BC hydro
FOR GENERATIONS

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December 30, 2013

Ms. Erica Hamilton
Commission Secretary
British Columbia Utilities Commission
Sixth Floor – 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

RE: British Columbia Utilities Commission (BCUC)
British Columbia Hydro and Power Authority (BC Hydro)
Large General Service Rate Application Negotiated Settlement Agreement (LGS NSA) - Response to Clause 16

BC Hydro writes in compliance with BCUC Order No. G-110-10 (**the Order**) which directed BC Hydro to file, within 36 months of the Implementation Date of January 1, 2011, a report which addresses the issues as outlined in Paragraph 16 of the NSA.

In accordance with the Order, BC Hydro encloses a copy of its LGS and MGS Three-Year Report.

For further information, please contact Gordon Doyle at 604-623-3815 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

(for) Janet Fraser
Chief Regulatory Officer

ac/rh

Copy to: BCUC Project No. 3698573 (LGS Rate Application) Registered Intervener Distribution List.

BC hydro

Large General Service Rate Application

LGS and MGS Three-Year Report

January 1, 2014

(Compliance with BCUC Order No. G-110-10 - Directive 3)

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1 Executive Summary

BCUC Order No. G-110-10 approved the LGS Rate Application Negotiated Settlement Agreement (**LGS NSA**) that was signed on May 10, 2010. The Order also directed BC Hydro to file, within 36 months of the Implementation Date of January 1, 2011, a report which addresses the issues as outlined in Paragraph 16 of the LGS NSA. BC Hydro is filing the attached report in compliance with the Order.

In summary, this report has the following key findings:

Energy Savings

- The energy savings for the LGS and MGS rates have been estimated by Power Smart Evaluation based on comparing the consumption of MGS and LGS rate customers with control group customers
- The LGS rate structure resulted in energy savings of 144 GWh/yr by December 31, 2011, increasing to 200 GWh/yr by December 31, 2012. This is considerably less than forecast energy savings. Note the timeframe evaluated incorporated only nine months of data with the Part 2 price at the long-run marginal cost (**LRMC**) based rate and the initial customer baselines[1] were set higher than they would be under normal operation of the rate (see finding 4, page 9, Power Smart Evaluation contained in Appendix A of this report).
- There were no measurable savings for MGS rate shaping in 2011 and 2012[2] (see finding 5, page 10, Power Smart Evaluation)
- There were no measurable savings for those MGS customers (**MGS1**[3]) that transitioned to the conservation rate structure April 1, 2012. Note the

[1] The conservation rate structure includes the setting of unique customer baselines. The baseline level is a determining factor in the calculation of the Part 2 Credit or Charge.

[2] MGS rate shaping refers to the rate structure change introduced by the LGS NSA which is intended to reduce the difference between the MGS Part 1 Tier 1 and Tier 2 rates.

time-frame evaluated included only nine months of data with MGS1 customers exposed to the two-part conservation rate (see finding 6, page 10, Power Smart Evaluation).

Control Groups

- The control groups have been of value and the Power Smart Evaluation used them to evaluate the LGS and MGS energy savings
- The control groups closely matched the treatment groups in a number of important ways, and they are therefore valid and effective control groups for the purpose of evaluating the LGS and MGS rate structures. Significant control group attrition has already occurred. Twenty per cent of control accounts were lost over three years. The relative precision of the control groups, while fair overall, could be improved by increasing the number of large LGS control accounts (see finding 1, page 9, Power Smart Evaluation).
- The evaluation has recommended BC Hydro consider undertaking a further evaluation of the MGS and LGS rates after all the conservation design elements are fully implemented and customers have had time to respond to them (see recommendation 7, page 10, Power Smart Evaluation)
- BC Hydro expects to file an application by spring 2014 to the BCUC seeking approval to maintain the existing control group accounts and to assign a proportion of new accounts to control group status, including larger accounts, so that an effective control group will be available for the next evaluation (see recommendation 6, page 10, Power Smart Evaluation)

[3] The MGS1 refers to the MGS accounts that have peak demand greater or equal to 85 kW. These accounts paid MGS rates (with rate shaping) for consumption starting in January 1, 2011 and were transitioned to the MGS conservation rate on April 1, 2012.

Financial Impacts and Cost Effectiveness

- Actual LGS rate energy revenues are $470.7 million in F2012 and $511 million in F2013 compared to forecast revenues of $509.5 million and $510.8 million respectively. The reason for the F2012 variance is almost entirely caused by the difference in actual and forecast load.
- Actual MGS revenues are $253.4 million in F2012 and $260.1 million in F2013 compared to forecast revenues of $259.5 million and $259.4 million respectively. The variances are relatively small in both fiscal years.
- The cost-effectiveness of the LGS conservation rate is assessed using the total resource cost (**TRC**) metric
- The TRC of the LGS conservation rate, incorporating the results of the 2011 and 2012 evaluation contained in Appendix A, is estimated at $8.40/MWh
- The TRC value is cost effective under both long-run and short-run avoided cost scenarios

Customer Impacts

- The Power Smart Evaluation also assessed customer awareness, understanding and response to the conservation rates
  - Unaided awareness and understanding of the LGS and MGS rate structures were relatively low. Awareness and understanding increased significantly following an explanation of the conservation rate structures (see finding 2, page 9, Power Smart Evaluation).
  - The top three drivers of energy conservation were: “want energy costs to be as low as possible”; “right thing to do”; and “overall level of electricity prices”. Awareness of the conservation rate structure is not required for a conservation response (see finding 3, page 9, Power Smart Evaluation).

- The number of inquiries and complaints are relatively low for the LGS and MGS conservation rates. These typically concern the baselines when historical consumption may not reflect current or expected operating conditions.

LGS and MGS Rate Structure

- The evaluation did not find any measurable savings attributable to MGS rate shaping, so there does not appear to be a conservation justification for additional rate shaping
- BC Hydro has not found evidence to show that customers are opening new accounts at an existing premise in order to benefit by avoiding exposure to the Part 2 LRMC-based rate
- BC Hydro has not found evidence to show that the Price Limit Band (**PLB**) and the average three-year rolling baseline (**HBL**) are not good rate design elements of the two-part rate
- BC Hydro has encountered significant operational challenges implementing the LGS and MGS conservation rates as they are difficult to administer. The billing process is complicated by BC Hydro having to manage exceptions to the customer baselines which is time consuming. In addition, customers have difficulty understanding the rates which adds to the administrative effort.
- Customers with significant prospective growth may qualify for modified LGS pricing under Tariff Supplement No. 82 (**TS No. 82**). Fifteen accounts have been billed under TS No. 82 and currently eleven accounts remain under the program.

2 Introduction

2.1 Background

On October 16, 2009, BC Hydro applied to the British Columbia Utilities Commission (**BCUC**) to establish new energy rates for customers who take or would take service under rate schedules 1200, 1201, 1210 and 1211. These four rate schedules have a common underlying rate structure that BC Hydro referred to in the application as the "Existing Large General Service" (**ELGS**) rate structure. ELGS was generally available for customers with monthly peak demand in excess of 35 kW, who take service at distribution voltage, and who are not eligible for other classes of service.

BC Hydro proposed to split ELGS accounts into two new rate classes, Medium General Service (**MGS**) and Large General Service (**LGS**). MGS service would be for ELGS accounts with monthly peak demand between 35 kW and 150 kW, while LGS service would be for ELGS accounts with monthly peak demand of 150 kW or greater.

The ELGS rate structure had three primary components: a "declining block" energy rate; an "inclining block" demand rate; and a basic charge. Under the declining block energy rate, customers receiving ELGS service are charged a relatively high "tier 1" energy rate for the first 14,800 kWh of energy consumed in a month. All energy consumed in a month in excess of 14,800 kWh is charged at a relatively low "Tier 2" rate.

BC Hydro proposed to replace the ELGS energy rate structure for the LGS rate class by a "two-part" energy rate and which was subsequently approved by BCUC Order No. G-110-10. The first part (Part 1) is the ELGS declining block energy rate, which is applied against the historic consumption level, or baseline, of each account. The second part (Part 2) is equal to BC Hydro's LRMC of new energy supply, and is applied against the difference between an account's current monthly (billed) energy consumption and its historic monthly consumption, or baseline.

A Part 2 charge is incurred when billed consumption exceeds historical consumption; a credit is earned when billed consumption is less than historical consumption; and when billed consumption equals historical baseline consumption there is no Part 2 charge or credit. There are no changes to the other elements of the ELGS rate structure.

BC Hydro proposed in its LGS Rate Application that the MGS rate structure would be the same as the ELGS rate structure, except that the declining block energy rate would be a constant flat rate for all energy consumed in a monthly billing period. BC Hydro proposed to phase-in the change to a flat energy rate over six years.

Regulatory review of BC Hydro's proposals for the LGS and MGS rate classes proceeded by way of a Negotiated Settlement Process (**NSP**) among BC Hydro, Interveners and BCUC staff. The NSP resulted in the LGS Negotiated Settlement Agreement (**NSA**) that was subsequently approved by BCUC Order No. G-110-10. The LGS NSA replaced BC Hydro's MGS rate proposal with a "two-part" energy rate which is similar to that proposed for the LGS rate class. However, the Part 1 energy rates are modified such that the Tier 1 and Tier 2 rates are inverted such that the higher Tier 1 rate applies to the last 14,800 kWh of baseline consumption and the Tier 2 rate applies to all baseline consumption less 14,800 kWh. In order to reduce the difference between the Tier 1 and Tier 2 rates, and to maintain a reasonable difference between the higher Tier 1 MGS rate and the LRMC-based Part 2 rate, the NSA established an implementation schedule over five years by which the lower Tier 2 MGS rate will be increased annually, subject to maximum forecast bill impacts for MGS accounts, before class average rate changes (**CARC**).

The NSA established a schedule whereby all LGS accounts would be transferred to the "two-part" energy rate on January 1, 2011. The MGS accounts would be transferred over a three-year period starting April 1, 2012, starting with the larger accounts (greater or equal to 85 kW) first, followed by accounts greater or equal to 55 kW on April 1, 2013 and ending with the balance of MGS accounts on

April 1, 2014. BC Hydro subsequently applied to also transfer the balance of MGS accounts on April 1, 2013, which was approved by BCUC Order No. G-115-12.

2.2 Summary LGS and MGS Information

Table 1 provides information on the number of accounts, annual consumption and total revenue for the LGS and MGS rate class for the period F2012 to F2014. The table includes information for LGS accounts that take electricity service under Rate Schedule (**RS**) 16xx and for MGS accounts under RS 15xx. The MGS information is provided separately for (1) those accounts that pay the MGS Part 1 Tier 1 and Tier 2 energy rates and that have not yet transitioned to the MGS two-part conservation rate and (2) those accounts that have transitioned and pay the MGS two-part rate.

Table 1 LGS and MGS Number of Accounts, Consumption and Revenue

	F2012	F2013	F2014 (3 months)
LGS			
Number of Accounts	6,390	6,505	6,486
Annual Consumption (kWh)	10,182,987,995	10,603,970,016	2,526,778,585
Total Revenue ($)	634,853,887	686,949,244	170,550,452
MGS			
Part 1 Rate			
Number of Accounts	16,618	12,835	n/a
Annual Consumption (kWh)	3,478,292,501	2,302,107,772	n/a
Total Revenue ($)	275,230,197	192,701,853	n/a
Two-part Rate			
Number of Accounts	n/a	3,900	16,213
Annual Consumption (kWh)	n/a	1,134,125,574	816,492,959
Total Revenue ($)	n/a	88,802,636	68,527,615

Note: Total revenue includes revenue from the basic charge, demand charge and energy charge.

The following Table 2 shows the LGS and MGS rates in effect during the F2012 to F2014 periods:

Table 2 LGS and MGS Rates F2012 to F2014

	F2012	F2013	F2014
LGS			
Basic Charge (cents/day)	18.53	19.25	19.53
Energy Charge			
Part 1 Tier 1(c/kWh)	8.85	9.37	9.61
Part 1 Tier 2(c/kWh)	4.26	4.51	4.62
Part 2 LRMC(c/kWh)	6.68	9.42	9.56
Minimum energy charge (c/kWh)	2.70	2.81	2.85
Demand Charge			
0 to 35 kW	nil	nil	nil
35 to 115 kW ($/kW)	4.51	4.69	4.76
All additional kW ($/kW)	8.66	9.00	9.13
MGS			
Basic Charge (cents/day)	18.53	19.25	19.53
Energy Charge			
Part 1 Tier 1(c/kWh)	8.72	8.97	8.85
Part 1 Tier 2(c/kWh)	4.44	4.90	5.49
Part 2 LRMC(c/kWh)	n/a	9.42	9.56
Minimum energy charge (c/kWh)	n/a	2.81	2.85
Demand Charge			
0 to 35 kW	nil	nil	nil
35 to 115 kW($/kW)	4.51	4.69	4.76
All additional kW ($/kW)	8.66	9.00	9.13

3 Scope of this Report

3.1 BCUC Order No. G-110-10

BCUC Order No. G-110-10 approved the LGS NSA that was signed on May 10, 2010. The Order also directed BC Hydro to file, within 36 months of the Implementation Date of January 1, 2011, a report which addresses the issues as outlined in Paragraph 16 of the NSA, which are as follows:

16. In a report to be filed by January 1, 2014 (i.e., within 36 months of the Implementation Date of January 1, 2011), BC Hydro will address:

    a. whether the control groups are still adding value and, if not, a proposal to terminate them;

    b. whether there is any evidence of customers opening new accounts to avoid exposure to the LRMC-based Part 2 rate under the two-part rate structure;

    c. whether BC Hydro will seek further amendments to the underlying Part 1 energy rate structure or pricing for the MGS class;

    d. implementation costs to date;

    e. estimated energy savings to date and the cost-effectiveness of the two-part rate structure;

    f. whether any changes or alternatives to the PLBs or 3-year rolling average HBLs are desirable or necessary; and

    g. generally, whether any elements of the LGS or MGS energy rate structures require further consideration.

    For greater certainty, the 3-year report will not address the merits of extending a two-part rate to MGS customers. (Amending section 1.10.2 of the LGS Rate Application)

This report is structured such that each major section covers each identified issue. The sections follow the same order as above.

Appendix A contains the report "Evaluation of the Large General Service and Medium General Service Conservation Rates Calendar Years 2011 and 2012" (November 2013) prepared by BC Hydro Power Smart Evaluation. This report (**the evaluation**) provides findings that help address items 16(a), 16(e), and 16(g) and which are discussed in further detail in these sections below.

3.2 The Bonbright Criteria

BC Hydro has used the following eight Bonbright criteria in its rate design applications, including the 2007 Rate Design Application (**RDA**), the 2008 Residential Inclining Block (**RIB**) Application and the 2009 LGS Rate Application:

1. Recovery of the revenue requirement
2. Fair apportionment of costs among customers
3. Price signals that encourage efficient use and discourage inefficient use
4. Customer understanding and acceptance
5. Practical and cost-effective to implement
6. Rate stability
7. Revenue stability
8. Avoidance of undue discrimination

The LGS NSA stated in Appendix G – Bonbright Criteria, page 2: "…One of the purposes of the 36-month report is to address whether the LGS and MGS rate structure continues to satisfy the eight Bonbright criteria". Table 3 shows the Bonbright Criteria and provides the relevant sections of this report that directly relate to them. Items (2) and (8) of the Bonbright Criteria are not covered in this report for the reasons provided in the table.

Table 3 Bonbright Criteria Covered in this Report

Bonbright Criteria	Relevant section of this Report
1. Recovery of the revenue requirement	· Section 8.3 Forecast and Actual LGS and MGS Sales and Energy Revenue
2. Fair apportionment of costs among customers	Not addressed. BC Hydro will review this when it has an updated cost of service study in the next RDA.
3. Price signals that encourage efficient use and discourage inefficient use	· Section 8.1 Energy Savings · Section 9 Issue 16 (f): PLB and Three-Year HBL
4. Customer understanding and acceptance	· Section 10.1 Evaluation Customer Survey Results · Section 10.2 Customer Inquiries and Complaints
5. Practical and cost-effective to implement	· Section 7 Issue (d): Implementation Costs · Section 8.2 Cost Effectiveness · Section 10.2.4 Rate Administration Challenges · Section 10.3.1 Billing Issues
6. Rate stability	· Section 8.3 Forecast and Actual LGS and MGS Sales and Energy Revenue
7. Revenue stability	· Section 8.3 Forecast and Actual LGS and MGS Sales and Energy Revenue
8. Avoidance of undue discrimination	Not addressed. As discussed qualitatively in the LGS Application (Appendix I page 17), two-part rates will inherently have some issues since unlike a flat rate, customer baseline load (CBL) based designs do not yield identical bills for two customers with identical consumption, unless these customers also have an identical CBL. Since this is inherent in the rate design, BC Hydro has not examined this in this report.

4 Issue 16 (a): Value of Control Groups

BC Hydro proposed in its LGS Rate Application that 200 randomly selected LGS and MGS accounts remain on the pre-existing large general service rate structure. The control group was expected to provide a method to help isolate the effects of the new rate structures from other factors that affect consumption.

The control groups have added value since they have been used to help evaluate the impact of the LGS and MGS rates in calendar years 2011 and 2012 in the evaluation contained in Appendix A.

The evaluation chose to use experimental design with randomized control trial since it "is considered the strongest research method across many fields because it controls for all factors aside from the treatment of interest" (see page 16 of the evaluation).

The evaluation first assessed the effectiveness of the LGS and MGS control group accounts for the evaluation of energy savings. There were still approximately 320 of the 400 control group accounts that remained valid at the time of the study. The other 80 accounts were lost due to either account closure, or migration to a different rate class as a result of significant changes in account consumption. Statistical tests indicated that the control groups were effective and were equivalent to their treatment groups on the basis of electricity consumption in the year prior to conservation rate implementation, and are representative of the treatment groups by account sector, and region.

Please refer to section 2 of the evaluation for more details on the evaluation approach, the methodology used to assess the control group effectiveness and the methodology to estimate energy and demand savings. Section 3.1 of the evaluation provides detailed statistical results for the effectiveness of the LGS and MGS control accounts.

The evaluation provides the following summary key findings and recommendations regarding the control groups:

Key findings (see page 9 of the study):

> "1. The control groups closely matched the treatment groups in a number of important ways, and they are therefore valid and effective control groups for the purpose of evaluating the LGS and MGS rate structures. Significant control group attrition has already occurred. Twenty per cent of control accounts were lost over three years. The relative precision of the control groups, while fair overall, could be improved by increasing the number of large LGS control accounts."

Key recommendations (see page 10 of the study):

> "4. Consider using focus groups or structured interviews to better understand the mechanism by which customers respond to the rates, given the finding that awareness of the rate is not required for a conservation response.
>
> 5. Request approval of the British Columbia Utilities Commission to maintain existing control accounts and to assign a proportion of new accounts to control group status in order to preserve an effective control group for future evaluation of the LGS and MGS conservation rate structures.
>
> 6. Request approval of the British Columbia Utilities Commission to assign an increased proportion of new, large accounts to control group status, specifically LGS customers expected to have consumption above 6.5 GWh/yr.
>
> 7. Consider re-evaluating the conservation rate structures after all conservation rate design elements are fully implemented and customers have had time to respond to them."

Therefore, based on the evaluation, the control groups have added value. Also since the study has recommended that BC Hydro consider a further evaluation of the conservation rates after all the conservation design elements are fully implemented, BC Hydro recommends that the control groups remain in place for the purpose of future evaluation.

Based on the evaluation recommendations, BC Hydro expects to file an application by spring 2014 to the BCUC seeking approval to maintain the existing control group accounts and to assign a proportion of new accounts to control group status, including larger accounts, so that an effective control group will be available for the next evaluation.

5 Issue 16 (b): Opening of New Accounts

In the LGS Rate Application, BC Hydro proposed that a new account would pay 90 per cent at the Part 1 energy rate and 10 per cent at the Part 2 LRMC energy

rate. The BCUC approved the pricing under the LGS NSA whereby a new account pays 85 per cent at the Part 1 energy rate and 15 per cent at the Part 2 LRMC energy rate.

Under the LGS rate, an existing account which experiences load growth would pay the Part 2 LRMC energy rate for any load growth that is up to 20 per cent of its HBL. This compares with a new account which in the first year pays 15 per cent of the load at the at the Part 2 LRMC energy rate. For example, an existing account which has an HBL of 100 kWh and load growth of 20 kWh would pay 100 kWh at the Part 1 energy rate and 20 kWh at the Part 2 energy rate. A new account which has 120 kWh of consumption would pay 102 kWh at the Part 1 energy rate and 18 kWh at the Part 2 energy rate. Thus the difference in bills is relatively small in the first year.

However, the primary benefit occurs for the new account in the second and third years, since in Year 2 the HBLs will be based on the 12 months of consumption in Year 1, and in Year 3 the HBLs will be based on the average of the consumption in Year 1 and Year 2. If the new account maintains the same level of consumption in each year, none of its load will be exposed to the Part 2 LRMC energy rate in Year 2 and Year 3, since the HBLs will have incorporated the new account's entire load. This compares with the case of the existing account which will continue to have some of its load growth priced at the Part 2 LRMC energy rate in Year 2 and Year 3.

In its IR responses in the LGS Rate Application regulatory proceeding (see BC Hydro response to CEC IR 1.5.4), BC Hydro explained that a customer would have limited ability to close and open accounts, since current policy is that new accounts can be established only (1) if there is a new service, or (2) if there is a new or different customer that takes responsibility for service and meter of an existing account holder, or (3) when there is a substantial change in service (e.g., massive expansion). Therefore, BC Hydro would not expect in its normal course of business, that there would be many accounts that have closed and opened new accounts in

the same premise to avoid exposure to the Part 2 LRMC energy rate, since this is not allowed under current policy.

In order to determine whether there is any evidence of customers opening new accounts to avoid exposure to the LRMC-based Part 2 rate under the two-part rate structure, data on the number of move-ins and move-ins as a percentage of active accounts were calculated for the LGS class for F2012 and F2013. This was compared to the same data for F2008 for LGS accounts greater or equal to 150 kW, as reported in Appendix B, Table B-6 of BC Hydro's 2009 LGS Rate Application.

Table 4 LGS Account Move ins

Accounts with Peak Load ≥ 150 kW (LGS Accounts)	Move-in Accounts	Move-in Accounts as a Percentage of Total Active Accounts
F2008	349	1.5
F2012	474	2.0
F2013	513	2.1

Table 4 shows that the percentage of move-in accounts does not increase significantly in F2012 (0.5 per cent increase) and F2013 (0.6 per cent increase), when the LGS conservation rate is in effect, compared to in F2008, when the pre-existing LGS RS 12xx rate was in effect. This does not provide strong evidence that LGS customers are opening new accounts to avoid exposure to the LRMC-based Part 2 rate.

6 Issue 16 (c): MGS Part 1 Energy Rate Structure

The LGS NSA modified the Part 1 energy rates that apply to the MGS rate class by specifying a schedule, by which the lower Tier 2 MGS rate will be increased annually, subject to maximum forecast bill impacts for MGS accounts, before CARC, as follows:

(a) January 1, 2011 (Implementation Date): 2 per cent

(b) April 1,2011 (start of F2012): 2 per cent

(c) April 1,2012 (start of F2013): 4 per cent

(d) April 1,2013 (start of F2014): 4 per cent

(e) April 1,2014 (start of F2015): 4 per cent

The LGS NSA indicated that this is particularly important for the MGS class since a large percentage of MGS accounts (about 30 per cent) are smaller consumers and only see the higher Tier 1 energy rate. This is in marked contrast to LGS accounts who in almost all cases consume the large majority of their energy at the lower Tier 2 rate.

Table 5 shows what MGS Part 1 energy rates would have been in the absence of rate shaping:

Table 5 MGS Part 1 Energy Rates without Rate Shaping

	Tier 2 Energy Rate c/kWh	Tier 1 Energy rate c/kWh	RRA Increase (%)	Part 2 LRMC-Based Energy Rate c/kWh
F2011 (April 2010 RS 12xx)	3.93	8.16		n/a
F2012 (May 2011)	4.24	8.81	8	n/a
F2013 (April 2012)	4.40	9.15	3.91	9.42
F2014 (April 2013)	4.46	9.28	1.44	9.56

Applying the LGS NSA rate shaping schedule has resulted in the following MGS Part 1 energy rates shown in Table 6.

Table 6 MGS Part 1 Energy Rates with Rate Shaping

	Tier 2 Energy Rate c/kWh	Tier 1 Energy rate c/kWh	Tier 1 Energy Rate Change (%)	Part 2 LRMC-Based Energy Rate c/kWh
F2011 (January 2011)	4.05	8.10		n/a
F2012 (May 2011)	4.44	8.72	7.65	n/a
F2013 (April 2012)	4.90	8.97	2.87	9.42
F2014 (April 2013)	5.49	8.85	-1.34	9.56

Table 5 shows that in F2014 the Part 1 Tier 1 energy rate would have been closer to the Part 2 LRMC-price without rate shaping, compared to with rate shaping shown in Table 6.

BC Hydro does not intend to seek approval for any additional rate shaping for MGS Part 1 rates for F2016 for the following reasons:

- Rate shaping the Part 1 rates should not have a significant conservation impact under a two-part rate, since the Part 1 rates are applied to the HBL and these Part 1 charges are fixed. [4] The evaluation also did not find any measurable savings attributable to MGS rate shaping, so there does not appear to be a conservation justification for rate shaping.
- Smaller customers that consume less than 14,800 kWh only pay the Tier 1 energy rate. The original RS 12xx rate design is that these customers pay a higher energy rate because they do not pay a demand charge since their demand is typically less than 35 kW. This raises the issue that there may not be a cost of service basis for lowering the energy charges for these smaller customers under rate shaping.
- The rate shaping under the RRA increase in F2014 led to a decrease in the Tier 1 rate. Therefore smaller MGS customers had a rate decrease while all

[4] See Appendix B of the evaluation for further explanation. It states “Rate shaping does not affect the marginal LRMC price signal and therefore is not expected to affect conservation for accounts with consumption within the price limit band.” (bottom of page B-1)

other customers had a rate increase. This outcome does not meet the regulatory fairness principle.

BC Hydro will review the cost of service basis of MGS Part 1 rates in its next rate design application in 2015, when it will have an updated cost of service study available.

7 Issue 16 (d): Implementation Costs

Table 7 reports forecast and actual LGS and MGS costs over the period F2009 to F2014.

Costs are shown by the following major activities:

- **Rate Design, Application Development & Regulatory Review Process:** This includes costs associated with developing, filing and regulatory review of rate applications. The work includes rate design modelling, conservation and customer impact analysis, bill and revenue impact analysis, customer and stakeholder consultation, development of evidence and applications to the BCUC, IR response development, and costs associated with hearings or Negotiated Settlement processes.
- **Rate Implementation and Sustainment:** This includes implementation of any new rate structures including billing system changes and on-line tool development, development and implementation of new customer service processes, plus on-going support and communication related to conservation rate structures
- **Rate Assessment:** This includes the assessment of the rate regarding conservation, elasticity, customer bills, operations and revenue

Table 7 LGS and MGS Design, Implementation and Assessment Costs

Category	Costs $ million[1]					
	F2009	F2010	F2011	F2012	F2013	F2014[4]
Forecast						
Rate Design and Regulatory[2]	n/a see note	2.9	0.0	0.2	0.7	0.2
Implementation and Sustainment[3]	n/a	n/a	4.0	2.8	1.3	0.3
Assessment	n/a	n/a	0.2	0.1	0.3	0.2
Total	n/a	2.9	4.2	3.2	2.3	0.7
Actual						
Rate Design and Regulatory	2.9	3.3	0.1	0.0	0.4	0.0
Implementation and Sustainment	n/a	0.6	4.4	2.7	0.6	0.1
Assessment	n/a	0.0	0.1	0.0	0.0	0.1
Total	2.9	4.0	4.6	2.7	1.0	0.2

Notes:

1. Source: Conservation Rates Annual Budget Spreadsheets and BC Hydro F2012-F2014 Revenue Requirements Application, BC Hydro response to BCUC IR No. 2.200.2.
2. F2009 Rate Design & Regulatory costs were not separately forecast for the LGS design under a prior project management structure.
3. Forecast and Actual Implementation and Sustainment costs include the costs to implement the approved MGS two-part rate structure. These costs are not comparable to the implementation costs initially forecast in the LGS Rate Application (October 2009), which did not contemplate implementation of a two-part rate design for the MGS class. Appendix F to the LGS NSA provided a high level range in forecast implementation costs between $10.2 million to 24.8 million over the period F2010 to F2015. The range of costs indicates the high uncertainty in the level of support that MGS customers will require to understand the more complex two-part rate.
4. F2014 Actual costs are for the six months ending September 30, 2013.

The table shows that Rate Design and Regulatory costs were higher before the LGS and MGS rates were implemented in F2009 and F2010. When the rates were implemented, starting January 1, 2011, BC Hydro spent more on implementation and sustainment, as would be expected. These costs have declined as one time Information Technology (**IT**) programming costs and costs for special training for the business call centre and billing have been reduced once the MGS and LGS rates have been implemented.

Appendix F of the LGS NSA provided an estimated range of implementation costs of between $10.2 million and $24.8 million for total costs for LGS and MGS two-part rates for the period F2010 to F2015. The above table shows that the cumulative actual total cost for the period F2010 to F2013 is $12.3 million, which is still well within the estimated range, even though actual costs for F2014 and F2015 are not yet available.

8 Issue 16 (e): Energy Savings and Cost Effectiveness

8.1 Energy Savings

The energy savings for calendar year 2011 and 2012 for the LGS and MGS rates have been estimated by the evaluation contained in Appendix A. The estimated energy savings are summarized in the following Table ES 1.3 which has been extracted from the evaluation study (see page 8):

Table ES 1.3. Summary of Energy and Peak Demand Savings

Calendar Year	Cumulative Run Rate Energy Savings (GWh/yr)		Peak Demand Savings (MW)	
	Reported	Evaluated Net	Reported	Evaluated Net
2011	286	144	40	20
2012	616	200	86	28

The findings regarding energy savings are summarized in the evaluation as follows (see pages 9 and 10):

> "4. The LGS rate structure resulted in energy savings of 144 GWh/yr by December 31, 2011, increasing to 200 GWh/yr by December 31, 2012. This is considerably less than forecast energy savings. Note the timeframe evaluated incorporated only 9 months of data with the Part 2 price at the LRMC based rate and the initial customer baselines were set higher than they would be under normal operation of the rate.
>
> 5. There were no measurable savings for MGS rate shaping in 2011 and 2012.

6. There were no measurable savings for those MGS customers (MGS1) that transitioned to the conservation rate structure April 1, 2012. Note the timeframe evaluated included only 9 months of data with MGS1 customers exposed to the two-part conservation rate."

8.2 Cost Effectiveness

Consistent with other filings and applications from BC Hydro, the cost-effectiveness of a DSM measure (whether a rate, a program or a code and standard) is assessed using the TRC metric. This aligns DSM to the same perspective as other resources, allowing a comparison of cost-effectiveness between supply- and demand-side resources. The TRC of the LGS conservation rate, incorporating the results of the 2011 and 2012 evaluation contained in Appendix A, is estimated at $8.40/MWh.

To determine the cost-effectiveness of this TRC value, two avoided cost scenarios are used as comparative values. Scenario 1 uses a long-run perspective based on a LRMC, and Scenario 2 uses a short-run marginal cost (market price). The avoided cost for Scenario 1 is taken from the LRMC outlook in the 2013 IRP, and is as follows: $85/MWh to $100/MWh from F2017 to about F2030. For Scenario 2, the avoided cost based on market price is assumed to be the annual Mid-C price and averaged $28.15/MWh for F2012 and $24.44/MWh for F2013.

The TRC for the LGS rate at $8.40/MWh is cost effective and compares favourably to Scenario 1 using a LRMC proxy as well as Scenario 2 using a short-run marginal cost (market price).

8.3 Forecast and Actual LGS and MGS Energy Sales and Energy Revenue

Table 8 below compares the forecast and actual LGS energy sales and energy revenue for F2012, F2013 and three months of F2014. In F2012, actual total energy sales of 10,183 GWh were 806.7 GWh lower than forecast sales of 10,989.7 GWh. As a result, in that year actual revenue of $470.7 million was $38.8 million lower than forecast revenue of $509.5 million. The difference in actual and forecast revenue

(-7.62 per cent) is almost entirely caused by the difference in actual and forecast load (-7.34 per cent).

In F2013, actual total energy sales of 10,604 GWh were 101.8 GWh higher than forecast sales of 10,502.2 GWh. Actual revenue was $511 million and was $0.2 million higher than forecast revenue of $510.8 million. The revenue variance was much smaller in F2013, since the difference in actual and forecast load was much smaller (.96 per cent).

In F2014 (three months), actual total energy sales of 2,526.8 GWh were 16.1 GWh higher than forecast sales of 2,510.7 GWh. Actual revenue was $126.5 million and was $2.6 million higher than forecast revenue of $123.9 million.

For the period F2012 to 2014, BC Hydro had a load variance account which allows it to recover any revenue difference due to load variance and this revenue difference is recovered from all ratepayers.

The forecast and actual average energy rates, calculated based on energy revenue divided by energy sales, are reported at the bottom of the table. The LGS rates are determined so that they are revenue neutral on a forecast basis. This means that annual, prospective pricing adjustments are made to the LGS Part 1 energy rates to account for the annual forecast revenue difference that will arise from differences between HBLs and forecast consumption. The table shows that the forecast and actual average LGS rates are relatively close in value each year, which means that the LGS rate and revenue are relatively stable and effective in collecting the revenue requirement.

Table 8 Actual Versus Forecast LGS Energy Sales and Energy Revenue

	F2012	F2013	F2014 (3 months)
LGS Rates	**($/MWh)**	**($/MWh)**	**($/MWh)**
Part 1 Tier 1 Rate	88.50	93.70	96.10
Part 1 Tier 2 Rate	42.60	45.10	46.20
Part 2 LRMC based Rate	66.80	94.20	95.60
Forecast LGS Energy Sales	**(GWh)**	**(GWh)**	**(GWh)**
Forecast HBL	11,464.5	10,656.8	2,611.7
Forecast Part 2 energy sales	(474.8)	(210.2)	(124.3)
Forecast total LGS energy sales	10,989.7	10,502.2	2,510.7
Actual LGS Energy Sales			
Actual HBL	10,252.7	10,477.6	2,438.4
Actual Part 2 energy sales	(423.3)	(266.6)	(32.3)
Actual total LGS energy sales	10,183.0	10,604.0	2,526.8
Energy Sales Variance	(806.7)	101.8	16.1
Energy Revenue	**$ million**	**$ million**	**$ million**
Actual RS 16xx energy revenue	470.7	511.0	126.5
Forecast RS 16xx energy revenue	509.5	510.8	123.9
Revenue Variance	(38.8)	0.2	2.6
Average LGS Rate (c/kWh) (Energy revenue/Energy sales)			
Forecast average rate	4.64	4.86	4.93
Actual average rate	4.62	4.82	5.01

Table 9 below compares the forecast and actual MGS energy sales and energy revenue for F2012, F2013 and three months of F2014.

In F2012, all MGS accounts paid Part 1 energy rates which had rate shaping applied under the terms of the LGS NSA. In F2013, larger MGS accounts with peak demand greater than or equal to 85 kW were placed on the two-part conservation rate. The remaining MGS accounts were placed on the two-part conservation rate in F2014.

Total MGS energy revenue is about half of the LGS energy revenue ($253.4 million in F2012 and $260.1 million in F2013), while total MGS energy sales is about one third of LGS energy sales (3,478.3 GWh in F2012 and 3,436.2 GWh in F2013). The

table shows that the energy sales variance and revenue variance is relatively small for the years that are shown.

The table shows that the forecast and actual average MGS rates are relatively close in value each year, which means that the MGS rate and revenue are relatively stable and effective in collecting the revenue requirement for the years shown.

Table 9 Actual Versus Forecast MGS Energy Sales and Energy Revenue

	F2012	F2013	F2014 (3 months)
MGS Rates	**($/MWh)**	**($/MWh)**	**($/MWh)**
Part 1 Tier 1 Rate	87.20	89.70	88.50
Part 1 Tier 2 Rate	44.40	49.00	54.90
Part 2 LRMC based Rate	n/a	94.20	95.60
Forecast MGS Energy Sales	**(GWh)**	**(GWh)**	**(GWh)**
Forecast HBL	n/a	1,095.7	768.2
Forecast Part 2 energy sales	n/a	5.5	(11.4)
Forecast total MGS energy sales	3,539.4	3,382.4	808.6
Actual MGS Energy Sales			
Actual HBL	n/a	1,104.3	685.4
Actual Part 2 energy sales	n/a	(11.2)	(14.9)
Actual total MGS energy sales	3,478.3	3,436.2	816.5
Energy Sales Variance	(61.1)	53.8	7.9
Energy Revenue	**$ million**	**$ million**	**$ million**
Actual RS 15xx energy revenue	253.4	260.1	63.1
Forecast RS 15xx energy revenue	259.5	259.4	62.9
Revenue Variance	(6.1)	0.7	0.2
Average MGS Rate (c/kWh) (Energy revenue/Energy sales)			
Forecast average rate	7.33	7.67	7.78
Actual average rate	7.29	7.57	7.73

9 Issue 16 (f): PLB and Three-Year HBL

This section addresses whether any changes or alternatives to the PLBs or three-year rolling average HBLs are desirable or necessary.

In the LGS Application, BC Hydro stated that "BC Hydro is proposing Price Limit Bands that would expose customers' incremental consumption up to 20 per cent of their HBLs to LRMC pricing because it strikes a reasonable balance between mitigating bill volatility and realizing the conservation potential of a two-part rate." (page 3-23, BC Hydro 2009 LGS Rate Application).

The evaluation shows that there are energy savings from the LGS rate, but the savings are lower than forecast. However, there are no findings in the evaluation regarding whether increasing the PLBs will provide a higher level of savings.

In order to assess this further, Table 10 reports the percentage of bills with load falling outside the PLBs.

Table 10 Percentage of Bills outside PLBs

LGS	F2011	F2012	F2013
Number of accounts	5,972	6,696	6,869
Total number of bills	23,295	90,995	82,387
Percentage of bills with load > or < 20 per cent of HBL	7.4	25.2	19.4
Percentage of bills with load > 20% of HBL	2.7	8.4	6.2
Percentage of bills with load < 20% of HBL	4.7	16.8	13.2

In F2012, the percentage of bills outside the PLBs was 25.2 per cent (16.8 per cent of bills with load below the -20 per cent HBL and 8.4 per cent of bills with load above the +20 per cent HBL). This percentage is higher than the 20.1 per cent of bills outside the PLBs that was reported in the LGS Application (Table L-3, Appendix L). However, in F2013 the percentage is 19.4 per cent, which is closer to the percentage reported in the LGS Application. It is not clear why there was an increase in the percentage of bills with load outside the PLBs in F2012. It may have been partially a result of the higher initial HBL, as established by the LGS NSA, which may have contributed to the relatively high percentage of bills (16.8 per cent) with load below the -20 per cent PLB.

In the absence of any direct evidence regarding the impact of PLBs on conservation, BC Hydro believes that it is not warranted to make changes to the PLBs. In addition, changing the PLBs would require significant customer communication, and it may be challenging for customers to understand and keep abreast of any PLB changes given the complexity of the rates.

Regarding the three-year rolling average HBL, the evaluation has only assessed energy savings for calendar year 2011 and 2012 for the LGS rate. In 2011, per clause 9 of the LGS NSA, the Initial HBL is based on account history from the period January 1, 2005 to December 31, 2007, or the period July 1, 2007 to June 30, 2010, whichever three-year period is the higher energy consumption period for that account (where applicable). In 2012, the HBL is based on the average of the Initial HBL and the consumption from the same month in the previous year. It will only be in F2015 when the HBL will be set based on the average of consumption from the same month in the previous three years. Therefore, BC Hydro does not have any basis currently to recommend any changes or alternatives to the three-year rolling average HBLs as desirable or necessary.

10 Issue 16 (g): Other Elements of LGS and MGS Rate Structure

10.1 Evaluation Customer Survey Results

10.1.1 Customer Awareness and Understanding

Item four of the eight Bonbright criteria is customer understanding and acceptance. The evaluation reports the results of two customer surveys that were conducted in order to assess customer awareness, understanding, and response. For ease of reference the following summary of the findings with respect to customer awareness and understanding is extracted from page 8 of the evaluation:

> "Customers were asked about several dimensions of rate awareness. Unaided awareness was measured by asking

survey respondent to identify their rate structure from a list of possibilities. About 33 per cent of LGS customers, 20 per cent of MGS1 customers, and 7 per cent of MGS2/3[5] correctly identified the structure of their energy charge. Aided awareness was much higher. Aided awareness was measured by describing their rate structure to survey respondents and then asking them whether they were previously familiar with it. Aided awareness was 81 per cent of LGS customers, 70 per cent of MGS1 customers and 30 per cent of MGS2/3 customers.

To examine ease of understanding of their rate, customers were provided with a detailed description of the conservation rate structure and then asked how easy or difficult they found it to understand. About 66 per cent of LGS customers said that it was very easy or somewhat easy to understand as did 70 per cent of MGS1 customers and 67 per cent of MGS2/3 customers.

Customers were asked if they support the rate. About 58 per cent of LGS customers indicated that they strongly or somewhat support the rate as did 45 per cent of MGS1 customers and 29 per cent of MGS2/3 customers."

10.1.2 Customer Response

For ease of reference the following summary of the findings with respect to customer response to the LGS and MGS rates is extracted from page 9 of the evaluation:

"Most customers felt that the rate had an impact on their energy conservation efforts. About 84 per cent of LGS customers said their rate had a major or a minor incentive effect, as did 70 per cent of MGS1 and 52 per cent of MGS2/3 customers.

To examine customers' ease of managing their account, customers were asked "assuming your organization wanted to do so, how easy or difficult is it to currently manage this account to minimize total energy charge on the bill?" Responses were similar across the three customer groups. About two third of respondents indicated it would be very or somewhat difficult to

[5] MGS2/3 refers to MGS accounts that that have peak demand greater or equal to 35 kW but less than 85 kW. These accounts paid MGS rates (with rate shaping) starting on January 1, 2011, and that transitioned to the MGS conservation rate on April 2013.

respond, with the balance indicating it would be very or somewhat easy to respond.

Customers were asked about their major drivers of energy conservation. For all customer groups, the top three drivers of energy conservation were: "want energy costs to be as low as possible"; "right thing to do"; and "overall level of electricity prices". Responding to the conservation rate structure was cited as a driver of conservation for 35 per cent of LGS customer respondents.

Analysis of variance revealed that customers who are aware of the LGS or MGS conservation rates on an unaided basis have a higher mean annual consumption than customers who are not aware. Regression analysis indicated that awareness of the rate structure is not required for a conservation response."

10.1.3 Evaluation Recommendations

The following are the summary findings regarding customer awareness, understanding and response provided on page 9 of the evaluation:

"2. Unaided awareness and understanding of the LGS and MGS rate structures were relatively low. Awareness and understanding increased significantly following an explanation of the conservation rate structures.

3. The top three drivers of energy conservation were: "want energy costs to be as low as possible"; "right thing to do"; and "overall level of electricity prices". Awareness of the conservation rate structure is not required for a conservation response."

The evaluation makes the following recommendations regarding these findings which are extracted from page 10 of the report:

1. To promote a conservation response, focus communication and advertising on energy costs, "doing the right thing", and energy prices

2. If customer awareness and understanding of the rate is of value, consider simplifying the rate structure or expanding advertising and communication efforts

4. Consider using focus groups or structured interviews to better understand the mechanism by which customers respond to the rates, given the finding that awareness of the rate is not required for a conservation response

BC Hydro is intending to use focus groups for the next planned evaluation in 2015. This will provide BC Hydro better understanding of the factors that cause customers to respond to the rate.

10.2 Customer Inquiries and Complaints

10.2.1 Call Centre Inquiries

Business customers who do not qualify for a Key Account Manager (**KAM**) are supported through BC Hydro's main Call Centre[6]. Approximately 40 per cent of LGS accounts and 60 per cent of MGS accounts (2,500 and 11,000 accounts, respectively) are supported in this manner. To prepare for implementation of the LGS conservation rate, BC Hydro reorganized the Call Centre in the fall of 2010 to include a sub-set of customer service agents that had a higher level of training regarding the new business rates. This group of specialized agents is referred to as Business Customer Care (**BCC**).

The mandate of the BCC is to handle calls from business accounts that are of a more complex nature – i.e., regarding rates, rate structures and billing issues. As well, when BCC capacity permits, this group of agents also handles more routine calls from business customers, such as move-ins, move-out, account inquiries, etc. The BCC also responds to correspondence (email and Canada Post mail) from business customers.

[6] A business customer qualifies for a KAM if the total energy consumption across all its accounts is greater than 4 GWh/year

There are three main categories of complex calls to the BCC Call Centre:

1. LGS Rate Calls: Calls regarding the new LGS rate structure and associated bill impacts, bill interpretation, etc
2. MGS Rate Calls: Calls regarding the new MGS rate structure and associated bill impacts, bill interpretation, etc. (MGS calls were logged separately from October 2011 onward in advance of the April 2012 conservation rate launch.)
3. General Rate Inquiries: Calls that concern other rate and pricing matters, such as general BC Hydro rates increase, changes to rate riders, etc.

Table 11 summarizes the incidence of complex calls handled by the BCC Call Centre.

Table 11 Complex Calls Handled by the BCC Call Centre

	2011				2012				2013 (8 months)			
BCC Complex Calls	LGS Rate	MGS Rate	General Rate	Total	LGS Rate	MGS Rate	General Rate	Total	LGS Rate	MGS Rate	General Rate	Total
Annual Total	133	31	244	408	263	116	257	635	50	104	275	429
Monthly Average	11	3	20	34	22	10	21	53	6	13	34	54
Percentage of All Complex Calls handled by BCC	89	91	76	81	87	85	71	80	81	94	68	75
Average Handle Time - Minutes	16	13	13	n/a	16	14	13	n/a	14	12	10	n/a
Average Handle Time – Ratio All Calls	2.3	1.9	1.9	n/a	1.9	1.8	1.6	n/a	1.8	1.6	1.3	n/a

The table shows that:

- The number of complex calls that relate to the LGS and MGS rate structures is very low and average at most 22 per month for LGS (in 2012) and at most 13 per month for MGS (in 2013).Total LGS calls represent at most 10 per cent of

all LGS accounts served by the BCC Call centre (263/2500 in 2012). Total MGS calls represent at most 1 per cent of all MGS accounts served by the BCC Call centre (116/11,000 in 2012).

- Complex calls that regard the LGS rate structure appear to have peaked in 2012 and declined in 2013. Those that regard the MGS rate structure appear relatively flat in 2012 and 2013.
- Complex calls are effectively routed to the BCC Call centre, as over 80 per cent of complex calls regarding MGS and LGS rate structures are handled by agents in the BCC Call centre rather than being handled by the general Call Centre
- Complex calls typically require between 10 to 20 minutes of a specialized agent's time, which is about double the average time required to respond and document most other calls to the call centre

10.2.2 Call Centre Escalations and Complaints

The effectiveness of the specialized training of the BCC agents is indicated by that fact that 8.3 per cent of BCC complex calls in 2011, 2.2 per cent of BCC complex calls in 2012 and 3.3 per cent of BCC complex calls were escalated from an agent to a work leader due to the complexity of the call or at the request of the customer. Please refer to Table 12 below.

The issues that required escalation were predominately related to customer concern or lack of understanding about their account's baseline: i) the mechanism to determine; ii) the level relative to actual consumption; or iii) the applicability of the Prospective Growth Rule.

Table 12 Escalations and Complaints to BCC Call Centre

LGS and MGS	2011	2012	2013
Total Escalations	34	14	14
Monthly Average Escalations	3	1	2
Escalations as a percentage of Complex Calls to BCC	8.3	2.2	3.3
Complaints	2	–	1

10.2.3 KAM Inquiries and Complaints

Approximately 60 per cent of LGS accounts and 35 per cent of MGS accounts (3,900 and 5,700 accounts, respectively) are supported by a KAM. As with business customer calls to the Call Centre, in some cases the issues raised by a business customer to its KAM require escalation to a subject matter expert (**SME**) more knowledgeable and better equipped to respond. These escalations are logged on an ongoing basis. This 'issues log' also records the escalations that are subsequently defined as complaints in circumstances where the SME's direction or clarification on an escalated issue was deemed to have not resolved the customer's issues.

By the end of 2011, 22 customer issues were logged. Seven of these issues were logged prior to the implementation of the LGS effective January 1, 2011, with 15 issues logged over 2011. 17 customer issues were logged in 2012 and 40 customer issues were logged in 2013.

As with inquiries to the Call Centre, the main issues that required escalation were:

1. Customer concern that the rate structure penalizes customer growth – the inquiries reflected circumstances in which accounts all had experienced some level of growth above an initial baseline, but below the threshold for a prospective growth adjustment

2. Customer concern that the rate does not align with their operational conditions; for example, by not reflecting shutdown periods or "throughput" driven consumption load

3. Customer needed help determining impact of rate on possible energy efficient upgrades

4. Customer requesting to keep baseline having only changed customer name and not ownership

10.2.4 Rate Administration Challenges

The complexity of the rates makes it difficult for Customer Service Operations (**CSO**), Key Accounts, Power Smart and others to communicate with customers without visual aids and extensive face to face or telephone conversations. BC Hydro has revamped the entire Business Rates website, created a few videos to demonstrate how the rates work, and sent out many targeted letters and emails to try to educate customers about the new rate structure and its benefits. However, most LGS and MGS customers still do not fully understand how the rates work, or the differences between them.

Specific examples of rate administration challenges include:

- **Bill Presentment:** the new rate structures introduced many new line items on customers' bills. BC Hydro has received constant feedback from customers, industry partners, and internal employees about being confused by the LGS and MGS energy charge line items.

- **Savings Estimates:** customers' energy saving under the conservation rates could be priced at LRMC, Tier 1 and/or Tier 2, which makes estimating savings very difficult for customers, BC Hydro's Key Account Managers and industry energy advisors, consultants, and vendors

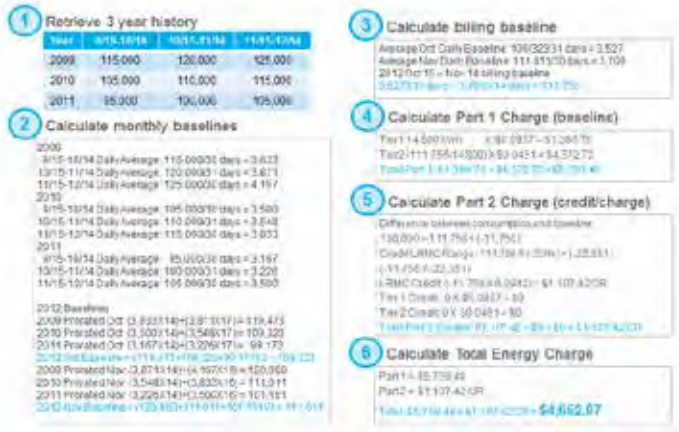
- **New Account 85/15 Rule:** this pricing rule applies to new accounts. However, this rule has caused unexpected issues in customers' account management because a customer's unrelated operational change (e.g., transferring BC Hydro account ownership between the parent company and subsidiaries) triggers the higher 15 per cent LRMC charge. Some customers have avoided updating account ownership to avoid this potential treatment; however, this also creates a risk to BC Hydro in that BC Hydro's account records no longer match the true legal owner of the business.

10.3 Billing

10.3.1 Billing Issues

The inclusion of historic consumption in the calculation of current electricity charges significantly complicates the billing process and makes the conservation rates difficult to administer. Please see Figure 1 below for an illustration of the energy charge calculation before and after the LGS two-part rate was implemented:

Figure 1 LGS Energy Charge Calculations under Old versus New LGS Rate

Old LGS Rate	LGS Conservation Rate
Customer X consumed 100,000 kWh from Oct 15 to Nov 14, 2012 Tier1 14,800 kWh X $0.0937 = $1,386.76 Tier2 (100,000-14,800) X $0.0451 = $3,842.52 ========== Total Energy charge: **$5,229.28**	

To support these calculations, customers' consumption history needs to be prorated from billing periods into monthly baselines. IT performs this task on the quarterly

basis. Although this is largely automated, each time there are hundreds of accounts in which baselines are not properly calculated due to various reasons. This requires one IT Full-Time Equivalent around one-and-a-half weeks to investigate and fix issues.

It is also noted that while the LGS and MGS conservation rates are similar, they also have some differences. This complicates billing system configuration and operations.

BC Hydro also notes that it is time consuming to manage exceptions under the conservation rates. Like other rates, manual effort is required to address account adjustments such as move-in/move-out reversals or meter reading estimates. However, because of the complexity of the rate, the average LGS/MGS manual bill handle time has increased from 10 minutes per bill before LGS conservation rate to 46 minutes now.

TS No. 82 is a specific exception applicable to LGS accounts that expect significant growth due to capital expansions. Bills for these customers cannot be automated and, as a result, are entirely managed by the billing team manually. The average process cost to produce one TS No. 82 bill is around $100. Furthermore, this cost does not include the accounts that do not meet the one-year growth threshold and require all 12 monthly bills to be reversed for the account.

In addition, there have been scenarios where BC Hydro has to manage some customer accounts outside of the defined rules in the billing system, e.g., property management companies transferring account ownership back to the strata owners; BC Hydro consolidated multiple meters in customers' premises. Due to the complexity of the rates, these accounts can only be managed manually. Since customers' historic consumption is included in current and future energy charge calculations, BC Hydro has to manually manage these exception accounts for three years.

10.3.2 LGS and MGS Billing Proration

10.3.2.1 Billing Proration Issue

In the course of implementing the LGS and MGS two-part rates, BC Hydro uncovered a billing issue caused by the current billing system proration method when there is a rate schedule change that occurs part way through a billing period.

The current billing system proration method uses 365 days to prorate the LGS and MGS energy and demand thresholds that are applicable to each rate in each partial billing period. However, section 5.2 (c) of the BC Hydro Electric Tariff stipulates that the proration is according to the number of days in each billing period that the rate is in effect and when the billing period is of standard length. The billing system proration method is correct if the billing period is outside the standard 27 to 33-day period or if there are no energy and demand thresholds in the rate schedules involved.

The billing system proration method has been in place since 2003 and was adopted because the billing system cannot technically bill according to the method outlined in section 5.2 (c) of the BC Hydro Electric Tariff when there is a rate schedule change occurring part way through a billing period. However, the proration method had not been a substantive issue until the following LGS and MGS rate changes occurred: [7]

(i) General Service accounts on rate schedule RS 12xx were migrated to RS 15xx and RS 16xx rates on January 1, 2011

(ii) MGS accounts under RS 15xx that were transferred from the one part to the two-part rate on April 1, 2012 and April 1, 2013

(iii) The on-going migration of accounts between the MGS and LGS rates according to the migration rules in RS 15xx and RS 16xx

[7] The proration would have affected a small number of accounts that migrated between the SGS (RS 1220) and pre-existing LGS (RS 12xx) rates. The pre-existing LGS rate also had the 14,800 kWh energy threshold for Tier 1 energy rate.

The billing system proration method results in a higher Tier 1 energy threshold (>14,800 kWh) for accounts with more than 30 days and less than or equal to 33 days in the billing period, and a lower Tier 1 threshold for accounts with greater or equal to 27 days and less than 30 days in the billing period. This results in higher bills for the accounts in the first category and lower bills for the accounts in the second category, since the Tier 1 energy rate is higher than the Tier 2 energy rate. There also is an impact regarding the demand thresholds and demand proration which results in increasing the bills for some accounts than would otherwise be the case.

10.3.2.2 Revenue Impact

Table 13 shows the estimated revenue impact resulting from the events outlined in items (i) and (ii) above. The revenue impact is the total net impact inclusive of both energy and demand for all affected accounts. The overall total net impact is $1.31 million over-collection by BC Hydro. The largest impact occurred in January 2011 when all the LGS and MGS accounts were migrated from RS 12xx, which resulted in an estimated $1.08 million over-collection.

F2012 revenue for LGS and MGS classes combined is $910 million (see Table 1). Therefore, the 2011 LGS and MGS over-collection as a percentage of F2012 revenue is very small (less than 0.5 per cent).

Table 13 LGS and MGS Proration Billing Impact Summary

	Accts	kWh Impact ($)	kW Impact ($)	Total Impact ($)
2011 LGS	5,704	223,743	391,455	615,199
2011 MGS	16,498	402,437	63,126	465,563
2012 MGS 1	3,280	105,676	21,343	127,019
2013 MGS 2	12,864	97,610	9,619	107,229
Total	16,144	829,466	485,543	1,315,010

10.3.2.3 Bill Impacts

The billing system proration method results in a higher Tier 1 energy threshold for MGS and LGS accounts with a billing period of more than 30 days and less than or equal to 33 days and a lower Tier 1 energy threshold for accounts with a billing period greater or equal to 27 days and less than 30 days. Therefore, accounts in the first category will receive a bill increase and accounts in the second category will receive a bill decrease relative to if they were billed according to the BC Hydro Electric Tariff. There is also a bill impact as a result of the effect of the proration method on the demand threshold levels. Accounts that have a billing period outside the standard 27 to 33 days will not have a bill impact since the billing system proration methodology is consistent with the BC Hydro Electric Tariff in this circumstance.

A sample of 632 accounts was taken from the 2012 MGS transfer of accounts from the one part rate to the two-part rate (about 20 per cent of the total number of accounts). There were about 51 accounts (or 8 per cent of the total sample population), that had a billing period outside 27 to 33 days and were excluded from the billing analysis. This analysis provided the following distribution of bill impacts shown in Figure 2.

Figure 2 Distribution of Bill Impacts

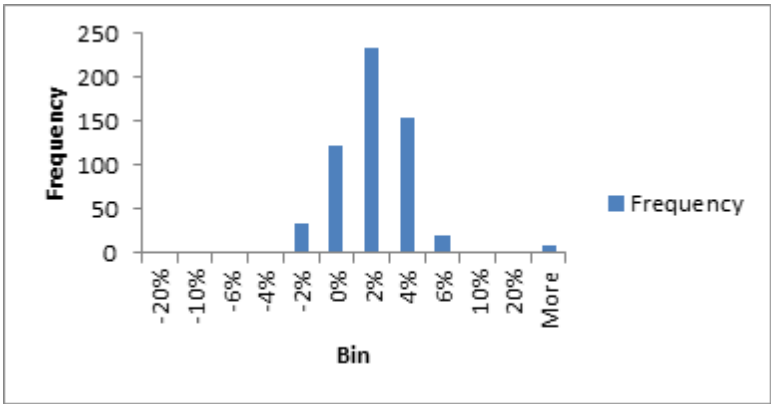


Table 14 Distribution of Bill Impacts - 2012 MGS Transfer to Conservation Rate

Bin	Frequency	% pop
<-20%	0	0.00
-20%<-10%	0	0.00
-10%<-6%	1	0.17
-6%<-4%	3	0.52
-4%<-2%	34	5.85
-2%<0%	123	21.17
0%<2%	233	40.10
2%<4%	154	26.51
4%<6%	21	3.61
6%<10%	2	0.34
10%<20%	2	0.34
More	8	1.38
	581	

Table 14 shows that 40 per cent of the remaining sample population had a bill increase between 0 per cent and 2 per cent and 26 per cent had a bill increase between 2 per cent and 4 per cent. Approximately 28 per cent of the sample population had a bill decrease. The average positive bill increase was 2.5 per cent which is on average $53 more than the correct average bill of $2,100 for the billing period.

10.3.2.4 Proposed Resolution of Billing Issue

The following summarizes the proration billing issue:

- The proration revenue impact was unintended and was primarily caused by BC Hydro introducing the LGS and MGS conservation rates to existing large general service customers. BC Hydro did not foresee this proration revenue impact at the time these rates were being introduced.
- BC Hydro did not systematically over-collect revenue from affected customers. Some accounts had a bill decrease, while other accounts had a bill increase. In addition, the calculated dollar impacts on customers are relatively small.

- The aggregate annual LGS and MGS revenue impact is relatively small

BC Hydro is not able to back-bill the difference for accounts that received a bill increase, as this would be very costly given the number of accounts and given that it would require manual billing. BC Hydro has amended current migration business practice so that accounts are transferred at the end of the billing period so that the billing system proration method is not an issue on a going forward basis. This has been implemented effective November 1, 2013.

In order to provide a longer term solution, BC Hydro will consider revising the LGS and MGS rates' energy and demand thresholds in the next rate design application so that the billing system would be able to prorate the thresholds on a daily basis when there is a rate schedule change.

10.4 TS No. 82

Paragraph 13 of the LGS NSA allows for customers who anticipate significant, permanent increases in energy consumption, as defined in Paragraph 13, to apply for relief from the two-part rate on a prospective basis.

TS No. 82, which was approved by the BCUC on December 13, 2011 and February 29, 2012, in Order Nos G-213-11 and G-22-12 respectively, describes the rules that apply to LGS customer applications for prospective growth adjustments under Paragraph 13 of the LGS NSA.

Table 15 shows that fifteen accounts have been billed under TS No. 82 and as of September 2013 eleven accounts remain under the program. Four accounts faced early termination since they did not meet the first year threshold growth requirement.

Table 15 Number of Accounts on TS No. 82

Start Year on TS No. 82	Number of Accounts	Early Termination	Remaining Number of Accounts (as of September 2013)
2011	4	None	4
2012	9	4	5
2013	2	None to date	2
Total	15	4	11

The average first year growth is 50 per cent (based on eight accounts) above the average annual energy consumption in the three-year period immediately prior to the customer application date. The aggregate first year bill savings for accounts on TS No. 82 is $518,804 and $559,693 in the second year. The average bill savings per account is $57,645 in the first year and $69,962 per account in the second year (both based on eight accounts).

BC hydro

Large General Service Rate Application

LGS and MGS Three-Year Report

Appendix A

Evaluation of the LGS and MGS Conservation Rates Calendar Years 2011 and 2012 (December 2013)

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Evaluation of the Large General Service and Medium General Service Conservation Rates Calendar Years 2011 and 2012

Revision 1

December, 2013

Prepared by:

BC Hydro

Power Smart Evaluation

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Executive Summary

Introduction

The purpose of this study is to provide a comprehensive evaluation of the impacts and customer response to BC Hydro's Large General Service (LGS) and Medium General Service (MGS) conservation rate structures for the period January 1, 2011 through December 31, 2012. The scope of this study includes electric energy conservation effects as well as customer understanding and experience with the LGS and MGS rates.

BC Hydro's LGS and MGS rate classes are made up of all BC Hydro accounts that purchase electricity at distribution voltage and have a monthly peak demand above 35 kW. MGS refers to general service accounts with a monthly peak demand that is equal to or greater than 35 kW but less than 150 kW, or whose energy consumption in any 12 consecutive periods is less than or equal to 550,000 kWh. LGS refers to general service accounts with a monthly peak demand equal to or greater than 150 kW, or whose energy consumption in any 12 month period is greater than 550,000 kWh.

This diverse group of customers includes a wide range of facility types, such as hospitals, manufacturing facilities, office buildings, retail, and the common areas of multi-unit residential buildings. The total electricity purchases of these rates classes was approximately 13,000 GWh in calendar year 2010, covering approximately 23,000 accounts.

Prior to the implementation of the conservation rate structures, LGS and MGS customers were all served under a declining block energy charge. Starting in January 2011, conservation rate structures were introduced that were designed to encourage customers to conserve electricity. Under the LGS and MGS rate conservation rate structure, this encouragement is provided through a bill credit when consumption is lower than historical average consumption, and an additional charge when consumption is higher.

To support the implementation of the LGS and MGS rates, BC Hydro undertook detailed consultations with relevant customers and conducted a variety of information and advertising activities. These activities included the development of a dedicated website, letters to customers, bill inserts, and online tools.

In order to evaluate the impact of the conservation rates, and with the approval of the British Columbia Utilities Commission, BC Hydro assigned 400 accounts to control groups before the implementation of the conservation rate structures. Two hundred accounts were drawn from the MGS population, and 200 from the LGS population. The control group accounts were maintained on the pre-existing rate but increased each year by the general rate increase. The remaining population of accounts (called the treatment groups in this report) started transition to the conservation rate structure on January 1, 2011.

LGS customers transitioned as one group to the conservation rate structure on January 1, 2011. MGS customers were divided into three groups for the purpose of transitioning to the conservation rate structure. The MGS1 treatment group started on an interim rate shaping stage on January 1, 2011 and transitioned to the conservation rate structure April 1, 2012. The MGS2 and MGS3 treatment groups started on an interim rate shaping stage in January 1, 2011, and transitioned to the conservation rate structure April 2013.

Approach

Table ES1.1 summarizes the evaluation objectives and research questions for this study.

Table ES 1.1. Evaluation Objectives and Research Questions

Evaluation Objective	Research Questions
1. Assess the effectiveness of the LGS and MGS control groups for the evaluation of energy savings.	1. Were the treatment and control groups equivalent in the year prior to the introduction of the conservation rate structures (calendar year 2010)? 2. Are the control groups representative of the treatment groups? 3. What is the relative precision of the control groups?
2. Estimate the energy and peak demand savings attributable to the LGS and MGS conservation rate structures.	1. What are the energy and peak demand savings due to the LGS conservation rate in 2011 and 2012? 2. What are the energy and peak demand savings due to the MGS rate shaping in 2011 and 2012? 3. What are the energy and peak demand savings due to the MGS conservation rate structure in 2012?
3. Assess customer awareness, understanding and acceptance of the LGS and MGS rate structures.	1. What is unaided awareness of the energy and demand charges? 2. Has there been a change in unaided awareness? 3. What is aided awareness of the energy and demand charges? 4. How easy or difficult is it to understand how the rate works? 5. How did customers first become aware of the conservation rate? 6. Which communication method did customers find most useful in understanding the rate? 7. What best reflects customers' understanding of the basis for the conservation rate? 8. How much support do customers have for the energy charge?
4. Assess customer response to the LGS and MGS conservation rate structures.	1. How much of an incentive to conserve do the energy and demand charges provide? 2. How easy or difficult is it for customers to manage their energy consumption? 3. How much of an effort do organizations put into minimizing energy charges? 4. What are the key enablers and barriers to energy conservation? 5. Is awareness of the conservation rate structure required for a conservation response?

Table ES1.2 summarizes, for each of the evaluation objectives, the evaluation data and methods used.

Table ES 1.2. Evaluation Objectives, Data and Methods

Evaluation Objective	Data	Methods
1. Assess the effectiveness of the LGS and MGS control groups for the evaluation of energy savings.	• BC Hydro billing data from January 2010 to December 2012 • Power Smart program tracking data • BC Hydro account data by region	• Statistical tests • Stratified sampling design analysis
2. Estimate the energy and peak demand savings attributable to the LGS and MGS conservation rate structures.	• BC Hydro billing data from January 2010 to December 2012	• Experimental design with randomized controlled trial • Difference-in-differences • Rate class average peak to energy ratio
3. Assess customer awareness, understanding and acceptance of the LGS and MGS rate structures.	• 2010 customer survey (n = 504) • 2012 customer survey (n = 421)	• Cross tabulations • Z-tests
4. Assess customer response to the LGS and MGS conservation rate structures.	• 2010 customer survey (n = 504) • 2012 customer survey (n = 421) • BC Hydro billing data from January 2010 to December 2012	• Cross tabulations • Z-tests • Analysis of variance • Regression

Results

Results for Objective 1: Effectiveness of Control Groups

Of the 400 control accounts assigned in 2010, 320 were found to still be valid at the time of this study. The other 80 accounts were lost from the control group either because of account closure, or migration to a different rate class as a result of significant changes in account consumption.

Effective control groups will be equivalent to their treatment groups on all factors that are expected to impact electricity consumption, with the exception of their electricity rate. Analysis of the factors listed below was completed in order to test the effectiveness of the control groups.

- Average electricity consumption in the year prior to conservation rate implementation.
- Distribution of consumption by percentile.
- Representation by major account sector (industrial, commercial, and multi-unit residential).
- Representation by region.
- Power Smart program participation.
- Relative precision.
- Potential for control group contamination resulting from accounts with parent corporations outside the control group.

The results indicate that the control groups are equivalent to their treatment groups on the basis of electricity consumption in the year prior to conservation rate implementation, and are representative of the treatment groups by account sector and region, at a 90 per cent confidence level. Further, the distribution of annual electricity consumption, and the level of Power Smart program participation were found to be similar between the control and treatment groups. The relative precision was found to be good for MGS control group and fair

for the LGS control group. Finally, control account consumption was not influenced as a result of having corporate parent or sister accounts in the treatment groups.

Results for Objective 2: Energy and Peak Demand Savings

Shown below are the combined energy and peak demand savings for the LGS and MGS conservation rate structures and MGS rate shaping, in calendar years 2011 and 2012. Evaluated net savings are statistically significant at the 90 per cent confidence level.

Table ES 1.3. Summary of Energy and Peak Demand Savings

Calendar Year	Cumulative Run Rate Energy Savings (GWh/yr)		Peak Demand Savings (MW)	
	Reported	Evaluated Net	Reported	Evaluated Net
2011	286	144	40	20
2012	616	200	86	28

All evaluated net savings resulted from the LGS conservation rate structure with no statistically significant savings from the MGS1 conservation rate or from rate shaping. Note these results are based on an analysis timeframe encompassing only 9 months with the LGS Part 2 price at the long-run marginal cost (LRMC),[1] and only 9 months of MGS1 customers being exposed to the conservation rate. An increasing response is observed for LGS customers over time, with relative savings increasing from 1.33 per cent in 2011 to 1.82 per cent of annual consumption in 2012.

Results for Objective 3: Customer Awareness, Understanding and Acceptance of their Rate Structures

Customers were asked about several dimensions of rate awareness. Unaided awareness was measured by asking survey respondents to identify their rate structure from a list of possibilities. About 33 per cent of LGS customers, 20 per cent of MGS1 customers, and 7 per cent of MGS2/3 correctly identified the structure of their energy charge. Aided awareness was much higher. Aided awareness was measured by describing their rate structure to survey respondents and then asking them whether they were previously familiar with it. Aided awareness was 81 per cent of LGS customers, 69 per cent of MGS1 customers and 30 per cent of MGS2/3 customers.

To examine ease of understanding of their rate, customers were provided with a detailed description of the conservation rate structure and then asked how easy or difficult they found it to understand. About 66 per cent of LGS customers said that it was very easy or somewhat easy to understand as did 70 per cent of MGS1 customers and 67 per cent of MGS2/3 customers.

Customers were asked if they support the rate. About 57 per cent of LGS customers indicated that they strongly or somewhat support the rate as did 45 per cent of MGS1 customers and 28 per cent of MGS2/3 customers.

[1] Part 2 refers to the credit / charge mechanism of the conservation rate structure. LRMC used in the context of the Part 2 rate refers to BC Hydro's Long Run Marginal Cost of electricity using the levelized weighted average plant-gate price for firm energy from BC Hydro's F2006 Call for Tenders (grossed up to account for line losses and inflation) as a proxy. The conservation rate design intent is for the Part 2 rate to be valued at the LRMC. A transitional value was temporarily applied to Part 2 starting January 2011 before moving it to LRMC in April 2012.

Results for Objective 4: Customer Response to the Conservation Rate Structures

Most customers felt that the rate had an impact on their energy conservation efforts. About 84 per cent of LGS customers said their rate had a major or a minor incentive effect, as did 70 per cent of MGS1 and 52 per cent of MGS2/3 customers.

To examine customers' ease of managing their accounts, customers were asked "assuming your organization wanted to do so, how easy or difficult is it to currently manage this account to minimize total energy charge on the bill?" Responses were similar across the three customer groups. About two-thirds of respondents indicated it would be very or somewhat difficult to respond, with the balance indicating it would be very or somewhat easy to respond.

Customers were asked about their major drivers of energy conservation. For all customer groups, the top three drivers of energy conservation were: "want energy costs to be as low as possible"; "right thing to do"; and "overall level of electricity prices". Responding to the conservation rate structure was cited as a driver of conservation for 35 per cent of LGS customer respondents.

Analysis of variance revealed that customers who are aware of the LGS or MGS conservation rates on an unaided basis have a higher mean annual consumption than customers who are not aware. Regression analysis indicated that awareness of the rate structure is not required for a conservation response.

Findings and Recommendations

The study has six key findings, which are summarized as follows.

1. The control groups closely matched the treatment groups in a number of important ways, and they are therefore valid and effective control groups for the purpose of evaluating the LGS and MGS rate structures. Significant control group attrition has already occurred. Twenty per cent of control accounts were lost over three years. The relative precision of the control groups, while fair overall, could be improved by increasing the number of large LGS control accounts.

2. Unaided awareness and understanding of the LGS and MGS rate structures were relatively low. Awareness and understanding increased significantly following an explanation of the conservation rate structures.

3. The top three drivers of energy conservation were: "want energy costs to be as low as possible"; "right thing to do"; and "overall level of electricity prices". Awareness of the conservation rate structure is not required for a conservation response.

4. The LGS rate structure resulted in energy savings of 144 GWh/yr by December 31, 2011, increasing to 200 GWh/yr by December 31, 2012. This is considerably less than forecast energy savings. Note the timeframe evaluated incorporated only 9 months of data with the Part 2 price at the

LRMC-based rate and the initial customer baselines[2] were set higher than they would be under normal operation of the rate.

5. There were no measurable savings for MGS rate shaping in 2011 and 2012.

6. There were no measurable savings for those MGS customers (MGS1) that transitioned to the conservation rate structure April 1, 2012. Note the timeframe evaluated included only 9 months of data with MGS1 customers exposed to the two-part conservation rate.

Listed below are recommendations related to the management of the LGS and MGS conservation rate structures (1-3) and the evaluation of the rate structures (4-7).

1. To promote a conservation response, focus communication and advertising on energy costs, "doing the right thing", and energy prices.

2. If customer awareness and understanding of the rate is of value, consider simplifying the rate structure or expanding advertising and communication efforts.

3. Revisit the forecast method in light of the variance between evaluated and forecast savings.

4. Consider using focus groups or structured interviews to better understand the mechanism by which customers respond to the rates, given the finding that awareness of the rate is not required for a conservation response.

5. Request approval of the British Columbia Utilities Commission to maintain existing control accounts and to assign a proportion of new accounts to control group status in order to preserve an effective control group for future evaluation of the LGS and MGS conservation rate structures.

6. Request approval of the British Columbia Utilities Commission to assign an increased proportion of new, large accounts to control group status, specifically LGS customers expected to have consumption above 6.5 GWh/yr.

7. Consider re-evaluating the conservation rate structures after all conservation rate design elements are fully implemented and customers have had time to respond to them.

Conclusions

The study conclusions are as follows.

1. The LGS rate structure is achieving its objective of encouraging conservation in the LGS rate class. However, evaluated savings achieved are significantly lower than forecast.

2. In 2012, the MGS rate structure had not yet achieved its objective of encouraging conservation in the MGS rate class.

[2] The conservation rate structure includes the setting of unique customer baselines. The baseline level is a determining factor in the calculation of the Part 2 Credit or Charge.

1.0 Introduction

1.1 Evaluation Scope

The purpose of this study is to provide a comprehensive evaluation of the impacts of and customer response to BC Hydro's Large General Service (LGS) and Medium General Service (MGS) conservation rate structures for the period January 1, 2011 through December 31, 2012. The scope of this study includes electric energy conservation effects as well as customer understanding and experience with the LGS and MGS rates.

1.2 Organization of the Report

Section 2 summarizes the Evaluation approach, Section 3 the Evaluation results, Section 4 summarizes the Findings and Recommendations and Section 5 presents the Conclusions. The Appendices include detailed description of the evaluation methodologies used for this study as well as additional results.

1.3 Initiative Description

BC Hydro's LGS and MGS rate classes are made up of all BC Hydro accounts that purchase electricity at distribution voltage and have a monthly peak demand above 35 kW. MGS refers to general service accounts with a monthly peak demand that is equal to or greater than 35 kW but less than 150 kW, or whose energy consumption in any 12 consecutive periods is less than or equal to 550,000 kWh. LGS refers to general service accounts with a monthly peak demand equal to or greater than 150 kW, or whose energy consumption in any 12 month period is greater than 550,000 kWh.

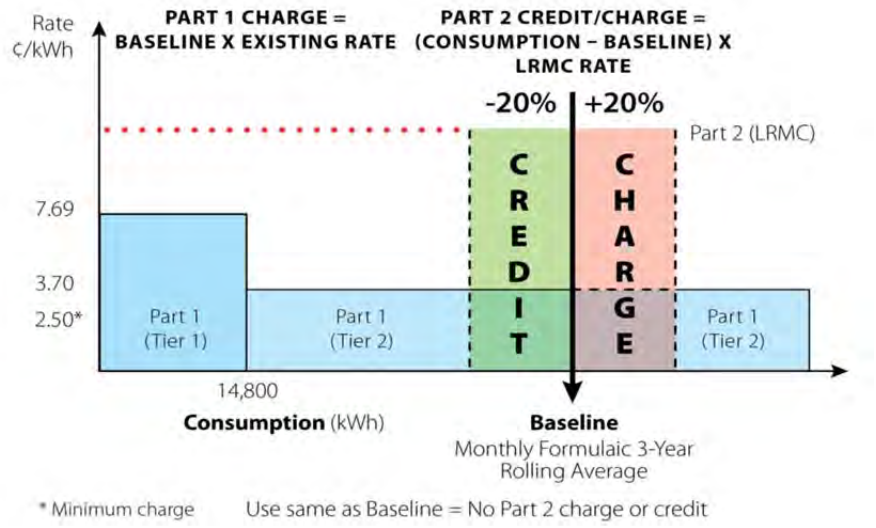
This diverse group of customers includes a wide range of facility types, such as hospitals, manufacturing facilities, office buildings, retail, and the common areas of multi-unit residential buildings. The total electricity purchases of these rates classes was approximately 13,000 GWh in calendar year 2010, covering approximately 23,000 accounts.

Prior to the implementation of the conservation rate structures, LGS and MGS customers were all served under a declining block energy charge (Rate Schedule 12xx). Starting in January 2011, conservation rate structures were introduced that were designed to encourage customers to conserve electricity. Under the LGS and MGS rate conservation rate structures, this encouragement is provided through a bill credit when consumption is lower than historical average consumption, and an additional charge when consumption is higher. Historical average consumption levels are determined through the creation of monthly baselines for each account based on a three year rolling average of consumption.

The LGS and MGS conservation rate structure design consists of two parts. For part 1, a higher (Tier 1) price applies to up to 14,800 kWh per billing period, and a lower (Tier 2) price applies to consumption beyond 14,800 kWh per billing period. Part 2 of the rate structure is the credit / charge mechanism. The customer receives a credit for energy savings of up to 20 per cent of their monthly baseline. The customer pays an additional charge for energy consumption up to 20 per cent greater than their monthly baseline. Credit or charges outside the -/+20 per cent price limit band is at the Part 1 rate.

Figure 1.1 provides an illustrative, graphical representation of the LGS conservation rate structure. Note that for the MGS rate, Part 1 is inverted, where the higher Tier 1 rate applies to the last 14,800 kWh of energy consumption up to a customer's baseline, and the lower Tier 2 rate applies to all consumption up to the baseline less 14,800 kWh.

Figure 1.1. LGS Conservation Rate Structure



Note: Prices are illustrative only and do not reflect actual RS16xx rates.

Both LGS and MGS rate structures went through transitional stages before stabilizing at the new conservation rate structure. For LGS, the transition included assigning a lower, interim value (6.68 cents/kWh) for the Part 2 credit and charge for the first fifteen months, before valuing it at the higher (9.42 cents/kWh) BC Hydro Long Run Marginal Cost of electricity (LRMC)[3] starting April 1, 2012. The transition also included setting the initial monthly baselines at the higher of average consumption from January 1, 2005 to December 31, 2007, or from July 1, 2007 to June 30, 2010. This has the effect of setting customer baselines higher than they otherwise would be until 2014, resulting in smaller Part 2 charges due to increases in consumption and/or larger Part 2 credits due to decreases in consumption, which could dampen any conservation impact of the rate. For MGS accounts, the transition included a rate shaping stage. Under rate shaping, the lower Tier 2 rate was gradually increased each year. The Part 2 credit / charge did not start to be applied to MGS accounts until April 2012. See Appendix B for a complete description of rate shaping and the full schedule of rates. Table 1.1 provides a brief history of the implementation of the LGS and MGS conservation rate structures.

[3] LRMC used in the context of the Part 2 rate refers to BC Hydro's Long Run Marginal Cost of electricity using the levelized weighted average plant-gate price for firm energy from BC Hydro's F2006 Call for Tenders (grossed up to account for line losses and inflation) as a proxy.

Table 1.1. LGS and MGS Conservation Rate Implementation Time Line

Date	Event
Oct 16, 2009	BC Hydro applied to its regulator, the BC Utilities Commission (BCUC) for approval of the LGS Rate Application including the creation of two new rate classes (LGS and MGS) and new energy conservation rate structures.
June 29, 2010	BCUC Order No. G-110-10 approved a modified two part conservation rate, a schedule for LGS transfer to the conservation rate structure, and separate schedule for MGS transfer. MGS accounts were divided into three groups (MGS1, MGS2 and MGS3). Approval was granted for the creation of a control group for the purpose of future rate evaluation.
Jan 1, 2011	Conservation rate structure implemented for the approximately 6,500 LGS accounts. LGS Part 2 price was set at a transitional value of 6.68 cents/kWh. MGS customer accounts start rate shaping. 400 control accounts maintained on the pre-existing rate structure.
April 1, 2012	Conservation rate structure in place for the first group of about 4,000 MGS1 customer accounts with peak demand > or equal to 85 kW. LGS Part 2 price increased to 9.42 cents/kWh to reflect BC Hydro LRMC.
August 30, 2012	BCUC Order G-115-12 approved BC Hydro's application to accelerate the MGS implementation schedule from April 1, 2014 to April 1, 2013 for MGS accounts with peak demand less than 55 kW and greater than or equal to 35 kW.
April 1, 2013	Conservation rate structure in place for the remaining MGS customer accounts, called MGS2/3, made up of about 12,500 accounts with peak demand > or equal to 35 kW and less than 85 kW

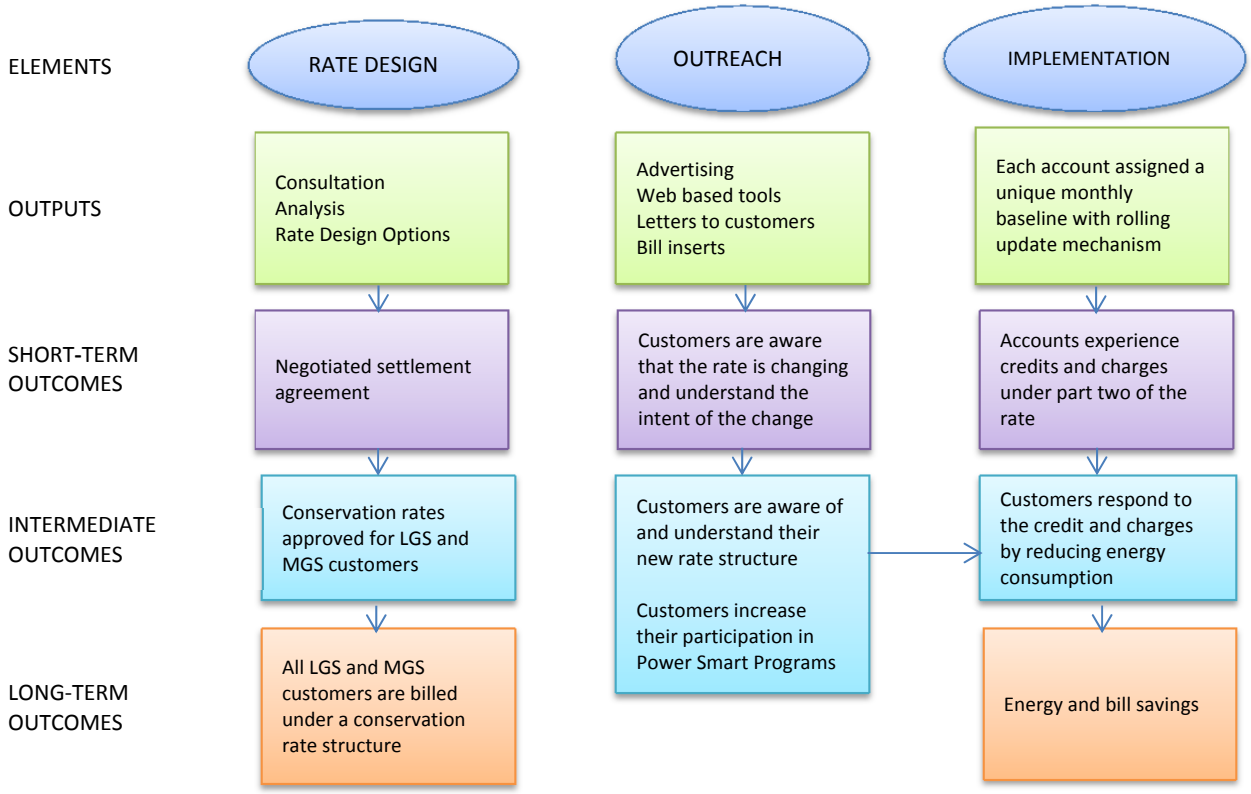
With approval of the BCUC, BC Hydro was able to randomly select and assign 400 accounts to a control group before the implementation of new conservation rates. Two hundred accounts were drawn from the MGS population, and 200 from the LGS population. These are called the control groups in this study, while the remaining accounts are called the treatment groups in this study. The control group accounts were maintained on the pre-existing rate (RS12xx) that increased each year by the general rate increase.

To support the implementation of the LGS and MGS rates, BC Hydro undertook detailed consultations with relevant customers and conducted a variety of information and advertising activities. These activities included the development of a dedicated website, letters to customers, bill inserts, and online tools. Additional information on these activities can be found in Appendix B.

The use of conservation rate structures is one of three tools used in BC Hydro's Demand Side Management ("DSM") Plan, the other two being the use of Power Smart programs and Codes & Standards. LGS and MGS customers participate in a range of Power Smart programs, and are subject to a variety of energy efficiency product and building codes.

The rationale for a conservation rate can be assessed in a variety of ways, but the most straight forward way is to build a logic model. A logic model divides a DSM initiative into its main elements, and then describes the outputs and outcomes associated with each element. For the LGS and MGS conservation rates the main elements were rate design, outreach to customers, and conservation rate implementation. The long-term outcomes are that all LGS and MGS customers are transitioned to the conservation rate structure, and that they are able to respond to its price signal thereby creating energy and bill savings.

Figure 1.2. Logic Model



2.0 Approach

2.1 Evaluation Objectives

A summary of the evaluation objectives and research questions for this study is shown below.

Table 2.1. Evaluation Objectives and Research Questions

Evaluation Objective	Research Questions
1. Assess the effectiveness of the LGS and MGS control groups for the evaluation of energy savings.	1. Were the treatment and control groups equivalent in the year prior to the introduction of the conservation rate structures (calendar year 2010)? 2. Are the control groups representative of the treatment groups? 3. What is the relative precision of the control groups?
2. Estimate the energy and peak demand savings attributable to the LGS and MGS conservation rate structures.	1. What are the energy and peak demand savings due to the LGS conservation rate in 2011 and 2012? 2. What are the energy and peak demand savings due to the MGS rate shaping in 2011 and 2012? 3. What are the energy and peak demand savings due to the MGS conservation rate structure in 2012?
3. Assess customer awareness, understanding and acceptance of the LGS and MGS rate structures.	1. What is unaided awareness of the energy and demand charges? 2. Has there been a change in unaided awareness? 3. What is aided awareness of the energy and demand charges? 4. How easy or difficult is it to understand how the rate works? 5. How did customers first become aware of the conservation rate? 6. Which communication method did customers find most useful in understanding the rate? 7. What best reflects customers' understanding of the basis for the conservation rate? 8. How much support do customers have for the energy charge?
4. Assess customer response to the LGS and MGS conservation rate structures.	1. How much of an incentive to conserve do the energy and demand charges provide? 2. How easy or difficult is it for customers to manage their energy consumption? 3. How much of an effort do organizations put into minimizing energy charges? 4. What are the key enablers and barriers to energy conservation? 5. Is awareness of the conservation rate structure required for a conservation response?

2.2 Methodology Review

A methodology review was completed covering conservation rate and energy program evaluations. Details of the review are included in Appendix C and a summary is provided here.

Thirteen third party evaluations of conservation rates were identified through search of relevant websites.[4] To be included, studies had to meet the following criteria: (1) customer group had to be business customers so

[4] Consortium for Energy Efficiency: cee1.org; International Energy Program Evaluation Conference: IEPEC.org; American Council for an Energy Efficient Economy: aceee.org.

residential rate studies were excluded; and (2) pricing scheme facing customers had to be multi-part so that customers faced at least two pricing periods or at least two pricing tiers. Review of the methodologies used revealed that all studies use some variation of the econometric demand modelling approach which produces an estimate of own price elasticity from which a conservation impact can be calculated. Two BC Hydro evaluations of the conservation impacts of the Transmission Service Rate (TSR) and Residential Inclining Block Rate (RIB) were also reviewed. These evaluations also relied on econometric demand modelling as the primary impact evaluation method. The method used in this study, experimental design with a randomized control trial, would not have been feasible for either of these evaluations because representative control groups were not available. Further, the relatively simple structure of BC Hydro's TSR and RIB Rate lend themselves more readily to econometric demand modelling than does the LGS and MGS conservation rate structures. Both the TSR and RIB rates are structured so that at any point in time, customers experience a constant marginal price. This is not true for the LGS and MGS conservation rate structures. No past evaluations of the LGS or MGS Conservation Rates have been undertaken.

Expansion of the methodology review to include energy program evaluation was required in order to find examples of the use of the experimental design method with a randomized control trial in the energy program evaluation field. While this method is common in medical and scientific fields, it is less common in energy program evaluation, because the creation of a control group is often not practical. Nine examples of experimental design with the use of randomized control trial were found in the evaluation of third party Residential sector behaviour change initiatives. For more information on these studies, see Appendix C.

Studies that include qualitative research on customer's response to electricity price typically rely on surveys of a sample of participants. Three third party studies were reviewed that used this method, including a U.S. national survey of customer response to time of use rates, an assessment of customers response to a time of use rate in Ontario, and a study of participation in and response to a time of use rate in California. Past BC Hydro rate evaluations have also used surveys, for example in the evaluation of the RIB, and for the evaluation of the TSR. The latter evaluation also used structured interviews to conduct qualitative research. Structured interviews are cost effective when the number of participants is relatively small, as is the case for the TSR Evaluation. They are also useful for exploring specific issues in greater depth than can be done through the use of surveys.

2.3 Methodology

Because of the availability of a valid control group, and the complexity of the LGS and MGS pricing scheme, experimental design was used to estimate quantitative impacts. Experimental design with a randomized control trial is considered the strongest research method across many fields because it controls for all factors aside from the treatment of interest. While econometric methods can also control for a range of factors, relative to experimental design they require the use of a larger number of professional assumptions, and a greater number and variety of data sources. For these reasons econometric methods commonly produce results with higher levels of uncertainty relative to a well-designed experimental method.

This evaluation study relies on surveys of a sample of customers for qualitative research into customers' responses to, and understanding of the LGS and MGS conservation rates. Surveys were used as the primary source of qualitative data because they provide a cost effective way to explore a number of research questions across a large population.

The objectives, data sources and methods used for this evaluation are summarized below.

Table 2.2. Evaluation Objectives, Data Sources and Methods

Evaluation Objectives	Data	Method
1. Assess the effectiveness of the LGS and MGS control groups for the evaluation of energy savings.	• BC Hydro billing data from January 2010 to December 2012 • Power Smart program tracking data • BC Hydro account data by region	• Statistical tests • Stratified sampling design analysis
2. Estimate the energy and peak demand savings attributable to the LGS and MGS conservation rate structures.	• BC Hydro billing data from January 2010 to December 2012	• Experimental design with randomized controlled trial • Difference-in-differences • Rate class average peak to energy ratio
3. Assess customer awareness, understanding and acceptance of the LGS and MGS rate structures.	• 2010 customer survey (n = 504) • 2012 customer survey (n = 421)	• Cross tabulations • Z-tests
4. Assess customer response to the LGS and MGS conservation rate structures.	• 2010 customer survey (n = 504) • 2012 customer survey (n = 421) • BC Hydro billing data from January 2010 to December 2012	• Cross tabulations • Z-tests • Analysis of variance • Regression

2.3.1 Methodology to Assess Control Group Effectiveness

The key to conducting a valid cause and effect analysis through experimental design is to construct a control group that is equivalent to the treatment group on all factors that impact the variable of interest in the base year period. For this study the variable of interest is energy consumption, and the base year is calendar year 2010, which is the year prior to the introduction of the conservation rate structures.

The Random Complete Block method was used to design the experiment and assign control accounts. Using this approach, accounts were separated into blocks before control accounts were randomly selected. The blocks included electricity demand, business type, and electricity consumption. Additional detail on the design of the control group can be found in Appendix C.

The following steps were used to assess the effectiveness of the control group:

1. Identify remaining valid control group accounts. Control group account attrition occurred because of account closures, as well as migration of accounts to different rate classes due to significant changes in account consumption in accordance with BC Hydro's Electric Tariff. Valid control accounts were defined as those accounts that remained on the pre-existing rate schedule and for which consecutive 3-year consumption data during 2010-2012 was available.

2. Test the remaining valid control group accounts for equivalency to the treatment groups on the following basis:

    a. Average base year consumption by rate class and demand classification.

    b. Average base year consumption by account sector.

    c. Average base year consumption by BC Hydro service territory region.

d. Base year consumption distribution by percentile (from 10% to 90%).

e. Two year Power Smart program participation rates.

3. Post-stratify the remaining valid control group accounts and estimate their relative precision. Post-stratification is a statistical method for assessing the variance of a sample[5], after the completion of an experiment, which can then be used to estimate relative precision. Relative precision provides an estimate of how closely the sample can predict the population.

4. Identify control accounts that have corporate parent and, or, sister accounts in the treatment groups (e.g., chain stores, government buildings). Test for control group contamination[6] at these sites by comparing their change in consumption to control accounts that are not associated with treatment accounts.

The primary data for the analysis was energy consumption and data on account characteristics obtained from the BC Hydro billing system and Power Smart program tracking systems, for the time period January 2010 through December 2012. The analysis was conducted on only those accounts with continuous electricity consumption records between January 2010 and December 2012.

2.3.2 Methodology to Estimate Energy and Peak Demand Savings

Energy and peak demand impacts were estimated through the following steps:

a. Define the base year as calendar year 2010, which was the year before implementation of the LGS rate structure and start of rate shaping for MGS customers. A length of one year is required in order to capture seasonal effects on electricity consumption.

b. Transform monthly consumption of control and treatment accounts to natural logarithmic form. Logarithmic transformation is required to meet one of the theoretical requirements of the difference-in-differences method (described below), which is normal distribution of consumption. See Appendix C for details on the difference-in-differences method, and Appendix D for details on the distributions of control and treatment accounts.

c. Calculate the average (mean) of the logarithm transformed consumption for each year for each of the treatment and control groups.

d. Apply the difference-in-differences method to the mean of the logarithm transformed consumption between 2011 and 2010 to estimate 2011 impacts. Difference-in-differences is an impact evaluation approach which relies on comparing the consumption between treatment and control accounts before and after the intervention, according to Equation 1.

[5] Variance is assessed by partitioning the population into distinct groups such that the variance of each group is minimized. For this study groups were selected on the basis of 2010 electricity consumption, across the entire rate class. Groups with larger variance will need a larger number of control accounts in order to reach a given precision level. Once the variance of each group was known, relative precision can be calculated based on the actual number of control accounts.

[6] Control group contamination occurs if the control group is influenced by the treatment, which could occur if head office directs energy management activities for a number of different sites, in a manner that is consistent with the assumption that all are under the conservation rate structures.

Equation 1

$$DDE = (Treatment_{Post} - Treatment_{Pre}) - (Control_{Post} - Control_{Pre})$$

Where,

The difference-in-differences estimator (DDE) is the estimation of the difference between the two groups

$Treatment_{Post}$ is the average outcome for the treatment group in the time period after the intervention

$Treatment_{Pre}$ is the average outcome for the treatment group in the time period before the intervention

$Control_{Post}$ is the average outcome for the control group in the time period after the intervention

$Control_{Pre}$ is the average outcome for the control group in the time period before the intervention

Additional details on the application of the difference-in-differences method for this evaluation are provided in Appendices C and D.

e. Apply the difference-in-differences method to the mean of the logarithm transformed consumption between 2012 and 2010 to estimate year 2012 savings.

f. Test the results of the difference-in-differences calculations for statistical significance using the bootstrapping method. The bootstrapping method allows for statistical tests of data that do not meet one of the standard statistical distributions, such as a normal distribution. For further information on bootstrapping see Appendix C. For details on the distribution of control and treatment accounts, see Appendix D.

MGS treatment accounts started rate shaping starting on January 1, 2011. MGS1 treatment accounts transitioned to the conservation rate structure fifteen months later on April 1, 2012. MGS2/3 treatment accounts transitioned to the conservation rate structure April 1, 2013 which falls outside the analysis timeframe for this study. In order to produce distinct estimates for the impact of rate shaping and the conservation rate structure, MGS1 and MGS2/3 accounts were analyzed together for the time period of calendar year 2011 and separately for calendar year 2012.

The primary data source for the analysis was energy consumption data and data on account characteristics obtained from the BC Hydro billing system and Power Smart program tracking systems. The analysis was conducted on only those accounts with continuous electricity consumption records between January 2010 and December 2012.

Peak demand savings were calculated by applying a peak-to-energy ratio of 0.139 MW/GWh. This ratio is calculated from a rate class load shape.

The method described above provides an estimate of evaluated net savings, on a cumulative run rate basis. [7] Electricity cross effects are accounted for within the evaluated savings results, to the extent that they exist,

[7] Run rate savings refers to the rate at which energy is saved at a given point in time, expressed in units of GWh/yr or kWh/yr. Cumulative run rate savings provides the annualized rate of all savings achieved since the start of the initiative.

through the use of account level billing data in the analysis. Natural conservation is accounted for through the use of a representative control group. In the context of energy savings resulting from a mandatory initiative such as a conservation rate, it may be reasonable to consider free ridership to be equivalent to natural conservation. Participant spillover could potentially occur if a customer was motivated by the conservation rate to implement energy conservation measures, and as a result of those actions discovered non-rate related benefits to installing additional measures, which they then pursued. Under these definitions, evaluated savings are net of free ridership, and include participant spillover to the extent it exists. The method is not able to provide stand-alone estimates of the magnitude of electricity cross effects, natural conservation, participant spillover, or price elasticity.

The LGS/MGS conservation rate structures are mandatory for all eligible general service accounts. The only non-participants that would otherwise be eligible are the control group accounts. Non-participant spillover could occur, if LGS/MGS customers are influenced by the conservation rate communication material to conserve energy at home, resulting in energy savings for residential accounts. An estimate of the extent of this type of non-participant spillover was not attempted.

Contamination of the control group, after implementation of the conservation rate structure is the main threat to the validity of this method and potential source of bias. Control group contamination can occur if control group accounts believe, incorrectly, that they are on the conservation rate structure, or if they respond to messaging designed to encourage conservation actions in response to the rate. The impact evaluation methodology does not control for unobservable factors such as beliefs. Survey analysis was used to determine the potential extent of control group contamination that could result from high levels of general awareness of the conservation rate structures. The analysis to test for the effectiveness of the control groups described in Section 2.3.1 was used to determine whether control group contamination had occurred for control accounts with corporate parents and, or, sister sites in the treatment groups (e.g., chain stores).

The influence of parallel DSM initiatives is controlled for in the same way as other exogenous factors, such as economic growth, through the design of a randomized control group that is exposed to the same factors as are the treatment group. The influence of Power Smart programs was tested for using the analysis described in the above section on assessing the effectiveness of the control groups.

2.3.3 Methodology to Assess Customer Awareness, Understanding, and Response

Detailed customer surveys of LGS and MGS customers were conducted prior to the implementation of the conservation rate in July 2010. In July 2012, 18 months after the implementation of the LGS rate, a second round of surveys was conducted. The survey was customized for the various rate groups.

The main steps in undertaking the surveys were as follows:

a. A draft survey instrument was prepared and reviewed with program stakeholders, then revised to include additional questions of interest;

b. A detailed sampling frame was built using information on the customer rate type and tier, and survey was programmed and pre-tested;

c. The surveys were fielded via the internet, with an incentive prize draw and customer reminders to increase the response rate; and

d. Data was cleaned and weighted, and cross tabulations were prepared.

With the permission of survey respondents, survey responses were linked to billing history in order to conduct analysis of variance and regression, to determine the relationship between responses and consumption.

A quasi-experimental design was used to assess the impacts on customer conservation actions. The LGS and MGS1 customers who were exposed to the conservation rate at the time of the customer survey in July 2012 are the treatment groups. The MGS2/3 customers who were not yet exposed to the conservation rate at the time of the survey in July 2012 are the comparison group.

2.4 Alternative Methodologies

Three alternative methods were considered for the evaluation of energy and demand savings: ARIMA modelling, Analysis of Covariance and estimation of own price elasticity. These methods were not selected because experimental design with randomized control trial was feasible and is recognized as the strongest methodology. A brief description of the alternative methods is provided below.

2.4.1 ARIMA

Autoregressive Integrated Moving Average Model (ARIMA) is a type of time series econometric analysis that recognizes the correlation in error terms to fit a regression model in order to predict electricity consumption. If successful, the ARIMA approach can provide estimates of impacts on a monthly basis. However, it is a complex method that relies on high quality input data and professional judgement. ARIMA modelling was considered and an ARIMA model was fitted for a subset of MGS accounts. This method was not pursued further because an experimental design with randomized control trial allows for a more straight forward approach that minimizes uncertainty and the potential for error.

2.4.2 ANCOVA

Analysis of Covariance (ANCOVA) is a widely used longitudinal modelling approach across scientific research fields. In an ANCOVA model, the base year measurement (i.e. calendar year 2010 electricity consumption) is included in the model as a predictor of future consumption after the intervention (i.e. the conservation rate structure). Other variables that are expected to influence electricity consumption, such as business sector and economic index levels, are also included in the model. Various ANCOVA models were attempted with post intervention annual consumption or logarithm of post intervention annual consumption as the dependent variable. None of the models were powerful enough to adequately explain the observed variations. This outcome is likely due to the wide diversity of business type and energy usage covered by the LGS and MGS rates.

2.4.3 Elasticity of Demand

Another potential alternative explored was to use econometric models of demand in relation to price in order to estimate own price elasticity, from which an estimate of the conservation impact can be calculated. As described in the Methodology Review section above and in Appendix C, elasticity-based methods are the most common rate impact evaluation method used in industry. The elasticity-based method was considered but not pursued because the existence of a control group allows for the use of the difference-in-differences method, which has the advantages of requiring few adjustments, assumptions and data inputs, all of which increase uncertainty and opportunity for error.

3.0 Results

3.1 Results for Effectiveness of the Control Groups

The control groups were reviewed to determine whether it accurately represents the rate class. Of the 400 control accounts assigned in 2010, 320 were found to still be valid at the time of this study. The other 80 accounts were lost from the control group either because of account closure, or migration to a different rate class as a result of significant changes in account consumption.

Shown below is the number of treatment and control group accounts, as well as their base year (calendar year 2010) average annual consumption, and standard deviation[8] of consumption for each rate and class group. The observed difference of energy usage between treatment and control groups are not statistically significant at the 90 per cent confidence level. These results indicate that control and treatment accounts were statistically equivalent on the basis of mean annual consumption in the base year.

Table 3.1. Mean Base Year Consumption and Number of Accounts for Control and Treatment Groups, by Rate Class

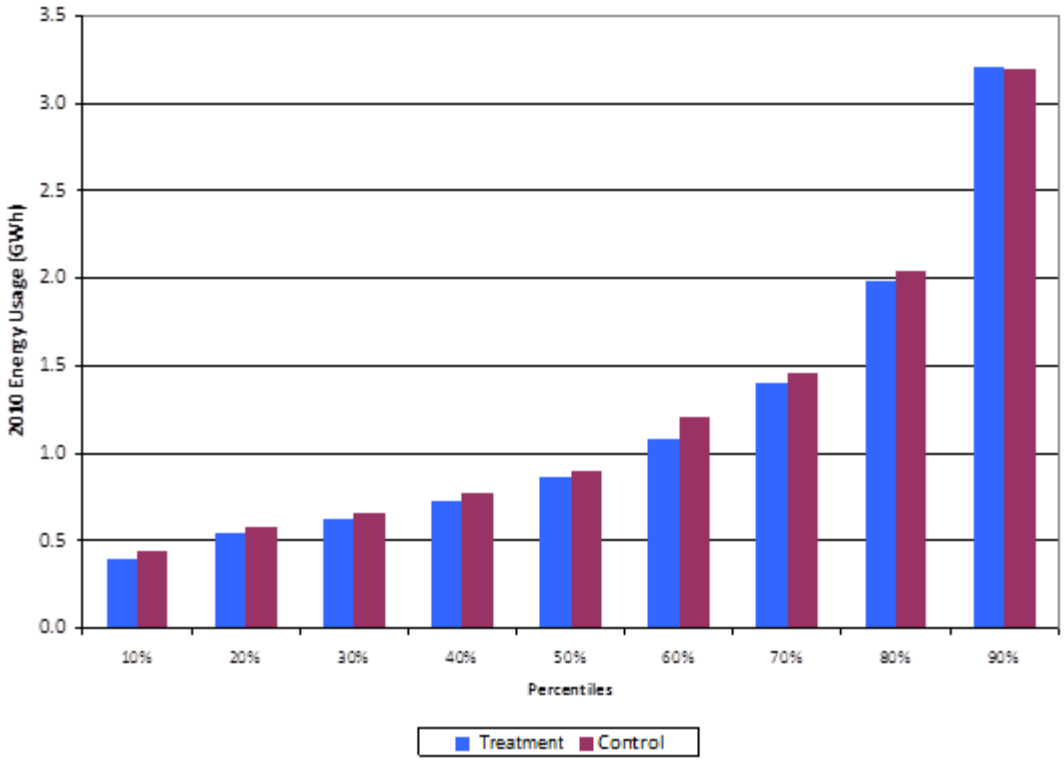
Group		Number of accounts	Mean Annual Consumption (GWh)	Standard deviation (GWh)
LGS Treatment		5,465	1.686	2.995
LGS Control		176	1.791	3.014
	Difference		-0.105*	
MGS1 Treatment		3,117	0.305	0.126
MGS1 Control		40	0.286	0.117
	Difference		0.019*	
MGS2/3 Treatment		9,838	0.182	0.092
MGS2/3 Control		104	0.192	0.097
	Difference		-0.01*	
Total Treatment		18,420	N/A	N/A
Total Control		320	N/A	N/A

*: Not statistically significant at the 90% confidence level.

[8] The standard deviation provides a measure of the variability in base year electricity consumption across all accounts in a group, relative to the average consumption for that group.

The figure below shows 2010 energy consumption by percentiles[9] for the LGS treatment and control groups. Control group accounts are found at each percentile level, and their consumption by percentile is similar to that of the treatment group. This suggests that the control group consumption is distributed similarly to that of the treatment group, and thus provides a reasonable representation of the energy consumption of the treatment group, despite the control group's relatively small size. Similar results are found for the MGS control and treatment groups, and are presented in Appendix D. Additional findings related to the distribution of the control and treatment accounts are also presented in Appendix D.

Figure 3.1. Annual Consumption for LGS Control and Treatment Groups in 2010, by Consumption Percentile



Energy usage of the LGS control group in the base year of 2010 was compared with the treatment group by account sector. These results are shown on the following page. Differences in mean consumption were found to be not statistically significant at the 90 per cent confidence level. These results indicate that the LGS control and treatment groups were equivalent on the basis of mean annual consumption by account sector, in the base year. The same results were found when this analysis was completed on MGS accounts (See Appendix D).

[9] Percentiles show how much of the population falls below (or above) a certain value. To illustrate, in the figure above, 10% of treatment and control accounts have annual consumption below approximately 0.45 GWh (see the 10% column), while 90% of control and treatment accounts have consumption below approximately 3.2 GWh (see the 90% column). An effective control group will have a similar percentile distribution as its treatment group.

Table 3.2. Mean Base Year Consumption and Number of Accounts for LGS Control and Treatment Groups, by Account Sector

Account Sector	Number of Accounts		Mean Annual Consumption (GWh)		Difference
	Treatment	Control	Treatment Accounts	Control Accounts	
Commercial	3,476	112	1.581	1.535	0.046*
Industrial	1,746	55	1.991	2.405	-0.414*
Residential	243	9	0.978	1.218	-0.240*

*Not statistically significant at the 90% confidence level.

Mean base year consumption for the LGS treatment and control accounts by region was also analyzed, and these results are presented below. As shown, the differences in mean annual energy consumption are not statistically significant, at 90 per cent confidence level, for any of the regions. These results indicate that mean base year consumption of LGS control and treatment accounts are equivalent on a regional basis.

Table 3.3. Mean Baseline Year Consumption for LGS and Control Group in 2010 by Region

Region	Number of Accounts		Mean Annual Consumption (GWh)		Difference
	Treatment	Control	Treatment	Control	
Lower Mainland	3,587	112	1.751	1.925	-0.174*
North	466	11	3.796	2.159	1.637*
Southern Interior	557	18	1.477	1.955	-0.478*
Vancouver Island	855	35	1.440	1.279	0.161*

*Not statistically significant at 90% confidence level.

LGS and MGS customers participate in a range of Power Smart program offers that can impact their energy consumption. Under or over-representation of program participation by control group customers would distort the results of this evaluation. Two year (2011 to 2012) program participation rates of the control and treatment groups were compared. Similar levels of program participation were found for both the treatment and control accounts. For example, 19 per cent of LGS treatment accounts had participated in a Power Smart Program offer, as had 20 per cent of control accounts. Full results are included in Appendix D.

Precision of a sample design indicates how closely a sample estimate approximates the true value for the corresponding population. It is usually measured by relative precision – the expected error bound of an estimator at a certain confidence level over the expected value of this estimator. The lower the relative precision is the more precise a sampling design is. The industry standard acceptable value for energy program evaluation is 20 per cent or better[10]. Relative precision for the remaining valid LGS control accounts was calculated and found to be 15 per cent overall, indicating that the LGS control group consumption predicts the treatment group consumption within 15 per cent. Similar analysis for the MGS control group found an overall relative precision of 2 per cent. These results indicate that the control group is a good predictor of consumption for MGS accounts, and a fair predictor of consumption for LGS accounts. LGS control group

[10] See EM&V Protocols and Requirements, Ontario Power Authority, March 2011; AVISTA Utilities EMV Framework September 2010 for examples.

relative precision could be improved by increasing the number of large LGS accounts in the control group. Detailed results are included in Appendix D.

If account holders in the control groups incorrectly believe that they are served under the conservation rate structure, then control group contamination has occurred, and this evaluation method will underestimate energy savings. Corporations that have multiple sites (e.g., supermarket chains or hotels), including at least one in the control groups and the remaining in the treatment groups, pose a risk of control group contamination resulting from centralized energy management efforts. Analysis was completed to test for this type of control group contamination. Year over year change in electricity consumption was analyzed for control accounts with and without sister accounts under the same parent company in the treatment groups. No evidence of control group contamination was found. For detailed results, see Appendix D.

3.2 Results for Energy and Demand Savings

The calculations and results are stepped through below for the LGS conservation rate savings impacts, and also summarized in the tables that follow. Numbers are rounded for the purpose of presentation here, which results in some discrepancies between the actual and presented calculations.

Let $Treatment_{post}$ and $Treatment_{pre}$ denote the consumption for the LGS treatment accounts in the year of interest and in the base year 2010, respectively. $Control_{post}$ and $Control_{pre}$ denote the consumption for the LGS control accounts in the year of interest and in 2010. Using Equation 1 and the average of the natural logarithms of consumption, the difference-in-differences estimator (DDE) is calculated as follows:

$$DDE = (ln(Treatment_{Post}) - ln(Treatment_{Pre})) - (ln(Control_{Post}) - ln(Control_{Pre}))$$

$$For\ 2011:\ DDE = (13.8222 - 13.8182) - (13.9112 - 13.8938)$$

$$0.004 - 0.0174 = -0.0134$$

$$For\ 2012:\ DDE = (13.8063 - 13.8182) - (13.9003 - 13.8938)$$

$$-0.0119 - 0.0065 = -0.0184$$

Since the treatment and control groups were shown to have no systematic difference on extraneous variables, it is reasonable to assume that the pre-existing difference $ln(Treatment_{Pre}) - ln(Control_{Pre})$ between the two groups would remain constant over time without the conservation rate. A counterfactual outcome of LGS treatment group, which indicates what LGS treatment group's consumption would have been had it not been exposed to the conservation rate, can be estimated as $ln(Treatment_{Pre}) - ln(Control_{Pre}) + ln(Control_{Post})$.

When using the average of the natural logarithms the difference-in-difference estimator, DDE, provides a measure of the true impact of LGS conservation rates intervention by comparing the actual outcome of LGS treatment group with its counterfactual.

Re-arranging terms in Equation 1, DDE can also be simplified and written in the following way:

$$DDE = ln(Treatment_{Post}) - \{ln(Treatment_{Pre}) - ln(Control_{Pre}) + ln(Control_{Post})\}$$

$$= ln(Treatment_{Post}) - ln(Counterfactual)$$

Using the rules of logarithms:

$$DDE = ln(\frac{Treatment}{Counterfactual})$$

Taking the exponential function of both sides,

$$e^{DDE} = \frac{Treatment}{Counterfactual}$$

To show the change in the treatment relative to the counterfactual, this can also be written as,

$$\frac{(Counterfactual - Treatment)}{Counterfactural} = 1 - e^{DDE}$$

For 2011: Relative Savings in LGS treatment group = 1 - $e^{(-0.0134)}$ = 1.33%

For 2012: Relative Savings in LGS treatment group = 1 - $e^{(-0.0184)}$ = 1.82%

Finally, energy savings are calculated by applying the relative savings as follows. There were 6,431 active LGS treatment accounts as of December 31, 2011. Their actual total consumption for calendar year 2011 was 10,507 GWh, which includes partial year consumption for some new accounts. Their run rate consumption in 2011 was estimated as 10,666 GWh/yr by extrapolating incomplete consumption for new accounts using the average load shape of existing accounts. The consumption that would have occurred in the absence of the conservation rate was calculated as: 10,666 GWh/yr *(1.0133) = 10,810 GWh/yr.

Similarly, the run rate consumption for the 6,597 active LGS treatment accounts as of Dec 31, 2012 was 10,803 GWh/yr, and the consumption that would have occurred in the absence of the conservation rate was calculated as: 10,803 GWh/yr *(1.0182) = 11,003 GWh/yr.

Energy savings in 2011 = 10,810 GWh/yr – 10,666 GWh/yr = 144 GWh/yr

Energy savings in 2012 = 11,003 GWh/yr – 10,803 GWh/yr = 200 GWh/yr

Table 3.4. Cumulative Run Rate Savings from the LGS Conservation Rate in 2011 and 2012

Calendar Year	Average of Log of Account Consumption		Difference	DD Estimator	Relative Savings	Energy Savings (GWh/yr)
	Treatment	Control				
Base Year 2010	13.8182	13.8938	-0.0756			
2011	13.8222	13.9112	-0.0890	-0.0134	1.33%	144*
2012	13.8063	13.9003	-0.0940	-0.0184	1.82%	200*

*Statistically significant at 90% confidence level.

The same method was used to calculate whether savings occurred as a result of rate shaping for MGS accounts in 2011. No savings were measurable at the 90 per cent confidence level.

Table 3.5. Cumulative Run Rate Savings from the MGS1/2/3 Rate Shaping Savings in 2011

Calendar Year	Average of Log of Account Consumption		Difference	Energy Savings (GWh/yr)
	Treatment	Control		
Base Year 2010	12.0926	12.1458	-0.0532	
2011	12.1101	12.1503	-0.0402	Not statistically significant*

*No statistically significant difference in energy usage changes between two groups at 90% confidence level.

Likewise, no savings were measureable for the MGS2/3 accounts due to rate shaping in 2012.

Table 3.6. Cumulative Run Rate Savings from MGS2/3 Conservation Rate Shaping in 2012

Calendar Year	Average of Log of Account Consumption		Difference	Energy Savings (GWh/yr)
	Treatment	Control		
Base Year 2010	11.9625	12.0231	-0.0606	
2012	11.9609	12.0156	-0.0547	Not statistically significant*

*No statistically significant difference in energy usage changes between two groups at 90% confidence level.

Likewise, no savings were measurable due to the MGS conservation rate structure introduced April 1, 2012.

Table 3.7. Cumulative Run Rate Savings from the MGS Conservation Rate in 2012

Calendar Year	Average of Log of Account Consumption		Difference	Energy Savings (GWh/yr)
	Treatment	Control		
Basel Year 2010	12.5032	12.4653	0.0379	
2012	12.5074	12.4604	0.0470	Not statistically significant*

*Not statistically significant difference on energy usage changes between two groups at 90% confidence level

Summary results are shown below, including both energy and peak demand savings for both LGS and MGS.

Table 3.8. Summary of LGS and MGS Energy and Demand Savings

Calendar Year	Cumulative Run Rate Energy Savings (GWh/yr)		Peak Demand Savings (MW)	
	Reported	Evaluated	Reported	Evaluated
2011	286	144	40	20
2012	616	200	86	28

All evaluated savings resulted from the LGS rate with no statistically significant savings from the MGS1 conservation rate or from rate shaping. An increasing response is observed for LGS customers over time, with relative savings increasing from 1.33 per cent in 2011 to 1.82 per cent in 2012.

Note the analysis timeframe incorporates the initial 15 months after the LGS implementation with the transitional Part 2 rate, with only the final 9 months with the LGS Part 2 price at the LRMC-based rate. Also recall the initial baselines for LGS customers were set higher than they would be under the normal operation as discussed in Section 1.3. MGS1 customers had been on the conservation rate for only nine 9 months of the analysis timeframe.

3.3 Results for Customer Awareness, Understanding and Acceptance of the Rate Structures

Survey responses by customer group are shown below.

Table 3.9. Survey Response Rates and Margins of Error at 95% Confidence Level

	2012 Survey				2010 Survey		
Customer Group	**LGS**	**MGS1**	**MGS2/3**	**Total**	**LGS**	**MGS**	**Total**
Total Valid Responses	156	118	147	421	213	291	504
Maximum margin of error	+/- 7.7%	+/- 8.9%	+/- 8.0%	+/- 4.7%	+/- 6.6%	+/- 5.7%	+/- 4.3%

3.3.1 Customer Awareness

To examine customer unaided awareness of their energy charge, customers were asked "*please indicate which one of the following types of energy charges (for kWh usage) you believe applies to this account*". At the time of the survey in 2012, LGS customers had been on the two part conservation rate for about 18 months, MGS1 customers had been on the conservation rate for about six months, and MGS2/3 customers were still undergoing rate shaping under a declining block charge. To ensure the respondent understood the question, a schematic and short description of each rate structure option was provided (See Appendix E for the survey instruments). About 33 per cent of LGS customers, about 20 per cent of MGS1 customers, and about 7 per cent of MGS2/3 customers correctly knew the structure of their energy charge at the time of the survey.

Table 3.10. Unaided Awareness of Energy Charge in 2012

	Shares (%)		
	LGS	**MGS1**	**MGS2/3**
Flat energy charge	11	20	33
Inclining block energy charge	36	35	31
Declining block energy charge	5	6	7
Conservation rate structure[11]	33	20	4
Other	-	-	1
Don't know/not sure	15	19	24
Total	**100%**	**100%**	**100%**

[11] In this section of the survey, this was referred to as the "declining block energy charge with historical adjustment" so as to position it in the same manner as the other energy charges.

In each of the 2010 (base year) and 2012 (post-implementation) surveys, LGS customers were asked what type of energy charge they believed applied to this account. In 2010 LGS customers were on a declining block rate structure. The share of customers who were aware of their rate structure remained relatively constant, at 32 per cent in 2010 and 33 per cent in 2012, and the difference in unaided awareness is not statistically significant.[12]

Table 3.11. Change in Unaided Awareness of Energy Charge from 2010 to 2012

	LGS 2010 (%)	LGS 2012 (%)	Difference (%)	Z-value	Probability
Flat energy charge	22	11	-11	2.89	0.002
Inclining block energy charge	28	36	8	-1.61	0.05
Declining block energy charge (2010) or conservation rate structure (2012)	32	33	+1	-0.16	0.44
Don't know/not sure	18	15	-3	0.75	0.23
Declining block energy charge (2012)	N/A	5	N/A	-	-
Total	**100%**	**100%**	**-**		

To assist customers in providing informed answers on energy charge awareness, surveyed customers were given descriptions of their energy charge structures. After seeing this information, about, 81 per cent of LGS customers, and 69 per cent of MGS1 customers correctly indicated that they were on the conservation rate structure, while about 30 per cent of MGS2/3 customers correctly indicated that they were on a declining block rate structure.

Table 3.12. Aided Awareness of Energy Charge in 2012

	Shares (%)		
	LGS	MGS1	MGS2/3
Prior to this survey, I was aware that BC Hydro charges this Account on this conservation rate (*or declining block for MGS2/3 respondents*) structure	33	20	11
Now that it has been mentioned, I had heard that BC Hydro charges this Account on this conservation rate (*or declining block for MGS2/3 respondents*) structure	48	49	19
This is the first time that I have heard that this Account is charged on this conservation rate (*or declining block for MGS2/3 respondents*) structure	13	27	60
Don't know	6	4	10
Total	**100%**	**100%**	**100%**

The LGS and MGS1 customers with aided awareness of the conservation rate were asked "*how did you first become aware of this conservation rate*?" For LGS customers, the main sources of awareness in declining order were the BC Hydro representative, E-mail notification and letter via Canada Post. For MGS1 customers, the main sources of awareness in declining order were letter via Canada Post, E-mail notification and the BC Hydro representative.

[12] Values in the probability column indicate the probability that two outcomes are equivalent.

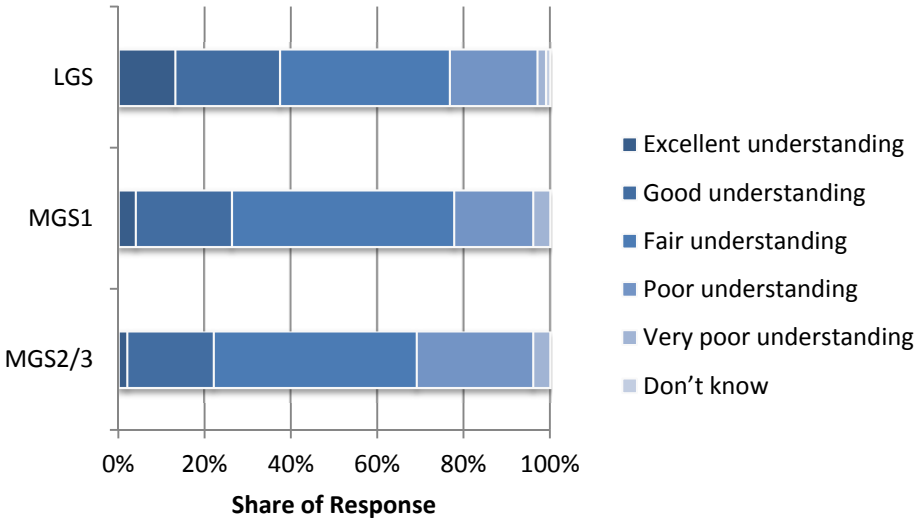
Table 3.13. Source of Awareness of the Conservation Rate in 2012

	LGS	MGS1
BC Hydro representative	28	18
E mail notification	23	23
Letter via Canada Post	11	25
BC Hydro newsletter	9	7
Word of mouth	8	9
BC Hydro website	5	2
Energy consultant	-	2
BC Hydro bill	3	5
Other	3	-
Don't know	10	9
Total	**100%**	**100%**

3.3.2 Rate Understanding

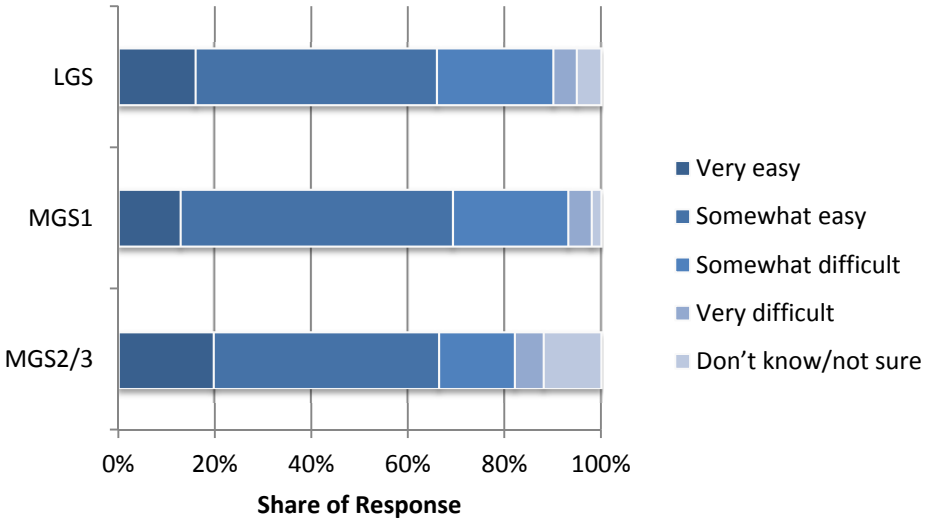
To examine customer level of understanding of their rate, LGS and MGS1 customers with aided awareness of the conservation rate were asked "*how well an understanding would you say you actually had prior to receiving this survey about the conservation rate that BC Hydro uses for charging this account?*" About 37 per cent of LGS customers and about 26 per cent of MGS1 customers said that they had an excellent or good understanding of their conservation rate. MGS2/3 customers with aided awareness of the conservation rate were asked "*how well an understanding would you say you actually had prior to receiving this survey about the declining block rate that BC Hydro uses for charging this account*?" About 22 per cent of MGS2/3 customers said that they had an excellent or good understanding of their rate.

Figure 3.2. Level of Rate Understanding



To examine ease of understanding of their rate, all customers were provided with a detailed description of the rate covering the baseline calculation, part one structure and part two credit / charge structure. They were then asked "*having read a little more about the conservation rate, how easy or difficult would you say it is to understand how the rate works*?" Responses were similar across the three customer groups. About 66 per cent of LGS customers said that it was very easy or somewhat easy. About 70 per cent of MGS1 customers said that it was very easy or somewhat easy. About 67 per cent of MGS2/3 customers said that it was very easy or somewhat easy to understand after being given the description.

Figure 3.3. Ease of Understanding of the Conservation Rate



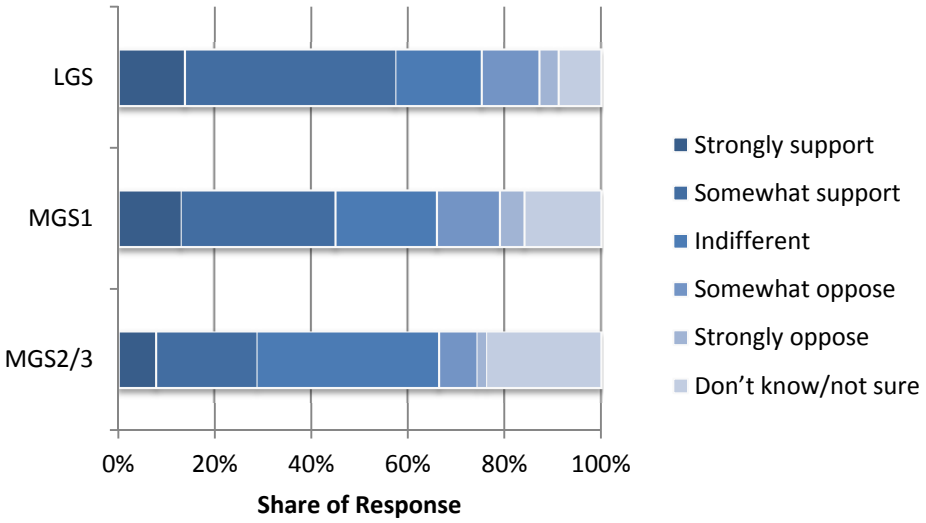
To examine understanding of the basis for the conservation rate, LGS and MGS1 customers with aided awareness of the conservation rate were asked "*thinking about the higher price that is applied to part 2 credits or charges, which one of the following best reflects your understanding of the basis for the price*?" About 67 per cent of LGS customers selected "*to reward customers who use less energy*" and 30 per cent of LGS customers selected "*to reflect BC Hydro's costs.*" About 63 per cent of MGS1 customers selected "*to reward customers who use less energy*" and 30 per cent of MGS1 customers selected "*to reflect BC Hydro's costs*."

Table 3.14. Perceived Basis for the Rate

	Shares (%)		
	LGS	**MGS1**	**MGS2/3**
To reward customers who use less energy than their base line and to penalize those who use more	67	63	NA
To reflect BC Hydro's costs to secure or save this additional energy	30	30	NA
Don't know	2	7	NA
Total	**100%**	**100%**	**NA**

To examine customer support for the rate, customers were asked "*overall, does your organization support or oppose the rate that applies to this Account, or is it indifferent to it*?" About 57 per cent of LGS customers strongly or somewhat support their rate, 45 per cent of MGS1 customers strongly or somewhat support their rate, and 28 per cent of MGS2/3 customers strongly or somewhat support their rate. At the time of the survey LGS and MGS1 customers were on conservation rates and MGS2/3 customers were undergoing rate shaping.

Figure 3.4. Support for the Rate

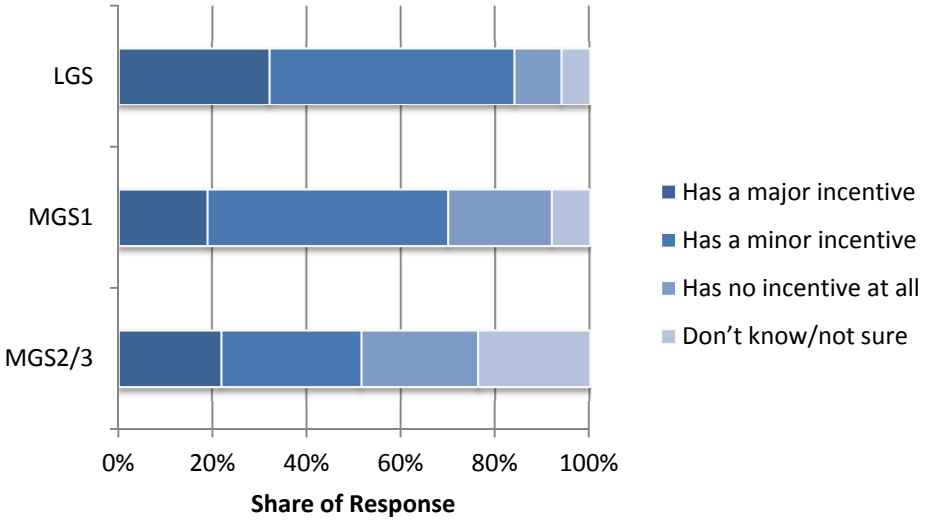


3.4 Results for Customer Response to the LGS and MGS Conservation Rate

3.4.1 Incentive Effects

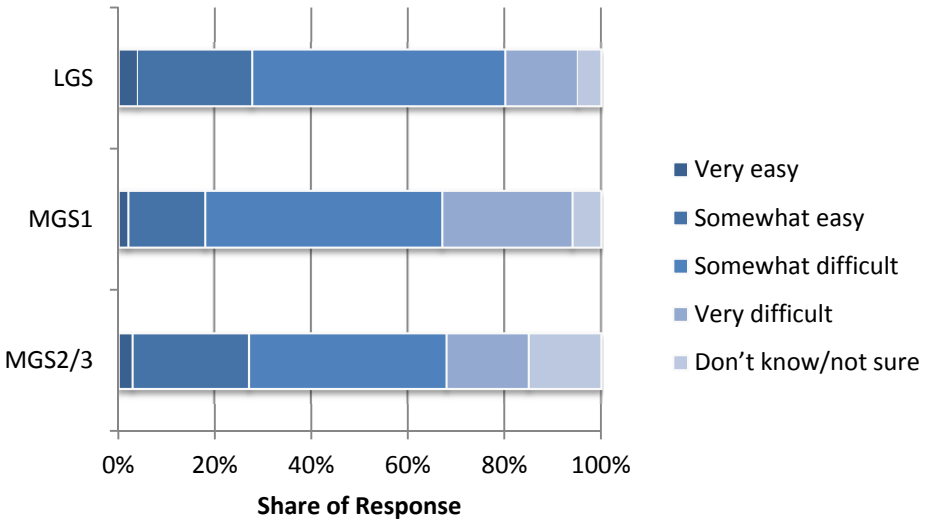
To examine incentive effects of the energy charge, LGS and MGS1 customers were asked "*Thinking about the conservation rate…how much of an incentive does this… energy charge have on … efforts to minimize electricity bills,*" and MGS2/3 customers were asked "*thinking about the declining block rate, how much of an incentive does this energy charge have on … efforts to minimize electricity bills*." About 84 per cent of LGS customers, 70 per cent of MGS1 customers and 52 per cent of MGS2/3 customers said the rates had a major or a minor incentive.

Figure 3.5. Incentive Effects of Energy Charge



To examine customer ease of managing their account, customers were asked "*assuming your organization wanted to do so, how easy or difficult is it to currently manage this account to minimize total energy charge on the bill?*" Responses were similar across the three customer groups. About two-thirds of respondents indicated it would be very or somewhat difficult to respond, with the balance indicating it would be very or somewhat easy to respond.

Figure 3.6. Ease of Minimizing Energy Charge



3.4.2 Conservation Drivers and Barriers

Customers were asked what were the major factors or drivers in managing their energy use. For all customer groups, the most frequently cited drivers or enablers of energy conservation were: "*want energy costs to be as low as possible*"; "*right thing to do*"; *and* "*overall level of electricity prices*". Responding to the conservation rate structure was cited as a driver of conservation for 35 per cent of LGS customer respondents.

Table 3.15. Percent of Survey Respondents Assessing Various Factors as Major Drivers

	Shares (%)		
	LGS	MGS1	MGS2/3
Want operating costs to be as low as possible	83	76	72
Right thing to do	54	44	48
Overall level of electricity prices	52	40	55
Incentive to save electricity built into rate	35	21	21
Need for more cost cutting measures	32	24	34
Decrease pay-back time of capital investments	28	30	17
Suppliers and customers want us to conserve electricity	27	19	6
Overall level of natural gas prices	24	14	16
Our employees want us to conserve electricity	19	28	15

Customers were asked what were major factors or barriers in managing energy use. For all customers groups, the most frequently cited major barriers were "*other operational priorities*" "*lack of access to funds for investment*"; "*insufficient payback*"; and "*lack of financial incentives for conservation*".

Table 3.16. Percent of Survey Respondents Assessing Various factors as Major Barriers

	Shares (%)		
	LGS	MGS1	MGS2/3
Other operational priorities	44	37	38
Lack of access to funding for investment	39	33	27
Insufficient payback	37	20	37
Lack of financial incentives for conservation	22	22	38
Lack of knowledge of where the opportunities for savings might be	21	15	25
Can't control employees' behaviour in regards to energy efficiency practices	18	11	14
Lack of staffing/staffing requirements	17	20	7
Takes too much time	15	11	10
Current energy use near lowest possible level	15	16	18
Lack of executive support	9	6	4

3.4.3 Relationship between Awareness, Consumption and Savings

Customers that are aware of the LGS or MGS conservation rates on an unaided basis have a higher mean annual consumption than customers who are not aware, as shown in the following table.

Table 3.17. Relationship of Awareness to Consumption

	Number of Respondents	2012 Mean Annual Consumption (GWh)
Not aware	361	0.705
Aware	60	1.589
Total	**421**	**0.830**

Further analysis was completed to understand whether awareness of the conservation rate resulted in energy savings. Regression analysis was completed for three groups of customers: LGS treatment accounts that were aware of the rate, LGS treatment accounts that were not aware of the rate, and LGS control accounts.

The analysis showed that LGS treatment accounts that were not aware of the rate managed to have a slightly better conservation performance than those who were, which indicates that awareness of the conservation rate structure is not required in order to produce a conservation response. See Appendix D for further details.

3.5 Confidence and Precision

The table below summarizes key findings related to confidence and precision[13] by evaluation objective.

Table 3.18. Summary of Confidence and Precision by Evaluation Objective

Objectives	Confidence	Precision
1. Assess the effectiveness of the LGS and MGS control groups for the evaluation of energy savings.	The control and treatment groups are equivalent at the 90% confidence level.	The overall relative precision of the LGS control group is 15%. The overall relative precision of the MGS control group is 2%.
2. Estimate the energy and peak demand savings attributable to the LGS and MGS conservation rate structures.	Energy savings for the LGS conservation rate structure are valid at the 90% confidence level.	Not applicable
3. Assess customer awareness, understanding and acceptance of the LGS and MGS rate structures.	Both the 2010 and 2012 survey have confidence level of 95%	Margin of error for the 2010 survey is +/- 4.3% Margin of error for the 2012 survey is +/- 4.7%
4. Assess customer response to the LGS and MGS conservation rate structures.	Both the 2010 and 2012 survey have confidence level of 95%	Margin of error for the 2010 survey is +/- 4.3% Margin of error for the 2012 survey is +/- 4.7%

[13] Relative precision and margin of error provide indications of how well a sample represents a population.

3.6 Limitations

There are four potential limitations to consider when interpreting the evaluation results:

1. The potential for control group contamination.
2. The inability to dis-aggregate impact analysis results.
3. The limited ability to reconcile evaluated results to commonly used elasticity based savings forecasts.
4. The method used to estimate peak-demand savings adds uncertainty.

Control group contamination could have occurred if control accounts were influenced by the LGS/MGS conservation rates to conserve electricity, even though they were not subject to the rate. This type of contamination would have the effect of diminishing measured energy savings. Evidence to suggest that control group contamination did not occur includes the relatively low level of unaided awareness of the conservation rate structures (33 per cent for LGS customers in 2012, and 20 per cent for MGS customers), and the similarity of year over year change in electricity consumption between control accounts with and without sister accounts in the treatment groups (e.g., chain businesses).

The impact analysis provides statistically significant results for the overall impact of the LGS conservation rate structure, but that significance does not apply if results are disaggregated by region, account size, business type, or other potential variables of interest.

Elasticity based methods are commonly used to forecast energy savings from rate structures. The experimental design method used in this study provides limited ability to reconcile evaluated net impacts to elasticity based savings forecast methods. The reason for this limitation is that elasticity based savings forecast require several input assumptions, which are most typically: the customers' marginal price, the level of natural conservation that would result from general rate increases, and the level of consumption that can be impacted by the customers' response to marginal price. The net evaluated savings from experimental design approach provides only a final estimate of net impacts, and provides limited insight to confirm or revise the input assumptions used in elasticity based methods.

Finally, the use of an average peak-to-energy ratio (capacity factor) based on the commercial class load shape adds uncertainty to the estimates of peak demand savings. It is difficult to determine exactly how the customer response to the LGS rate directly translates into actions taken during the short time frame that defines the overall system peak.

4.0 Findings and Recommendations

4.1 Findings

The study has six key findings which are summarized as follows.

1. The control groups closely matched the treatment groups in a number of important ways, and they are therefore valid and effective control groups for the purpose of evaluating the LGS and MGS rate structures. Significant control group attrition has already occurred. Twenty per cent of control accounts were lost over three years. The relative precision of the control groups, while fair overall, could be improved by increasing the number of large LGS accounts.

2. Unaided awareness and understanding of the LGS and MGS rate structures were relatively low. Awareness and understanding increased significantly following an explanation of the conservation rate structures.

3. The top three drivers of energy conservation were: “want energy costs to be as low as possible”; “right thing to do”; and “overall level of electricity prices”. Awareness of the conservation rate structure is not required for a conservation response.

4. The LGS rate structure resulted in energy savings of 144 GWh/yr by December 31, 2011, increasing to 200 GWh/yr by December 31, 2012. This is considerably less than forecast energy savings. Note the timeframe evaluated incorporated only 9 months of data with the Part 2 price at the LRMC-based rate and the initial customer baselines were set higher than they would be under normal operation of the rate.

5. There were no measurable savings for MGS rate shaping in 2011 and 2012.

6. There were no measurable savings for those MGS customers (MGS1) that transitioned to the conservation rate structure April 1, 2012. Note the timeframe evaluated included only 9 months of data where MGS1 customers were exposed to the two-part conservation rate.

4.2 Recommendations

Listed below are recommendations related to the management of the LGS and MGS conservation rate structures (1-3) and the evaluation of the rate structures (4-7).

1. To promote a conservation response, focus communication and advertising on energy costs, “doing the right thing”, and energy prices.

2. If customer awareness and understanding of the rate is of value, consider simplifying the rate structure or expanding advertising and communication efforts.

3. Revisit the forecast method in light of the variance between evaluated and forecast savings.

4. Consider using focus groups or structured interviews to better understand the mechanism by which customers respond to the rates, given the finding that awareness of the rate is not required for a conservation response.

5. Request approval of the British Columbia Utilities Commission to maintain existing control accounts and to assign a proportion of new accounts to control group status in order to preserve an effective control group for future evaluation of the LGS and MGS conservation rate structures.

6. Request approval of the British Columbia Utilities Commission to assign an increased proportion of new, large accounts to control group status, specifically LGS customers expected to have consumption above 6.5 GWh/yr.

7. Consider re-evaluating the conservation rate structures after all conservation rate design elements are fully implemented and customers have had time to respond to them.

5.0 Conclusions

The study conclusions are as follows.

1. The LGS rate structure is achieving its objective of prompting conservation in the LGS rate class. However, actual savings achieved are significantly lower than forecast.

2. In 2012, the MGS rate structure had not yet achieved its objective of prompting conservation in the MGS rate class.

Evaluation Oversight Committee Sign-Off

BC Hydro's Evaluation Oversight Committee is made up of DSM stakeholders from various parts of the company and is mandated to ensure that BC Hydro's DSM evaluations are objective, unbiased and of sufficient quality.

The Evaluation of the Large General Service and Medium General Service Rate Calendar Years 2011 and 2012 meets the following criteria for approval by the Evaluation Oversight Committee:

- The evaluation complied with the defined scope.
- The evaluation methodology is appropriate given the available resources at the time of the evaluation.
- The evaluation results are reasonable given the available data and resources at the time of the evaluation.

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Shane Hiebert, Sr. Regulatory Specialist

Evaluation Oversight Committee Chair

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Appendix A Results Summary

Table A.1. Cumulative Run Rate Savings as of December 31, 2012

	Reported	Evaluated Gross	Evaluated Net
Energy savings (GWh/yr)	616	Cannot be estimated using the evaluation method	200
Peak demand savings (MW)	86		28

Table A.2. Net Savings Adjustments

Factor	Approach
Electricity cross effects (% of evaluated gross)	The evaluation method produces a net result that includes electricity cross effects. As stand-alone estimate of electricity cross effects cannot be estimated.
Non-participant spillover (% of evaluated gross)	Not estimate for this evaluation
Persistence	Savings are estimated on a cumulative run rate basis, which means that if savings from calendar year 2011 persist to 2012 then they are included in the net evaluated savings results for 2012. The evaluation method cannot distinguish between savings that started in 2011 and persisted through to the end of 2012, and those savings that started and ended in 2011, and were then replaced by savings from new actions that started in 2012.

Appendix B Additional Details on the Initiative Description

For both the LGS and MGS rate structures, each month's baseline is an average of the total kWh usage for the same month over the past three years. For example, the January baseline is an average of the usage in the past three Januarys. Baselines are established to reflect the monthly historic use and are the starting point for the bill energy charges.

Both LGS and MGS rate structures went through transitional stages before stabilizing at the new conservation rate structure.

For LGS, the transition included assigning a lower, interim value (6.68 cents/kWh) for the Part 2 credit and charge for the first 15 months, before valuing it at the higher LRMC-based rate (9.42 cents/kWh) starting April 1, 2012. The transition also included setting the initial monthly baselines at the higher of average consumption from January 1, 2005 to December 31, 2007, or from July 1, 2007 to June 30, 2010. By using the higher of two consumption periods, accounts that were affected by the downturn in the economy, as well as those accounts that were unaffected, received a higher baseline. This had the effect of setting customer baselines higher than they otherwise would be until 2014, when baselines are set by the rolling 3 year average of monthly consumption, and by then will exclude the first year initial baseline. This could result in smaller Part 2 charges due to increases in consumption and/or larger Part 2 credits due to decreases in consumption, which could also dampen any conservation impact of the rate.

For MGS accounts, the transition included a period where only Part 1 charges were applied to actual consumption.[14] Under the provisions and schedule outlined in paragraph 8 of the LGS Negotiated Settlement Agreement (LGS NSA), rate shaping is applied to the MGS Part 1 charges in each year and was expected to have a small conservation impact during the transition period due to a change in the account's marginal price. Under rate shaping, the differential between the Tier 1 and Tier 2 rates were reduced each year by proportionally raising the lower Tier 2 rate and proportionally lowering the higher Tier 1 rate relative to what they would have otherwise been without rate shaping where class average rate changes are only applied. For accounts that have energy consumption less than 14,800 kWh per month, their average rate and marginal rate will be the same (Tier 1) and it will be proportionally lower under rate shaping than otherwise. For accounts that have energy consumption greater than 14,800 kWh per month, the marginal rate (Tier 2) will be proportionally higher under rate shaping than otherwise. For there to be conservation, any conservation arising from those whose marginal rate has proportionally increased due to rate shaping must more than offset any increased consumption by those whose average and marginal rate has proportionally decreased due to rate shaping.

The Part 2 credit / charge did not start to be applied to MGS accounts until April 2012. Under the two part conservation rate structure, Part 1 charges apply to each account's baseline in each month and are effectively a fixed charge given that the baseline volumes are not based on current actual consumption. Rate shaping does not affect the marginal LRMC price signal and therefore is not expected to affect conservation for accounts with consumption within the price limit band[15] where the LRMC price is their marginal price. For MGS accounts that have consumption outside the price limit band in a billing period credited or charged at the Tier 2 rate, rate shaping may provide a proportionally higher marginal price (Tier 2) than otherwise without rate

[14] Please refer to Section 1.3, Table 1.1 for the implementation timeline of the MGS conservation rate. MGS accounts that were not on the conservation rate paid Part 1 energy charges for actual consumption.

[15] The price limit band is shown in Section 1.3, Figure 1.1 by -20%/+20% of the baseline.

shaping and this may have a small conservation impact given that the number of these accounts is not expected to be large.

Table B.1. provides a summary of the LGS and MGS conservation rate prices, along with the control group (Exempt Large General Service RS12xx).

Table B.1. Summary of LGS and MGS Tariff as of April 1, 2013

BC Hydro Rates *Rate schedules provided are examples of rates from each of the rate classes and do not provide information on minimums or special conditions.*						
Rate Class & Schedule	**Rate**	**April 2013 (Interim)**	**April 2012 (Final)**	**May 2011 (Final)**	**Jan 2011 (Final)**	**April 2010 (Final)**
All	BCUC Order	G-77-12A	G-77-12A	G-77-12A	G-110-10	G-180-10
	Rate Increase (%)	1.44	3.91	8.00		6.11
	Rate Rider (%)	5.0	5.0	2.5	2.5	4.0
Medium General Service 1500	Basic Charge (cents/day)	19.53	19.25	18.53	17.16	
	Demand First 35 kW (per kW)	$0.00	$0.00	$0.00	$0.00	
	Demand Next 115 kW (per kW)	$4.76	$4.69	$4.51	$4.18	
	Demand Additional kW (per kW)	$9.13	$9.00	$8.66	$8.02	
	Part 1 Energy Up to 14,800 kWh/Month (cents/kWh)	8.85	8.97	8.72	8.10	
	Part 1 Energy Above 14,800 kWh/Month (cents/kWh)	5.49	4.90	4.44	4.05	
	Part 2 Energy Rate (cents/kWh)	9.56	9.42	N/A	N/A	
	Minimum Energy Charge (cents/kWh)	2.85	2.81	N/A	N/A	
Large General Service 1600	Basic Charge (cents/day)	19.53	19.25	18.53	17.16	
	Demand First 35 kW (per kW)	$0.00	$0.00	$0.00	$0.00	
	Demand Next 115 kW (per kW)	$4.76	$4.69	$4.51	$4.18	
	Demand Additional kW (per kW)	$9.13	$9.00	$8.66	$8.02	
	Part 1 Energy Up to 14,800 kWh/Month (cents/kWh)	9.61	9.37	8.85	8.15	
	Part 1 Energy Above 14,800 kWh/Month (cents/kWh)	4.62	4.51	4.26	3.93	
	Part 2 Energy Rate (cents/kWh)	9.56	9.42	6.68	6.68	
	Minimum Energy Charge (cents/kWh)	2.85	2.81	2.7	2.5	
Exempt Large General Service 1200	Basic Charge (cents/day)	19.53	19.25	18.53		17.16
	Demand First 35 kW (per kW)	$0.00	$0.00	$0.00		$0.00
	Demand Next 115 kW (per kW)	$4.76	$4.69	$4.51		$4.18
	Demand Additional kW (per kW)	$9.13	$9.00	$8.66		$8.02
	Energy Up to 14,800 kWh/Month (cents/kWh)	9.28	9.15	8.81		8.16
	Energy Above 14,800 kWh/Month (cents/kWh)	4.46	4.40	4.24		3.93

Source: RRA Update F14 Interim Rates.

Communication activities for LGS customers:

- A website provided detailed information on the rate and was regularly updated. A short video on the website explained how the new rate works.
- Twenty-one versions of the introductory letter were developed and sent, targeted to different groups of customers.
- Baseline letters were sent in December 2010 informing customers about their initial baseline.
- A bill insert was included in all LGS customers' first bill on the new rate.
- New online tools, Bill Explainer, Baseline, and Forecaster, were launched in March 2011.
- Two emails were sent to customers to promote the Forecaster tool to all LGS customers

Communication Activities for MGS Customers:

- Updated website with an MGS video as of October 2011
- An MGS Guide was published October 2011
- Introductory letter and email were sent in October 2011 and 2012, and in January 2012 and 2013
- Baseline letters and Emails were sent January 2012 and 2013. These letters encouraged customers to log in online to see their baselines and use the Forecaster tool
- In April 2013 emails were sent to all MGS customers for whom email contact information was available to remind customers about the rate launch.
- A bill insert were included in all MGS customers' first bill on the new rate to remind them about the new rate and to promote the online tools.
- There were also many newsletter stories that promoted the rates or the online tools.

Appendix C Approach Details

Additional Details from the Methodology Review of Business Rates

The purpose of the literature review was to understand the scope, approach, results and limitations of recent evaluations of business electricity rates. All of these studies use some variation of the econometric demand modelling approach, and there are no randomized controlled trials. Thirteen relevant studies were identified through a search of relevant websites (CEE, IEPEC, ACEEE) as well as an internet search. To be included, the study had to meet the following criteria:(1) customer group had to be business customers so residential rate studies were excluded; (2) pricing scheme facing customers had to be multi-part so that customers faced at least two pricing periods or at least two pricing tiers; and (3) evaluation had to estimate own price elasticity, if only substitution elasticities were estimated, the study was not included.

Recall the definition of price elasticity of demand (eta) as the relative change in quantity divided by the relative change in price, when the change in price is small

Equation C.1

$$\eta = (\Delta quantity/quantity)/(\Delta price/price)$$

Rearranging to isolate the change in quantity term, we then have

Equation C.2

$$\Delta quantity = \eta \cdot quantity \cdot (\Delta price/price),$$

So the key parameter of interest is the own price elasticity η, because the initial quantity is given and the relative change in price is a rate design decision. For this reason, we focus on the own price elasticity of demand in this summary.

If we consider only the impact of price as driver of electricity consumption, then the simplest constant elasticity demand curve is

Equation C.3

$$quantity = A \cdot price^{\eta}$$

So taking logs we have the double log form

Equation C.4

$$logquantity = logA + \eta logprice$$

And then taking differentials and noting that the differential of a constant is zero

Equation C.5

$$\Delta(logquantity) = \eta \cdot \Delta(logprice)$$

Recalling Δ(logu) = (Δu)/u

Equation C.6

$$\Delta(\text{quantity})/\text{quantity} = \eta \cdot \Delta(\text{logprice})/\text{price}$$

So rearranging, we then have

Equation C.7

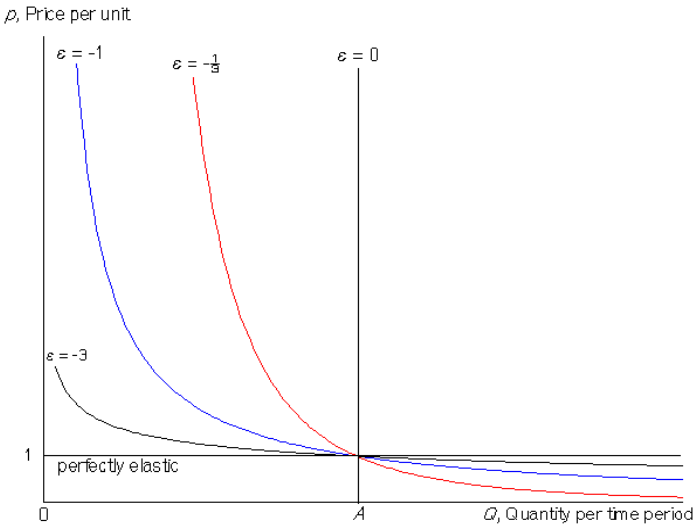
$$\eta = [\Delta(\text{quantity})/\text{quantity}] / [\Delta(\text{logprice})/\text{price}]$$

So the key parameter of interest is the own price elasticity η, because the initial quantity is given and the relative change in price is a rate design decision.

Elasticity of demand is the same at every point along a constant elasticity demand curve as shown in the next figure, and there are several specific cases shown:

- Perfectly inelastic demand curve, where = 0 everywhere, is a vertical straight line.
- The next most vertical demand curve in the figure is also inelastic, with a demand elasticity of -1/3 everywhere.
- The unitary elasticity, = -1, demand curve is flatter than the inelastic demand curves.
- As the elasticity becomes more negative (such as the = -3 demand curve), the demand curves become flatter.
- The demand curve that is completely flat is perfectly elastic.

Figure C.1. Examples of Demand Curves



The econometric literature summarized in the following table shows that own price elasticities for business customers vary substantially depending on the customer population studied, the time period used, and the econometric method employed. Some key findings are as follows:

- First, the studies identified used econometric methods to estimate own price and/or cross price elasticities of demand, and there were no randomized controlled trials – the method used in the present study.

- Second, all the studies found some degree of price response, that is, each study found that own price elasticities had the correct sign, and they were statistically significant.
- Third, the price elasticities vary substantially across studies with the mean of the low and high estimates being -0.68 and -0.13.
- Fourth, large customers were generally more price responsive than smaller customers. This may reflect greater opportunities to save energy for large energy users.
- Fifth, customers with larger energy costs as share of total costs were generally more price responsive. This may reflect the importance of energy savings if energy costs are a large share of total costs.
- Sixth, transaction costs loom large as a barrier for customers responding to multi-part rates, and coordinating innovative rate structures with traditional DSM activities and with behavioural programs can reduce transactions costs and increase customers' demand responses to price signals.

Table C.1. Summary of Business Multi-part Rate Studies

Study	Model	Data	Rate	Elasticities
Chung (1978)	Translog	Time series	Mandatory TOU	-0.58 to -0.03
Chung (1981)	Translog	Time series	Mandatory TOU	-1.00 to -0.50
Tishler (1983)	Quadratic	Time series	Mandatory TOU	-0.07 to 0.27
Aigner (1985)	Translog	Time series	Mandatory TOU	-0.75 to -0.05
Tishler (1984)	Quadratic	Time series	Mandatory TOU	-0.09 to -0.01
Acton (1984)	Double log	Panel data	Voluntary TOU	-0.66 to -0.15
Woo (1985)	Leontief	Panel data	Mandatory TOU	-2.39 to -0.35
Woo (1985)	Translog	Panel data	Mandatory TOU	-0.22 to -0.01
Sheen (1995)	Translog	Panel data	Voluntary TOU	-2.77 to -0.74
Schwartz (2002)	Gen McFadden	Panel data	Voluntary RTP	-0.02 to 0.08
Taylor (2005)	Gen McFadden	Panel data	Voluntary RTP	-0.25 to -0.05
Angevine (2007)	Double log	Times series	Mandatory RTP	-0.14 to -0.10
Zarnikau (2007)	Gen McFadden	Time series	Mandatory RTP	0.00 to 0.00
Average				-0.68 to -0.13

To understand why econometric demand modelling was an appropriate method for the rate studies reviewed, and to consider whether it could be applied to the LGS/MGS conservation rate structure evaluation, recall the definition of price elasticity of demand (η) as the relative change in quantity divided by the relative change in price, when the change in price is small. Recall Equations C.1 and C.2 from earlier:

Equation C.1

$$\eta = (\Delta quantity/quantity)/(\Delta price/price)$$

Rearranging to isolate the change in quantity term, we then have the standard demand model:

Equation C.2

$$\Delta quantity = \eta \cdot quantity \cdot (\Delta price / price),$$

The key parameter of interest for the evaluation studies reviewed was own price elasticity η. The initial quantity is given and the relative change in price is a rate design decision. This approach applies to the typical rate situation where prices are parametric (e.g., the marginal price signal is constant at any given point in time) such as with BC Hydro's Transmission Service Rate and Residential Inclining Block rates.

Given the relatively more complicated design of the LGS/MGS rate, it is not obvious that this simple model applies. First, the price change under the LGS/MGS conservation rate structures is not small because, for example, for different segments of the load, the marginal rate per kWh facing LGS customers can vary by over 100 per cent (e.g., between part two of the rate structure, which is valued at the long run marginal price, and tier two of part one of the rate structure). Second, pricing is highly non-linear because of: (1) the two part rate, (2) the charge/credit for consuming more than or less than the baseline up to a 20 per cent change; (3) reversion to the part 1 rate for changes greater than 20 per cent from the baseline. Third, the supply curve facing a given customer is not continuous but has jumps as consumption moves more than 20 per cent from the baseline.

While there is a large body of literature on the difficulties in estimating price effects with non-linear pricing, whether or not it is appropriate to do so using simple demand elasticity models is, to some extent, a matter of judgment. For the evaluation of BC Hydro's Transmission Service Rate and Residential Inclining Block Rate, it was believed that econometric methods could be applied because each customer faced a transparent supply curve. The situation for LGS/MGS is much more complex with moving baselines, multiple tiers, and credits and charges.

Randomized controlled trials and econometric models are valid alternative evaluation methods. Randomized controlled trails are preferable if the evaluation issue is only to understand the effect of the treatment on the treated. Econometric models are preferred if there are multiple evaluation questions which require estimating the underlying structure. Listed below are some examples of energy program evaluations that used randomized control trial methods.

Table C.2. Evaluation Studies Using Randomized Control Trial

Program	Evaluation Method
Cape Light Compact Residential Smart Energy Monitoring Pilot	Randomized Controlled Trial with Opt-In Enrolment, Difference-in-Differences
Energy Trust of Oregon Home Energy Reports	Randomized Controlled Trial with Opt-Out Enrolment, Difference-in-Differences
Illinois Citizens Utility Board (CUB) Energy Saver with Efficiency 2.0	Randomized Controlled Trial with Opt-In Enrolment, Difference-in-Differences
Payson City Energy Efficiency Reports	Randomized Controlled Trial, Difference-in-Differences
Puget Sound Energy Home Energy Reports	Randomized Controlled Trial with Opt-Out Enrolment, Difference-in-Differences
Sacramento Municipal Utility District Home Energy Reports	Randomized Controlled Trial with Opt-Out Enrolment, Difference-in-Differences
Seattle City Light Home Energy Reports	Randomized Controlled Trial with Opt-Out Enrolment, Difference-in-Differences
Snohomish Public Utility District Energy Challenge	Randomized Controlled Trial with Opt-In Enrolment, Difference-in-Differences
Western Massachusetts Electric Company Western Mass Saves!	Randomized Controlled Trial with Opt-In Enrolment, Difference-in-Differences

Additional Details on Sampling Design of Pre-selected Control Groups

Finding a proper counterfactual or baseline condition against which to calculate impacts is one of the primary challenges of evaluation. The counterfactual indicates what would have happened in the absence of an intervention. However, the same subject cannot be observed in two distinct situations—being treated and untreated at the same time.

A valid control group is the desired replacement of counterfactual of any impact assessment. The best way to achieve impact evaluation of intervention is through a Completely Randomized Design/Randomized Controlled Trial Design (RCT), which ensures that the treatment group, on average, is identical to the control group except for the impact of the intervention. A completely randomized design (RCT) is one where the treatments are assigned completely at random so that each experimental unit has the same chance of receiving any one treatment.

Usually, RCT is conducted for experiments with homogeneous experimental units, such as laboratory experiments or clinical trials. Random assignment is the key issue for designing an experiment that can establish strong evidence of cause and effect by ruling out as many extraneous variables as possible. In an ideal RCT experiment, treatment and control groups do not systematically differ on any variable (other than the treatment variable), and those extraneous variables will affect the outcome equally and the difference between the experimental and control groups can be attributed to the treatment.

When only a fraction of the population is exposed to the treatment, an untreated comparison group approach has been widely applied to identify temporal variation in the outcome that is not due to treatment exposure and estimate effect due to the intervention.

Shown below is the RCT sample design strategy used to pre-select the control accounts for the LGS and MGS conservation rates.

Table C.3. Pre-Selected Control Group Design

CPR Group ⇓	MGS < 55kW	MGS 55 kW < 85 kW	MGS 85 kW < 150 kW	LGS >= 150 kW or	Total
Commercial Accounts	21 control accounts with 1st tertile consumption	18 control accounts with 1st tertile consumption	11 control accounts with 1st tertile consumption	42 control accounts with 1st tertile consumption	275
	21 control accounts with 2nd tertile consumption	18 control accounts with 2nd tertile consumption	11 control accounts with 2nd tertile consumption	42 control accounts with 2nd tertile consumption	
	21 control accounts with 3rd tertile consumption	18 control accounts with 3rd tertile consumption	10 control accounts with 3rd tertile consumption	42 control accounts with 3rd tertile consumption	
Industrial Accounts	6 control accounts with 1st tertile consumption	4 control accounts with 1st tertile consumption	4 control accounts with 1st tertile consumption	22 control accounts with 1st tertile consumption	107
	6 control accounts with 2nd tertile consumption	4 control accounts with 2nd tertile consumption	4 control accounts with 2nd tertile consumption	22 control accounts with 2nd tertile consumption	
	6 control accounts with 3rd tertile consumption	4 control accounts with 3rd tertile consumption	4 control accounts with 3rd tertile consumption	21 control accounts with 3rd tertile consumption	
Residential Accounts	1 control accounts with 1st tertile consumption	1 control accounts with 1st tertile consumption	1 control accounts with 1st tertile consumption	3 control accounts with 1st tertile consumption	18
	1 control accounts with 2nd tertile consumption	1 control accounts with 2nd tertile consumption	1 control accounts with 2nd tertile consumption	3 control accounts with 2nd tertile consumption	
	1 control accounts with 3rd tertile consumption	1 control accounts with 3rd tertile consumption	1 control accounts with 3rd tertile consumption	3 control accounts with 3rd tertile consumption	
Total	84	69	47	200	**400**

Additional Details on the Difference-in-Differences Method

Differences-in-differences (DD) estimator is an impact evaluation approach which relies on a comparison of participants and nonparticipants before and after the intervention. The key of DD's implementation in program impact analysis is to credibly identify a control group similar enough to program participants during pre-program period. By applying DD approach, the difference is calculated between the observed mean outcomes for the treatment and control groups before and after program intervention to estimate program effect.

The DD estimator is originally derived from a linear model described as below.

Given a two-period setting for both treatment and control groups, an outcome Y can be modelled as follows:

$$Y = \alpha + \beta T + \gamma t + \delta (T \cdot t) + \varepsilon$$

Whereas T=0 stands for control group, T = 1 stands for treatment group; t = 0 stands for pre-program period, and t = 1 stands for post program period; $T \cdot t$ stands for the interaction between treatment and time; and ε is a random unobserved "error" term.

And all parameters can be interpreted as below,

α = constant term

β = treatment group specific effect (to account for average permanent differences between treatment and control)

γ = time trend common to control and treatment groups

δ = true effect of treatment

Based on the linear model above, the expected values of the average outcomes of the treatment and control groups during pre and post intervention are given as below correspondingly,

$$E(Y_0^T) = \alpha + \beta$$

$$E(Y_1^T) = \alpha + \beta + \gamma + \delta$$

$$E(Y_0^C) = \alpha$$

$$E(Y_1^C) = \alpha + \gamma$$

Therefore, the true effect of treatment $\delta = (E(Y_1^T) - E(Y_0^T)) - (E(Y_1^C) - E(Y_0^C))$.

Based on statistical inference, statistical mean is an unbiased best estimator of the expected value of an outcome variable y. Therefore, DD estimator, DDE, is derived as (mean (Y_1^T) − mean (Y_0^T)) – (mean (Y_1^C) − mean (Y_0^C)) to estimate the program effect.

As a result of the linear model, it is essential that output data meets the assumptions of linear models, including normality, homogeneity and independence of each subject, to apply the DD approach in an impact analysis. In addition, the conventional DD estimator requires that, in the absence of the treatment, the average outcomes for the treated and control groups would have followed parallel paths over time. This assumption is plausible if pre-treatment characteristics that are thought to be associated with the dynamics of the outcome variable are balanced between the treated and the untreated groups. Both LGS and its control

group have been exposed to the identical economic environment, and they are similar from "firmographic" and business type perspectives as well because the control group is only a fraction of the LGS rates eligible population. It is considered reasonable to assume that pre-treatment characteristics associated with the dynamics of the outcome variable are balanced between the treated and the untreated groups. Because energy usage of both LGS and its control group are normally distributed and comparable on a logarithmic scale in the baseline year, the DD approach is applied to estimate energy savings of LGS conservation rates on a logarithmic scale in years 2011 and 2012.

Let $\ln(LGS^1)$ and $\ln(LGS^0)$ denote logarithmic transformation of energy usage of LGS group and its counterfactual correspondingly, and DDE denotes the DD estimator – the estimation of their difference. Then,

Equation C.8

$$ln(LGS^1) - ln(LGS^0) = DDE$$

And relative savings due to LGS conservation rates can be derived as following steps,

Equation C.9

$$ln(LGS^1/LGS^0) = DDE$$

Equation C.10

$$\frac{LGS^1}{LGS^0} = e^{DDE}$$

Equation C.11

$$\frac{(LGS^0 - LGS^1)}{LGS^0} = 1 - e^{DDE}$$

Eventually, relative change of energy usage due to new rates structure estimated through Equation C.11 is applied to estimated overall energy savings attributable to LGS/MGS conservation rates.

Additional Details on the Bootstrapping Method

A Pairwise Bootstrap approach is applied to create an empirical distribution of energy savings and test the statistically significant impact of new rates on energy conservation. Bootstrapping is a non-parametric technique which draws a defined number of random samples from the original dataset (which, in and of itself, is a sample from the population) to create pseudo data and then to estimate the distribution of the object of interest over these pseudo data. As one of Monte Carlo methods applied based on observed data, Bootstrapping was firstly introduced by Efron B. in 1979. Ever since, it has been used widely in the applied science fields to estimate properties of an estimator or construct hypothesis tests in the past decades. Bootstrapping generates empirical distributions that have no convenient statistical formulae, and it can be a useful alternative to classic statistical inference when the traditional underlying parametric assumptions (i.e. assuming a normal distribution or asymptotic theory with infinite sample size) are not met, or are suspect.

The Pairwise Bootstrap method does not require a preliminary regression, and the pseudo data are created directly by resampling covariates of real data jointly. This method is applied to resample individual customers in the control group with energy consumptions during the pre and post the new rates intervention periods as a pair. It allows the energy savings attributable to LGS rates structure to be estimated by comparing and tracking the energy usage changes within and between LGS rates and control groups.

Appendix D Result Details

Data Exploration

Shown below are the control group distributions on an absolute, and log transformed basis.

Figure D.1. Histogram of LGS Treatment and Control Group Base Year Absolute Consumption

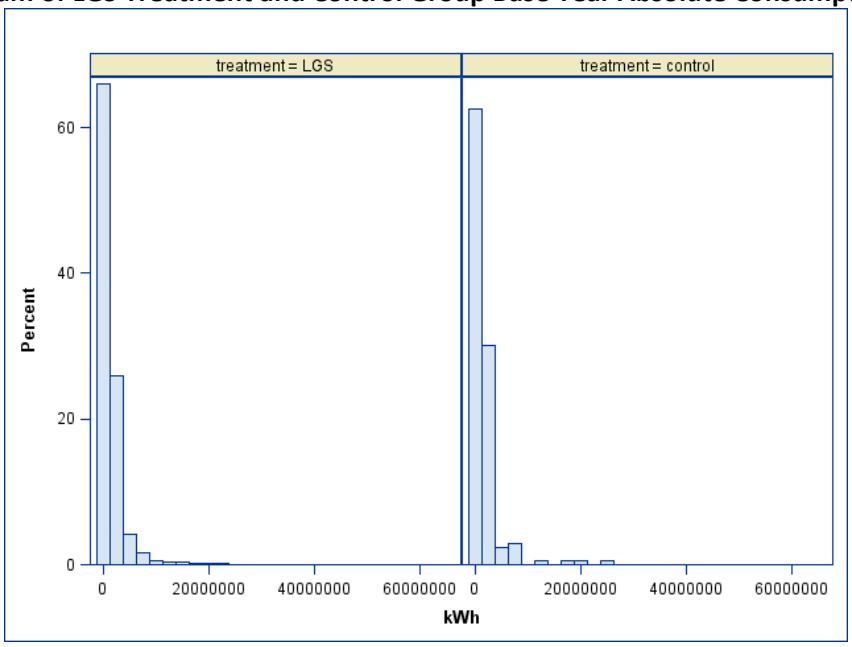


Figure D.2. Histogram of LGS Treatment and Control Group Base Year Log Transformed Consumption

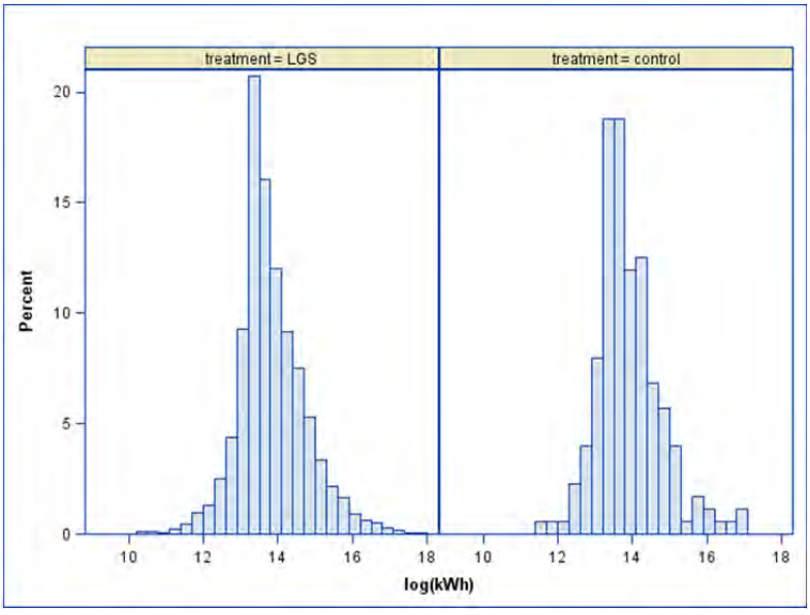


Figure D.3. Histogram of MGS Treatment and Control Group Base Year Absolute Consumption

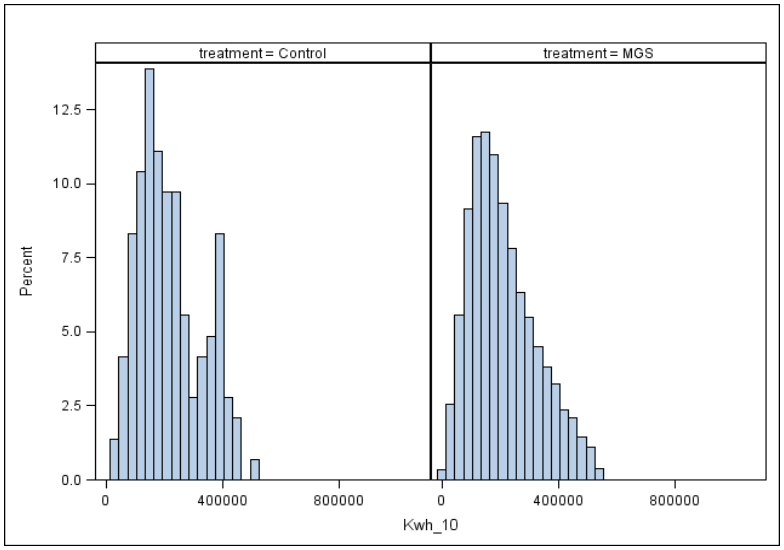
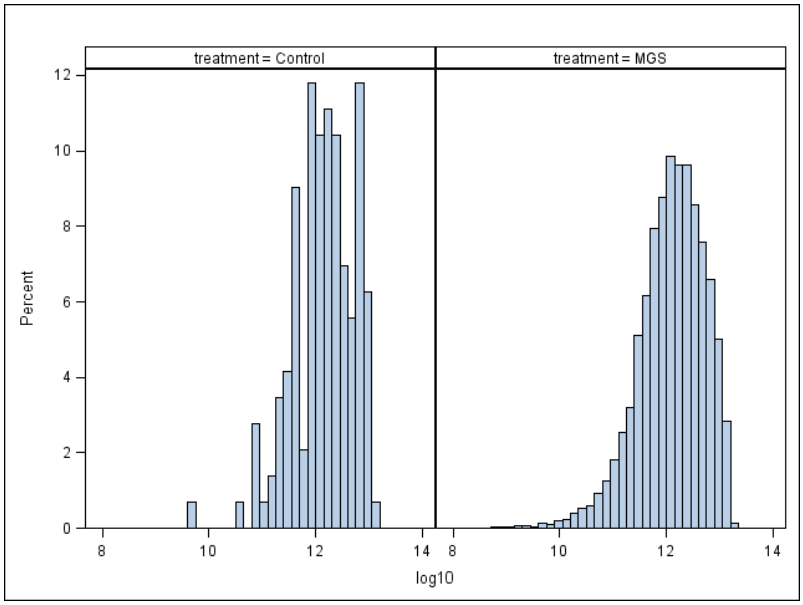


Figure D.4. Histogram of MGS Treatment and Control Group Base Year Log Transformed Consumption



The scatter plot below of electricity consumption in 2011 versus 2010 at logarithm scale for the LGS treatment and control groups provides a visualization of changes to energy consumption. In the figure, the reference line y=x with slope 1 shows the point at which 2010 consumption is equivalent to 2011 consumption. Points below the reference line indicate a consumption decrease, and points above the line represent a consumption increase.

Figure D.5. Scatter Plot of Electricity Usage in 2011 versus 2010 at Logarithm Scale for LGS Treatment and Control Groups

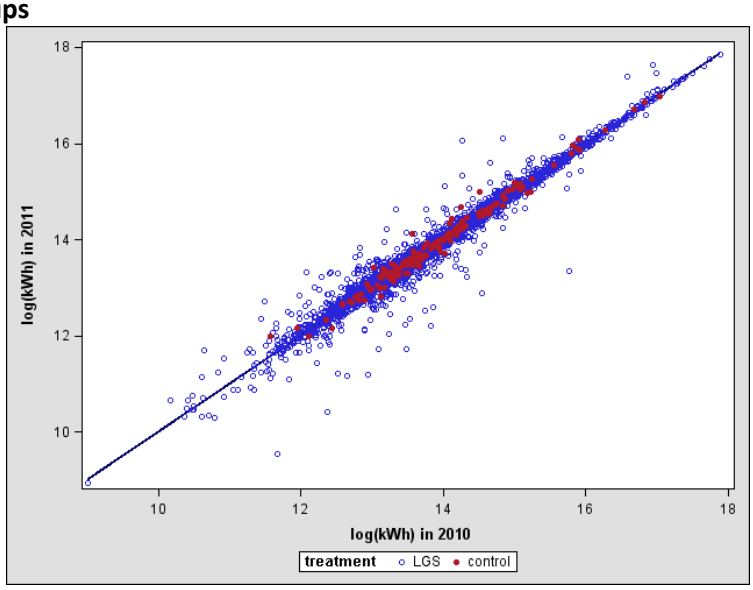
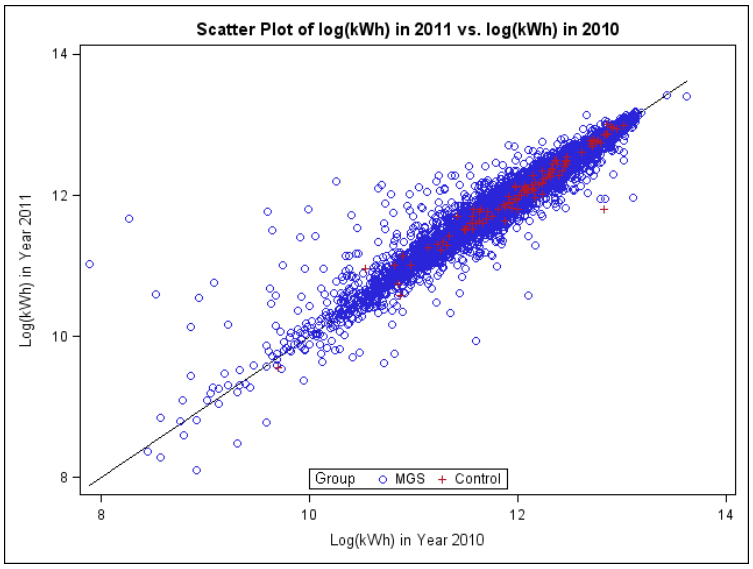


Figure D.6. Scatter Plot of Electricity Usage in 2011 versus 2010 at Logarithm Scale for MGS Treatment and Control Groups



Additional Details on Assessment of Control Group Effectiveness

Figure D.7. Annual Consumption for MGS Control and Treatment Groups, by Consumption Percentile

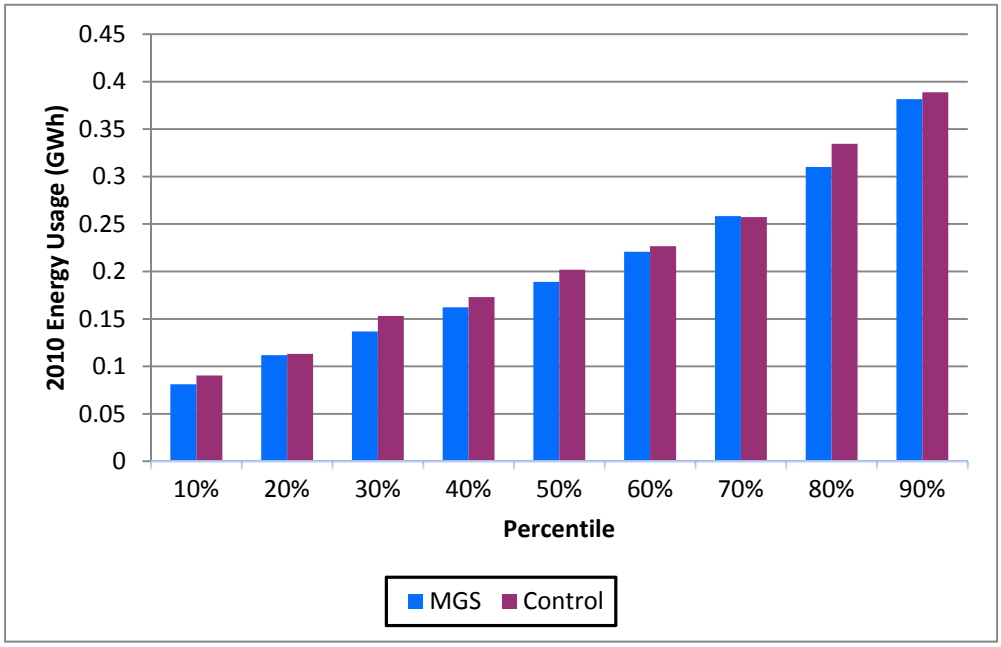


Table D.1. Mean Base Year Consumption and Number of Accounts for MGS Treatment and Control Groups, by Sector

Account Sector	Number of Treatment Accounts	Number of Control Accounts	Mean Annual Consumption of Treatment Accounts (GWh)	Mean Annual Consumption of Control Accounts (GWh)	Difference
Commercial	9,601	111	0.215	0.217	-0.002*
Industrial	2,535	25	0.188	0.199	-0.011*
Residential	712	8	0.265	0.301	-0.036*

*: No statistical significant difference at 90% confidence level according to bootstrapping of control group; excludes 107 MGS accounts that are missing account sector assignment in the billing system.

Table D.2. Mean Base Year Consumption and Number of Accounts for MGS Treatment and Control Groups, by Region.

Region	Number of MGS Accounts	Number of Accounts of Control	Mean Annual Consumption of Treatment Accounts (GWh)	Mean Annual Consumption of Control Accounts (GWh)	Difference
Lower Mainland	6,956	79	0.226	0.241	-0.015*
North	1,492	10	0.197	0.165	0.032*
Southern Interior	1,731	19	0.190	0.237	-0.047*
Vancouver Island	2,776	36	0.195	0.173	0.022**

*: Not statistically significant difference at 90% confidence level according to bootstrapping
**: Not statistically significant difference at 95% confidence level according to bootstrapping

Table D.3. Power Smart Program Participation for LGS Treatment and Control Groups

Power Smart Program Offer	Group	Number of total accounts	Number of accounts participated	Participation (%)
Prescriptive Incentive Projects	LGS Treatment	5465	704	13
	LGS Control	176	27	15
			Difference	-2*
Custom Incentive Projects	LGS Treatment	5465	148	3
	LGS Control	176	6	3
			Difference	0
Funded Enabling Activities	LGS Treatment	5465	166	3
	LGS Control	176	3	2
			Difference	1*
Overall at least one program offer	LGS Treatment	5465	1018	19
	LGS Control	176	36	20
			Difference	-1*

*: Not statistically significant difference at 90% confidence level.

Table D.4. Power Smart Program Participation for MGS Treatment and Control Groups

Power Smart Program Offer	Group	Number of total Accounts	Number of accounts participated	Participation (%)
Prescriptive Incentive Projects	MGS1 Treatment	3117	247	8
	MGS1 Control	40	3	8
			Difference	0
	MGS2/3 Treatment	9838	559	6
	MGS2/3 Control	104	3	3
			Difference	3*
Custom Incentive Projects	MGS1 Treatment	3117	14	0
	MGS1 Control	40	0	0
			Difference	0
	MGS2/3 Treatment	9838	19	0
	MGS2/3 Control	104	0	0
			Difference	0
Funded Enabling Activities	MGS1 Treatment	3117	61	2
	MGS1 Control	40	0	0
			Difference	2*
	MGS2/3 Treatment	9838	132	1
	MGS2/3 Control	104	2	2
			Difference	-1*
Overall at least one program offer	MGS1 Treatment	3117	322	10
	MGS1 Control	40	3	8
			Difference	2*
	MGS2/3 Treatment	9838	710	7
	MGS2/3 Control	104	5	5
			Difference	2*

*: Not statistically significant difference at 90% confidence level.

Precision of a sampling design measures how close a sample estimator is expected to be to the true value of a parameter. It is usually measured by relative precision -- the expected error bound of an estimator at a certain confidence level over the expected value of this estimator. The lower the relative precision is the more precise a sampling design is. The industry standard acceptable value is less than 20 per cent. In order to calculate relative precision, the control group samples were post-stratified by baseline consumption and the relative precision of the sampling design was calculated with Dalenius-Hodges stratifying sampling approach, at a 90 per cent confidence level.

As shown in the table below, the overall relative precision for the LGS control group, on an absolute basis, is 15 per cent, while the precision for individual stratum varies from a low of 6 per cent for small and medium accounts, to a high of 341 per cent for the largest accounts. Relative precision was also calculated on a logarithm basis, which aligns with the analytical method used in the impact analysis. On a log basis, overall relative precision is 0.7 per cent, ranging from a low of 0.4 per cent for medium sized accounts to a high of 14 per cent for the largest accounts.

The results of the analysis of relative precision indicate that overall, the LGS control group is representative of its treatment group. However, when each stratum is examined separately, it is apparent that the largest stratum is not well represented by its control group. This result is intuitive, given that the largest LGS accounts are also the most diverse. This stratum contains accounts as varied as sawmills, hospitals, universities, and large retail. The results from the analysis of relative precision indicate that, while overall findings resulting from the comparison of the control group to the treatment group are valid, it is not valid to analyze the largest stratum in isolation.

Table D.5. LGS Control Group Relative Precision of Sampling Design

Stratum	Consumption Range (GWh/yr)	Percentage of Total LGS Consumption (%)	Total Number of LGS Accounts	Number of LGS Control Accounts	Relative Precision Absolute Basis (%)	Relative Precision Log Basis (%)
1	0 - 0.94	19	3,052	93	6	0.64
2	0.95 -2.3	26	1,700	55	6	0.41
3	2.4 - 6.4	25	677	19	11	0.71
4	6.5 -58.2	30	212	9	341	14
Overall		**100**	**5,641**	**176**	**15**	**0.70**

Similar analysis of the relative precision was completed for the MGS control and treatment groups and is shown below. Results show that a very low relative precision overall, at 2 per cent on an absolute basis, with no single stratum above 10 per cent. The lower relative precision of the MGS accounts relative to LGS accounts is to be expected, as MGS accounts have relatively lower diversity of facility types and energy end use equipment compared to LGS accounts. The results indicate that the MGS control group provides a precise estimate of the MGS treatment group, across all account size stratums.

Table D.6. MGS Control Group Relative Precision of Sampling Design

Stratum	Consumption Range (GWh/yr)	Percentage of Total MGS Consumption (%)	Total Number of MGS Accounts	Number of Control Accounts	Relative Precision, Absolute Basis (%)	Relative Precision, Log Basis (%)
1	0 - 0.129	11%	3473	35	10	1.18
2	0.130 – 0.220	27%	4336	49	4	0.30
3	0.221 – 0.340	32%	3279	32	3	0.29
4	0.341 – 0.971	30%	2011	28	4	0.31
Overall		**100%**	**13,099**	**144**	**2**	**0.32**

Additional Details on the Energy Savings Results

The largest stratum of LGS accounts (some 200 accounts with consumption above 6.5 GWh/yr) are not well represented by their control group accounts. If these accounts respond to the conservation rate in a manner that is significantly and systematically different than other LGS accounts, then a bias could be occurring resulting in a distortion to the overall results. Scenario analysis was conducted to determine if the response to the rate changes with the exclusion of the largest accounts.

Shown below are the relative savings with the largest stratum of LGS accounts excluded from the analysis. Although a difference if observed, a trend cannot be seen from the two data points available. For example, in 2011 the relative savings decreased from 1.33 per cent to 1.15 per cent upon exclusion of the largest accounts, whereas in 2012 the relative savings increased from 1.82 per cent to 1.94 per cent.

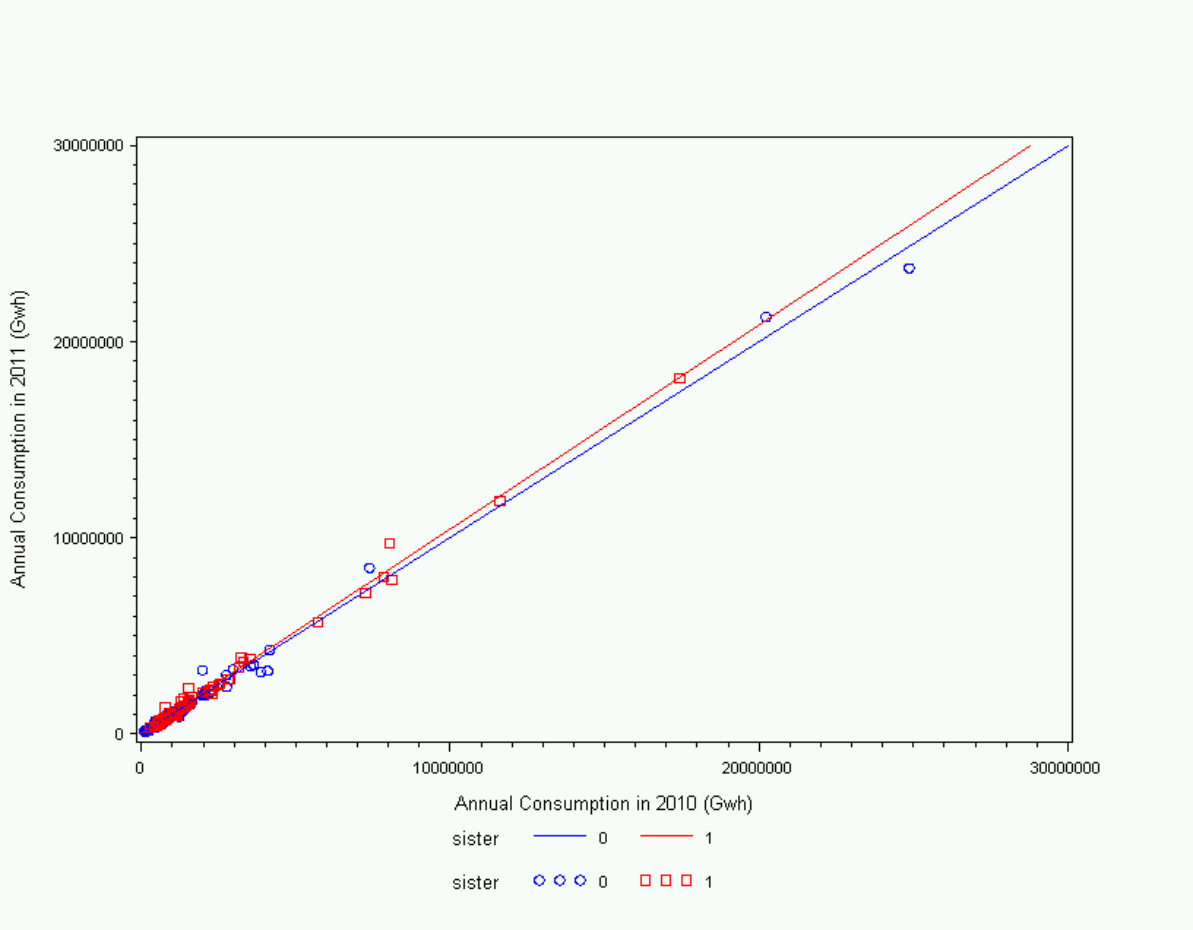
The results indicate that the largest accounts differ from the general population in manner that appear to be random, not systematic, and therefore evidence of bias is not found.

Table D.7. Scenario Analysis of Relative Savings with the Exclusion of the Largest LGS Accounts

Scenario	Relative Savings in 2011 (%)	Relative Savings in 2012 (%)
All LGS	1.33%	1.82%
With Largest Stratum Excluded	1.15%	1.94%
Difference	-0.18%	.12%

Analysis was completed to test for the possibility of control group contamination for control accounts that have sister accounts in the treatment group (eg. chain stores with one site in the control group, and all other sites under the conservation rate structures). As shown below, the change in consumption from 2010 to 2011 for sites with sisters in the treatment group was similar to that of sites without sisters in the treatment group. This result provides evidence that control group contamination did not occur.

Figure D.8. Change in Annual Consumption for LGS Control Accounts with and Without Sister Accounts in the LGS Treatment Group



Additional Details on Survey on Customer Awareness and Response

The table below shows the distribution of survey respondents by business type. Accounts classified as government made up 16 per cent of the 2012 sample and 29 per cent of the 2010 sample. Accounts classified as non-governmental organizations made up 14 per cent of the 2012 sample and 11 per cent of the 2010 sample. Accounts classified as for profit made up 70 per cent of the 2012 sample and 60 per cent of the 2010 sample.

Table D.8. Survey Sample Distribution by Business Type

Business type	2012 (%)	2010 (%)
Government	16	29
Non-Governmental Organization (NGO)	14	11
For profit	70	60

To examine customer unaided awareness of their demand charge, customers were asked "prior to this survey, had you heard of a demand charge?" About 78 per cent of LGS customers, 71 per cent of MGS1 customers and 58 per cent of MGS2/3 customers had heard of a demand charge. Unaided awareness of the demand charge was substantially higher for LGS and MGS1 customers than for MGS2/3 customers.

Table D.9. Unaided Awareness of the Demand Charge in Concept

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Yes	77	71	58	7	20	13
No	21	26	39	-5	-18	-13
Don't know	2	3	3	-1	-1	0
Total	**100**	**100**	**100**	**-**	**-**	**-**

In the 2010 and 2012 surveys, LGS customers were asked whether or not they had heard of a demand charge. The share of customers stating that they had heard of a demand charge decreased slightly from 79 per cent in 2010 to 77 per cent in 2012.

Table D.10. Change in Unaided Awareness of the Demand Charge in Concept

	LGS 2010 (%)	LGS 2012 (%)	Difference (%)	Z-test	Probability
Yes	79	77	-2	0.21	0.42
No	16	21	5	-1.24	0.11
Don't know	5	2	-3	1.43	0.08
Total	**100**	**100**	**-**		

Results summarized below show that aided awareness of the demand charge was substantially higher for the larger customers.

Table D.11. Aided Awareness that the Account has a Demand Charge

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Yes	66	43	31	23	35	12
No	5	13	10	-8	-5	3
Don't know	7	14	17	-7	-10	-3
Never before heard of a demand charge	23	30	42	-7	-19	-12
Total	**100**	**100**	**100**	**-**	**-**	**-**

To examine customer understanding of their demand charge, customers previously aware that their account has a demand charge were asked "*please indicate which one of the following types of demand charges (for kWh usage) applies to this Account,*" where the two types were "*flat demand charge*," and "*inclining block demand charge*." About 70 per cent of LGS, 73 per cent of MGS1 and 70 per cent of MGS2/3 customers correctly understood that they were on an inclining block demand charge.

Table D.12. Understanding of the Type of Demand Charge

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Flat	16	19	23	-3	-7	-4
Inclining block demand charge	70	73	70	-3	0	3
Don't know/not sure	14	8	7	6	7	1
Total	**100**	**100**	**100**	-	-	-

To examine customer support for the demand charge, customers previously aware that their account has a demand charge were asked "*overall, does your organization support or oppose the inclining block type of demand charge that applies to this Account, or is it indifferent about it.*" About 32 per cent of LGS customers strongly or somewhat support the demand charge, 40 per cent of MGS1 customers strongly or somewhat support the demand charge, and 25 per cent of MGS2/3 customers strongly or somewhat support the demand charge.

Table D.13. Support for the Demand Charge

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Strongly support	10	16	3	-6	-7	13
Somewhat support	22	24	22	-2	0	2
Indifferent	34	36	41	-2	-7	-5
Somewhat oppose	13	12	20	1	-7	-8
Strongly oppose	10	4	13	6	-3	-9
Don't know/not sure	10	8	1	2	9	7
Total	**100**	**100**	**100**	-	-	-

To examine incentive effects of the demand charge, customers previously aware that their account has a demand charge were asked "*how much of an incentive does this inclining block demand charge have on … efforts to minimize electricity bills*." About 85 per cent of LGS customers said they had a major or a minor incentive, 77 per cent of MGS1 customers said they had a major or a minor incentive, and 80 per cent of MGS2/3 customers said they had a major or a minor incentive.

Table D.14. Incentive Effects of Demand Charge

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Has a major incentive	31	23	25	8	6	-2
Has a minor incentive	54	54	55	0	-1	-1
Has no incentive at all	12	23	20	-11	-8	3
Don't know/not sure	3	0	0	3	3	0
Total	**100**	**100**	**100**	-	-	-

LGS and MGS1 customers with aided awareness of the conservation rate were asked "*regardless of how you first became aware of the conservation rate, which communications method did you find most useful in understanding how the rate works*." For these LGS customers, the most useful sources of awareness in declining order were BC Hydro representative, E-mail notification and BC Hydro website. For MGS1 customers, the most useful sources of awareness in declining order were E-mail notification, letter via Canada Post and video tutorial.

Table D.15. Most Useful Communication Method for Understanding how the Conservation Rate Works

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 - MGS2/3
E-mail notification	30	27	NA	3	-	-
Letter via Canada Post	5	24	NA	-19	-	-
BC Hydro rep	40	9	NA	31	-	-
Forecaster tool BCH	2	3	NA	-1	-	-
Video tutorial BCH	5	15	NA	-10	-	-
BC Hydro website	9	6	NA	3	-	-
Word of mouth	4	6	NA	-2	-	-
Energy consultant	1	3	NA	-1	-	-
Other	1	0	NA	2	-	-
BC Hydro bill	3	0	NA	3	-	-
Don't know	0	6	NA	-6	-	-
Total	**100**	**100**	**NA**	**-**	**-**	**-**

Customers were asked to consider a list major factors or drivers in managing energy use. For LGS customers, the top five drivers were "*want operating costs as low as possible; it's the right thing to do; overall level of electricity prices; incentive to save electricity built into the rate; and need for more cost cutting measures*".

For MGS1 customers, the top five drivers were "*want operating costs as low as possible; it's the right thing to do; overall level of electricity prices; decrease pay-back time of capital incentives; and need for more cost cutting measures*".

For MGS2/3 customers, the top five drivers were "*want operating costs as low as possible; overall level of electricity prices; it's the right thing to do; need for more cost cutting measures; and incentive to save electricity built into the rate*".

Table D.16. Percent of Survey Respondents Assessing various Factors as Major Drivers

	Percent (%)			Differences in Percent (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Want operating costs to be as low as possible	83	76	72	7	11	4
Right thing to do	54	44	48	10	6	-4
Overall level of electricity prices	52	40	55	12	-3	-15
Incentive to save electricity built into rate	35	21	21	14	14	0
Need for more cost cutting measures	32	24	34	8	-2	-10
Overall level of natural gas prices	24	14	16	10	8	-2
Decrease pay-back time of capital investments	28	30	17	-2	11	13
Suppliers and customers want us to conserve electricity	27	19	6	8	21	13
Our employees want us to conserve electricity	19	28	15	-9	4	13

In the 2010 and 2012 surveys, LGS customers were asked what their motivations were for managing energy use. The share of LGS customers motivated by the various drivers all increased between 2010 and 2012.

Table D.17. Change in Major Drivers for Managing Energy Use

	LGS 2010 (%)	LGS 2012 (%)	Difference (%)	Z-test	Probability
Want operating costs as low as possible	80	83	3	-0.04	0.49
For environment - right thing to do	48	54	6	-1.12	0.13
Overall level of electricity prices	46	52	6	-1.13	0.13
Due to economic turndown	30	32	2	-0.37	0.36
Incentive to save electricity built into rate	29	35	6	-1.29	0.10

Customers were also asked to consider a list of factors that could be major barriers in managing energy use. For LGS customers, the top five barriers were "*other operational priorities; lack of access to funds for investment; insufficient payback; lack of financial incentives for conservation; and lack of* knowledge of where the opportunities for savings may be".

For MGS1 customers, the top five barriers were *"other operational priorities; lack of access to funds for investment; lack of financial incentives for conservation; insufficient payback; and lack of staffing/staffing requirements"*.

For MGS2/3 customers, the top five barriers were "*other operational priorities, lack of financial incentives for conservation, insufficient payback, lack of access to funding for investment, and current energy use near lowest possible level".*

Table D.18. Percent of Survey Respondents Assessing Various Factors as Major Barriers

	Percent (%)			Differences in Percent (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Other operational priorities	44	37	38	7	6	-1
Lack of access to funding for investment	39	33	27	6	12	6
Insufficient payback	37	20	37	17	0	-13
Lack of financial incentives for conservation	22	22	38	0	-16	-16
Lack of knowledge of where the opportunities for savings might be	21	15	25	6	-4	-10
Can't control employees' behavior in regards to energy efficiency practices	18	11	14	7	4	-3
Lack of staffing/staffing requirements	17	20	7	-3	10	13
Takes too much time	15	11	10	4	5	1
Current energy use near lowest possible level	15	16	18	-1	-3	-2
Lack of executive support	9	6	4	3	5	2

In the 2010 and 2012 surveys, LGS customers were asked about barriers to managing energy use.

Table D.19. Change to Major Barriers to Managing Energy Use from 2010 to 2012

	LGS 2010 (%)	LGS 2012 (%)	Difference (%)	Z-test	Probability
Lack of access to funding for investment	42	39	-3	0.65	0.26
Other operational priorities	33	44	11	-2.22	0.01
Insufficient payback	33	37	4	-0.88	0.19
Lack of financial incentives for conservation	31	22	-9	1.67	0.05

To examine customer ease of managing their account, customers were asked "*assuming your organization wanted to do so, how easy or difficult is it to currently manage this Account to minimize total energy charge on the bill.*" About 28 per cent of LGS customers said it was "*very easy*" or "*somewhat easy*", 18 per cent of MGS1 customers said it was "*very easy*" or "*somewhat easy*", and 27 per cent of MGS2/3 customers said it was "*very easy*" or "*somewhat easy*".

Table D.20. Ease of Managing Energy Charges

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Very easy	4	2	3	2	1	-1
Somewhat easy	24	16	24	8	0	-8
Somewhat difficult	53	49	41	4	12	8
Very difficult	15	27	17	-12	-2	10
Don't know/not sure	5	6	15	-1	-10	-9
Total	**100%**	**100%**	**100%**	-	-	-

To examine customer organizations' efforts to conserve energy, customers were asked "*how much of an effort does your organization make managing this Account to minimize the total energy charges on the bill*." About 62 per cent of LGS customers said that there organization made a *great deal of effort* or *a fair amount of effort*, about 44 per cent of MGS1 customers said that their organization made a *great deal of effort* or *a fair amount of effort*, and 47 per cent of MGS2/3 customers said that that their organization made *a great deal of effort* or *a fair amount of effort*.

Table D.21. Organization's Effort to Minimize Total Energy Charges

	Shares (%)			Differences in Shares (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
A great deal of effort	17	6	10	11	7	-4
A fair amount of effort	45	38	37	7	8	1
A little effort	31	38	34	-7	-3	4
None at all	2	6	8	-4	-6	-2
Not applicable– there is little opportunity	1	8	8	-7	-7	0
Don't know/not sure	4	3	3	-1	-1	0
Total	**100%**	**100%**	**100%**	-	-	-

In the 2010 and 2012 surveys, LGS customers were asked about current efforts to manage energy use. The share of customers stating that they spent "*a great deal*" or "*a fair amount*" of effort was found to have decreased from 66 per cent in 2010 to 62 per cent in 2012.

Table D.22. Current Efforts to Manage Energy Use

	LGS 2010 (%)	LGS 2012 (%)	Difference (%)	Z-test	Probability
A great deal	23	17	-6	1.48	0.07
A fair amount	43	45	2	-0.41	0.34
A little	26	31	5	-1.18	0.12
None at all	4	2	-2	0.84	0.20
Don't know	3	5	2	-0.91	0.18
Total	**100%**	**100%**	-		

Customers were asked which energy efficient equipment they had installed in the last year. For LGS customers, the top five energy efficient equipment installed were "*energy efficient lighting, lighting controls, computer power bars, HVAC and computer power management*".

For MGS1 customers, the top five energy efficient products installed were "*computer power management, computer power bars, energy efficient lighting, HVAC and lighting controls*".

For MGS2/3 customers, the top five energy efficient products installed were "*energy efficient lighting, computer power bars, computer power management, HVAC and lighting controls*."

Results shown below provide insight into the relative levels of equipment installation, but should not be interpreted as an indication of the actual number of installations in 2012, as self-reported installation rates are significantly higher than expected installation rates some equipment types.

Table D.23. Energy Efficient Equipment Recently Installed

	Percent Installed (%)			Differences in Percent (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Energy efficient lighting	84	49	71	35	13	-22
Lighting controls	57	28	26	29	31	-2
Computer power bars	55	50	55	5	0	-5
Computer power management	36	33	23	3	13	10
Commercial dishwasher	11	12	11	-1	0	1
Commercial kitchen	15	8	7	7	8	1
Refrigeration	24	14	12	10	12	2
CO2 sensors for fans	20	25	6	-5	14	19
Synchronous belt drive	11	5	5	6	6	0
HVAC	52	38	26	14	26	12
Variable frequency drive	42	27	15	15	27	12

In the 2010 and 2012 surveys, LGS customers were asked what type of energy efficient equipment they had installed over the past year. The percent of LGS customers "*installing energy efficient lighting, lighting controls, computer power management, energy efficient HVAC, energy efficient refrigeration, carbon dioxide sensors,*

commercial dishwashers, commercial kitchen equipment, synchronous belt drives and variable speed drives" all increased.

Table D.24. Change in Energy Efficient Equipment Installations from 2010 to 2012

	LGS 2010 (%)	LGS 2012 (%)	Difference (%)	Z-test	Probability
Energy efficient lighting	62	84	22	-4.78	<0.001
Computer power bars	56	55	-1	0.16	0.44
Lighting controls	37	57	20	-2.84	0.002
Computer power management	25	36	11	-3.61	<0.001
HVAC	25	52	27	-5.24	<0.001
Refrigeration	13	24	11	-2.68	0.004
CO2 sensors for fans	8	20	12	-3.33	<0.001
Commercial dishwasher	6	11	5	-1.70	0.05
Commercial kitchen	5	15	10	-3.02	0.001
Synchronous belt drives	5	11	6	-1.94	0.026
Variable speed drives	2	42	40	-3.42	<0.001

Customers were asked which energy conservation actions they had increased in frequency over the last year. For LGS customers, the top five energy efficient measures "*were turn off lights not in use; discussed energy use and conservation; turn off computers not in use; check settings for EM; and increase maintenance periods*".

For MGS1 and MGS2/3 customers, the top five energy measures were "*turn off lights not in use; turn off computers not in use; discussed energy use and conservation; check settings for EMS; and increase maintenance periods*".

Table D.25. Energy Conservation Actions Recently Taken

	Percent (%)			Differences in Percent (%)		
	LGS	MGS1	MGS2/3	LGS – MGS1	LGS – MGS2/3	MGS1 – MGS2/3
Turn off lights not in use	77	67	73	10	4	-6
Discussed energy use and conservation	68	43	41	25	27	2
Turn off computers not in use	63	57	46	6	17	11
Check settings for EMS	56	28	38	28	18	-10
Maintenance periods	35	26	29	9	6	-3
Had an energy audit	28	15	12	13	16	3
Decrease operating periods	21	21	16	0	5	5
Decrease number of peak operating periods	14	13	7	1	7	6

In the 2010 and 2012 surveys, LGS customers were asked what type of energy conservation actions had increased in frequency over the past year. The share of LGS customers turning off lights not in use, turning off

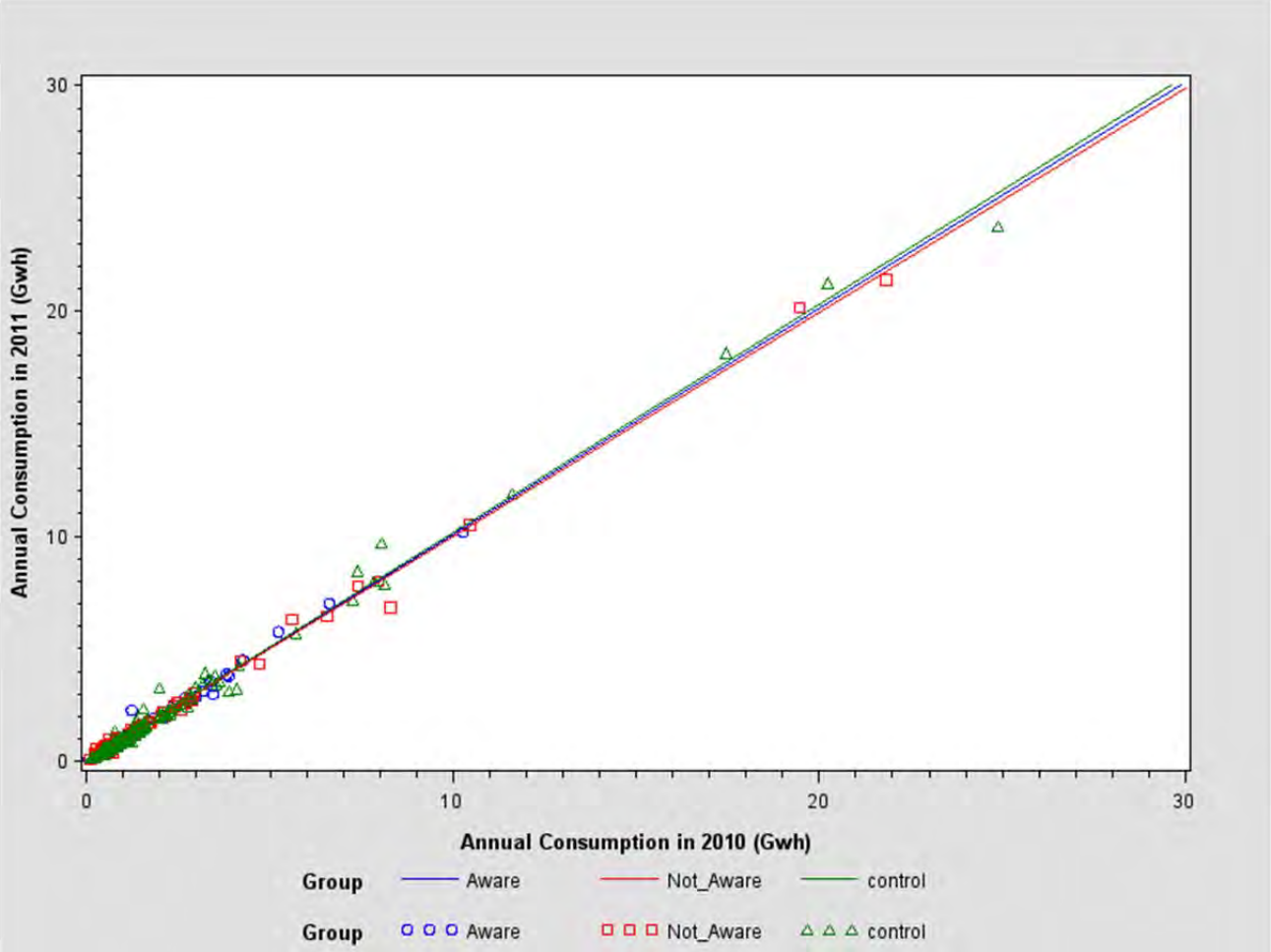
computers not in use, checking setting for energy management systems, increasing number of maintenance periods, decreasing number of peak operating periods and having an energy audit all increased.

Table D.26. Change in Energy Conservation Actions from 2010 to 2012

	LGS 2010 (%)	LGS 2012 (%)	Difference (%)	Z-test	Probability
Turn off lights not in use	66	77	11	-2.33	0.01
Turn off computers not in use	48	63	15	-2.84	0.002
Checked settings for EMS	32	56	24	-4.54	<0.001
Increased number of maintenance periods	29	35	6	-1.29	0.10
Decreased operating periods	21	21	0	0.00	0.50
Decreased number of peak operating periods	13	14	1	3.75	<0.001
Had an energy audit	2	28	26	-0.22	<0.001

A scatter plot and an overall regression line of annual consumption in 2011 on annual consumption in 2010 are plotted for three groups of customers: 47 LGS customers who were aware of LGS rates structure, 93 LGS customers who were not aware of LGS rates structure, and 176 control accounts. The slope of the regression line is the estimation of ratio of annual consumption in 2011 (post intervention) over baseline consumption in 2010.

Figure D.9. Scatter Plot of Consumption for LGS customers who were Aware for the Conservation Rate, and those who were not previously aware.



Because the slopes of regressions line of both LGS aware and not aware groups are slightly flatter than control group, it indicates that overall LGS treatment group were able to save energy compared to control group after LGS rates intervention. In addition, without being aware of LGS rates structure, 47 LGS customers still managed to have a slightly better conservation performance than 97 LGS customers who were aware of LGS rates. This result indicates that awareness of the conservation rate structure is not required for a conservation response.

Appendix E Survey Questionnaire

2010 Survey

Rates, Conservation and Energy Efficiency Survey

INTRODUCTION TEXT

Thank you for taking the time to complete this Rates, Conservation and Energy Efficiency Survey.

{For Survey IDs 100,000 -100,149,000 AND 150,000-159,000}

Please complete the survey specifically in regards to your organization's use of electricity located at: (insert service address, service town)

If you feel another colleague has a greater understanding of this Account, then you may forward the original email invitation to that person.

For Survey IDs - 200,000-249,000 AND 250,000 -259,000)}

Your organization uses electricity via two or more meters located at: (insert service address, service town)

Please complete the survey specifically in regards to the largest Account at this address – that is, the meter with the highest consumption of electricity.

If you feel another colleague has a greater understanding of this Account, then you may forward the original email invitation to that person.

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About this Account

1. Which of the following best describes the ownership of this Account?

☐[1] Government or public sector
☐[2] Non-governmental organization (non-profit)
☐[3] For profit ⇒ Which of the following best describes the for profit business?

- ☐[4] Independently owned
- ☐[5] Franchise (i.e. Tim Hortons)
- ☐[6] Part of a chain (i.e. The Bay)
- ☐[6] Don't know

☐[9] Don't know/Not sure

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About this Account

2. Please check the one box that indicates the primary activity related to this Account. (check one only)

☐[1] Agriculture/Fishing	☐[14] Healthcare/Hospitals
☐[2] Arts/Entertainment/Film	☐[15] Hospitality/Lodging/Tourism
☐[3] Automotive	☐[16] Manufacturing
☐[4] Banking/Finance/Insurance	☐[17] Membership Organizations
☐[5] Building or Property Management	☐[18] Mining
☐[6] Business/Professional Services	☐[19] Personal Services
☐[7] Camps/Recreation/Sports/Amusement	☐[20] Restaurants and food service
☐[8] Charity/Not for profit	☐[21] Retail Trade (non-food)
☐[9] Communications/Media	☐[22] Retail Food Stores
☐[10] Construction/Contractors	☐[23] Wholesale and Distribution
☐[11] Education	☐[24] Transportation
☐[12] Forestry	☐[25] Utilities & Energy
☐[13] Government - Local/Provincial/Federal	
☐[26] Other (specify _____)	

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About this Account

3. Which of the following best describes the relationship between the organization this Account is located at and the building it is located in? (check one only)

☐[1] This organization owns or co-owns the whole building
☐[2] This organization owns or co-owns only the part of the building it occupies

☐[3] This organization has a short-term lease/sub-lease (<2 years)
☐[4] This organization has a medium-term lease/sub-lease (2 - 5 years)
☐[5] This organization has a long-term lease/sub-lease (>5 years)

☐[9] Don't know

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About this Account

4. Please estimate the total square footage of the premises that this Account is located at. Please take into consideration recessed floors, but exclude parking levels, parking structures and garages.

_____ square feet OR _____ square meters ☐[3] Don't know/not sure

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About this Account

5. Thinking about your answer to the previous question, what percentage of the floor space at the premises is currently occupied? (exclude parking and storage areas)

_____ % occupied ☐[999] Don't know/not sure

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About this Account

6a. How many employees does your organization have in total?

_____ ☐ Don't know/Not sure

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About this Account

6b. On a typical week day, what is the average number of people (i.e. employees, customers, students, visitors, patients) present at this organization's address during the daytime? (Please check 0 if none.)

- ☐[0] 0 (none)
- ☐[1] 1 to 9
- ☐[2] 10 to 19
- ☐[3] 20 to 29
- ☐[4] 30 to 49
- ☐[5] 50 to 99
- ☐[6] 100 to 150
- ☐[7] More than 150
- ☐[9] Don't know/Not sure

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About You

7. Which of the following best describes your position/title within the organization: (check one only)

- ☐[1] Business owner or co-owner
- ☐[2] Executive
- ☐[3] Facility or property manager/supervisor
- ☐[4] General manager
- ☐[5] Energy manager
- ☐[6] Operations or maintenance manager
- ☐[7] Operations or maintenance technician/engineer
- ☐[8] Finance manager
- ☐[9] Purchasing manager
- ☐[10] Accountant/Bookkeeper

☐[11] Other (please specify) _____

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About You

8a. How long have you held your current job within the organization?

_____ years OR _____ months ☐ Prefer not to say

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About You

8b. How long have you worked in the industry that this organization is a part of?

_____ years OR _____ months ☐ Prefer not to say

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About You

9. For each of the following, please indicate whether you are primarily or jointly responsible for decision making in relation to the organization that this Account is located at, whether someone else is, or whether it is not applicable to the organization.

	Yes, I am the primary or joint decision maker	No, someone else is the decision maker	Not applicable at this organization
a. Decisions related to capital investments	☐1	☐2	☐3
b. Decisions related to investments in energy-efficient equipment	☐1	☐2	☐3
c. Decisions related to production/operating schedule of equipment	☐1	☐2	☐3
d. Decisions related to energy management	☐1	☐2	☐3
e. Decisions related to the maintenance of equipment	☐1	☐2	☐3
f. Decisions related to hours of operation	☐1	☐2	☐3
g. Decisions related to finance/accounting	☐1	☐2	☐3

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About How this Account Uses Electricity

10. In this section of the survey, we would like to gain an in-depth understanding of how the electricity *in relation to this specific Account* is used.

For each item, please choose one of the following:

1. Yes, electricity in relation to this specific Account is used to power the item, or

2. No, but electricity in relation to a different Account at this organization's address is used to power the item, or [IDs 200,000s/250,000s]

3. None of your Accounts at this organization's address are used to power the item

	Yes, this Account	No, but a different Account at this address is for this	No, none of our Accounts at this address is for this	Don't know/ Not sure
a. Indoor lighting	☐1	☐2	☐3	☐9
b. Outdoor lighting	☐1	☐2	☐3	☐9
c. Light computer equipment such as personal computers, photocopiers and printers	☐1	☐2	☐3	☐9
d. Heavy computer equipment such mainframe computers and servers	☐1	☐2	☐3	☐9
e. Light electric cooking equipment such as microwave ovens, electric toasters, etc.	☐1	☐2	☐3	☐9
f. Heavy electric cooking equipment such as electric ovens, electric stoves, electric grills, exhaust fans, steamers, ice makers, etc.	☐1	☐2	☐3	☐9
g. Light refrigeration/freezer equipment such as bar fridges, household fridges and freezers	☐1	☐2	☐3	☐9
h. Heavy refrigeration/freezer equipment such as walk-in units, open and closed vertical/horizontal units	☐1	☐2	☐3	☐9

About How this Account Uses Electricity

10. Here are some more items we would like you to consider in relation to this specific Account.

For each item, please choose one of the following:

1. Yes, electricity in relation to this specific Account is used to power the item, or

2. No, but electricity in relation to a different Account at this organization's address is used to power the item, or [IDs 200,000s/250,000s]

3. None of your Accounts at this organization's address is used to power the item

		Yes, this Account	No, but a different Account at this address is for this	No, none of our Accounts at this address is for this	Don't know/ Not sure
i.	Light space cooling equipment such as room air conditioners, portable air conditioners and portable fans	☐1	☐2	☐3	☐9
j.	Heavy space cooling equipment such as rooftop packaged air conditioning units, central chillers and heat pumps	☐1	☐2	☐3	☐9
k.	Light electric space heating equipment such electric baseboards and portable electric heaters, etc.	☐1	☐2	☐3	☐9
l.	Heavy electric space heating equipment such as electric forced-air furnaces, electric rooftop or room packaged heat pumps, etc.	☐1	☐2	☐3	☐9
m.	Electric water heating equipment	☐1	☐2	☐3	☐9
n.	Process equipment such as air compressors, pumps and electric welders	☐1	☐2	☐3	☐9
o.	Other light equipment such as battery chargers, televisions, small electronic devices	☐1	☐2	☐3	☐9
p.	Other medium equipment such as clothes washers, clothes dryers, dishwashers, elevators, escalators, etc.	☐1	☐2	☐3	☐9

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About How this Account Uses Electricity

11. Thinking about the total annual operating cost (including labour, other energy, rent/leasing, materials, etc.) at this organization's address, what percentage of it is attributable to the annual electricity bill for this Account?

_____ % of total annual operating costs at this address are for this Account's electricity use ☐[999] Don't know/not sure

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About Your Account's Rate

As you may know, there are a variety of rate structures that utility companies can implement for their various customer groups. Generally speaking, rates structures can include, but are not limited to, combinations of an energy charge, a demand charge, and a basic charge.

In this section of the survey, we would like to explore your awareness and understanding of the rate structure that may apply to this Account.

REMINDER

In this section, we are interested in your current understanding of the rate structure that you believe this Account is on and your top-of-mind thoughts about it.

We ask you not to view any of your bills or other BC Hydro correspondence while completing this section of the survey.

THANK YOU!

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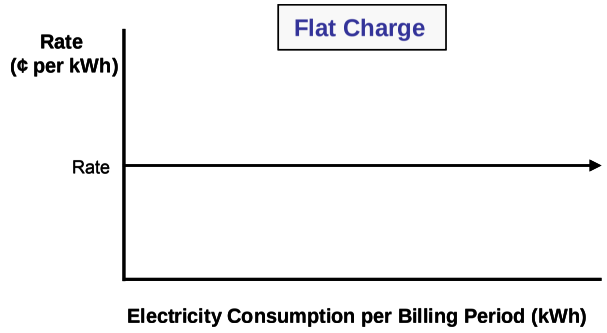
About Your Account's Rate – the energy charge

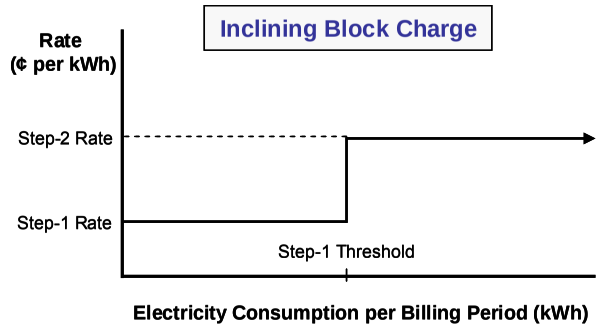
The energy charge is the price per kilowatt hour of electricity consumed (kWh).

12. Please indicate which one of the following types of energy charges (for kWh usage) you believe applies to this Account.

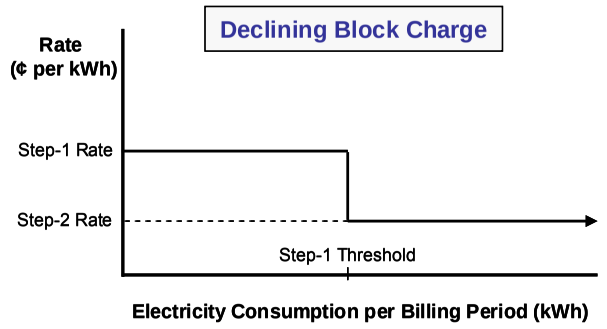
☐[1] The price per kilowatt hour of electricity is constant regardless of the amount of electricity consumed over a time period. This is known as a flat charge. ⇒ SKIP TO Q14



☐[2] The price per kilowatt hour of electricity is lower for the first portion of consumption, and steps-up to a higher price for any additional consumption beyond a specified threshold. This is known as an inclining block charge.



☐[3] The price per kilowatt hour of electricity is higher for the first portion of consumption, and steps-down to a lower price for any additional consumption beyond a specified threshold. This is known as a declining block charge.



☐[9] Don't know/not sure ⇒ SKIP TO Q18

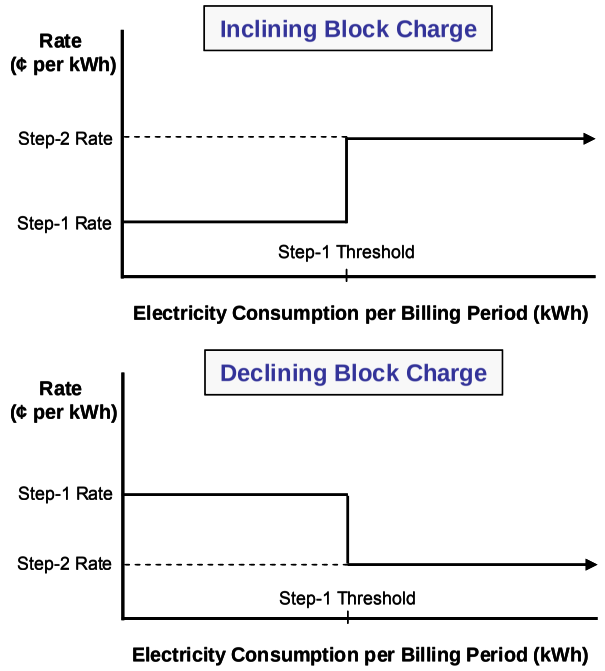
About Your Account's Rate – the energy charge

13. You indicated that you believe this Account has an (INSERT FROM Q12: inclining/declining) block energy charge. After how many kWh (kilowatt hours) do you believe the pricing level (insert BASED ON Q12: steps up/steps down) from block 1 to block 2?

_____ **kWh** ☐[9] Don't know/not sure

SHOW APPROPRIATE GRAPH

AS PER Q12 INCLINING/DECLING



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About Your Account's Rate – the energy charge

14. Thinking about the (INSERT FROM Q12: flat/inclining block/declining block) type of energy charge you believe applies to this Account, how much of an incentive does this type of energy charge have on any of your organization's efforts to minimize electricity bills related to this Account?

- ☐1 Has a major incentive
- ☐2 Has a minor incentive
- ☐3 Has no incentive at all
- ☐9 Don't know/not sure

15. Assuming your organization wanted to do so, how easy or difficult is it to currently manage this Account to minimize the total energy charges on the bill?

This might be done by installing energy-efficient measures, decreasing production, etc.

- ☐1 Very easy
- ☐2 Somewhat easy
- ☐3 Somewhat difficult
- ☐4 Very difficult
- ☐9 Don't know/not sure

16. How much of an effort does your organization currently make managing this Account to minimize the total energy charges on the bill?

- ☐1 A great deal of effort
- ☐2 A fair amount of effort
- ☐3 A little effort
- ☐4 No effort at all
- ☐5 Not Applicable – there is little opportunity to manage the energy charge related to this Account.
- ☐9 Don't know/not sure

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About Your Account's Rate – the energy charge

17. Overall, does your organization support or oppose the (INSERT FROM Q12: flat/inclining block/declining block) type of energy charge you believe applies to this Account, or is it indifferent about it?

- ☐[1] Strongly support
- ☐[2] Somewhat support
- ☐[3] Indifferent
- ☐[4] Somewhat oppose
- ☐[5] Strongly oppose
- ☐[9] Don't know/not sure

SHOW APPROPRIATE GRAPH TO THE RIGHT AS PER Q12 FLAT/INCLINING/DECLING

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About Your Account's Rate – the demand charge

The demand charge reflects the peak rate – measured in kilowatts (kW) – at which electricity is being consumed.

18. Prior to this survey, had you ever heard of a demand charge?

☐[1] Yes
☐[2] No ⇒ SKIP TO Q26
☐[9] Don't know/not sure ⇒ SKIP TO Q26

<< BACK EXIT NEXT >>

About Your Account's Rate – the demand charge

19. Based on your understanding, does the rate structure for this Account include a demand charge?

☐[1] Yes

☐[2] No ⇒ SKIP TO Q26

☐[9] Don't know/not sure ⇒ SKIP TO Q26

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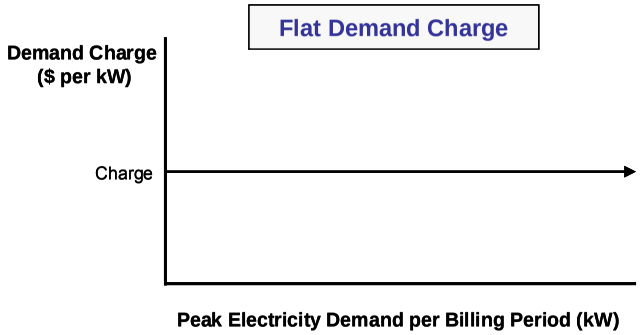
About Your Account's Rate – the demand charge

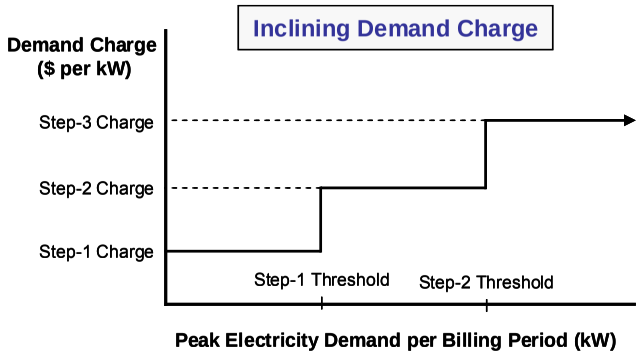
20. Please indicate which one of the following types of demand charges (for kW usage) you believe applies to this Account.

The demand charge for this Account is…

☐[1] Flat ⇒ SKIP TO Q22



☐[2] The demand charge steps-up to a higher amount when electricity is being used at a high rate. This is known as an inclining demand charge. ⇒ CONTINUE



☐[9] Don't know/not sure ⇒ SKIP TO Q26

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About Your Account's Rate – the demand charge

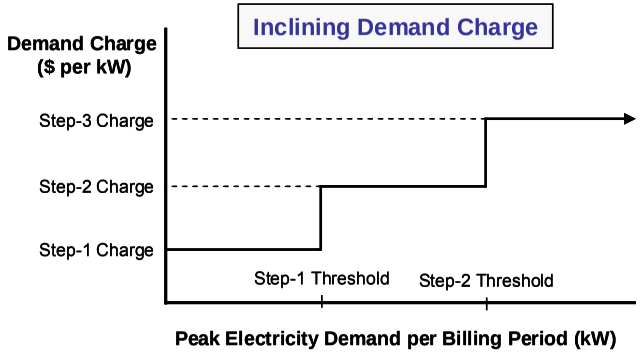
21a. You indicated that you believe this Account has an inclining demand charge. At what level of demand do you believe the demand charge steps-up from step 1 to step 2?

_____ **kW** ☐9 Don't know/not sure

21b. And at what level of demand do you believe the demand charge steps-up from step 2 to step 3?

_____ **kW** ☐9 Don't know/not sure

SHOW GRAPH



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About Your Account's Rate – the demand charge

22. Thinking about the (INSERT FROM Q20: flat/inclining) demand charge you believe applies to this Account, how much of an incentive does this type of charge have on any of your organization's efforts to minimize electricity bills related to this Account?

- ☐1 Has a major incentive
- ☐2 Has a minor incentive
- ☐3 Has no incentive at all
- ☐9 Don't know/not sure

23. Assuming your organization wanted to do so, how easy or difficult is it to currently manage this Account to minimize the total demand charges on the bill?

This might be done by installing energy-efficient measures, trimming/displacing peak consumption, etc.

- ☐1 Very easy
- ☐2 Somewhat easy
- ☐3 Somewhat difficult
- ☐4 Very difficult
- ☐9 Don't know/not sure

24. How much of an effort does your organization make managing this Account to minimize the total demand charges on the bill?

- ☐1 A great deal of effort
- ☐2 A fair amount of effort
- ☐3 A little effort
- ☐4 No effort at all
- ☐5 Not Applicable – there is little opportunity to manage the demand charge related to this account.
- ☐9 Don't know/not sure

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About Your Account's Rate – the demand charge

25. Overall, does your organization support or oppose the (INSERT FROM Q20: flat/inclining block) type of demand charge you believe applies to this Account, or is it indifferent about it?

- ☐[1] Strongly support
- ☐[2] Somewhat support
- ☐[3] Indifferent
- ☐[4] Somewhat oppose
- ☐[5] Strongly oppose
- ☐[9] Don't know/not sure

SHOW APPROPRIATE GRAPH TO THE RIGHT AS PER Q20 FLAT/INCLINING/DECLING

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About Your Account's Bill

26. How often do you or another decision maker at your organization look over this Account's electricity bill?

- ☐[1] At least once a month
- ☐[2] Once every 2 months
- ☐[3] Once every 3 months
- ☐[4] Once every 4 to 6 months
- ☐[5] Once or twice a year
- ☐[6] Never – we just pay it and/or our accounting department just pays it ⇒ SKIP TO Q28
- ☐[9] Don't know/not sure ⇒ SKIP TO Q28

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About Your Account's Bill

27. And when you or another decision maker at your organization does look at the Account's bill, which parts of it are typically looked at? (check all that apply)

☐[1] Total dollar amount owed, including taxes
☐[2] Total electricity consumption on the bill (kWh)

☐[3] Sub-total dollar amount specifically for each of the various energy blocks (ONLY IF INCLINGING/DECLINING CHOSEN IN Q12)
☐[4] Sub-total electricity consumption specifically for each of the various energy blocks (ONLY IF INCLINGING/DECLINING CHOSEN IN Q12)

☐[5] Sub-total dollar amount specifically for each of the various demand blocks (ONLY IF INCLINING CHOSEN IN Q20)
☐[6] Sub-total electricity consumption specifically for each of the various demand bocks (ONLY IF INCLINING CHOSEN IN Q20)

☐[7] Comparison to previous bills
☐[8] Daily average usage

☐[9] Other: please specify _____

☐[18] Don't know/not sure

☐[19] No part of the bill in particular

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About Your Account's Bill

28. How much of an understanding does your organization have about the factors that cause any changes in this Account's total electricity bill?

- ☐[1] A great deal of understanding
- ☐[2] A fair amount of understanding
- ☐[3] A little understanding
- ☐[4] No understanding at all ⇒ SKIP TO Q30
- ☐[9] Don't know/not sure ⇒ SKIP TO Q30

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About Your Account's Bill

29. Which one of the following is the most dominant factor in explaining the year-to-year changes that occur in this specific Account's total electricity bill? Which is the second most dominant factor? Any other factors? RANDOMIZE

	Most dominate factor (check one only)	Second most dominate factor (check one only)	All other factors (check all that apply)
Changes by BC Hydro in the energy charge (the price per kilowatt hour)	☐1	☐1	☐1
Changes by BC Hydro in the demand charge (price per kilowatt) (ONLY IF YES IN Q19)	☐2	☐2	☐2
The overall consumption level (total energy consumed) of the Account likely due to longer/shorter operating hours	☐3	☐3	☐3
The peak rate of consumption as reflected in the demand charge (ONLY IF YES IN Q19)	☐4	☐4	☐4
The addition, removal or change of equipment and machinery	☐5	☐5	☐5
Other factor: please specify _____	☐6	☐6	☐6
Other factor: please specify _____	☐7	☐7	☐7
Don't know/not sure	☐8	☐8	☐8
Not applicable – the Account's bill never really changes	☐9		

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Managing Electricity Use

30. Overall, how much of an effort would you say your organization is <u>currently</u> making to manage its use of electricity?

- ☐[1] A great deal of effort
- ☐[2] A fair amount of effort
- ☐[3] A little effort
- ☐[4] No effort at all
- ☐[9] Don't know/Not sure

31. And compared to one year ago, would you say your organization is making more of an effort to manage its use of electricity, less of an effort, or has there been no change?

- ☐[1] Much more of an effort
- ☐[2] A little more of an effort
- ☐[3] No change
- ☐[4] A little less of an effort
- ☐[5] Much less of an effort
- ☐[9] Don't know/not sure

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Managing Electricity Use – motivators

SKIP Q32 FOR ORGANIZATIONS WHICH MADE "NO EFFORT AT ALL" TO MANAGE IN Q30

In this section, we would like to learn about what motivated your organization to make an effort to manage its use of electricity over the past year.

32. For each item in the table below, please indicate how much of a factor it has had on your organization's effort to manage its use of electricity over the past year. RANDOMIZE

		Major factor	Minor factor	Not a factor	Don't know
a.	Due to economic downturn – we had to take more cost-cutting measures	☐1	☐2	☐3	☐9
b.	Just want operating costs to be as low as possible	☐1	☐2	☐3	☐9
c.	The incentive to conserve electricity that is built into BC Hydro's rate structure	☐1	☐2	☐3	☐9
d.	Overall level of electricity prices	☐1	☐2	☐3	☐9
e.	Overall level of natural gas prices	☐1	☐2	☐3	☐9
f.	To decrease pay-back time of capital investments	☐1	☐2	☐3	☐9
g.	Our suppliers and customers want us to conserve electricity	☐1	☐2	☐3	☐9
h.	Our employees want us to conserve electricity	☐1	☐2	☐3	☐9
i.	For the environment - it's just the right thing to do	☐1	☐2	☐3	☐9
j.	If applicable: Other factor (1): specify_____	☐1	☐2	☐3	☐9
k.	If applicable: Other factor (2): specify_____	☐1	☐2	☐3	☐9

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Managing Electricity Use – barriers

In this section, we would like to learn about the barriers your organization may have faced in any effort to manage its use of electricity over the past year.

33. For each item in the table below, please indicate how much of a barrier it has been on your organization's effort to manage its use of electricity over the past year. RANDOMIZE

		Major barrier	Minor barrier	No barrier	Don't know
a.	Lack of access to funding for capital investment into energy efficiency	☐1	☐2	☐3	☐9
b.	Lack of executive support	☐1	☐2	☐3	☐9
c.	Lack of staffing/staffing requirements	☐1	☐2	☐3	☐9
d.	Lack of knowledge of where the opportunities for savings might be	☐1	☐2	☐3	☐9
e.	Lack of financial incentives for conservation program and energy efficiency	☐1	☐2	☐3	☐9
f.	Can't control employees' behaviour in regards energy efficiency practices	☐1	☐2	☐3	☐9
g.	Insufficient pay-back of capital or operational investments in energy efficiency	☐1	☐2	☐3	☐9
h.	There are other operational priorities	☐1	☐2	☐3	☐9
i.	Takes too much time	☐1	☐2	☐3	☐9
j.	Current usage is already near its lowest possible level	☐1	☐2	☐3	☐9
k.	If applicable: Other barrier (1): specify_____	☐1	☐2	☐3	☐9
l.	If applicable: Other barrier (2): specify_____	☐1	☐2	☐3	☐9

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Managing Electricity Use – steps taken

Now we would like to learn about the actions or steps your organization may have taken to manage this Account's use of electricity over the past year.

This first set of questions is specifically about the installation of energy-efficient equipment and products.

34. For each item, please indicate if your organization undertook the measure in the past year to manage the electricity consumption specifically for this Account.

Be sure to select Not Possible if the energy-efficiency measure is not possible for this specific Account.

		Yes, for this Account	No, not for this Account	Not Possible for this Account	Don't know
a.	Installed energy-efficient lighting	☐1	☐2	☐3	☐9
b.	Installed lighting controls	☐1	☐2	☐3	☐9
c.	Installed power bars for computers	☐1	☐2	☐3	☐9
d.	Installed Computer Power Management Software for computer workstations	☐1	☐2	☐3	☐9

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Managing Electricity Use – steps taken

34. Here is a second set of energy-efficient steps related to the installation of energy-efficient equipment and products. For each item, please indicate if your organization undertook the measure in the past year to manage the electricity consumption specifically for this Account.

Be sure to select Not Possible if the energy-efficiency measure is not possible for this specific Account.

		Yes, for this Account	No, not for this Account	Not Possible for this Account	Don't know
e.	Installed energy-efficient components for commercial dishwashers	☐1	☐2	☐3	☐9
f.	Installed energy-efficient components for commercial kitchens	☐1	☐2	☐3	☐9
g.	Installed energy-efficient components for refrigeration	☐1	☐2	☐3	☐9
h.	Installed carbon monoxide sensors for exhaust fans	☐1	☐2	☐3	☐9
i.	Installed synchronous belt drives	☐1	☐2	☐3	☐9
j.	Installed energy-efficient components/controls for HVAC	☐1	☐2	☐3	☐9

34k. Were there any other energy-efficient equipment or products installed in the past year specifically for this Account?

☐1 Yes ⇒ please specify: _____ (comment: longer text box here)
☐2 No
☐9 Don't know

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Managing Electricity Use – steps taken

This next set of questions is specifically about operational, maintenance and behavioural measures.

35. For each item, please indicate if your organization undertook the measure more often than in the previous year to manage the electricity consumption specifically for this Account. RANDOMIZE

Be sure to select Not Applicable if the energy-efficiency measure is not possible for this specific Account.

	Compared to last year…	Yes, for this Account	No, not for this Account	Not Possible for this Account	Don't know
a.	Decreased the operating periods of equipment & machinery (not for maintenance)	☐1	☐2	☐3	☐9
b.	Decreased the number of peak consumption periods	☐1	☐2	☐3	☐9
c.	More often turned-off lights when they have not been used	☐1	☐2	☐3	☐9
d.	More often turned-off computers when they have not been used	☐1	☐2	☐3	☐9
e.	More often cleaned the HVAC coils	☐1	☐2	☐3	☐9
f.	Increased the number of maintenance periods for equipment & machinery	☐1	☐2	☐3	☐9
g.	More often checked the settings for the energy management system	☐1	☐2	☐3	☐9

35h. Were there any other operational, maintenance or behavioural measures undertaken in the past year specifically for this Account?

☐1 Yes ⇒ please specify: _____ (comment: longer text box here)
☐2 No
☐9 Don't know

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BC Hydro/Power Smart Programs

As you may know, BC Hydro has Power Smart programs that can provide assistance in support of its customers' efforts to manage their use of electricity, including:

- **BC Hydro/Power Smart Product Incentive Program**
- **BC Hydro/Power Smart Partners Program**
- **BC Hydro/Power Smart New Construction Program**
- **Continuous Optimization Program for Commercial Buildings**
- **Power Smart Partner Distribution Program**

36a. Prior to this survey, had your organization heard of any of these Power Smart programs?

☐[1] Yes, our organization was previously awareness of one or more of these programs ⇒ CONTINUE
☐[2] No, our organization was not previously awareness of any of these programs ⇒ SKIP TO 37 RULE
☐[9] Don't know/not sure ⇒ SKIP TO Q37 RULE

36b. And did your organization **participate in any of these programs or other Power Smart programs in the past year?**

☐[1] Yes
☐[2] No
☐[9] Don't know/not sure

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BC Hydro/Power Smart Programs

ASK 37 ONLY IF CUSTOMER IS ELIGIBLE FOR A KEY ACCOUNT MANAGER (SURVEY IDs 100,000-149,000 AND 200,000-249,000)

37. Some organizations' accounts have a BC Hydro Key Account Manager (KAM) assigned to them. Prior to this survey, had your organization heard of this additional support available via Key Account Managers?

☐[1] Yes, our organization was previously aware
☐[2] No, our organization was not previously aware
☐[9] Don't know/not sure

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Managing Electricity Use - influences

ASK Q38a IF PARTICIPATED IN ANY OF QUESTION 34 including other specify; ELSE SKIP TO Q39a
PIPE-IN ITEM c ONLY IF 'YES' IN Q36b; PIPE-IN ITEM d ONLY IF SURVEY IDs 100,000-149,000 AND 200,000-249,000

38a. You indicated earlier that your organization installed energy-efficient equipment and products over the past year such as (insert items from Q34). To what degree did each of the following influence your decision to install these items… RANDOMIZE

		Very influential	Somewhat influential	Not too influential	Not at all influential	Don't know
a.	Overall level of electricity prices	☐1	☐2	☐3	☐4	☐9
b.	The incentive to conserve electricity that is built into BC Hydro's rate structure	☐1	☐2	☐3	☐4	☐9
c.	BC Hydro/Power Smart program(s) (IF APPLICABLE)	☐1	☐2	☐3	☐4	☐9
d.	BC Hydro Key Account Manager (KAM ACCOUNTS ONLY)	☐1	☐2	☐3	☐4	☐9
e.	Contractors, vendors or customers	☐1	☐2	☐3	☐4	☐9
f.	Employees	☐1	☐2	☐3	☐4	☐9
g.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9
h.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9

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Managing Electricity Use - influences

ASK Q38b IF c OR d IN Q41a ARE “VERY INFLUENTIAL” OR “SOMEWHAT INFLUENTIAL”

38b. How likely is it that your organization would have installed energy-efficient equipment and products over the past year such as (insert items from Q34) even if it did not have the assistance from BC Hydro/Power Smart?

- ☐1 Definitely would have
- ☐2 Probably would have
- ☐3 Might or might not
- ☐4 Probably would not have
- ☐5 Definitely would not have
- ☐9 Don’t know/not sure

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Managing Electricity Use - influences

ASK Q39a IF DID ANY OF QUESTION 35 including other specify; ELSE SKIP TO 40a
PIPE-IN ITEM c ONLY IF 'YES' IN Q36b; PIPE-IN ITEM d ONLY IF SURVEY IDs 100,000-149,000 AND 200,000-249,000

39a. You indicated earlier that your organization implemented operational, maintenance and behavioural energy-efficiency measures over the past year such as (insert items from Q35). To what degree did each of the following influence your decision to make these operational changes… RANDOMIZE

		Very influential	Somewhat influential	Not too influential	Not at all influential	Don't know
a.	Overall level of electricity prices	☐1	☐2	☐3	☐4	☐9
b.	The incentive to conserve electricity that is built into BC Hydro's rate structure	☐1	☐2	☐3	☐4	☐9
c.	BC Hydro/Power Smart program(s) (IF APPLICABLE)	☐1	☐2	☐3	☐4	☐9
d.	BC Hydro Key Account Manager (KAM ACCOUNTS ONLY)	☐1	☐2	☐3	☐4	☐9
e.	Contractors, vendors or customers	☐1	☐2	☐3	☐4	☐9
f.	Employees	☐1	☐2	☐3	☐4	☐9
g.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9
h.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9

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Managing Electricity Use - influences

ASK Q39b IF c OR d IN Q39a ARE “VERY INFLUENTIAL” OR “SOMEWHAT INFLUENTIAL”

39b. How likely is it that your organization would have implemented operational, maintenance, or behavioural energy-efficient measures over the past year such as (insert items from Q35) even if it did not have the assistance from BC Hydro/Power Smart?

- ☐[1] Definitely would have
- ☐[2] Probably would have
- ☐[3] Might or might not
- ☐[4] Probably would not have
- ☐[5] Definitely would not have
- ☐[9] Don’t know/not sure

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Managing Electricity Use – looking forward

40a. Looking forward into the next year, would you say your organization will make more of an effort to manage its use of electricity compared to this past year, less of an effort, or do you anticipate no change?

- ☐[1] Much more of an effort than in this past year ⇒ CONTINUE WITH Q40b and c
- ☐[2] A little more of an effort than in this past year ⇒ CONTINUE WITH Q40b and c
- ☐[3] No change ⇒ SKIP TO Q40d
- ☐[4] A little less of an effort than in this past year ⇒ SKIP TO Q40e
- ☐[5] Much less of an effort than in this past year ⇒ SKIP TO Q40e
- ☐[9] Don't know/not sure ⇒ SKIP TO Q41

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Managing Electricity Use – looking forward

40b. For what reasons do you foresee the organization making more of an effort over the next year to manage its use of electricity? (In consideration of privacy issues, please do not reference any individuals' names.) **(OPEN-END)**

40c. And what sort of things do you foresee the organization doing over the next year in making more of an effort to manage its use of electricity? (In consideration of privacy issues, please do not reference any individuals' names.) **(OPEN-END)**

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THEN SKIP TO Q41

Managing Electricity Use – looking forward

ASK Q40d ONLY FOR "NO CHANGE" IN q40a

40d. For what reasons do you foresee the organization making no change in effort over the next year to manage its use of electricity? (In consideration of privacy issues, please do not reference any individuals' names.) **(OPEN-END)**

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THEN SKIP TO Q41

Managing Electricity Use – looking forward

ASK Q40e ONLY FOR "LESS OF AN EFFORT" IN q40a

40e. For what reasons do you foresee the organization making less of an effort over the next year to manage its use of electricity? (In consideration of privacy issues, please do not reference any individuals' names.) **(OPEN-END)**

<< BACK EXIT NEXT >>

Expectations and Ratings of BC Hydro

In this section, we would like to understand how important various aspects of BC Hydro's service delivery are to your organization as well as your rating as to how well BC Hydro is performing on each one.

41. This first set of importance/performance questions relates to billing. For each item, please check the number that corresponds to how important that service aspect is to your organization followed by your rating of BC Hydro on that service aspect.

a. BC Hydro has bills/statements that clearly show how the total amount owed is calculated								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
b. BC Hydro has bills/statements that are easy to read and understand								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
c. BC Hydro provides the right amount of detail on the bill								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

<< BACK EXIT NEXT >>

Expectations and Ratings of BC Hydro

41. Here is another set of importance/performance questions that relates to billing. For each item, please check the number that corresponds to how important that service aspect is to your organization followed by your rating of BC Hydro on that service aspect.

d. BC Hydro offers convenient methods of paying your bill(s)								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
e. BC Hydro offers the ability to download your billing and consumption information on-line This is the NEW e)								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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Expectations and Ratings of BC Hydro

42. This set of importance/performance questions relates to your energy efficiency needs. For each item, please check the number that corresponds to how important that service aspect is to your organization followed by your rating of BC Hydro on that service aspect.

a. BC Hydro encourages my organization to make efficient use of electricity								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
b. BC Hydro provides information on how my organization can reduce electricity consumption								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
c. BC Hydro provides financial incentives to reduce initial costs of energy efficiency related investments								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
d. BC Hydro provides workshops on how to reduce energy usage								
Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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Expectations and Ratings of BC Hydro

42. Here is another set of importance/performance questions that relates to your energy efficiency needs. For each item, please check the number that corresponds to how important that service aspect is to your organization followed by your rating of BC Hydro on that service aspect.

e. BC Hydro provides information on energy use best practices								
	Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
f. BC Hydro provides on-site audits to identify energy savings opportunities								
	Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
g. BC Hydro provides experts to help plan and implement energy efficient activities								
	Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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Expectations and Ratings of BC Hydro

43. This set of importance/performance questions relates to electricity rates. For each item, please check the number that corresponds to how important that service aspect is to your organization followed by your rating of BC Hydro on that service aspect.

a.	BC Hydro provides the appropriate financial incentive built into the rate structure to conserve electricity or encourage energy efficient investments.							
	Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
b.	BC Hydro provides rates that are predictable over time							
	Importance ⇒	1 Not at all important	2	3	4 Neutral	5	6	7 Very important	☐ Don't know
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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OLD QUESTION 44 DELETED - RENUMBER REMAINING QUESTIONS

Your Contact with BC Hydro

44a. During the past year, how many times did you personally contact BC Hydro on behalf of your organization?

___ time(s), IF ZERO, CHECK HERE ☐ AND SKIP TO QUESTION 45a

44b. Thinking about the past year, what were the reason(s) for contacting BC Hydro on behalf of your organization? (check all that apply)

- ☐1 Account balance
- ☐2 Billing inquiry or resolve billing issue
- ☐3 Connect/disconnect service
- ☐4 Consumption history
- ☐5 Meter reading inquiry
- ☐6 Outage information or inquiry
- ☐7 Payment arrangements plans
- ☐8 Power Smart/conservation/energy efficiency information
- ☐9 Rates enquiry/information
- ☐10 Safety enquiries
- ☐11 Other (please specify): _____
- ☐99 Don't know/not sure

44c. What service channel did you use for your last contact with BC Hydro? (check one only)

- ☐1 Key Account Manager via in-person meeting (ONLY FOR IDs 100,000-149,000 and 200,000-249,000)
- ☐2 Key Account Manager via telephone (ONLY FOR IDs 100,000-149,000 and 200,000-249,000)
- ☐3 Key Account Manager via email (ONLY FOR IDs 100,000-149,000 and 200,000-249,000)
- ☐4 Call centre agent via telephone
- ☐5 Automated phone system
- ☐6 Email into general inbox
- ☐7 Other (please specify): _____
- ☐9 Don't know/not sure

44d. Thinking about your last contact with BC Hydro, how would you rate the service?

1	2	3	4	5	6	7	☐
Very Poor						Excellent	Don't know

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Your Experience with BC Hydro's Website

45a. Have you personally visited BC Hydro's website during the past year on behalf of your organization?

☐[1] Yes
☐[2] No (SKIP TO QUESTION 46)

45b. How often do you typically visit BC Hydro's website on behalf of your organization?

☐[1] At least once a week
☐[2] Once to a few times a month
☐[3] Every couple of months or so
☐[4] Once or twice a year

45c. Thinking about the past year, what were the reason(s) for visiting BC Hydro's website on behalf of your organization? (check all that apply)

☐[1] Account balance
☐[2] Billing inquiry or resolve billing issue
☐[3] Connect/disconnect service
☐[4] Consumption history
☐[5] Meter reading inquiry
☐[6] Outage information or inquiry
☐[7] Payment arrangements plans
☐[8] Power Smart/conservation/energy efficiency information
☐[9] Rates enquiry/information
☐[10] Safety enquiries

☐[11] Other (please specify): _____

☐[99] Don't know/not sure⇒ SKIP TO Q47

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Your Experience with BC Hydro's Website

ASK 45d-f FOR UP TO 3 MENTIONS IN 46c; IF MORE THAN 3 MENTIONS, ENSURE THE FOLLOWING ARE INCLUDED (Rate enquiry/information; Power Smart /conservation/energy efficiency information; Consumption History)

45d. Thinking about your visits over the past year to BC Hydro's website specifically for (insert code from Q45c), how would you rate the performance of the website in providing you with the information you needed?

1	2	3	4	5	6	7	☐
Very Poor						Excellent	Don't know

45e. Thinking about your visits over the past year to BC Hydro's website specifically for (insert code from Q45c), how would you rate the performance of the website in providing you with the information you needed?

1	2	3	4	5	6	7	☐
Very Poor						Excellent	Don't know

45f. Thinking about your visits over the past year to BC Hydro's website specifically for (insert code from Q45c), how would you rate the performance of the website in providing you with the information you needed?

1	2	3	4	5	6	7	☐
Very Poor						Excellent	Don't know

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Your Overall Service Rating

46. How would you rate BC Hydro in terms of the overall service it provides? Please check the number on the corresponding 7-point scale where 1 means 'very poor' and 7 means 'excellent'.

1 Very Poor	2	3	4	5	6	7 Excellent	☐ Don't know

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Your Communications Preferences

Listed below are various methods in which you can interact with BC Hydro.

- **Email**
- **BC Hydro website (completing an online form)**
- **Automated phone system (using a touch tone phone, no communication with a person)**
- **Call centre agent (calling BC Hydro and speaking directly to a person)**
- **Key Account Manager (a specific BC Hydro representative) [ONLY FOR IDs 100,000-149,000 and 200,000-249,000]**

47. For each scenario below, please indicate your most preferred method of interaction. [SHOW CONTACT YOUR KEY ACCOUNT MANAGER ONLY FOR IDs 100,000-149,000 and 200,000-249,000]

a.	To provide feedback to BC Hydro					
	☐1 Send an Email	☐2 Access BC Hydro's website	☐3 Use automated phone system	☐4 Phone a call centre agent	☐5 Contact your Key Account Manager	☐9 Don't know/ Not sure
b.	To enquire about a billing discrepancy					
	☐1 Send an Email	☐2 Access BC Hydro's website	☐3 Use automated phone system	☐4 Phone a call centre agent	☐5 Contact your Key Account Manager	☐9 Don't know/ Not sure
c.	To get information about your past electricity usage					
	☐1 Send an Email	☐2 Access BC Hydro's website	☐3 Use automated phone system	☐4 Phone a call centre agent	☐5 Contact your Key Account Manager	☐9 Don't know/ Not sure

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Your Communications Preferences

47. Here is another set of scenarios. For each one, please indicate your <u>most preferred</u> method of interaction.

Please note the addition of a Workshop as one of the options.

d. To get information about conservation/energy efficiency programs and tips

☐1 Send an Email	☐2 Access BC Hydro's website	☐3 Use automated phone system	☐4 Phone a call centre agent	☐5 Contact your Key Account Manager	☐6 At a workshop	☐9 Don't know/ Not sure

e. To sign-up to participate in conservation/energy efficiency programs and tips

☐1 Send an Email	☐2 Access BC Hydro's website	☐3 Use automated phone system	☐4 Phone a call centre agent	☐5 Contact your Key Account Manager	☐6 At a workshop	☐9 Don't know/ Not sure

f. To get information about rates and changes in rates

☐1 Send an Email	☐2 Access BC Hydro's website	☐3 Use automated phone system	☐4 Phone a call centre agent	☐5 Contact your Key Account Manager	☐6 At a workshop	☐9 Don't know/ Not sure

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Your Communications Preferences

48. If BC Hydro wanted to send you information, how would you like to receive it? For each scenario, please indicate your most preferred method of receiving information.

[SHOW DIRECT LIASISON WITH YOUR KEY ACCOUNT MANAGER ONLY FOR IDs 100,000-149,000 and 200,000-249,000]

a. To receive information about rates and changes in rates

☐1 Receive an Email	☐2 In the mail from Canada Post	☐3 Receive a phone call from a customer service representative	☐4 Direct liaison with your Key Account Manager	☐5 At tradeshows and industry events	☐6 Informational advertising in the media
				☐7 At a workshop	☐9 Don't know/ Not sure

b. To receive information about conservation/energy efficiency programs and tips

☐1 Receive an Email	☐2 In the mail from Canada Post	☐3 Receive a phone call from a customer service representative	☐4 Direct liaison with your Key Account Manager	☐5 At tradeshows and industry events	☐6 Informational advertising in the media
				☐7 At a workshop	☐9 Don't know/ Not sure

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Final Words

49. The key objective of this survey is to collect the necessary information to inform our program evaluation and load forecasting functions for estimating how domestic electricity requirements are evolving. To do this, it is important to have this Account's annual electricity consumption.

Rather than asking you to estimate how much electricity this Account has consumed over the past year, BC Hydro would like to access this information from your account history and link it to the responses you have given in this survey.

May we please have your permission for BC Hydro to do this?

☐[1] Yes
☐[2] No

50. From time to time, BC Hydro conducts follow-up research with survey respondents – either in the form of a survey or a paid discussion group to hear from them first-hand. When we do so, we like to invite people who might be similar to each other and this can be most effectively done by selecting them from the original survey data. This can only be achieved by having a respondent's permission to link their survey responses to their contact information.

When we conduct research in regards to service and/or electricity conservation planning and wish to invite you, may we please have your permission to link your survey responses to your contact information? Of course, your survey responses would remain confidential in a secure environment and would not be used on an individual basis for other purposes.

☐[1] Yes
☐[2] No

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Final Words

50. Are you the original recipient of the survey invitation or was it forwarded along to you by a colleague?

- ☐[1] Original recipient
- ☐[2] The survey was forwarded to me
- ☐[3] Don't know/not sure

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Please indicate your name and phone number below if you wish to be entered into the draw for one of four $500 gift certificates to a home improvement retailer of your choice. Official rules and regulations are detailed here.

First Name: **Last Name:** **Telephone:**

☐ **No thanks.**

2012 Survey

Rates, Conservation and Energy Efficiency Survey

INTRODUCTION TEXT

Thank you for taking the time to complete this Rates, Conservation and Energy Efficiency Survey.

{For Survey IDs 100,000 -179,999}

Please complete the survey specifically in regards to your organization's use of electricity located at: (insert service address, service town)

If you feel another colleague has a greater understanding of this Account, then you may forward the original email invitation to that person.

{For Survey IDs - 200,000-279,999}

Your organization uses electricity via two or more meters located at: (insert service address, service town)

Please complete the survey specifically in regards to the largest Account at this address – that is, the meter with the highest consumption of electricity.

If you feel another colleague has a greater understanding of this Account, then you may forward the original email invitation to that person.

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About this Account

1. Which of the following best describes the ownership of this Account?

☐[1] Government or public sector
☐[2] Non-governmental organization (non-profit)
☐[3] For profit ⇒ Which of the following best describes the for profit business?

- ☐[4] Independently owned
- ☐[5] Franchise (i.e. Tim Hortons)
- ☐[6] Part of a chain (i.e. The Bay)
- ☐[6] Don't know

☐[9] Don't know/Not sure

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About this Account

2. Please check the one box that indicates the primary activity related to this Account. (check one only)

☐[1] Agriculture/Fishing	☐[14] Healthcare/Hospitals
☐[2] Arts/Entertainment/Film	☐[15] Hospitality/Lodging/Tourism
☐[3] Automotive	☐[16] Manufacturing
☐[4] Banking/Finance/Insurance	☐[17] Membership Organizations
☐[5] Building or Property Management	☐[18] Mining
☐[6] Business/Professional Services	☐[19] Personal Services
☐[7] Camps/Recreation/Sports/Amusement	☐[20] Restaurants and food service
☐[8] Charity/Not for profit	☐[21] Retail Trade (non-food)
☐[9] Communications/Media	☐[22] Retail Food Stores
☐[10] Construction/Home & Building Contractors	☐[23] Wholesale and Distribution
☐[11] Education	☐[24] Transportation
☐[12] Forestry	☐[25] Utilities & Energy
☐[13] Government - Local/Provincial/Federal	
☐[26] Other (specify _____)	

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About this Account

3. Which of the following best describes the relationship between the organization this Account is located at and the building it is located in? (check one only)

This organization…

☐[1] Owns or co-owns the whole building
☐[2] Owns or co-owns only the part of the building it occupies

☐[3] Has a short-term lease or sub-lease (less than 2 years)
☐[4] Has a medium-term lease or sub-lease (2 - 5 years)
☐[5] Has a long-term lease or sub-lease (more than 5 years)

☐[9] Don't know

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About this Account

4. Please estimate the total square footage of the premises that this Account is located at. Please take into consideration recessed floors, but exclude parking levels, parking structures and garages.

_____ square feet OR _____ square meters ☐[3] Don't know/not sure

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About this Account

5. Thinking about your answer to the previous question, what percentage of the floor space at the premises is currently occupied? (exclude parking and storage areas)

_____ % occupied ☐[999] Don't know/not sure

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About this Account

6. On a typical week day, what is the average number of people (i.e. employees, customers, students, visitors, patients) present at this organization's address during the daytime? (Please check 0 if none.)

_____ ☐[0] 0 (none) ☐[999] Don't know/Not sure

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About You

7. Which of the following best describes your position/title within the organization: (check one only)

- ☐[1] Business owner or co-owner
- ☐[2] Executive
- ☐[3] Facility or property manager/supervisor
- ☐[4] General manager
- ☐[5] Energy manager
- ☐[6] Operations or maintenance manager
- ☐[7] Operations or maintenance technician/engineer
- ☐[8] Finance manager
- ☐[9] Purchasing manager
- ☐[10] Accountant/Bookkeeper

☐[11] Other (please specify) _____

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About You

8. For each of the following, please indicate whether you are primarily or jointly responsible for decision making in relation to the organization that this Account is located at, whether someone else is, or whether it is not applicable to the organization.

Decisions related to…	Yes, I am the primary or joint decision maker	No, someone else is the decision maker	Not applicable at this organization
a. Capital investments	☐1	☐2	☐3
b. Investments in energy-efficient equipment	☐1	☐2	☐3
c. Production/operating schedule of equipment	☐1	☐2	☐3
d. Energy management	☐1	☐2	☐3
e. Maintenance of equipment	☐1	☐2	☐3
f. Hours of operation	☐1	☐2	☐3
g. Finance/accounting	☐1	☐2	☐3

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About Your Account's Rate

As you may know, there are a variety of rate structures that utility companies can implement for their various customer groups. Generally speaking, rates structures can include, but are not limited to, combinations of an energy charge, a demand charge, and a basic charge.

In this section of the survey, we would like to explore your awareness and understanding of the rate structure that may apply to this Account.

REMINDER

In this section, we are interested in your current understanding of the rate structure that you believe this Account is on and your top-of-mind thoughts about it.

We ask you not to view any of your bills or other BC Hydro correspondence while completing this section of the survey.

THANK YOU!

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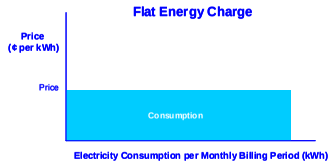
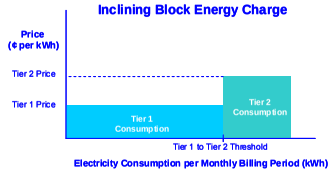
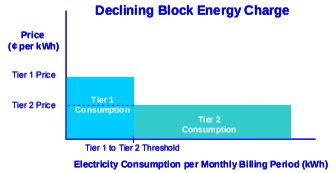
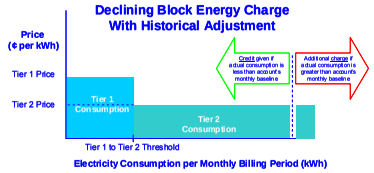
About Your Account's Rate – the energy charge

The energy charge is the price per kilowatt hour of electricity consumed (kWh).

9. Please indicate which one of the following types of energy charges (for kWh usage) you believe applies to this Account. Please scroll down…

☐1	**Flat Energy Charge** The price per kilowatt hour of electricity is constant regardless of the amount of electricity used in a monthly billing period.	
☐2	**Inclining Block Energy Charge** The price per kilowatt hour of electricity is lower for the first portion of electricity used, and steps up to a higher price for any additional consumption beyond a specified threshold in a monthly billing period.	
☐3	**Declining Block Energy Charge** The price per kilowatt hour of electricity is higher for the first portion of electricity used, and steps down to a lower price for any additional consumption beyond a specified threshold in a monthly billing period.	
☐4	**Declining Block Energy Charge with Historical Adjustment** Similar to the declining block energy charge (as above), but with an additional credit and charge adjustment based on a comparison of the account's current usage versus its historical monthly baseline.	
☐5	Other type of energy charge: please specify _____	
☐9	Don't know/not sure	

About Your Account's Rate (for LGS and MGS tranche 1)

SHOW PREAMBLE BELOW ONLY IF LGS OR MGS TRANCHE 1 (SURVEY IDs 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999)

ELSE SKIP TO PREAMBLE FOR Q17 FOR MGS TRANCHES 2 AND 3

PREAMBLE FOR Q10

FOR SURVEY IDs 100,000-109,999; 150,000-159,999; 200,000-209,999; 250,000-259,999): **In January 2011, BC Hydro changed the method it charges Large General Service (LGS) accounts for their consumption of electricity from a declining block energy charge to a conservation rate structure with customer baselines.**

FOR SURVEY IDs 110,000-119,999; 160,000-169,999; 210,000-219,999; 260,000-269,999): **In April 2012, BC Hydro changed the method it charges some Medium General Service (MGS) accounts – those with maximum demand 85 kW to less than 150 kW such as this one – for their consumption of electricity from a declining block energy charge to a conservation rate structure with customer baselines.**

ALL: **This rate structure – called a conservation rate – is designed to encourage customers to use less electricity than they have historically done so (called the baseline). Using less electricity than your baseline results in a CREDIT on your bill. Using more than your baseline results in an additional CHARGE.**

Here's a closer look as to how it works:

1. **The conservation rate starts with an account's monthly baseline – its 3-year historical average consumption for that month.**
2. **The energy charge for the account's current month's energy usage has two parts.**
3. **In Part 1 of the energy charge, the customer pays one price (Tier 1) for up to 14,800 kWh in the month, and a second, lower price (Tier 2) for any additional KWh compared to the month's baseline. If the account's actual usage is equal to its baseline, then there is no Part 2 adjustment.**
4. **In Part 2 of the energy charge, an adjustment is made if there is a difference between the account's actual consumption in the month versus its 3-year baseline.**
    - **If the actual month's usage is less than the baseline average, then the customer account receives a credit; and a portion of the credit is at a higher price;**
    - **If the actual month's usage is greater than the baseline average, then the customer account receives an additional charge; and the charge is at the same higher price reflecting the cost of new supply;**

About Your Account's Rate (for LGS and MGS tranche 1)

(FOR SURVEY IDS 100,000-109,999; 150,000-159,999; 200,000-209,999; 250,000-259,999

10. Having read a little more about the conservation rate that BC Hydro uses for charging Large General Service accounts for their consumption of electricity, how easy or difficult would you say it is to understand how the rate works?

FOR SURVEY IDs 110,000-119,999; 160,000-169,999; 210,000-219,999; 260,000-269,999

10. Having read a little more about the conservation rate that BC Hydro uses for charging some Medium General Service accounts – those with maximum demand 85 kW to less than 150 kW such as this one – for their consumption of electricity, how easy or difficult would you say it is to understand how the rate works?

- ☐[1] Very easy
- ☐[2] Somewhat easy
- ☐[3] Somewhat difficult
- ☐[4] Very difficult
- ☐[9] Don't know/not sure

About Your Account's Rate (for LGS and MGS tranche 1)

11. Which of the following statements best describes your awareness of how BC Hydro charges this (FOR SURVEY IDS 100,000-109,999; 150,000-159,999; 200,000-209,999; 250,000-259,999 "**Large**"; FOR SURVEY IDs 110,000-119,999; 160,000-169,999; 210,000-219,999; 260,000-269,999 "**Medium**") **General Service Account for its consumption of electricity?**

☐[1] Prior to this survey, I was aware that BC Hydro's charges this Account for its consumption of electricity on this conservation rate structure

☐[2] Now that it has been mentioned, I had heard that BC Hydro charges this Account for its consumption of electricity on this conservation rate structure

☐[3] This is the first time I have heard that this Account is charged on this conservation rate structure ⇒ SKIP TO Q16

☐[99] Don't know ⇒ SKIP TO Q16

About Your Account's Rate (for LGS and MGS tranche 1)

12. How did you first become aware of this conservation rate? (choose one only)

- ☐[1] Email notification
- ☐[2] Letter notification via Canada Post
- ☐[3] Personal notification from BC Hydro representative (in-person or via telephone)
- ☐[4] BC Hydro website (general)
- ☐[5] BC Hydro eNewsletters
- ☐[6] An energy consultant
- ☐[7] Word of mouth such as from a colleague or friend
- ☐[8] Other: please specify _____
- ☐[99] Don't know

About Your Account's Rate (for LGS and MGS tranche 1)

13. How well of an understanding would you say you actually had – prior to receiving this survey – about the conservation rate that BC Hydro uses for charging this (FOR SURVEY IDS 100,000-109,999; 150,000-159,999; 200,000-209,999; 250,000-259,999 "**Large**"; FOR SURVEY IDs 110,000-119,999; 160,000-169,999; 210,000-219,999; 260,000-269,999 "**Medium**") **General Service Account?**

☐[1] Excellent understanding
☐[2] Good understanding
☐[3] Fair understanding
☐[4] Poor understanding ⇒ SKIP TO Q15
☐[5] Very poor understanding ⇒ SKIP TO Q15
☐[99] Don't know ⇒ SKIP TO Q15

About Your Account's Rate (for LGS and MGS tranche 1)

14. Regardless of how you first become aware of the conservation rate, which communications method did you find most helpful in understanding how the rate works? (choose one only)

☐[1] Email Notification
☐[2] Letter via Canada Post
☐[3] Personal discussions from BC Hydro representative (in-person or via telephone)
☐[4] Forecaster tool on BC Hydro's website
☐[5] Video tutorial on BC Hydro's website
☐[6] BC Hydro website (general)
☐[7] Discussions with a colleague or friend
☐[8] Discussions with an energy consultant

☐[9] Other: please specify _____

☐[99] Don't know

About Your Account's Rate (for LGS and MGS tranche 1)

15. Thinking about the higher price that is applied to Part 2 credits or charges, which one of the following best reflects your understanding of the basis for this price? (choose one only)

☐[1] To reward customers who use less energy than their baseline, and to penalize those that use more.

☐[2] To reflect BC Hydro's costs to secure or save this additional energy (the difference between actual energy consumed and the baseline)

☐[99] Don't know

About Your Account's Rate (for LGS and MGS tranche 1)

16. Thinking about the conservation rate that applies to this Account, how much of an incentive does this type of energy charge have on any of your organization's efforts to minimize electricity bills related to this Account?

- ☐[1] Has a major incentive
- ☐[2] Has a minor incentive
- ☐[3] Has no incentive at all
- ☐[9] Don't know/not sure

THEN ALL LGS AND MGS TRANCHE 1 SKIP TO Q21 (SURVEY IDs 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999 SKIP TO Q21)

About Your Account's Rate (for MGS tranches 2 and 3)

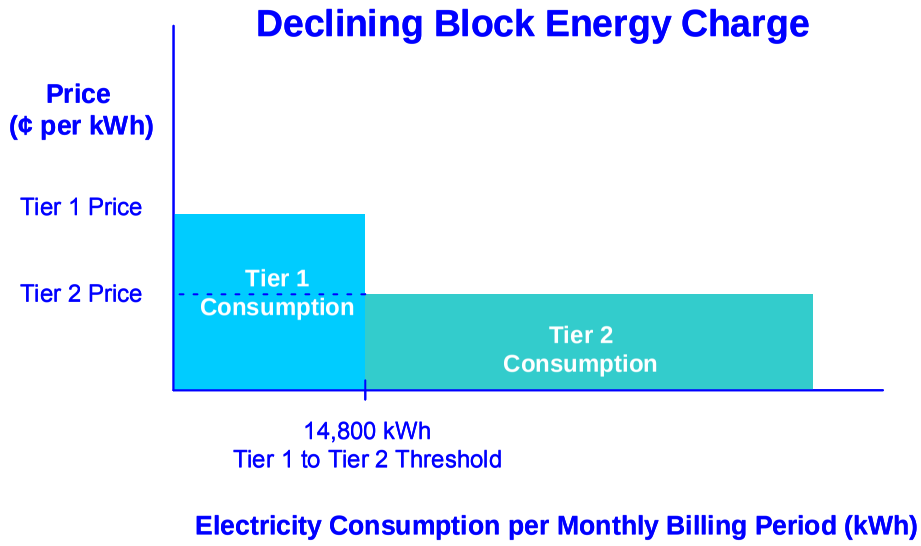
SHOW PREAMBLE BELOW ONLY IF MGS TRANCHES 2 AND 3: (SURVEY IDs 120-129,999; 170,000-179,999; 220,000-229,999; 270,000-279,999);

PREAMBLE FOR Q17

Some Medium General Service (MGS) accounts – those with maximum demand less than 85 kW such as this one – are charged on a declining block energy charge.

Here's a closer look as to how it works:

1. **The customer pays one price (Tier 1) for up to 14,800 kWh in the month, and a second, lower price (Tier 2) for any additional KWh beyond 14,800 kWh.**



About Your Account's Rate (for MGS tranches 2 and 3)

17. Having read a little more about the declining block energy charge that BC Hydro uses for charging these types of Medium General Service accounts – those with maximum demand less than 85 kW – for their consumption of electricity, how easy or difficult would you say it is to understand how the rate works?

- ☐[1] Very easy
- ☐[2] Somewhat easy
- ☐[3] Somewhat difficult
- ☐[4] Very difficult
- ☐[9] Don't know/not sure

About Your Account's Rate (for MGS tranches 2 and 3)

18. Which of the following statements best describes your awareness of BC Hydro's current method of charging these types of Medium General Service accounts – those with maximum demand less than 85 kW – for their consumption of electricity?

☐[1] Prior to this survey, I was aware that BC Hydro's current method of charging these Medium General Service accounts for their consumption of electricity is on a declining block energy charge

☐[2] Now that it has been mentioned, I have heard that BC Hydro's current method of charging these Medium General Service accounts for their consumption of electricity is on a declining block energy charge

☐[6] This is the first time I have heard that these accounts are billed on a declining block energy charge ⇒ SKIP TO Q20

☐[99] Don't know ⇒ SKIP TO Q20

About Your Account's Rate (for MGS tranches 2 and 3)

19. How well of an understanding would you say you actually had – prior to receiving this survey – about the declining block energy charge that BC Hydro uses for charging these types of Medium General Service accounts?

- ☐[1] Excellent understanding
- ☐[2] Good understanding
- ☐[3] Fair understanding
- ☐[4] Poor understanding
- ☐[5] Very poor understanding
- ☐[99] Don't know

About Your Account's Rate (for MGS tranches 2 and 3)

20. Thinking about the declining block energy charge that applies to this Account, how much of an incentive does this type of energy charge have on any of your organization's efforts to minimize electricity bills related to this Account?

- ☐[1] Has a major incentive
- ☐[2] Has a minor incentive
- ☐[3] Has no incentive at all
- ☐[9] Don't know/not sure

About Your Account's Rate – the energy charge

ASK ALL

21. Assuming your organization wanted to do so, how easy or difficult is it to currently manage this Account to minimize the total energy charges on the bill?

This might be done by installing energy-efficient measures, decreasing production, etc.

- ☐[1] Very easy
- ☐[2] Somewhat easy
- ☐[3] Somewhat difficult
- ☐[4] Very difficult
- ☐[9] Don't know/not sure

22. How much of an effort does your organization currently make managing this Account to minimize the total energy charges on the bill?

- ☐[1] A great deal of effort
- ☐[2] A fair amount of effort
- ☐[3] A little effort
- ☐[4] No effort at all
- ☐[5] Not Applicable – there is little opportunity to manage the energy charges related to this Account.
- ☐[9] Don't know/not sure

<< BACK EXIT NEXT >>

About Your Account's Rate – the energy charge

ASK ALL

23. **Overall, does your organization support or oppose the** (INSERT "**conservation rate**" FOR SURVEY IDs 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999); INSERT "**declining block energy charge**" FOR (SURVEY IDs 120,000-129,999; 170,000-179,999; 220,000-229,999; 270,000-279,999) **that applies to this Account, or is it indifferent about it?**

- ☐[1] Strongly support
- ☐[2] Somewhat support
- ☐[3] Indifferent
- ☐[4] Somewhat oppose
- ☐[5] Strongly oppose
- ☐[9] Don't know/not sure

SHOW APPROPRIATE GRAPH TO THE RIGHT AS PER THE CONSERVATION RATE OR DECLINING BLOCK ENERGY CHARGE

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About Your Account's Rate – the demand charge

ASK ALL

The demand charge reflects the peak rate – measured in kilowatts (kW) – at which electricity is being consumed.

24. Prior to this survey, had you ever heard of a demand charge?

☐[1] Yes ⇒ CONTINUE
☐[2] No ⇒ SKIP TO Q32
☐[9] Don't know/not sure ⇒ SKIP TO Q32

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About Your Account's Rate – the demand charge

25. Based on your understanding, does the rate structure for this Account include a demand charge?

☐[1] Yes ⇒ CONTINUE
☐[2] No ⇒ SKIP TO Q32
☐[9] Don't know/not sure ⇒ SKIP TO Q32

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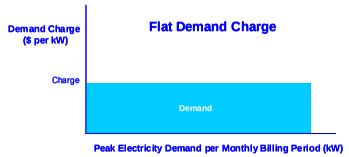
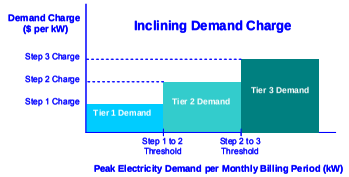
About Your Account's Rate – the demand charge

26. Please indicate which one of the following types of demand charges (for kW usage) you believe applies to this Account.

The demand charge for this Account is…

☐[1]	Flat ⇒ SKIP TO Q28	
☐[2]	The demand charge steps-up to a higher amount when electricity is being used at a high rate. This is known as an inclining block demand charge. ⇒ CONTINUE	
☐[9]	Don't know/not sure ⇒ SKIP TO Q28	

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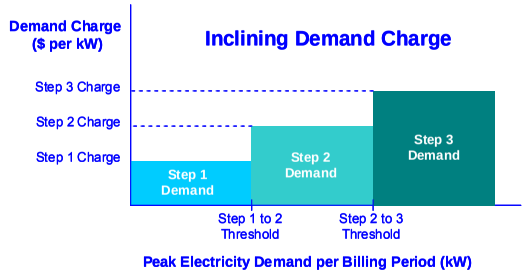
About Your Account's Rate – the demand charge

27a. You indicated that you believe this Account has an inclining block demand charge. At what level of demand do you believe the demand charge steps-up from Step 1 to Step 2?

_____ **kW** ☐9 Don't know/not sure

27b. And at what level of demand do you believe the demand charge steps-up from Step 2 to Step 3?

_____ **kW** ☐9 Don't know/not sure

	SHOW GRAPH	

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About Your Account's Rate – the demand charge

28. In fact, all Large and Medium General Service accounts have an inclining block demand charge. How much of an incentive does this inclining block demand charge have on any of your organization's efforts to minimize electricity bills related to this Account?

- ☐[1] Has a major incentive
- ☐[2] Has a minor incentive
- ☐[3] Has no incentive at all
- ☐[9] Don't know/not sure

29. Assuming your organization wanted to do so, how easy or difficult is it to currently manage this Account to minimize the total demand charges on the bill?

This might be done by installing energy-efficient measures, trimming/displacing peak consumption, etc.

- ☐[1] Very easy
- ☐[2] Somewhat easy
- ☐[3] Somewhat difficult
- ☐[4] Very difficult
- ☐[9] Don't know/not sure

30. How much of an effort does your organization make managing this Account to minimize the total demand charges on the bill?

- ☐[1] A great deal of effort
- ☐[2] A fair amount of effort
- ☐[3] A little effort
- ☐[4] No effort at all
- ☐[5] Not Applicable – there is little opportunity to manage the demand charges related to this account.
- ☐[9] Don't know/not sure

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About Your Account's Rate – the demand charge

31a. Overall, does your organization support or oppose the inclining block type of demand charge that applies to this Account, or is it indifferent about it?

- ☐[1] Strongly support
- ☐[2] Somewhat support
- ☐[3] Indifferent ⇒ SKIP TO Q32
- ☐[4] Somewhat oppose
- ☐[5] Strongly oppose
- ☐[9] Don't know/not sure ⇒ SKIP TO Q32

SHOW CHART ILLUSTRATING INCLINING DEMAND CHARGE

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About Your Account's Rate – the demand charge

31b. For what reasons does your organization (INSERT FROM Q31a: VALUE LABEL FOR CODE 1, 2, 3 OR 4) **the inclining block type of demand charge that applies to this Account?** (In consideration of privacy issues, please do not reference any individuals' names.) (OPEN-END)

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About How this Account Uses Electricity (ASK ALL)

32. In this section of the survey, we would like to gain an in-depth understanding of how the electricity *in relation to this specific Account* is used.

For each item, please choose one of the following:

1. Yes, electricity in relation to this specific Account is used to power the item, or

SHOW CODE 2 BELOW FOR SURVEY IDS 200-000 – 279,999 INCLUSIVE

2. No, but electricity in relation to a different Account at this organization's address is used to power the item, or

3. None of your Accounts at this organization's address are used to power the item

	Yes, this Account	No, but a different Account at this address is for this	No, none of our Accounts at this address is for this	Don't know/ Not sure
a. Indoor lighting	☐1	☐2	☐3	☐9
b. Outdoor lighting	☐1	☐2	☐3	☐9
c. Light computer equipment such as personal computers, photocopiers and printers	☐1	☐2	☐3	☐9
d. Heavy computer equipment such mainframe computers and servers	☐1	☐2	☐3	☐9
e. Light electric cooking equipment such as microwave ovens, electric toasters, etc.	☐1	☐2	☐3	☐9
f. Heavy electric cooking equipment such as electric ovens, electric stoves, electric grills, exhaust fans, steamers, ice makers, etc.	☐1	☐2	☐3	☐9
g. Light refrigeration/freezer equipment such as bar fridges, household fridges and freezers	☐1	☐2	☐3	☐9
h. Heavy refrigeration/freezer equipment such as walk-in units, open and closed vertical/horizontal units	☐1	☐2	☐3	☐9

About How this Account Uses Electricity

32. Here are some more items we would like you to consider in relation to this specific Account.

For each item, please choose one of the following:

1. Yes, electricity in relation to this specific Account is used to power the item, or

SHOW CODE 2 BELOW FOR SURVEY IDS 200-000 – 279,999 INCLUSIVE

2. No, but electricity in relation to a different Account at this organization's address is used to power the item, or

3. None of your Accounts at this organization's address are used to power the item

		Yes, this Account	No, but a different Account at this address is for this	No, none of our Accounts at this address is for this	Don't know/ Not sure
i.	Light space cooling equipment such as room air conditioners, portable air conditioners and portable fans	☐1	☐2	☐3	☐9
j.	Heavy space cooling equipment such as rooftop packaged air conditioning units, central chillers and heat pumps	☐1	☐2	☐3	☐9
k.	Light electric space heating equipment such electric baseboards and portable electric heaters, etc.	☐1	☐2	☐3	☐9
l.	Heavy electric space heating equipment such as electric forced-air furnaces, electric rooftop or room packaged heat pumps, etc.	☐1	☐2	☐3	☐9
m.	Electric water heating equipment	☐1	☐2	☐3	☐9
n.	Process equipment such as air compressors, pumps and electric welders	☐1	☐2	☐3	☐9
o.	Other light equipment such as battery chargers, televisions, small electronic devices	☐1	☐2	☐3	☐9
p.	Other medium equipment such as clothes washers, clothes dryers, dishwashers, elevators, escalators, etc.	☐1	☐2	☐3	☐9

About How this Account Uses Electricity

32q. Are there any other significant items not previously listed that are powered by electricity in relation to this specific Account?

☐[1] Yes ⇒ please specify_____

☐[2] No

☐[9] Don't know/not sure

About How this Account Uses Electricity

33. Thinking about the total annual operating cost (including labour, other energy, rent/leasing, materials, etc.) at this organization's address, what percentage of it is attributable to the annual electricity bill for this Account?

_____ % of total annual operating costs at this address are for this Account's electricity use ☐[999] Don't know/not sure

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About Your Account's Bill

34. How often do you or another decision maker at your organization look over this Account's electricity bill?

- ☐[1] At least once a month
- ☐[2] Once every 2 months
- ☐[3] Once every 3 months
- ☐[4] Once every 4 to 6 months
- ☐[5] Once or twice a year
- ☐[6] Never – we just pay it and/or our accounting department just pays it ⇒ SKIP TO Q36
- ☐[9] Don't know/not sure ⇒ SKIP TO Q36

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About Your Account's Bill

35. And when you or another decision maker at your organization does look at the Account's bill, which parts of it are typically looked at? (check all that apply)

☐[1] Total dollar amount owed, including taxes
☐[2] Total electricity consumption on the bill (kWh)

SHOW CODES 3 AND 4 ONLY IF: SURVEY IDS 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999

☐[3] Part 1 Energy charge
☐[4] Part 2 Energy charge or credit

SHOW CODES 5 AND 6 ONLY IF: SURVEY IDS 120,000-129,999; 170,000-179,999; 220,000-229,999; 270,000-279,999)

☐[5] Sub-total dollar amount specifically for each of the various energy blocks
☐[6] Sub-total electricity consumption specifically for each of the various energy blocks

☐[7] Sub-total dollar amount specifically for each of the various demand blocks
☐[8] Sub-total electricity consumption specifically for each of the various demand bocks

☐[9] Power factor surcharge

☐[10] Comparison to previous bills
☐[11] Daily average usage
☐[12] Bill due date

☐[13] Other: please specify _____
☐[18] Don't know/not sure

☐[19] No part of the bill in particular

About Your Account's Bill

36. Compared to 1 year ago, would you say the <u>total dollar amount</u> of this Account's electricity bills have…

- ☐[1] Increased a great deal
- ☐[2] Increased just a little
- ☐[3] Stayed about the same
- ☐[4] Decreased just a little
- ☐[5] Decreased a great deal
- ☐[9] Don't know/not sure

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About Your Account's Bill

37. How much of an understanding does your organization have about the factors that cause any changes in this Account's total electricity bill?

☐[1] A great deal of understanding ⇒ CONTINUE
☐[2] A fair amount of understanding ⇒ CONTINUE
☐[3] A little understanding ⇒ CONTINUE
☐[4] No understanding at all ⇒ SKIP TO Q39
☐[9] Don't know/not sure ⇒ CONTINUE

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About Your Account's Bill

ASK Q38 ONLY IF CODES 1, 2, 4 OR 5 IN Q36 AND CODES 1, 2, 3 OR 9 IN Q37; ELSE SKIP TO Q39 (SKIP Q38 IF Q36=3/9 AND/OR Q37=4)

38. Which one of the following do you believe has been the most dominant factor in explaining the (INSERT **"increase"** IF CODE 1 OR 2 IN Q36; INSERT **"decrease"** IF CODE 4 OR 5 IN Q36) **in this specific Account's total electricity bills over the past year? Which do you believe has been the second most dominant factor? Any other factors? RANDOMIZE**

	Most dominant factor (check one only in this column)	Second most dominant factor (check one only in this column)	All other factors (check all that apply in this column)
Change in the method BC Hydro charges this Account for its consumption of electricity (from a declining block energy charge to the conservation rate) (ONLY FOR (SURVEY IDs 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999)	☐1	☐1	☐1
Change in the overall price this Account is charged for its consumption of electricity	☐2	☐2	☐2
Change in the overall consumption level (total energy consumed) of this Account likely due to longer/shorter operating hours	☐3	☐3	☐3
Changes by BC Hydro in the demand charge (price per kilowatt) (ONLY IF YES IN Q25)	☐4	☐4	☐4
The peak rate of consumption as reflected in the demand charge (ONLY IF YES IN Q25)	☐5	☐5	☐5
The addition, removal or change of equipment and machinery	☐6	☐6	☐6
Occupancy levels	☐7	☐7	☐7
Temperature/weather	☐8	☐8	☐8
Other factor: please specify _____	☐9	☐9	☐9
Other factor: please specify _____	☐10	☐10	☐10
Don't know/not sure	☐12	☐12	☐12
Not applicable – the Account's bill never really changes	☐13		

Managing Electricity Use

39. Overall, how much of an effort would you say your organization is <u>currently</u> making to manage its use of electricity?

- ☐[1] A great deal of effort
- ☐[2] A fair amount of effort
- ☐[3] A little effort
- ☐[4] No effort at all
- ☐[9] Don't know/Not sure

40. And compared to one year ago, would you say your organization is making more of an effort to manage its use of electricity, less of an effort, or has there been no change?

- ☐[1] Much more of an effort
- ☐[2] A little more of an effort
- ☐[3] No change
- ☐[4] A little less of an effort
- ☐[5] Much less of an effort
- ☐[9] Don't know/not sure

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Managing Electricity Use – motivators

SKIP TO Q42 FOR ORGANIZATIONS WHICH MADE "NO EFFORT AT ALL" TO MANAGE IN Q39

In this section, we would like to learn about what motivated your organization to make an effort to manage its use of electricity over the past year.

41. For each item in the table below, please indicate how much of a factor it has had on your organization's effort to manage its use of electricity over the past year. RANDOMIZE

		Major factor	Minor factor	Not a factor	Don't know
a.	Due to economic downturn – we had to take more cost-cutting measures	☐1	☐2	☐3	☐9
b.	Just want operating costs to be as low as possible	☐1	☐2	☐3	☐9
c.	The incentive to conserve electricity that is built into BC Hydro's rate structure	☐1	☐2	☐3	☐9
d.	Overall level of electricity prices	☐1	☐2	☐3	☐9
e.	Overall level of natural gas prices	☐1	☐2	☐3	☐9
f.	To decrease pay-back time of capital investments	☐1	☐2	☐3	☐9
g.	Our suppliers and customers want us to conserve electricity	☐1	☐2	☐3	☐9
h.	Our employees want us to conserve electricity	☐1	☐2	☐3	☐9
i.	For the environment - it's just the right thing to do	☐1	☐2	☐3	☐9
j.	If applicable: Other factor (1): specify_____	☐1	☐2	☐3	☐9
k.	If applicable: Other factor (2): specify_____	☐1	☐2	☐3	☐9

Managing Electricity Use – barriers

In this section, we would like to learn about the barriers your organization may have faced in any effort to manage its use of electricity over the past year.

42. For each item in the table below, please indicate how much of a barrier it has been on your organization's effort to manage its use of electricity over the past year. RANDOMIZE

		Major barrier	Minor barrier	No barrier	Don't know
a.	Lack of access to funding for capital investment into energy efficiency	☐1	☐2	☐3	☐9
b.	Lack of executive support	☐1	☐2	☐3	☐9
c.	Lack of staffing/staffing requirements	☐1	☐2	☐3	☐9
d.	Lack of knowledge of where the opportunities for savings might be	☐1	☐2	☐3	☐9
e.	Lack of financial incentives for conservation program and energy efficiency	☐1	☐2	☐3	☐9
f.	Can't control employees' behaviour in regards to energy efficiency practices	☐1	☐2	☐3	☐9
g.	Insufficient pay-back of capital or operational investments in energy efficiency	☐1	☐2	☐3	☐9
h.	There are other operational priorities	☐1	☐2	☐3	☐9
i.	Takes too much time	☐1	☐2	☐3	☐9
j.	Current usage is already near its lowest possible level	☐1	☐2	☐3	☐9
k.	If applicable: Other barrier (1): specify_____	☐1	☐2	☐3	☐9
l.	If applicable: Other barrier (2): specify_____	☐1	☐2	☐3	☐9

Managing Electricity Use – steps taken

Now we would like to learn about the actions or steps your organization may have taken to manage this Account's use of electricity over the past year.

This first set of questions is specifically about the installation of energy-efficient equipment and products.

43. For each item, please indicate if your organization undertook the measure in the past year to manage the electricity consumption specifically for this Account.

Be sure to select Not Possible if the energy-efficiency measure is not possible for this specific Account.

		Yes, for this Account	No, not for this Account	Not Possible for this Account	Don't know
a.	Installed energy-efficient lighting	☐1	☐2	☐3	☐9
b.	Installed lighting controls	☐1	☐2	☐3	☐9
c.	Installed power bars for computers	☐1	☐2	☐3	☐9
d.	Installed Computer Power Management Software for computer workstations	☐1	☐2	☐3	☐9

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Managing Electricity Use – steps taken

43. Here is a second set of energy-efficient steps related to the installation of energy-efficient equipment and products. For each item, please indicate if your organization undertook the measure in the past year to manage the electricity consumption specifically for this Account.

Be sure to select Not Possible if the energy-efficiency measure is not possible for this specific Account.

		Yes, for this Account	No, not for this Account	Not Possible for this Account	Don't know
e.	Installed energy-efficient components for commercial dishwashers	☐1	☐2	☐3	☐9
f.	Installed energy-efficient components for commercial kitchens	☐1	☐2	☐3	☐9
g.	Installed energy-efficient components for refrigeration	☐1	☐2	☐3	☐9
h.	Installed carbon monoxide sensors for exhaust fans	☐1	☐2	☐3	☐9
i.	Installed synchronous belt drives	☐1	☐2	☐3	☐9
j.	Installed energy-efficient components/controls for HVAC	☐1	☐2	☐3	☐9
k.	Installed variable frequency drives for motors, pumps, fans, etc.	☐1	☐2	☐3	☐9

43l. Were there any other energy-efficient equipment or products installed in the past year specifically for this Account?

☐1 Yes ⇒ please specify: _____ (comment: longer text box here)
☐2 No
☐9 Don't know

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Managing Electricity Use – steps taken

This next set of questions is specifically about operational, maintenance and behavioural measures.

44. For each item, please indicate if your organization undertook the measure more often than in the previous year to manage the electricity consumption specifically for this Account. RANDOMIZE

Be sure to select Not Applicable if the energy-efficiency measure is not possible for this specific Account.

	Compared to last year…	Yes, for this Account	No, not for this Account	Not Possible for this Account	Don't know
a.	Decreased the operating periods of equipment & machinery (not for maintenance)	☐1	☐2	☐3	☐9
b.	Decreased the number of peak consumption periods	☐1	☐2	☐3	☐9
c.	More often turned-off lights when they have not been used	☐1	☐2	☐3	☐9
d.	More often turned-off computers when they have not been used	☐1	☐2	☐3	☐9
e.	More often cleaned the HVAC coils	☐1	☐2	☐3	☐9
f.	Increased the number of maintenance periods for equipment & machinery	☐1	☐2	☐3	☐9
g.	More often checked the settings for the energy management system	☐1	☐2	☐3	☐9
h.	More often discussed energy use and conservation measures	☐1	☐2	☐3	☐9
i.	Had an energy audit	☐1	☐2	☐3	☐9

44j. Were there any other operational, maintenance or behavioural measures undertaken in the past year specifically for this Account?

☐1 Yes ⇒ please specify: _____ (comment: longer text box here)
☐2 No
☐9 Don't know

BC Hydro/Power Smart Programs

As you may know, BC Hydro has Power Smart programs that can provide assistance in support of its customers' efforts to manage their use of electricity, including:

- **BC Hydro/Power Smart Product Incentive Program (PIP)**
- **BC Hydro/Power Smart Partner Express Program**
- **BC Hydro/Power Smart New Construction Program**
- **BC Hydro/Power Smart Industrial Program**
- **BC Hydro/Power Smart Industrial Self-Serve Incentive Program**

45a. Prior to this survey, had your organization heard of any of these Power Smart programs?

☐[1] Yes, our organization was previously aware of one or more of these programs ⇒ CONTINUE
☐[2] No, our organization was not previously aware of any of these programs ⇒ SKIP TO 46 RULE
☐[9] Don't know/not sure ⇒ SKIP TO Q46 RULE

45b. And did your organization participate in any of these programs or other Power Smart programs in the past year?

☐[1] Yes
☐[2] No
☐[9] Don't know/not sure

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BC Hydro/Power Smart Programs

ASK 46 ONLY IF CUSTOMER IS ELIGIBLE FOR A KEY ACCOUNT MANAGER (SURVEY IDs 100,000-129,999; 200,000-229,999); ELSE, SKIP TO RULE FOR Q47a

46. Some organizations' accounts have a BC Hydro Key Account Manager (KAM) assigned to them. Prior to this survey, had your organization heard of this additional support available via Key Account Managers?

☐[1] Yes, our organization was previously aware
☐[2] No, our organization was not previously aware
☐[9] Don't know/not sure

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Managing Electricity Use - influences

ASK Q47a IF DID ANY OF QUESTION 43 INCLUDING OTHER SPECIFY; ELSE SKIP TO Q48a
PIPE-IN ITEM c ONLY IF 'YES' IN Q45b; PIPE-IN ITEM d ONLY IF SURVEY IDs 100,000-129,999; 200,000-229,999

47a. You indicated earlier that your organization installed energy-efficient equipment and products over the past year such as (insert items from Q43). To what degree did each of the following influence your decision to install these items… RANDOMIZE

		Very influential	Somewhat influential	Not too influential	Not at all influential	Don't know
a.	Overall level of electricity prices	☐1	☐2	☐3	☐4	☐9
b.	The incentive to conserve electricity that is built into BC Hydro's rate structure	☐1	☐2	☐3	☐4	☐9
c.	BC Hydro/Power Smart program(s) (IF APPLICABLE)	☐1	☐2	☐3	☐4	☐9
d.	BC Hydro Key Account Manager (KAM ACCOUNTS ONLY)	☐1	☐2	☐3	☐4	☐9
e.	Contractors, vendors or customers	☐1	☐2	☐3	☐4	☐9
f.	Employees	☐1	☐2	☐3	☐4	☐9
g.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9
h.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9

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Managing Electricity Use - influences

ASK Q47b IF c OR d IN Q47a ARE “VERY INFLUENTIAL” OR “SOMEWHAT INFLUENTIAL”

47b. How likely is it that your organization would have installed energy-efficient equipment and products over the past year such as (insert items from Q43) even if it did not have the assistance from BC Hydro/Power Smart?

- ☐1 Definitely would have anyway
- ☐2 Probably would have anyway
- ☐3 Might or might not
- ☐4 Probably would not have
- ☐5 Definitely would not have
- ☐9 Don’t know/not sure

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Managing Electricity Use - influences

ASK Q48a IF DID ANY OF QUESTION 44 INCLUDING OTHER SPECIFY; ELSE SKIP TO 49a
PIPE-IN ITEM c ONLY IF 'YES' IN Q45b; PIPE-IN ITEM d ONLY IF SURVEY IDs 100,000-129,999; 200,000-229,999

48a. You indicated earlier that your organization implemented operational, maintenance and behavioural energy-efficiency measures over the past year such as (insert items from Q44). To what degree did each of the following influence your decision to make these operational changes… RANDOMIZE

		Very influential	Somewhat influential	Not too influential	Not at all influential	Don't know
a.	Overall level of electricity prices	☐1	☐2	☐3	☐4	☐9
b.	The incentive to conserve electricity that is built into BC Hydro's rate structure	☐1	☐2	☐3	☐4	☐9
c.	BC Hydro/Power Smart program(s) (IF APPLICABLE)	☐1	☐2	☐3	☐4	☐9
d.	BC Hydro Key Account Manager (KAM ACCOUNTS ONLY)	☐1	☐2	☐3	☐4	☐9
e.	Contractors, vendors or customers	☐1	☐2	☐3	☐4	☐9
f.	Employees	☐1	☐2	☐3	☐4	☐9
g.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9
h.	Other influences: please specify _____	☐1	☐2	☐3	☐4	☐9

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Managing Electricity Use - influences

ASK Q48b IF c OR d IN Q48a ARE “VERY INFLUENTIAL” OR “SOMEWHAT INFLUENTIAL”

48b. How likely is it that your organization would have implemented operational, maintenance, or behavioural energy-efficient measures over the past year such as (insert items from Q44) even if it did not have the assistance from BC Hydro/Power Smart?

- ☐[1] Definitely would have anyway
- ☐[2] Probably would have anyway
- ☐[3] Might or might not
- ☐[4] Probably would not have
- ☐[5] Definitely would not have
- ☐[9] Don’t know/not sure

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Managing Electricity Use – looking forward

49a. Looking forward into the next year, would you say your organization will make more of an effort to manage its use of electricity compared to this past year, less of an effort, or do you anticipate no change?

- ☐[1] Much more of an effort than in this past year ⇒ CONTINUE WITH Q49b and c
- ☐[2] A little more of an effort than in this past year ⇒ CONTINUE WITH Q49b and c
- ☐[3] No change ⇒ SKIP TO Q49d
- ☐[4] A little less of an effort than in this past year ⇒ SKIP TO Q49e
- ☐[5] Much less of an effort than in this past year ⇒ SKIP TO Q49e
- ☐[9] Don't know/not sure ⇒ SKIP TO Q50

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Managing Electricity Use – looking forward

49b. For what reasons do you foresee the organization making more of an effort over the next year to manage its use of electricity? (In consideration of privacy issues, please do not reference any individuals' names.) (OPEN-END)

49c. And what sort of things do you foresee the organization doing over the next year in making more of an effort to manage its use of electricity? (In consideration of privacy issues, please do not reference any individuals' names.) (OPEN-END)

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THEN SKIP TO Q50

Managing Electricity Use – looking forward

ASK Q49d ONLY FOR "NO CHANGE" IN Q49a

49d. For what reasons do you foresee the organization making no change in effort over the next year to manage its use of electricity?
(In consideration of privacy issues, please do not reference any individuals' names.) (OPEN-END)

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THEN SKIP TO Q50

Managing Electricity Use – looking forward

ASK Q49e ONLY FOR "LESS OF AN EFFORT" IN Q49a

49e. For what reasons do you foresee the organization making less of an effort over the next year to manage its use of electricity? (In consideration of privacy issues, please do not reference any individuals' names.) (OPEN-END)

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Ratings of BC Hydro

In this section, we would like to understand how you would assess BC Hydro's performance on various aspects of their service delivery.

50. This first set of performance questions relates to billing. For each item, please check the number that corresponds to your rating of BC Hydro on that service aspect.

a.	BC Hydro has bills/statements that clearly show how the total amount owed is calculated							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
b.	BC Hydro has bills/statements that are easy to read and understand							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
c.	BC Hydro provides the right amount of detail on the bill							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
d.	BC Hydro offers convenient methods of paying your bill(s)							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
e.	BC Hydro offers the ability to download your billing and consumption information on-line							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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Ratings of BC Hydro

51. This set of performance questions relates to your energy efficiency needs. For each item, please check the number that corresponds to your rating of BC Hydro on that service aspect.

a.	BC Hydro encourages my organization to make efficient use of electricity							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
b.	BC Hydro provides information on how my organization can reduce electricity consumption							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
c.	BC Hydro provides financial incentives to reduce initial costs of energy efficiency related investments							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
d.	BC Hydro provides workshops on how to reduce energy usage							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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Ratings of BC Hydro

51. Here is another set of performance questions that relates to your energy efficiency needs. For each item, please check the number that corresponds to your rating of BC Hydro on that service aspect.

e. BC Hydro provides information on energy use best practices								
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
f. BC Hydro provides on-site audits to identify energy savings opportunities								
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
g. BC Hydro provides experts to help plan and implement energy efficient activities								
Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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Ratings of BC Hydro

52. This set of performance questions relates to electricity rates. For each item, please check the number that corresponds to your rating of BC Hydro on that service aspect.

a.	BC Hydro provides the appropriate financial incentive built into the rate structure to conserve electricity or encourage energy efficient investments.							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know
b.	BC Hydro provides rates that are predictable over time							
	Rating ⇒	1 Very poor	2	3	4 Neutral	5	6	7 Excellent	☐ Don't know

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Your Contact with BC Hydro

53a. During the past year, how many times did you personally contact BC Hydro on behalf of your organization? (exclude any website use)

___ time(s), IF ZERO, CHECK HERE ☐ (SKIP TO QUESTION 54a)

53b. Thinking about the past year, what were the reason(s) for contacting BC Hydro on behalf of your organization? (check all that apply)

☐[1] Account balance
☐[2] Billing inquiry or resolve billing issue
☐[3] Connect/disconnect service
☐[4] Consumption history
☐[5] Meter reading inquiry
☐[6] Outage information or inquiry
☐[7] Payment arrangements plans
☐[8] Power Smart/conservation/energy efficiency information
☐[9] Rates enquiry/information
☐[10] Safety enquiries

☐[14] Other (please specify): _____

☐[99] Don't know/not sure⇒ SKIP TO Q55

53c. What service channel did you use for your last contact with BC Hydro? (check one only)

☐[1] Key Account Manager via in-person meeting (ONLY FOR SURVEY IDs 100,000-129,999; 200,000-229,999)
☐[2] Key Account Manager via telephone (ONLY FOR SURVEY IDs 100,000-129,999; 200,000-229,999)
☐[3] Key Account Manager via email (ONLY FOR SURVEY IDs 100,000-129,999; 200,000-229,999)
☐[4] Call centre agent via telephone
☐[5] Automated phone system
☐[6] Email or the Contact Us form on the website
☐[7] Other (please specify): _____

☐[9] Don't know/not sure

Your Contact with BC Hydro

53d. Thinking about your last contact with BC Hydro, excluding any website use, how would you rate the service?

1 Very Poor	2	3	4	5	6	7 Excellent	☐ Don't know

Your Experience with BC Hydro's Website

54a. Have you personally visited BC Hydro's website during the past year on behalf of your organization?

☐[1] Yes
☐[2] No (SKIP TO QUESTION 55)

54b. How often do you typically visit BC Hydro's website on behalf of your organization?

☐[1] At least once a week
☐[2] Once to a few times a month
☐[3] Every couple of months or so
☐[4] Once or twice a year

54c. Thinking about the past year, what were the reason(s) for visiting BC Hydro's website on behalf of your organization? (check all that apply)

☐[1] Account balance
☐[2] Billing inquiry or resolve billing issue
☐[3] Connect/disconnect service
☐[4] Consumption history
☐[5] Meter reading inquiry
☐[6] Outage information or inquiry
☐[7] Payment arrangements plans
☐[8] Power Smart/conservation/energy efficiency information
☐[9] Rates enquiry/information
☐[10] Safety enquiries
☐[11] Check your Account's baseline on the website (SURVEY IDs 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999)
☐[12] Use the Forecaster tool on the website to forecast your energy cost (SURVEY IDs 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999)
☐[13] View the video tutorial describing the conservation rate on the website (SURVEY IDs 100,000-119,999; 150,000-169,999; 200,000-219,999; 250,000-269,999)

☐[14] Other (please specify): _____

☐[99] Don't know/not sure⇒ SKIP TO Q55

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Your Experience with BC Hydro's Website

ASK 54d-f FOR UP TO 3 MENTIONS IN 54c; IF MORE THAN 3 MENTIONS, ENSURE ANY 3 OF THE FOLLOWING ARE INCLUDED (Rate enquiry/information; Power Smart /conservation/energy efficiency information; Check you Account's baseline on the website; use the Forecaster tool;

54d. Thinking about your visits over the past year to BC Hydro's website specifically for (insert code from Q54c), how would you rate the performance of the website in providing you with the information you needed?

1	2	3	4	5	6	7	☐
Very Poor						Excellent	Don't know

54e. Thinking about your visits over the past year to BC Hydro's website specifically for (insert code from Q54c), how would you rate the performance of the website in providing you with the information you needed?

1	2	3	4	5	6	7	☐
Very Poor						Excellent	Don't know

54f. Thinking about your visits over the past year to BC Hydro's website specifically for (insert code from Q54c), how would you rate the performance of the website in providing you with the information you needed?

1	2	3	4	5	6	7	☐
Very Poor						Excellent	Don't know

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Your Overall Service Rating

55. How would you rate BC Hydro in terms of the overall service it provides? Please check the number on the corresponding 7-point scale where 1 means 'very poor' and 7 means 'excellent'.

1 Very Poor	2	3	4	5	6	7 Excellent	☐ Don't know

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Communications Preferences

56. If BC Hydro wanted to send you information about rates and changes in rates, how would you most prefer to receive it? (choose only one)

- ☐[1] Receive an Email
- ☐[2] In the mail from Canada Post
- ☐[3] Receive a phone call from a customer service representative
- ☐[4] Direct liaison with your Key Account Manager (ONLY FOR SURVEY IDs 100,000-129,999; 200,000-229,999)
- ☐[5] At tradeshows and industry events
- ☐[6] Informational advertising in the media
- ☐[7] At a work shop
- ☐[9] Don't know/not sure

Final Words

57. The key objective of this survey is to collect the necessary information to inform our program evaluation, including how an account's consumption of electricity may vary with the various electrical end-uses associated with it.

To facilitate this, it is important to analyze an account's consumption of electricity for a period dating back to 2009 as a long 'time series' of consumption helps us to better control for year-to-year changes in the weather, the economy, etc.

Rather than asking you to estimate how much electricity this account has consumed over the past couple of years, BC Hydro would like to access this information from your account history and link it to the responses you have given in this survey. We will NOT review any of your bill payment information.

May we please have your permission for BC Hydro to do this?

☐[1] Yes

☐[2] No

Final Words

58. Are you the original recipient of the survey invitation or was it forwarded along to you by a colleague?

- ☐[1] Original recipient
- ☐[2] The survey was forwarded to me
- ☐[3] Don't know/not sure

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Final Words

59. From time to time, BC Hydro conducts follow-up research with survey respondents – either in the form of a survey or a paid discussion group to hear from them first-hand. When we do so, we like to invite people who might be similar to each other and this can be most effectively done by selecting them from the original survey data. This can only be achieved by having a respondent's permission to link their survey responses to their contact information.

When we conduct research in regards to service and/or electricity conservation planning and wish to invite you, may we please have your permission to link your survey responses to your contact information? Of course, your survey responses would remain confidential in a secure environment and would not be used on an individual basis for other purposes.

☐[1] Yes
☐[2] No

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Please indicate your name and phone number below if you wish to be entered into the draw for one of four $500 gift certificates to a home improvement retailer of your choice. Official rules and regulations are detailed here.

First Name: **Last Name:** **Telephone:**

☐ **No thanks.**