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October 30, 2020

Ms. Marija Tresoglavic
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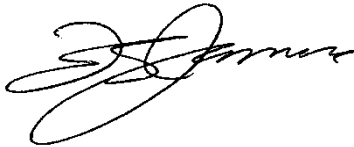
Dear Ms. Tresoglavic:

**RE: Project No. 1599004
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Application to Amend Net Metering Service under Rate Schedule 1289
Compliance with BCUC Order No. G-168-20 Directive 5
Net Metering Evaluation Report**

BC Hydro writes in compliance with Directive 5 of BCUC Order No. G-168-20 to provide its Net Metering Evaluation Report.

For further information, please contact Anthea Jubb at 604-623-3545 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,



Fred James
Chief Regulatory Officer

rz/ma

Enclosure

**Application to Amend Net Metering Service under
Rate Schedule 1289
Compliance with BCUC Order No. G-168-20**

Net Metering Evaluation Report No. 5

October 30, 2020

Table of Contents

| | | |
|-------|---|----|
| 1 | Executive Summary | 4 |
| 2 | Introduction | 7 |
| 3 | Regulatory and Policy Background | 9 |
| 4 | RS 1289 Customer Data | 11 |
| 4.1 | Summary of Inquiries | 11 |
| 4.2 | Applications for New RS 1289 Accounts..... | 12 |
| 4.3 | RS 1289 Customer Characteristics | 14 |
| 5 | RS 1289 Costing Data..... | 16 |
| 5.1 | Energy Deliveries, Credits and Payments..... | 17 |
| 6 | Cost and Benefit of the Program | 20 |
| 6.1 | Cost Shifting..... | 20 |
| 6.1.1 | Methodology | 22 |
| 6.1.2 | Data Cleaning and RS 1289 Summary..... | 24 |
| 6.1.3 | Result | 27 |
| 6.1.4 | Limitations | 41 |
| 6.2 | RS 1289 Electricity Market Value Assessment | 42 |
| 6.3 | Other Potential Benefits | 44 |
| 7 | Consultation and Engagement | 44 |
| 7.1 | Communication and Education | 44 |
| 7.2 | Net Metering Survey | 46 |
| 7.2.1 | Survey Description..... | 46 |
| 7.2.2 | Survey Respondents | 47 |
| 7.3 | Survey Feedback – Current Program..... | 48 |
| 7.3.1 | Application Process | 48 |
| 7.3.2 | Satisfaction of RS 1289 Customers | 49 |
| 7.3.3 | Overall Satisfaction..... | 50 |
| 7.3.4 | Satisfaction of Other Interested Parties | 50 |
| 7.4 | Survey Feedback – Future Issues..... | 51 |
| 7.4.1 | Virtual Net Metering | 51 |
| 7.4.2 | Marginal Cost Pricing..... | 52 |
| 7.4.3 | Treatment of Hydropower Generation | 53 |
| 7.5 | Survey Conclusions | 54 |
| 7.6 | Additional Consultation and Engagement | 55 |
| 8 | Utility Trends in Net Metering | 55 |
| 8.1 | Duke Energy | 55 |

| | | |
|-----|--------------------------------------|----|
| 8.2 | Salt River Project | 56 |
| 8.3 | Hydro Quebec | 57 |
| 8.4 | Hydro One | 57 |
| 8.5 | California | 57 |
| 8.6 | Alberta | 58 |
| 8.7 | Nevada | 59 |
| 9 | System Planning Considerations | 59 |
| 9.1 | Portfolio Planning | 59 |
| 9.2 | Connection Policy | 60 |
| 9.3 | Safety and Reliability | 62 |
| 10 | Future Considerations | 63 |
| 11 | Conclusion | 64 |

List of Figures

| | | |
|----------|--|----|
| Figure 1 | Participation in RS 1289 by Region and Fiscal Year | 15 |
| Figure 2 | Aggregated Hourly Load Profile of Electricity Supplied to and Delivered from Residential RS 1289 Solar Customers | 29 |
| Figure 3 | Average Seasonal 24-Hour Load Profile of Electricity Supplied by BC Hydro and Delivered from Residential RS 1289 Solar Customers | 30 |
| Figure 4 | Daily Aggregated Energy Supplied to and Delivered from Residential RS 1289 Solar Customers on day of F2019 System Peak | 31 |
| Figure 5 | Average Seasonal 24-Hour Profile of Electricity Supplied to and Delivered from Residential Hydropower RS 1289 Customers | 37 |
| Figure 6 | Daily Profile of Electricity Supplied to and Delivered from Residential Hydropower RS 1289 Customers on day of F2019 System Peak | 38 |

List of Tables

| | | |
|---------|--|----|
| Table 1 | Summary of Inquiries Related to RS 1289 | 12 |
| Table 2 | Customers Joining RS 1289 in F2019 and F2020, by Rate Schedule | 13 |
| Table 3 | Customers Joined in F2019 by Region, Generation Type and Size | 14 |
| Table 4 | F2019 Program Administration Costs | 16 |

| | | |
|----------|---|----|
| Table 5 | F2019 Administration Cost Breakdown | 16 |
| Table 6 | BC Hydro Compensation to RS 1289 Customers through Reduction in Future Bills via the Generation Credits, in F2019 | 19 |
| Table 7 | F2019 Net Metering Customer Generation Compensated via Payments to Customers at the RS 1289 Energy Price | 20 |
| Table 8 | Proportion of Accounts Analyzed by Rate Schedule/Rate Class, Cross-Subsidization per Account and Total Cross-Subsidization for Analyzed Accounts..... | 22 |
| Table 9 | Summary of RS 1289 Customers on Residential Service | 26 |
| Table 10 | Summary of LGS RS 1289 Customers..... | 27 |
| Table 11 | Summary of MGS RS 1289 Customers..... | 27 |
| Table 12 | R/C Ratio Estimation of Residential Solar RS 1289 Customers..... | 33 |
| Table 13 | R/C Ratio Estimation of Residential Hydro RS 1289 Customers..... | 40 |
| Table 14 | Market Value of Electricity During Freshet Months (May through July)..... | 43 |
| Table 15 | Breakdown of Survey Respondents | 47 |
| Table 16 | Feedback on Application Process (379 responses) | 48 |
| Table 17 | Feedback on Customer Satisfaction..... | 49 |

Appendices

- Appendix A Cost of Service Study
- Appendix B Net Metering Survey
- Appendix C Summary of Survey Results

1 **Executive Summary**

2 This is the fifth Net Metering Evaluation Report (**Report**) BC Hydro has provided the
3 British Columbia Utilities Commission (**Commission or BCUC**) since Rate
4 Schedule 1289 - Net Metering Service (**RS 1289 or Net Metering**) was established
5 in 2004. It is being submitted in response to Order No. G-168-20 (the **Order**),
6 Directive 5. This Report describes the developments in RS 1289 from April 1, 2016
7 to date with a detailed analysis of cross-subsidization completed for Fiscal 2019
8 (F2019) which ended on March 31, 2019. The Report also identifies trends and
9 considerations for the future of RS 1289. This Report is being submitted for
10 information only and BC Hydro applies for no change to RS 1289 as part of this
11 Report. Below are key findings of the Report.

12 Participation in RS 1289 increased from 640 accounts with a total aggregate
13 Generating Facility nameplate rating of 3.8 MW at the end of F2016 to
14 2,619 accounts and an aggregate rating of just under 20 MW at the end of F2020.

15 Solar photovoltaic (**solar**) systems are by far the most common Generating Facility
16 technology (98.6 per cent of installations). Other technologies include, in order of
17 decreasing popularity, hydropower (mostly run of river without reservoir storage),
18 wind power, combinations of wind/solar and hydro/solar, and biogas.

19 From an account type perspective, Residential customers represent a large majority
20 of RS 1289 accounts (88.5 per cent). Similarly, RS 1289 participation by Customers
21 taking electricity under Residential Service rates has grown considerably more than
22 participation by Customers taking electricity under General Service rates.

23 Participation in RS 1289 is greatest on Vancouver Island (45 per cent), followed by
24 the Lower Mainland (30 per cent), the Southern Interior (19 per cent) and Northern
25 BC (6 per cent).

1 Residential Customers enrolled in RS 1289 have electricity purchases from
2 BC Hydro that are approximately 50 per cent higher than average for Residential
3 Customers.

4 A cost of service study demonstrated that RS 1289 Customers are being subsidized
5 by non-participating BC Hydro ratepayers. BC Hydro conducted cost of service
6 analysis on 79 per cent of RS 1289 accounts. The total cross-subsidization for the
7 accounts analyzed was \$2.9 million in F2019. The analysis showed that the average
8 value of generation credits provided to RS 1289 Customers was 10.71 ¢ per kWh,
9 which is higher than the market value of that energy. While BCUC Order
10 No. G-168-20 prescribed future payments at the market price, it does not address or
11 change the value of the generation credits.

12 Residential RS 1289 accounts with hydropower Generating Facilities had higher
13 levels of cross-subsidization per account than those with solar. Electricity deliveries
14 from both solar and hydropower Generating Facilities demonstrated seasonality with
15 relatively lower levels of electricity delivered to BC Hydro's system during the winter
16 peak demand period, and relatively higher electricity deliveries during summer and
17 shoulder periods including the freshet months of May through July when the value of
18 electric energy is typically low.¹

19 This cross-subsidization arises for several reasons such as:

- 20 (a) During BC Hydro's peak demand period (winter evenings) the amount of
21 electricity delivered from RS 1289 Customer Generating Facilities to
22 BC Hydro's system is low and RS 1289 Customer demand for electricity from
23 BC Hydro is high; and

¹ The cross-subsidization analysis uses system wide average values and is not applicable to the Non Integrated Areas that are not connected to BC Hydro's integrated system.

-
- 1 (b) The rate schedules under which RS 1289 customers take service from
2 BC Hydro, such as RS 1101 Residential Inclining Block Rate, recover the
3 majority of BC Hydro's costs of service through the use of Energy Charges
4 which are avoidable for RS 1289 customers through the use of Generation
5 Account credits; and
- 6 (c) The RS 1289 Energy Price that BC Hydro pays to RS 1289 accounts with a
7 Generation Account Balance at the end of each year exceeds BC Hydro's cost
8 of energy;²
- 9 (d) BC Hydro's standard charges for RS 1289 applicants do not fully recover the
10 costs associated with processing new applicants.

11 BC Hydro received 854 responses to a survey of RS 1289 Customers and
12 stakeholders. RS 1289 Customers generally indicated a positive experience with
13 their participation in RS 1289. Overall, 57 per cent indicated that RS 1289 meets
14 their needs. BC Hydro will use feedback provided from these customers to continue
15 to improve its operations.

16 The survey also indicates there is a low to moderate level of interest and awareness
17 about virtual net metering (41 per cent expressed interest), marginal cost pricing
18 (24 per cent in favour), differing program terms and conditions based on generation
19 type (45 per cent in favour). However, there was a low level of understanding of
20 these issues. Additional engagement and consultation will be necessary before
21 customer and stakeholder viewpoints can be adequately represented.

22 As participation is expected to grow, BC Hydro recognizes there is a need to change
23 RS 1289 to address cross-subsidization and set an economically-efficient rate. We
24 plan to assess potential solutions such as marginal pricing. We also plan to explore
25 options to expand program participation through virtual net metering. Additional

² The value of the payout provided to RS 1289 customers in F2019 was 9.99 ¢ per kWh, however over time the value of the payout will align with the Mid-C market price value as a result of BCUC Order No. G-168-20.

1 consultation and engagement will be undertaken to understand customer and
2 stakeholder perspectives on net metering and alternatives for RS 1289
3 amendments. In proposing these amendments, BC Hydro's operational and safety
4 implications will be considered. Any future changes to the rate will be assessed
5 through the next Comprehensive Rate Design Application or in a separate RS 1289
6 rate design filing.

7 **2 Introduction**

8 RS 1289 was established in 2004 for BC Hydro's Residential and General Service
9 Customers to meet all or part of their electricity needs through small clean or
10 renewable distributed generation facilities at their premises. Over 2,600 BC Hydro
11 Customers participated in RS 1289 (**RS 1289 Customers**) as of March 31, 2020,
12 with over 98 per cent of those customers choosing to install solar facilities.

13 RS 1289 was designed for BC Hydro customers to generate electricity for their own
14 use. Billing under RS 1289 is as follows:

- 15 • If a RS 1289 Customer generates more electricity than they can use at any
16 given time, this excess generation is delivered to BC Hydro's system;
- 17 • BC Hydro tracks the amount of electricity delivered to BC Hydro in the
18 Generation Account of the RS 1289 Customer;
- 19 • The Generation Account Balance is accumulated and applied as a credit to the
20 RS 1289 Customer's Energy Charge payable in future billing periods under the
21 Rate Schedule under which they take service; and
- 22 • Once a year, on the RS 1289 Customer's Anniversary Date, BC Hydro sets the
23 RS 1289 Customer's Generation Account Balance to zero and compensates
24 the RS 1289 Customer for any remaining credits (in electricity units of kWh) in
25 their Generation Account at the Energy Price prescribed in RS 1289.

1 On April 29, 2019, BC Hydro filed an application with the BCUC requesting the
2 following amendments to RS 1289:

- 3 • Update of the Energy Price from 9.99 cents per kWh to an amount updated
4 every January 1 based on the daily average Mid-Columbia (**Mid-C**) prices for
5 the previous calendar year, converted to Canadian dollars using the average
6 annual exchange rate from the Bank of Canada for that year.
- 7 • Maintain the current Energy Price of 9.99 cents per kWh until April 30, 2024 for
8 all RS 1289 Customers with accepted applications as of April 20, 2018 for a
9 period of five years;
- 10 • For Generating Facilities with nameplate rating of greater than 5 kW, the
11 Generating Facility's Annual Energy Output must not exceed 110 per cent of
12 the RS 1289 Customer's Annual Load; and
- 13 • Approval to make various minor amendments to improve the clarity, simplicity
14 and safety of RS 1289 and to reflect existing program practices.

15 On June 23, 2020, the BCUC issued the Order, approving the proposed
16 amendments, with one exception. The proposal to limit the output of a Net Metering
17 Generating Facility to 110 per cent of the customer's annual load was rejected. The
18 Order directed BC Hydro to file a progress report on the RS 1289 Net Metering Rate
19 by October 31, 2020 (Directive 5). This Report reflects a similar format as the
20 2017 Report No. 4, but as requested by the BCUC, also includes an analysis of cost
21 shifting and results of RS 1289 customer and stakeholder consultation. This Report
22 is the fifth net metering evaluation report filed with the BCUC since RS 1289 was
23 established.

3 Regulatory and Policy Background

In November 2003, BC Hydro applied for approval of a new rate schedule, RS 1289 - Net Metering Service, and in 2004 the BCUC approved the new tariff by Order No. G-26-04. Some key aspects of RS 1289 at the time included:

- A 50 kW limit on the nameplate rating of the customers Generating Facility;
- The requirement that a Customer's Generating Facility meet the definition of a "clean or renewable resource" as defined in the *Clean Energy Act*;
- Availability to all Residential and General Service Customers; and
- Compensation to RS 1289 Customers for excess generation delivered to BC Hydro through two means, first by allowing the Customer's excess generation to offset the Energy Charge of the Rate Schedule under which they take service, with generation credits (in kWh) that can accumulate and offset the RS 1289 Customer's bill for up to one year, and second through paying the RS 1289 Customer for any excess generation surplus to usage on an annual basis at an Energy Price initially set to 5.40 cents per kWh.

In Order No. G-16-04, the BCUC directed BC Hydro to file a monitoring and evaluation report on RS 1289 one year after the rate was approved and BC Hydro filed that report on June 1, 2005.

Subsequently, the B.C. Government released the 2007 BC Energy Plan. Policy Action No. 11 of the 2007 BC Energy Plan provided that the price paid for net annual surpluses of generation acquired by BC Hydro under RS 1289 should be generally consistent with prices paid under the Standing Offer Program (**SOP**). As a result, in 2008 BC Hydro applied to increase the Energy Price to 8.16 cents per kWh, based on the 2006 SOP prices and the BCUC approved the increase by Order No. G-4-09. In its 2009 Order, the BCUC directed BC Hydro to submit a second Net Metering evaluation report after the completion of the next review of the SOP.

1 In January 2011, BC Hydro released its report on the SOP 2-Year Review which
2 included revised SOP pricing. In September 2011, BC Hydro filed an application with
3 the BCUC to, among other things, increase the RS 1289 Energy Price to 9.99 cents
4 per kWh, consistent with the revised SOP pricing. BC Hydro also filed its second Net
5 Metering evaluation report.

6 In 2012, the BCUC issued Order No. G-57-12, directing BC Hydro to file a third
7 report on RS 1289. On April 30, 2013, BC Hydro submitted the 2013 Report No. 3 in
8 accordance with Directive 4 of BCUC Order No. G-57-12 addressing the issues
9 identified and providing a future direction for RS 1289, including a list of
10 recommended actions.

11 Subsequently, on February 28, 2014 BC Hydro filed an application with the BCUC to
12 amend RS 1289 to increase the capacity limit for a Generating Facility from 50 kW to
13 100 kW for all eligible Customers. BC Hydro also proposed to amend RS 1289 to
14 allow it to recover incremental interconnection-related costs from RS 1289
15 Customers incurred as a result of allowing larger, more complex projects.

16 On July 25, 2014, the BCUC issued Order No. G-104-14 approving the proposed
17 capacity limit increase to 100 kW for a Generating Facility and the ability to recover
18 from RS 1289 Customers any incremental costs incurred by BC Hydro for
19 interconnecting generating facilities with a nameplate greater than 50 kW. In
20 Directive 6 of Order No. G-104-14, the BCUC also directed BC Hydro to provide a
21 progress report (fourth evaluation report) on RS 1289 by April 30, 2017.

22 On June 26, 2015, to help expand Net Metering participation and in consideration of
23 BCUC Order No. G-7-15,³ BC Hydro applied for approval to amend RS 1289 to allow
24 RS 1289 Customers to either own or lease a Generating Facility for the purpose of
25 generating electricity to serve all or part of their electricity requirements under

³ BCUC Order No. G-7-15 provided regulatory exemptions for leasing entities involved in providing electricity from small scale solar and wind generation eligible for service under RS 1289

1 RS 1289. The BCUC issued Order No. G-116-15 on July 9, 2015 approving
2 BC Hydro's proposed amendments to RS 1289.

3 On April 20, 2018, BC Hydro filed an application to seek approval from the BCUC to
4 amend RS 1289 so that it would no longer be available to customers proposing a
5 generating facility with an estimated annual energy output that is greater than their
6 estimated annual load. BCUC approved this application on an interim basis.

7 On April 29, 2019, BC Hydro filed an application with the BCUC to seek approval to,
8 among other things, amend the availability, billing and rate provisions in RS 1289.

9 On June 23, 2020, BCUC issued Order No. G-168-20, approving all proposed
10 amendments except for the request to limit Generating Facility output to
11 110 per cent of the RS 1289 Customer's annual load. Further detail on the
12 amendments can be found in section [2](#). In Directive 5 of the Order, the BCUC
13 directed BC Hydro to provide a fifth evaluation report on RS 1289 by
14 October 31, 2020.

15 **4 RS 1289 Customer Data**

16 BC Hydro provides the following information concerning RS 1289 Customers.

17 **4.1 Summary of Inquiries**

18 From April 2018 to March 2019, BC Hydro responded to 1,078 phone calls and
19 286 emails regarding RS 1289. The following is a summary of the most frequent
20 types of inquiries related to RS 1289.

1 **Table 1 Summary of Inquiries Related to RS 1289**

| | F2019 | |
|--|---------------------------------|--------------|
| | April 2018 to March 2019 | |
| | Phone | Email |
| Total number of calls or emails responded by Net Metering team | 490 | 286 |
| Application status | 160 | 25 |
| Eligibility requirements (e.g., energy source, technical requirements, service type, load size) | 105 | 68 |
| Recent changes to the program / requirement to size generation to match the load | 81 | 92 |
| How net metering and billings work | 68 | 29 |
| Community solar/virtual net metering | 3 | 2 |
| Other | 73 | 70 |
| Total number of calls or emails by Call Centre | 588 | n/a |
| Grand total | 1,078 | 286 |

 2 **4.2 Applications for New RS 1289 Accounts**

 3 BC Hydro has a two-step application process to obtain service under RS 1289. First
 4 customers apply to RS 1289 and then subsequently they are approved to join the
 5 rate once they have met the requirements of RS 1289. Customers may join RS 1289
 6 up to 18 months from the date that the application was accepted by BC Hydro.

 7 In F2019, BC Hydro received and processed 766 applications for new
 8 RS 1289 accounts. In F2020, BC Hydro received and processed 914 applications.

 9 In F2019, 574 customers joined RS 1289, and 726 joined in F2020. [Table 2](#) shows
 10 the breakdown by Rate Schedule:

1
 2

Table 2 Customers Joining RS 1289 in F2019 and F2020, by Rate Schedule

| Rate Schedule | F2019 | F2020 |
|----------------------|--------------|--------------|
| 1101 | 495 | 628 |
| 1101A | 10 | 6 |
| 1105 | 6 | 4 |
| 1107 | 1 | |
| 1121 | | 1 |
| 1151 | 19 | 22 |
| 1255 | 2 | |
| 1300 | 25 | 50 |
| 1300A | | 3 |
| 1500 | 11 | 8 |
| 1600 | 3 | 4 |
| 1611 | 2 | |
| | 574 | 726 |

1 [Table 3](#) shows the Customers who have joined RS 1289 by region.

2 **Table 3 Customers Joined in F2019 by Region,**
 3 **Generation Type and Size**

| | Generation Type | F2019 | | F2020 | |
|------------------|-----------------|--------------------------------|---|--------------------------------|---|
| | | Number of New RS 1289 Accounts | Generating Facility Nameplate Rating (kW) | Number of New RS 1289 Accounts | Generating Facility Nameplate Rating (kW) |
| Central Interior | solar | 18 | 116 | 12 | 73 |
| East Kootenay | solar | 18 | 146 | 24 | 290 |
| Kelly/Nicola | solar | 28 | 228 | 29 | 371 |
| Lower Mainland | | 170 | 1,272 | 207 | 1,643 |
| | solar | 169 | 1,264 | 207 | 1,643 |
| | wind_solar | 1 | 8 | | |
| NIA | solar | 4 | 80 | | |
| North Coast | solar | 5 | 36 | 1 | 7 |
| Peace River | solar | 10 | 87 | 9 | 89 |
| South Interior | solar | 53 | 509 | 92 | 1,035 |
| Vancouver Island | | 268 | 2,021 | 352 | 2,583 |
| | hydro | 1 | 100 | | |
| | hydro_solar | 1 | 9 | | |
| | solar | 266 | 1912 | 352 | 2,583 |
| Total | | 574 | 3,894,4495 | 726 | 6,091 |

4 **4.3 RS 1289 Customer Characteristics**

5 Solar is by far the most common technology (98.6 per cent of installations). Other
 6 technologies include, in order of decreasing popularity, hydropower, wind power,
 7 combinations of wind/solar and hydro/solar, and biogas.

8 Participation in RS 1289 by region is as follows:

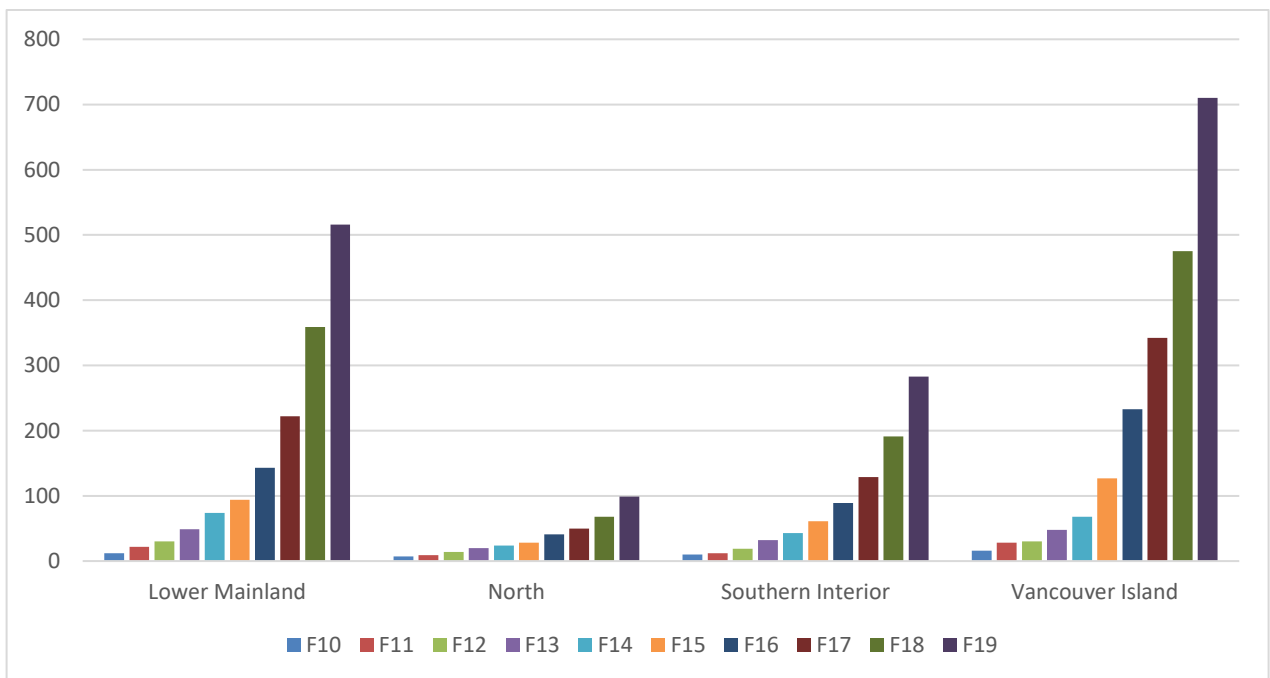
- 9 • Vancouver Island: 45 per cent;

- 1 • Lower Mainland: 30 per cent;
- 2 • Southern Interior: 19 per cent; and
- 3 • North: 6 per cent.

4 By location, 10 per cent of RS 1289 Customers are located in Victoria, followed by
5 Vancouver (5 per cent), Duncan (4 per cent), Courtney (3 per cent) and Nanaimo
6 (3 per cent).

7 Mirroring current popularity of the program, growth in RS 1289 participation has
8 been greatest on Vancouver Island.

9 **Figure 1 Participation in RS 1289 by Region and**
10 **Fiscal Year**



11 From an account type perspective, Residential customers represent a large majority
12 of RS 1289 Customers (88.5 per cent). Similarly, RS 1289 participation by
13 Customers taking electricity under Residential Service rates has grown considerably
14 more than participation by Customers taking electricity under General Service rates.

1 Among RS 1289 Customers served under General Service rate schedules, the most
 2 common site type is offices, followed by other commercial facilities and public
 3 schools.

4 **5 RS 1289 Costing Data**

5 [Table 4](#) below reflects BC Hydro's costs to administer RS 1289 in F2019.⁴ [Table 5](#)
 6 further disaggregates F2019 costs to identify costs associated with supporting
 7 current RS 1289 Customers, as well as RS 1289 more generally, as compared to
 8 the processing of applications for new RS 1289 accounts received by prospective
 9 RS 1289 Customers.

10 **Table 4 F2019 Program Administration Costs**

| Activity | Estimated Costs (\$000) |
|---|-------------------------|
| Administration | 285 |
| Technical Review (engineering costs) | 51 |
| Billing | 30 |
| Engagement | 9 |
| Preparation of application to the BCUC* | 29 |
| Transformer Heavy-Up ⁵ | 8 |
| Total Cost | 412 |

11 * This estimate does not include Participant Assistance/Cost Awards (**PACA**) and hearing costs associated
 12 with BC Hydro's Application to the BCUC to Amend Net Metering Service under Rate Schedule 1289.

13 **Table 5 F2019 Administration Cost Breakdown**

| Activity | Estimated Costs (\$000) |
|--|-------------------------|
| Ongoing RS 1289 operations | 142 |
| Processing of new RS 1289 applications | 270 |
| Total Cost | 412 |

⁴ F2019 costing data was used in order to align with the cost of service study for which F2019 is the most recent complete set of data inputs

⁵ Transformer heavy up costs were first introduced in the Net Metering Evaluation Report No. 4 filed in 2017. BC Hydro covers the cost of the transformer heavy-up when a new RS 1289 Customer installs a generator that fits within their existing electrical service, but is larger than the existing BC Hydro distribution transformer.

1 RS 1289 administration costs have been increasing as a result of increases in the
2 number of RS 1289 accounts and the number of applications for new
3 RS 1289 accounts. For example, since F2016:

- 4 • BC Hydro's Net Metering team increased from one to three people to process
5 applications, and to respond to telephone and email inquiries;
- 6 • Technical review costs have increased due to a higher volume of applications
7 requiring engineering review; and
- 8 • Bill processing costs have increased with an increase in the number of
9 RS 1289 accounts.

10 BC Hydro notes that prospective customers are not charged a fee for submitting an
11 application for service under RS 1289. Additional connection costs may be assessed
12 for non-standard new connections (i.e., a RS 1289 Customer at primary voltage level
13 or with synchronous generators). If BC Hydro determines that site verification is
14 required, the applicant will be assessed a site verification acceptance fee of
15 BC Hydro's actual costs to perform the assessment, up to a maximum of \$600. In
16 F2019, one RS 1289 Customer with a generator sized over 50 kW was subject to
17 incremental interconnection costs and also paid a Net Metering Site Acceptance
18 Verification Fee of \$600 (per section 11 – Schedule of Standard Charges of
19 BC Hydro's Electric Tariff).

20 **5.1 Energy Deliveries, Credits and Payments**

21 Under the terms of RS 1289, BC Hydro compensates RS 1289 Customers for their
22 excess energy generation in two ways: first by allowing the Generation Account
23 Balance to act as a credit to offset the Energy Charge bills of the Rate Schedule
24 under which the customer takes service, and second by paying the RS 1289
25 Customer for any accumulated Generation Account Balance at the RS 1289 Energy
26 Price once a year.

1 In F2019, 4,395 MWh was applied as credits to Customer's bills, the value of which
2 varies based on the rate schedule under which the customer takes service, as
3 shown in [Table 6](#) below.

4 In F2019, a total of 8,369 MWh was delivered to BC Hydro's system. Of this
5 electricity, 3,842 MWh was paid out to RS 1289 Customers at the RS 1289 Energy
6 Price (9.99 ¢ per kWh in F2019).

7 The first type of compensation is valued at the current Energy Charge of the Rate
8 Schedule under which the RS 1289 Customer takes service and the amounts are
9 summarized below for F2019. For rates that have tiered Energy Charges, such as
10 RS 1101, the average rate was applied to estimate the value of the credit. The total
11 value of the credits in F2019 is estimated to have been \$470,875, which is
12 equivalent to 10.71 ¢ per kWh.

1
2
3

Table 6 BC Hydro Compensation to RS 1289 Customers through Reduction in Future Bills via the Generation Credits, in F2019

| Rate Schedule | Energy Charge (April 1, 2018) (¢ per kWh) | Total Value of Credit (MWh) | Total Value of Credit (\$) |
|---------------|---|------------------------------------|-----------------------------------|
| RS 1101 | | 3,715 | 393,456 ⁶ |
| Step 1: | 8.84 | | |
| Step 2: | 13.26 | | |
| Average | 10.59 | | |
| RS 1107 | | 16.8 | 1,784 ⁷ |
| Step 1: | 10.59 | | |
| Step 2: | 18.20 | | |
| RS 1121 | | 2.7 | 281 ⁸ |
| Step 1: | 8.84 | | |
| Step 2: | 13.26 | | |
| Average | 10.59 | | |
| RS 1151 | 10.59 | 173.9 | 18,274 |
| RS 1234 | | 19.4 | 2,309 ⁹ |
| Step 1: | 11.9 | | |
| Step 2: | 19.81 | | |
| RS 1255 | | 0 | 0 |
| Step 1: | 11.90 | | |
| Step 2: | 19.81 | | |
| RS 1300 | 11.73 | 466.9 | 54,772 |
| RS 1500 | 9.06 | 0 | 0 |
| RS 1600 | 5.67 | 0 | 0 |
| RS 1611 | 5.67 | 0 | 0 |
| Total | 10.71 | 4,395 | 470,875 |

⁶ Average rate applied.

⁷ Step 1 rate applied.

⁸ Average rate applied.

⁹ Step 1 rate applied.

1 The second type of compensation is payment to RS 1289 Customers at the RS 1289
 2 Energy Price. [Table 7](#) shows the sum of RS 1289 Customers' Generation Account
 3 Balance for which BC Hydro paid the RS 1289 Customers the RS 1289 Energy Price
 4 in F2019 and F2020. Total payments by BC Hydro to RS 1289 Customers were
 5 \$383,858 in F2019 and \$449,004 in F2020.

6 **Table 7 F2019 Net Metering Customer Generation**
 7 **Compensated via Payments to**
 8 **Customers at the RS 1289 Energy Price**

| | F2019 | F2020 |
|---|----------------|----------------|
| Number of accounts that received payout | 402 | 630 |
| Total Generation Account Balance for which BC Hydro paid the RS 1289 Energy Price (GWh) | 3,842 | 4,495 |
| RS 1289 Energy Price Applicable | 9.99 ¢ per kWh | 9.99 ¢ per kWh |
| Annual payment (\$) | 383,858 | 449,004 |

9 **6 Cost and Benefit of the Program**

10 **6.1 Cost Shifting**

11 Cost shifting between RS 1289 Customers and non-participating ratepayers is
 12 evaluated by a full cost of service study, which compares the actual net revenue
 13 from RS 1289 Customers (billed revenue net of the Generation Account Balance
 14 payout at the Anniversary Date, plus the value of the electricity delivered to
 15 BC Hydro's grid by RS 1289 Customers) with BC Hydro's cost of serving them. The
 16 outcome of the analysis is expressed as the revenue to cost ratio (**R/C ratio**).

17 This study evaluated whether RS 1289 Customers paid more or less than the cost of
 18 providing them electricity. If the R/C ratio is lower than one, it indicates that RS 1289
 19 Customers are subsidized by non-participant ratepayers since they are not paying
 20 their actual full cost of service. BC Hydro refers to this as cross-subsidization in this
 21 Report.

1 BC Hydro's analysis covered Residential, Medium General Service (**MGS**) and
2 Large General Service (**LGS**) accounts with a focus on understanding the difference
3 between solar and hydropower generation facilities as the difference between these
4 two generation types was an issue raised in the last Application. BC Hydro focused
5 on these rate classes because they have different rate structures. For example, LGS
6 has a demand charge whereas Residential does not. Due to time constraints we
7 were unable to analyze Small General Service (**SGS**) accounts, however we note
8 that their rate structure is very similar to Residential.

9 In total, BC Hydro analyzed 79 per cent of RS 1289 accounts. For the reasons
10 described in section [6.1.2](#), not all accounts can be analyzed within any given year as
11 a full year of data is required and some new RS 1289 accounts joined partway
12 through the year.

13 [Table 8](#) shows the accounts analyzed by rate schedule and the total cross-
14 subsidization for the accounts analyzed was \$2.9M in F2019. Additional details on
15 the methodology and results are presented in sections [6.1.1](#) through [6.1.4](#).

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Table 8 Proportion of Accounts Analyzed by Rate Schedule/Rate Class, Cross-Subsidization per Account and Total Cross-Subsidization for Analyzed Accounts

| Customer Class | Rate Schedules | Generating Facility Technology Type | Total Number of Participation Accounts | Accounts Analyzed | Per cent of Accounts Analyzed (%) | Cross-Subsidization for the Accounts Analyzed (\$)¹⁰ | Average Cross-Subsidization per Account Analyzed (\$) |
|------------------------|------------------------|-------------------------------------|--|-------------------|-----------------------------------|--|---|
| Residential | 1101, 1107, 1121, 1151 | Solar | 1,611 | 1,440 | 89 | (880,953) | (612) |
| | | Hydropower | 7 | 4 | 57 | (69,421) | (17,355) |
| | | Other | 13 | 0 | 0 | N/A | N/A |
| Small General Service | 13xx, 1234 | Solar | 156 | 0 | 0 | N/A | N/A |
| | | Hydropower | 6 | 0 | 0 | N/A | N/A |
| | | Other | 2 | 0 | 0 | N/A | N/A |
| Medium General Service | 1255, 15xx | Solar | 48 | 16 | 33 | (63,045) | (3,940) |
| | | Hydropower | 3 | 0 | 0 | N/A | N/A |
| | | Other | 1 | 0 | 0 | N/A | N/A |
| Large General Service | 16xxx | Solar | 45 | 28 | 62 | (1,864,164) | (66,577) |
| | | Other | 1 | 0 | 0 | N/A | N/A |
| Total | | | 1,893 | 1,488 | 79 | (2,877,583) | N/A |

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6.1.1 Methodology

The analysis used the standard embedded cost of service approach approved by the BCUC, the output of the F2019 Fully Allocated Cost of Service (FACOS) Study filed with the BCUC on May 13, 2020,¹¹ and electricity load and billing data for RS 1289 Customers.

Fully allocated cost of service analysis is a standard electric utility approach to calculating the recovery of average accounting costs (i.e., revenue requirements

¹⁰ Compare to the R/C ratio of the customer class.

¹¹

<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/facos/00-2020-05-13-bchydro-facos-2019-annual-report.pdf>

1 cost) by rate class. The approach classifies an electricity utility's costs of service into
2 three main groups: demand related, energy related and customer related.

3 Approximately 51 per cent of BC Hydro's costs of service are demand related.

4 Demand related costs are those costs required to serve customer load when it is at
5 its greatest and includes both the dependable generation resource and the electricity
6 "grid" (i.e., transmission and distribution) required to deliver the electricity.

7 Dependable capacity refers to generation resources that are available when
8 customer load is at its greatest; typically cold winter evenings. Large hydropower,
9 biomass, geothermal, pumped storage, gas-fired generation and some demand-side
10 management programs provide dependable capacity. Variable resources like wind,
11 solar and hydropower without reservoir storage, the output of which depends on
12 environmental factors, generally do not have this dependable capacity. A topic of
13 interest for this evaluation is the extent to which RS 1289 Generating Facilities
14 provide contribution towards BC Hydro's demand related costs.

15 Approximately 44 per cent of BC Hydro's costs of service in F2019 are energy
16 related. Energy related costs are the cost of energy¹² to our customers and include
17 costs such as water rentals or market energy purchases.

18 The remaining approximately 5 per cent of BC Hydro's costs of service are customer
19 related. Customer related costs are fixed costs such as billing and metering required
20 to provide service to the customer.

21 Energy related costs are allocated to customers based on their proportion of energy
22 consumption. Generation and transmission demand-related costs are allocated to
23 customers based on their contribution to BC Hydro's system peak demand, which is
24 calculated over the four winter months of November through February, i.e., the

¹² The cost of energy includes cost of water rentals, market purchases, Independent Power Producer long-term purchase commitments, natural gas for thermal generation, NIA generation, Operation Maintenance & Administration and the proportion of capital investment related costs that were classified as energy related.

1 four coincident peak method. Distribution demand-related costs are allocated to
2 customers based on their contribution to the peak demand of the customer group,
3 i.e., the non-coincident peak method. This methodology is well established. It was
4 originally based on BCUC direction in Order No. G-111-07 issued
5 September 18, 2007, and again reviewed in Order No. G-47-16 pursuant to
6 BC Hydro's F2016 Cost of Service Study.

7 Additional information on the methodology can be found in [Appendix A](#).

8 **6.1.2 Data Cleaning and RS 1289 Summary**

9 The cost of service study for RS 1289 was conducted based on the following four
10 data sets:

- 11 1. RS 1289 Customer lists containing detailed account information of individual
12 participants (e.g., Customer account ID, participation dates, rate schedule and
13 Generating Facility technology).
- 14 2. RS 1289 Customer electricity data containing electricity supplied from the
15 BC Hydro system to the Customer, electricity delivered from the Customer's
16 Generating Facility to the BC Hydro system, and the Generation Account
17 Balance payment by BC Hydro at the Anniversary Date (if applicable). This
18 information is collected for each monthly or bi-monthly billing period for the
19 Customer accounts included in the study.
- 20 3. Billing information for each RS 1289 Customer, including billed energy, billed
21 demand (if applicable), and associated bills including the amount that BC Hydro
22 paid for the Generation Account Balance remaining in the Customer's
23 Generation Account at the Anniversary Date (if applicable) and the amount
24 BC Hydro billed or paid (for Generation Account Balance remaining at
25 Anniversary Date) the Customer in each billing period.

1 4. Hourly metered data of electricity delivered to BC Hydro's system and electricity
2 provided by BC Hydro for individual RS 1289 Customers. This data was used to
3 generate load shapes of RS 1289 Customers by rate class and technology.

4 The analysis is for BC Hydro's F2019 year as this is the most recent year for which
5 the required data and information inputs were available.

6 There were 1,893 active RS 1289 accounts at the end of F2019. Of these
7 1,893 accounts, electricity data was available for the 1,828 accounts that had
8 completed one full anniversary year under RS 1289. The number of accounts that
9 had completed a full annual billing cycle is lower than the total number of RS 1289
10 active accounts because customers may have joined RS 1289 partway through the
11 year.

12 Analysis of a full annual billing cycle is required in order to capture the financial
13 impact of compensation by BC Hydro to RS 1289 Customers at the RS 1289 Energy
14 Price, which occurs once annually on the RS 1289 Customers' Anniversary Date,
15 and to capture the impact of seasonality on BC Hydro's cost of service. Therefore,
16 only the 1,828 accounts with a full year of electricity data were carried forward for
17 analysis.

18 Next, the electricity data was linked to the billing data and the Customer accounts
19 were linked to the bi-directional load data from BC Hydro's smart meters.

20 The analysis was then completed for the 1,455 Residential Service, 16 Medium
21 General Service (**MGS**) and 28 Large General Service (**LGS**) Customers that
22 participated in RS 1289 and for which complete annual electricity data, billing
23 information and bi-directional hourly load data were available for F2019.

24 The summary of the billing statistics of RS 1289 Customers that take BC Hydro
25 Residential service is shown in [Table 9](#).

1 Residential customers enrolled in RS 1289 have substantially higher electricity
 2 purchases from BC Hydro than Residential customers that do not participate in
 3 RS 1289. In F2019, the average annual energy provided by BC Hydro to Residential
 4 RS 1289 accounts (net of the customers' own generation) was 14,490 kWh/year,
 5 compared to the average Residential usage of 9,819 kWh/year and average
 6 single-family dwelling customer electricity usage of 10,969 kWh/year.¹³

7 **Table 9 Summary of RS 1289 Customers on**
 8 **Residential Service**

| Generating Facility Type | Number of Accounts | Total BC Hydro Revenue (\$) Net of Credit Pay Out | Electricity Provided by BC Hydro to the Customer (kWh) | Electricity Delivered to BC Hydro's System from the Customer (kWh) | Average Electricity Provided by BC Hydro Per RS 1289 Customer (kWh) |
|--------------------------|--------------------|---|--|--|---|
| Solar | 1,440 | 1,774,357 | 20,253,158 | 5,260,681 | 14,065 |
| Hydropower | 4 | (104,097) | 35,581 | 1,083,906 | 8,895 |
| Biogas | 1 | 51,340 | 484,080 | - | 484,080 |
| Hydro & Solar | 1 | 413 | 8,346 | 4,954 | 8,346 |
| Wind | 6 | 33,288 | 272,708 | 8 | 45,451 |
| Wind & Solar | 3 | 2,709 | 29,472 | 6,818 | 9,824 |
| Total | 1,455 | 1,758,011 | 21,083,345 | 6,356,367 | 14,490 |

9 [Table 10](#) shows the billing statistics of the 28 LGS accounts analyzed. In F2019, the
 10 average annual electric energy provided by BC Hydro to RS 1289 Customers who
 11 take service under LGS was 2,195 MWh, which is significantly higher than the
 12 average for all LGS customers of 1,537 MWh. The average billed annual demand

¹³ The average consumption of electric heated and non-electric heated single-family homes was 15,104 kWh and 9,384 kWh correspondingly in F2019.

1 per account was 5,531 kW for LGS RS 1289 Customers, which is also substantially
 2 higher than the average for all LGS customers of 3,475 kW in F2019.

3 **Table 10 Summary of LGS RS 1289 Customers**

| Generating Facility Type | Number of Accounts | Total BC Hydro Revenue (\$) | Electricity Delivered by BC Hydro to the Customer (kWh) | Electricity Received by BC Hydro from the Customer (kWh) | Total Billed Demand (kW) | Average Consumption Per RS 1289 Customer (kWh) | Sum of Annual Billed Demand Averaged over all RS 1289 Customers (kW) |
|--------------------------|--------------------|------------------------------------|--|---|---------------------------------|---|---|
| Solar | 28 | 3,429,205 | 61,465,240 | 0 | 154,860 | 2,195,187 | 5,531 |

4 [Table 11](#) shows the billing statistics of the 16 MGS accounts analyzed. In F2019, the
 5 average electric energy provided by BC Hydro to RS 1289 Customers who take
 6 service under MGS was 189,264 kWh, which was slightly lower than the average of
 7 201,959 kWh for all MGS accounts. The average annual billed demand of MGS
 8 RS 1289 Customers was 628 kW, which is about 15 per cent higher than the
 9 average of 548 kW for all MGS accounts.

10 **Table 11 Summary of MGS RS 1289 Customers**

| Generating Facility Type | Number of Accounts | Total BC Hydro Revenue | Electricity Delivered by BC Hydro to the Customer (kWh) | Electricity Received by BC Hydro from the Customer (kWh) | Total Billed Demand (kW) | Average Consumption Per RS 1289 Customer (kWh) | Sum of Annual Billed Demand Averaged over all RS 1289 Customers (kW) |
|--------------------------|--------------------|------------------------|--|---|---------------------------------|---|---|
| Solar | 16 | 275,344 | 3,028,220 | - | 10,048 | 189,264 | 628 |

11 **6.1.3 Result**

12 BC Hydro conducted separate cost of service studies for Residential, LGS and MGS
 13 customer classes by technology. The Residential customer class accounted for
 14 86 per cent of all active RS 1289 accounts. The SGS customer class,

1 which accounted for 9 per cent of RS 1289 accounts at the end of F2019, was
2 excluded from the study due to resource and time constraints.

3 **6.1.3.1 Residential RS 1289 Customers**

4 The cost of service for Residential RS 1289 Customers was analyzed separately for
5 those RS 1289 Customers with solar and hydropower Generating Facilities.

6 *Generating Facility Type - Solar*

7 Among the total of 1,455 RS 1289 Customers that take Residential Service that
8 were analyzed, 1,440 have solar Generating Facilities. As shown in [Table 9](#),
9 BC Hydro had provided 20,253,158 kWh of energy to these RS 1289 Customers in
10 F2019 and BC Hydro's revenue from these customers was \$ 1,774,357. These
11 RS 1289 Customers delivered 5,260,681 kWh to BC Hydro's system.

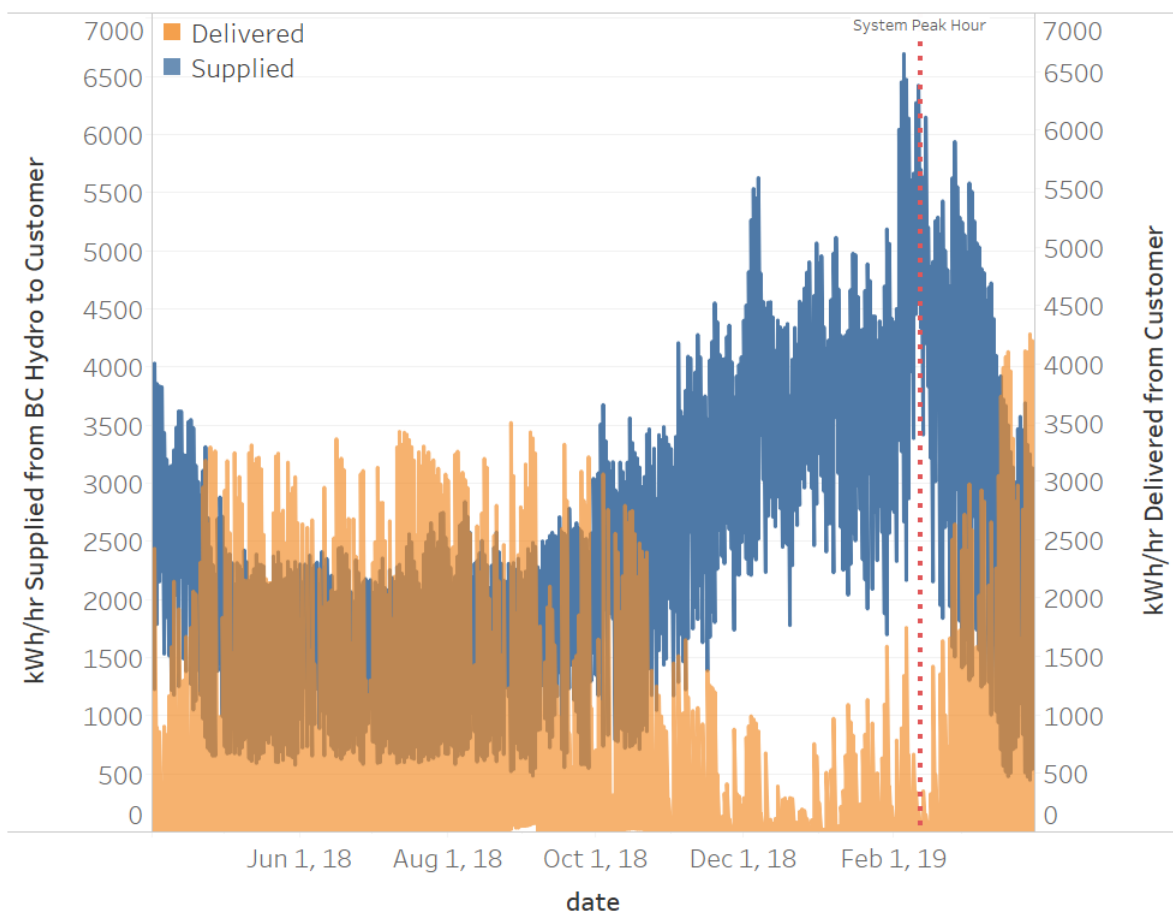
12 To assess BC Hydro's demand related cost to serve these RS 1289 Customers and
13 the demand related value of the electricity delivered to the grid, aggregated
14 8760-hour hourly and 24-hour average electricity usage per customer load shapes of
15 this customer group were generated shown as in [Figure 2](#) and [Figure 3](#), where the
16 blue line is the hourly load of electricity that BC Hydro supplied to RS 1289
17 Customers taking Residential Service (electricity inflow at the customer's meter) and
18 the orange line is the hourly load of electricity delivered to BC Hydro's grid by
19 RS 1289 Customers taking Residential Service (electricity outflow at the customer's
20 meter).

21 [Figure 2](#) shows that RS 1289 Customers with solar Generating Facilities taking
22 Residential Service have the greatest demand for electricity service for BC Hydro in
23 winter, which is the same as is observed for Residential Service customers who do
24 not participate in RS 1289. In contrast, the electricity delivered to BC Hydro's system
25 by the RS 1289 Customers primarily occurred in the summer and shoulder seasons.

1 BC Hydro is a winter peaking utility and our demand related costs are driven by the
2 winter residential peak demand. The peak demand period of Residential customers
3 coincides with and drives our system peak.

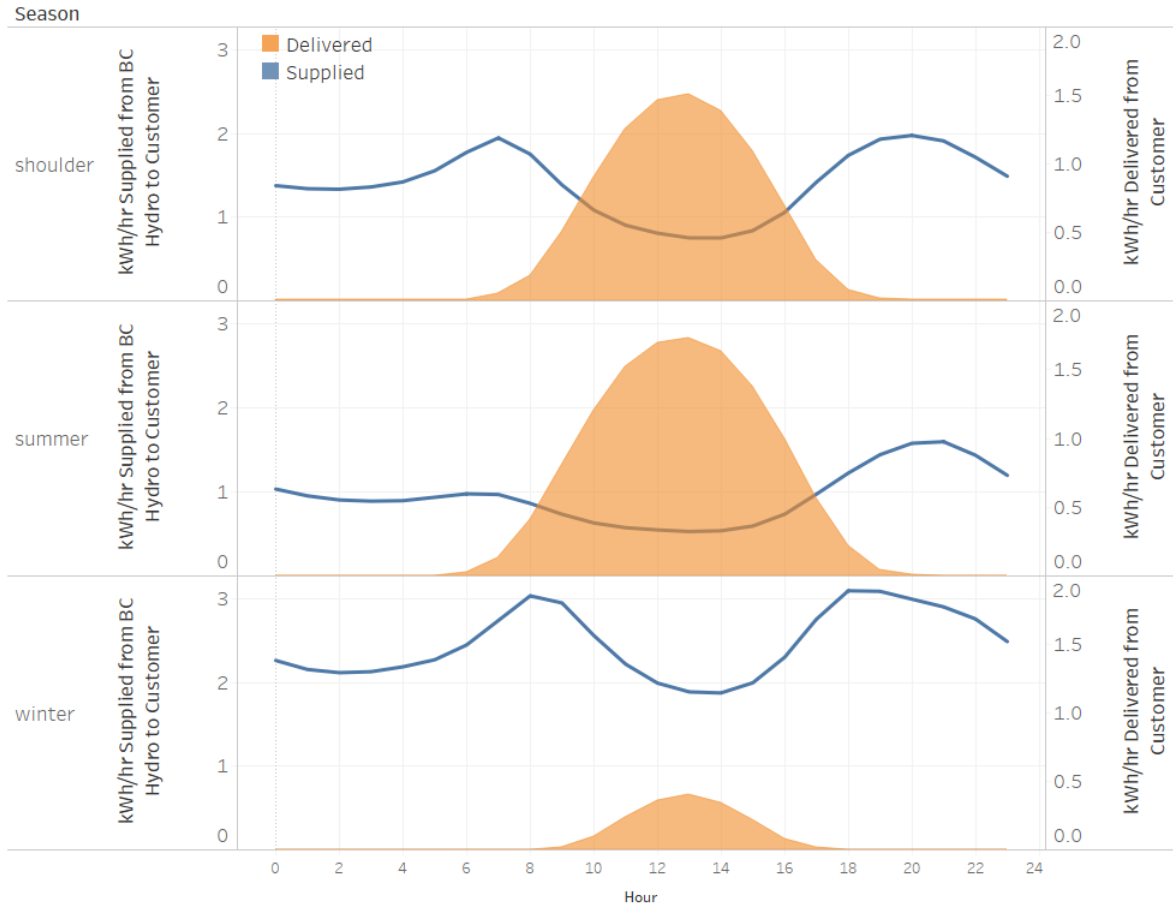
4 The results shown in [Figure 2](#) indicate that RS 1289 Customers are imposing
5 demand related costs on BC Hydro’s system (by drawing their peak power demand
6 during our system peak), and that solar Generating Facilities are not offsetting those
7 costs.

8 **Figure 2 Aggregated Hourly Load Profile of**
9 **Electricity Supplied to and Delivered from**
10 **Residential RS 1289 Solar Customers**



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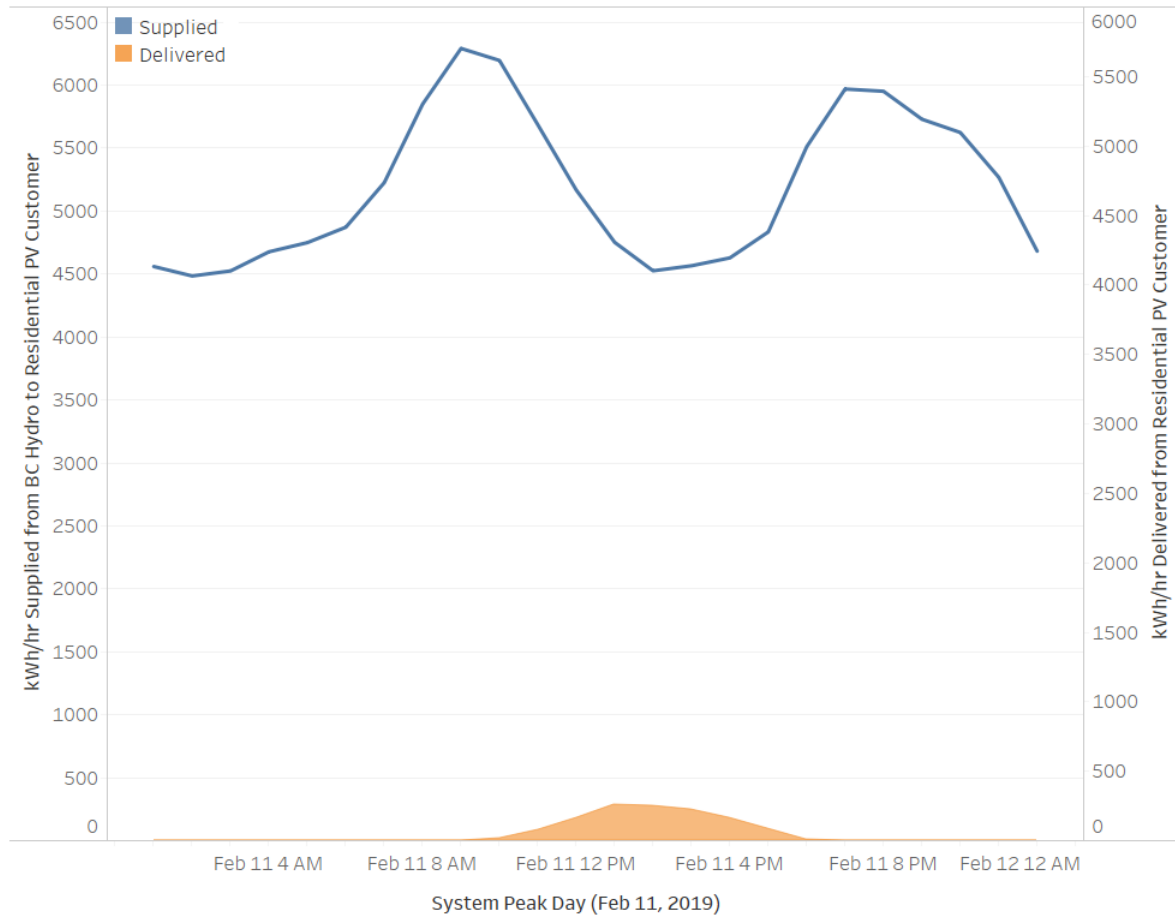
Figure 3 Average Seasonal 24-Hour Load Profile of Electricity Supplied by BC Hydro and Delivered from Residential RS 1289 Solar Customers



5 BC Hydro’s system peak in F2019 occurred at 7 p.m. in February 11, 2019. To
 6 further examine the impact of RS 1289 solar generation on BC Hydro’s system peak,
 7 we analyzed this particular day. As shown below, the peak electricity usage of this
 8 group of customers occurred in the morning and evening on February 11, whereas
 9 electricity was delivered to BC Hydro during mid-day.

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Figure 4 Daily Aggregated Energy Supplied to and Delivered from Residential RS 1289 Solar Customers on day of F2019 System Peak



4 During BC Hydro’s peak demand period the amount of electricity delivered from
5 RS 1289 Customer Generating Facilities to BC Hydro’s system was low and
6 RS 1289 Customer demand for electricity from BC Hydro was high.

7 The costs of serving 1,440 Residential solar RS 1289 Customers were estimated by
8 pro-rating of energy, demand and customer related costs of the entire Residential
9 customer class by the proportion of the individual allocation factors accounted by
10 this group of customers. Particularly, energy related costs of solar RS 1289
11 Customers were estimated based on their proportion of total residential energy

1 consumption. Generation and transmission demand-related costs are also allocated
2 to solar RS 1289 based on our standard FACOS methodology as further described
3 in [Appendix A](#). The customer related cost was allocated to solar RS 1289 Customers
4 based on the proportion of the number of accounts of this group of participants out of
5 the total 1,833,097 residential accounts in F2019. The program administration cost is
6 directly assigned to the program and allocated between and within customer classes
7 by the blended RS 1289 customer care allocator (weighted average of 90 per cent of
8 # of bills allocators and 10 per cent revenue allocator) and the number of accounts.
9 The electricity that RS 1289 Customers delivered to BC Hydro's system was also
10 valued for its energy and demand avoided cost according to the total energy,
11 coincident demand and its demand at non-coincident time of the residential sector of
12 the RS 1289 Customers' delivered electricity.

13 The net revenue of RS 1289 Customers with solar Generating Facilities is the sum
14 of the revenue net of credit payout plus the energy and demand value of the
15 electricity delivered to the grid by these RS 1289 Customers. The energy and
16 demand values of electricity delivered to BC Hydro were estimated by the unit cost
17 of energy and demand (estimated based on F2019 FACOS) multiplied by the total
18 energy and demand contributed by the RS 1289 Customers. The R/C ratio of the
19 overall residential customer class in F2019 FACOS and the estimated R/C ratio of
20 the residential solar RS 1289 Customers are shown in [Table 12](#). The table shows
21 that the R/C ratio of this group of RS 1289 Customers was 65.3 per cent, which was
22 substantially lower than the 94.6 per cent R/C ratio of the residential class overall in
23 F2019. Since the R/C ratio of this group of RS 1289 Customers was significantly
24 lower than 100 per cent, BC Hydro concludes that the residential solar RS 1289
25 Customers were subsidized by the non-participant ratepayers.

26 As shown in the last row of [Table 12](#), BC Hydro under-recovered \$612/year per
27 Residential solar RS 1289 Customer relative to all residential class.

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Table 12 R/C Ratio Estimation of Residential Solar RS 1289 Customers

| BC Hydro Cost to Serve | | | | |
|-------------------------------------|---|---|--|---|
| Cost Items | | Total Cost of Residential Class in F2019 (\$ million) | Share of RS 1289 for Residential Solar ¹⁴ (%) | Annual Cost of RS 1289 for Residential Solar (\$) |
| A | Energy Related Costs | 748.6 | 0.113 | 842,954 |
| B | Generation Demand Related Cost | 359.5 | 0.134 | 483,160 |
| | Transmission Demand Related Cost | 432.5 | 0.134 | 581,186 |
| | Distribution Demand Related Cost | 417.0 | 0.143 | 598,035 |
| C | Customer Related Cost (without Program Administration Cost) | 183.8 | 0.096 | 177,228 |
| D | Program Administration Cost ¹⁵ | 0.3 | 98.969 | 332,226 |
| E | Total Costs to Serve | E = A + B + C + D | | <u>3,014,788</u> |
| BC Hydro Revenues and Avoided Costs | | | | |
| F | BC Hydro Revenues Received | Electricity Bill Revenues Less Payments for Generation Credit Balance | | \$1,774,357 |
| G | Energy Value to BC Hydro of Net Metering Generation Delivered | 0.037(\$/kWh) * 5,260,681 kWh Delivered to BC Hydro | | \$194,715 |
| H | G&T Demand Value to BC Hydro of Net Metering Generation Delivered | 213.58(\$/kW-year) per System CP*CP of Outflow | | \$471 |
| I | D Demand Value to BC Hydro of Net Metering Generation Delivered | 100.19(\$/kW-year) per NCP* Demand of Outflow at Residential NCP Hour | | \$205 |
| J | Total Revenues and Avoided Costs | J = F + G + H + I | | \$1,969,748 |
| Cost Shifting | | | | |
| K | Average Residential Net Metering Revenues to Cost Ratio | K = J / E | | 65.3% |
| L | Average Residential Metering Customer Revenue to Cost Ratio | As per F2019 FACOS | | 94.6% |
| M | Cost Shifting Per Account | M = E * (L - K) / # of Accounts | | \$612/year |

¹⁴ Based on Cost Allocators of Energy/4CP/NCP/# of Customers.

¹⁵ Assigned to residential by blended RS 1289 Customer Care allocator=81.48 per cent.

1 This cost of service study was further analyzed to estimate the portion of the
2 cross-subsidization that is associated with transfers to existing RS 1289 Customers
3 as compared to administration costs incurred to process applications for prospective
4 RS 1289 Customers. This analysis indicates that application processing costs result
5 in a cross-subsidization of approximately \$143 per Residential solar RS 1289
6 Customer, or 23 per cent of the \$612 per year per RS 1289 Customer
7 cross-subsidization shown above.

8 BC Hydro notes that it has not performed a detailed analysis of the average cost of
9 processing applications from prospective RS 1289 Customers. As a result, the
10 cross-subsidization related to the processing of new RS 1289 applications is
11 included for illustrative purposes only.

12 **Generating Facility Type - Hydropower**

13 Among the total of 1,455 RS 1289 Customers that take Residential Service that
14 were analyzed, only four accounts have hydropower Generating Facilities. As shown
15 in [Table 9](#), BC Hydro supplied 35,581 kWh energy to these RS 1289 Customers in
16 F2019 and BC Hydro's net revenue after credit payout from these RS 1289
17 Customers was -\$104,097. These RS 1289 Customers delivered 1,083,906 kWh to
18 BC Hydro's system.

19 To assess BC Hydro's demand related cost to serve these RS 1289 Customers and
20 the demand related value of the electricity delivered to the grid, aggregated
21 8760-hour hourly and 24-hour average load shapes per account of this customer
22 group were generated and shown as in [Figure 4](#) and [Figure 5](#), where the blue line is
23 the hourly load of electricity that BC Hydro supplied to hydro facility RS 1289
24 Customers taking Residential Service (inflow electricity of the customer's meter) and
25 the orange line is the hourly load of electricity delivered to BC Hydro's grid by the
26 same group of RS 1289 Customers (outflow of electricity at the customer's meter).

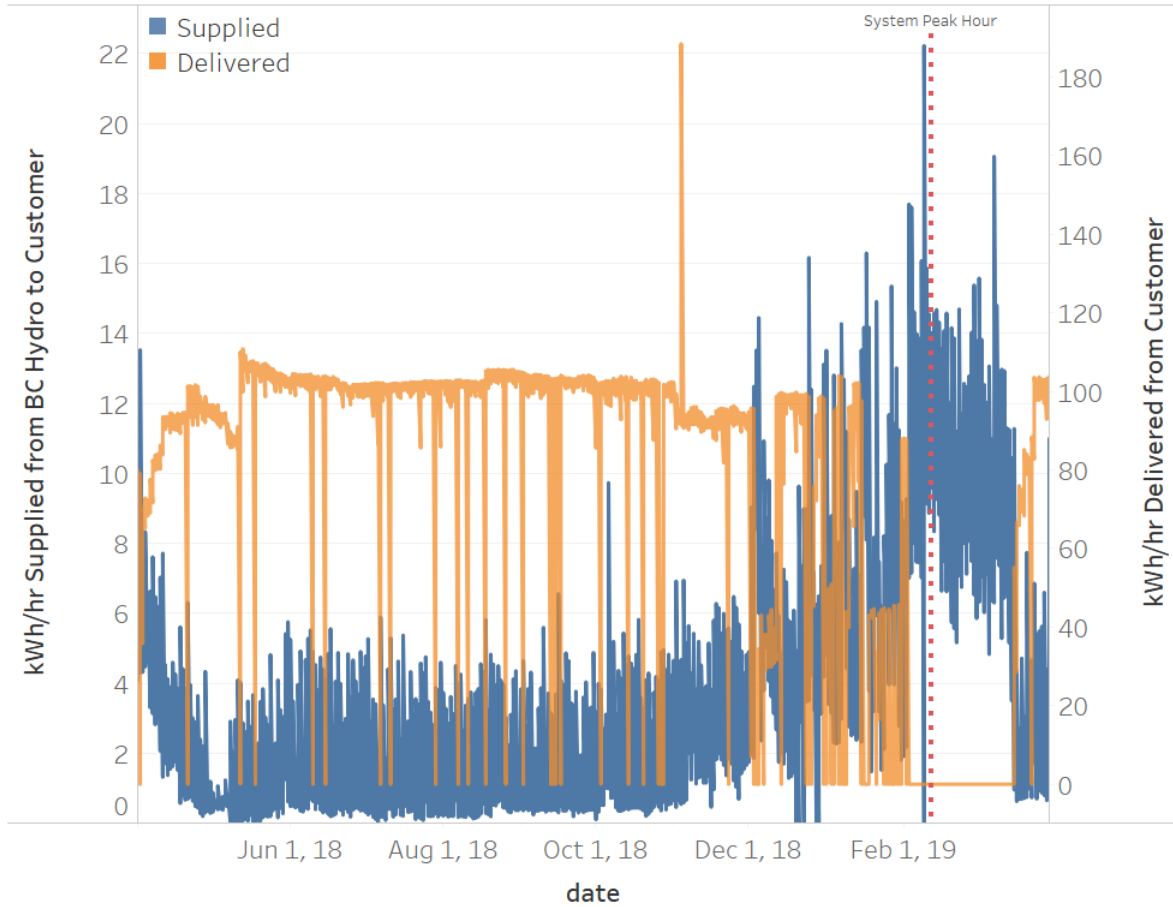
1 [Figure 6](#) showed that RS 1289 Customers with hydropower Generating Facilities
2 taking Residential Service have the greatest demand for electricity service for
3 BC Hydro in winter, which aligns with the seasonal pattern of overall energy usage
4 at BC Hydro's system level. The Residential hydropower RS 1289 Customers did
5 not deliver excess electricity to BC Hydro's system during the winter peak season.

6 Similar to Residential solar RS 1289 Customers, the results shown in [Figure 6](#)
7 indicate that Residential hydropower RS 1289 Customers impose demand related
8 costs on BC Hydro's system (by drawing their peak power demand during our
9 system peak), and that hydropower Generating Facilities are not offsetting those
10 costs.

11 Again, to further examine the impact of RS 1289 hydropower generation on
12 BC Hydro's system peak, BC Hydro investigated this group of RS 1289 Customers'
13 load shape on the system peak day of February 11, 2019. As shown below, no
14 electricity was delivered to BC Hydro during this system peak hour (7 p.m. on
15 February 11, 2019).

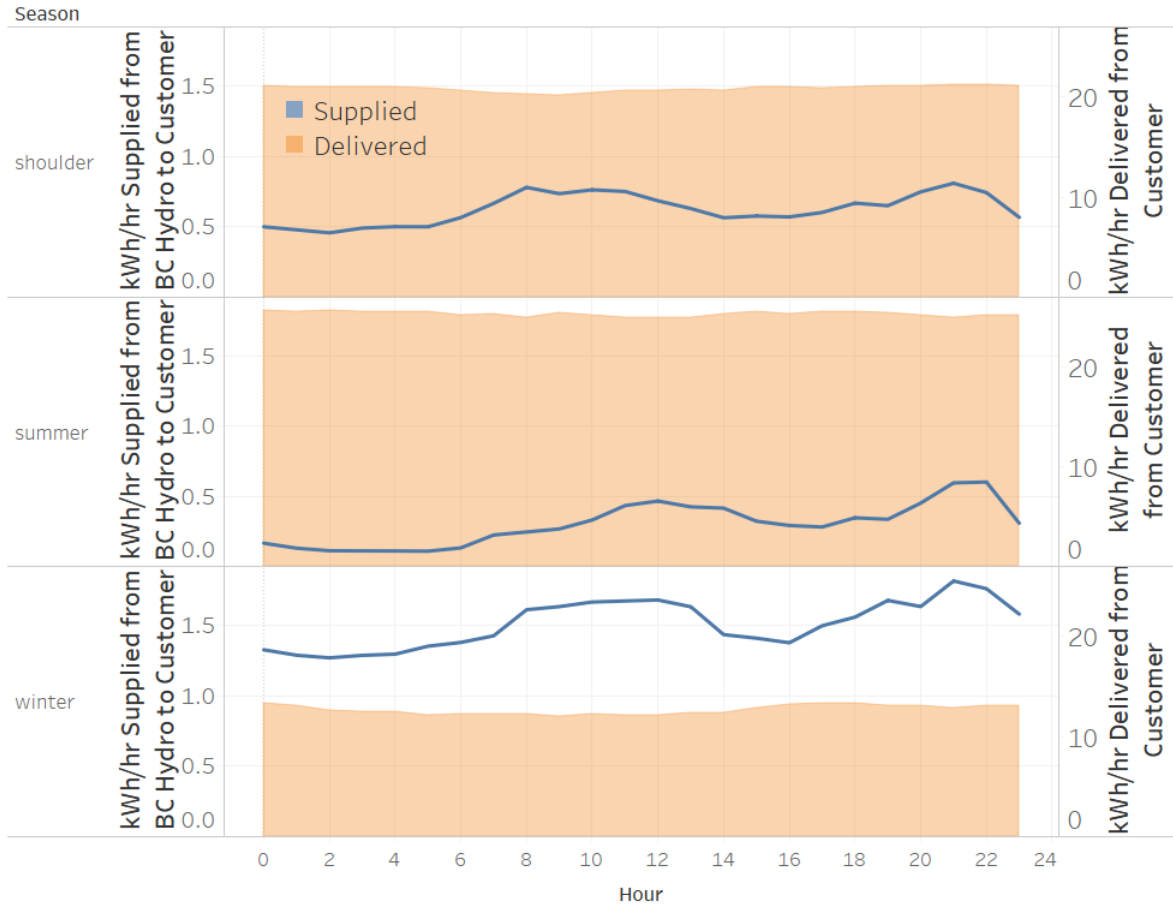
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Figure 4 Aggregated Hourly Profile of Electricity Supplied to and Delivered from Residential RS 1289 Hydropower Generating Customers



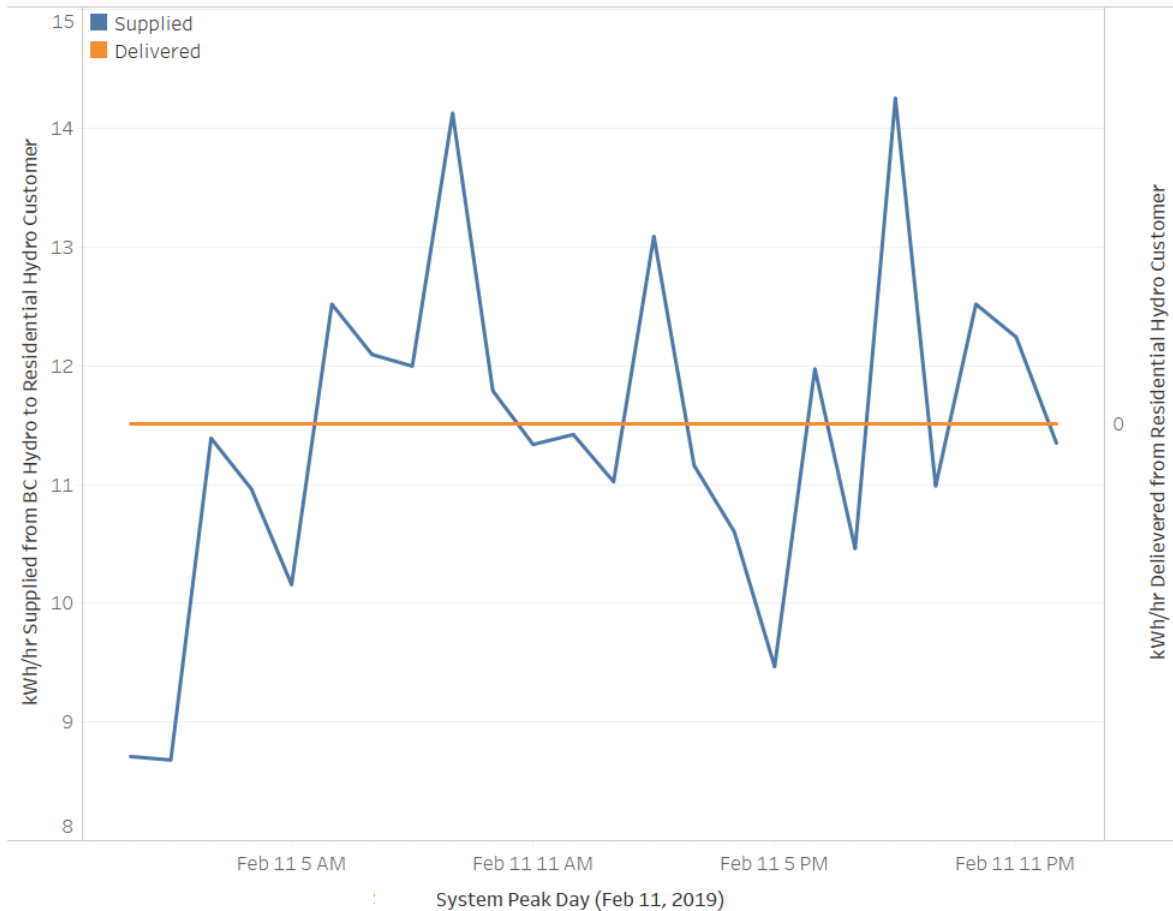
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Figure 5 Average Seasonal 24-Hour Profile of Electricity Supplied to and Delivered from Residential Hydropower RS 1289 Customers



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Figure 6 Daily Profile of Electricity Supplied to and Delivered from Residential Hydropower RS 1289 Customers on day of F2019 System Peak



5 The revenue to cost ratio of the residential hydropower RS 1289 Customers is
6 calculated as shown in [Table 13](#). Similar to residential solar RS 1289 Customers, the
7 costs of serving this group of residential hydropower RS 1289 Customers were
8 estimated by pro-rating the energy, demand and customer related cost of the entire
9 residential customer class by the proportion of the individual allocation
10 factors accounted by this group of customers. Again, the electricity that residential
11 hydropower RS 1289 Customers delivered to the grid was also valued for its energy

1 and demand avoided cost according to the total energy, coincident demand and its
2 demand at non-coincident time of the Residential sector of the Customers' outflow of
3 electricity. [Table 13](#) shows that BC Hydro not only did not collect any revenue from
4 this group of customers to recover the cost of serving them, but also paid significant
5 amounts to the Residential hydropower RS 1289 Customers for the electricity
6 delivered to the grid. On average, each Residential hydropower RS 1289 Customer
7 under paid \$17,355 to BC Hydro for electricity service in F2019 and was subsidized
8 by non-participants of RS 1289.

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Table 13 R/C Ratio Estimation of Residential Hydro RS 1289 Customers

| BC Hydro Cost to Serve | | | | |
|-------------------------------------|---|---|---|--|
| Cost Items | | Total Cost of Residential Class in F2019 (\$ million) | Share of RS 1289 for Residential Hydropower ¹⁶ (%) | Annual Cost of RS 1289 for Residential Hydropower (\$) ¹⁷ |
| A | Energy Related Costs | 748.6 | 0.0002 | 1,193 |
| B | Generation Demand Related Cost | 359.5 | 0.0002 | 892 |
| | Transmission Demand Related Cost | 432.5 | 0.0002 | 1,073 |
| | Distribution Demand Related Cost | 417.0 | 0.0003 | 1,048 |
| C | Customer Related Cost (without Program Administration Cost) | 183.8 | 0.0002 | 418 |
| D | Program Administration Cost ¹⁸ | 0.3 | 0.3374 | 1,133 |
| E | Total Costs to Serve | E = A + B + C + D | | 5,757 |
| BC Hydro Revenues and Avoided Costs | | | | |
| F | BC Hydro Revenues Received | Electricity Bill Revenues less Payments for Generation Credit Balance | | \$(104,097) |
| G | Energy Value to BC Hydro of Net Metering Generation Delivered | 0.037(\$/kWh) * 1,083,906 kWh Delivered to BC Hydro | | \$40,119 |
| H | G&T Demand Value to BC Hydro of Net Metering Generation Delivered | 213.58(\$/kW-year) per System CP*CP of Outflow | | 0 |
| I | D Demand Value to BC Hydro of Net Metering Generation Delivered | 100.19(\$/kW-year) per NCP* Demand of Outflow Out at Residential NCP Hour | | 0 |
| J | Total Revenues and Avoided Costs | J = F + G + H + I | | \$(63,978) |
| Cost Shifting | | | | |
| K | Average Residential Net Metering Revenues to Cost Ratio | K = J / E | | -1,111.4% |
| L | Average Residential Customer Revenue to Cost Ratio | As per F2019 FACOS | | 94.6% |
| M | Cost Shifting Per Account | M = E * (L-K) / # of Accounts | | \$17,355/year |

¹⁶ Based on Cost Allocators of Energy/4CP/NCP/ # of Customers.

¹⁷ Figures may not add up due to rounding.

¹⁸ Assigned to residential by blended RS 1289 CC allocator = 81.48 per cent.

1 **6.1.3.2 Cost Shifting of LGS and MGS Accounts**

2 Cost shifting studies were also conducted for LGS RS 1289 Customers by
3 generation technology.

4 BC Hydro believes that almost all of the generation of LGS solar RS 1289
5 Customers was used to offset their own energy usage since no electricity was
6 delivered to BC Hydro's system from the group of 28 accounts with complete sales,
7 billing and hourly load data in F2019. In F2019, the R/C ratio of this group of
8 RS 1289 Customers was 66.3 per cent, which is substantially lower than the R/C
9 ratio of 102.4 per cent for the LGS class overall. Compared to the general LGS
10 class, average LGS solar RS 1289 Customers under paid \$66,577 for the service
11 that BC Hydro provided in F2019.

12 BC Hydro conducted a cost of service study for 16 MGS solar RS 1289 Customers.
13 Similar to LGS RS 1289 Customers, it is believed that the electricity generation of
14 MGS solar RS 1289 Customers solar was also used to offset its energy usage and
15 there was no excessive electricity delivered to BC Hydro's grid by these 16 accounts
16 in F2019. The R/C ratio of this group of RS 1289 Customers was 93.6 per cent,
17 which is lower than the overall 115.1 per cent R/C of the MGS class overall.

18 Compared to the overall MGS accounts, on average \$3,940 of the BC Hydro's cost
19 to service each of this group of RS 1289 Customers was subsidized by the other
20 rates payers who didn't participate in the program.

21 Refer to [Appendix A](#) for additional details on LGS and MGS cost shifting calculation
22 and results.

23 **6.1.4 Limitations**

24 There are two primary limitations of the cost of service analysis presented in this
25 Report:

-
- 1 • The analysis does not include Small General Service customers on RS 1289.
- 2 • The cost shifting analysis presented in this Report includes some
- 3 RS 1289 accounts located in BC Hydro's Non-Integrated Areas (**NIA**), although
- 4 the majority of RS 1289 accounts are in the integrated area. BC Hydro's
- 5 standard fully allocated cost of service methodology analyzes average costs
- 6 across all the rate classes and does not differentiate based on geographical
- 7 locations. Nonetheless, BC Hydro acknowledges that our cost of energy in the
- 8 NIA is higher than it is in the integrated area and therefore the
- 9 cross-subsidization results presented in this Report may not be applicable in
- 10 the NIA. Further analysis would need to be completed to determine whether
- 11 and to what extent RS 1289 in the NIA results in cross-subsidization.

12 **6.2 RS 1289 Electricity Market Value Assessment**

13 The analysis presented in section [6.1](#) assesses BC Hydro's costs to serve from

14 BC Hydro infrastructure. As BC Hydro is part of the Western Interconnection,

15 another potential perspective is to assess the RS 1289 electricity deliveries to

16 BC Hydro's system against the market value of electricity in the Western

17 Interconnection. BC Hydro's energy market trading hub is the Mid-C energy market.

18 The annual average value of energy at the Mid-C market was 3.0 ¢ per kWh in

19 F2016, 2.8 ¢ per kWh in F2017, 2.8 ¢ per kWh in F2018, 5.6 ¢ per kWh in F2019 and

20 3.2 ¢ per kWh in F2020. Market prices were higher in F2019 compared to other

21 years due to an electricity supply issue arising from the explosion of the Enbridge

22 Pipeline in October 2018 and low water inflows to hydroelectric reservoirs.

23 We note that as shown in section [5.1](#), the average value of the Generation Account

24 credits provided to RS 1289 customers was 10.71 ¢ per kWh, which is higher than its

25 market value in each year from F2016 to F2020. BCUC Order No. G-168-20 did not

26 address or change the value of the credit.

1 Likewise, the Energy Price paid to RS 1289 Customers in F2019 was 9.99 ¢ per
 2 kWh, however over time the Energy Price payable for annual Generation Account
 3 balance payments to RS 1289 Customers will align with the Mid-C market price as a
 4 result of BCUC Order No. G-168-20.

5 The use of the annual average Mid-C market price does not account for the fact that
 6 RS 1289 electricity deliveries to BC Hydro's system fluctuate over the year, due to
 7 strong seasonality as shown in [Figure 2](#), [Figure 3](#), [Figure 4](#) and [Figure 5](#). Electricity
 8 deliveries to BC Hydro's system from RS 1289 customers with solar and hydropower
 9 Generating Facilities are very low in winter, and are highest in spring, summer and
 10 fall. The time period with high electricity deliveries to BC Hydro's system includes the
 11 spring freshet period. The freshet results in BC Hydro and other hydropower electric
 12 utilities that are part of the Western Interconnection experiencing a seasonal energy
 13 surplus during the months of May through July. As a result, market prices for energy
 14 are typically depressed and sometimes even negative during these months.

15 The market price of energy in the freshet months is presented below for high load
 16 hours (day time) and low load hours (overnight). Electricity delivered by
 17 RS 1289 Customers with solar generation coincides with high load hours, whereas
 18 electricity delivered from RS 1289 Customers with hydropower generation occurs in
 19 both high and low load hours.

20 **Table 14 Market Value of Electricity During Freshet**
 21 **Months (May through July)**

| Fiscal Year Freshet Period | Average Market Price in Heavy Load Hours (¢ per kWh) | Average Market Price in Light Load Hours (¢ per kWh) |
|-------------------------------|--|--|
| F2016 | 4.2 | 2.9 |
| F2017 | 2.7 | 2.0 |
| F2018 | 2.5 | 1.0 |
| F2019 | 3.9 | 1.5 |
| F2020 | 2.8 | 1.9 |
| F2021 | 1.7 | 0.5 |

1 **6.3 Other Potential Benefits**

2 The direct economic benefits to BC Hydro ratepayers for electricity delivered to
3 BC Hydro's system by RS 1289 Generating Facilities is limited to the value of the
4 non-firm energy produced, as discussed in sections [6.1](#) and [6.2](#).

5 An important contrast with the value of customer side distributed generation in B.C.
6 relative to some regions in the United States is the value associated with
7 greenhouse gas emission reductions. In some regions of the United States,
8 customer side solar generation is assigned a greenhouse gas emission reduction
9 value in the form of a direct financial credit, as it is offsetting a higher carbon content
10 generation source (e.g., coal). However, as BC Hydro's supply is primarily
11 hydroelectric, a greenhouse gas emission reduction related value does not arise for
12 customer side generation in B.C.

13 **7 Consultation and Engagement**

14 **7.1 Communication and Education**

15 BC Hydro has undertaken consultation and communication initiatives to increase the
16 awareness of the RS 1289 and obtain feedback about our customers' experience
17 with the rate and its operation, as listed below.

- 18 • September 2017 – ribbon cutting ceremony for the solar project for Ktunaxa
19 Nation;
- 20 • February 2018 – presentation to solar installers organized by a company called
21 HES PV;
- 22 • August 2018 – executive discussion with Bowen Island municipal staff at Union
23 of BC Municipalities (UBCM) meetings;
- 24 • November 2018 – presentation at First Nations workshop at Clean Energy BC
25 Generate 2018 conference;

-
- 1 • March to April 2019 – two webinars for RS 1289 Customers and stakeholders
2 on our application to the BCUC for changes to RS 1289;
- 3 • May 2019 – Canadian Solar Industry Association conference – discussion and
4 networking with other Canadian utilities;
- 5 • September 2019 – executive discussion with Bowen Island municipal staff and
6 presentation to District of Invermere and Regional District of East Kootenay
7 staff at UBCM meetings;
- 8 • December 2019 to February 2020 – multiple discussions with First Nations in
9 the NIA about solar installations in the community; and
- 10 • February 2020 – presentation to solar installers organized by HES PV.

11 A continued area of focus is on enhancing and building relationships with the solar
12 installer community in B.C.

13 Going forward, BC Hydro intends to continue to engage with RS 1289 Customers
14 and stakeholders to identify improvements to RS 1289 and to help guide future
15 changes to RS 1289 policy. Based on feedback from our survey, BC Hydro plans to:

- 16 • Improve communications to clarify details on how net metering works with the
17 intent of having information readily available to make it easier for customers to
18 understand and obtain;
- 19 • Involve customers in discussions about net metering as we make operational
20 improvements;
- 21 • Continue to participate in or host workshops, webinars, and community events
22 to raise awareness of net metering to a broader audience; and
- 23 • Continue to work with First Nations, municipalities, local governments and
24 school districts to provide support and education on the benefits of net
25 metering.

1 7.2 Net Metering Survey

2 7.2.1 Survey Description

3 On September 15, 2020, BC Hydro sent an e-mail to over 4,000 RS 1289
4 Customers and interested parties (e.g., contractors, non-participating BC Hydro
5 customers) subscribed to BC Hydro's Net Metering e-mail list, inviting them to
6 participate in a survey to provide feedback on RS 1289. [Appendix B](#) includes a copy
7 of the e-mail invitation. A link to the survey was also posted on the Net Metering
8 page on www.bchydro.com/netmetering.

9 [Appendix B](#) includes a copy of the survey questions, customized to provide relevant
10 questions based on the audience. For example, current RS 1289 Customers and
11 contractors were asked a series of questions regarding their satisfaction with the
12 program, while other interested parties such as those involved in the clean energy
13 industry, were asked about barriers to entry and how well they feel Net Metering is
14 meeting the needs of British Columbians. Most questions used a five-point scale in
15 which a customer identified their level of agreement with the statement posed:
16 Strongly Agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree,
17 or Strongly Disagree.

18 The survey allowed for many open-ended responses where respondents could
19 provide additional feedback. To allow for further flexibility and in consideration of
20 people's time, respondents were also able to navigate back and forth through the
21 survey questions, or skip any questions they felt did not apply. [Appendix C](#) contains
22 a summary report of the relevant findings and detailed methodology.

23 The key areas we sought feedback on were overall satisfaction with the program,
24 virtual net metering, marginal pricing, treatment of hydropower generation and
25 concerns/improvements for the program.

7.2.2 Survey Respondents

BC Hydro received 854 responses to the survey.¹⁹

There is strong interest in RS 1289 from the survey participants as evidenced by the e-mail open rate of 55 per cent, a high rate of response, and the amount and depth of feedback received overall.

As shown in [Table 15](#), the majority of respondents were customers currently taking service under RS 1289.

Table 15 Breakdown of Survey Respondents

| Respondent Type | Number | Percentage |
|--|------------|------------|
| Current RS 1289 Customer | 617 | 76 |
| BC Hydro Customer Currently Applying for RS 1289 | 44 | 5 |
| Contractor / Installer for RS 1289 Customers | 43 | 5 |
| Other ²⁰ | 105 | 13 |
| Total Responses Received | 809 | |

Of the 661 RS 1289 Customers and applicants that responded, the majority are residential (631), followed by business (13) and municipal government (2). A single respondent identified as a First Nation. Nine identified “other” as their account type.

Of the current RS 1289 Customers who completed the survey:

- 586 are using solar, 19 RS 1289 Customers have hydropower generation, and five identified “other”;
- 50 per cent have participated in Net Metering for less than two years, 40 per cent for two to five years, and 10 per cent for more than five years;

¹⁹ The number of responses varies for each question in the survey because customization of the survey meant that not all respondents were asked the same questions. In addition, some respondents chose not to provide responses to some questions. As a result, the number of responses to specific questions as described elsewhere in this Report may vary from the 854 total responses received.

²⁰ “Other” includes respondents considering generating electricity for their own use, associate with an organization involved in clean energy, or are consultants or advocates.

- 1 • 43 per cent own an electric vehicle; and 51 per cent currently do not but may be
2 considering it in the future; and
- 3 • 39 RS 1289 Customers indicated they have battery storage and a further
4 200 RS 1289 Customers are considering adding battery storage.

5 An open-ended question asked RS 1289 Customers their primary motivations for
6 joining RS 1289. Responses can be grouped into three main categories and for
7 several customers, multiple categories apply. The top three reasons expressed are:

- 8 1. Concern for the environment (383);
- 9 2. Saving money (240); and
- 10 3. A new energy model and future proofing (84).

11 **7.3 Survey Feedback – Current Program**

12 **7.3.1 Application Process**

13 Current applicants, RS 1289 Customers that joined within the past two years, and
14 contractors/installers were asked questions about the experience of the application
15 process. Responses are summarized in [Table 16](#).

16 **Table 16 Feedback on Application Process**
17 **(379 responses)**

| | Strongly or Somewhat Agree | Neutral | Strongly or Somewhat Disagree |
|--|-----------------------------------|----------------|--------------------------------------|
| | (%) | (%) | (%) |
| Clear how to apply | 56 | 28 | 16 |
| Processed in a reasonable timeframe | 69 | 17 | 14 |
| Application process meets expectations | 63 | 24 | 13 |

18 As shown above, respondents generally indicated a positive experience with the
19 application process. Of these respondents, slightly more respondents indicated they

1 “strongly agree” with the statements than those who indicated they “somewhat
 2 agree.”

3 Approximately 15 per cent of respondents indicated a negative experience with the
 4 application process. Respondent comments indicated the reasons for their
 5 dissatisfaction included complexity, processing times, lack of incentives and a
 6 feeling that BC Hydro is not supportive of net metering overall.

7 **7.3.2 Satisfaction of RS 1289 Customers**

8 Current RS 1289 Customers were asked about their level of satisfaction in four
 9 broad categories. Responses are summarized in [Table 17](#).

10 **Table 17 Feedback on Customer Satisfaction**

| | Strongly or Somewhat Agree | Neutral | Strongly or Somewhat Disagree |
|--|---------------------------------------|----------------|--|
| | (%) | (%) | (%) |
| Found information I needed (523 responses) | 50 | 32 | 18 |
| Satisfied with BC Hydro interaction (555 responses) | 64 | 20 | 16 |
| Understand how Net Metering billing works (573 responses) | 81 | 9 | 10 |
| Net Metering meets my needs (572 responses) | 57 | 20 | 23 |

11 As shown above, respondents generally indicated a positive experience with their
 12 program participation. Of these respondents, roughly twice as many indicated they
 13 “somewhat agree” with the statements than “strongly agree.”

14 Twenty-three per cent of responding RS 1289 Customers disagreed that RS 1289
 15 meets their needs. Further analysis of these responses indicates there is a
 16 statistically significant relationship with satisfaction and length of time in the
 17 program. RS 1289 Customers who have been in the program for more than five
 18 years are more likely to disagree that RS 1289 meets their expectations. There is no

1 significant difference based on the type of generation and the RS 1289 Customers'
2 agreement with how well RS 1289 meets their expectations.

3 **7.3.3 Overall Satisfaction**

4 Current RS 1289 Customers and contractors were asked what they liked most about
5 the program. The top responses are grouped into three main categories:

- 6 1. Simple, clear and easy (254);
- 7 2. Financial benefits (149); and
- 8 3. Energy Banking (123).

9 When asked what they dislike about the program, the top categories are:

- 10 1. Level of compensation (184);
- 11 2. Nothing or too soon to say (123); and
- 12 3. Program rules and structure (117).

13 **7.3.4 Satisfaction of Other Interested Parties**

14 Other interested parties were asked how well they believe RS 1289 works for British
15 Columbians. Of the 119 responses received, 55 per cent of respondents indicated
16 that it meets the needs at least moderately well, while 45 per cent indicated it meets
17 the needs of British Columbians only slightly well or not well at all.

18 When asked about barriers preventing British Columbians from generating their own
19 electricity, 86 per cent (91 respondents) agreed that there are barriers. Those can be
20 broadly described as cost (35 mentions), lack of capital incentives (34 mentions) and
21 a general feeling that BC Hydro does not support net metering (25 mentions).

1 **7.4 Survey Feedback – Future Issues**

2 There were three specific topics that the BCUC directed BC Hydro to conduct further
3 consultation on in preparation of this Report. The majority of respondents
4 (approximately 700) chose to answer these questions.

5 Below is a summary of the results.

6 **7.4.1 Virtual Net Metering**

7 Virtual net metering refers to a system where an electric utility facilitates sharing of
8 generation credits between different customers. There are many different types of
9 virtual net metering. It varies from customers using generation credits across
10 multiple sites (e.g. school district or municipality) and extends to a concept of a
11 community energy project (credits are distributed among community members). In
12 all cases, it's a way for customers to participate in locally generated electricity
13 without having to install their own generating system. In this survey, we refer to all
14 these options as virtual net metering.

15 The survey provided the above description of virtual net metering, followed by a
16 question in which respondents were asked about their interest in participating in
17 virtual net metering and why. Forty-one per cent said they would be interested,
18 37 per cent didn't know and 21 per cent said no, they're not interested.

19 Respondents were also able to provide an open-ended answer to explain the reason
20 for their expressed level of interest. There were 358 responses to the open-ended
21 question. The main reasons for supporting virtual net metering were identified as
22 follows:

- 23 1. It encourages small-scale distributed renewable energy (and community-based
24 energy) (177);
- 25 2. Increases access to electricity generation (74); and

1 3. Improves society and the environment (70).

2 The main reasons for those that said no were: they felt it didn't apply to them (23) or
3 they need more information (21) before commenting.

4 **7.4.2 Marginal Cost Pricing**

5 Our net metering program enables customers to use their generation to offset their
6 electricity costs. Customers also receive a credit if they generate more electricity
7 than they use. Currently, the value of electricity generated does not depend on when
8 the excess generation is provided, nor on the value of the electricity to BC Hydro. In
9 addition, customers that generate their own electricity are not fully paying for their
10 share of the infrastructure costs of maintaining the grid (e.g., transmission and
11 distribution wires, provision of on demand energy, etc.). As the net metering program
12 grows, customers who are not participants of net metering would pay more to
13 contribute to the costs of maintaining the grid. Under a marginal cost pricing
14 scheme, customers on net metering would be able to buy and sell energy at its
15 marginal, market or real time cost, while paying a system access charge to cover the
16 fixed costs associated with receiving electricity service from BC Hydro.

17 Similar to the questions on virtual net metering, a description of marginal cost pricing
18 was provided along with a question asking about support followed by an open ended
19 tell us why question. Twenty-four per cent said yes they supported marginal cost
20 pricing, 42 per cent said no and 34 per cent chose I don't know. Several RS 1289
21 Customers mentioned that they take issue with the question itself and disagree that
22 they are not "paying their share," others wanted further information to make an
23 informed decision.

24 A total of 410 responses were provided to the open-ended question. Those that
25 supported marginal cost pricing said:

26 1. All users should support the grid (96);

-
- 1 2. If this pricing approach supports a new energy model (74); and
- 2 3. BC Hydro should be exploring new rates, including time-based rates (48).
- 3 Respondents that didn't support marginal cost pricing cited the following reasons:
- 4 1. They feel the infrastructure investment they have made in their own system
- 5 helps BC Hydro avoid costs of additional energy production via large projects
- 6 (156);
- 7 2. It won't help the environment as it discourages people from participating in
- 8 local, clean, distributed generation (123); and
- 9 3. General disagreement (54).

10 **7.4.3 Treatment of Hydropower Generation**

11 The last survey question was related to developing separate program terms and

12 conditions for RS 1289 Customers based on their generation type.

13 Most customers in BC Hydro's net metering program use solar panels to generate

14 electricity. A small number of customers participating in the net metering program

15 use a hydroelectric generator. Relative to solar net metering customers, net

16 metering customers with hydroelectric generators produce electricity in larger

17 volumes, often exceeding their needs. In addition, the time of day and year that the

18 electricity is generated is different for net metering customers with hydroelectric

19 generation than it is for customers with solar generation. The difference in the

20 amount and timing of excess generation impacts the value of the generation to an

21 electric utility.

22 Developing terms and conditions that vary based on the generation type could help

23 ensure that the cost of the net metering program aligns with the value it provides to

24 the utility. When asked whether they would support this, 45 per cent of survey

25 respondents said yes, they would, while 21 per cent said no and 33 per cent said

1 they don't know. Respondents had much to say on this topic with 384 detailed
2 responses to the open-ended portion of this question.

3 There was general agreement for separate terms and conditions from
4 120 responses highlighting the value of electricity delivered during peak demand
5 period and a need for time of use rates. Of those clearly against separate treatment
6 based on generation type, 76 comments were related to equity and fairness.

7 There do not appear to be any significant differences in responses based on the
8 respondent's interest in net metering, i.e., RS 1289 Customers vs. other interested
9 parties.

10 **7.5 Survey Conclusions**

11 The survey results indicate that a majority of survey participants are satisfied with
12 the application process and other aspects of RS 1289 operations. Analysis of
13 responses that indicate dissatisfaction with RS 1289 operations indicates that
14 BC Hydro could make improvements to the speed and complexity of the application
15 process, as well as to the availability of information on BC Hydro's website. We will
16 further review this feedback and consider improvements to our operations.

17 Fifty-seven per cent of RS 1289 Customers agreed or somewhat agreed that the
18 program meets their needs. This level of agreement is similar to the 55 per cent of
19 contractors/installers and interested parties that indicated the program meets the
20 needs at least moderately well. Program rules and the level of compensation were
21 common themes amongst RS 1289 Customers and interested parties who did not
22 indicate support.

23 Respondents indicated a general level of support for virtual net metering and for
24 different treatment of hydropower generation, while there was a low level of support
25 for marginal cost pricing. Responses indicate a wide range of opinions and

1 understanding of these concepts, as well as the need for further consultation with
2 customers and stakeholders.

3 **7.6 Additional Consultation and Engagement**

4 BC Hydro acknowledges that the scope of consultation performed for this Report
5 does not fully address the BCUC's suggestions in Order No. G-168-20. This is
6 largely the result of delays in developing and implementing engagement plans
7 because of the COVID-19 pandemic.

8 BC Hydro intends to continue to engage with RS 1289 Customers and interested
9 parties to provide input for improvements to operations and also to help guide future
10 changes to RS 1289.

11 **8 Utility Trends in Net Metering**

12 There have been several recent developments in net metering programs across
13 North America. In the sections that follow, we'll describe a few of the most notable
14 developments.

15 **8.1 Duke Energy**

16 Duke Energy is one of the largest electric utilities in the US with operations in
17 several states, including Florida and the Carolinas.

18 Under Duke's net metering program, the nameplate capacity of a residential
19 customer's installed generator is limited to 20 kW. The nameplate capacity of a
20 non-residential customer's installed renewable generation system and equipment is
21 limited to 1,000 kW or 100 per cent of the customer's contract demand (i.e.,
22 maximum expected demand). Any excess energy not used in the current month to

1 offset usage carries forward to the next billing month. Annually in March, the
2 customer is paid out for the amount of the accumulated excess energy.²¹

3 In South Carolina, Duke Energy recently put forth a plan that would keep the current
4 net-metering framework but transition solar customers to time-of-use rates. The
5 proposed plan, called Solar Choice Net Metering, offers options for customers with
6 rooftop solar while allowing the company to address increasing electricity demand
7 periods in the winter to the benefit of Duke's customers in North and South Carolina.
8 If approved by regulators, a transitional tariff is anticipated to be available in mid
9 2021. Full transition into the new plan is expected by the end of 2021.²²

10 **8.2 Salt River Project**

11 Arizona's Salt River Project has several price plan options for customers who
12 produce some of their own energy with rooftop solar or other distributed generation
13 technologies, some of which incorporate mandatory demand charges. The two main
14 types of price plans are the export price plans and the demand-based price plans.

15 Two export price plans are available: Time-of-Use Export and Electric Vehicle
16 Export. On an export price plan, customers pay only for the energy from the grid
17 they use, and any excess energy generated is credited at a fixed price (2.81 cents
18 per kWh) and subtracted from the bill. When using energy supplied by the utility,
19 customers can save when they limit energy use during high-priced on-peak hours
20 and shift usage to lower-priced off-peak hours.

21 Two demand-based solar price plans are available: Customer Generation and
22 Average Demand. These plans incorporate a demand charge and are designed to

²¹ https://www.duke-energy.com/_/media/pdfs/for-your-home/rates/electric-sc/scridernm.pdf?la=en.

²² <https://news.duke-energy.com/releases/duke-energy-reaches-deal-with-vote-solar-sunrun-renewable-energy-advocates-to-modernize-expand-rooftop-solar-in-south-carolina>.

1 encourage customers to minimize demand for electricity during on-peak hours and
2 to manage their peak energy demand.²³

3 **8.3 Hydro Quebec**

4 Hydro Quebec allows customers with renewable generation with a maximum output
5 of 50 kW to participate in its net metering program. Customers are able to select
6 their Anniversary Date and also assign default optimized Anniversary Dates. The
7 program has a formal requirement that the customer's Annual Energy Output match
8 their Annual Load. Hydro Quebec does not provide a Surplus Energy Payment to
9 customers. Instead, a customer's Generation Account Balance is only applied
10 against their consumption. After a 24-month period, the balance expires on the
11 Anniversary Date.²⁴

12 **8.4 Hydro One**

13 Hydro One's net metering program is open to any combination of wind, water, solar
14 radiation or agricultural biomass with a total nameplate rating of 500 kW or less.
15 Excess generation credits can be carried forward for a consecutive 12-month period
16 to offset future electricity costs after which the credit expires. Hydro One does not
17 pay customers for any excess generation.²⁵

18 **8.5 California**

19 The California Public Utilities Commission recently commenced its NEM-3
20 proceeding, which will establish the successor to the current NEM 2.0 program in
21 California

22 Under NEM 2.0, net metering customers are required to pay charges that align them
23 more closely with the utility's cost of service than under the original pricing structure.

23 <https://www.srpnet.com/prices/home/solarpriceplanfaq.aspx>.

24 <https://www.hydroquebec.com/residential/customer-space/rates/net-metering-option-i.html>.

25 https://www.hydroone.com/businessservices/_generators/Documents/FAQ%20-%20FIT.pdf.

1 This was achieved through the introduction of (i) a one-time interconnection fee; (ii)
2 non-bypassable charges on each kilowatt-hour of electricity consumed from the grid;
3 and (iii) transfer to a time-of-use rate. NEM-3 seeks to further reduce the cross-
4 subsidization.²⁶

5 To align to NEM 2.0, Southern California Edison introduced mandatory time-varying
6 rates for net metering customers and a one-time application fee.²⁷ The utility offers
7 time-of-use rates with two different evening peak periods (5 to 8 p.m. and
8 4 to 9 p.m.) and an optional super off-peak period aimed at electric vehicle owners.²⁸

9 **8.6 Alberta**

10 In 2008, the Government of Alberta established regulation to deal with renewable
11 generators with capacities below 5 MW (**micro-generators**) in Alberta's deregulated
12 electricity market. Installations over 5 MW or not qualifying as renewable are not
13 eligible under this program.

14 Small micro-generators (total nameplate capacity of up to 150 kW) and large
15 micro-generators (between 150 kW and 5 MW) are paid under different conditions.
16 Small micro-generators are paid for each kWh of electricity delivered to the grid. The
17 prices are the same rates as the electricity supplied by the retailer to the customer.
18 Large micro-generators are paid at the hourly wholesale market price.

19 Every month, any electricity delivered to the grid results in bill credits to offset
20 charges for any month. At the end of every 12-month period, unused credits
21 accumulated by the customer are paid out by the retailer.²⁹

26 <https://www.cpuc.ca.gov/general.aspx?id=3800>.

27 <https://www.sce.com/business/generating-your-own-power/net-energy-metering>.

28 <https://www.sce.com/residential/rates/Time-Of-Use-Residential-Rate-Plans>.

29 https://www.qp.alberta.ca/documents/Regs/2008_027.pdf.

1 **8.7 Nevada**

2 In contrast to most other utilities with a net metering program, Nevada has a tiered
3 credit rate structure. All net metering customers, regardless of tier, receive credit at
4 100 per cent of the retail rate for generation up to the amount consumed during a
5 billing period. For any excess generation delivered to the grid, the credit rate offered
6 to new net metering customers is now 75 per cent of the retail volumetric electricity
7 rate (Tier 4).³⁰ Excess generation is converted to a monetary credit after monthly
8 netting and can be applied to the volumetric energy portion of a future bill. At no
9 point are customers paid out for excess generation. The credits are non-
10 transferrable and non-payable in the event the customer transfers service to another
11 premises or ceases service.³¹

12 **9 System Planning Considerations**

13 **9.1 Portfolio Planning**

14 The extent that RS 1289 will impact portfolio planning will be addressed by
15 BC Hydro through our next long-term resource plan, which we refer to as the
16 2021 Integrated Resource Plan (**2021 IRP**). The 2021 IRP will look at options for
17 BC Hydro's electricity system over a 20-year horizon. It will produce updates to our
18 load resource balance and inputs required to assess future resource options,
19 including for example, a market price forecast. It will examine advancements in
20 technology and explore ways to integrate them with our system. Distributed
21 generation, solar power, battery storage and other advanced technologies are all
22 within the scope of the 2021 IRP. BC Hydro initiated three consultation streams for
23 the 2021 IRP with the following three constituencies: Indigenous Nation

³⁰ http://puc.nv.gov/Renewable_Energy/Net_Metering/.

³¹ <https://www.nvenergy.com/account-services/energy-pricing-plans/net-metering/net-metering-faqs>.

1 Consultation; Technical Advisory Committee, and Customer and Public
2 Consultation.

3 The 2021 IRP will be reviewed by the BCUC through a public process.

4 Within the planned scope of the 2021 IRP is the incorporation of the forecasted
5 reduced consumption from current and future RS 1289 Customers into the Load
6 Resource Balance.

7 **9.2 Connection Policy**

8 BC Hydro's net metering interconnection requirements follow industry standards for
9 distributed generation interconnections and are generally in line with, or less
10 onerous than, other jurisdictions. They ensure that connected generation maintains
11 the safety and reliability of the electric supply system. A refresh to the Distributed
12 Generation Technical Interconnection Requirements 100kW and Below
13 (DGTIR-100) is expected to align with the latest Canadian Standards Association
14 (**CSA**) C22.3 No. 9:20 standard. The timing of this update will depend on resourcing
15 and work priorities. No major change from the existing interconnection requirements
16 is currently being contemplated.

17 BC Hydro's current interconnection policies are supportive of small-scale clean
18 distributed generators that have applied through the program. As discussed in the
19 previous net metering evaluation report, BC Hydro is the only utility that pays almost
20 the entire cost to connect generators to our system (BC Hydro pays all system
21 upgrade costs associated with connection to our system except for customers who
22 utilize a synchronous generator, take service at a primary potential, or have projects
23 over 50 kW). Most other Canadian utilities require the customer to pay the full costs
24 to connect.

25 For the majority of RS 1289 applicants, system upgrades are not required to
26 accommodate the additional generation. However, when upgrades are required,

1 they are typically needed to mitigate power quality issues caused by the
2 interconnection of new RS 1289 generation. In order for RS 1289 Customers to
3 deliver excess power back into the grid, the voltage from the generation source
4 needs to be higher than the grid, resulting in voltage rise. The amount of voltage rise
5 is dependent on the system characteristics such as impedance of the system and
6 the amount of current being pushed.

7 BC Hydro designs the secondary service connection to load customers such that the
8 service entrance voltage is able to meet CSA requirements, while allowing for
9 voltage drop on the secondary conductors and normal power system voltage
10 fluctuations on the primary system. Load diversity among connected customers is
11 considered so that the transformer and secondary is sized appropriately for the
12 expected coincident load demand. It should be noted that the CSA voltage
13 requirements have a larger tolerance for voltage drop compared to voltage rise,
14 leading to the same system which has low enough impedance to accommodate for
15 the voltage drop caused by load, to exhibit issues when generation is connected
16 causing voltage rise.

17 Generation from RS 1289 Customers does not exhibit the same level of diversity
18 over a relatively small geographical area served by one distribution service
19 transformer as compared to load. For example, if two neighbouring customers have
20 solar generation, it is expected that the peak generation will occur at the same time
21 because the solar radiation is the same for both customers. As a result, the voltage
22 rise caused by generation over the secondary and service transformer can cause
23 the service voltage to exceed CSA requirements for the RS 1289 Customer and
24 other customers connected to the same secondary. Under these circumstances,
25 upgrades, such as increasing the size of the secondary and service wires, and/or
26 upgrading the transformer size, are required before interconnecting the RS 1289
27 Customer. Upgrades could also be triggered if the total generation exceeds the
28 capacity of existing assets.

1 This issue is exacerbated if the generation installed is larger than the load. Given
2 that a RS 1289 Customer could offset greater than 100 per cent of its energy costs,
3 BC Hydro would likely not be able to recover its cost from the RS 1289 Customer for
4 system improvements. Historically, the costs of these upgrades have not been
5 significant for the program, however as RS 1289 expands, these costs will continue
6 to be monitored.

7 **9.3 Safety and Reliability**

8 The RS 1289 Customer Generating Facilities must meet all applicable safety and
9 performance standards, including the codes and standards identified in BC Hydro's
10 DGTIR-100 or other interconnection requirements as applicable to the Generating
11 Facility. A RS 1289 Customer is responsible for the safe and proper operations of
12 the Generating Facility consistent with any legal requirements including the *Safety*
13 *Standards Act*, Electrical Safety Regulation.

14 Unauthorized generation poses serious public and worker safety hazards and may
15 impact power quality and reliability. BC Hydro revised the language in the BC Hydro
16 Electric Tariff to clarify that RS 1289 Customers need to have interconnection
17 approval before connecting and commencing the operation of their Generating
18 Facility. We are also mindful that customers are more likely to install unauthorized
19 generation if there are operational or financial barriers that restrict their participation
20 in RS 1289.

10 Future Considerations

As noted in section [6](#), RS 1289 as currently designed is resulting in cross-subsidization. Options to address this may include moving to marginal pricing for all electricity delivered from the customer Generating Facilities to BC Hydro's system, an updated standard charge for interconnecting new applicants, fixed charges and demand charges for service.

In addition, as noted in section [5](#), a large percentage of annual administration costs is associated with the processing and approval of RS 1289 applications from prospective RS 1289 Customers. As a fee is not assessed for application processing, these costs are subsidized by non-participants. Implementing an application processing fee is one potential approach to ensure incremental administration costs are paid by the customers that cause them.

BC Hydro has not yet analyzed the feasibility or impacts of these types of rate modifications.

In addition, BC Hydro is exploring the following future considerations to improve RS 1289.

1. Virtual Net Metering – BC Hydro will continue to monitor the level of interest and policy development in other jurisdictions. BC Hydro will continue to engage with customers and stakeholders on this topic.
2. Leasing solar equipment – This opportunity has yet to contribute to significant growth in RS 1289 Customers. BC Hydro will continue to monitor the RS 1289 participation rate of customers leasing equipment.

Any proposed changes will be assessed in either the next Rate Design Application review and/or in a separate future Net Metering filing.

11 Conclusion

At the end of F2020, 2,619 customers were participating in RS 1289. The number of RS 1289 Customers increased significantly in the past two years, with 574 joining in F2019 and 726 joining in F2020.

An analysis of program costs and benefits indicates that the current rate structure results in RS 1289 Customers under-contributing to the costs of BC Hydro's infrastructure as compared to other customers. The cross-subsidization varies by customer and generation types, and ranges from \$612/year per residential RS 1289 Customer with solar generation to \$66,577/year per LGS RS 1289 customer with solar generation.

BC Hydro invited over 4,000 RS 1289 Customers and interested parties to participate in a comprehensive customer satisfaction survey, with 854 responding. RS 1289 Customers and stakeholders indicated that they are generally satisfied with RS 1289 and that it meets their needs. BC Hydro intends to further analyze survey feedback and conduct additional customer engagement to further improve customer experience.

As participation is expected to grow, BC Hydro recognizes there is a need to change RS 1289 to address cross-subsidization and set an economically-efficient rate. We plan to assess potential solutions such as marginal pricing. We also plan to explore options to expand program participation through virtual net metering. Additional consultation and engagement will be undertaken to understand customer and stakeholder perspectives on net metering and alternatives for RS 1289 amendments. In proposing these amendments, BC Hydro's operational and safety implications will be considered. Any future changes to the rate will be assessed through the next Comprehensive Rate Design Application review or in a separate RS 1289 rate design filing.

**Application to Amend Net Metering Service under
Rate Schedule 1289
Compliance with BCUC Order No. G-168-20**

Net Metering Evaluation Report No. 5

Appendix A

Cost of Service Study

Table of Contents

| | | |
|---|-----------------------------|---|
| 1 | Methodology..... | 1 |
| 2 | Large General Service | 5 |
| 3 | Medium General Service..... | 7 |

List of Figures

| | | |
|----------|--|---|
| Figure 1 | Methodology of Cost of Service Study | 1 |
|----------|--|---|

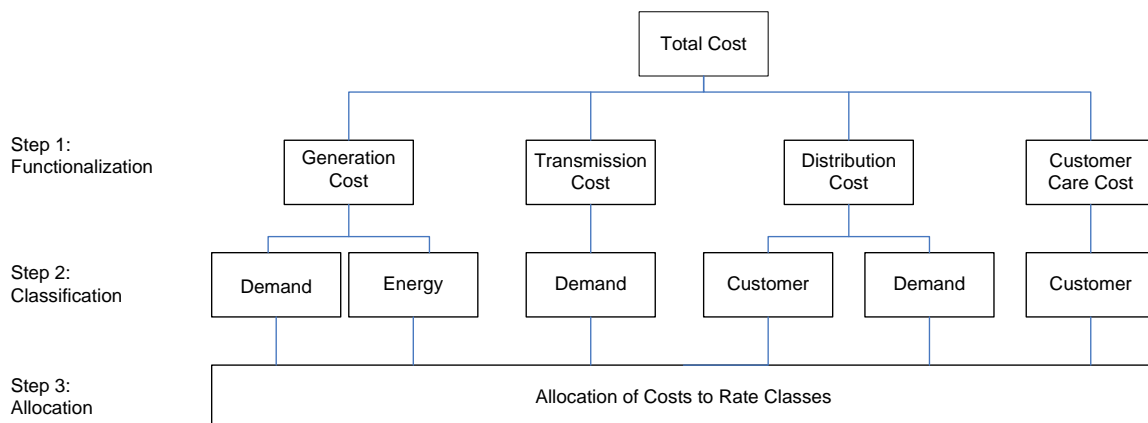
List of Tables

| | | |
|---------|--|---|
| Table 1 | Cost Allocators of Classified Costs..... | 2 |
| Table 2 | Summary of Costs by Classification (Schedule 4.0 of F2019 FACOS)..... | 3 |
| Table 3 | R/C Ratio Estimation for LGS Solar RS 1289 Customers | 6 |
| Table 4 | R/C Ratio Estimation for MGS Solar RS 1289 Customers | 8 |

1 Methodology

A cost of service study for RS 1289 Customers was undertaken for each customer class and technology type using BC Hydro’s standard Fully Allocated Cost of Service (**FACOS**) methodology. This methodology uses the industry standard and Commission approved embedded cost methodology to allocate accounting costs to rate classes and examine the revenue-to-cost ratios of rates classes. The revenue-to-cost (**R/C**) ratio provides an estimate of the extent to which revenues from electricity sales offset BC Hydro’s embedded costs. Embedded costs include all costs associated with delivering electricity services, such as operating and capital related expenses. Individual Revenue Requirement Application cost items are allocated to rate classes in the widely-adopted three-step process summarized as in [Figure 1](#) below. Costs are first functionalized into four functions: Generation, Transmission, Distribution and Customer Care. Costs in each function are then classified as customer, energy, or demand related. Finally, the classified costs are allocated to rate classes based on the various allocation factors (e.g., proportion of energy, coincident peak, non-coincident peak (**NCP**), or number of customers).

Figure 1 Methodology of Cost of Service Study



1 [Table 1](#) shows the allocation factors that BC Hydro uses to allocate energy,
2 generation demand related, transmission demand related, distribution demand
3 related, and customer related costs to individual customer rate classes.

4 **Table 1 Cost Allocators of Classified Costs**

| Classified Cost | Cost Allocator |
|----------------------------------|----------------------------------|
| Energy Related Cost | Proportion of total energy |
| Generation Demand Related Cost | Coincident Peak Factor |
| Transmission Demand Related Cost | Coincident Peak Factor |
| Distribution Demand Related Cost | Non-Coincident Peak Factor |
| Customer Related Cost | 90% number of bills, 10% revenue |

5 The F2019 FACOS study was filed with the BCUC on May 13, 2020.¹ The R/C ratios
6 for each customer class, as determined by the F2019 FACOS study, are shown in
7 [Table 2](#).

1

<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/facos/00-2020-05-13-bchydro-facos-2019-annual-report.pdf>

1

Table 2 Summary of Costs by Classification (Schedule 4.0 of F2019 FACOS)

| Rate Class | Generation Costs | Transmission Costs | Distribution Costs | Customer Care Costs | Total Cost | Total Revenue | Revenue Cost (\$ million) | Revenue Cost Ratios |
|----------------------|------------------|--------------------|--------------------|---------------------|------------|---------------|---------------------------|---------------------|
| Residential | 1,108.1 | 432.5 | 528.9 | 72.3 | 2,141.8 | 2,025.2 | -116.6 | 94.6 |
| GS Under 35 kW | 226.4 | 71.9 | 101.4 | 7.9 | 407.6 | 492.6 | 85.0 | 120.9 |
| MGS < 150 kW | 192.7 | 56.9 | 71.3 | 2.0 | 322.9 | 371.7 | 48.7 | 115.1 |
| LGS > 150 kW | 615.9 | 174.2 | 152.8 | 2.3 | 945.3 | 968.0 | 22.8 | 102.4 |
| Irrigation | 3.4 | 0.1 | 4.0 | 0.1 | 7.6 | 6.3 | -1.3 | 83.4 |
| Street Lighting BCH | 3.0 | 1.2 | 6.1 | 0.4 | 10.7 | 22.6 | 11.9 | 211.9 |
| Street Lighting Cust | 11.1 | 4.5 | 4.9 | 0.5 | 20.9 | 18.5 | -2.4 | 88.4 |
| Transmission | 741.8 | 195.1 | 0.0 | 1.6 | 938.6 | 890.3 | -48.2 | 94.9 |
| Total | 2,902.3 | 936.4 | 869.4 | 87.1 | 4,795.2 | 4,795.2 | 0.0 | 100.0 |

1 Based on the total annual energy consumption, bi-directional hourly load shape, and
2 the number of RS 1289 Customer accounts, energy, demand and customer related
3 costs were pro-rated by the proportion of the individual allocation factors attributable
4 to RS 1289 accounts under each rate class. For example, if the total energy related
5 cost of the Residential class in FACOS is \$x, and the Residential RS 1289
6 Customers account for a per cent of the Residential energy consumption, then the
7 energy related costs of Residential RS 1289 Customers is estimated as a per cent
8 multiplied by \$x. Likewise, if the total generation demand related cost and
9 transmission demand related of the Residential class in FACOS is \$y and \$z
10 correspondingly, and the Residential RS 1289 Customers account for b per cent of
11 the Residential 4CP, then the generation and transmission demand related costs of
12 Residential RS 1289 Customers are estimated as b per cent multiplied by \$y and
13 b per cent multiplied by \$z respectively. Similarly, the distribution demand related
14 costs and customer related costs are pro-rated by the proportion of the NCP and the
15 number of accounts accounted by RS 1289 Customers. RS 1289 administration
16 costs were directly assigned and allocated to each customer class of RS 1289
17 Customers according to the number of accounts under each customer category.

18 The net revenue of individual RS 1289 accounts is calculated as BC Hydro's billed
19 revenue minus any BC Hydro payments to RS 1289 Customers for Generation
20 Account Balances, plus the value of any electricity delivered by RS 1289 Customers
21 to BC Hydro's system. The energy value and demand value of the electricity
22 delivered to BC Hydro's system by the RS 1289 Generating Facility were assessed
23 separately. The energy value is estimated as the unit price of energy related cost
24 multiplied by the total energy. The generation and transmission demand related
25 values, which are allocated to customer classes based on the four coincident peaks²
26 (**4CP**), are estimated as the unit system peak price (\$/kW) of these related cost

² 4CP is the average load during the monthly system peak hour in each of the four winter months (November to February) for each customer class.

1 in FACOS multiplied by the average demand of electricity delivered to BC Hydro's
2 system by RS 1289 Customers during the four system peak hours. The distribution
3 demand related value of electricity delivered to BC Hydro's system by RS 1289
4 Customers is estimated as the unit non-coincident peak price (\$/kW) of these related
5 costs for its customer class in FACOS multiplied by the average demand of the
6 electricity delivered to BC Hydro's system during the non-coincident peak hour of
7 individual customer classes.

8 Separate cost of service studies were conducted for Residential, LGS and MGS
9 customer classes by technology. The Residential customer class accounted for
10 86 per cent of RS 1289 accounts. The SGS customer class, which accounted for
11 9 per cent of RS 1289 accounts by the end of F2019, were excluded from the study
12 due to resource and time constraints.

13 **2 Large General Service**

14 Cost shifting studies were conducted for 28 LGS RS 1289 Customers with solar
15 Generating Facilities.

16 BC Hydro believes that nearly all the generation of LGS solar RS 1289 Customers
17 was used to offset their own energy usage since no electricity was delivered to
18 BC Hydro's system from the 28 accounts with complete sales, billing and hourly load
19 data in F2019. The cost of service study was conducted as shown in [Table 3](#). In
20 F2019, the R/C ratio of this group of RS 1289 Customers was 66.3 per cent, which is
21 substantially lower than the R/C ratio of 102.4 per cent for the entire LGS class.
22 Compared to the LGS class overall, on average each LGS solar RS 1289 Customer
23 under-paid \$66,577 for the service that BC Hydro provided in F2019.

24 In F2019, the load factor of the aggregated annual 8760-hour load of this group of
25 RS 1289 customers was 61 per cent, which was a decrease from the 71 per cent
26 load factor of the entire LGS class. The lower load factor explains the poor cost
27 recovery from LGS solar RS 1289 Customers, since much of the demand related

1 cost of LGS Customers is expected to be recovered via the energy charge of the
2 associated rate schedules.

3 **Table 3 R/C Ratio Estimation for LGS Solar**
4 **RS 1289 Customers**

| BC Hydro Cost to Serve | | | | |
|-------------------------------------|---|---|---|--|
| Cost Items | | Total Cost of LGS Class in F2019 (\$ million) | Share of RS 1289 for LGS Solar ³ (%) | Annual Cost of RS 1289 for LGS Solar (\$) ⁴ |
| A | Energy Related Costs | 471.1 | 0.535 | 2,520,146 |
| B | Generation Demand Related Cost | 144.9 | 0.563 | 815,239 |
| | Transmission Demand Related Cost | 174.2 | 0.563 | 980,640 |
| | Distribution Demand Related Cost | 148.1 | 0.529 | 784,012 |
| C | Customer Related Cost (without Program Administration Cost) | 6.9 | 0.467 | 32,396 |
| D | Program Administration Cost ⁵ | 0.038 | 97 | 36,316 |
| E | Total Costs to Serve | E = A + B + C + D | | <u>5,168,750</u> |
| BC Hydro Revenues and Avoided Costs | | | | |
| F | BC Hydro Revenues Received | Electricity Bill Revenues less Payments for Generation Credit Balance | | \$3,429,205 |
| G | Energy Value to BC Hydro of Net Metering Generation Delivered | 0.037 (\$/kWh) * 0 kWh Delivered to BC Hydro | | \$0 |
| H | G&T Demand Value to BC Hydro of Net Metering Generation Delivered | 213.58 (\$/kW-year) per System CP*0 kW CP of Flow Out | | \$0 |
| I | D Demand Value to BC Hydro of Net Metering Generation Delivered | 100.19 (\$/kW-year) per NCP* Demand of Flow Out at LGS NCP Hour | | \$0 |
| J | Total Revenues and Avoided Costs | J = F + G + H + I | | \$3,429,205 |
| Cost Shifting | | | | |
| K | Average LGS Net Metering Revenues to Cost Ratio | K = J / E | | 66.3% |
| L | Average LGS Customer Revenue to Cost Ratio | As per F2019 FACOS | | 102.4% |
| M | Cost Shifting Per Account | J = E * (L - K) / # of Accounts | | \$66,577/year |

³ Based on Cost Allocators of Energy/4CP/NCP/ # of Customers.

⁴ Figures may not add up due to rounding.

⁵ Assigned to LGS by blended RS 1289 Customer Care allocator = 9.13 per cent.

1 **3 Medium General Service**

2 Cost shifting studies were conducted for 16 MGS RS 1289 Customers with solar
3 Generating Facilities. Similar to LGS RS 1289 Customers, it is believed that the
4 electricity generated by MGS solar RS 1289 Customers was used to offset their
5 energy usage and there was no electricity delivered to BC Hydro's grid by these
6 16 accounts in F2019. Shown as in [Table 4](#), the R/C ratio of this group of RS 1289
7 Customers was 93.6 per cent, which is lower than the 115.1 per cent R/C ratio for
8 the MGS class overall.

9 Compared to MGS accounts overall, on average, each MGS solar RS 1289
10 Customer under paid \$3,940 to BC Hydro for electricity service in F2019 and was
11 subsidized by non-participants of RS 1289.

12 Similar to the LGS rate schedule, much of the demand related costs of MGS
13 customers is expected to be recovered via the MGS energy charge. Compared to
14 the 63 per cent load factor of the aggregated load of the entire MGS class in F2019,
15 the lower load factor (53 per cent) of the aggregated 8760-hour load of MGS
16 RS 1289 solar group explains the reduced cost recovery of these accounts relative
17 to MGS customers overall.

1
2

**Table 4 R/C Ratio Estimation for MGS Solar
RS 1289 Customers**

| BC Hydro Cost to Serve | | | | |
|-------------------------------------|---|---|--|----------------|
| Cost Items | Total Cost of MGS Class in F2019 (\$ million) | Share of RS 1289 for MGS Solar ⁶ (%) | Annual Cost of RS 1289 for MGS Solar (\$) ⁷ | |
| A | Energy Related Costs | 145.4 | 0.086 | 125,398 |
| B | Generation Demand Related Cost | 47.3 | 0.088 | 41,550 |
| | Transmission Demand Related Cost | 56.9 | 0.088 | 49,979 |
| | Distribution Demand Related Cost | 62.0 | 0.093 | 57,515 |
| C | Customer Related Cost (without Program Administration Cost) | 11.3 | 0.093 | 10,477 |
| D | Program Administration Cost ⁸ | 0.0 | 94.1 | \$9,105 |
| E | Total Costs to Serve | E = A + B + C + D | | <u>294,024</u> |
| BC Hydro Revenues and Avoided Costs | | | | |
| F | BC Hydro Revenues Received | Electricity Bill Revenues less Payments for Generation Credit Balance | | \$275,344 |
| G | Energy Value to BC Hydro of Net Metering Generation Delivered | 0.037 (\$/kWh) * 0 kWh Delivered to BC Hydro | | \$0 |
| H | G&T Demand Value to BC Hydro of Net Metering Generation Delivered | 213.58(\$/kW year) per System CP*0 kW CP of Flow Out | | \$0 |
| I | D Demand Value to BC Hydro of Net Metering Generation Delivered | 100.19(\$/kW year) per NCP* Demand of Flow Out at LGS NCP Hour | | \$0 |
| J | Total Revenues and Avoided Costs | J = F + G + H + I | | \$275,344 |
| Cost Shifting | | | | |
| K | Average MGS Net Metering Revenues to Cost Ratio | K = J / E | | 93.6% |
| L | Average MGS Customer Revenue to Cost Ratio | As per F2019 FACOS | | 115.1% |
| M | Cost Shifting Per Account | J = E * (L - K) / # of Accounts | | \$3,940/year |

⁶ Based on Cost Allocators of Energy/4CP/NCP/ # of Customers.

⁷ Figures may not add up due to rounding.

⁸ Assigned to MGS by blended RS 1289 Customer Care allocator = 2.35 per cent.

**Application to Amend Net Metering Service under
Rate Schedule 1289
Compliance with BCUC Order No. G-168-20**

Net Metering Evaluation Report No. 5

Appendix B

Net Metering Survey

Online survey email invitation:



Have your say by [September 25](#)

[Read this email online](#)

Net metering

Have ideas about our net metering program? We'd like to hear them.

Please [complete this 10-15 minute survey](#) by September 25. Your valuable input will help us continue to improve the program and evolve it to meet future needs.

The feedback you provide through this survey will be considered in our report to the BC Utilities Commission that we'll file later this fall.

We'll continue to share updates and further opportunities to provide your input on [our net metering program page](#).

[Take the survey now](#)

Thank you,
BC Hydro Net Metering Team

[Log in to MyHydro](#)

[Accounts](#)

[Energy Savings](#)

[Outages & Safety](#)

[Contact Us](#)

[Unsubscribe](#)

You've received this email at test.user@test.domain because you recently participated in or expressed interest in net metering program communications.

No longer interested? [Unsubscribe](#).

© BC Hydro, 333 Dunsmuir Street, Vancouver, B.C. V6B 5R3 | [Privacy Statement](#)

Net metering questionnaire:

Note that question numbers were assigned by the software system, so do not always appear in order. Although it may appear that there are gaps in question numbers, this document contains all of the questions that were asked in the survey.

Q1 Our net metering program is growing. As we prepare for the future, we'd like to invite you to participate in this survey by September 25 to help improve and shape the net metering program.

It's important to note that your feedback, including the organization you are representing (if applicable), will be used by BC Hydro and included in an evaluation report to the BC Utilities Commission (BCUC) by October 31, 2020. Please do not identify third-party individuals or account specific information in your comments. Comments bearing references to identifiable individuals will not be included as part of the public records due to privacy concerns.

Any personal information you provide to BC Hydro on this form is collected and protected in accordance with the Section 26 (c) of the Freedom of Information and Protection of Privacy Act. BC Hydro is collecting information with this for the purpose of program evaluation. If you have any questions about the collection or use of the personal information collected on this form, please contact the net metering team at net.metering@bchydro.com

BC Hydro will not be able to identify the respondent unless you voluntarily provide your consent at the end of the survey.

Q2 Please tell us a little bit about who you are so we can better understand your responses. I am: (Please select one):

- A net metering customer (my system is operating and on net metering billing) (4)
- In the process of applying for net metering (1)
- An installer/contractor for net metering customers (5)
- Other (8)

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing)

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = In the process of applying for net metering

Q3 What type of net metering account do/will you have? (Please select one)

- Residential (1)
- Business (4)
- Municipal government (5)
- First Nation (6)
- Community group (11)
- School (7)
- Other (Please specify) (9) _____

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing))

Q4 What generation technology are you currently using?

- Solar photovoltaic (1)
- Hydro (2)
- Other (Please specify) (3) _____

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing))

Q7 How long have you been participating in the net metering program?

- Less than 2 years (5)
- 2 - 5 years (1)
- More than 5 years (4)

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = Other

Q22 Tell us your interest in net metering.

- I am considering generating electricity for my own use (1)
- I am associated with an organization involved in clean energy (2)
- I am an intervener (4)
- Other (please specify) (5) _____

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing)

Q6 What is your primary reason for becoming a net metering customer?

Display This Question:

If How long have you been participating in the net metering program? = Less than 2 years

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = In the process of applying for net metering

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = An installer/contractor for net metering customers

Q12 Please tell us your level of agreement with the following statements regarding BC Hydro's net metering program **application process**:

| | Strongly disagree (24) | Somewhat disagree (25) | Neither agree nor disagree (26) | Somewhat agree (27) | Strongly agree (28) |
|---|------------------------|------------------------|---------------------------------|-----------------------|-----------------------|
| It was clear to me how to apply for the net metering program. (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The application was processed within a reasonable timeframe. (2) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The overall application process meets my expectations. (3) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Display This Question:

If Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = The overall application process meets my expectations. [Somewhat disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = The overall application process meets my expectations. [Strongly disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = The application was processed within a reasonable timeframe. [Somewhat disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = The application was processed within a reasonable timeframe. [Strongly disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = It was clear to me how to apply for the net metering program. [Strongly disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = It was clear to me how to apply for the net metering program. [Somewhat disagree]

Q15 What could we do to improve the overall application process?

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing))

Q16 Please tell us your level of agreement with the following statements regarding BC Hydro's net metering program:

| | Strongly Disagree (1) | Disagree (3) | Neutral (4) | Agree (5) | Strongly Agree (6) | N/A (7) |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| I found the information I needed regarding net metering on the BC Hydro website. (1) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I am satisfied with my interaction with BC Hydro on the net metering program. (8) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I understand how net metering billing works. (14) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The net metering program meets my expectations (26) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Display This Question:

If Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = I found the information I needed regarding net metering on the BC Hydro website. [Disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = I found the information I needed regarding net metering on the BC Hydro website. [Strongly Disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = I am satisfied with my interaction with BC Hydro on the net metering program. [Strongly Disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = I am satisfied with my interaction with BC Hydro on the net metering program. [Disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = I understand how net metering billing works. [Strongly Disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = I understand how net metering billing works. [Disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = The net metering program meets my expectations [Strongly Disagree]

Or Please tell us your level of agreement with the following statements regarding BC Hydro's net met... = The net metering program meets my expectations [Disagree]

Q17 Please tell us why you disagree.

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing)

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = An installer/contractor for net metering customers

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = Other

Q19 What aspects of the net metering program do you like most?

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing)

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = An installer/contractor for net metering customers

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = Other

Q20 What aspects of the net metering program do you dislike?

Display This Question:

If What type of net metering account do/will you have? (Please select one) != First Nation

Q21 Is there any other feedback about net metering you'd like to share?

Display This Question:

If What type of net metering account do/will you have? (Please select one) = First Nation

Q45 As a First Nation, are there any considerations for the net metering program that may be unique to your communities?

Q8 Have you contacted BC Hydro in the last 12 months regarding the net metering program?

- Yes (23)
- No (24)

Display This Question:

If Have you contacted BC Hydro in the last 12 months regarding the net metering program? = Yes

Q9 How did you contact us?

- Phone (1)
- Email (2)
- Website (3)
- Other (Please specify) (4) _____

Display This Question:

If How did you contact us? = Phone
Or How did you contact us? = Email
Or How did you contact us? = Website
Or How did you contact us? = Other (Please specify)

Q10 How satisfied were you with the response you received to resolve your inquiry?

- Extremely satisfied (18)
- Somewhat satisfied (19)
- Neither satisfied nor dissatisfied (20)
- Somewhat dissatisfied (21)
- Extremely dissatisfied (22)

Display This Question:

If How satisfied were you with the response you received to resolve your inquiry? = Somewhat dissatisfied
Or How satisfied were you with the response you received to resolve your inquiry? = Extremely dissatisfied

Q11 Tell us why you were dissatisfied with the response you received.

Display This Question:

If What type of net metering account do/will you have? (Please select one) = Residential

Q5 Do you currently own an electric vehicle?

- No, not interested (1)
- Not at the moment but maybe in the future (4)
- Yes (5)

Display This Question:

If What type of net metering account do/will you have? (Please select one) = Residential

Q59 Do you currently have battery storage associated with your generation?

- Yes (23)
- No (24)

Display This Question:

If Do you currently have battery storage associated with your generation? = No

Q61 Are you considering adding battery storage?

- Yes (28)
- No (29)

Display This Question:

If Are you considering adding battery storage? = Yes

Or Are you considering adding battery storage? = No

Or Do you currently have battery storage associated with your generation? = Yes

Q62 Can you please tell us why?

Display This Question:

If Tell us your interest in net metering. = I am considering generating electricity for my own use

Q65 What generation technology are you planning to use?

- Solar photovoltaic (1)
- Hydro (2)
- Other (Please specify) (3) _____

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = Other

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = An installer/contractor for net metering customers

Q25 Please tell us your level of agreement with how well the net metering program currently meets the needs of British Columbians?

- Not well at all (16)
- Slightly well (17)
- Moderately well (18)
- Very well (19)
- Extremely well (20)

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = Other

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = An installer/contractor for net metering customers

Q23 Are there barriers you see preventing British Columbians from generating electricity for their own use?

- Yes (23)
- No (24)

Display This Question:

If Are there barriers you see preventing British Columbians from generating electricity for their ow... = Yes

Q24 Please describe those barriers.

Q26 Future of Net Metering

Our net metering program is growing. We are assessing new concepts and models to better prepare for evolving needs. In this section of the survey, we'd like to gather your thoughts on three areas:

Virtual net metering Marginal pricing Treatment of hydroelectric generation

Q27 Virtual net metering

Virtual net metering refers to a system where an electric utility facilitates sharing of generation credits between different customers. There are many different types of virtual net metering. It varies from customers using generation credits across multiple sites (e.g. school district or municipality) and extends to a concept of a community energy project (credits are distributed among community members). In all cases, it's a way for customers to participate in locally generated electricity without having to install their own generating system. In this survey, we refer to all these options as virtual net metering.

Would you be interested in participating in virtual net metering?

- Yes (28)
- No (30)
- I don't know (31)

Display This Question:

If Virtual net metering Virtual net metering refers to a system where an electric utility facilitate... = Yes

Or Virtual net metering Virtual net metering refers to a system where an electric utility facilitate... = No

Q28 Please share your thoughts on virtual net metering.

Q29 Marginal cost pricing

Our net metering program enables customers to use their generation to offset their electricity costs. Customers also receive a credit if they generate more electricity than they use. Currently, the value of electricity generated does not depend on when the excess generation is provided, nor on the value of the electricity to BC Hydro. In addition, customers that generate their own electricity are not fully paying for their share of the infrastructure costs of maintaining the grid (e.g., transmission and distribution wires, provision of on-demand energy, etc.). As the net metering program grows, customers who are *not* participants of net metering would pay more to contribute to the costs of maintaining the grid. Under a marginal cost pricing scheme, customers on net metering would be able to buy and sell energy at its marginal, market or real time cost, while paying a system access charge to cover the fixed costs associated with receiving electricity service from BC Hydro. **Do you agree that in the future it might be appropriate to use a marginal cost pricing scheme for net metering?**

- Yes (1)
- No (3)
- I don't know (8)

Display This Question:

If Marginal cost pricing Our net metering program enables customers to use their generation to offse... = Yes

Or Marginal cost pricing Our net metering program enables customers to use their generation to offse... = No

Q30 Please tell us why.

Q31 Treatment of hydroelectric generation

Most customers in BC Hydro’s net metering program use solar panels to generate electricity. A small number of customers participating in the net metering program use a hydroelectric generator. Relative to solar net metering customers, net metering customers with hydroelectric generators produce electricity in larger volumes, often exceeding their needs. In addition, the time of day and year that the electricity is generated is different for net metering customers with hydroelectric generation than it is for customers with solar generation. The difference in the amount and timing of excess generation impacts the value of the generation to an electric utility. Developing terms and conditions that vary based on the generation type could help ensure that the cost of the net metering program aligns with the value it provides to the utility. **Would you support developing separate program terms and conditions for customers based on their generation type?**

- Yes (1)
- No (3)
- I don't know (24)

Display This Question:

If Treatment of hydroelectric generation Most customers in BC Hydro’s net metering program use solar... = Yes
Or Treatment of hydroelectric generation Most customers in BC Hydro’s net metering program use solar... = No

Q32 Please tell us why.

Display This Question:

If Please tell us a little bit about who you are so we can better understand your responses. I am: (... = A net metering customer (my system is operating and on net metering billing)

Or Please tell us a little bit about who you are so we can better understand your responses. I am: (... = In the process of applying for net metering

Q34 CONSENT TO USE PERSONAL INFORMATION (Optional)

BC Hydro would like to append your account information to this survey. Data will be analyzed in aggregate form only (e.g. geographic location), meaning you will not be identified.

Do you consent to BC Hydro using this type of information for analytical purposes?

Yes (52)

No (53)

Display This Question:

If CONSENT TO USE PERSONAL INFORMATION (Optional) BC Hydro would like to append your account inform... = Yes

Q35 Please provide your Account information **OR** provide your name, service address, phone number if you don't know your account number.

BC Hydro account number (4) _____

Name (First, Last) (9) _____

Organization (If Applicable) (10) _____

Service Address (11) _____

Phone Number (12) _____

Q36 Thank you for taking the time to complete our survey, we appreciate your feedback!

If you're interested in participating in upcoming discussions about the net metering program and are not on our mailing list, please join [here](#)

**Application to Amend Net Metering Service under
Rate Schedule 1289
Compliance with BCUC Order No. G-168-20**

Net Metering Evaluation Report No. 5

Appendix C

Summary of Survey Results

*Net Metering Customer Survey Report***Survey duration: September 15 to September 25, 2020****METHODOLOGY**

On September 15, 2020 an e-mail was sent to over 4,000 RS 1289 customers and interested parties (e.g., contractors, non-participating BC Hydro customers) who are subscribed to BC Hydro's Net Metering e-mail list inviting them to participate in a survey to provide feedback on RS 1289. A link to the survey was also posted on the Net Metering page on www.bchydro.com/netmetering. The survey closed at midnight on September 25, 2020. A total of 854 responses were recorded.

The questionnaire was customized to provide relevant questions to the respondent based on their involvement in net metering. For example, current net metering customers and contractors were asked a series of questions regarding their satisfaction with the program, while other interested parties such as those involved in the clean energy industry, were asked about barriers to entry and how well they feel RS 1289 is meeting the needs of British Columbians. Most questions used a five-point scale in which a customer identified their level of agreement with the statement posed: Strongly Agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree, or Strongly Disagree.

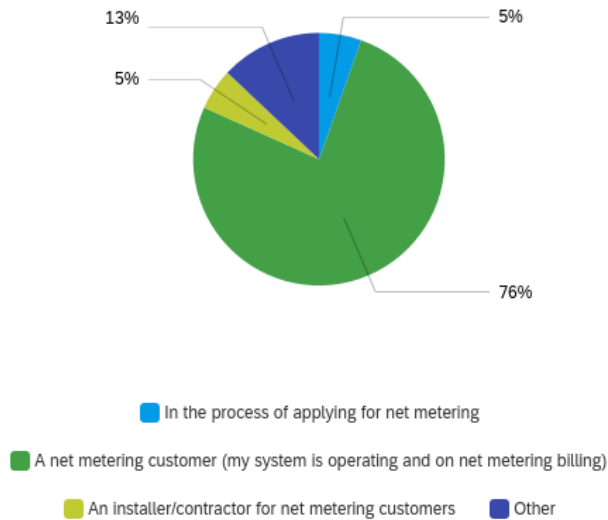
The survey allowed for many open-ended responses where respondents could provide additional feedback. One open ended response can contain more than one theme, resulting in multiple mentions as indicated by (# of mentions) throughout the report. To allow for further flexibility and in consideration of people's time, respondents were also able to navigate back and forth through the survey questions, or skip any questions they felt did not apply.

The key areas we sought feedback on were overall satisfaction with the program, virtual net metering, marginal pricing, the treatment of hydro generation and concerns/improvements for the program.

RESPONDENT PROFILE

Please tell us a little bit about who you are so we can better understand your responses. I am: (Please select one):

Base: n=809



The large majority of the respondents identified as RS 1289 Customers (76 per cent); another 5 per cent said they are in the process of applying. Contractors and installers comprised another 5 per cent. The remaining 13 per cent of respondents classified as “other” include those considering generating electricity for their own use, associate with an organization involved in clean energy, or are consultants and other advocates. Only two respondents said that they are intervenors.

What type of net metering account do/will you have? (Please select one)

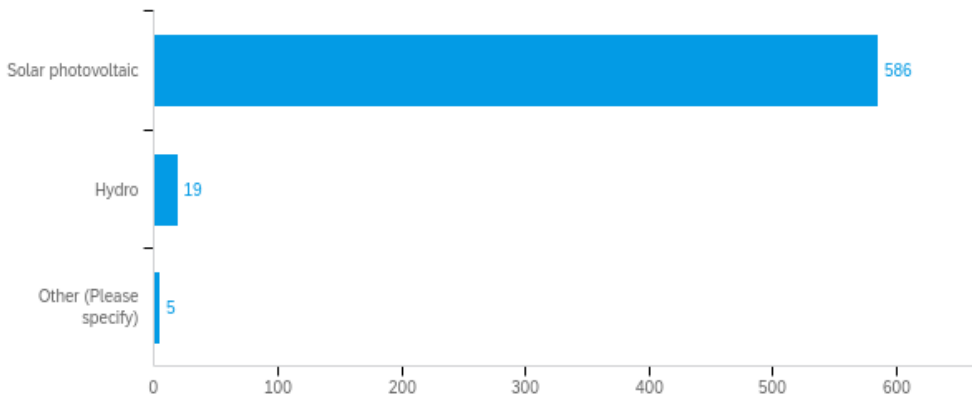
Base: those currently a net metering customer or are considering participation, n=657

| Answer | % | Count |
|------------------------|-------|-------|
| Residential | 96.04 | 631 |
| Business | 1.98 | 13 |
| Municipal government | 0.30 | 2 |
| First Nation | 0.15 | 1 |
| School | 0.00 | 0 |
| Other (Please specify) | 1.52 | 10 |
| Community group | 0.00 | 0 |
| Total | 100 | 657 |

In terms of customer type, the majority are residential (631), with only a small number identifying as business (13), municipal government (2) or First Nation (1), plus a small number of “Other” (10) such as farms, or having both a residential and business account.

What generation technology are you currently using?

Base: those who are currently in the net metering program, n=610



Of those customers currently engaged in net metering, the vast majority (96 per cent) are using solar photovoltaic generation, while 3 per cent have hydro generation and 1 per cent are using other technology such as wind.

What is your primary reason for becoming a net metering customer?

Top 3 themes: concern for the environment (354), saving money (240), support for a new energy model and future proofing (84)

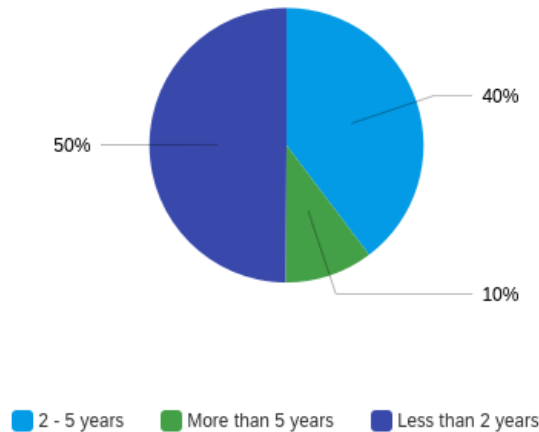
Sample customer comments

“Distributed power, especially residential solar, makes sense to reduce the burden on the grid, help alleviate the need for new dams, and allows me to control my monthly spending.”

“to reduce my hydro bills, and to provide green power to the grid”

How long have you been participating in the net metering program?

Base: those who are currently in the net metering program, n=609

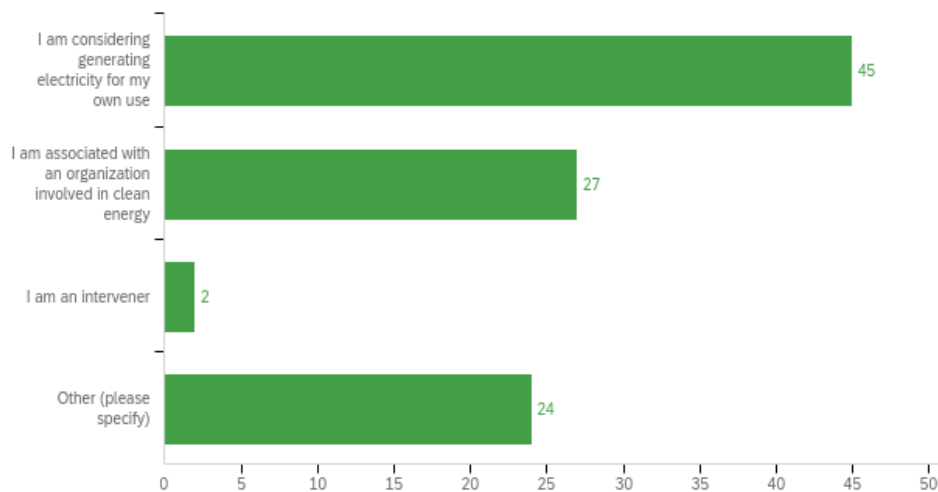


In terms of tenure of participation in the program, half of the respondents reported being in the program for under two years, while the other half have been in the program for longer, including 10 per cent reporting participation for more than five years.

One notable result in the survey is that tenure in the program impacts the level of agreement that the program meets the customer’s expectations. Those participating for more than five years report a statistically significantly higher level of disagreement that the program meets their needs.

Tell us your interest in net metering. (Other - non customers)

Base: non customers, n=98

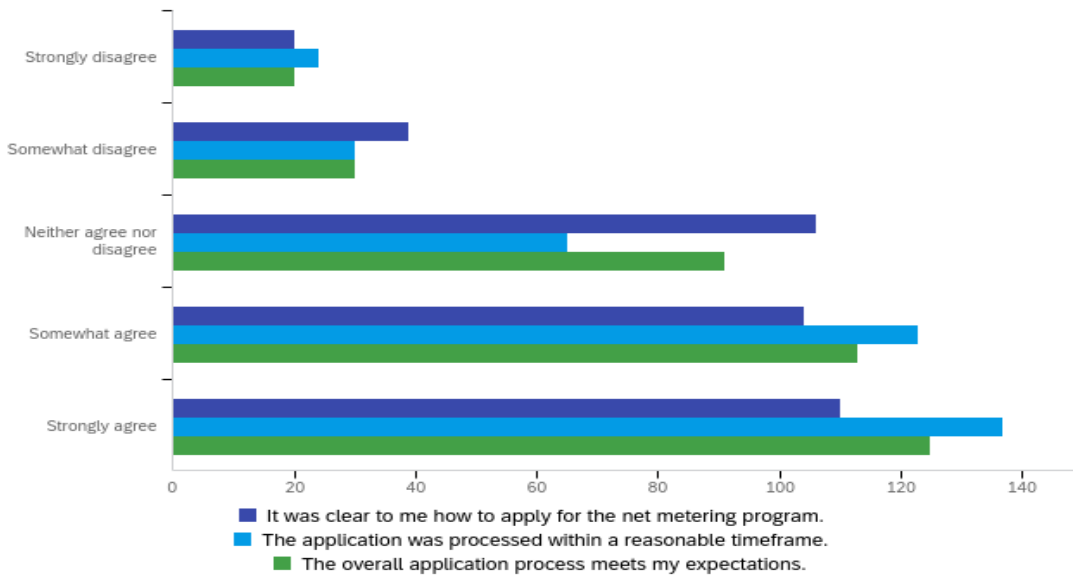


There was a sizable number of respondents who are not currently net metering customers but can be considered interested other parties. The largest group was prospective customers (46 per cent), followed by those associated with clean energy organizations (28 per cent). Two interveners (2 per cent) also responded, while the remaining 25 per cent were made up of various other individuals such as engineers, consultants or advocates.

PROGRAM SATISFACTION

Please tell us your level of agreement with the following statements regarding BC Hydro's net metering program application process:

Base: those who have been in the program under two years, are in the process of applying, or who perform installations for net metering customers, n=379

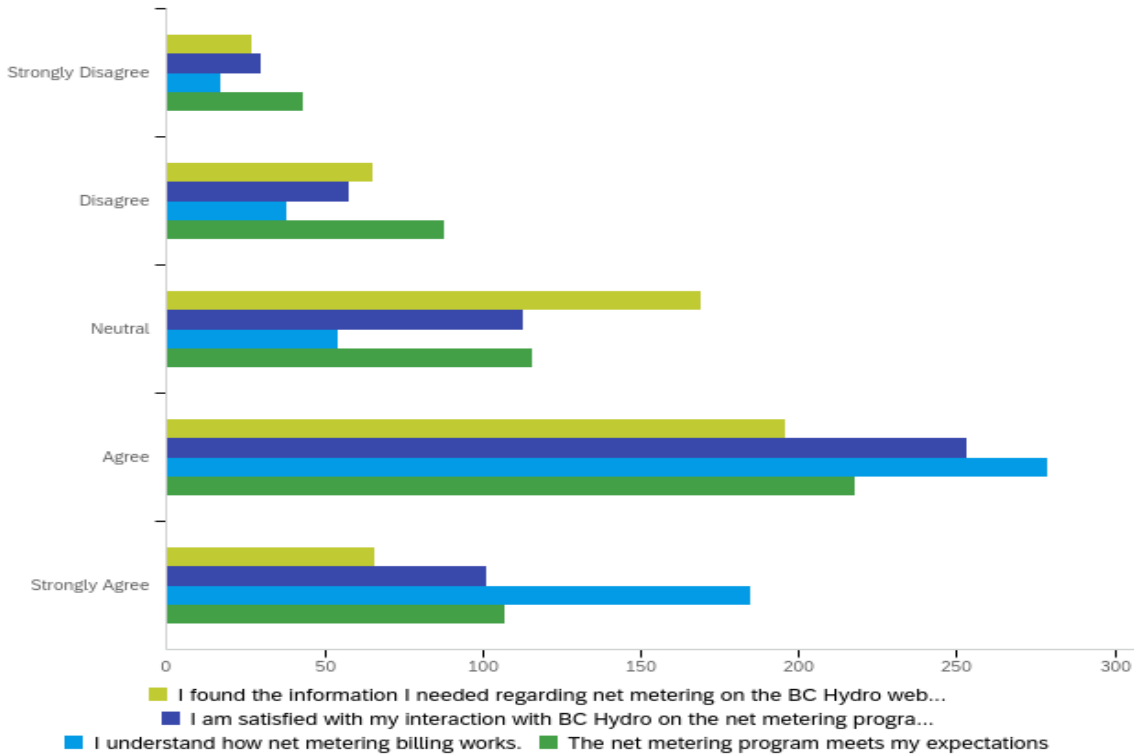


| Statement | % Somewhat Agree / Strongly Agree |
|---|-----------------------------------|
| It was clear to me how to apply for the net metering program. | 56.5 |
| The application was processed in a reasonable timeframe. | 68.6 |
| The overall application process meets my expectations. | 62.8 |

As a means to gauge the net metering application process experience, the survey identified respondents who had recently gone through that process in order to get some feedback. These questions were asked in an agree statement format. The results indicate that the majority of respondents agreed the process generally works, but there is still room for improvement, particularly in providing clarity about the process.

Please tell us your level of agreement with the following statements regarding BC Hydro's net metering program:

Base: those who are currently in the net metering program, n=523



| Statement | % Agree or Strongly Agree |
|--|---------------------------|
| I found the information I needed regarding net metering on the BC Hydro website. | 50.1 |
| I am satisfied with my interaction with BC Hydro on the net metering program. | 63.8 |
| I understand how net metering billing works. | 81.0 |
| The net metering program meets my expectations | 56.8 |

Respondents identifying as current net metering customers were asked their level of agreement on four aspects of the program: online information, interaction with BC Hydro, understanding of billing, and the program meeting their expectations.

The results indicate that the large majority of customers understand net metering billing, while there is a much lower level of agreement on the other three aspects. Notably, only half agreed that the needed information was on the BC Hydro website, suggesting a need to improve user experience on that channel.

What aspects of the net metering program do you like most?

Top 3 themes: It is simple, clear and easy (254), financial benefits (149), and energy banking (123)

Sample customer comment

“We like the way we generate small amounts in summer and receive bill credits later in the year. Over the year we consume way more than we generate. We like the fact that we receive generating credits at the same unit cost that we purchase power”

What aspects of the net metering program do you dislike?

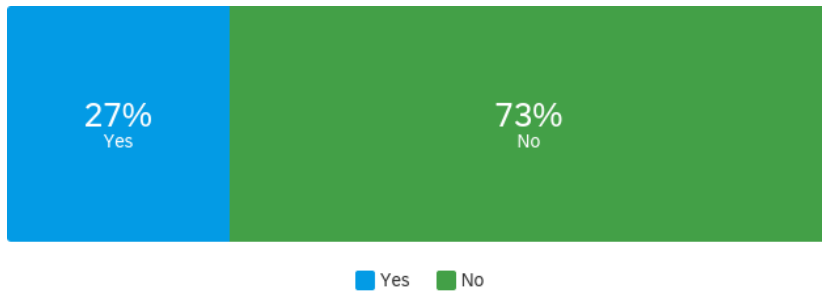
Top 3 themes: The level of compensation (184), nothing or too soon to say (123), and program rules and structure (117).

Sample customer comment

“I would appreciate the option to either receive an annual payout or to bank credits for any annual excess electricity I generate, and would appreciate elimination of (or more flexibility) in determining net metering generation caps/production limits.”

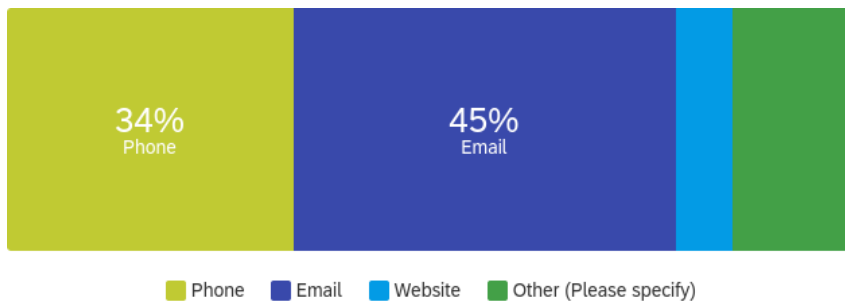
Have you contacted BC Hydro in the last 12 months regarding the net metering program?

Base: all respondents, n=720



How did you contact us?

Base: those who said Yes, contacted, n=193

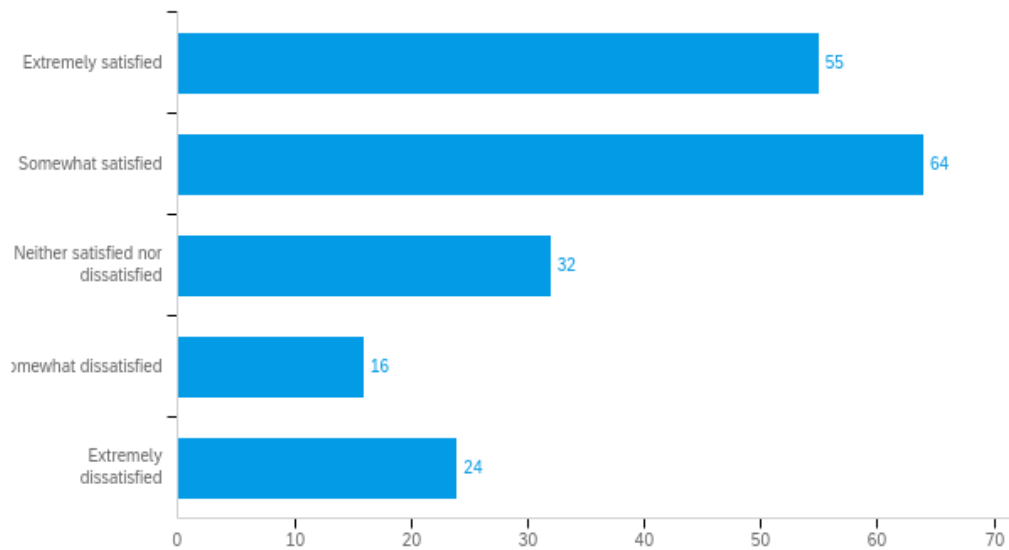


When asked if they had, contacted BC Hydro in the last 12 months regarding net metering, more than seven-in-ten respondents indicated they had not, while more than one-in-four said they had.

Among those who said yes, the most-used channel was email (45 per cent), followed by phone (34 per cent), website (7 per cent) and other (15 per cent)

How satisfied were you with the response you received to resolve your inquiry?

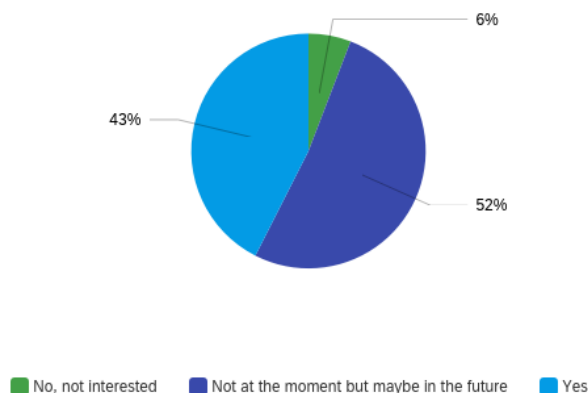
Base: those who contacted BC Hydro about net metering in the past 12 months, n=191



When asked about their satisfaction with the response received from BC Hydro, 62 per cent said they were Extremely or Somewhat Satisfied, 21 per cent said they were Extremely or Somewhat Dissatisfied, and 17 per cent were Neither Satisfied nor Dissatisfied.

Do you currently own an electric vehicle?

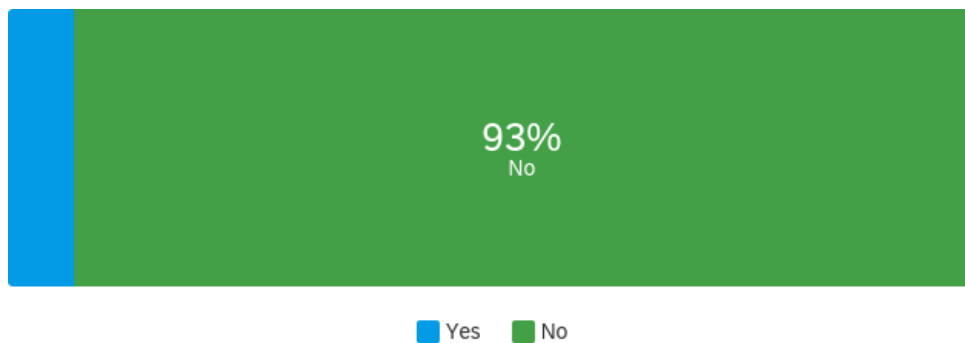
Base: respondents identifying as Residential, n=581



Interestingly, electric vehicle ownership (penetration) is much higher (43 per cent) among the net metering customers responding to this survey than the general market penetration. Electric vehicle ownership is high among those currently applying to the program as well, with 30 per cent penetration.

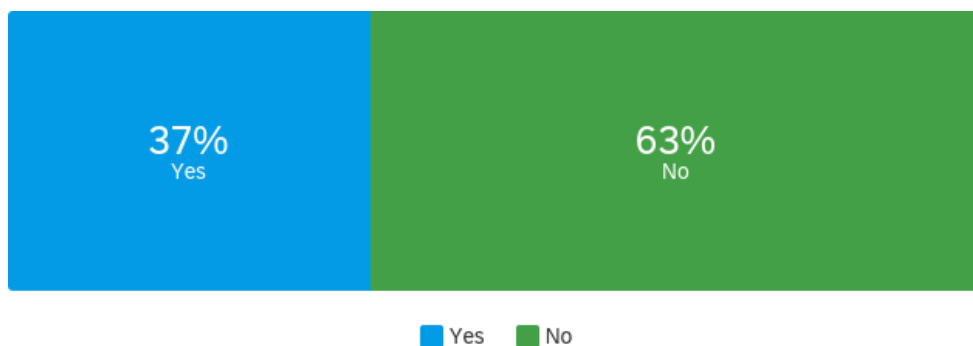
Do you currently have battery storage associated with your generation?

Base: respondents identifying as Residential, n=581



Are you considering adding battery storage?

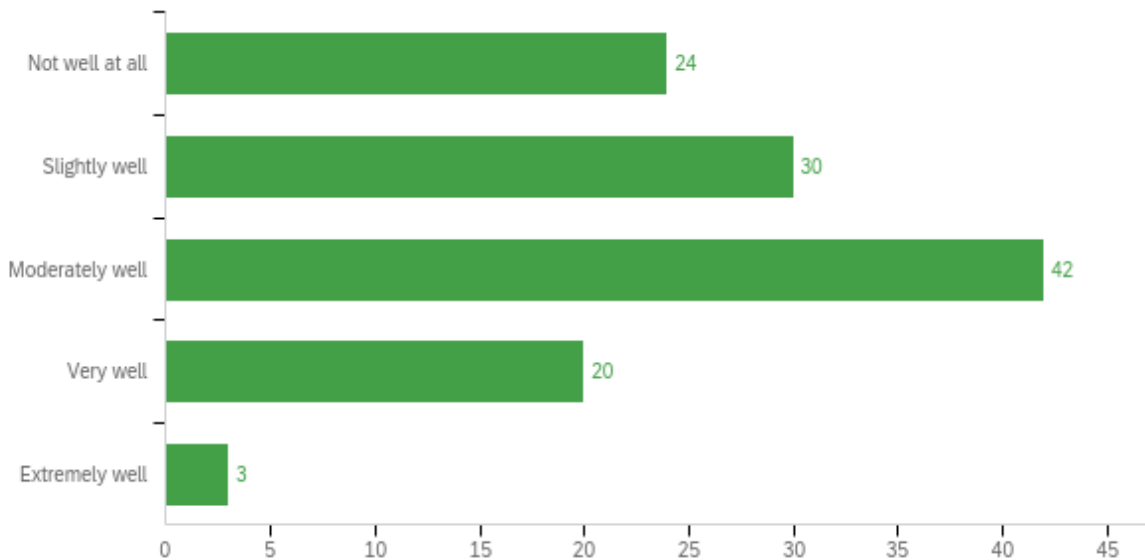
Base: respondents identifying as Residential and not having storage, n=539



In terms of battery storage, only 7 per cent of residential net metering customers said they have battery storage associated with their generation. Among those who do not have storage, 37 per cent said they are considering adding that to their system.

Please tell us your level of agreement with how well the net metering program currently meets the needs of British Columbians?

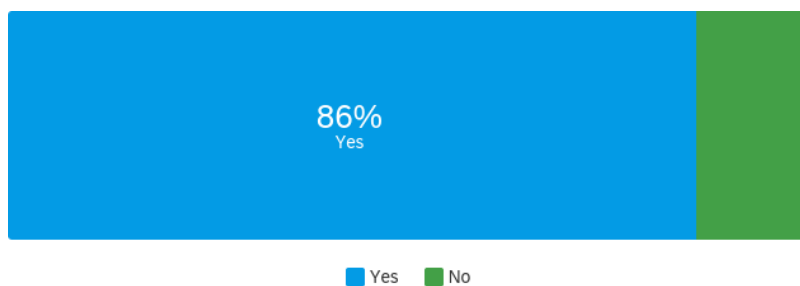
Base: respondents identifying as non-customers, n=119



Other interested parties, which included 119 of the respondents, were asked their opinion on how well the Net Metering program works for British Columbians. Of this group, 55 per cent said that the program meets the needs at least moderately well (19 per cent said Extremely or Very Well).

Are there barriers you see preventing British Columbians from generating electricity for their own use?

Base: respondents identifying as non-customers, n=114



Further, 86 per cent agreed there are barriers preventing British Columbians from generating their own electricity. Those barriers can be broadly described as relating to cost (35), lack of capital incentives (34) and a general feeling that BC Hydro does not support net metering (25).

Sample customer comment

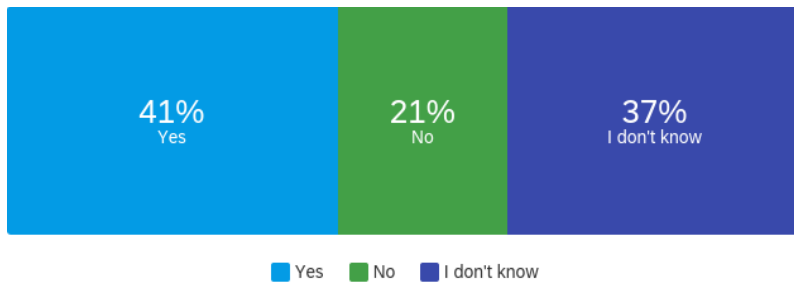
“Cost of installations prohibitive in terms of payback period. Due to size restrictions payback is beyond 10 years and my clients back out of proposed installations. Meanwhile my community continues to burn diesel to meet demand and BC Hydro actually loses money due to the high cost.”

FUTURE ISSUES

Virtual net metering

Would you be interested in participating in virtual net metering?

Base: all respondents, n=705



Four in ten (41 per cent Yes) indicated interest in virtual net metering, while two in ten (21 per cent No) indicated no interest and the remaining 37 per cent answered “don’t know”.

Those answering Yes or No (total 358 responses) were asked to elaborate their answers through an open-ended question.

The main themes for supporting virtual net metering are:

1. It encourages small-scale distributed renewable energy (and community-based energy) (177)
2. Increases access to electricity generation (74)
3. Improves society and the environment (70)

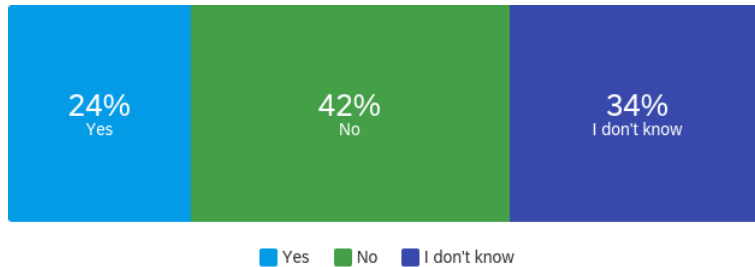
The main themes for those that said no to virtual net metering are:

1. They felt it didn’t apply to them (23)
2. They need more information (21) before commenting

Marginal cost pricing

Do you agree that in the future it might be appropriate to use a marginal cost pricing scheme for net metering?

Base: all respondents, n=705



A description of marginal cost pricing was provided along with a question asking about support followed by an open ended tell us why question. One-quarter (24 per cent Yes) said they agree that Marginal Cost Pricing might be an appropriate pricing scheme for net metering in the future, while four-in-ten disagree (42 per cent No) and one-third (34 per cent) answered “I don’t know.” Several customers mentioned that they take issue with the question itself and disagree with the notion that they are not “paying their share” as a net metering customer; others wanted further information to make an informed decision to answer the question.

The main themes emerging from those who agree with marginal cost pricing as a potential future pricing method were:

1. All users should support the grid (96)
2. If this pricing approach supports a new energy model (74); and
3. BC Hydro should be exploring new rates, including time-based rates (48);

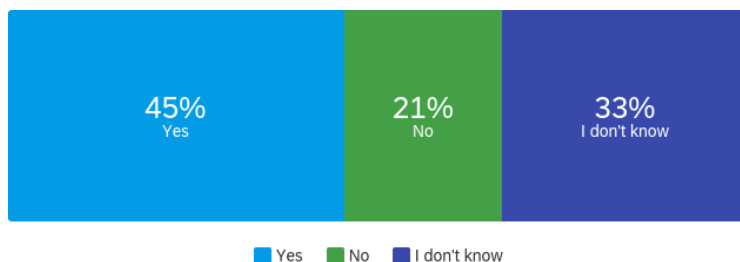
The main themes emerging from those who said no to marginal cost pricing as a future method are:

1. They feel they are already contributing via the infrastructure investment they have made in their own systems with translates to cost avoidance to reduce the need for more energy production via large projects (156).
2. It won't help the environment as it discourages people from participating in local, clean, distributed generation (123); and
3. General disagreement (54).

Treatment of hydroelectric generation

Would you support developing separate program terms and conditions for customers based on their generation type?

Base: all respondents, n=705



A description of hydroelectric generation associated with net metering was provided along with a question asking about support for separate program terms and conditions based on generation type, followed by an open ended tell us why question. In response to the first question, 45 per cent said they would support separate terms and conditions, while 21 per cent said they would not, and one-third (33 per cent) answered “I don't know.”

There was general agreement for separate terms and conditions from 120 responses highlighting the value of electricity delivered during peak demand period and a need for time of use rates. Of those clearly against separate treatment based on generation type, 76 comments were related to equity and fairness.

There do not appear to be any significant differences in responses based on the respondent's interest in net metering, i.e., customers vs. other interested parties.

Support for these three concepts (virtual net metering, marginal cost pricing, and separate terms and conditions for different generation types) varies, but in all cases there's a notably high level of "Don't know" responses, suggesting that more information and consultation is needed before current and prospective participants to the net metering program can make a fully-informed decision.

Conclusions

The survey results indicate that a majority of survey participants are satisfied with the application process and other aspects of RS 1289 operations. Analysis of responses that denote dissatisfaction with RS 1289 operations indicates that BC Hydro could make improvements to the speed and complexity of the application process, as well as to the availability of information on BC Hydro's website. Further analysis of this feedback should be considered for improvements to Net Metering operations.

Fifty-seven per cent of RS 1289 Customers agreed or somewhat agreed that the program meets their needs. This level of agreement is similar to the 55 per cent of contractors/installers and interested parties that indicated the program meets the needs at least moderately well. Program rules and the level of compensation were common themes amongst RS 1289 Customers and interested parties who did not indicate support.

Respondents indicated a general level of support for virtual net metering and for different treatment of hydro generation, while there was a low level of support for marginal cost pricing. Responses indicate a wide range of opinions and understanding of these concepts, as well as the need for further consultation with customers and stakeholders.