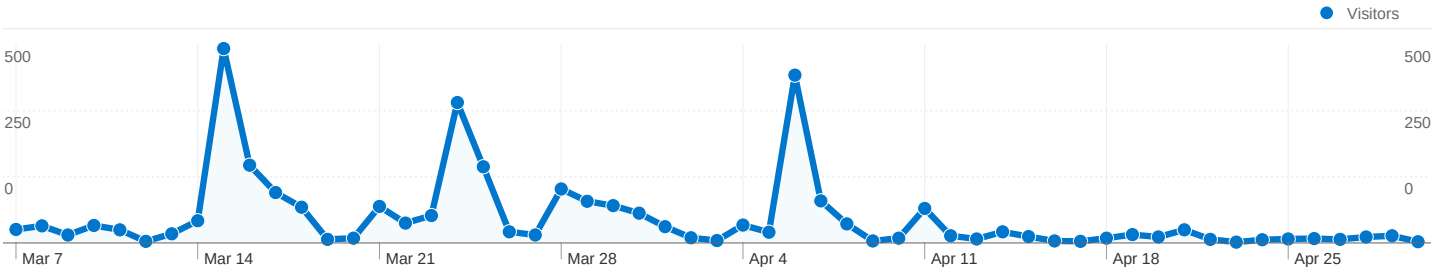
Content Overview

Pages	Pageviews	% Pageviews
/greencare/user/login?destinati	6,564	19.70%
/greencare/	2,621	7.87%
/greencare/user	2,535	7.61%
/greencare/user/register	2,358	7.08%
/greencare/dashboard	1,891	5.68%

c3community.ca/greencare

Visitors Overview

Mar 7, 2011 - Apr 30, 2011
Comparing to: Site



2,352 people visited this site

4,798 Visits

2,352 Absolute Unique Visitors

33,321 Pageviews

6.94 Average Pageviews

00:07:40 Time on Site

27.66% Bounce Rate

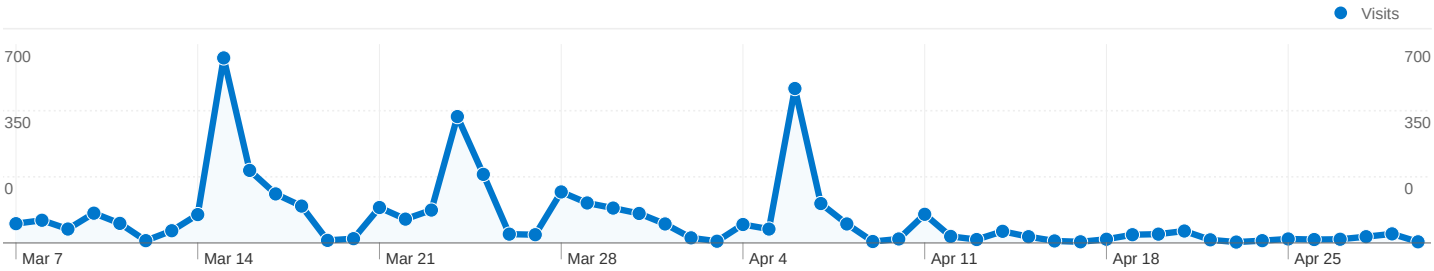
48.37% New Visits

Technical Profile

Browser	Visits	% visits
Internet Explorer	3,656	76.20%
Safari	405	8.44%
Chrome	385	8.02%
Firefox	321	6.69%
Mozilla Compatible Agent	11	0.23%

Traffic Sources Overview

Mar 7, 2011 - Apr 30, 2011
Comparing to: Site



All traffic sources sent a total of 4,798 visits

67.65% Direct Traffic

32.35% Referring Sites

0.00% Search Engines

Direct Traffic
3,246.00 (67.65%)

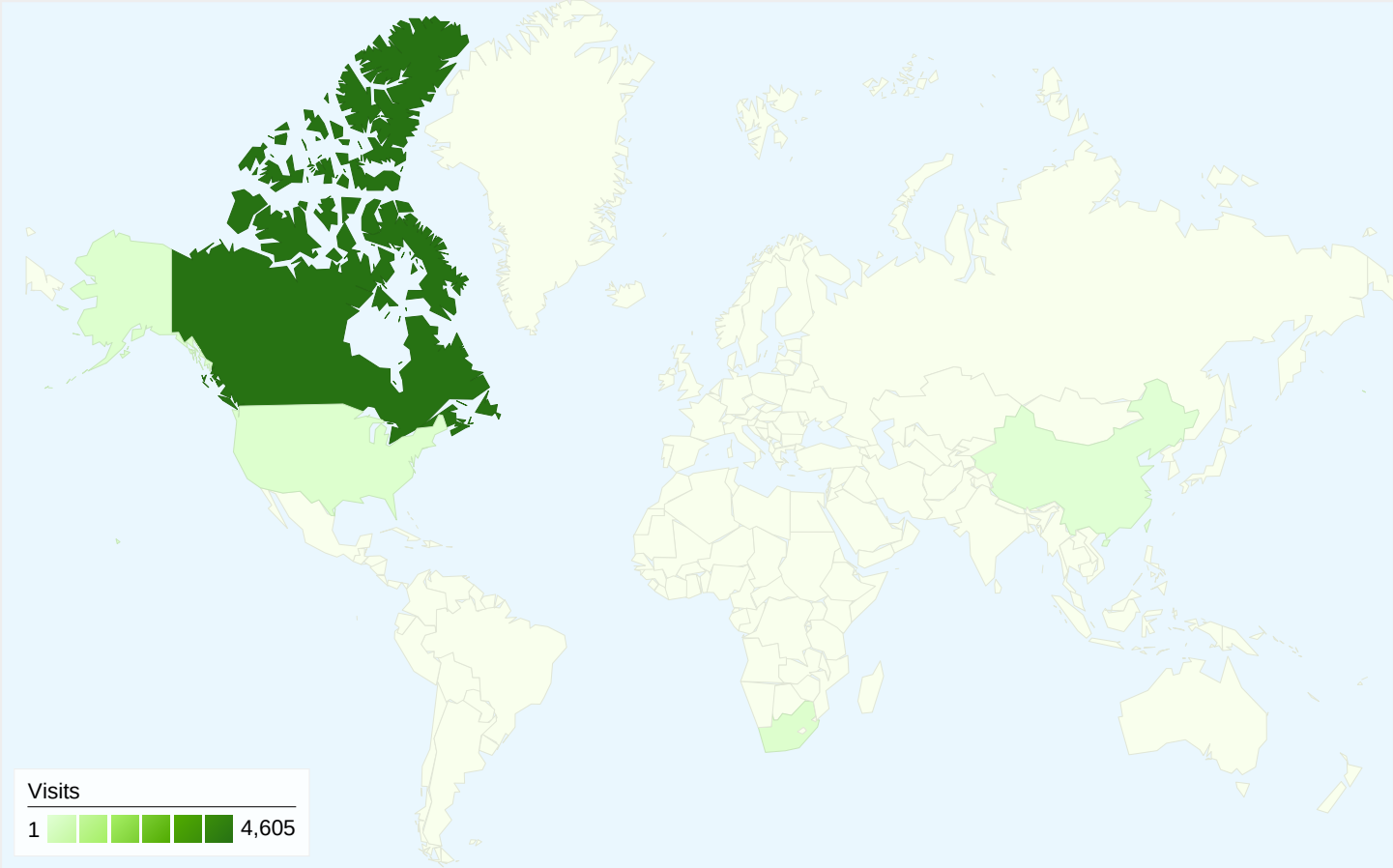
Referring Sites
1,552.00 (32.35%)

Top Traffic Sources

Sources	Visits	% visits
(direct) ((none))	3,246	67.65%
pod (referral)	312	6.50%
fhpulse (referral)	274	5.71%
vchconnect.vch.ca (referral)	228	4.75%
vcha.ca (referral)	156	3.25%

Keywords	Visits	% visits
There is no data for this view.		

Map Overlay



4,798 visits came from 4 countries/territories

Site Usage

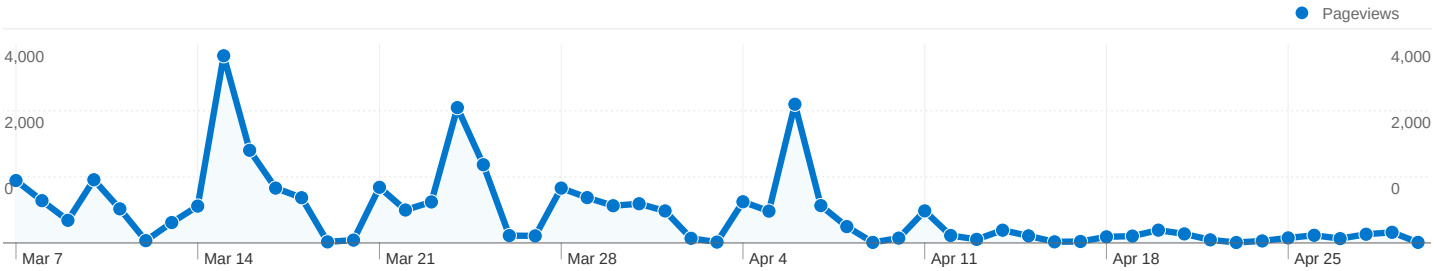
Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
4,798 % of Site Total: 100.00%	6.94 Site Avg: 6.94 (0.00%)	00:07:40 Site Avg: 00:07:40 (0.00%)	48.42% Site Avg: 48.37% (0.09%)	27.66% Site Avg: 27.66% (0.00%)

Country/Territory	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
Canada	4,605	7.00	00:07:37	50.18%	26.95%
South Africa	102	5.71	00:10:07	5.88%	37.25%
United States	90	5.47	00:07:43	5.56%	52.22%
China	1	1.00	00:00:00	100.00%	100.00%

1 - 4 of 4

Content Overview

Mar 7, 2011 - Apr 30, 2011
Comparing to: Site



Pages on this site were viewed a total of 33,321 times

33,321 Pageviews

19,589 Unique Views

27.66% Bounce Rate

Top Content

Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard	6,564	19.70%
/greencare/	2,621	7.87%
/greencare/user	2,535	7.61%
/greencare/user/register	2,358	7.08%
/greencare/dashboard	1,891	5.68%

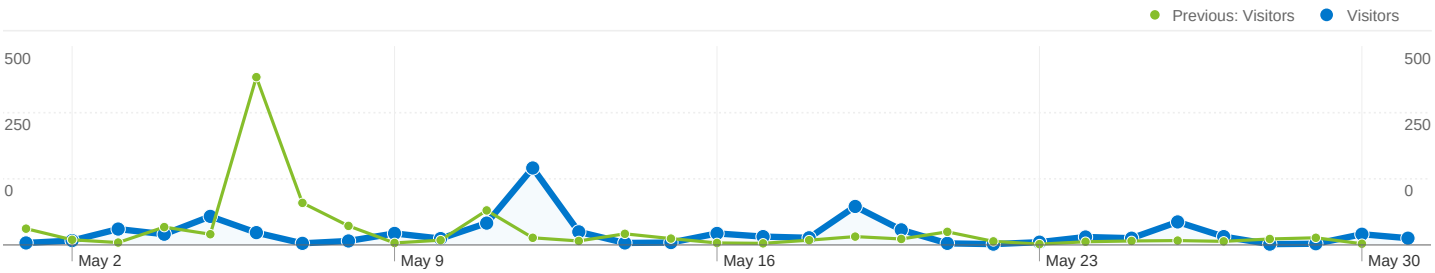
TABLE OF CONTENTS

c3community.ca/greencare

Visitors Overview

May 1, 2011 - May 31, 2011

Comparing to: Apr 1, 2011 - Apr 30, 2011



672 people visited this site

1,176 Visits

Previous: 1,419 (-17.12%)

672 Absolute Unique Visitors

Previous: 826 (-18.64%)

7,172 Pageviews

Previous: 9,086 (-21.07%)

6.10 Average Pageviews

Previous: 6.40 (-4.75%)

00:07:22 Time on Site

Previous: 00:07:05 (3.99%)

38.52% Bounce Rate

Previous: 31.29% (23.11%)

44.56% New Visits

Previous: 39.89% (11.71%)

Technical Profile

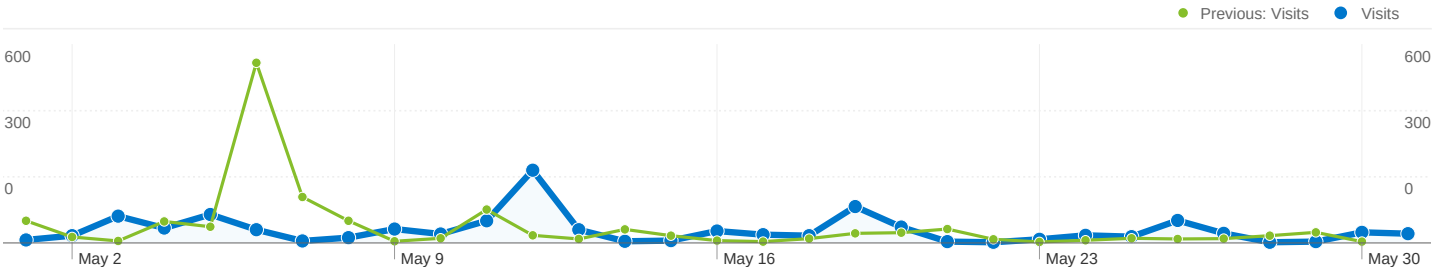
Browser	Visits	% visits
Internet Explorer		
May 1, 2011 - May 31, 2011	757	64.37%
Apr 1, 2011 - Apr 30, 2011	1,062	74.84%
% Change	-28.72%	-13.99%
Chrome		
May 1, 2011 - May 31, 2011	178	15.14%
Apr 1, 2011 - Apr 30, 2011	174	12.26%
% Change	2.30%	23.44%

Connection Speed	Visits	% visits
Unknown		
May 1, 2011 - May 31, 2011	1,176	100.00%
Apr 1, 2011 - Apr 30, 2011	1,419	100.00%
% Change	-17.12%	0.00%

Safari		
May 1, 2011 - May 31, 2011	156	13.27%
Apr 1, 2011 - Apr 30, 2011	103	7.26%
% Change	51.46%	82.75%
Firefox		
May 1, 2011 - May 31, 2011	74	6.29%
Apr 1, 2011 - Apr 30, 2011	67	4.72%
% Change	10.45%	33.27%
IE with Chrome Frame		
May 1, 2011 - May 31, 2011	2	0.17%
Apr 1, 2011 - Apr 30, 2011	0	0.00%
% Change	100.00%	100.00%

Traffic Sources Overview

May 1, 2011 - May 31, 2011
Comparing to: Apr 1, 2011 - Apr 30, 2011



All traffic sources sent a total of 1,176 visits

39.54% Direct Traffic

Previous: 70.54% (-43.95%)

60.46% Referring Sites

Previous: 29.46% (105.24%)

0.00% Search Engines

Previous: 0.00% (0.00%)

Referring Sites
711.00 (60.46%)
Direct Traffic
465.00 (39.54%)

Top Traffic Sources

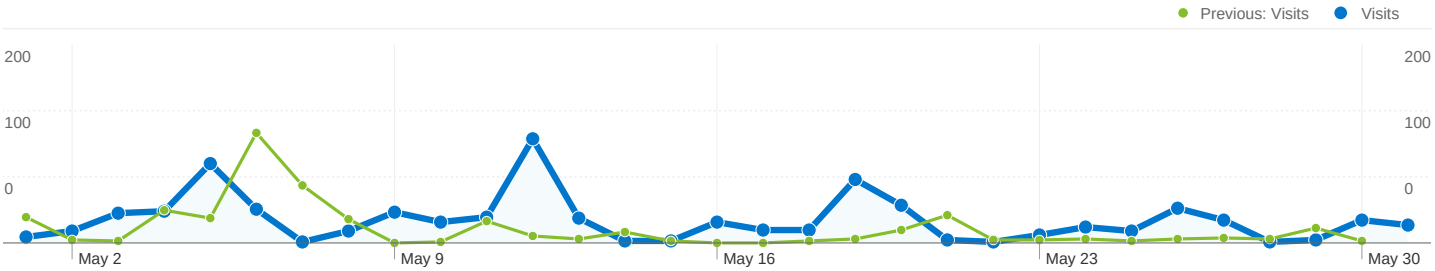
Sources	Visits	% visits
(direct) ((none))		
May 1, 2011 - May 31, 2011	465	39.54%
Apr 1, 2011 - Apr 30, 2011	1,001	70.54%
% Change	-53.55%	-43.95%
pod (referral)		
May 1, 2011 - May 31, 2011	250	21.26%
Apr 1, 2011 - Apr 30, 2011	63	4.44%
% Change	296.83%	378.82%
fhpulse (referral)		
May 1, 2011 - May 31, 2011	155	13.18%
Apr 1, 2011 - Apr 30, 2011	88	6.20%
% Change	76.14%	112.53%
c3.cleancommuter.ca (referral)		
May 1, 2011 - May 31, 2011	145	12.33%
Apr 1, 2011 - Apr 30, 2011	3	0.21%
% Change	4,733.33%	5,732.06%
c3community.ca (referral)		

Keywords	Visits	% visits
There is no data for this view.		

May 1, 2011 - May 31, 2011	42	3.57%
Apr 1, 2011 - Apr 30, 2011	10	0.70%
% Change	320.00%	406.79%

Referring Sites

May 1, 2011 - May 31, 2011
Comparing to: Apr 1, 2011 - Apr 30, 2011



Referring sites sent 711 visits via 34 sources

Site Usage

Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
711	5.79	00:06:52	39.24%	40.93%
Previous: 418 (70.10%)	Previous: 6.71 (-13.72%)	Previous: 00:07:55 (-13.26%)	Previous: 25.84% (51.88%)	Previous: 30.38% (34.71%)

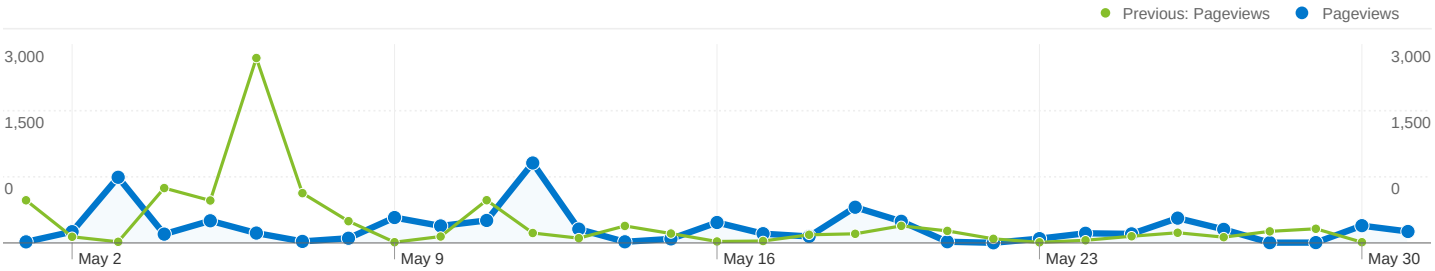
Source	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
pod					
May 1, 2011 - May 31, 2011	250	4.06	00:03:53	59.20%	46.40%
April 1, 2011 - April 30, 2011	63	5.63	00:04:17	44.44%	50.79%
% Change	296.83%	-27.88%	-9.42%	33.20%	-8.65%
fhpulse					
May 1, 2011 - May 31, 2011	155	4.90	00:04:58	60.00%	36.77%
April 1, 2011 - April 30, 2011	88	6.81	00:06:41	32.95%	25.00%
% Change	76.14%	-28.06%	-25.56%	82.07%	47.10%
c3.cleancommuter.ca					
May 1, 2011 - May 31, 2011	145	10.89	00:14:19	8.97%	26.90%
April 1, 2011 - April 30, 2011	3	2.67	00:03:29	33.33%	33.33%
% Change	4,733.33%	308.36%	311.05%	-73.10%	-19.31%
c3community.ca					
May 1, 2011 - May 31, 2011	42	1.71	00:00:35	0.00%	90.48%
April 1, 2011 - April 30, 2011	10	3.40	00:04:43	0.00%	70.00%
% Change	320.00%	-49.58%	-87.70%	0.00%	29.25%
webmail.vch.ca					
May 1, 2011 - May 31, 2011	36	8.31	00:16:03	2.78%	19.44%
April 1, 2011 - April 30, 2011	27	12.33	00:23:52	7.41%	22.22%
% Change	33.33%	-32.66%	-32.73%	-62.50%	-12.50%
affinitybridge.unfuddle.com					
May 1, 2011 - May 31, 2011	23	4.57	00:07:50	0.00%	30.43%

April 1, 2011 - April 30, 2011	**33**	3.45	00:07:00	0.00%	36.36%
% Change	**-30.30%**	32.15%	11.80%	0.00%	-16.30%
us2.campaign-archive1.com					
May 1, 2011 - May 31, 2011	**14**	5.36	00:03:43	35.71%	35.71%
April 1, 2011 - April 30, 2011	**39**	5.08	00:03:09	35.90%	23.08%
% Change	**-64.10%**	5.52%	18.03%	-0.51%	54.76%
admin.onelesstonne.org					
May 1, 2011 - May 31, 2011	**12**	5.92	00:09:18	66.67%	25.00%
April 1, 2011 - April 30, 2011	**33**	12.18	00:19:08	0.00%	6.06%
% Change	**-63.64%**	-51.43%	-51.40%	100.00%	312.50%
stage.c3.affinitybridge.com					
May 1, 2011 - May 31, 2011	**10**	5.10	00:07:05	20.00%	20.00%
April 1, 2011 - April 30, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	**100.00%**	100.00%	100.00%	100.00%	100.00%
us2.campaign-archive2.com					
May 1, 2011 - May 31, 2011	**5**	9.20	00:06:47	60.00%	40.00%
April 1, 2011 - April 30, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	**100.00%**	100.00%	100.00%	100.00%	100.00%

1 - 10 of 34

Content Overview

May 1, 2011 - May 31, 2011
Comparing to: Apr 1, 2011 - Apr 30, 2011



Pages on this site were viewed a total of 7,172 times

7,172 Pageviews

Previous: 9,086 (-21.07%)

4,286 Unique Views

Previous: 5,548 (-22.75%)

38.52% Bounce Rate

Previous: 31.29% (23.11%)

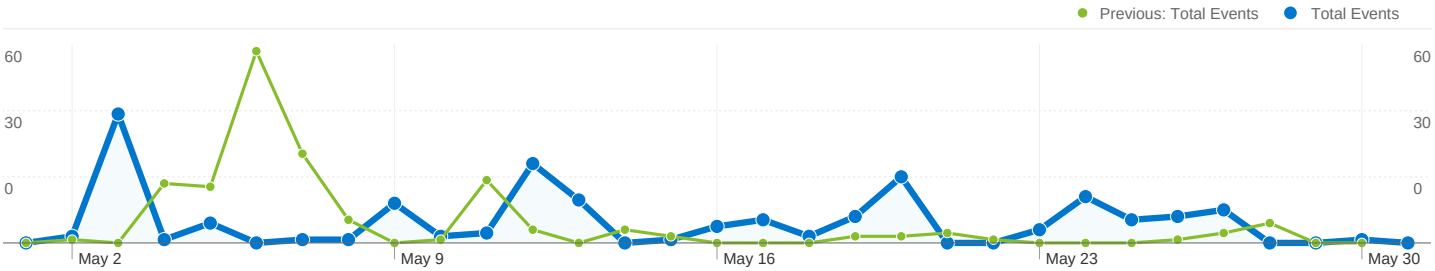
Top Content

Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard		
May 1, 2011 - May 31, 2011	1,411	19.67%
Apr 1, 2011 - Apr 30, 2011	1,711	18.83%
% Change	-17.53%	4.47%
/greencare/		
May 1, 2011 - May 31, 2011	780	10.88%
Apr 1, 2011 - Apr 30, 2011	646	7.11%
% Change	20.74%	52.97%
/greencare/user		
May 1, 2011 - May 31, 2011	340	4.74%
Apr 1, 2011 - Apr 30, 2011	696	7.66%
% Change	-51.15%	-38.11%
/greencare/dashboard		
May 1, 2011 - May 31, 2011	308	4.29%
Apr 1, 2011 - Apr 30, 2011	398	4.38%
% Change	-22.61%	-1.96%
/		

May 1, 2011 - May 31, 2011	262	3.65%
Apr 1, 2011 - Apr 30, 2011	142	1.56%
% Change	84.51%	133.75%

Event Tracking Categories

May 1, 2011 - May 31, 2011
Comparing to: Apr 1, 2011 - Apr 30, 2011



191 total events were recorded via 4 event categories

Events

Total Events	Unique Events	Event Value	Avg. Value
191	105	0	0.00
Previous: 176 (8.52%)	Previous: 121 (-13.22%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Category	Total Events	Unique Events	Event Value	Avg. Value
Outbound links				
May 1, 2011 - May 31, 2011	187	101	0	0.00
April 1, 2011 - April 30, 2011	170	117	0	0.00
% Change	10.00%	-13.68%	0.00%	0.00%
Downloads				
May 1, 2011 - May 31, 2011	2	2	0	0.00
April 1, 2011 - April 30, 2011	3	2	0	0.00
% Change	-33.33%	0.00%	0.00%	0.00%
Fortis				
May 1, 2011 - May 31, 2011	1	1	0	0.00
April 1, 2011 - April 30, 2011	2	1	0	0.00
% Change	-50.00%	0.00%	0.00%	0.00%
Mails				
May 1, 2011 - May 31, 2011	1	1	0	0.00
April 1, 2011 - April 30, 2011	1	1	0	0.00
% Change	0.00%	0.00%	0.00%	0.00%

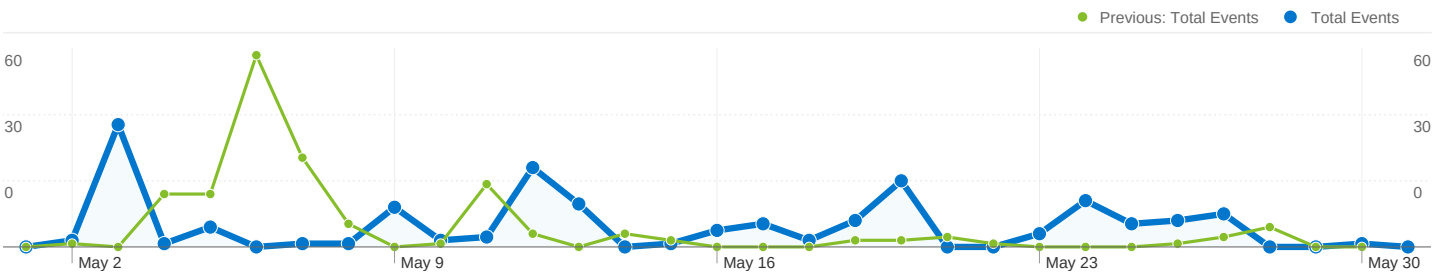
1 - 4 of 4

Event Tracking Action:

Click

May 1, 2011 - May 31, 2011

Comparing to: Apr 1, 2011 - Apr 30, 2011



This action recorded 189 total events via 185 event labels

Events

Total Events	Unique Events	Event Value	Avg. Value
189	144	0	0.00
Previous: 173 (9.25%)	Previous: 151 (-4.64%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Label	Total Events	Unique Events	Event Value	Avg. Value
javascript:void(0)				
May 1, 2011 - May 31, 2011	37	10	0	0.00
April 1, 2011 - April 30, 2011	12	5	0	0.00
% Change	208.33%	100.00%	0.00%	0.00%
javascript:void('Link')				
May 1, 2011 - May 31, 2011	24	10	0	0.00
April 1, 2011 - April 30, 2011	5	3	0	0.00
% Change	380.00%	233.33%	0.00%	0.00%
http://my.pulseenergy.com/LMHA/dashboard/#/overview				
May 1, 2011 - May 31, 2011	6	6	0	0.00
April 1, 2011 - April 30, 2011	11	11	0	0.00
% Change	-45.45%	-45.45%	0.00%	0.00%
https://c3community.ca/greencare/case-study/poonam-sandhu-c3-peer-leader				
May 1, 2011 - May 31, 2011	5	4	0	0.00
April 1, 2011 - April 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
https://c3community.ca/greencare/topic-area/18				
May 1, 2011 - May 31, 2011	5	5	0	0.00
April 1, 2011 - April 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%

http://www.newsroom.gov.bc.ca/downloads/Letter_to_editor_May6-2011.pdf				
May 1, 2011 - May 31, 2011	**4**	4	0	0.00
April 1, 2011 - April 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.phsa.ca/AboutPHSA/Environmental-Sustainability/Green-Plus-Leaders/default.htm				
May 1, 2011 - May 31, 2011	**4**	4	0	0.00
April 1, 2011 - April 30, 2011	**8**	7	0	0.00
% Change	-50.00%	-42.86%	0.00%	0.00%
http://www.snotr.com/video/6948/using_a_2_litre_bottle_as_a_50_watt_light_bulb				
May 1, 2011 - May 31, 2011	**3**	3	0	0.00
April 1, 2011 - April 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.youtube.com/watch?v=tX-CjkfBKUs				
May 1, 2011 - May 31, 2011	**3**	3	0	0.00
April 1, 2011 - April 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
https://c3community.ca/greencare/topic-area/21				
May 1, 2011 - May 31, 2011	**3**	3	0	0.00
April 1, 2011 - April 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
				1 - 10 of 185

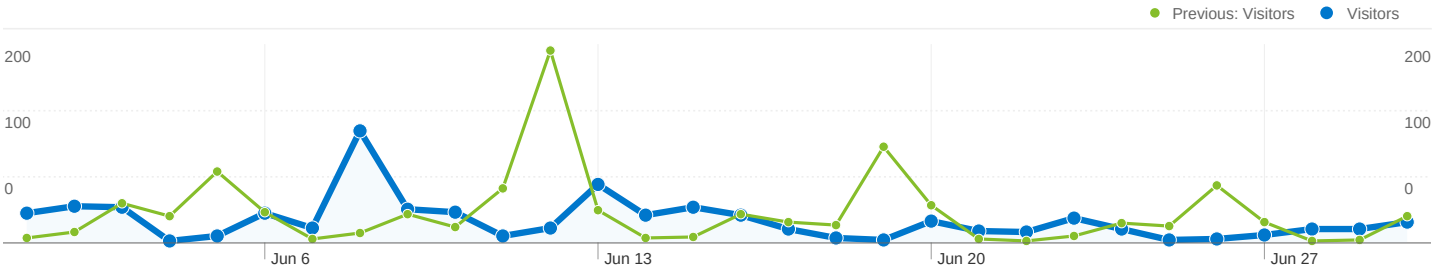
TABLE OF CONTENTS

c3community.ca/greencare

Visitors Overview

Jun 1, 2011 - Jun 30, 2011

Comparing to: May 1, 2011 - May 31, 2011



440 people visited this site

904 Visits

Previous: 1,176 (-23.13%)

440 Absolute Unique Visitors

Previous: 672 (-34.52%)

6,033 Pageviews

Previous: 7,172 (-15.88%)

6.67 Average Pageviews

Previous: 6.10 (9.43%)

00:07:05 Time on Site

Previous: 00:07:22 (-3.95%)

30.53% Bounce Rate

Previous: 38.52% (-20.74%)

32.63% New Visits

Previous: 44.56% (-26.76%)

Technical Profile

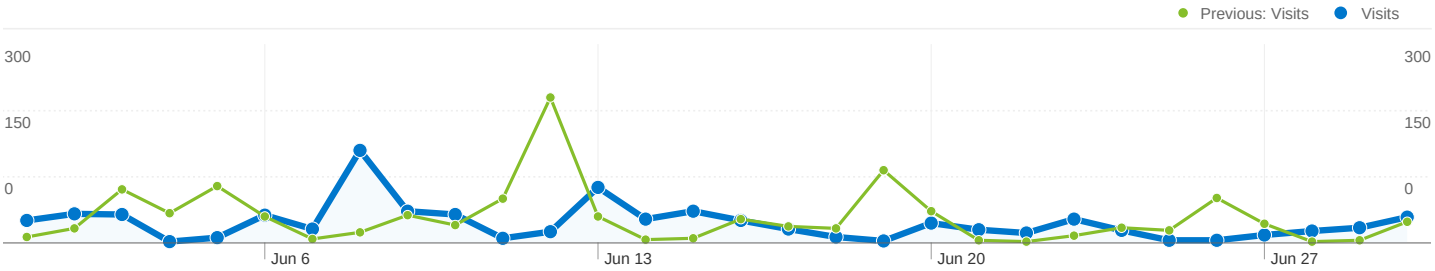
Browser	Visits	% visits
Internet Explorer		
Jun 1, 2011 - Jun 30, 2011	539	59.62%
May 1, 2011 - May 31, 2011	757	64.37%
% Change	-28.80%	-7.37%
Chrome		
Jun 1, 2011 - Jun 30, 2011	158	17.48%
May 1, 2011 - May 31, 2011	178	15.14%
% Change	-11.24%	15.47%

Connection Speed	Visits	% visits
Unknown		
Jun 1, 2011 - Jun 30, 2011	904	100.00%
May 1, 2011 - May 31, 2011	1,176	100.00%
% Change	-23.13%	0.00%

Safari		
Jun 1, 2011 - Jun 30, 2011	133	14.71%
May 1, 2011 - May 31, 2011	156	13.27%
% Change	-14.74%	10.91%
Firefox		
Jun 1, 2011 - Jun 30, 2011	66	7.30%
May 1, 2011 - May 31, 2011	74	6.29%
% Change	-10.81%	16.02%
IE with Chrome Frame		
Jun 1, 2011 - Jun 30, 2011	4	0.44%
May 1, 2011 - May 31, 2011	2	0.17%
% Change	100.00%	160.18%

Traffic Sources Overview

Jun 1, 2011 - Jun 30, 2011
Comparing to: May 1, 2011 - May 31, 2011

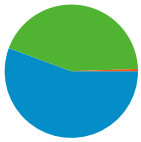


All traffic sources sent a total of 904 visits

55.64% Direct Traffic
Previous: 39.54% (40.72%)

43.81% Referring Sites
Previous: 60.46% (-27.55%)

0.55% Search Engines
Previous: 0.00% (0.00%)



- **Direct Traffic** 503.00 (55.64%)
- **Referring Sites** 396.00 (43.81%)
- **Search Engines** 5.00 (0.55%)

Top Traffic Sources

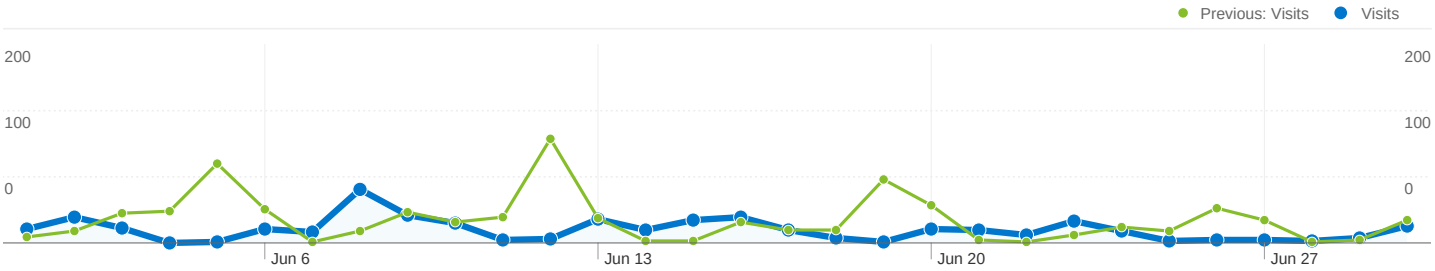
Sources	Visits	% visits
(direct) ((none))		
Jun 1, 2011 - Jun 30, 2011	503	55.64%
May 1, 2011 - May 31, 2011	465	39.54%
% Change	8.17%	40.72%
c3.cleancommuter.ca (referral)		
Jun 1, 2011 - Jun 30, 2011	105	11.62%
May 1, 2011 - May 31, 2011	145	12.33%
% Change	-27.59%	-5.80%
pod (referral)		
Jun 1, 2011 - Jun 30, 2011	101	11.17%
May 1, 2011 - May 31, 2011	250	21.26%
% Change	-59.60%	-47.44%
fhpulse (referral)		
Jun 1, 2011 - Jun 30, 2011	86	9.51%
May 1, 2011 - May 31, 2011	155	13.18%
% Change	-44.52%	-27.82%
webmail.vch.ca (referral)		

Keywords	Visits	% visits
3292 production way inter rai		
Jun 1, 2011 - Jun 30, 2011	2	40.00%
May 1, 2011 - May 31, 2011	0	0.00%
% Change	100.00%	100.00%
c3community.ca		
Jun 1, 2011 - Jun 30, 2011	1	20.00%
May 1, 2011 - May 31, 2011	0	0.00%
% Change	100.00%	100.00%
cut the carbon community c3		
Jun 1, 2011 - Jun 30, 2011	1	20.00%
May 1, 2011 - May 31, 2011	0	0.00%
% Change	100.00%	100.00%
www.c3community.ca/greencare		
Jun 1, 2011 - Jun 30, 2011	1	20.00%
May 1, 2011 - May 31, 2011	0	0.00%
% Change	100.00%	100.00%

Jun 1, 2011 - Jun 30, 2011	29	3.21%
May 1, 2011 - May 31, 2011	36	3.06%
% Change	-19.44%	4.79%

Referring Sites

Jun 1, 2011 - Jun 30, 2011
Comparing to: May 1, 2011 - May 31, 2011



Referring sites sent 396 visits via 32 sources

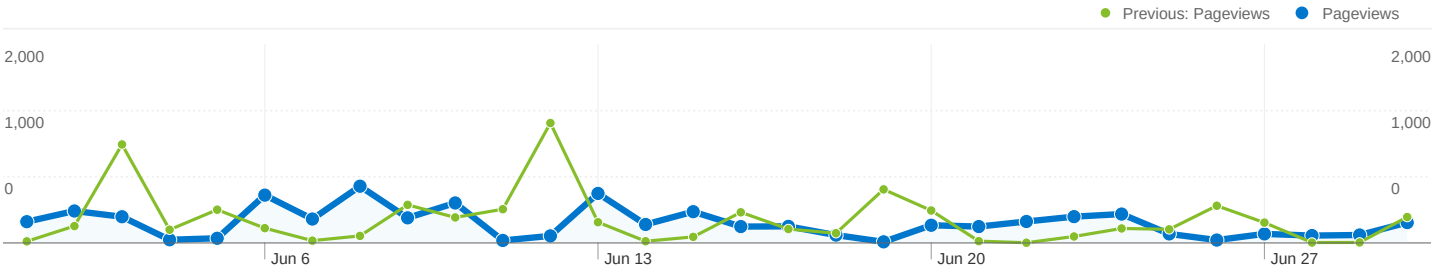
Site Usage

Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
396	8.89	00:09:45	23.23%	24.49%
Previous: 711 (-44.30%)	Previous: 5.79 (53.67%)	Previous: 00:06:52 (41.97%)	Previous: 39.24% (-40.80%)	Previous: 40.93% (-40.15%)

Source	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
c3.cleancommuter.ca					
June 1, 2011 - June 30, 2011	105	17.77	00:20:16	0.95%	12.38%
May 1, 2011 - May 31, 2011	145	10.89	00:14:19	8.97%	26.90%
% Change	-27.59%	63.20%	41.57%	-89.38%	-53.97%
pod					
June 1, 2011 - June 30, 2011	101	5.66	00:05:44	37.62%	31.68%
May 1, 2011 - May 31, 2011	250	4.06	00:03:53	59.20%	46.40%
% Change	-59.60%	39.35%	47.56%	-36.45%	-31.72%
fhpulse					
June 1, 2011 - June 30, 2011	86	6.98	00:05:21	48.84%	36.05%
May 1, 2011 - May 31, 2011	155	4.90	00:04:58	60.00%	36.77%
% Change	-44.52%	42.48%	7.70%	-18.60%	-1.98%
webmail.vch.ca					
June 1, 2011 - June 30, 2011	29	7.14	00:12:27	10.34%	10.34%
May 1, 2011 - May 31, 2011	36	8.31	00:16:03	2.78%	19.44%
% Change	-19.44%	-14.06%	-22.41%	272.41%	-46.80%
affinitybridge.unfuddle.com					
June 1, 2011 - June 30, 2011	24	2.54	00:02:36	0.00%	29.17%
May 1, 2011 - May 31, 2011	23	4.57	00:07:50	0.00%	30.43%
% Change	4.35%	-44.33%	-66.79%	0.00%	-4.17%
us2.campaign-archive1.com					
June 1, 2011 - June 30, 2011	12	3.17	00:01:15	33.33%	33.33%

May 1, 2011 - May 31, 2011	**14**	5.36	00:03:43	35.71%	35.71%
% Change	**-14.29%**	-40.89%	-66.47%	-6.67%	-6.67%
localhost.c3					
June 1, 2011 - June 30, 2011	**11**	3.18	00:05:02	0.00%	18.18%
May 1, 2011 - May 31, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	**100.00%**	100.00%	100.00%	0.00%	100.00%
admin.onelesstonne.org					
June 1, 2011 - June 30, 2011	**5**	5.40	00:13:53	0.00%	0.00%
May 1, 2011 - May 31, 2011	**12**	5.92	00:09:18	66.67%	25.00%
% Change	**-58.33%**	-8.73%	49.28%	-100.00%	-100.00%
c3community.ca					
June 1, 2011 - June 30, 2011	**5**	8.40	00:07:33	0.00%	0.00%
May 1, 2011 - May 31, 2011	**42**	1.71	00:00:35	0.00%	90.48%
% Change	**-88.10%**	390.00%	1,199.02%	0.00%	-100.00%
us2.campaign-archive2.com					
June 1, 2011 - June 30, 2011	**4**	4.25	00:01:31	0.00%	0.00%
May 1, 2011 - May 31, 2011	**5**	9.20	00:06:47	60.00%	40.00%
% Change	**-20.00%**	-53.80%	-77.76%	-100.00%	-100.00%
					1 - 10 of 32

Content Overview



Pages on this site were viewed a total of 6,033 times

6,033 Pageviews

Previous: 7,172 (-15.88%)

3,465 Unique Views

Previous: 4,286 (-19.16%)

30.53% Bounce Rate

Previous: 38.52% (-20.74%)

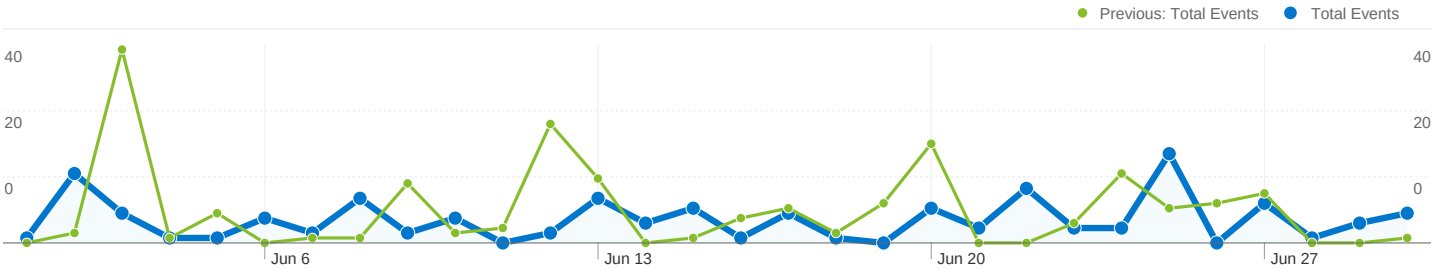
Top Content

Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard		
Jun 1, 2011 - Jun 30, 2011	1,003	16.63%
May 1, 2011 - May 31, 2011	1,411	19.67%
% Change	-28.92%	-15.50%
/greencare/		
Jun 1, 2011 - Jun 30, 2011	721	11.95%
May 1, 2011 - May 31, 2011	780	10.88%
% Change	-7.56%	9.89%
/greencare/dashboard		
Jun 1, 2011 - Jun 30, 2011	339	5.62%
May 1, 2011 - May 31, 2011	308	4.29%
% Change	10.06%	30.84%
/greencare/user		
Jun 1, 2011 - Jun 30, 2011	268	4.44%
May 1, 2011 - May 31, 2011	340	4.74%
% Change	-21.18%	-6.29%
/greencare/topic-areas		

Jun 1, 2011 - Jun 30, 2011	183	3.03%
May 1, 2011 - May 31, 2011	249	3.47%
% Change	-26.51%	-12.63%

Event Tracking Categories

Jun 1, 2011 - Jun 30, 2011
Comparing to: May 1, 2011 - May 31, 2011



140 total events were recorded via 4 event categories

Events

Total Events	Unique Events	Event Value	Avg. Value
140	69	0	0.00
Previous: 191 (-26.70%)	Previous: 105 (-34.29%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Category	Total Events	Unique Events	Event Value	Avg. Value
Outbound links				
June 1, 2011 - June 30, 2011	136	66	0	0.00
May 1, 2011 - May 31, 2011	187	101	0	0.00
% Change	-27.27%	-34.65%	0.00%	0.00%
Downloads				
June 1, 2011 - June 30, 2011	4	3	0	0.00
May 1, 2011 - May 31, 2011	2	2	0	0.00
% Change	100.00%	50.00%	0.00%	0.00%
Fortis				
June 1, 2011 - June 30, 2011	0	0	0	0.00
May 1, 2011 - May 31, 2011	1	1	0	0.00
% Change	-100.00%	-100.00%	0.00%	0.00%
Mails				
June 1, 2011 - June 30, 2011	0	0	0	0.00
May 1, 2011 - May 31, 2011	1	1	0	0.00
% Change	-100.00%	-100.00%	0.00%	0.00%

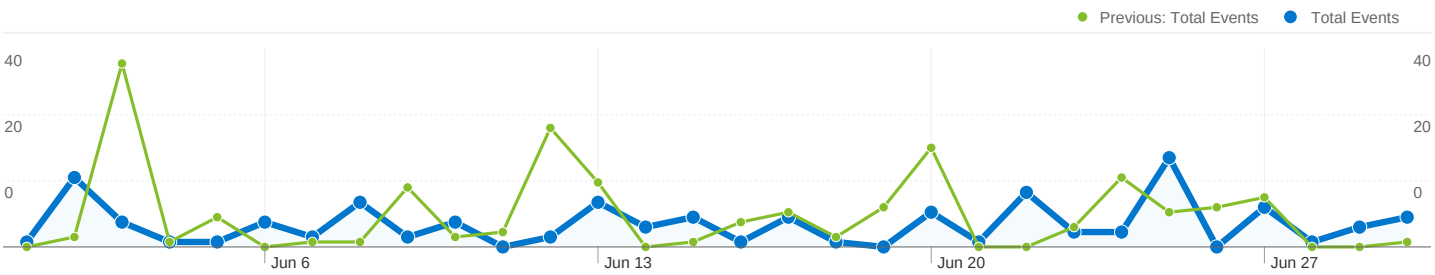
1 - 4 of 4

Event Tracking Action:

Click

Jun 1, 2011 - Jun 30, 2011

Comparing to: May 1, 2011 - May 31, 2011



This action recorded 136 total events via 169 event labels

Events

Total Events	Unique Events	Event Value	Avg. Value
136	109	0	0.00
Previous: 189 (-28.04%)	Previous: 144 (-24.31%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Label	Total Events	Unique Events	Event Value	Avg. Value
javascript:void(0)				
June 1, 2011 - June 30, 2011	19	7	0	0.00
May 1, 2011 - May 31, 2011	37	10	0	0.00
% Change	-48.65%	-30.00%	0.00%	0.00%
javascript:void('Link')				
June 1, 2011 - June 30, 2011	9	6	0	0.00
May 1, 2011 - May 31, 2011	24	10	0	0.00
% Change	-62.50%	-40.00%	0.00%	0.00%
http://www.environmentalleader.com/2011/06/01/stanley-cup-to-be-water-neutral/				
June 1, 2011 - June 30, 2011	6	5	0	0.00
May 1, 2011 - May 31, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://my.pulseenergy.com/LMHA/dashboard/#/overview				
June 1, 2011 - June 30, 2011	5	5	0	0.00
May 1, 2011 - May 31, 2011	6	6	0	0.00
% Change	-16.67%	-16.67%	0.00%	0.00%
http://www.pc.gc.ca/pn-np/bc/pacificrim/activ/activ6a.aspx				
June 1, 2011 - June 30, 2011	3	2	0	0.00
May 1, 2011 - May 31, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%

http://www.world-nuclear.org/info/reactors.html				
June 1, 2011 - June 30, 2011	**3**	1	0	0.00
May 1, 2011 - May 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
https://c3community.ca/greencare/topic-area/19				
June 1, 2011 - June 30, 2011	**3**	2	0	0.00
May 1, 2011 - May 31, 2011	**1**	1	0	0.00
% Change	200.00%	100.00%	0.00%	0.00%
http://admin.onelesstonne.org/init/vch2011?phase=2011-1&email=shirley.ireland%40fraserhealth.ca&name=Shirley%20Ireland&phone=				
June 1, 2011 - June 30, 2011	**2**	1	0	0.00
May 1, 2011 - May 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://oee.nrcan.gc.ca/residential/energystar-portal.cfm				
June 1, 2011 - June 30, 2011	**2**	1	0	0.00
May 1, 2011 - May 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.carfreevancouver.org/				
June 1, 2011 - June 30, 2011	**2**	2	0	0.00
May 1, 2011 - May 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
				1 - 10 of 169

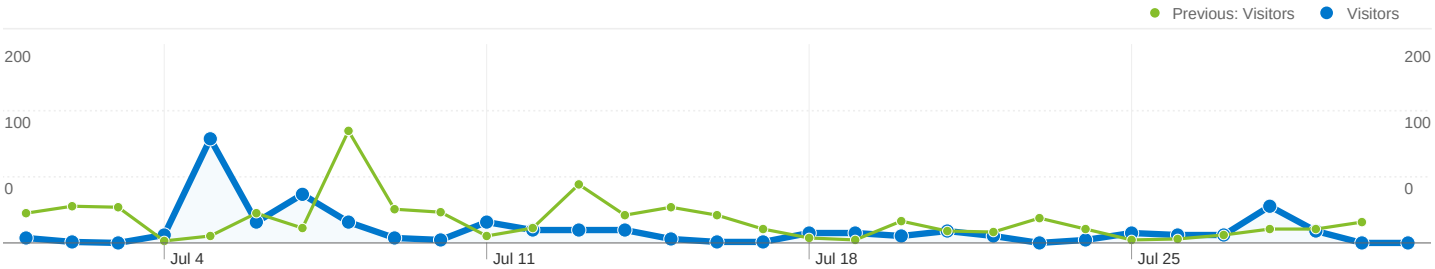
TABLE OF CONTENTS

c3community.ca/greencare

Visitors Overview

Jul 1, 2011 - Jul 31, 2011

Comparing to: Jun 1, 2011 - Jun 30, 2011



312 people visited this site

519 Visits

Previous: 904 (-42.59%)

312 Absolute Unique Visitors

Previous: 440 (-29.09%)

3,146 Pageviews

Previous: 6,033 (-47.85%)

6.06 Average Pageviews

Previous: 6.67 (-9.17%)

00:05:59 Time on Site

Previous: 00:07:05 (-15.53%)

36.99% Bounce Rate

Previous: 30.53% (21.17%)

39.31% New Visits

Previous: 32.63% (20.45%)

Technical Profile

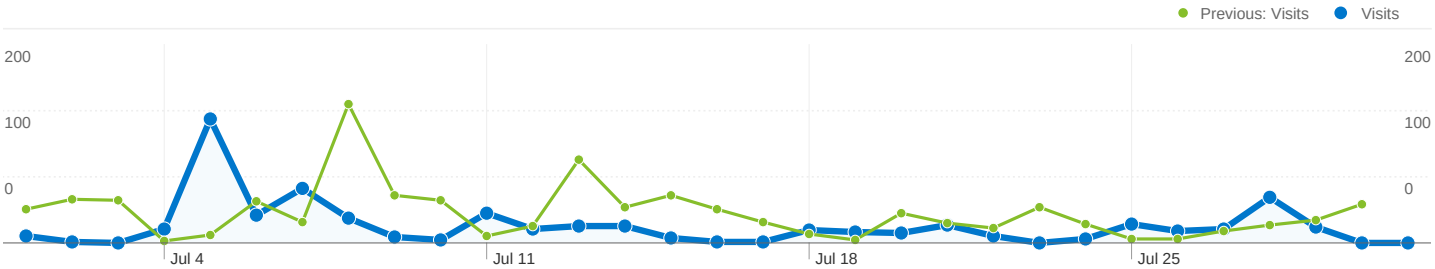
Browser	Visits	% visits
Internet Explorer		
Jul 1, 2011 - Jul 31, 2011	384	73.99%
Jun 1, 2011 - Jun 30, 2011	539	59.62%
% Change	-28.76%	24.09%
Chrome		
Jul 1, 2011 - Jul 31, 2011	45	8.67%
Jun 1, 2011 - Jun 30, 2011	158	17.48%
% Change	-71.52%	-50.39%

Connection Speed	Visits	% visits
Unknown		
Jul 1, 2011 - Jul 31, 2011	519	100.00%
Jun 1, 2011 - Jun 30, 2011	904	100.00%
% Change	-42.59%	0.00%

Firefox		
Jul 1, 2011 - Jul 31, 2011	45	8.67%
Jun 1, 2011 - Jun 30, 2011	66	7.30%
% Change	-31.82%	18.76%
Safari		
Jul 1, 2011 - Jul 31, 2011	43	8.29%
Jun 1, 2011 - Jun 30, 2011	133	14.71%
% Change	-67.67%	-43.69%
BlackBerry9300		
Jul 1, 2011 - Jul 31, 2011	1	0.19%
Jun 1, 2011 - Jun 30, 2011	0	0.00%
% Change	100.00%	100.00%

Traffic Sources Overview

Jul 1, 2011 - Jul 31, 2011
Comparing to: Jun 1, 2011 - Jun 30, 2011

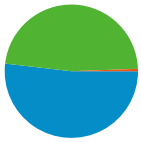


All traffic sources sent a total of 519 visits

51.83% Direct Traffic
Previous: 55.64% (-6.85%)

47.59% Referring Sites
Previous: 43.81% (8.64%)

0.58% Search Engines
Previous: 0.55% (4.51%)



- **Direct Traffic** 269.00 (51.83%)
- **Referring Sites** 247.00 (47.59%)
- **Search Engines** 3.00 (0.58%)

Top Traffic Sources

Sources	Visits	% visits
(direct) ((none))		
Jul 1, 2011 - Jul 31, 2011	269	51.83%
Jun 1, 2011 - Jun 30, 2011	503	55.64%
% Change	-46.52%	-6.85%
fhpulse (referral)		
Jul 1, 2011 - Jul 31, 2011	101	19.46%
Jun 1, 2011 - Jun 30, 2011	86	9.51%
% Change	17.44%	104.56%
pod (referral)		
Jul 1, 2011 - Jul 31, 2011	69	13.29%
Jun 1, 2011 - Jun 30, 2011	101	11.17%
% Change	-31.68%	19.00%
c3.cleancommuter.ca (referral)		
Jul 1, 2011 - Jul 31, 2011	29	5.59%
Jun 1, 2011 - Jun 30, 2011	105	11.62%
% Change	-72.38%	-51.89%
webmail.vch.ca (referral)		

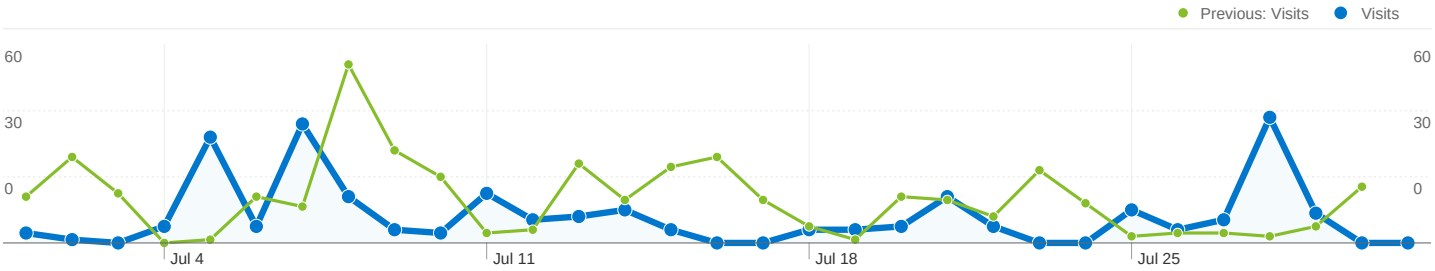
Keywords	Visits	% visits
32900 marshall road abbotsford energy management		
Jul 1, 2011 - Jul 31, 2011	1	33.33%
Jun 1, 2011 - Jun 30, 2011	0	0.00%
% Change	100.00%	100.00%
fraser health authority 625 agnes new westminster		
Jul 1, 2011 - Jul 31, 2011	1	33.33%
Jun 1, 2011 - Jun 30, 2011	0	0.00%
% Change	100.00%	100.00%
i work for providence health at brock fahrni		
Jul 1, 2011 - Jul 31, 2011	1	33.33%
Jun 1, 2011 - Jun 30, 2011	0	0.00%
% Change	100.00%	100.00%
3292 production way inter rai		
Jul 1, 2011 - Jul 31, 2011	0	0.00%
Jun 1, 2011 - Jun 30, 2011	2	40.00%
% Change	-100.00%	-100.00%
c3community.ca		

Jul 1, 2011 - Jul 31, 2011	16	3.08%
Jun 1, 2011 - Jun 30, 2011	29	3.21%
% Change	-44.83%	-3.90%

Jul 1, 2011 - Jul 31, 2011	0	0.00%
Jun 1, 2011 - Jun 30, 2011	1	20.00%
% Change	-100.00%	-100.00%

Referring Sites

Jul 1, 2011 - Jul 31, 2011
Comparing to: Jun 1, 2011 - Jun 30, 2011



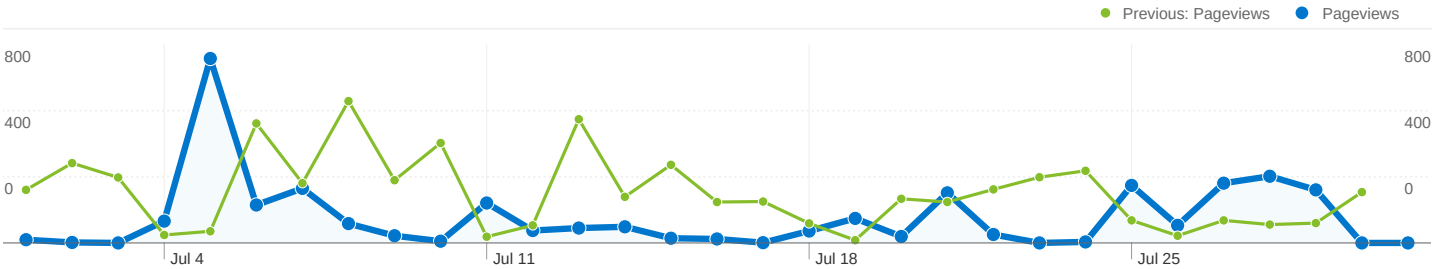
Referring sites sent 247 visits via 23 sources

Site Usage

Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
247	7.18	00:06:48	42.11%	36.03%
Previous: 396 (-37.63%)	Previous: 8.89 (-19.29%)	Previous: 00:09:45 (-30.27%)	Previous: 23.23% (81.24%)	Previous: 24.49% (47.10%)

Source	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
fhpulse					
July 1, 2011 - July 31, 2011	101	4.58	00:02:38	72.28%	43.56%
June 1, 2011 - June 30, 2011	86	6.98	00:05:21	48.84%	36.05%
% Change	17.44%	-34.29%	-50.90%	48.00%	20.86%
pod					
July 1, 2011 - July 31, 2011	69	5.41	00:04:53	39.13%	39.13%
June 1, 2011 - June 30, 2011	101	5.66	00:05:44	37.62%	31.68%
% Change	-31.68%	-4.55%	-14.93%	4.00%	23.51%
c3.cleancommuter.ca					
July 1, 2011 - July 31, 2011	29	24.97	00:26:16	0.00%	13.79%
June 1, 2011 - June 30, 2011	105	17.77	00:20:16	0.95%	12.38%
% Change	-72.38%	40.48%	29.59%	-100.00%	11.41%
webmail.vch.ca					
July 1, 2011 - July 31, 2011	16	5.94	00:11:18	0.00%	25.00%
June 1, 2011 - June 30, 2011	29	7.14	00:12:27	10.34%	10.34%
% Change	-44.83%	-16.82%	-9.21%	-100.00%	141.67%
us2.campaign-archive2.com					
July 1, 2011 - July 31, 2011	9	4.56	00:03:28	11.11%	33.33%
June 1, 2011 - June 30, 2011	4	4.25	00:01:31	0.00%	0.00%
% Change	125.00%	7.19%	129.83%	100.00%	100.00%
affinitybridge.unfuddle.com					
July 1, 2011 - July 31, 2011	5	2.80	00:11:15	0.00%	0.00%

June 1, 2011 - June 30, 2011	**24**	2.54	00:02:36	0.00%	29.17%
% Change	**-79.17%**	10.16%	332.21%	0.00%	-100.00%
localhost.c3					
July 1, 2011 - July 31, 2011	**5**	2.40	00:00:58	0.00%	20.00%
June 1, 2011 - June 30, 2011	**11**	3.18	00:05:02	0.00%	18.18%
% Change	**-54.55%**	-24.57%	-80.67%	0.00%	10.00%
admin.onelesstonne.ca					
July 1, 2011 - July 31, 2011	**3**	4.67	00:01:07	0.00%	33.33%
June 1, 2011 - June 30, 2011	**1**	1.00	00:00:00	0.00%	100.00%
% Change	**200.00%**	366.67%	100.00%	0.00%	-66.67%
us2.campaign-archive1.com					
July 1, 2011 - July 31, 2011	**3**	9.00	00:09:02	33.33%	0.00%
June 1, 2011 - June 30, 2011	**12**	3.17	00:01:15	33.33%	33.33%
% Change	**-75.00%**	184.21%	625.45%	0.00%	-100.00%
owa.fraserhealth.ca					
July 1, 2011 - July 31, 2011	**2**	2.00	00:01:04	100.00%	50.00%
June 1, 2011 - June 30, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	**100.00%**	100.00%	100.00%	100.00%	100.00%
					1 - 10 of 23



Pages on this site were viewed a total of 3,146 times

3,146 Pageviews

Previous: 6,033 (-47.85%)

2,021 Unique Views

Previous: 3,465 (-41.67%)

36.99% Bounce Rate

Previous: 30.53% (21.17%)

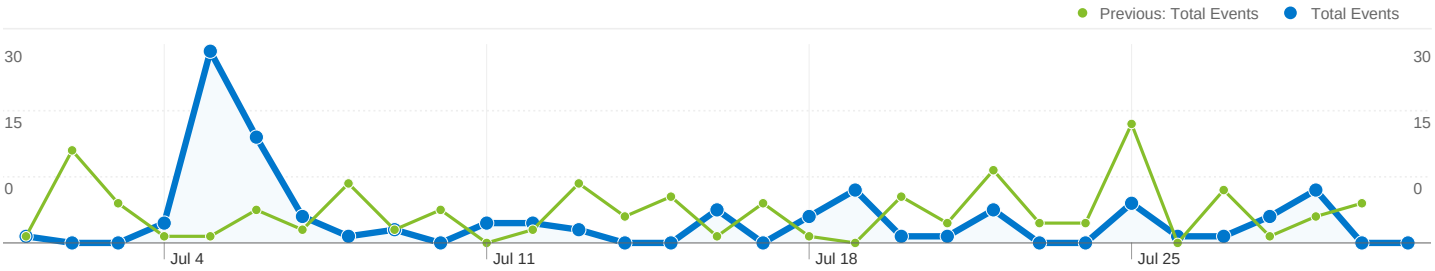
Top Content

Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard		
Jul 1, 2011 - Jul 31, 2011	514	16.34%
Jun 1, 2011 - Jun 30, 2011	1,003	16.63%
% Change	-48.75%	-1.73%
/greencare/		
Jul 1, 2011 - Jul 31, 2011	291	9.25%
Jun 1, 2011 - Jun 30, 2011	721	11.95%
% Change	-59.64%	-22.60%
/greencare/dashboard		
Jul 1, 2011 - Jul 31, 2011	208	6.61%
Jun 1, 2011 - Jun 30, 2011	339	5.62%
% Change	-38.64%	17.66%
/greencare/user		
Jul 1, 2011 - Jul 31, 2011	135	4.29%
Jun 1, 2011 - Jun 30, 2011	268	4.44%
% Change	-49.63%	-3.40%
/greencare/user/login?destination=node/8046		

Jul 1, 2011 - Jul 31, 2011	97	3.08%
Jun 1, 2011 - Jun 30, 2011	1	0.02%
% Change	9,600.00%	18,501.43%

Event Tracking Categories

Jul 1, 2011 - Jul 31, 2011
Comparing to: Jun 1, 2011 - Jun 30, 2011



108 total events were recorded via 3 event categories

Events

Total Events	Unique Events	Event Value	Avg. Value
108	78	0	0.00
Previous: 140 (-22.86%)	Previous: 69 (13.04%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Category	Total Events	Unique Events	Event Value	Avg. Value
Outbound links				
July 1, 2011 - July 31, 2011	103	73	0	0.00
June 1, 2011 - June 30, 2011	136	66	0	0.00
% Change	-24.26%	10.61%	0.00%	0.00%
Downloads				
July 1, 2011 - July 31, 2011	3	3	0	0.00
June 1, 2011 - June 30, 2011	4	3	0	0.00
% Change	-25.00%	0.00%	0.00%	0.00%
Mails				
July 1, 2011 - July 31, 2011	2	2	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%

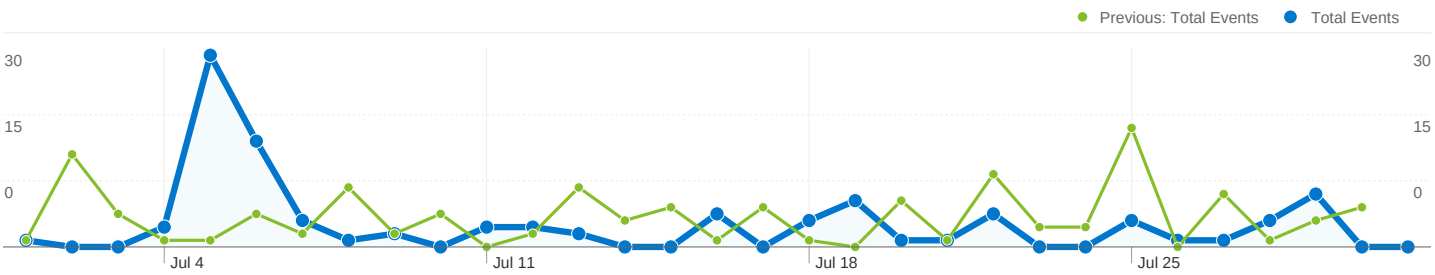
1 - 3 of 3

Event Tracking Action:

Click

Jul 1, 2011 - Jul 31, 2011

Comparing to: Jun 1, 2011 - Jun 30, 2011



This action recorded 105 total events via 147 event labels

Events

Total Events	Unique Events	Event Value	Avg. Value
105	100	0	0.00
Previous: 136 (-22.79%)	Previous: 109 (-8.26%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Label	Total Events	Unique Events	Event Value	Avg. Value
http://www.popularmechanics.com/home/improvement/electrical-plumbing/4221398?click=main_sr				
July 1, 2011 - July 31, 2011	5	4	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://my.pulseenergy.com/LMHA/dashboard/#/overview				
July 1, 2011 - July 31, 2011	4	4	0	0.00
June 1, 2011 - June 30, 2011	5	5	0	0.00
% Change	-20.00%	-20.00%	0.00%	0.00%
http://www.cwn-rce.ca/category/news-and-events/news/				
July 1, 2011 - July 31, 2011	4	2	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.healthcaredevelopmentmagazine.com/article/case-studies-green-roofs-on-health-care-facilities.html				
July 1, 2011 - July 31, 2011	3	3	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.livesmartbc.ca/community/features/interior_health.html				
July 1, 2011 - July 31, 2011	3	3	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00

% Change	100.00%	100.00%	0.00%	0.00%
http://admin.onelesstonne.org/init/vch2011?phase=2011-2&email=pawanjot.johal%40fraserhealth.ca&name=&phone=				
July 1, 2011 - July 31, 2011	2	2	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://publicdreams.org/event/illuminaires_2011/				
July 1, 2011 - July 31, 2011	2	2	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.fortisbc.com/About/ProjectsPlanning/GasUtility/NewOngoingProjects/Biogas/Pages/Significant-developments.aspx				
July 1, 2011 - July 31, 2011	2	1	0	0.00
June 1, 2011 - June 30, 2011	2	1	0	0.00
% Change	0.00%	0.00%	0.00%	0.00%
http://www.fortisbc.com/EnergySolutions/GeoexchangeSystems/Pages/Types-of-geoexchange-systems.aspx				
July 1, 2011 - July 31, 2011	2	2	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.greenbiz.com/news/2011/06/30/san-francisco-named-north-americas-greenest-city				
July 1, 2011 - July 31, 2011	2	2	0	0.00
June 1, 2011 - June 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
				1 - 10 of 147

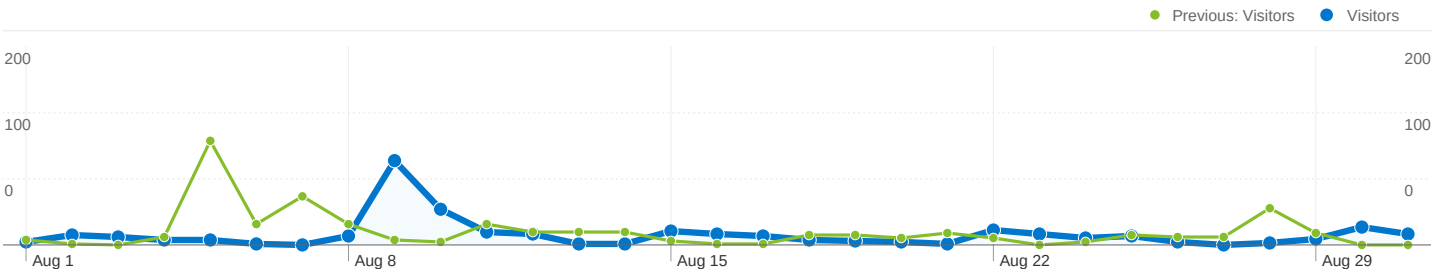
TABLE OF CONTENTS

c3community.ca/greencare

Visitors Overview

Aug 1, 2011 - Aug 31, 2011

Comparing to: Jul 1, 2011 - Jul 31, 2011



197 people visited this site

428 Visits

Previous: 519 (-17.53%)

197 Absolute Unique Visitors

Previous: 312 (-36.86%)

2,518 Pageviews

Previous: 3,146 (-19.96%)

5.88 Average Pageviews

Previous: 6.06 (-2.94%)

00:07:16 Time on Site

Previous: 00:05:59 (21.59%)

38.08% Bounce Rate

Previous: 36.99% (2.95%)

27.57% New Visits

Previous: 39.31% (-29.86%)

Technical Profile

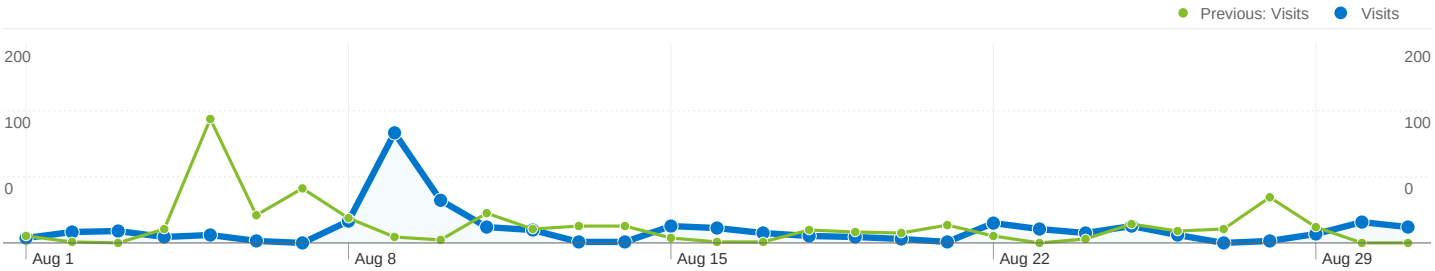
Browser	Visits	% visits
Internet Explorer		
Aug 1, 2011 - Aug 31, 2011	215	50.23%
Jul 1, 2011 - Jul 31, 2011	384	73.99%
% Change	-44.01%	-32.11%
Chrome		
Aug 1, 2011 - Aug 31, 2011	89	20.79%
Jul 1, 2011 - Jul 31, 2011	45	8.67%
% Change	97.78%	139.83%

Connection Speed	Visits	% visits
Unknown		
Aug 1, 2011 - Aug 31, 2011	428	100.00%
Jul 1, 2011 - Jul 31, 2011	519	100.00%
% Change	-17.53%	0.00%

Safari		
Aug 1, 2011 - Aug 31, 2011	72	16.82%
Jul 1, 2011 - Jul 31, 2011	43	8.29%
% Change	67.44%	103.04%
Firefox		
Aug 1, 2011 - Aug 31, 2011	47	10.98%
Jul 1, 2011 - Jul 31, 2011	45	8.67%
% Change	4.44%	26.65%
Mozilla Compatible Agent		
Aug 1, 2011 - Aug 31, 2011	4	0.93%
Jul 1, 2011 - Jul 31, 2011	0	0.00%
% Change	100.00%	100.00%

Traffic Sources Overview

Aug 1, 2011 - Aug 31, 2011
Comparing to: Jul 1, 2011 - Jul 31, 2011



All traffic sources sent a total of 428 visits

62.15% Direct Traffic

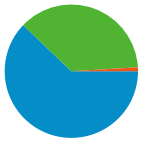
Previous: 51.83% (19.91%)

36.92% Referring Sites

Previous: 47.59% (-22.43%)

0.93% Search Engines

Previous: 0.58% (61.68%)



- **Direct Traffic** 266.00 (62.15%)
- **Referring Sites** 158.00 (36.92%)
- **Search Engines** 4.00 (0.93%)

Top Traffic Sources

Sources	Visits	% visits
(direct) ((none))		
Aug 1, 2011 - Aug 31, 2011	266	62.15%
Jul 1, 2011 - Jul 31, 2011	269	51.83%
% Change	-1.12%	19.91%
c3.cleancommuter.ca (referral)		
Aug 1, 2011 - Aug 31, 2011	51	11.92%
Jul 1, 2011 - Jul 31, 2011	29	5.59%
% Change	75.86%	113.25%
webmail.vch.ca (referral)		
Aug 1, 2011 - Aug 31, 2011	30	7.01%
Jul 1, 2011 - Jul 31, 2011	16	3.08%
% Change	87.50%	127.37%
pod (referral)		
Aug 1, 2011 - Aug 31, 2011	23	5.37%
Jul 1, 2011 - Jul 31, 2011	69	13.29%
% Change	-66.67%	-59.58%
affinitybridge.unfuddle.com (referral)		

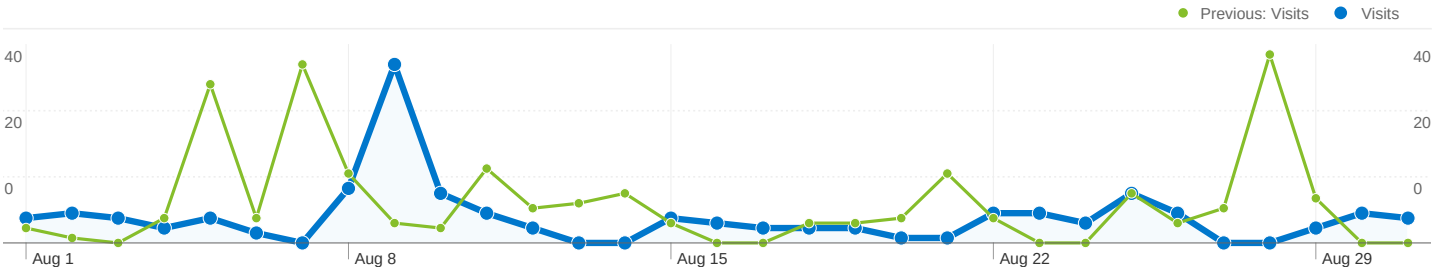
Keywords	Visits	% visits
c3 community chest carbon wise		
Aug 1, 2011 - Aug 31, 2011	1	25.00%
Jul 1, 2011 - Jul 31, 2011	0	0.00%
% Change	100.00%	100.00%
carbon c3 vancouver coastal health		
Aug 1, 2011 - Aug 31, 2011	1	25.00%
Jul 1, 2011 - Jul 31, 2011	0	0.00%
% Change	100.00%	100.00%
cut the carbon c3 vancouver coastal health		
Aug 1, 2011 - Aug 31, 2011	1	25.00%
Jul 1, 2011 - Jul 31, 2011	0	0.00%
% Change	100.00%	100.00%
cut the carbon community greencare		
Aug 1, 2011 - Aug 31, 2011	1	25.00%
Jul 1, 2011 - Jul 31, 2011	0	0.00%
% Change	100.00%	100.00%
32900 marshall road abbotsford energy management		

Aug 1, 2011 - Aug 31, 2011	13	3.04%
Jul 1, 2011 - Jul 31, 2011	5	0.96%
% Change	160.00%	215.28%

Aug 1, 2011 - Aug 31, 2011	0	0.00%
Jul 1, 2011 - Jul 31, 2011	1	33.33%
% Change	-100.00%	-100.00%

Referring Sites

Aug 1, 2011 - Aug 31, 2011
Comparing to: Jul 1, 2011 - Jul 31, 2011



Referring sites sent 158 visits via 18 sources

Site Usage

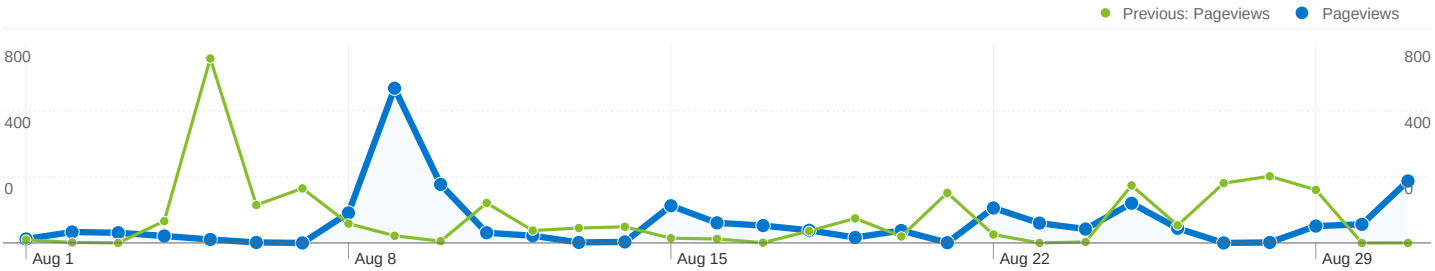
Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
158	7.81	00:10:23	9.49%	37.34%
Previous: 247 (-36.03%)	Previous: 7.18 (8.80%)	Previous: 00:06:48 (52.86%)	Previous: 42.11% (-77.45%)	Previous: 36.03% (3.63%)

Source	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
c3.cleancommuter.ca					
August 1, 2011 - August 31, 2011	51	15.14	00:20:06	0.00%	15.69%
July 1, 2011 - July 31, 2011	29	24.97	00:26:16	0.00%	13.79%
% Change	75.86%	-39.37%	-23.47%	0.00%	13.73%
webmail.vch.ca					
August 1, 2011 - August 31, 2011	30	3.10	00:04:45	6.67%	46.67%
July 1, 2011 - July 31, 2011	16	5.94	00:11:18	0.00%	25.00%
% Change	87.50%	-47.79%	-58.05%	100.00%	86.67%
pod					
August 1, 2011 - August 31, 2011	23	4.26	00:04:49	26.09%	56.52%
July 1, 2011 - July 31, 2011	69	5.41	00:04:53	39.13%	39.13%
% Change	-66.67%	-21.18%	-1.43%	-33.33%	44.44%
affinitybridge.unfuddle.com					
August 1, 2011 - August 31, 2011	13	4.23	00:13:05	0.00%	23.08%
July 1, 2011 - July 31, 2011	5	2.80	00:11:15	0.00%	0.00%
% Change	160.00%	51.10%	16.42%	0.00%	100.00%
fhpulse					
August 1, 2011 - August 31, 2011	11	6.00	00:05:02	27.27%	72.73%
July 1, 2011 - July 31, 2011	101	4.58	00:02:38	72.28%	43.56%
% Change	-89.11%	30.89%	91.55%	-62.27%	66.94%
localhost.c3					
August 1, 2011 - August 31, 2011	9	6.56	00:08:13	0.00%	22.22%

July 1, 2011 - July 31, 2011	**5**	2.40	00:00:58	0.00%	20.00%
% Change	80.00%	173.15%	743.42%	0.00%	11.11%
us2.campaign-archive2.com					
August 1, 2011 - August 31, 2011	**8**	7.75	00:06:32	37.50%	12.50%
July 1, 2011 - July 31, 2011	**9**	4.56	00:03:28	11.11%	33.33%
% Change	**-11.11%**	70.12%	88.40%	237.50%	-62.50%
admin.onelesstonne.org					
August 1, 2011 - August 31, 2011	**5**	1.80	00:00:42	0.00%	80.00%
July 1, 2011 - July 31, 2011	**1**	2.00	00:08:56	0.00%	0.00%
% Change	400.00%	-10.00%	-92.13%	0.00%	100.00%
www.br4.in/ForexMarket					
August 1, 2011 - August 31, 2011	**3**	1.00	00:00:00	0.00%	100.00%
July 1, 2011 - July 31, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	100.00%	100.00%	0.00%	0.00%	100.00%
red001.mail.microsoftonline.com					
August 1, 2011 - August 31, 2011	**2**	1.00	00:00:00	0.00%	100.00%
July 1, 2011 - July 31, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	100.00%	100.00%	0.00%	0.00%	100.00%

Content Overview

Aug 1, 2011 - Aug 31, 2011
Comparing to: Jul 1, 2011 - Jul 31, 2011



Pages on this site were viewed a total of 2,518 times

2,518 Pageviews

Previous: 3,146 (-19.96%)

1,552 Unique Views

Previous: 2,021 (-23.21%)

38.08% Bounce Rate

Previous: 36.99% (2.95%)

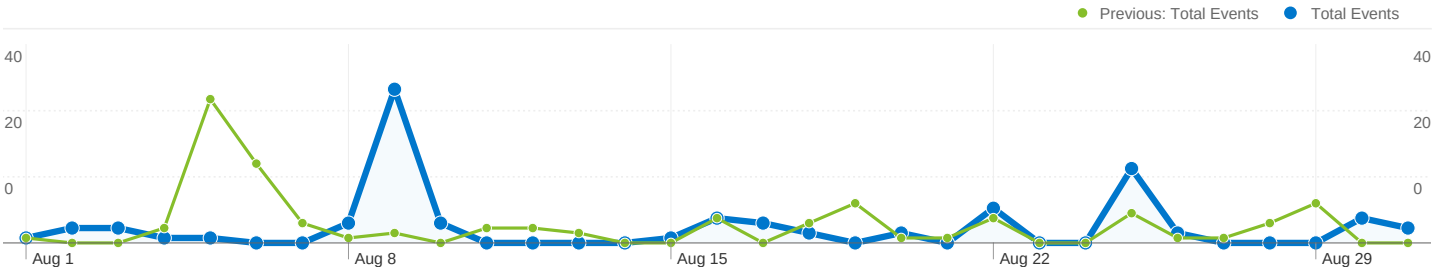
Top Content

Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard		
Aug 1, 2011 - Aug 31, 2011	348	13.82%
Jul 1, 2011 - Jul 31, 2011	514	16.34%
% Change	-32.30%	-15.41%
/greencare/		
Aug 1, 2011 - Aug 31, 2011	331	13.15%
Jul 1, 2011 - Jul 31, 2011	291	9.25%
% Change	13.75%	42.11%
/greencare/dashboard		
Aug 1, 2011 - Aug 31, 2011	147	5.84%
Jul 1, 2011 - Jul 31, 2011	208	6.61%
% Change	-29.33%	-11.70%
/greencare/user		
Aug 1, 2011 - Aug 31, 2011	77	3.06%
Jul 1, 2011 - Jul 31, 2011	135	4.29%
% Change	-42.96%	-28.74%
/greencare/user/login?destination=node/8607		

Aug 1, 2011 - Aug 31, 2011	74	2.94%
Jul 1, 2011 - Jul 31, 2011	0	0.00%
% Change	100.00%	100.00%

Event Tracking Categories

Aug 1, 2011 - Aug 31, 2011
Comparing to: Jul 1, 2011 - Jul 31, 2011



94 total events were recorded via 5 event categories

Events

Total Events	Unique Events	Event Value	Avg. Value
94	**45**	**0**	**0.00**
Previous: **108** (-12.96%)	Previous: **78** (-42.31%)	Previous: **0** (0.00%)	Previous: **0.00** (0.00%)

Event Category	Total Events	Unique Events	Event Value	Avg. Value
Outbound links				
August 1, 2011 - August 31, 2011	**83**	41	0	0.00
July 1, 2011 - July 31, 2011	**103**	73	0	0.00
% Change	**-19.42%**	-43.84%	0.00%	0.00%
Mails				
August 1, 2011 - August 31, 2011	**5**	2	0	0.00
July 1, 2011 - July 31, 2011	**2**	2	0	0.00
% Change	150.00%	0.00%	0.00%	0.00%
Fortis				
August 1, 2011 - August 31, 2011	**3**	1	0	0.00
July 1, 2011 - July 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
OLT				
August 1, 2011 - August 31, 2011	**3**	1	0	0.00
July 1, 2011 - July 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
Downloads				
August 1, 2011 - August 31, 2011	**0**	0	0	0.00
July 1, 2011 - July 31, 2011	**3**	3	0	0.00
% Change	**-100.00%**	-100.00%	0.00%	0.00%

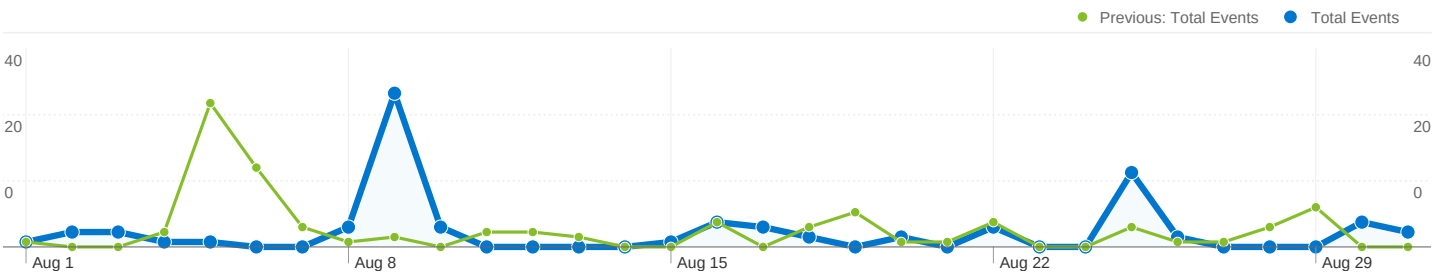
1 - 5 of 5

Event Tracking Action:

Click

Aug 1, 2011 - Aug 31, 2011

Comparing to: Jul 1, 2011 - Jul 31, 2011



This action recorded 91 total events via 128 event labels

Events

Total Events	Unique Events	Event Value	Avg. Value
91	70	0	0.00
Previous: 105 (-13.33%)	Previous: 100 (-30.00%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Label	Total Events	Unique Events	Event Value	Avg. Value
javascript:void(0)				
August 1, 2011 - August 31, 2011	11	3	0	0.00
July 1, 2011 - July 31, 2011	2	2	0	0.00
% Change	450.00%	50.00%	0.00%	0.00%
http://www.grist.org/biking/2011-08-02-mayor-of-vilnius-runs-over-mercedes-parked-in-bike-lane-witha-ta				
August 1, 2011 - August 31, 2011	6	6	0	0.00
July 1, 2011 - July 31, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
javascript:void('Link')				
August 1, 2011 - August 31, 2011	6	2	0	0.00
July 1, 2011 - July 31, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://my.pulseenergy.com/LMHA/dashboard/#/overview				
August 1, 2011 - August 31, 2011	4	4	0	0.00
July 1, 2011 - July 31, 2011	4	4	0	0.00
% Change	0.00%	0.00%	0.00%	0.00%
contest@C3community.ca?subject=Photo%20submission%20-%20C3's%20Summer%20Conservation%20Action%20contest				
August 1, 2011 - August 31, 2011	3	2	0	0.00
July 1, 2011 - July 31, 2011	0	0	0	0.00

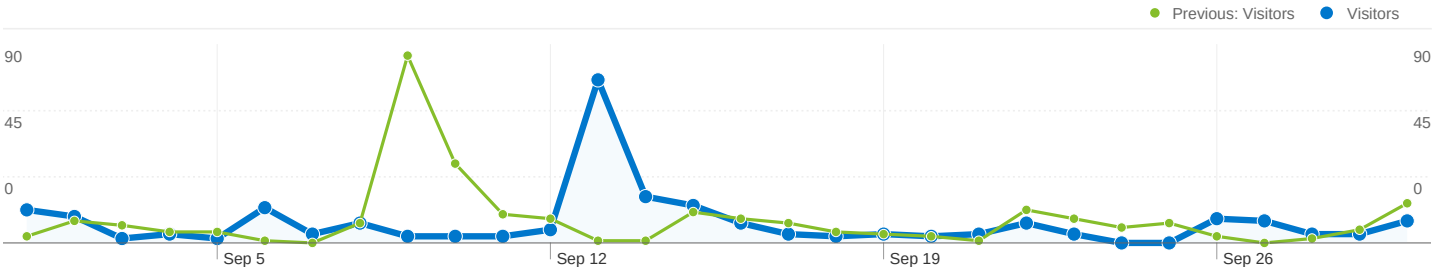
% Change	100.00%	100.00%	0.00%	0.00%
fortis_logo				
August 1, 2011 - August 31, 2011	**3**	1	0	0.00
July 1, 2011 - July 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.fortisbc.com/				
August 1, 2011 - August 31, 2011	**3**	1	0	0.00
July 1, 2011 - July 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
contest@c3community.ca?subject=Photo%20submission%20-%20C3's%20Summer%20Conservation%20Action%20contest				
August 1, 2011 - August 31, 2011	**2**	1	0	0.00
July 1, 2011 - July 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.fortisbc.com/EnergySolutions/DistrictEnergySystems/Pages/Sources-of-district-energy.aspx				
August 1, 2011 - August 31, 2011	**2**	2	0	0.00
July 1, 2011 - July 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.fortisbc.com/NaturalGas/Homes/Offers/RenewableNaturalGas/Pages/Sign-up.aspx				
August 1, 2011 - August 31, 2011	**2**	1	0	0.00
July 1, 2011 - July 31, 2011	**1**	1	0	0.00
% Change	100.00%	0.00%	0.00%	0.00%
				1 - 10 of 128

TABLE OF CONTENTS

c3community.ca/greencare

Visitors Overview

Sep 1, 2011 - Sep 30, 2011
Comparing to: Aug 1, 2011 - Aug 31, 2011



198 people visited this site

310 Visits

Previous: 428 (-27.57%)

198 Absolute Unique Visitors

Previous: 197 (0.51%)

1,928 Pageviews

Previous: 2,518 (-23.43%)

6.22 Average Pageviews

Previous: 5.88 (5.71%)

00:06:19 Time on Site

Previous: 00:07:16 (-13.16%)

38.39% Bounce Rate

Previous: 38.08% (0.80%)

37.42% New Visits

Previous: 27.57% (35.72%)

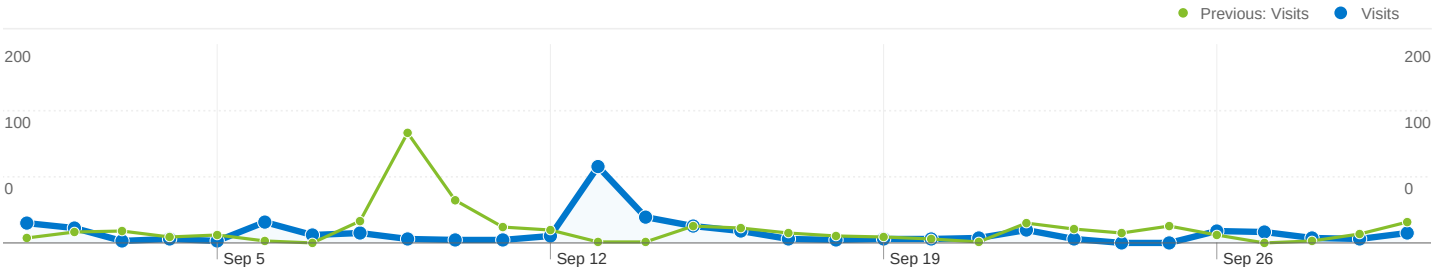
Technical Profile

Browser	Visits	% visits
Internet Explorer		
Sep 1, 2011 - Sep 30, 2011	194	62.58%
Aug 1, 2011 - Aug 31, 2011	215	50.23%
% Change	-9.77%	24.58%
Safari		
Sep 1, 2011 - Sep 30, 2011	45	14.52%
Aug 1, 2011 - Aug 31, 2011	72	16.82%
% Change	-37.50%	-13.71%

Chrome		
Sep 1, 2011 - Sep 30, 2011	36	11.61%
Aug 1, 2011 - Aug 31, 2011	89	20.79%
% Change	-59.55%	-44.15%
Firefox		
Sep 1, 2011 - Sep 30, 2011	32	10.32%
Aug 1, 2011 - Aug 31, 2011	47	10.98%
% Change	-31.91%	-6.00%
Mozilla Compatible Agent		
Sep 1, 2011 - Sep 30, 2011	2	0.65%
Aug 1, 2011 - Aug 31, 2011	4	0.93%
% Change	-50.00%	-30.97%

Traffic Sources Overview

Sep 1, 2011 - Sep 30, 2011
Comparing to: Aug 1, 2011 - Aug 31, 2011

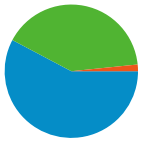


All traffic sources sent a total of 310 visits

57.74% Direct Traffic
Previous: 62.15% (-7.09%)

40.65% Referring Sites
Previous: 36.92% (10.10%)

1.61% Search Engines
Previous: 0.93% (72.58%)



- **Direct Traffic** 179.00 (57.74%)
- **Referring Sites** 126.00 (40.65%)
- **Search Engines** 5.00 (1.61%)

Top Traffic Sources

Sources	Visits	% visits
(direct) ((none))		
Sep 1, 2011 - Sep 30, 2011	179	57.74%
Aug 1, 2011 - Aug 31, 2011	266	62.15%
% Change	-32.71%	-7.09%
fhpulse (referral)		
Sep 1, 2011 - Sep 30, 2011	34	10.97%
Aug 1, 2011 - Aug 31, 2011	11	2.57%
% Change	209.09%	326.74%
c3.cleancommuter.ca (referral)		
Sep 1, 2011 - Sep 30, 2011	32	10.32%
Aug 1, 2011 - Aug 31, 2011	51	11.92%
% Change	-37.25%	-13.37%
pod (referral)		
Sep 1, 2011 - Sep 30, 2011	25	8.06%
Aug 1, 2011 - Aug 31, 2011	23	5.37%
% Change	8.70%	50.07%
webmail.vch.ca (referral)		

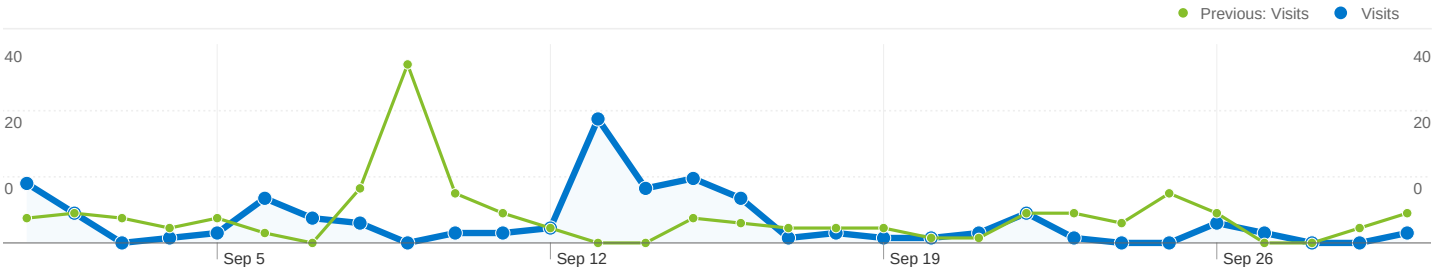
Keywords	Visits	% visits
"301 east hastings" "burnaby centre"		
Sep 1, 2011 - Sep 30, 2011	1	20.00%
Aug 1, 2011 - Aug 31, 2011	0	0.00%
% Change	100.00%	100.00%
"301 east hastings" coastal health		
Sep 1, 2011 - Sep 30, 2011	1	20.00%
Aug 1, 2011 - Aug 31, 2011	0	0.00%
% Change	100.00%	100.00%
c3 carbon community		
Sep 1, 2011 - Sep 30, 2011	1	20.00%
Aug 1, 2011 - Aug 31, 2011	0	0.00%
% Change	100.00%	100.00%
c3 cut carbon community phsa		
Sep 1, 2011 - Sep 30, 2011	1	20.00%
Aug 1, 2011 - Aug 31, 2011	0	0.00%
% Change	100.00%	100.00%
vch cut the carbon community		

Sep 1, 2011 - Sep 30, 2011	15	4.84%
Aug 1, 2011 - Aug 31, 2011	30	7.01%
% Change	-50.00%	-30.97%

Sep 1, 2011 - Sep 30, 2011	1	20.00%
Aug 1, 2011 - Aug 31, 2011	0	0.00%
% Change	100.00%	100.00%

Referring Sites

Sep 1, 2011 - Sep 30, 2011
Comparing to: Aug 1, 2011 - Aug 31, 2011



Referring sites sent 126 visits via 18 sources

Site Usage

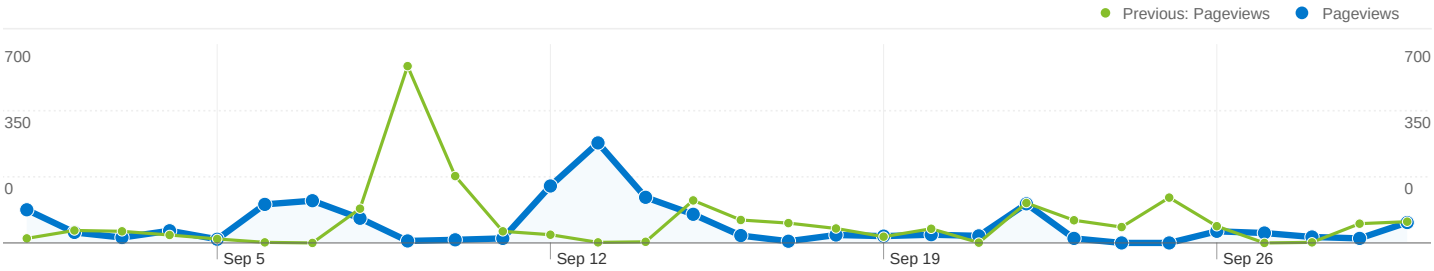
Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
126	8.09	00:08:42	22.22%	35.71%
Previous: 158 (-20.25%)	Previous: 7.81 (3.55%)	Previous: 00:10:23 (-16.20%)	Previous: 9.49% (134.07%)	Previous: 37.34% (-4.36%)

Source	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
fhpulse					
September 1, 2011 - September 30, 2011	34	6.38	00:05:21	44.12%	44.12%
August 1, 2011 - August 31, 2011	11	6.00	00:05:02	27.27%	72.73%
% Change	209.09%	6.37%	6.04%	61.76%	-39.34%
c3.cleancommuter.ca					
September 1, 2011 - September 30, 2011	32	16.88	00:18:48	0.00%	12.50%
August 1, 2011 - August 31, 2011	51	15.14	00:20:06	0.00%	15.69%
% Change	-37.25%	11.48%	-6.53%	0.00%	-20.31%
pod					
September 1, 2011 - September 30, 2011	25	4.24	00:07:23	24.00%	44.00%
August 1, 2011 - August 31, 2011	23	4.26	00:04:49	26.09%	56.52%
% Change	8.70%	-0.49%	53.60%	-8.00%	-22.15%
webmail.vch.ca					
September 1, 2011 - September 30, 2011	15	6.60	00:06:58	13.33%	26.67%
August 1, 2011 - August 31, 2011	30	3.10	00:04:45	6.67%	46.67%
% Change	-50.00%	112.90%	46.84%	100.00%	-42.86%
us2.campaign-archive1.com					
September 1, 2011 - September 30, 2011	4	1.50	00:00:09	25.00%	75.00%
August 1, 2011 - August 31, 2011	0	0.00	00:00:00	0.00%	0.00%
% Change	100.00%	100.00%	100.00%	100.00%	100.00%
co104w.col104.mail.live.com					
September 1, 2011 - September 30, 2011	3	3.67	00:02:17	33.33%	0.00%

August 1, 2011 - August 31, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	**100.00%**	100.00%	100.00%	100.00%	0.00%
admin.onelesstonne.org					
September 1, 2011 - September 30, 2011	**2**	3.00	00:00:47	0.00%	50.00%
August 1, 2011 - August 31, 2011	**5**	1.80	00:00:42	0.00%	80.00%
% Change	**-60.00%**	66.67%	10.19%	0.00%	-37.50%
localhost.c3					
September 1, 2011 - September 30, 2011	**2**	5.50	00:03:29	0.00%	50.00%
August 1, 2011 - August 31, 2011	**9**	6.56	00:08:13	0.00%	22.22%
% Change	**-77.78%**	-16.10%	-57.67%	0.00%	125.00%
us2.campaign-archive2.com					
September 1, 2011 - September 30, 2011	**2**	6.00	00:02:34	0.00%	0.00%
August 1, 2011 - August 31, 2011	**8**	7.75	00:06:32	37.50%	12.50%
% Change	**-75.00%**	-22.58%	-60.83%	-100.00%	-100.00%
www.br4.in/ForexMarket					
September 1, 2011 - September 30, 2011	**2**	1.00	00:00:00	0.00%	100.00%
August 1, 2011 - August 31, 2011	**3**	1.00	00:00:00	0.00%	100.00%
% Change	**-33.33%**	0.00%	0.00%	0.00%	0.00%
					1 - 10 of 18

Content Overview

Sep 1, 2011 - Sep 30, 2011
Comparing to: Aug 1, 2011 - Aug 31, 2011



Pages on this site were viewed a total of 1,928 times

1,928 Pageviews

Previous: 2,518 (-23.43%)

1,227 Unique Views

Previous: 1,552 (-20.94%)

38.39% Bounce Rate

Previous: 38.08% (0.80%)

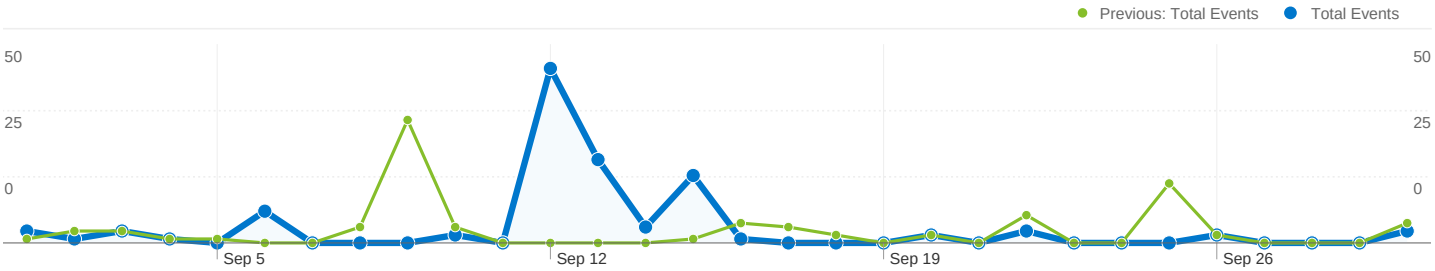
Top Content

Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard		
Sep 1, 2011 - Sep 30, 2011	317	16.44%
Aug 1, 2011 - Aug 31, 2011	348	13.82%
% Change	-8.91%	18.97%
/greencare/		
Sep 1, 2011 - Sep 30, 2011	177	9.18%
Aug 1, 2011 - Aug 31, 2011	331	13.15%
% Change	-46.53%	-30.16%
/greencare/user		
Sep 1, 2011 - Sep 30, 2011	105	5.45%
Aug 1, 2011 - Aug 31, 2011	77	3.06%
% Change	36.36%	78.09%
/greencare/dashboard		
Sep 1, 2011 - Sep 30, 2011	94	4.88%
Aug 1, 2011 - Aug 31, 2011	147	5.84%
% Change	-36.05%	-16.49%
/greencare/user/login?destination=node/8816		

Sep 1, 2011 - Sep 30, 2011	61	3.16%
Aug 1, 2011 - Aug 31, 2011	0	0.00%
% Change	100.00%	100.00%

Event Tracking Categories

Sep 1, 2011 - Sep 30, 2011
Comparing to: Aug 1, 2011 - Aug 31, 2011



115 total events were recorded via 4 event categories

Events

Total Events	Unique Events	Event Value	Avg. Value
115	38	0	0.00
Previous: 94 (22.34%)	Previous: 45 (-15.56%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Category	Total Events	Unique Events	Event Value	Avg. Value
Outbound links				
September 1, 2011 - September 30, 2011	103	27	0	0.00
August 1, 2011 - August 31, 2011	83	41	0	0.00
% Change	24.10%	-34.15%	0.00%	0.00%
OLT				
September 1, 2011 - September 30, 2011	8	7	0	0.00
August 1, 2011 - August 31, 2011	3	1	0	0.00
% Change	166.67%	600.00%	0.00%	0.00%
Mails				
September 1, 2011 - September 30, 2011	4	4	0	0.00
August 1, 2011 - August 31, 2011	5	2	0	0.00
% Change	-20.00%	100.00%	0.00%	0.00%
Fortis				
September 1, 2011 - September 30, 2011	0	0	0	0.00
August 1, 2011 - August 31, 2011	3	1	0	0.00
% Change	-100.00%	-100.00%	0.00%	0.00%

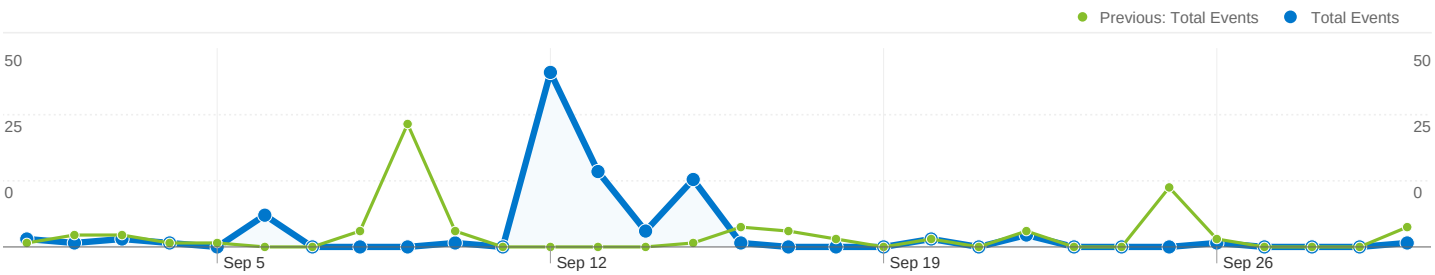
1 - 4 of 4

Event Tracking Action:

Click

Sep 1, 2011 - Sep 30, 2011

Comparing to: Aug 1, 2011 - Aug 31, 2011



This action recorded 107 total events via 79 event labels

Events

Total Events	Unique Events	Event Value	Avg. Value
107	45	0	0.00
Previous: 91 (17.58%)	Previous: 70 (-35.71%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Label	Total Events	Unique Events	Event Value	Avg. Value
javascript:void(0)				
September 1, 2011 - September 30, 2011	40	6	0	0.00
August 1, 2011 - August 31, 2011	11	3	0	0.00
% Change	263.64%	100.00%	0.00%	0.00%
javascript:void('Link')				
September 1, 2011 - September 30, 2011	24	5	0	0.00
August 1, 2011 - August 31, 2011	6	2	0	0.00
% Change	300.00%	150.00%	0.00%	0.00%
javascript:void('Unlink')				
September 1, 2011 - September 30, 2011	10	1	0	0.00
August 1, 2011 - August 31, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://climaterealityproject.org/#step-1				
September 1, 2011 - September 30, 2011	3	3	0	0.00
August 1, 2011 - August 31, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.grist.org/biking/2011-08-02-mayor-of-vilnius-runs-over-mercedes-parked-in-bike-lane-witha-ta				
September 1, 2011 - September 30, 2011	2	2	0	0.00
August 1, 2011 - August 31, 2011	6	6	0	0.00
% Change	-66.67%	-66.67%	0.00%	0.00%

angela.banford@fraserhealth.ca?subject=Employer%20Pass				
September 1, 2011 - September 30, 2011	**1**	1	0	0.00
August 1, 2011 - August 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
contest@C3community.ca?subject=Photo%20submission%20-%20C3's%20Summer%20Conservation%20Action%20contest				
September 1, 2011 - September 30, 2011	**1**	1	0	0.00
August 1, 2011 - August 31, 2011	**3**	2	0	0.00
% Change	-66.67%	-50.00%	0.00%	0.00%
contest@c3community.ca?subject=Photo%20submission%20-%20C3's%20Summer%20Conservation%20Action%20contest				
September 1, 2011 - September 30, 2011	**1**	1	0	0.00
August 1, 2011 - August 31, 2011	**2**	1	0	0.00
% Change	-50.00%	0.00%	0.00%	0.00%
http://admin.onelesstonne.org/init/vch2011?phase=2011-2&email=Dave.Griffiths%40fraserhealth.ca&name=David%20Griffiths&phone=&actor=7768				
September 1, 2011 - September 30, 2011	**1**	1	0	0.00
August 1, 2011 - August 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://admin.onelesstonne.org/init/vch2011?phase=2011-2&email=bkuchinka%40cw.bc.ca&name=Brian%20Kuchinka&phone=&actor=7661				
September 1, 2011 - September 30, 2011	**1**	1	0	0.00
August 1, 2011 - August 31, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%

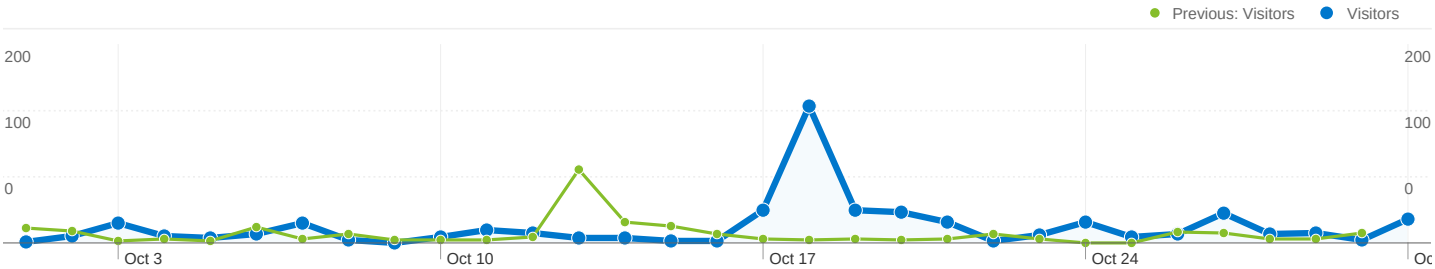
TABLE OF CONTENTS

c3community.ca/greencare

Visitors Overview

Oct 1, 2011 - Oct 31, 2011

Comparing to: Sep 1, 2011 - Sep 30, 2011



374 people visited this site

601 Visits

Previous: 310 (93.87%)

374 Absolute Unique Visitors

Previous: 198 (88.89%)

4,556 Pageviews

Previous: 1,928 (136.31%)

7.58 Average Pageviews

Previous: 6.22 (21.89%)

00:09:23 Time on Site

Previous: 00:06:19 (48.64%)

27.12% Bounce Rate

Previous: 38.39% (-29.35%)

40.60% New Visits

Previous: 37.42% (8.50%)

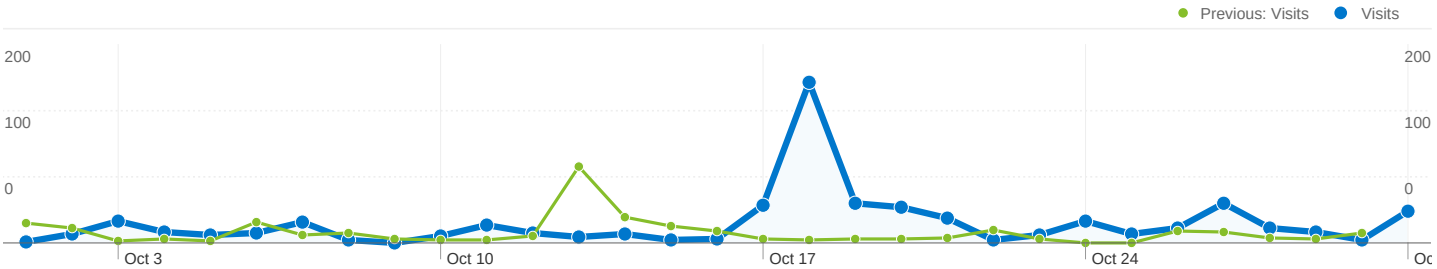
Technical Profile

Browser	Visits	% visits
Internet Explorer		
Oct 1, 2011 - Oct 31, 2011	381	63.39%
Sep 1, 2011 - Sep 30, 2011	194	62.58%
% Change	96.39%	1.30%
Chrome		
Oct 1, 2011 - Oct 31, 2011	129	21.46%
Sep 1, 2011 - Sep 30, 2011	36	11.61%
% Change	258.33%	84.83%

Firefox		
Oct 1, 2011 - Oct 31, 2011	62	10.32%
Sep 1, 2011 - Sep 30, 2011	32	10.32%
% Change	93.75%	-0.06%
Safari		
Oct 1, 2011 - Oct 31, 2011	26	4.33%
Sep 1, 2011 - Sep 30, 2011	45	14.52%
% Change	-42.22%	-70.20%
Mozilla Compatible Agent		
Oct 1, 2011 - Oct 31, 2011	3	0.50%
Sep 1, 2011 - Sep 30, 2011	2	0.65%
% Change	50.00%	-22.63%

Traffic Sources Overview

Oct 1, 2011 - Oct 31, 2011
Comparing to: Sep 1, 2011 - Sep 30, 2011



All traffic sources sent a total of 601 visits

69.38% Direct Traffic
Previous: 57.74% (20.16%)

30.12% Referring Sites
Previous: 40.65% (-25.90%)

0.50% Search Engines
Previous: 1.61% (-69.05%)

- **Direct Traffic** 417.00 (69.38%)
- **Referring Sites** 181.00 (30.12%)
- **Search Engines** 3.00 (0.50%)

Top Traffic Sources

Sources	Visits	% visits
(direct) ((none))		
Oct 1, 2011 - Oct 31, 2011	417	69.38%
Sep 1, 2011 - Sep 30, 2011	179	57.74%
% Change	132.96%	20.16%
fhpulse (referral)		
Oct 1, 2011 - Oct 31, 2011	39	6.49%
Sep 1, 2011 - Sep 30, 2011	34	10.97%
% Change	14.71%	-40.83%
webmail.vch.ca (referral)		
Oct 1, 2011 - Oct 31, 2011	34	5.66%
Sep 1, 2011 - Sep 30, 2011	15	4.84%
% Change	126.67%	16.92%
pod (referral)		
Oct 1, 2011 - Oct 31, 2011	24	3.99%
Sep 1, 2011 - Sep 30, 2011	25	8.06%
% Change	-4.00%	-50.48%
admin.onelesstonne.org (referral)		

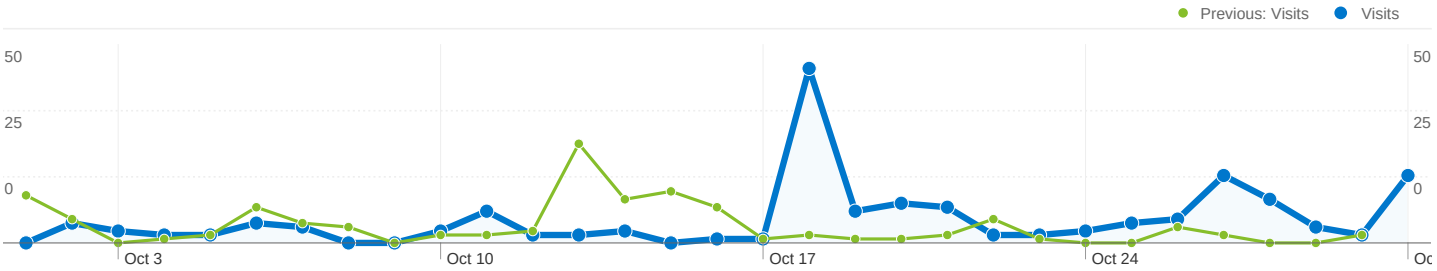
Keywords	Visits	% visits
c3community.ca		
Oct 1, 2011 - Oct 31, 2011	1	33.33%
Sep 1, 2011 - Sep 30, 2011	0	0.00%
% Change	100.00%	100.00%
fraser health 840 cambie		
Oct 1, 2011 - Oct 31, 2011	1	33.33%
Sep 1, 2011 - Sep 30, 2011	0	0.00%
% Change	100.00%	100.00%
inurl:user/register environmental victoria		
Oct 1, 2011 - Oct 31, 2011	1	33.33%
Sep 1, 2011 - Sep 30, 2011	0	0.00%
% Change	100.00%	100.00%
"301 east hastings" "burnaby centre"		
Oct 1, 2011 - Oct 31, 2011	0	0.00%
Sep 1, 2011 - Sep 30, 2011	1	20.00%
% Change	-100.00%	-100.00%
"301 east hastings" coastal health		

Oct 1, 2011 - Oct 31, 2011	16	2.66%
Sep 1, 2011 - Sep 30, 2011	2	0.65%
% Change	700.00%	312.65%

Oct 1, 2011 - Oct 31, 2011	0	0.00%
Sep 1, 2011 - Sep 30, 2011	1	20.00%
% Change	-100.00%	-100.00%

Referring Sites

Oct 1, 2011 - Oct 31, 2011
Comparing to: Sep 1, 2011 - Sep 30, 2011



Referring sites sent 181 visits via 21 sources

Site Usage

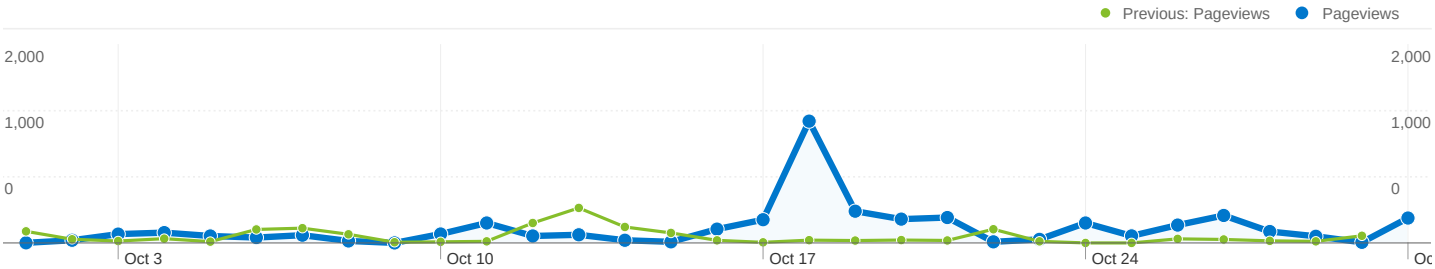
Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
181	8.16	00:11:35	22.65%	25.97%
Previous: 126 (43.65%)	Previous: 8.09 (0.90%)	Previous: 00:08:42 (33.11%)	Previous: 22.22% (1.93%)	Previous: 35.71% (-27.29%)

Source	Visits	Pages/Visit	Avg. Time on Site	% New Visits	Bounce Rate
fhpulse					
October 1, 2011 - October 31, 2011	39	9.15	00:09:32	58.97%	43.59%
September 1, 2011 - September 30, 2011	34	6.38	00:05:21	44.12%	44.12%
% Change	14.71%	43.42%	78.33%	33.68%	-1.20%
webmail.vch.ca					
October 1, 2011 - October 31, 2011	34	8.00	00:10:16	5.88%	17.65%
September 1, 2011 - September 30, 2011	15	6.60	00:06:58	13.33%	26.67%
% Change	126.67%	21.21%	47.44%	-55.88%	-33.82%
pod					
October 1, 2011 - October 31, 2011	24	8.00	00:09:03	25.00%	33.33%
September 1, 2011 - September 30, 2011	25	4.24	00:07:23	24.00%	44.00%
% Change	-4.00%	88.68%	22.48%	4.17%	-24.24%
admin.onelesstonne.org					
October 1, 2011 - October 31, 2011	16	19.00	00:42:58	0.00%	6.25%
September 1, 2011 - September 30, 2011	2	3.00	00:00:47	0.00%	50.00%
% Change	700.00%	533.33%	5,444.76%	0.00%	-87.50%
affinitybridge.unfuddle.com					
October 1, 2011 - October 31, 2011	15	4.27	00:08:33	0.00%	20.00%
September 1, 2011 - September 30, 2011	1	5.00	00:03:47	0.00%	0.00%
% Change	1,400.00%	-14.67%	125.87%	0.00%	100.00%
us2.campaign-archive2.com					
October 1, 2011 - October 31, 2011	14	6.36	00:08:22	28.57%	28.57%

September 1, 2011 - September 30, 2011	**2**	6.00	00:02:34	0.00%	0.00%
% Change	**600.00%**	5.95%	226.85%	100.00%	100.00%
blog.vcha.ca					
October 1, 2011 - October 31, 2011	**8**	5.12	00:12:37	0.00%	0.00%
September 1, 2011 - September 30, 2011	**0**	0.00	00:00:00	0.00%	0.00%
% Change	**100.00%**	100.00%	100.00%	0.00%	0.00%
c3.cleancommuter.ca					
October 1, 2011 - October 31, 2011	**8**	6.25	00:05:05	0.00%	25.00%
September 1, 2011 - September 30, 2011	**32**	16.88	00:18:48	0.00%	12.50%
% Change	**-75.00%**	-62.96%	-72.96%	0.00%	100.00%
localhost.c3					
October 1, 2011 - October 31, 2011	**5**	2.60	00:02:47	0.00%	20.00%
September 1, 2011 - September 30, 2011	**2**	5.50	00:03:29	0.00%	50.00%
% Change	**150.00%**	-52.73%	-20.00%	0.00%	-60.00%
owa.fraserhealth.ca					
October 1, 2011 - October 31, 2011	**4**	3.75	00:02:22	75.00%	25.00%
September 1, 2011 - September 30, 2011	**1**	1.00	00:00:00	100.00%	100.00%
% Change	**300.00%**	275.00%	100.00%	-25.00%	-75.00%
					1 - 10 of 21

Content Overview

Oct 1, 2011 - Oct 31, 2011
Comparing to: Sep 1, 2011 - Sep 30, 2011



Pages on this site were viewed a total of 4,556 times

4,556 Pageviews

Previous: 1,928 (136.31%)

2,720 Unique Views

Previous: 1,227 (121.68%)

27.12% Bounce Rate

Previous: 38.39% (-29.35%)

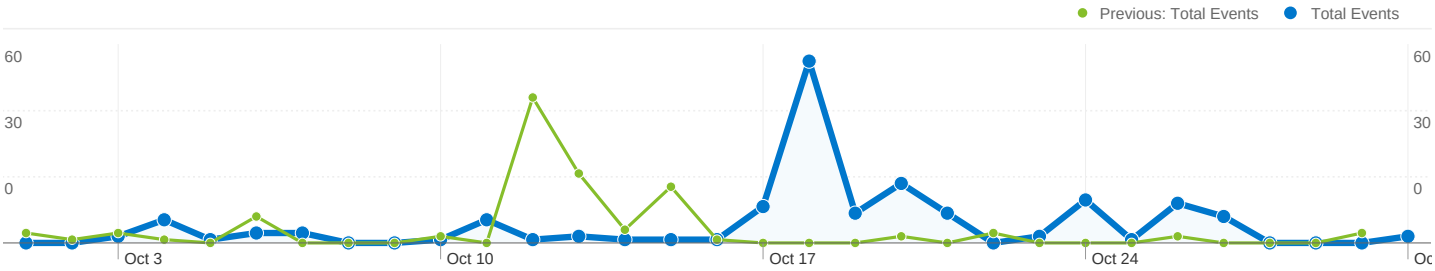
Top Content

Pages	Pageviews	% Pageviews
/greencare/user/login?destination=dashboard		
Oct 1, 2011 - Oct 31, 2011	759	16.66%
Sep 1, 2011 - Sep 30, 2011	317	16.44%
% Change	139.43%	1.32%
/greencare/		
Oct 1, 2011 - Oct 31, 2011	477	10.47%
Sep 1, 2011 - Sep 30, 2011	177	9.18%
% Change	169.49%	14.04%
/greencare/user		
Oct 1, 2011 - Oct 31, 2011	339	7.44%
Sep 1, 2011 - Sep 30, 2011	105	5.45%
% Change	222.86%	36.63%
/greencare/dashboard		
Oct 1, 2011 - Oct 31, 2011	274	6.01%
Sep 1, 2011 - Sep 30, 2011	94	4.88%
% Change	191.49%	23.35%
/user/password		

Oct 1, 2011 - Oct 31, 2011	199	4.37%
Sep 1, 2011 - Sep 30, 2011	37	1.92%
% Change	437.84%	127.60%

Event Tracking Categories

Oct 1, 2011 - Oct 31, 2011
Comparing to: Sep 1, 2011 - Sep 30, 2011



170 total events were recorded via 4 event categories

Events

Total Events	Unique Events	Event Value	Avg. Value
170	120	0	0.00
Previous: 115 (47.83%)	Previous: 38 (215.79%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Category	Total Events	Unique Events	Event Value	Avg. Value
Outbound links				
October 1, 2011 - October 31, 2011	123	77	0	0.00
September 1, 2011 - September 30, 2011	103	27	0	0.00
% Change	19.42%	185.19%	0.00%	0.00%
OLT				
October 1, 2011 - October 31, 2011	44	40	0	0.00
September 1, 2011 - September 30, 2011	8	7	0	0.00
% Change	450.00%	471.43%	0.00%	0.00%
Downloads				
October 1, 2011 - October 31, 2011	3	3	0	0.00
September 1, 2011 - September 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
Mails				
October 1, 2011 - October 31, 2011	0	0	0	0.00
September 1, 2011 - September 30, 2011	4	4	0	0.00
% Change	-100.00%	-100.00%	0.00%	0.00%

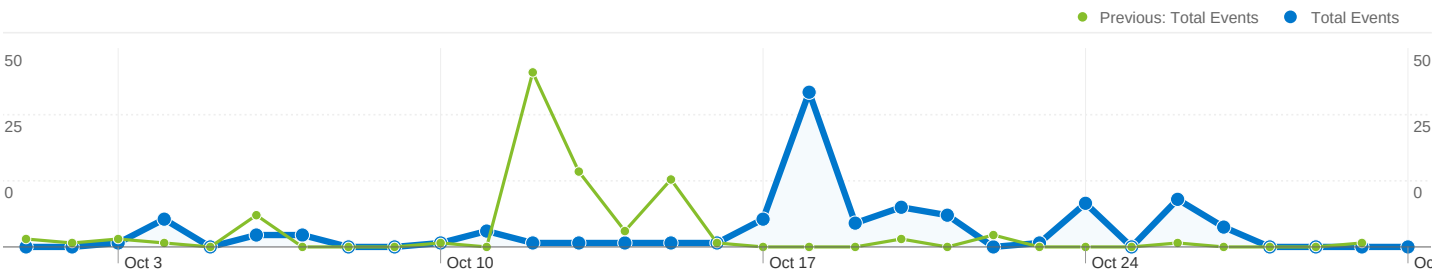
1 - 4 of 4

Event Tracking Action:

Click

Oct 1, 2011 - Oct 31, 2011

Comparing to: Sep 1, 2011 - Sep 30, 2011



This action recorded 123 total events via 99 event labels

Events

Total Events	Unique Events	Event Value	Avg. Value
123	111	0	0.00
Previous: 107 (14.95%)	Previous: 45 (146.67%)	Previous: 0 (0.00%)	Previous: 0.00 (0.00%)

Event Label	Total Events	Unique Events	Event Value	Avg. Value
http://www.phsa.ca/NR/rdonlyres/B1D5EBF3-2349-4AD8-86DD-A85EF02C6796/0/RR_Rollout_Schedule.pdf				
October 1, 2011 - October 31, 2011	8	6	0	0.00
September 1, 2011 - September 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
javascript:void(0)				
October 1, 2011 - October 31, 2011	7	3	0	0.00
September 1, 2011 - September 30, 2011	40	6	0	0.00
% Change	-82.50%	-50.00%	0.00%	0.00%
http://r20.rs6.net/tn.jsp?llr=aabzt8cab&et=1107960697053&s=16769&e=001GVLMDualLN53OnmMT09r06CdoS3ziJ1_xbyb2BLL2KIcPoOmhLjFsq-C0TtfkB2szFL-k7dEjsxy3yyTf-Vaq-w6T6UfVlSW5VY1K5Q6ZbHGaO82DTCH3xHiX0jm83EuIsMf3MSekIs=				
October 1, 2011 - October 31, 2011	5	4	0	0.00
September 1, 2011 - September 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
https://my.pulseenergy.com/LMHA/dashboard/#/overview				
October 1, 2011 - October 31, 2011	5	5	0	0.00
September 1, 2011 - September 30, 2011	0	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://wwe5.bchydro.com/grid/?hcu=http%3a%2f%2fwwe5.bchydro.com%2f5pmsprint				
October 1, 2011 - October 31, 2011	4	4	0	0.00

September 1, 2011 - September 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.flickr.com/photos/massivehealth/6101469480/in/set-72157627253013486				
October 1, 2011 - October 31, 2011	**4**	4	0	0.00
September 1, 2011 - September 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
javascript:void('Link')				
October 1, 2011 - October 31, 2011	**4**	3	0	0.00
September 1, 2011 - September 30, 2011	**24**	5	0	0.00
% Change	-83.33%	-40.00%	0.00%	0.00%
http://blog.vcha.ca/?p=345				
October 1, 2011 - October 31, 2011	**3**	2	0	0.00
September 1, 2011 - September 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.bchydro.com/rebates_savings/				
October 1, 2011 - October 31, 2011	**3**	3	0	0.00
September 1, 2011 - September 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
http://www.fortisbc.com/Electricity/PowerSense/Pages/default.aspx				
October 1, 2011 - October 31, 2011	**3**	3	0	0.00
September 1, 2011 - September 30, 2011	**0**	0	0	0.00
% Change	100.00%	100.00%	0.00%	0.00%
				1 - 10 of 99