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VIA EMAIL
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March 31, 2014

BC HYDRO AMEND RATE SCHEDULE 1289 FOR NET METERING SERVICE EXHIBIT A2-1

Ms. Janet Fraser
Chief Regulatory Officer
British Columbia Hydro and Power Authority
333 Dunsmuir Street
Vancouver, BC V6B 5R3

Dear Ms. Fraser:

Re: British Columbia Hydro and Power Authority
Application to Amend Rate Schedule 1289 for Net Metering Service

Commission staff submit the following document for the record in this proceeding:

British Columbia Hydro and Power Authority
Net Metering Evaluation Report No. 3
April 30, 2013

Yours truly,

Erica Hamilton

/nd
Enclosure
cc: Registered Interveners

BC hydro
FOR GENERATIONS

Janet Fraser
Chief Regulatory Officer
Phone: 604-623-4046
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April 30, 2013

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

Dear Ms. Hamilton:

RE: British Columbia Utilities Commission (BCUC)
British Columbia Hydro and Power Authority (BC Hydro)
Net Metering Evaluation Report No. 3 - April 30, 2013

BC Hydro is writing to the BCUC to submit the Net Metering Evaluation Report No. 3, in accordance with Directive No. 4 of BCUC Order No. G-57-12.

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

Yours sincerely,

Janet Fraser
Chief Regulatory Officer

ls/ma

Enclosure

Copy to: BCUC Application to Amend Rate Schedule 1289 - Net Metering Service and Cancel Tariff Supplement No. 63 - Net Metering Interconnection Agreement Registered Intervener Distribution List.

BC hydro

Re: BCUC Order No. G-57-12

Net Metering Evaluation Report No. 3

April 30, 2013

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1 Introduction

The Net Metering rate, known as RS 1289, was established in 2004 as a simple rate available to BC Hydro's residential and commercial customers who wish to install small clean or renewable distributed generation (**DG**) facilities at their premises, primarily for the purpose of allowing them to meet all or part of their electricity needs. In 2012, the British Columbia Utilities Commission (**BCUC**) issued Order No. G-57-12, directing BC Hydro to file a net metering report. This report is filed in accordance with that directive and is the third net metering evaluation report filed with the BCUC since RS 1289 was established.

At page 21 of the Reasons for Decision attached as Appendix A to Order No. G-57-12, the BCUC directed BC Hydro to address a number of issues. The report responds to those issues and provides a future direction for BC Hydro's continued promotion and enablement of Net Metering, and small-scale DG projects more broadly. The Table of Concordance attached as Appendix A indicates where each of the issues is addressed.

This report is comprised of the following sections:

- Section 1 Introduction
- Section 2 Regulatory and Policy Backgroud
- Section 3 Consultation and Communication
- Section 4 RS 1289 - Customer Data
- Section 5 RS1289 - Costing Data
- Section 6 Energy Credit and Energy Price Methodology
- Section 7 Benchmarking
- Section 8 Barriers to Developing Small-Scale DG Projects

- Section 9 Distributed Generation Strategy
- Section 10 Net Metering Objectives and Recommended Actions

The following Appendices are included with this report:

- Appendix A Table of Concordance
- Appendix B Stakeholder Meeting Notes and Comments on Draft Net Metering Evaluation Report
- Appendix C Marketing and Communications Materials
- Appendix D Jurisdictional Review
- Appendix E Analysis of Small-Scale Offers Up to 15 MW
- Appendix F DG Business Models

2 Regulatory and Policy Background

In 2002, several parties asked the BCUC to require BC Hydro to implement a limited and simple form of net metering. The policy justification was Policy Action No. 20 of the 2002 B.C. Energy Plan which stated that electricity distributors pursue a voluntary goal to acquire 50 per cent of new supply from B.C. Clean Electricity over the following ten years. The BCUC asked BC Hydro to prepare a report regarding the merits of a net metering policy and in 2003, BC Hydro submitted its report, *Net Metering in British Columbia*.

The BCUC recommended the development and implementation of a net metering tariff, stating that its support for a net metering tariff was "conditional on development and implementation that does not incur any substantial cost on the utility, and does not impose any inordinate barrier to ratepayers seeking to net meter."[1] The BCUC directed BC Hydro to prepare an application for a net metering tariff with, at a minimum, six parameters:

1. It should be available to residential and commercial customers
2. It should be applied only to clean energy projects, as defined in the B.C. Government's energy policy
3. It should be applicable to generation of 50 kW or less
4. Interconnection must be safe, but the rules governing interconnection should not be extensive, nor burdensome in administrative process
5. BC Hydro should consult with other agencies and interest groups
6. Customer generation should be limited to own use only at the registered location of the net metering installation

[1] BCUC Letter No. L-37-03 dated July 22, 2003.

The BCUC also stated that, in determining consumption charges, net excess generation may be banked as a credit to the customer's account to be applied against future net consumption. The BCUC agreed with BC Hydro that any excess energy in the customer's account should be transferred to BC Hydro at a pre-determined anniversary date but the BCUC was "not convinced, even in light of the lower quality energy likely available from net metering in B.C., that this transfer of energy should come at zero cost to BC Hydro." The BCUC recommended that BC Hydro propose a rate for purchase of net excess generation – now known as the RS 1289 **Energy Price**.

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 of the key aspects of RS 1289 at the time included a 50 kW limit on generator nameplate capacity, the requirement that customer generation be "clean", and the payment of an Energy Price of 5.40 cents per kWh for surplus customer generation on an annual basis. The rate is based on a "netting" of energy deliveries (deliveries by BC Hydro to the customer minus deliveries by the customer to BC Hydro).

In its 2004 Order, the BCUC directed BC Hydro to file a monitoring and evaluation report on the Net Metering program 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 program.

In January 2011, BC Hydro released its *Report on the SOP 2-Year Review* which included revised SOP pricing based on the results of the Clean Power Call. In September 2011, BC Hydro filed an application with the BCUC to, among other things, increase the Energy Price to 9.99 cents per kWh, consistent with the revised SOP pricing. BC Hydro also filed its second Net Metering evaluation report. In May 2012, the BCUC issued Order No. G-57-12 and directed BC Hydro to file a third Net Metering evaluation report. This report has been prepared in compliance with that direction.

3 Consultation and Communication

BC Hydro's consultation and communication goal is to increase the awareness of the Net Metering program, through increased consultation and communication, and obtain feedback about both the positive aspects of Net Metering and the areas for improvement. Specifically, BC Hydro has developed and is implementing a marketing and communications plan that focuses on building program awareness with BC Hydro's customers and stakeholders.

3.1 Stakeholder Consultation

BC Hydro's consultation objectives are to:

- Engage key stakeholders on proposed changes to the Net Metering program
- Seek input on the barriers that prevent the development of small-scale DG projects under 1 MW
- Maintain ongoing dialogue regarding future modifications or updates to the Net Metering program with key stakeholders

From September 2012 to February 2013, BC Hydro undertook an extensive consultative process that involved interveners, contractors and interested parties. These consultative efforts included:

- A series of face to face meetings with customers, interveners and contractors
- One webinar, with 19 customers in attendance
- Presentations to the Canadian Solar Industries Association (**CanSIA**) and Union of British Columbia Municipalities (**UBCM**)
- Circulation of a copy of a draft of this report to interveners and other key stakeholders for their review and comment prior to finalization and filing with the BCUC

A summary of discussions is available in Appendix B. Comments received on the draft report as well as BC Hydro's responses to the comments are also included in Appendix B.

3.2 Communications

BC Hydro has undertaken several marketing and communications initiatives since the BCUC's 2012 Order to enhance the public awareness of RS 1289, (copies of the materials can be found in Appendix C):

- Enhanced the BC Hydro Net Metering program website: www.bchydro.com/netmetering
- Developed postcards with information about the Net Metering program with links to BC Hydro's updated website and made these available at BC Hydro Power Smart booths across the province and at the UBCM convention
- In Fall 2012, highlighted the Net Metering program in a bill insert that went to approximately 1 million residential customers and 5,000 small commercial customers
- In December 2012, published a story highlighting three net metering customers in BC Hydro's internal weekly newsletter that went to approximately 5,000 BC Hydro employees. This was done to raise awareness and educate employees of the program.
- In February 2013, BC Hydro issued the profile of the three net metering customers externally, via a BC Hydro customer e-newsletter, to approximately 200,000 customers
- In March 2013, BC Hydro conducted a random survey of approximately 350 customers to test the level of awareness and understanding of the Net Metering program

- BC Hydro has begun working with Net Metering contractors and installers to identify opportunities to develop materials that both promote and provide education about the Net Metering program

A copy of the Marketing and Communications Plan for the Net Metering program can be found at Appendix C.

4 RS 1289 - Customer Data

In its Order No. G-57-12, the BCUC asked BC Hydro for specific data concerning Net Metering customers.

4.1 Summary of Inquiries

The Net Metering inquiries received since the 2012 BCUC decision have been tracked by BC Hydro. The data below was collected during the period from May 2012 to March 2013. Prior to May 2012, BC Hydro was not collecting this type of data. During this period, BC Hydro responded to over 270 phone calls and emails.[2] The following is a summary of the types of inquiries related to Net Metering:

- Over 100 inquiries about the process to install solar photovoltaic (**PV**)
- Approximately 45 inquiries from existing Net Metering customers with various questions (e.g., billing, metering, power quality, change of ownership)
- Ten inquiries about the eligibility of gas-based Combined Heat and Power (**CHP**) projects
- Approximately 35 inquiries about developing micro-hydro projects
- Approximately 20 inquiries about developing wind projects
- Approximately 12 customers asked questions pertaining to smart meters
- Approximately 20 inquiries about available incentives from government and BC Hydro
- Five customers expressed an interest in increasing the maximum generation size for the Net Metering program
- About 60 inquiries of a general nature pertaining to the Net Metering program

[2] Please note that some inquiries are captured in multiple categories so the total is greater than 270 inquiries.

4.2 Net Metering Project Summary

As of March 31, 2013, BC Hydro's Net Metering program had a total of 228 projects installed with approximately 1.1 MW of aggregate capacity. The breakdown is as follows: 90 per cent solar PV, 4 per cent micro-hydro, 3 per cent wind, 2 per cent wind/PV and 1 per cent biogas, as reflected in Table 1 below. This table also provides a regional overview of the projects currently in the Net Metering program.

Table 1 Net Metering Projects by Region

	Generation Type	Number of Projects	Capacity (kW)
Central Interior	PV	11	21
	Wind	1	2
	Wind & PV	1	7
East Kootenay	Hydro	1	25
	PV	10	29
Kelly/Nicola	Hydro	2	8
	PV	14	47
Lower Mainland	Biogas	1	20
	Hydro	3	75
	PV	71	366
	Wind	2	5
	Wind & PV	1	5
North Coast	PV	11	29
	Wind	1	3
Peace River	PV	7	29
South Interior	Hydro	2	62
	PV	21	78
	Wind	2	11
	Wind & PV	1	8
Vancouver Island	Hydro	1	11
	PV	61	287
	Wind	1	3
	Wind & PV	2	7
Total		**228**	**1,138**

Table 2 provides a summary of the customers that applied for Net Metering or had projects that came into service in F2012 and F2013.

Table 2 Net Metering Activities for F2012 and F2013

Net Metering Activity for F2012					
	Generation Type	Reached In-Service		Applications Received	
		No. of Projects	Capacity (kW)	No. of Projects	Capacity (kW)
Central Interior	PV	1	3	6	10
	Wind & PV			1	7
East Kootenay	Hydro	1	25		
	PV	1	4	1	9
Kelly/Nicola	PV	4	21	7	21
	Wind & PV			1	5
Lower Mainland	Biogas	1	20		
	Hydro			1	2
	PV	18	120	22	130
	Wind & PV	1	5	1	5
	Other			1	22
North Coast	PV	2	4	2	6
	Wind			1	3
Peace River	PV	4	13	1	2
South Interior	Hydro	2	62		
	PV	6	20	6	22
Vancouver Island	Hydro			1	45
	PV	4	7	10	69
	Wind	1	3		
Total		46	307	62	358
Net Metering Activitiy for F2013					
	Generation Type	Reached In-Service		Applications Received	
		No. of Projects	Capacity (kW)	No. of Projects	Capacity (kW)
Central Interior	PV	5	8	4	13
	Wind & PV	1	7	1	1
East Kootenay	PV	2	10	2	6
Kelly/Nicola	Hydro			1	50
	PV	5	10	3	7
	Wind			1	1
Lower Mainland	Hydro	1	2	2	60
	PV	22	161	18	146
North Coast	PV	3	7	2	4
	Wind	1	3		
Peace River	PV	1	1		
South Interior	PV	8	26	6	16
	Wind & PV			1	8
Vancouver Island	Hydro	1	11		
	PV	20	102	17	76
Total		70	348	58	388

4.3 Net Metering Energy Deliveries, Credits and Payments

In F2012, BC Hydro delivered 29,545 MWh (29.5 GWh) of electricity to Net Metering customers. These customers received approximately 107 MWh of Energy Credits (generation delivered to BC Hydro over and above the customer's load at the time of delivery and applied against the customer's energy bill). In addition, BC Hydro purchased 529 MWh[3] of surplus energy from 13 Net Metering customers (generation delivered to BC Hydro in excess of the customer's total load for the year).

[3] RS 1289 customers are paid for "surplus" energy delivered to BC Hydro at the Energy Price on each customer's anniversary date. The 529 MWh of F2012 purchases would include some energy delivered in F2011. Note that approximately 80 per cent of the surplus energy purchased in F2012 came from one customer project.

5 RS 1289 - Costing Data

Table 3 below reflects the costs to BC Hydro to administer the Net Metering program. The costing data reflects the timeframe for F2013.

Table 3 Net Metering Cost Data

Activity	Estimated Costs ($000)
Administration	53
Technical Review	2
Billing	21
Metering Staff	3
Marketing	3
Engagement (external)	7
Program Review	8
Evaluation Report Preparation	28
Total Cost	**125**

The costs to administer the program have increased since the filing of the F2011 Net Metering evaluation report (which was approximately $100,000). The higher costs are in part due to an increase in applications, inquiries and projects reaching in-service which are dealt with by BC Hydro's Net Metering Coordinator. This increase in the amount of customer interactions has necessitated a full-time coordinator to respond to the demand. However, the streamlining of BC Hydro interconnection requirements (NMIR/25), including the introduction of a "small Net Metering DG" category defined as solar PV projects up to 25 kW using CSA-certified inverters, has led to a significant reduction in the amount of engineering review time. Out of the projects listed in Table 1 in section 4.2, about 90 per cent of the projects were processed via the streamlined process where no engineering review is required.

During the past year, BC Hydro has separated out the billing component of the Net Metering program in the program cost summary which is a significant cost element given that the bills are prepared manually. However, with the transition to bill automation which is scheduled to be in place later this year, BC Hydro expects to see the volume of work handled by the Billing group to decrease accordingly.

The other noteworthy Net Metering cost areas are marketing and customer engagement. The Net Metering team has been working to increase the profile of the program through the development of collateral marketing materials. BC Hydro has also been engaging key stakeholders with regard to the Net Metering program. Finally, a key expenditure over this period has been the preparation of this Net Metering evaluation report.

6 Energy Credit and Energy Price Methodology

In its May 2012 Reasons for Decision, the BCUC discussed whether or not the "Energy Credit" and "Energy Price" under RS 1289 may be too low, particularly in comparison to the perceived benefits of Net Metering distributed generation and the prices under the SOP. This section of the report addresses those issues.

6.1 Value of RS 1289: Avoided Cost and Load-Resource Balance

In assessing whether, from an economic perspective, the Energy Credit and Energy Price available under the Net Metering program are reasonable, it is important to understand the economic value of the energy generated by RS 1289 customers to BC Hydro and its non-participating customers.

Generally speaking, the economic value of customer self-generation to BC Hydro and non-participating customers is measured in terms of avoided costs because customers supply part or all of their own electricity. For example, customer self-generation may reduce forecast load that BC Hydro is expected to serve or it may appear as a supply resource, reducing the amount of electricity BC Hydro must generate or acquire. Customer generation may also allow BC Hydro to avoid or defer system costs, such as upgrades to enhance the reliability of the system in a particular area.

RS 1289 affects the load in the BC Hydro Load-Resource Balance (**LRB**) to the extent that a current RS 1289 customer's generation reduces the amount of energy delivered by BC Hydro to such customers (and the amount of energy billed at the customer meter). Historical sales to BC Hydro's customers, including RS 1289 customers, are one of the key drivers for forecasting future expected electricity demand. However, the impact of RS 1289 customer generation on the load forecast is inconsequential, given the size of BC Hydro's system and the very small amount of installed RS 1289 generation (1.1 MW). On the supply side, BC Hydro does not include surplus RS 1289 electricity in its LRB portfolio of existing or planned resources given the nature of RS 1289 and the associated small volume of energy.

Under RS 1289, customers are not obligated to generate any electricity. In F2012, the total energy purchases from RS 1289 customers was about 0.5 GWh.

To BC Hydro's knowledge, there are no material system costs that have been avoided or deferred due to RS 1289 generation.

At this time, the installed capacity of RS 1289 generators and the volume of energy generated by those customers is simply too small to result in any appreciable avoided cost benefits to BC Hydro and other ratepayers, both in terms of the impact on BC Hydro's LRB and avoided system costs.[4] As participation in RS 1289 expands and the energy volumes grow, BC Hydro will continue to monitor the value of RS 1289 electricity to BC Hydro and non-participating customers and consider its impact on the LRB and other costs.

The remainder of this section of the report discusses the Energy Credit and the Energy Price applicable to RS 1289.

6.2 Energy Credit

As noted, the primary purpose of RS 1289 is to allow a customer to install and interconnect small, clean distributed generation to meet the customer's own electricity requirements. From an economic perspective, the main benefit to most RS 1289 customers is avoided electricity payments to BC Hydro.

The majority of customers under the Net Metering program are either receiving electricity service from BC Hydro under the residential service or small general service rate schedule in Rate Zone I. As of April 1, 2013, residential service rates for customers are 6.9 cents per kWh for the first 1,350 kWh for customers billed bi-monthly and 10.34 cents per kWh for any additional energy consumption. The small general service rate is currently 9.28 cents per kWh.

BC Hydro is only able to estimate the average Energy Credit benefit realized by residential or commercial customers because BC Hydro and Net Metering

[4] In its F2011 Net Metering Application (page 4), BC Hydro stated that the avoided costs were in the range of $55,000 based on certain favourable assumptions. These dollar amounts demonstrate that the avoided costs to BC Hydro and non-participating ratepayers are minimal.

customers do not meter how much electricity the customer generates or the amount of electricity the customer uses. BC Hydro only meters the amount of electricity that is exported from the customer to BC Hydro's system, and the amount of electricity that BC Hydro delivers to the customer. As such, the following analysis assumes an "average" RS 1101 (residential service) and RS 1300 (small general service) customer load. For simplicity, the calculations assume a flat load and generation profile throughout the year.

Average residential customer consumption in F2012 was approximately 11,000 kWh per annum or 1,830 kWh bi-monthly. Table 4 below shows a simple example of an estimated bill amount for the Energy Charge portion only (before any applicable taxes) for the average residential customer under RS 1101 with a bi-monthly load of 1,830 kWh. The table also shows the value of the Energy Charge and Energy Credit, expressed in $ per kWh.

Table 4 Bill Example for Residential Service Customer

	Net Metering Energy Charge/Credit and Analysis RS 1101 Residential Service Customer				
Percentage of Customer Self-Generation to Load (%)	0	25	50	75	100
Customer Bi-monthly Load (kWh)	1,830	1,830	1,830	1,830	1,830
Customer Bi-monthly Self-Generation (kWh)	0	458	915	1,372	1,830
Customer Bi-monthly Load Net of Self-Generation (kWh)	1,830	1,372	915	458	0
RS 1101 Energy Charge Step 1 ($0.0690/kWh) ($)	93	93	63	32	0
RS 1101 Energy Charge Step 2 ($0.1034/kWh) ($)	50	2	0	0	0
Bi-Monthly RS 1101 Energy Charge Total ($)	143	96	63	32	0
Annual RS 1101 Energy Charge Total ($)	857	573	379	190	0
Estimated RS 1289 Energy Charge/Credit per Annum	0	284	478	667	857
Estimated RS 1289 Energy Charge/Credit per kWh ($)	0	0.103	0.087	0.081	0.078

Average small general service customer consumption in F2012 was approximately 23,000 kWh per annum or 3,833 kWh bi-monthly. Table 5 below shows a simple example of an estimated bill amount for the Energy Charge portion only (before any applicable taxes) for the average Small General Service customer under RS 1300 with a bi-monthly load of 3,833 kWh.

Table 5 Bill Example for Small General Service Customer

	Net Metering Energy Charge/Credit and Analysis RS 1300 Small General Service Customer				
Percentage of Customer Self-Generation to Load (%)	0	25	50	75	100
Customer Bi-monthly Load (kWh)	3,833	3,833	3,833	3,833	3,833
Customer Bi-monthly Self-Generation (kWh)	0	958	1,917	2,875	3,833
Customer Bi-monthly Load Net of Self-Generation (kWh)	3,833	2,875	1,917	958	0
RS 1300 Energy Charge ($0.0928/kWh) ($)	356	267	178	89	0
Bi-Monthly RS 1300 Energy Charge Total ($)	356	267	178	89	0
Annual RS 1300 Energy Charge Total ($)	2,136	1,602	1,068	534	0
Estimated RS 1289 Energy Charge/Credit per Annum ($)	0	534	1,068	1,602	2,136
Estimated RS 1289 Energy Charge/Credit ($/kWh) ($)	0	0.093	0.093	0.093	0.093

The above tables demonstrate, based on some simple assumptions, that a typical residential customer would enjoy an Energy Credit of between 7.8 and 10.3 cents per kWh, depending on the amount of energy generated and small general service customers would receive an Energy Credit equivalent to the same 9.3 cents per kWh rate they pay for electricity. In BC Hydro's view, the Energy Credit is reasonable and appropriate, given the nature and purpose of RS 1289 and the value to BC Hydro and non-participating customers.[5]

[5] For comparative purposes, the SOP prices (2010$) were approximately 9.5 to 10.4 cents per kWh, depending on the region. The RS 1289 Energy Price is 9.99 cents per kWh (2011$).

6.3 Energy Price

The Energy Price is paid to RS 1289 customers if, over the course of a year, the customer delivers more energy to BC Hydro than BC Hydro delivers to the customer. Very few customers receive Energy Price payments. As stated in section 4.3, in F2012, BC Hydro purchased approximately 0.5 GWh of surplus generation from 13 RS 1289 customers and one customer project accounted for about 80 per cent of those purchases.

BC Hydro calculated the RS 1289 Energy Price of 9.99 cents per kWh[6] on a very simple basis in accordance with B.C. Government policy and the overarching principle of rate simplicity. Specifically, Policy Action No. 11 of the 2007 BC Energy Plan provides that Net Metering prices should be "generally consistent" with SOP prices. The Energy Price is the same for all RS 1289 customers – this is consistent with the government's policy of "postage stamp" rates.

A fundamental premise of RS 1289 is rate simplicity. In establishing RS 1289, BC Hydro has not adjusted for losses, network upgrades or the cost of incremental firm transmission, as it does for SOP energy prices, because BC Hydro wanted to keep the RS 1289 Energy Price as simple as possible. As a result, some RS 1289 customers receive a somewhat better price than the SOP participants and some RS 1289 customers receive a somewhat lower price than the SOP, depending on the region.[7] In BC Hydro's view, this is consistent with the government policy direction that the Net Metering Energy Price be generally consistent with the SOP prices. In any event, even if BC Hydro allowed adjustments for losses without including other considerations such as network upgrades and firm transmission, the

[6] Consistent with the 2011 SOP Report, BC Hydro used the SOP starting price of $117.76 per MWh (2009$). No deductions or additions were made for losses, network upgrades, or the cost of incremental firm transmission. BC Hydro used the non-firm energy price of $48.84 per MWh (2009$) and applied the SOP assumption that energy is 70 per cent firm and 30 per cent non-firm. All amounts were adjusted for inflation to 2011$. The price of 9.99¢/ kWh was calculated as follows: (0.7)*($117.76) + (0.3)*($48.84), adjusted to 2011$.

[7] The assumption of 70 per cent firm and 30 per cent non-firm is generous to RS 1289 customers. In the 2011 SOP Report, BC Hydro noted that it had determined the 70 per cent firm assumption for SOP based on the fact that 93 per cent of SOP applications by capacity were small hydro projects and prior studies had indicated that 70 per cent firm was a reasonable proxy for small, intermittent hydro. This is not the case for RS 1289. As of March 2013, about 88 per cent of projects (RS 1289 customers plus applicants) were photovoltaic. In B.C., small-scale photovoltaic technology is approximately 10 per cent firm.

impact on the Energy Price would be marginal (e.g., - 0.57 to + 0.16 cents per kWh). In BC Hydro's view, including losses in the Energy Price would not have any appreciable impacts on RS 1289 participation rates, installed capacity, and total energy generation.

BC Hydro's view is that the current Energy Price for its Net Metering program is simple, fair and reasonable and consistent with B.C. Government energy policy.

7 Benchmarking

7.1 Benchmarking Analysis

BC Hydro undertook a benchmarking study to examine net metering practices in other jurisdictions in North America. This study explored the types of programs offered, customer uptake, marketing efforts, process requirements/associated costs, project size thresholds and energy prices. Not all jurisdictions have the same type of net metering offering as BC Hydro, therefore, the comparisons are not “apples to apples” but the eligibility criteria and other program requirements provide useful information.

The table below lists the 13 jurisdictions and 18 utilities that were included in BC Hydro’s benchmarking study.

Table 6 Jurisdictions/Utilities Surveyed for Benchmarking Analysis

Jurisdiction	Utility
Canada	
Nova Scotia	Nova Scotia Power
Quebec	Hydro-Quebec
Ontario	Ontario Power Authority
Manitoba	Manitoba Hydro
Saskatchewan	SaskPower
Alberta	ENMAX, EPCOR and ATCO
British Columbia	FortisBC
United States	
California	Southern California Edison Pacific Gas & Electric San Diego Gas & Electric
Oregon	Portland General and PacifiCorp
Washington	Puget Sound Energy
Vermont	Green Mountain Power
New Jersey	Public Service Enterprise Group
Florida	Florida Power & Light

The full matrix spreadsheet of all the utilities explored can be found in Appendix D. The key findings of this jurisdictional analysis are discussed below.

- Size Limit – Many jurisdictions have tiered net metering programs to allow for a range of projects from very small to relatively large (up to 1 or 2 MW). The tiered programs can generally be classified into three categories:
  - Small - 10 kW to 30 kW
  - Medium - 50 kW to 100 kW
  - Large - 101 kW to 2,000 kW
- Eligibility – All Canadian jurisdictions require the power generation to come from clean resources, except for Manitoba. This requirement also holds true for most U.S. jurisdictions, although in Florida and New Jersey the clean criterion is tied to the incentives rather than being part of the net metering rules. The most common technology used for net metering purposes is solar with wind generation also being prominent in a few jurisdictions.
- Load Restriction – Generator size is restricted to customer load levels in about one-half of the jurisdictions surveyed, including Nova Scotia, Alberta, California and Florida. In the other jurisdictions (including B.C.), the amount of electricity generated can exceed the customer's load.
- Incentives – Most Canadian utilities do not offer Net Metering incentives except for Saskatchewan and Ontario. Saskatchewan offers a low interest rate reduction on loans and a rebate program whereas Ontario's MicroFIT program offers a relatively high energy price. Conversely, most U.S. jurisdictions provide grants based on generator size and tax credits/exemptions at both the federal and state levels. For example, California offers a solar incentive of $200 per kW installed whereas New Jersey provides a sales tax exemption for solar projects.

- Marketing – Virtually all North American utilities have dedicated websites for their net metering programs. Most of the utility websites in the U.S. and Canada tend to be well designed and organized with quick access for interested customers.
- Energy Credit – Net metering customers who offset all or part of their load avoid paying retail electricity rates to the utility. For residential customers in Canada, this avoided cost ranges between 7 to 13 cents per kWh, whereas in the U.S. the avoided rate is between 7.5 to 30 cents per kWh, with California having the highest residential rates.
- Energy Price – About two-thirds of the surveyed utilities compensate net metering customers for energy generated in excess of their load. Canadian utilities tend to pay market prices for excess generation whereas most of the U.S. utilities pay retail electricity rates, except California which uses spot market prices and Oregon, New Jersey and Florida which pay avoided cost rates.
- Application Process –The time required by most North American utilities between application and operation is typically about one month for smaller projects and two to three months for larger, more complex projects. The application cost for interconnecting a net metering generator varies between zero for smaller projects (e.g., Alberta and Nova Scotia) and up to $1,000 or more for larger generator projects (e.g., Florida).
- Utility Upgrades – To accommodate net metering customers, utilities typically need to change out meters and install transfer/feed protections. In most jurisdictions, these upgrade costs are borne by customers other than in Quebec, Alberta and California where customers are only charged for extraordinary or unique costs.
- Interconnection Requirements

- Most utilities do not have specific “net metering” technical requirements; instead they have a series of requirements that become more complex depending on the size of the generation and technology (e.g., inverters, synchronous generators). The technical interconnection requirements are generally used to ensure that generator interconnections do not negatively impact the safety and reliability the utility's system.
- Utilities follow industry standards for distributed generator interconnections with Canadian utilities adhering to CSA C22.3 No. 9-08 whereas U.S. utilities use IEEE 1547. There are very few differences between these two standards. All utilities follow standards relating to voltage and frequency protection settings, intertie protection relays, distribution system characteristics, interconnection transformer winding configuration, temporary overvoltage requirements, and power quality requirements.
- BC Hydro's interconnection requirements are generally in line with, or less onerous than, those of other jurisdictions. Most jurisdictions require documentation, such as single line diagrams and site plans for all net metering applications. One difference between BC Hydro and other utilities is the requirement for a utility accessible visible disconnect switch for small net metering inverters. Many utilities (e.g., Southern California Edison) require a separate switch to be located beside the revenue meter. BC Hydro has no specific requirements for the location of the switch other than that it meets the Canadian Electrical Code.
- Another difference is the size threshold between simplified interconnection requirements and more complicated requirements. Interveners have raised the argument that other jurisdictions have larger size thresholds for their net metering programs and have drawn the conclusion that the technical interconnection requirements must be simpler for the larger size. This is not always the case, with jurisdictions and utilities such as Ontario and PG&E

having simplified requirements for interconnection up to 30 kW and more rigorous interconnection requirements beyond that threshold.

7.2 Net Metering Programs with Highest Customer Uptake Rates

As indicated in the table below, the net metering programs with the highest uptake rates in North America appear to be those found in California and Ontario. Uptake is calculated by taking the number of net metering participants as a percentage of the total number of customers in each utility's service area.

Table 7 Uptake Rates for Net Metering Programs

Jurisdiction	Net Metering Customers	Total Customers (million)	Uptake (%)
California	139,000	11.8	1.18
Vermont	1,000	0.3	0.40
New Jersey	12,000	3.3	0.36
Oregon	4,200	1.4	0.31
Washington	1,250	1.0	0.12
Florida	4,000	9.7	0.04
Ontario	22,521	4.8	0.47
Saskatchewan	400	0.5	0.06
Alberta	400	1.2	0.03
BC Hydro	228	1.8	0.01

The net metering programs with the highest uptake rates are located in the most populous regions of the U.S. and Canada. The main driver for the relatively higher uptake rates appears to be the relatively higher retail electricity rates (in comparison to BC Hydro) combined with attractive net metering incentives. California has the highest residential electricity rates of the utilities surveyed and also offers attractive solar grants combined with federal income tax credits. Ontario offers generous electricity prices under its MicroFIT program, which is not a true net metering program.

7.3 Comparative Terms and Conditions

The following table compares the key terms and conditions of BC Hydro's RS 1289 tariff with the relevant provisions of other net metering programs in North America. Summarized below are some of the findings regarding program eligibility, energy pricing and technical interconnection requirements.

BC Hydro's Net Metering program is similar to other jurisdictions in that it is readily available to those residential and commercial customers that are interested in installing renewable energy generation to displace their electricity consumption. However, BC Hydro's 50 kW size limit is lower than other Canadian provinces (e.g., Nova Scotia and Alberta) or most of the surveyed U.S. states, where net metering projects can be larger.

Net metering customers in all jurisdictions benefit by avoiding the payment of retail rates for the electricity they generate. For residential customers, the avoided electricity rates vary from 7.5¢ to 15¢ per kWh across North America and are as high as 30¢/kWh in California. If a customer's annual generation exceeds its load, only about one-half of the utilities surveyed pay for such excess generation. In Canada, the energy prices paid by utilities such as BC Hydro for excess electricity are at or above retail rates whereas the prices paid in the U.S. are relatively lower and often linked to avoided wholesale or spot market costs.

Regarding interconnection requirements, BC Hydro is similar to most other jurisdictions (except Nova Scotia and Saskatchewan) in that the utility bears the cost of installing new meters. As for other equipment and other interconnection upgrades, BC Hydro's approach is relatively simple compared to other utilities, likely a consequence of the small 50 kW size limit prescribed in its RS 1289 tariff.

Table 8 Net Metering – Comparative Terms and Conditions

Term/Condition	BC Hydro - RS 1289	Other Jurisdictions
Availability	Available to any residential or general service customer who installs an electricity generating facility to serve all or part of its load	For most U.S. states, residential, commercial and industrial customers are eligible Primary purpose of most Net Metering programs is to offset customer's electricity consumption; thus, several jurisdictions have load-related restrictions
Eligible Resources	Clean or renewable energy resources including biogas, biomass, geothermal, hydro, solar or wind	Most Net Metering programs are focused on renewable energy Many U.S. states target solar projects with the aid of grants, rebates and tax incentives
Project Size	Nameplate rating of generator must be not more than 50 kW	Maximum size for smaller tier in most North American jurisdictions ranges between 10 kW to 150 kW Larger-sized tier in Nova Scotia, Alberta and Nova Scotia is capped at 1 MW whereas Oregon, New Jersey and Florida allow projects of up to 2 MW
Location	Generating facility must be located on land owned or leased by a residential or commercial customer	Many states (e.g., Oregon) allow the aggregation of meters at a given customer site
Energy Charge	Energy charge is valued at the customer's current rate schedule; most common rate schedules are: • Residential – 6.9¢ per kWh for first 1,350 kWh and 10.34¢/kWh thereafter • Small General Service – 9.3¢ per kWh	Customers typically receive retail prices for electricity generated since they are charged only for net usage Residential rates range from 7.5¢ to 15¢ per kWh in most jurisdictions; however, second-tier residential rates in California are 30¢ per kWh
Energy Price	For surplus generation balance at end of each year, BC Hydro will pay customer 9.99¢ per kWh	About ½ of utilities surveyed (e.g., Saskatchewan and Oregon) do not pay for excess generation at end of year In Canada, higher market-based prices are paid for excess energy while lower avoided cost rates are used in the U.S.
Billing	Any monthly excess energy is applied against customer's future bills	Most jurisdiction allow monthly energy credits to be carried forward to the next month's bill True-up of energy credit balance typically occurs at the end of a calendar year or a 12-month billing period
Metering	BC Hydro will supply and install a bi-directional meter or separate inflow and outflow meters	For North American utilities, the meter change-out cost is borne by the utility; only Nova Scotia, Saskatchewan and Ontario require the customer to pay for the new meter
Interconnection Requirements	Customer will install (at its cost) the meter base, wiring, protection-isolation devices, disconnect switches and other equipment as required by NMIR/50	Many North American utilities require the customer to install a visible and accessible disconnect switch Some Canada utilities require anti-islanding protection
Contractual Arrangement	The interconnection terms and conditions are embedded into the RS 1289 tariff	Other jurisdictions require a separate interconnection contract, with a minimum term of 1 to 2 years
System Upgrades	Upgrade requirements are minimal with no cost to the customer	Upgrades can include transfer trips, feeder protection and transformer replacements with some costs charged to customer

8 Barriers to Developing Small-Scale DG Projects

BC Hydro examined the economic and other barriers faced by customers in connecting small-scale clean DG projects sized at less than one MW. This section identifies the barriers and suggests potential solutions.

8.1 Identification of Barriers

BC Hydro held a series of workshops and meetings to identify and assess the barriers to developing small-scale generation projects. This data has informed BC Hydro's recommendations regarding realignment of its existing programs to support cost-effective, small-scale DG projects with customers.

BC Hydro assembled an internal team to consider the barriers to developing small-scale DG projects. The Net Metering team comprised of representatives from the Distribution Generator Interconnections, Distribution Planning, Energy Procurement, Legal and Regulatory groups. This team also worked with Revenue Metering, the Smart Metering Initiative, Finance, Power Smart and Energy Planning to identify solutions for overcoming the identified barriers.

During BC Hydro's consultation process, participants identified several barriers to connecting small-scale DG projects (refer to Appendix E). These barriers included:

- Cost of revenue metering required for the SOP
- High cost of interconnection studies and subsequent upgrades
- Payment schedule for the interconnection upgrades
- Interconnection requirements too costly
- Contract term too long
- Relatively low price escalation rates
- Insufficient price (noted for anaerobic digesters in particular)

- The SOP process was considered onerous for smaller DG projects (e.g., smaller than one MW)

Criticisms raised in regard to the existing Net Metering program include:

- The 50 kW cap is too small
- Customer bills are delayed and often inaccurate and customers cannot access their accounts on-line
- Permitting at the municipal level for solar projects results in additional costs
- Lack of standardization of equipment for interconnection
- Lack of marketing of the program
- Lack of educational materials that contribute to a lack of understanding by customers around what net metering means

8.2 Solutions to Identified Barriers

Table 9 and Table 10 below summarize BC Hydro's efforts to explore solutions to the criticisms and barriers raised by the BCUC and throughout the stakeholder engagement process. The Net Metering team reviewed project-specific data with proponents to identify where the concentrations of costs and impacts occurred and how these could be reduced or deferred, a summary of these discussions can be found at Appendix E. Furthermore, BC Hydro identified possible improvements to existing processes using the criteria laid out by the BCUC, namely:

- Not impose any unnecessary economic or other barriers to ratepayers seeking to install small-scale clean DG
- Not incur any substantial cost on the utility
- Interconnection must be safe, but interconnection rules must not be excessive or burdensome

BC Hydro also used two additional criteria:

- Consistency with government policy
- Consistency with the purpose of Net Metering namely, to provide customers with a simple rate to allow them the opportunity generate electricity primarily for their own consumption

1 **Table 9 Barriers to Small-Scale Projects < 1 MW**

Barrier	Description of Issue	Impact of issue	Barrier Reduced/Removed	Economic Benefits to Developers and BC Hydro	Interconnect Safely/Reliably	Estimated Timing	More Study Required
Cost of revenue metering	Meter costs to install and monthly lease fees too high	Seen by developers as financial barrier to small-scale projects	Exploring use of Smart Meters to be used in lieu of revenue meters; will result in eliminating delivery requirements and moving to monthly downloads	Enhances economic benefit to participant Neutral impact to BC Hydro	N/A	Fall 2013	Cost analysis and transition
Uncertainty and high cost of interconnection studies	Study costs are high and not always conclusive	Seen by developers to be financial barrier and risk given uncertainty of costs to interconnect	Explore use of flat fee for service;this will provide a set fee study and enable an earlier go/no go decision for the developer	Enhances economic benefit to participant Impact to BC Hydro still under review	Yes	Fall 2013	Further analysis required to understand the impacts on BC Hydro interconnections processes and demands on interconnection resources
Uncertainty and high cost of system upgrades	Costs of upgrades are high, and security is required early in the process tying up capital	Seen by developers as black box and security for upgrades upfront cause hardship on developer	Exploring options to pay upgrade costs later in project stage, e.g., at COD	Enhances economic benefit to participant Impact to BC Hydro still under review	Yes	Fall 2013	Understand risks to BC Hydro and ratepayers for stranded assets or non-payment if developers unable to pay or cancel projects
Contract term, length and inflexibility	25- 40 year contract too long	Limits participation of some small commercial and municipal government who must hold a referendum to sign contracts > 5years	Design contracts with more flexible contract terms 5-year with evergreen clause	Impact to BC Hydro and participants under review	N/A	Fall 2013	Confirm ability to reduce contract terms and understand impacts to BC Hydro and customers
Inflation in SOP	BC Hydro's 50% CPI in the SOP process causes financial barrier for some small developers	With small projects, the ratio of operating costs to revenue is very high; much higher than multi-megawatt projects	Consider lower energy price to small-scale developers while increasing CPI to 100%	No decision has been made on CPI treatment	N/A	Fall 2013	Requires further study to understand financial risk to BC Hydro and ratepayers if payment changes
Onerous SOP Process	Developers claim that the SOP process is onerous for small-scale projects	Capital and resource Intensive	Consider developing separate stream for small-scale projects; increase cap of Net Metering	Enhances economic benefit to participant Neutral impact to BC Hydro provided no cost shifting or change in risk allocation		Design of new micro offer 2014 Amendments to existing Net Metering by Winter 2013/Spring /2014	BC Hydro is exploring the development of micro SOP type of offer BC Hydro is also exploring increasing the cap of the current Net Metering program up to 100 kW

Table 10 Criticisms and Barriers with Net Metering

Barrier	Description of Issue	Impact of issue	Barrier Reduced/Removed	Economic Benefit to Participants and BC Hydro	Interconnect Safely/Reliably	Estimated Timing	More Study Required
Increase Net Metering project cap from 50 kW	Current project size is too restrictive	May impact policy; interconnection processes, cost; potential cost shifting to customers; safety and reliability issues	Explore possibility of raising project cap to 100 kW for general service customers	Enhances economic benefits to participant Impact to BC Hydro not fully understood	Further study is required	Fall 2013	Understand impacts on BC Hydro system, and ratepayers Further cost analysis required
Billing practices	Net Metering customers are billed manually, inability for customers to access their bills online, and practices are inconsistent across customer programs	This often results in delays and inaccurate bills; inconsistent billing practices	BC Hydro has initiated automated billing that will correct bill information, and address delays; make BC Hydro billing practices consistent and provide online accessibility to customers	N/A	N/A	Spring 2013	None
Lack of standardization of interconnection equipment	Net Metering contractors and installers have asked if BC Hydro can standardize interconnection equipment	Result in increased process time, number of parties involved to approve or sign off the installation. Increases costs and resources	BC Hydro has had some success with our simplified connection rules for inverter- based systems PV; however, BC Hydro will explore how we can work more closely with industry groups to standardize interconnection equipment	Enhance long-term economic benefit to participant and decreased BC Hydro administrative cost	Yes	Near Term	More collaboration required with industry groups
Municipal permitting for solar PVs is onerous	Contractors/ installers indicated that solar PV permit requirements for both building and electrical are often extraneous and inconsistent across municipalities	Results in increased costs and resources	Develop collateral materials that explain the Net Metering program to municipalities including the impacts of solar PV and the benefits of standardizing requirements	Enhance economic benefit to participant Neutral impact to BC Hydro	Yes	Fall 2013	More collaboration required with Local Governments

Barrier	Description of Issue	Impact of issue	Barrier Reduced/Removed	Economic Benefit to Participants and BC Hydro	Interconnect Safely/Reliably	Estimated Timing	More Study Required
Lack of marketing	Net Metering contractors, installers and customers have asked for heightened profile for Net Metering program	Low profile, may result in low participation and low interest in program may result in cancellation	BC Hydro has developed a new website, profiled 3 Net Metering customers internally and externally; developed material for dispersal at Power Smart Outreach booths across province; and undertaken a Power Poll survey	N/A	N/A	Ongoing	BC Hydro has developed a communications and marketing plan; will monitor results to determine need for additional marketing
Lack of educational materials	Net Metering contractors, installers and customers have asked more educational material to promote and explain the Net Metering program	Lack of educational material results in uninformed customers with unrealistic expectations about the Net Metering program	BC Hydro has committed via the development of more educational material to increase our outreach in this area and work with contractors, installers and local governments to streamline the requirements, as appropriate	Greater education will enhance participants' understanding of program and benefits	May improve understanding of the interconnection process and requirements	Fall 2013	Work collaboratively with contractors, installers and customers on educational material
Interconnection requiremenst too costly, e.g., utility grade relays for induction and synchronous machines	Developers claim utility grade relays are expensive.	BC Hydro requires utility grade relays	BC Hydro is in the process of modifiying the definition of utility grade relay to allow for larger selection of relays; this increases the number of low cost acceptable relays	Enhances economic benefit to participants Neutral impact to BC Hydro with no cost shifting or change in risk allocation	Still maintains safety and reliability	Completed in Net Metering Interconnections Requirements document May 2013	N/A

Table 11 Impacts of > 100 kW DG on BC Hydro's System

DG Impacts	Impact on Safety, Reliability & Power Qualtiy	Study Required	Potential BC Hydro System Upgrades
Increased Short Circuit Current	Desensitizes feeder protection Desensitizes substation protection May exceed equipment ratings causing safety issues. To mitigate this impact BC Hydro needs to upgrade its system	A number of studies need to be completed including: • Short Circuit Study • Feeder Protection Study • Substation/Line Protection Study	To ensure a safe and reliable system, the following upgrades may be required: • Upgrade feeder and substation protection / Add CTs and VTs • Add or upgrade re-closers • Add Current Limiting Reactors • Replace under-rated equipment • Neutral Grounding Reactor at Generator These costs are estimated at $100,000 or higher per project
Power Injection to the BC Hydro System	Reverse Power Flow through devices This creates potential safety issue for BC Hydro's line crew because our equipment may not operate properly, e.g., unintentional islanding can result in a generator operating on a circuit that BC Hydro believes is de-energized; it can also damage other customer's sensitive electronics or appliances in the surrounding area	A number of studies need to be completed including: • Feeder Load Flow Study for every feeder that has a generator application in place	To maintain a safe system, BC Hydro may require the following upgrades: • Add supervised closing of substation breakers (requires new protective relay and voltage transformers) • Replace circuit re-closers for reverse power flow and sync check capability • Replace voltage regulators and modify voltage regulation controls. • Protection changes • Voltage regulation control changes These costs are estimated > $100,000 or higher per project
Equipment Loading	Increased power flow may exceed equipment thermal ratings and result in capacity issues. To mitigate, BC Hydro would need to increase the capacity of the system; this could include replacing overhead conductors	A number of studies need to be completed including: • Load Flow Study • Review of Equipment Ratings	To ensure the capacity of the system is maintained, BC Hydro may require the following upgrades: Various equipment upgrades such as conductor replacement, transformer replacement, and voltage regulators These cost estimated at approximately $180,000 per Km to replace conductors
Temporary Overvoltage	Generators can raise the voltage above equipment ratings damaging our equipment and sensitive electronic equipment of surrounding customers; this is a safety and system equipment impact	A Temporary Overvoltage study would need to be competed	To ensure the safety and maintain the integrity of the system, the following upgrades may be required: • Transformer winding connection • Grounding transformer These upgrades will cost ~ $20,000-30,000 depending on size of transformer
Power Quality	Generators can cause fluctuations in our system, resulting in the following service impacts: • Flicker • Voltage Rise/Regulation • Harmonics • Sags/Swells	A number of studies need to be completed including: • Load Flow • Inrush and Flicker Study • Harmonic Study	To ensure continued high quality service to our customers, the following upgrades may be required: • Various line and equipment upgrades • Replace Distribution Transformers These cost estimates are approximately $10,000- $1 million depending on location and length of line to be replaced

8.3 RS 1289 Eligible Generator Size

Under RS 1289, a customer must use a generator with a capacity of 50 kW or less. This limit has been in place since RS 1289 was implemented. Today, customers who wish to install small DG generators above 50 kW may participate in the Standing Offer Program (up to 15 MW). However, some interested parties who wish to install generators greater than 50 kW have expressed the view that the SOP process is too burdensome and costly for small-scale DG and, as such, have argued that the 50 kW limit for RS 1289 should be increased. Some have asked that the RS 1289 eligible generator size be increased to as much as 500 kW (0.5 MW).

The purpose of this section of the report is to address this concern.

8.3.1 Considerations – RS 1289 Generator Capacity

In addition to the considerations set out in section 8.2, BC Hydro assessed the impact on reliability, technical and safety issues related to the distribution system if the size of an eligible RS 1289 generator is increased. Table 11 above provides a brief overview of the potential upgrades that may be required if the project size were to increase beyond 100 kW. However, it is important to note, that size is only one of the criteria to be considered, with project location, technology and existing equipment also potentially impacting BC Hydro's distribution system.

The following are a few key issues:

- The BC Hydro distribution system is not uniform and installing larger generation may have impacts depending on its location. The BC Hydro system has physical capacity limitations that restrict the amount of power that can be transferred through the distribution feeder. The power is limited by the conductor and equipment ratings, the system stiffness,[8] and the delivery of electricity by Independent Power Producers (**IPPs**). There are several

[8] System stiffness is defined as ability of the distribution system to resist voltage changes cause by adding generation. It is related to the available short circuit current and the generator size.

substations in B.C. that have more IPP generation than load, and the transformers operate near their maximum ratings during spring freshet. For these substations, it may not be possible to add any additional Net Metering generation without upgrading the substation transformers.

- The other physical limitation is the short circuit current rating of the existing equipment and the feeder protection. Adding generation, especially synchronous and induction machines, increases the short circuit current. Increased short circuit current can exceed equipment ratings and impact the feeder and substation protection and cause safety issues. In many cases with larger projects, substation and feeder protection needs to be replaced to accommodate the generation.
- BC Hydro's primary distribution system is a four-wire grounded system. Because of this, the system must remain effectively grounded with the customer's generator connected. If not effectively grounded, BC Hydro's system could experience temporary over voltages that would damage its equipment as well as sensitive customers' electronic equipment and appliances in the surrounding area. This is especially critical for projects over 100 kW.
- BC Hydro's technical interconnection requirements are used to ensure that generator interconnections do not negatively impact the safety and reliability of its system. If the customer follows the requirements during design, construction, and operation then the safety and reliability of the BC Hydro system should not be compromised. For projects above 100 kW, BC Hydro expects that customers will engage qualified engineers to ensure that the generator installation does not compromise the safety and reliability of the BC Hydro system.
- Customers must also maintain and test their DG systems in order to keep them in working condition. This is a concern, especially with induction and synchronous generators, with owners who are not familiar with generators and

protective relays and who may not adequately test and maintain their systems. If the interconnection protection devices fail to operate during a fault, this could cause a safety issue and potentially damage other customers' sensitive electronics and appliances.

- BC Hydro's distribution system is generally designed for power flow from the substations to the loads. Introducing DG often introduces a two-way power flow that requires system upgrades.

Due to the variability of the system, it is difficult to set a size threshold which would trigger material system upgrades or other issues (e.g., safety concerns). BC Hydro believes that the Net Metering program can sustain an increase up to 100 kW if the increased generation is primarily to offset a customer's own load.

8.3.2 Eligible Generator Size: Residential Service Customers

BC Hydro believes that the 50 kW generator size is generally appropriate for RS 1289 residential service customers because:

- RS 1289 is a simple, straightforward tariff intended for residential customers who wish to supply their own electricity needs. RS 1289 was never intended to be an energy acquisition process which encourages customers to install excess generation capacity for the purpose of selling surplus electricity to BC Hydro.
- A generator of 50 kW corresponds to a 200-amp, 240-volt service, which represents a typical new residential service size
- A 50 kW generator size is more than sufficient to generate electricity for a typical residential customer. Therefore, increasing the generator size may result in increased sales of surplus energy at the RS 1289 Energy Price which would impose an increased cost on BC Hydro and its non-participating ratepayers in the current environment (i.e., BC Hydro has sufficient planned and committed resources to meet the needs of its customers in the near future).

8.3.3 Eligible Generator Size: General Service Customers

BC Hydro acknowledges that there may be situations where a General Service rate customer may have loads that are larger than the 50 kW RS 1289 generator size limit, particularly where the customer has several accounts (e.g., municipal or institutional customer or a First Nations community). As such, consistent with the purpose of RS 1289, BC Hydro is considering an increase in the eligible generator size for RS 1289 General Service customers to 100 kW for the purpose of allowing those customers to generate electricity for their own consumption.

As noted above, from a technical and safety perspective, BC Hydro believes that the 100 kW size limit for RS 1289 General Service rate customers will still allow for simplified engineering studies and minimal risk of upgrades to the BC Hydro system provided the generation is primarily for offsetting a customer's own load. If the generator size is less than the existing customer service size, the only likely BC Hydro upgrade is the replacement of a distribution transformer for a secondary service with multiple customers.

If the generator size is increased from 50 kW to 100 kW for General Service rate customers, those customers who wish to install generators larger than 50 kW should be required to pay costs incurred by BC Hydro as a result of the larger generator to mitigate the risk of cost shifting to non-participating customers, similar to the treatment of synchronous generators and primary service customers.

8.3.4 Eligible Generators > 100 kW

BC Hydro does not support an increase in the eligible generator size above 100 kW because it is contrary to the purpose of RS 1289, may impose additional costs on non-participating customers, and may be inconsistent with the principle of rate simplicity inherent in RS 1289. More specifically:

- To maintain system safety and reliability, BC Hydro may require significant upgrades to its system, as discussed in section 8.3.1. From a safety

perspective, any increases to the short circuit current (as a result of increased injection into its system) may desensitize the feeder and substation protection and without mitigation could result in an unsafe environment.

- Generator sizes above 100 kW requires more BC Hydro system studies resulting in more upgrades and higher costs
- BC Hydro's distribution system is generally a radial system where power flows from the substation to the load. Adding generation in excess of 100 kW may change the direction of power flow, causing devices such as voltage regulators and re-closers to function incorrectly. Having large reverse power flows is likely to result in costly device replacement and BC Hydro system upgrades.
- Generator sizes above 100 kW may result in more surplus electricity sales to BC Hydro at the Energy Price which will impose additional costs on BC Hydro and non-participating customers in the current environment (i.e., BC Hydro has sufficient planned and committed resources to meet the needs of its customers in the near future).

8.4 Technical Requirements vs. Standard Design

Some customers and potential customers have commented that the Net Metering Interconnection Requirements (**NMIR**) document is too technical for the layperson. These customers are of the view that BC Hydro should have standard designs and drawings available for customers to use to develop their projects, which would reduce the engineering time required to review such projects.

This barrier applies mainly to small induction or synchronous machines because there is no industry equipment certification program for utility-connected generator systems. For utility-connected inverter based systems, there is a CSA certification program which BC Hydro uses to simplify the study and interconnection requirements.

BC Hydro is willing to work with industry associations to create a certification program for utility-connected small generator systems. Should such a certification program be started, BC Hydro would modify the NMIR accordingly.

8.5 Connection Policy and Process for Small-Scale DG

BC Hydro's connection processes will need to be modified to enable the inclusion of the proposed flat fee screening study (refer to Table 9) earlier in the process. BC Hydro anticipates that this study will result in savings in costs, resources and time for all parties.

Projects using CSA-certified inverters have the required equipment and protective functions built in. Because the manufacturers have designed and built their inverters to the applicable CSA standards, BC Hydro is satisfied that the equipment will generally operate as per the standard. This makes the installation simpler for customers and reduces the risks to BC Hydro and ratepayers, saving all parties time and money. Small inverter-based systems make up the bulk of Net Metering projects in B.C. and as a result, there is a community of experienced suppliers and installers in the province.

8.6 Regulatory Barriers for Small-Scale DG

To date, BC Hydro has not identified any major regulatory barriers to the development of small-scale DG. Some stakeholders referenced local government building and electrical permitting processes for photovoltaic generation. BC Hydro is willing to work with contractors and other interested parties to discuss the Net Metering program with local governments to the extent that would be helpful.

9 Distributed Generation Strategy

The BCUC directed BC Hydro to file a DG strategy demonstrating how BC Hydro aims to integrate clean electricity into BC Hydro's grid at customer sites. The BCUC stated that the strategy should demonstrate coordination and consistency between BC Hydro's different DG-related initiatives, including but not limited to, BC Hydro's Net Metering tariff, the SOP, and Demand-Side Management (**DSM**) programs. The strategy should also articulate clear goals and objectives for the Net Metering program.

For the purpose of this report, small-scale DG refers to Distributed Generation that has a nameplate capacity of 1 MW or less.

9.1 What is Customer Distributed Generation?

DG is, generally speaking, generation that is located at or near the point of consumption. It can be either a demand-side or supply-side resource, or a combination of the two.

DG is not a new concept for BC Hydro or its customers. For a number of years, BC Hydro has facilitated the development of customer DG projects through the award of Electricity Purchase Agreements (**EPAs**) and/or Power Smart funding incentives as well as the Net Metering, as follows:

- 2001 40 GWh RFP
- 2002 Customer Based-Generation Call
- 2006 Open Call for Power
- 2009 Bioenergy Phase 1 Call
- 2010 Community-Based Biomass Call
- 2011 Bioenergy Phase 2 Call
- Standing Offer Program up to 15 MW

- 2009-2012 Integrated Power Offer (**IPO**)[9]
- Power Smart Load Displacement Incentive Funding
- RS 1289 – Net Metering Service

Over the past several years, BC Hydro focused on encouraging the development of, or optimal use of, larger and more cost-effective industrial DG projects, such as large biomass projects. For example, BC Hydro initiated the IPO to work with its pulp and paper customers in order to optimize distributed generation and DSM at their industrial sites. This allowed BC Hydro to align with current government policy at the time to support the B.C. Government's biomass initiative and to take advantage of the Federal Government's Green Transformation Program fund.

The Integrated Customer Solutions (**ICS**) process, the successor to the IPO, targets customers interested in generating their own electricity for self-supply or sale to BC Hydro. All customer-based generation projects greater than 50 kW are intended to be evaluated via the ICS process. This single window approach to demand-side and supply-side offers ensures that optimal solutions for the customer and BC Hydro will be identified.

Project size levels are aligned to provide a distinction between RS 1289 Net Metering projects and projects that would be evaluated through the ICS. The SOP rules were revised so that all customer-based generation projects must be evaluated via the ICS process. BC Hydro's Energy Procurement and Power Smart Industrial Marketing groups work together to review proposed projects from customers through a screening process and determine the best rate, offer or program that optimizes the value to BC Hydro, customers and other ratepayers based on BC Hydro's future energy needs.

[9] In June 2009, the Federal Government introduced the $1 billion Green Transformation Program (**GTP**) which provided funding to Canadian pulp and paper companies for innovation and investment in areas such as energy efficiency and renewable energy production technologies. In mid-2009, BC Hydro initiated the Integrated Power Offer to work with its pulp and paper customers in order to optimize distributed generation and DSM at their industrial sites. BC Hydro has eight customers that received GTP funds totalling about $500 million.

9.2 Development of BC Hydro's Small-Scale DG Strategy

In late 2008, BC Hydro began formalizing, in consultation with key stakeholders, a DG Strategy to explore the opportunities for facilitating project development with customers. At that time, BC Hydro's vision was to demonstrate leadership in DG by working collaboratively with customers, industry, First Nations and other stakeholders to develop clean and renewable energy to assist in meeting the needs of customers. The intention was to look broadly at the market potential and determine how to design an efficient and cost-effective process for potential projects given BC Hydro's current suite of power acquisition offers.

The strategy identified five key drivers: customer solutions; environmental sustainability; portfolio diversification; grid performance; and economic development. Additionally, BC Hydro explored a variety of business models that could be used to advance DG opportunities with customers. These business models spanned a spectrum of options that saw BC Hydro in a variety of roles. The seven business models are: Customer Self-Generator; Customer Energy Supplier; Customer Energy Supplier (Feed in Tariff); Integrated Energy Management Solution; Joint Utility Customer Ownership; Utility-Owned Customer Directed; and Utility Aggregator. A more in-depth discussion of these business models is provided in Appendix F.

In the past, BC Hydro has utilized the following four business models: Customer Self-Generator; Customer Energy Supplier; Integrated Energy Management Solution; and Utility-Owned Customer Directed for various projects. In the future, BC Hydro may consider other models depending on project specifics and government policy.

9.3 DG Demonstration Projects

As part of its DG Strategy, BC Hydro tested the drivers, business models, technologies, and economics of potential projects to gain a better understanding of any policy and process requirements that might be needed to advance these types of projects.

The focus of the DG Strategy, at this time, was to identify small-scale DG projects. This was in part due to demand by customers to develop small-scale projects at their sites (e.g., pressure reducing valves; biomass cogeneration; and waste heat) and the fact that BC Hydro's current available offers were targeting larger-scale projects.

A number of demonstration projects from across customer groups were identified and after a preliminary screening, six opportunities were chosen in an effort to test as many of the business models as possible: a municipal project; a small commercial customer utilizing waste heat; a small industrial project utilizing biomass; an industrial project utilizing waste hydrogen; a First Nations community project targeting small hydro development; and an anaerobic digester on a mid-sized dairy farm. Five of the projects were less than 2 MW and the other was greater than 5 MW. Of these six demonstration projects, three were completed successfully (biomass, waste hydrogen and anaerobic digester).[10]

The learnings from the demonstration projects are as follows:

- A formal program or offering with a well-articulated process and milestones, would facilitate the development of small-scale DG
- The learning curve was steep for every project given that customers were not in the business of developing DG projects
- The technologies selected by customers were not always a good fit for the size of their business or their economic situation
- The initial scale and size of the projects could sometimes put the customer at a disadvantage, given that the economics of the projects would often benefit with a scaling up over time, as the customer's business grew, (e.g., additional cows would grow the dairy farm thus increasing the capacity of the anaerobic digester)

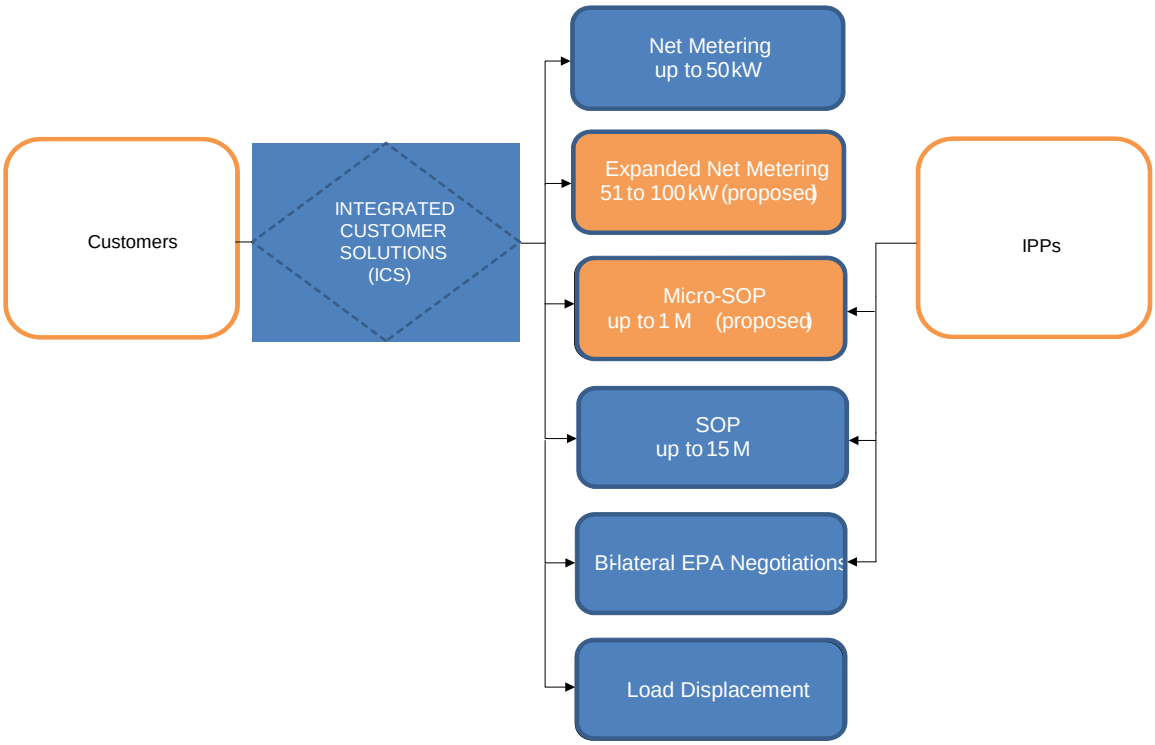
[10] The DG opportunity in the First Nations community could not proceed because of capacity issues with the BC Hydro system; the other two have not proceeded due to funding or resourcing needs on the part of the customers.

- It is challenging to monetize the reliability and capacity system benefits to BC Hydro's system that could occur as a result of a small-scale DG
- Financially, these DG demonstration projects were often at the higher end of the cost curve, reaching or surpassing BC Hydro's avoided cost of energy

9.4 Future Direction – Small-Scale DG

Based on the feedback from Net Metering stakeholders and a review of its current DG processes, BC Hydro has identified gaps between its existing processes and developed an approach on how to bridge those gaps with a seamless suite of offers that span demand-side and supply-side opportunities. The graphic below illustrates the spectrum of existing opportunities (shown in blue) and how BC Hydro can introduce potential new offers to attract smaller-sized projects (shown in orange) by tailoring specific components that result in a simple, streamlined and cost-effective process for a smaller-scale DG projects.

Figure 1 Distributed Generation Approach



9.4.1 Small Project Stream – Up to 1 MW

BC Hydro is in the process of developing a small project stream under the SOP for projects between 50 kW to 1 MW.[11] The intent of the small project stream in the SOP is to address a number of the concerns raised by stakeholders. More specifically, the small project stream will hopefully address some, if not all, of the barriers described in Table 9 without imposing significant costs on non-participating customers or compromising safety and reliability.

[11] The BCUC directed BC Hydro to consult in respect of a program with a limit of up to 2 MW. However, an upper limit of 1 MW aligns with BC Hydro's distribution interconnection requirements. BC Hydro may consider increasing the upper limit to 2 MW at a later date depending on the experience with the 1 MW limit.

The graphic above outlines an approach whereby BC Hydro can continue to ensure that ratepayers are getting the best value from BC Hydro's demand-side and supply-side offers.

This integrated DG approach is intended to remove the barriers for municipal, institutional, industrial customers and First Nations communities who have faced challenges under BC Hydro’s existing processes. It will help customers and small developers reduce their bills, enhance their self-sufficiency, and provide greater control over their energy use.

BC Hydro believes that removing barriers and streamlining the interconnection processes, coupled with the decreasing cost of DG technologies, will facilitate a steady and modest growth of the Net Metering participation rate and the number of small-scale projects.

10 Net Metering Objectives and Recommended Actions

10.1 Net Metering Objectives

Recognizing the inter-relationship between the DG offers, BC Hydro defines the following objectives for its Net Metering program:

- Continue to provide a streamlined process and simple rate
- Provide a safe and simple interconnection process that is reasonable and cost-effective
- Raise awareness of the Net Metering program
- Enable residential and small commercial customers to offset their load with clean and renewable self-generation
- Provide a program that is consistent with B.C. Government policy
- Ensure fairness to participating and non-participating ratepayers

BC Hydro does not believe that setting a specific target for the number of Net Metering projects or applicants is necessary. Research has demonstrated that jurisdictions with the highest uptake rate are those that have relatively high electricity rates and generous incentives.

BC Hydro believes that mirroring the policies of these other jurisdictions, given the current environment, is not in the best interest of BC Hydro ratepayers. BC Hydro's efforts will continue to focus on simplifying and streamlining processes and reducing costs to enable the development of cost-effective, small-scale clean or renewable DG projects including Net Metering.

10.2 Recommended Actions

Based on the objectives outlined above, BC Hydro offers the following recommended actions to improve the existing Net Metering program:

A1. Increase the Net Metering cap from 50 kW to 100 kW for General Service rate customers (e.g., commercial, institutional, industrial, municipal and First Nations customers), provided that BC Hydro is satisfied there will be no adverse cost impacts on non-participating ratepayers

A2. Automate and improve billing practices to increase accuracy, enhance online accessibility and ensure consistency with other customer programs

A3. Continue to promote Net Metering through BC Hydro's website, and by implementing the actions identified in BC Hydro's Marketing and Cmmunications plan for the Net Metering program

A4. Work with local government, contractors, installers and customers on educational materials to enhance understanding of the impacts of solar PV on the urban environment. This will include discussions around streamlining the permitting processes for small-scale rooftop PV systems.

The following recommended actions relate to improving the development process for small-scale DG projects between 50 kW and 1 MW:

B1. Design a streamlined acquisition process that supports small-scale DG projects (50 kW to 1 MW) under the umbrella of the SOP

B2. Identify opportunities to work collaboratively with industry associations to standardize interconnection equipment for small-scale DG projects

B3. Explore the replacement of revenue meters with Smart Meters to reduce costs for both customers and BC Hydro.

B4. Explore the implementation of a flat fee for interconnection studies for small DG projects (less than 1 MW) taking into consideration associated impacts to

interconnection processes, demands on interconnection resources, and cost impacts on BC Hydro and its customers

B5. Explore the possibility of deferring cost of upgrades until projects have reached commercial operation

B6. Create optional contract lengths (five, ten, 15 and up to 40 years) for small-scale projects

B7. Explore how BC Hydro applies energy price escalation rates for small-scale projects and determine if an alternative approach may be appropriate

BC hydro

Re: BCUC Order No. G-57-12

Net Metering Evaluation Report No. 3

Appendix A

Table of Concordance

BC hydro

Table of Concordance

Reasons for Decision - BCUC Report Requirements	Report Reference
Consultation (Reasons, pages 21, 23; Appendix B, directive 3): Actively solicit and record feedback at all levels of the Net Metering application process on the economic and other barriers faced by ratepayers in connecting small-scale clean DG (less than 1 MW) and receiving compensation generally consistent with the SOP price for the gross amount of energy generated. The Panel directs BC Hydro to consult with stakeholders in the preparation of the F2012 Report, and include the results of that consultation in the report.	Section 3, Appendix B and C
DG Strategy (Reasons, page 21 to 22): File a DG strategy which shows how BC Hydro aims to help integrate clean electricity into BC Hydro's grid at customer sites. This strategy should demonstrate coordination of BC Hydro's differing DG related initiatives, including but not limited to, BC Hydro's Net Metering tariff, the SOP, and DSM programs. It should also articulate clear goals and objectives for the Net Metering program.	Sections 9 and 10, Appendix F
RS 1289 Customer Data (Reasons, page 22): This should include the following: • summary of all inquiries into Net Metering • number of applications filed • number of executed agreements • Net Metering facility (type, generator rating and location)	Section 4
RS 1289 Costing Data (Reasons, page 22): • administrative, marketing, billing/meter reading costs, engineering costs • connection – additional connection costs for non-standard new connections (customer at primary voltage level or with synchronous generators) • estimated average price paid for energy generated by RS 1289 customers, by customer class (weighted average ¢/kWh Energy Credit and Energy Price, with other assumptions clearly stated).	Section 5 and 6
Energy Price (Reasons, pages 22, 25; Appendix B, directive 4): A review of the calculation of the Energy Price. BC Hydro is directed to review the calculation of the Energy Price in the next Net Metering Monitoring and Evaluation Report to determine whether it appropriately reflects all network benefits (transmission and distribution) and takes into account typical Net Metering generator location in translating a regional SOP rate to a postage stamp Net Metering rate.	Section 6
Safety/reliability (Reasons, page 22): Power quality and reliability of supply and how it affects other customers.	Section 8

Reasons for Decision - BCUC Report Requirements	Report Reference
Benchmarking (Reasons, page 22): Other utility experiences and technological advances in distributed generation. Where possible, this analysis should include the size of the Net Metering Energy Credit for residential and commercial customers in ¢/kWh. In addition, it should also contain a description of the most successful programs in North America and a comparison of the terms and conditions of RS 1289 to the terms and conditions of those programs. It should also contain a description of any incentive programs offered in those jurisdictions and marketing efforts undertaken by utilities.	Section 7 and Appendix D
Regulation (Reasons, page 22): Changes in regulatory and code requirements in B.C.	Table 10 in Section 8 and Action A4
Portfolio Planning (Reasons, page 22): Impact of Net Metering on energy portfolio planning.	Section 6
Capacity Limit (Reasons, page 22): The issues associated with changes in capacity limits or limit based on voltage in order to mitigate market barriers to small scale clean DG while limiting any negative cost impacts on non-participants.	Section 8 and Action B1
Connection policy and Interconnection Requirements (Reasons, pages 22 and 35; Appendix B, directive 12): Consideration of any other potential future changes to mitigate economic and other barriers to connection of small-scale clean DG (provided safety not compromised etc.). Analysis and recommendations of simplifying the interconnection requirements for other types of net metering installations.	Table 9 in Section 8 and Actions B2, B3, B4 and B5
Others	
Marketing (Reasons, page 38; Appendix B, directive 13): The Panel directs BC Hydro to consult with program participants in a meaningful way to identify if absence of marketing is a market barrier, and if so to develop and evaluate options to address it. BC Hydro is directed to report on this evaluation in its next Net Metering Monitoring and Evaluation Report.	Section 3, Table 10 in Section 8 and Action A3
Small-Scale DG (Reasons, page 45; Appendix B, directive 14): The Panel directs BC Hydro to further consider the issue of capacity limit. BC Hydro is directed to consult with affected market participants to identify connection related barriers to entry to small-scale clean DG less than 2 MW, develop and evaluate options to address those barriers and provide the results of this consultation in the next Net Metering Monitoring and Evaluation Report. (For the purposes of this report BC Hydro is characterizing small-scale DG as projects less than 1 MW in size.)	Sections 3 and 8, Actions A1 and B1, and Appendix E
Billing (Reasons, page 46; Appendix B, directive 15): The Panel directs an analysis of billing issues be included in BC Hydro's Net Metering and Evaluation Report.	Section 5, Table 10 in Section 8 and Action A2
Energy Credit (Reasons, page 50; Appendix B, directive 17): BC Hydro is directed to provide an analysis of the estimated Energy Credit paid to Net Metering customers in the next Net Metering and Evaluation Report.	Section 6

BC hydro

Re: BCUC Order No. G-57-12

Net Metering Evaluation Report No. 3

Appendix B

Stakeholder Meeting Notes and Comments on Draft Net Metering Evaluation

Net Metering Intervener's Meeting

2nd Floor Customer Presentation Centre

SUMMARY

September 18 , 2012 1:00 – 4:00

333 Dunsmuir Street Vancouver

TYPE OF MEETING	Meeting to communicate recent changes and work being done on the net metering program and to seek feedback from participants on the barriers to participation.
PRESENTERS	Joanne McKenna, Ryan Hefflick, Matt Good, Alevtina Akbulatova
ATTENDEES	Jim Weimer, representing CEBC, Thomas Hackney, BCSEA (over the phone), Ethan Werner, CH4, Eric Redmond
BC HYDRO	Linda Sahota
OBJECTIVES	To provide: · an update on the Net Metering Tariff revisions, · an overview of the jurisdictional work completed to date, · consultation going forward, · a discussion regarding the existing interconnections process, · potential changes to this process with project size increases, and · technical constraints and barriers to developing small projects in the 50kW -2MW size threshold.
AGENDA	1. Welcome 2. Introductions 3. Changes to Net Metring 1289 Tariff (NMIR/50) 4. Overview of Jurisdictional Findings 5. Existing Interconnections Process 6. Potential Challenges to expand project size threshold 7. Barriers to develop small scale projects 8. Wrap-up and Next Steps

SUMMARY OF KEY THEMES HEARD AT THE MEETING
Financing/Economic Barriers 1. Power acquisition projects are not able to get financing unless they are fully leveraged as financers do not consider downstream benefits. The Big 5 lenders don't acknowledge revenues from energy sales when assessing loans for small projects. 2. For many of these small projects the developer is not relying solely on the economics of the projects from the electricity generation; other key drivers such as displacing own load, multiple revenue streams, environmental benefits, disposal of waste, elimination of odour etc. are other reasons for proceeding with the projects. Revising the pricing to 9.99cents does not make projects economic. All projects under 1 MW only work with multiple revenue streams (eg. tipping fees). Interconnections Barriers 3. Barriers mentioned include the interconnection and study costs; if study costs are reasonable, maybe customers with small projects are able to afford paying for these costs if kept to a minimum. Suggestion for a fee that is proportional to the MW. 4. Suggestions made for an independent consultant to prepare Net Metering Interconnection Studies. Ethan suggested a small project team that adopts a standardized approach for reviewing Net Metering projects. 5. BCH Interconnection study fees for project > 50 kW are significantly more expensive than other jurisdictions (1000 times in one particular jurisdiction); this makes many small projects cost prohibitive 6. An observation was made that BCH uses a team accustomed to larger projects for evaluation of small

Net Metering Intervener's Meeting

2nd Floor Customer Presentation Centre

SUMMARY September 18 , 2012 1:00 – 4:00

333 Dunsmuir Street Vancouver

projects. The team thinks in larger terms/steps which quickly overwhelm the study and upgrade budget available. A suggestion was made for a small working group or consultant to focus on small projects.

Other Barriers and Concerns

7. Communication with small developers is lacking.
8. The technical requirement for simple and more complex projects needs to be better defined in the documentation.

The Net Metering Jurisdictional Review and Report

9. Other jurisdictions to consider in the Review are Newfound Land, Massachusetts, Connecticut, Prince Edward Island, Michigan, Wisconsin and other utilities in the Great Lake regions.
10. Useful to incorporate the key drivers in the Jurisdictional Review. Specific interest was expressed around who pays for the interconnection costs in other jurisdictions.

General Comments

11. Support was expressed for the Net Metering tier system and agreement with having extraordinary upgrade costs paid for by the developer. This is how Alberta deals with upgrades. However, under the NM tariff, concerns have been raised around cost shifting to non-participating ratepayers, thus customers interested in the Net Metering program should bear some of the costs of any upgrades and studies.
12. A few questions were asked about existing customers (geographical breakdown, primary service, synchronous, per cent of 'simple', and how many receive a payment annually).
13. The Net Metering program is attractive for its simplicity and for a forum for appeal with the BCUC.

Net Metering Customer Webinar

Via Live Meeting

SUMMARY

September 25 , 2012 10:00 – 11:30

TYPE OF MEETING	Meeting to communicate recent changes and work being done on the net metering program and to seek feedback from participants on the barriers to participation.
PRESENTERS	Alevtina Akbulatova
ATTENDEES	19 customers attended this session.
BC HYDRO	Aaron Ellis, Linda Sahota, Joanne McKenna, Ryan Hefflick, Marc Beauchemin, Brandee Clayton
OBJECTIVES	To seek feedback on: · Customer experiences, · Barriers to developing projects, · Suggestions for the future of the Net Metering Program
AGENDA	1. Welcome 2. Introductions 3. What is Net Metering? 4. Overview and history of Net Metering at BC Hydro 5. Application process 6. Metering scenarios 7. Next Steps

SUMMARY OF KEY THEMES HEARD AT THE MEETING
Economic Barriers 1. Several participants expressed frustration that installing solar energy on their homes required a significant investment with little return. 2. There are also penalties to having solar installed in your home, including , increases in municipal taxes, and exemption from conservation programs. BC Hydro should work with government to address the HST charges, work with Ministry of Finance regarding municipal taxes and ensure conservation programs are available to those who self-generate. BC Hydro should also consider publicly recognizing those individuals who are offsetting their electricity use. 3. BC Hydro should look at capital offset schemes to decrease the initial installation costs. Electrical Inspection as a Barrier 4. The requirement for a certificate of electrical inspection can be a barrier as the Safety Authority seems to subjectively decide whether they will inspect. They also do not discuss the project with the owner making it challenging to continue the process. Other Barriers and Concerns 5. Barriers identified included permitting, fees and processes. 6. Other barriers identified included education and funding. General Comments 7. The Net Metering tariff seems to be acting as a low priced Feed in Tariff. Perhaps BC Hydro should consider marketing it as a Feed in Tariff. 8. Community solar power projects (Co-ops) where multiple investors or a municipality sell power to BC Hydro from aggregate sources in the community should be eligible under BC Hydro's programs, currently this is not eligible for ICS and under Net Metering each project would need to be treated separately unless the multiple projects was less than the NM upper size limit.

Net Metering Customer Webinar

Via Live Meeting

SUMMARY

September 25 , 2012 10:00 – 11:30

9. Interest was expressed around when smart meters will be installed and how they will measure the electricity being accepted by the grid.

Net Metering Contractor's Meeting

SFU Harbour Centre
515 West Hastings Street,
Room 1430
Vancouver

SUMMARY

October 3 , 2012 1:00 – 4:00

TYPE OF MEETING	Meeting to communicate recent changes to the Net Metering Tariff 1289 , share findings from the research BC Hydro has been undertaking,; and seek input on how the Net Metering program might be improved.
PRESENTERS	Alevtina Akbulatova, Joanne McKenna,
ATTENDEES	Landon Aldridge, Will Andrews, Peter Bakker, Rob Baxter ,Felix Candela, Scott Fleenor, Chris Hynes, Ed Knaggs, Kirby Rietze, Goran Vranic, Jason Zurowski, Matt Dickson, Robert Lunardon
BC HYDRO	Ryan Hefflick, Matt Good, Aaron Ellis, Linda Sahota
OBJECTIVES	To provide: · Update on the Net Metering Tariff revisions, · Overview of jurisdictional work completed to date, · Discuss Marketing & Communication opportunities, · Discussion on potential barriers to developing small scale projects: o Interconnections o Process o Project Size o Other · Update on NM Report to BCUC
AGENDA	1. Welcome 2. Introductions 3. Overview of NM Process & Application 4. Changes to Net Metring 1289 Tariff (NMIR/50) 5. Changes to NMIR/50 6. Metering Scenarios 7. Overview of Jurisdictional Findings 8. Marketing & Communication Opportunities 9. Barriers to develop small scale projects 10. Report to BCUC 11. Wrap-up and Next Steps

SUMMARY OF KEY THEMES HEARD AT THE MEETING
Economic Barriers 1. While there is "no" fee for Net Metering Application, a lot of money is spent by consultants in the iterative process between them and BC Hydro regarding requirements, e.g. line drawings, etc. This seems to have been more of an issue historically, however some attendees indicated that it is still an issue with municipalities regarding permitting (see Permitting section). Eg. A 10 kW hydro turbine generator would typically have a 10 year payback; any extra costs would kill the project. On average, it costs approximately $20k to $30k to complete the paperwork for the application. Interconnections Barriers 2. For many of the small projects even up to 100kW, the study costs of $40k are still an issue, when you combine the high cost of the studies with the revenue metering charges, a project quickly becomes uneconomic.

Net Metering Contractor's Meeting

SFU Harbour Centre
515 West Hastings Street,
Room 1430
Vancouver

SUMMARY

October 3 , 2012 1:00 – 4:00

3. Suggestion that a standard interconnection fee or charge be developed. Thus enabling customers/contractors to know what the costs will be upfront prior to doing other work on obtaining permits, etc.
4. Suggestion that BC Hydro pre-approve standard products (i.e. relays or equipment drawings) to speed up approval process and reduce engineering costs for customers.

Customer visibility regarding load and consumption

5. A lot of interest in Smart Meters and whether a customer would be able to see the generation and load offsets in real time. This seemed to be of particular interest to customers. An interest was expressed to see if contractors could get a preview of the "My Hydro" website.

Marketing, Communication and Education

6. Many suggestions for enhanced marketing/communication/education:

   Instructions for customers on how to read their smart meters

   Increase awareness within BC Hydro regarding NM Program, e.g. educate PS Outreach team

   Closer integration with BC Safety Authority and Municipalities around NM and how they can better facilitate these projects (see Permitting)

   Many customers know about the Net Metering program but they don't know how to go through the program or what technical specs or generators BC Hydro would accept – once they see the process they feel overwhelmed and back down

Permitting

7. Many municipalities permitting process is onerous and inconsistent and often the developer is asked to get the project signed off by an electrical and/or structural engineer. Municipalities are most concerned about liability as they do not have the knowledge. Consider standardization of permitting requirement and elimination of engineer sign-off. Can BC Hydro work with local government to improve their understanding of NM and small scale projects? Suggested to review Ontario's guide to working with Municipalities.
8. Electrical permits are very expensive as they are based on a percentage of the project cost. For PV equipment costs are high, but there is not a lot of equipment to inspect. Suggest that there is a flat fee for PV equipment inspections instead of a percentage of cost. BC Hydro could help by advocating for this.

Project Size

9. Consider breaking down the size thresholds into tiers, 51kW to 2MW is too broad, see other utility programs that have tiered systems. A likely upper limit is 1MW, anything above that is more aligned with the SOP.
10. Most anaerobic digestor projects are economic in the 150 kW to 250 kW size and use synchronous generators.
11. 50 kW is a good limit for most solar projects; however, for large commercial developments a higher limit would be good. (i.e. one proponent has a 100 kW project at a commercial development that he could split into two 50 kW projects on separate meters, but would prefer one inverter instead of two).

Next Steps

12. Interest in getting together again for update and discussion. For future sessions, suggested dividing into technology and /or capacity to capture common concerns in more detail.

Net Metering Interveners' Meeting

SUMMARY

November 16, 2012 10:00- 1:00

BC Hydro
333 Dunsmuir St
17th Floor
Vancouver

TYPE OF MEETING	Review of Net Metering program focusing on economic and other barriers associated with small scale project development.
PRESENTERS	Discussion
ATTENDEES	Ethan Werner, Jim Weimer, Eric Redmond
BC HYDRO	Joanne McKenna, Aaron Ellis, Ryan Hefflick, Alevtina Akbulatova, Linda Sahota
OBJECTIVES	To identify barriers to the development of small scale projects and to review developers project cost data matrix to gain a shared understanding of the economic and other barriers facing developers.
AGENDA	Walk through table to identify barriers (see attachment)

SUMMARY OF KEY THEMES HEARD AT THE MEETING

Discussed the barriers associated with anaerobic digestion, solar and hydro projects in BC.

Anaerobic digesters in BC. Key barriers are permitting process that is onerous and costly and high cost of interconnection fees that make small scale projects (90kW-100kW) uneconomic. In BC, even if the interconnection cost was zero, the projects would not be viable due to the energy price. At 14 cents per kWh these projects would be viable.

In other jurisdictions, such as Ontario and Vermont, the prices paid for this type of energy are 14 cents per kWh and higher. For small project between the sizes of 720kW – 1MW the capital costs of 10-15% is the upper limit to make these project works for 14 cents. For 10 cents, a 5-10 % capital cost limit is likely more appropriate.

Anaerobic digestion

Anaerobic digestion has other benefits aside from electricity output. These other benefits need to be valued. E.g. manure disposal, odour control, bedding, fertilizer, GHG reductions, and other emission Rule of thumb is for 1MW = $1M in revenue for electricity generation. A $1 M project has a 5-7 year payback. Permitting for AD is onerous; this is particularly true in the Agricultural Land Reserve (ALR) where it is challenging to re-zone the A1 land to A5 light industrial load for AD. Also the increased tax assessment that often accompanies these re-zonings is also seen as a barrier to development.

Projects over 1 MW would work in BC, but only if interconnection costs were in the range of 10-15% of the project cost. Participants suggested that if BC Hydro could identify where the closest 3 phase connection would be to proposed anaerobic digesters this would help with a go/no go decision. BC Hydro has a "Basic Distribution Information" process which provides this information. The first two requests in a year have no cost. Starting with the third request there is a cost of $200 per request. Participants were unaware of this process. According to the developer, 15km would be the upper distance limit for projects sized between 720kW-1MW.

Solar PV

Solar projects less than or equal to 35kW are relatively barrier free. The process is simplified within BC Hydro. The barriers for solar inverter type of projects tend to be with the municipalities and permitting departments who often ask for excessive requirements.

Small Hydro

From a small hydro perspective, interconnection study costs and system upgrade costs are seen as a barrier to development. A developer also noted that the treatment of inflation under the Standing Offer Program ½ CPI was inadequate for small developers. He suggested that most developers would prefer to be paid at the SOP levelized energy price and have the price indexed to CPI as opposed to a higher energy price of which only 50% in indexed to CPI. Without full indexing, many small developers will be unable to take the risk of developing a micro project.

Net Metering Interveners' Meeting

November 16, 2012 10:00- 1:00

BC Hydro
333 Dunsmuir St
17th Floor
Vancouver

SUMMARY

For a 250 kW project, a $100k interconnection cost would kill the project.

Meter costs were also identified as a barrier. According to the developer, BC Hydro typically charges $50,000 or more for metering installation. BC Hydro responded that this was for two meters. The SOP also requires the developer to provide telephone access to the BC Hydro meter. BC Hydro charges a meter fee of $300/mos whereas under the NM program, a smart meter can be used, essentially reducing the metering costs to zero.

Paying the upfront costs of interconnection studies and system upgrades places a financial burden on small project developers making the risk too great to develop projects.

Net Metering Contractor's Meeting

BC Hydro
10th Floor
333 Dunsmuir
Vancouver, B.C.
V6B 5R3

SUMMARY

November 27th, 2012 1 p.m. – 4 p.m.

TYPE OF MEETING	Contractor's Meeting
PRESENTERS	Alevtina Akbulatova, Joanne McKenna
ATTENDEES	In person: Sarj Sethi, Future Energy Powell Jagger-Doe, Future Energy Alan Tsung, Future Energy Gordon Mier Via conference call: Ed Knaggs, HESPV Robert Walter Jason Zurowski, EECOL ELECTRIC CORP Robert Stupka, Morrison Hershfield David Kelly, SkyFire Energy Inc Don Scarlett
BC HYDRO	Ryan Hefflick, Aaron Ellis, Linda Sahota, Susan Hancock
OBJECTIVES	Seek feedback from contractors on any barriers to connecting and initial jurisdictional review findings.
AGENDA	· NM Intro · Project Costs · Barriers to developing small scale projects

SUMMARY OF KEY THEMES HEARD AT THE MEETING
Barriers Identified: · Inconsistencies in electrical inspection requirements ultimately cost the customer time and money to accommodate. · BC Hydro's Net Metering technical requirements are much more stringent than FortisBC. Specifically the voltage settings were identified. · Safety concerns are paramount when customers lack adequate training to monitor and operate micro systems. · A need for Municipalities to develop programs with public incentives to support net metering projects. · A gap remains between Municipalities pursuing clean energy programs and suitable platforms available through BC Hydro to support these programs. · Net Metering goals and measurement of success should be defined for customers · Resolve the gaps between three DG programs: Net Metering, SOP, Integrated Customer Solutions (ICS) · Desire to promote Net Metering program in surplus conditions

Net Metering Contractor's Meeting

BC Hydro
10th Floor
333 Dunsmuir
Vancouver, B.C.
V6B 5R3

SUMMARY

November 27th, 2012 1 p.m. – 4 p.m.

Marketing Opportunities Identified:

- Increase profile of the program internally and externally
- Create a series of testimonial or feature stories for media use
- BC Hydro has developed a Net Metering Postcard for distribution at PowerSmart booth and other events
- Work with Municipalities to create programs that will encourage the public to adopt Net Metering. Give contractors an opportunity to present at such sessions.
- Development of educational literature for customer use. For example: Science World solar energy project is completed but not yet profiled.
- Organizing public workshops where contractors can present projects to different audience groups
- Create a video demonstrating solar PV technology and featuring existing NM installations to educate general customers

Other suggestions/topics:

- BCH to consider changing annual true-up to quarterly true-up
- What is the measure of success for BCH NM program?
- What is NM program: "conservation" initiative or supply opportunity?

Net Metering Interveners' Meeting

BC Hydro
12th Floor
333 Dunsmuir St
Vancouver, BC

SUMMARY

Wednesday, January 23rd, 2013 — 10:00 a.m. – 11:30 a.m.

TYPE OF MEETING	Review of Net Metering program focusing on economic and other barriers associated with the development of small scale projects. Follow up from Nov. 16th meeting
PRESENTERS	Joanne McKenna
ATTENDEES	Eric Redmond, Ethan Werner, Jim Weimer
BC HYDRO	Linda Sahota, Joanne McKenna, Alevtina Akbulatova,
OBJECTIVES	To continue discussion around the challenges associated with developing small scale projects under the Standing Offer Program.
AGENDA	Review of small scale project table to solicit input into opportunities to eliminate barriers. See attachment

SUMMARY OF KEY THEMES HEARD AT THE MEETING

A table of potential barriers for the SOP process was reviewed and the following comments were provided:

Several Intervenors have requested that the NM program be expanded to include projects up to 500kW. In response to this, BCH would require a more complex application form (impacting the simplicity of the current NM program) and would need to implement a screening level study to provide developers with a go/no go decision so that money wasn't spent on projects that could end up with uneconomic network upgrade costs. This would require developers to pay a flat fee for a screening study. The application form should include cost thresholds to identify expenses distributed across applicable parties involved in the project.

BCH suggested a micro SOP process under the umbrella of the SOP rather than changing the Tariff to address issues related to larger kW projects. Another option includes keeping the intent of the Net Metering program, but dividing into categories: 1) 0-50kW 2) 51-100kW, 3) 101kW+ (and include a minimum load offset that must be met prior to selling excess electricity back into the grid).

The Net Metering program Tariff currently doesn't include First Nations. However, if larger projects were contemplated under the program would this require consultation?

Could BCH change our payment policy for interconnection work? Smaller projects take a hit for paying for these costs upfront prior to being interconnected tying up capital. Could BCH bill developers at the end of the study? The developer could provide a Letter of Credit or Bond in lieu of payment upfront. However, this scenario presents a collection risk to BC Hydro. BC Hydro will look into the matter more to identify other options for applicants.

BCH suggested that a cost sharing similar to the SOP could be developed for the micro SOP. Intervenors seemed to support a project cost cap for what proportion BCH would cover for network upgrade costs. $/kW based on the size of project up to a maximum.

Discussion occurred around implications of expanding the Net Metering program to include larger +500kW, as current program is focused on load displacement and projects of this size without an existing and sizeable load would be unaligned with the spirit of the NM policy. If the program is expanded, BCH will need to apply for BCUC approval and the project review/approval process will need to be determined. Cost shifting to ratepayers is one key concern if NM program is expanded to include larger projects.

Moving forward, the advancement of developing small scale project regardless of the format will require education and ongoing guidance to support applicants. This means interfacing with clients who need support during the application process and throughout the project deliverables.

Interveners will be sent a copy of the draft NM report for their review and input prior to its submission to the BCUC.

From: Matt Dickson [redacted]
Sent: 2013, April 08 10:29 AM
To: McKenna, Joanne
Subject: RE: Draft Meeting Notes

Hi Joanne,

I have looked through the attached documents and overall I can say that it looks pretty good to me ;)

While the report doesn't include everything I had hoped for, it certainly shows that BC Hydro did listen to stakeholder comments and that you are trying, were possible, to implement or at least look at implementing some of the change required. Naturally, a commitment it increase the kWh price paid for renewable would be nice, but I guess as the Rolling Stones so aptly put it 'you can't always get what you want'!

Thanks for your work on this and continuing to include me in the discussion despite my absence.

Sincerely
Matt

Matt Dickson, *MRM.* | **Renewable Agri-Energy Program Manager** | BC Agricultural Research and Development Corporation
[redacted]

From: McKenna, Joanne [mailto:Joanne.McKenna@bchydro.com]
Sent: April-05-13 3:03 PM
To: Eric Redmond [redacted]; Eric Redmond [redacted]; [redacted]; [redacted]; Zdenek Los [redacted]; [redacted]; Thomas Hackney; [redacted]
Subject: Draft Meeting Notes

Hello everyone, for your review, attached please find the draft meeting notes from the various meetings that BC Hydro hosted on the topic of the Net Metering program.

Please review the notes from the meetings **you** attended and send any comments back to me by April 17th at 5pm.

These notes, when final, will be included in the report to the BCUC. The final report will be filed with the BCUC by April 30, 2013.

Thank-you for your participation.

Joanne

Joanne McKenna
Sr. Distribution Generation, Lead
Energy Planning & Economic Development

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From: Ed Knaggs [redacted]
Sent: 2013, April 09 3:12 PM
To: McKenna, Joanne; Akbulatova, Alevtina
Subject: BCH NM Review

Below are the bullet points from my review of the Net Metering evaluation report.

- 3.2 - Results from marketing report TBD, it will be nice to see where the gaps in the general public's understanding are.
- Table 4. - Noted that 25% of the average home in the sweet spot for residential Net Metering
- 6.4 - Energy price is based on the average SOP price and therefore the T&D variance is minimal.
- 7.1 Incentives - Differentiate between Net Metering and FIT incentives. Sask 20% rebate Net Metering and Ont is $0.549/kwh MicroFIT. There are also Federal tax incentives on top of the state incentives in the US.
- 7.1 Interconnection – The new simplified process for BCH Net Metering 18kw and below was a huge success and a major step in the right direction. It should be noted as such.
- Table 7 – Ontario number includes MicroFIT and RESOP which should be noted.
- 8.1 – Building and Electrical permits should be addressed separately.
- Table 10 Standardization – It should be noted that under the simplified connection rules for PV, this has been accomplished and has proven very beneficial.
- 8.3.1 Capacity – The increase to 100kw should be tied to load offset.
- 10.2 – Collaborate with DSM

Thank you,

Ed Knaggs, P.Eng.
www.hespv.ca
[redacted]
Barrie , ON & Victoria, BC

From: Akbulatova, Alevtina
Sent: 2013, April 17 9:09 AM
To: McKenna, Joanne
Subject: FW: Feedback on the Draft NM Report for BCCU

Joanne,

Please see comment from Ben Giudici, one of a solar installer in Kamloops.

Alevtina

From: [redacted]
Sent: 2013, April 16 11:40 PM
To: Akbulatova, Alevtina
Subject: Feedback on the Draft NM Report for BCCU

Hi Alevtina,

Thanks very much for the opportunity to read and comment on the report. As I read it, many thoughts came to mind which I would have brought up had I participated in the consultation sessions directly. I offer feedback in two general categories:

1. The quality and general impact of the report.
2. Questions that cross my mind and who knows.....maybe will cross BCUC's mind?

Quality and General Feeling

Congratulations on a very well written document! Excellent history is given. The purpose for reporting and conclusions are presented very clearly. Arguments are made lucidly and extremely interesting and revealing data provided. The streamlining of approvals and possibilities for larger projects are very exciting. I can't really think of anything that would improve the presentation other than adding charts to graphically present the data in tables 4, 5, and 7.

Observations/Questions/Suggestions of Mine....and Who Knows if anyone in BCUC might have the same?

1. Avoided costs to BC Hydro were in the range of $55,000 from a total of 228 NM projects. This is about $240 per project at an extremely low adoption rate...0.01%. How would these avoided costs change if the NM adoption rate became much higher?

2. What would need to happen in order for BC Hydro to be willing to include RS1289 and RS1300 energy contributions in their Load Resource Balance?

3. BC Hydro from the start has viewed RS1289 and RS1300 as "load displacement programs"; a means for customers to reduce their consumption and save money on their bills, and not contenders for any significant "excess" energy production. The Power Smart Program has provided rebates and incentives for reducing consumption through more efficient lighting, more efficient appliances, etc. Power Smart representatives

insist that NM projects cannot qualify under their program because NM is "generation". So here in my view is a corporate contradiction. Are NM projects "load displacements" and "consumption reduction" or are they "sources of generation"? Calling them one so as to exclude them from Power Smart support, and then calling them the other to preclude their contribution to energy supply is confusing and frustrating for potential adopters. I have heard this feedback from many of my clients.

4. Why is there so much concern for non-participating rate payers and the appearance of providing some advantage to NM participants? NM participants assume risk and large project costs. NM Non-participants are free to become NM participants if they so choose. Why is there not a similar concern for non-participants in the Power Smart program having to bear any costs in BC Hydro delivering rebates and incentives to Power Smart participants? For example as a residential rate payer, I do not have access to the more broad sweeping Power Smart support a commercial or industrial customer does.

5. The concerns regarding feeder infrastructure and protection systems requiring upgrading to support larger NM projects are valid and well taken. Has BC Hydro consulted with other jurisdictions in North America, Canada, or Europe with more NM history and higher uptake rates to determine how they have or are resolving these issues?

6. Are SOP adopters typically industrial or commercial level operations with access to business tax write offs or other cost reducing means not generally available to residential NM adopters? If so what can be done to level the playing field?

7. Ontario's FIT program pays 51 cents/kwh presently so adopter benefit is about 5x higher than RS1289; yet their adoption rate is a staggering 86x greater than BC!! Are Alberta, Saskatchewan, and California adopter benefits really 3, 6, and 119 times respectively more lucrative than BC? The relationship between incentives and adoption rates seem to be exponential. Is this a case of a little stimulus going a long way?

8. The extremely low 0.01% adoption rate in BC is stark and disturbing given our jurisdiction has 15-20% more solar potential than Germany or Japan (two of the worlds most aggressive adopters of solar). Is it possible adoption rates via RS1289, RS1300, and other programs could accelerate with minor rate changes, small tax benefits, or other incentives (eg. Power Smart recognition); allowing adopters to a make a more significant contribution to Policy Action No. 20 of the 2002 BC Energy Plan?

Thank you so very much for all the outstanding work you are doing and your continued support with NM grid-tie projects. I look forward to more!

Sincerely
Ben

Ben Giudici, P.Eng
Riverside Energy Systems
[redacted]
www.riversideenergy.ca

Clean Energy BC

Friday, April 19th 2013

Joanne McKenna
Sr Distribution Generation, Lead
Energy Planning and Economic Development
10th Floor 333 Dunsmuir Street
Vancouver BC
V6B 5R3

Dear Ms. McKenna:

Re: Net Metering Report

Thank you for the opportunity to comment on the BC Hydro Net Metering and Distributed Generation Report. As previously recommended CEBC believes that the optimal solution to incorporating small distributed generation is to increase the Net Metering program capacity limit to 500kW.

CEBC has the following comments for your consideration regarding the report.

1. Section 8.2 Solutions to Identified Barriers

BC Hydro has added the following criteria to the analysis of the Net Metering program beyond the criteria laid out by the BCUC: "consistency with the purpose of Net Metering, namely to provide customers with a simple rate to allow them the opportunity to generate electricity primarily for their own consumption."

This criteria contradicts the BCUC decision of May 2012 which states:

"BC Hydro states that the original intent of the Net Metering program was to allow individual customers to meet all or part of their electricity demand and to that end, the 50 kW limit is consistent with the maximum amperage and voltage that most residential and commercial customers take service... It is the Panel's view that the capacity of a Net Metering installation should be driven by considerations of economically available clean energy and not by the theoretical maximum capacity a homeowner may require... The Panel is of the view that BC Hydro should demonstrate that increasing the cap would result in a substantial cost on the utility and its ratepayers, not just that it would result in more exports to the grid."

Clean Energy | Association of British Columbia
354 - 409 Granville Street | Vancouver, BC V6C 1T2, Canada | [redacted] | www.cleanenergybc.org

2) BC Hydro 100kW Proposed Net Metering Limit

BC Hydro has stated that projects over 100kW can contribute to safety, reliability and power quality issues. This is can be true in some cases, but the 100kW capacity limit creates a barrier to all larger potential Net Metering projects, the majority of which would not cause issues with the BC Hydro grid. The proposed 100kW limit is somewhat arbitrary. Other jurisdictions have addressed capacity limit with a more site specific process.

Oregon, California, New Jersey and other states have limited net metering and Feed in Tariff (FIT) projects to a maximum of 15% of the annual peak load of the serving substation. This prevents situations where a change in the direction of power flow through a substation may occur. This also limits the impact projects can have on safety and power quality.

Nova Scotia currently limits projects connecting under the provincial FIT program to "the minimum load on the substation transformer serving the feeder to which the generators would connect, minus the capacity of the generators already connected to the substation transformer". Nova Scotia Power offers a map to customers that show the provincial substation capacities available to the program.

Ontario's Hydro One also limits FIT projects based on substation capacity. A recent review of their interconnection criteria states:
"Hydro One imposes several limits on the amount of PV solar generation that can be connected to their distribution system in order to preserve reliability and quality of supply to existing load customers and distributed generators. One of these limits is driven by the need to prevent unintentional islanding, that is, unintentional energization of a portion of the system that has become disconnected from the utility supply. To accomplish this, Hydro One limits microFIT PV solar penetration on the utility's F- and M-class feeders to 7% and 10% of the peak feeder load, respectively."

This 7% to 10% limit applies to PV inverters and other generator types such as induction and synchronous generators. Hydro One, like Nova Scotia Power, provides information online to show customers and developers existing substation capacities.

Imposing limits such as those shown above would mitigate or eliminate issues with connecting larger Net Metering projects, including problems with feeder desensitization, short circuit current, reverse power, equipment loading, overvoltage, and power quality.

3) Clean Energy BC Proposed 500kW Limit

CEBC stated in our January 14, 2013 letter to BC Hydro that a 500kW limit for Net Metering is appropriate. The 500kW rational is based on the following:

a) BC Hydro stated in the 2011 Net Metering application:
"BC Hydro has concerns with the use of synchronous generators as they are capable of self-exciting and back-feeding into the utility system... the cost to process the applications is high; and other types of generators are inherently safer, BC Hydro wishes to exclude future synchronous generators from participating in the net metering program."

BC Hydro indicates induction and inverter-based generators are inherently safer than synchronous generators. BC Hydro's *35kV and Below Generator Interconnection Requirements for Power Generators* states induction generators cannot exceed *"approximately 500 kVA where the BCH primary service voltage is 3-phase 25kV or 3-phase 34.5kV"* and *"approximately 200 kVA where the BCH primary service voltage is 1-phase 25kV or 1-phase 19.9kV"*. A 500kW limit would match the size of the largest induction generator safely allowed on the BC Hydro system.

b) Section 8.3 of the *BC Hydro Electric Tariff* states that loads smaller than 500kW are not required to pay for substation and system upgrades. It is assumed that this criteria is based on the determination that these loads are small, do not have major impacts, and requiring system upgrades fees would be a substantial burden for small customers. Although this policy addresses loads, not generators, it is hoped that the same rational would apply regarding a Net Metering capacity limit.

c) Projects 500kW and smaller would in the majority of cases generate power at secondary voltage. A proponent would typically examine moving to higher voltage at about 1,000kW. The 2011 Net Metering application stated *"BC Hydro is proposing to exclude primary service distribution customers from eligibility in the Net Metering program, due to the added technical complexity of this type of interconnection. These applications require a more rigourous review by BC Hydro staff to ensure projects meet safety and compliance standards."* Thus secondary voltage projects would be simpler and safer to interconnect than primary voltage projects.

d) Smart meters can be used on secondary voltage generator systems. These meters already include bi-directional metering capabilities and will reduce metering costs.

As stated in the BCUC Net Metering decision of May 2012, it is expected that primary voltage and synchronous generators would face higher interconnection costs.

4) BCUC Jurisdiction

It is the preference of developers to have distributed generation within the jurisdiction of the BCUC. Small developers and BC Hydro are far from “equal parties” in any negotiation or program development process. Any acquisition program should be fair to the rate payer, BC Hydro, and developers.

5) Inflation

Operating costs are very high for micro projects. We recommend indexing price increases at full CPI. Without full CPI indexing, many small developers may well be unable to take the risk of developing a micro project.

In conclusion, we would like to thank BC Hydro staff for preparing this report and for their ongoing support of distributed generation in BC. We look forward to working with BC Hydro to develop distributed generation solutions that will benefit all parties.

Sincerely yours,

Paul Kariya
Executive Director

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April 19th, 2013

Joanne,

RE: BC Hydro Net Metering and Distributed Generation Report Draft

I would like to thank you and your staff for your ongoing work to create opportunities for micro projects in BC, and for your time spent authoring this report.

I have reviewed the report and have the following comments for your consideration:

1) Section 6.4 Energy Price

Section 6.4 states "In 2011, for example, only four customers were paid for net annual energy deliveries. This represented 57,730 kWh of energy and $4,711 in payments...". This does not seem to include Zdenek Los' 50kW hydro plant, which has a capacity factor of 90% and produces approximately 400,000 kWh per year. The majority of this energy is sold to the BC Hydro grid.

As well, this section states "The assumption of 70% firm and 30% non-firm [energy] is generous to RS 1289 customers". Mr Los' hydro plant produces the majority of energy sold under Net Metering, and his plant is undersized for the size of creek. His plant operates at a very high capacity factor of 90%, thus the assumption of 30% non-firm power is likely high. Typical SOP power projects have a capacity factor of 40%, resulting in a substantially higher non-firm energy ratio.

2) Inflation

The cost of maintaining and operating micro projects is very high. BC Hydro has suggested creating a Micro SOP program under the current SOP framework for micro projects. The failure of the SOP to adjust the full energy prices to inflation means small projects may not be sustainable for more than 10 to 20 years (as operating cost increases outpace the limited indexing of energy prices under the SOP). A simple financial model for a 100kW hydro project regarding this issue was provided to BC Hydro (emailed on January 23, 2013). Most small developers would prefer to be paid at the SOP levelized energy price and have the price indexed to CPI, as opposed to a higher energy price of which only 50% is

indexed to CPI. Many small developers will not be able to take the risk of developing a micro project without full indexing.

3) CEBC Letter of April 19th, 2013

I would like to state I agree with and support all items addressed in the Clean Energy BC letter of April 19, 2013. These include:

a) Sizing net metering projects based on available energy resources, not customer load.
b) Developing a local approach to determine net metering project capacity limits, such as limiting a project's capacity to the minimum substation load
c) Increasing the net metering project capacity limit to 500kW
d) Having micro project power acquisition under the jurisdiction of the BCUC
e) Fully indexing net metering energy prices

Please contact me at [redacted] if you wish to discuss any of the above.

Regards,

E. Redmond

Eric Redmond, P. Eng.

Micro Green Hydro

April 29, 2013

Clean Energy BC
Paul Kariya, Executive Director
Email address:[redacted]

Re: Net Metering Report Comments

Thank-you for your comments on BC Hydro's Draft Net Metering Evaluation Report. We have reviewed your comments and offer the following responses:

Q1. Section 8.2 Solutions to Identified Barriers – BC Hydro has added the following criteria to the analysis of the Net Metering program beyond the criteria laid out by the BCUC: "consistency with the purpose of Net Metering, namely to provide customers with a simple rate to allow them the opportunity to generate electricity primarily for their own consumption."

This criteria contradicts the BCUC decision of May 2012 which states:

"BC Hydro states that the original intent of the Net Metering program was to allow individual customers to meet all or part of their electricity demand and to that end, the 50 kW limit is consistent with the maximum amperage and voltage that most residential and commercial customers take service... It is the Panel's view that the capacity of a Net Metering installation should be driven by considerations of economically available clean energy and not by the theoretical maximum capacity a homeowner may require... The Panel is of the view that BC Hydro should demonstrate that increasing the cap would result in a substantial cost on the utility and its ratepayers, not just that it would result in more exports to the grid."

BC Hydro Response

BC Hydro does not agree that this criterion contradicts the BCUC decision of May 2012. BC Hydro remains of the view that the size of a customer's load should be the primary determinant of the size of eligible RS 1289 generation. On the issue of costs, in the current environment, an increase in the size of eligible RS 1289 generators may impose costs on non-participating ratepayers. BC Hydro has identified in the Report a number of costs and risks, particularly if the RS1289 eligible generator size is increased beyond 100kW (see section 8.3.4 of the Report). In addition, BC Hydro's recent load-resource balance demonstrates that BC Hydro has sufficient energy to meet its expected load in the near term. As a result, any increase to the RS 1289 generator capacity limit that results in additional surplus energy purchases at the Energy Price (9.99 cents per kWh) would impose increased costs on BC Hydro's non-participating ratepayers. This is particularly the case for residential customers given that 50 kW is already more than sufficient to satisfy a typical residential customer's load. An increase beyond 50 kW for residential customers would result in more surplus energy sales to BC Hydro and therefore would impose additional costs on BC Hydro and its non-participating ratepayers.

We acknowledge that some General Service rate customers may have loads larger than 50 kW. As stated in the Report, BC Hydro is considering an increase in the eligible generator size for RS 1289 General Service rate customers to 100 kW for the purpose of allowing those customers to generate electricity for their own consumption, provided the increase does not have any material adverse cost impacts on other ratepayers. This proposal is based on the load of General Service rate customers and is not intended to incent them to generate surplus electricity.

Q2. BC Hydro 100kW Proposed Net Metering Limit

BC Hydro has stated that projects over 100kW can contribute to safety, reliability and power quality issues. This is can be true in some cases, but the 100kW capacity limit creates a barrier to all larger potential Net Metering projects, the majority of which would not cause issues with the BC Hydro grid. The proposed 100kW limit is somewhat arbitrary. Other jurisdictions have addressed capacity limit with a more site specific process.

Oregon, California, New Jersey and other states have limited net metering and Feed in Tariff (FIT) projects to a maximum of 15% of the annual peak load of the serving substation. This prevents situations where a change in the direction of power flow through a substation may occur. This also limits the impact projects can have on safety and power quality.

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"Hydro One imposes several limits on the amount of PV solar generation that can be connected to their distribution system in order to preserve reliability and quality of supply to existing load customers and distributed generators. One of these limits is driven by the need to prevent unintentional islanding, that is, unintentional energization of a portion of the system that has become disconnected from the utility supply. To accomplish this, Hydro One limits microFIT PV solar penetration on the utility's F- and M-class feeders to 7% and 10% of the peak feeder load, respectively."

This 7% to 10% limit applies to PV inverters and other generator types such as induction and synchronous generators. Hydro One, like Nova Scotia Power, provides information online to show customers and developers existing substation capacities.

Imposing limits such as those shown above would mitigate or eliminate issues with connecting larger Net Metering projects, including problems with feeder desensitization, short circuit current, reverse power, equipment loading, overvoltage, and power quality.

BC Hydro Response

BC Hydro does not agree that the 100kW individual program size limit is "arbitrary". The reasons for selecting 100kW as the upper limit are set out in section 8.3.4 and Table 11 of the Report.

Furthermore, the question references two size limits: an individual project size kW limit, and the aggregate size of generation facilities connected to a feeder or substation.

Most of the percentages given in the question are the aggregate size of all the projects connected to a feeder or substation and are not individual project size limits. At this time, BC Hydro does not have a posted aggregate size limit for Net Metering projects.

Direct comparisons of individual project size limits between utilities are not straight forward as some utilities have multiple criteria for determining maximum project size and separate interconnection requirements for Net Metering projects, which makes any comparison problematic.

By illustration, the Net Metering project size limits for Oregon on the commercial side allows for load offset only and does not provide the customer with a credit or payment for excess energy at the end of the annual billing cycle. By not paying for energy credits, Oregon has effectively imposed a size limit by eliminating any economic incentive for a customer to install generation that exceeds their annual energy production.

With respect to interconnection requirements, Oregon has a tiered net metering program as outlined below.

Oregon NM Program	Maximum Size	BC Hydro Interconnection Rules Comparison
Level 1 – Residential	25 kW	Net Metering Program
Level 2 - Commercial	2 MW	Proposed micro SOP
Level 3 - Commercial	2 MW	Existing SOP

Level 1 appears comparable to BC Hydro's Net Metering program; however, the 25 kW maximum size in Oregon is based on a 480 V service, which is not a standard residential service of 120V/ 240 V. On a standard service, (such as in BC) the project size threshold would be reduced to 12.5 kW.

Oregon's Level 2 requires a more thorough engineering review with associated study costs. This level is comparable to the proposed small project stream discussed in section 9.4.1 of the Report. Although the maximum size limit shown in the table above is 2 MW, this size threshold is contingent upon fulfillment of numerous interconnection requirements that if unmet, will reduce the project size below 2 MW.

Oregon's Level 3 deals with projects that significantly impact the distribution system. This level is comparable to the interconnection studies done by BC Hydro under the SOP program.

RS1289 is supposed to be a simple rate for customers who wish to install clean generation to meet their own electricity needs. The interconnection processes that have been developed for small generation, such as those eligible for RS1289, are simple and inexpensive, in large part because the generators are small. If the generator size increases, the interconnection process will invariably become more complex and expensive.

Q3. Clean Energy BC Proposed 500kW Limit CEBC stated in our January 14, 2013 letter to BC Hydro that a 500kW limit for Net Metering is appropriate. The 500kW rational is based on the following:
a) BC Hydro stated in the 2011 Net Metering application:
"BC Hydro has concerns with the use of synchronous generators as they are capable of self-exciting and back-feeding into the utility system... the cost to process the applications is high; and other types of generators are inherently safer, BC Hydro wishes to exclude future synchronous generators from participating in the net metering program."

BC Hydro indicates induction and inverter-based generators are inherently safer than synchronous generators. BC Hydro's 35kV and Below Generator Interconnection Requirements for Power Generators states induction generators cannot exceed "approximately 500 kVA where the BCH primary service voltage is 3-phase 25kV or 3-phase 34.5kV" and "approximately 200 kVA where the BCH primary service voltage is 1-phase 25kV or 1-phase 19.9kV". A 500kW limit would match the size of the largest induction generator safely allowed on the BC Hydro system.

b) Section 8.3 of the BC Hydro Electric Tariff states that loads smaller than 500kW are not required to pay for substation and system upgrades. It is assumed that this criteria is based on the determination that these loads are small, do not have major impacts, and requiring system upgrades fees would be a substantial burden for small customers. Although this policy addresses loads, not generators, it is hoped that the same rational would apply regarding a Net Metering capacity limit.

c) Projects 500kW and smaller would in the majority of cases generate power at secondary voltage. A proponent would typically examine moving to higher voltage at about 1,000kW. The 2011 Net Metering application stated "BC Hydro is proposing to exclude primary service distribution customers from eligibility in the Net Metering program, due to the added technical complexity of this type of

interconnection. These applications require a more rigourous review by BC Hydro staff to ensure projects meet safety and compliance standards." Thus secondary voltage projects would be simpler and safer to interconnect than primary voltage projects.

d) Smart meters can be used on secondary voltage generator systems. These meters already include bi-directional metering capabilities and will reduce metering costs.

As stated in the BCUC Net Metering decision of May 2012, it is expected that primary voltage and synchronous generators would face higher interconnection costs.

BC Hydro Response

Our response to your individual sub-questions is as follows:

a) Synchronous generators are not expected to stop back-feeding into the utility system when there is an outage on the utility system. Therefore, safety will have to be engineered and studied to ensure compliance. Induction generators and inverters, if not capable of self-exciting and back-feeding into the utility system, are inherently safer. However, the larger the induction generator or inverter, the higher the likelihood that these generators have been designed to supply power when there is an outage on the utility system. Larger induction generators can also contribute to temporary overvoltages on the system. Therefore, it is prudent that larger than 100kW connections be studied to ensure that the equipment specifications and settings are appropriate for the safety, reliability and power quality of other customers.

b) The reference to "loads smaller than 500kW" as noted under the BC Hydro Electric Tariff is for serving new customers and pertains to power flow from the substation to the customer whereas the "100kW Proposed Net Metering Limit" is for customers offsetting their load and providing any excess power back to the grid, i.e. power flowing from the customer to the substation. These are different situations that require different considerations as BC Hydro's distribution system has been designed and built for power flow from the substation to the customer and not in reverse.

c) The question around secondary vs. primary voltage projects is complex and BC Hydro would like to take more time to review this issue and provide a response at a later date.

d) Yes, smart meters can be used for secondary or primary voltage generators. However there may be circumstances where they are not appropriate. BC Hydro is reviewing the use of smart meters for this type of application as referenced in Table 9 and Recommendation B3 of the Report.

Q4. BCUC Jurisdiction – It is the preference of developers to have distributed generation within the jurisdiction of the BCUC. Small developers and BC Hydro are far from "equal parties" in any negotiation or program development process. Any acquisition program should be fair to the rate payer, BC Hydro, and developers.

BC Hydro Response

Generally, the BCUC regulates energy supply contracts under section 71 of the Utilities Commission Act (**UCA**), unless the seller and buyer are exempted from the filing requirements. The *Clean Energy Act* exempts BC Hydro and sellers from section 71 of the UCA in respect of SOP contracts.

RS 1289 is unusual in that it is a rate in the Electric Tariff under which BC Hydro provides a service to its customers, while also providing an opportunity for customers who generate excess generation over the course of the year to be paid for the energy. As noted in the Report, BC Hydro originally proposed when RS 1289 was established that customers would not be paid for excess annual generation but the BCUC determined that BC Hydro should pay what has become known as the "Energy Price", on the assumption (in our view) that the amount of excess generation over the course of a year would be very small.

Q5. Inflation - Operating costs are very high for micro projects. We recommend indexing price increases at full CPI. Without full CPI indexing, many small developers may well be unable to take the risk of developing a micro project.

BC Hydro Response

As noted in section 8 of the Report, (see table 9) inflation rates were identified as a barrier to small scale projects. In particular, the concern was that BC Hydro escalates at 50% of CPI in the SOP process causing a financial barrier for some small developers. Recommendation B7 of the Report states that BC Hydro is committed to *"explore how BC Hydro applies energy price escalation rates for small scale projects and determine if an alternative approach may be appropriate"*.

Regards,

Joanne McKenna

April 29, 2013

Ed Knaggs
HESPV
Email address:[redacted]

RE: comments on BC Hydro's Draft Net Metering Evaluation Report

Dear Mr. Knaggs:

Thank-you for your comments on the draft Net Metering Evaluation Report sent on April 9, 2013.

You had referenced a number of comments, suggestions and edits below. We have provided the following response to these items:

1. 3.2 - Results from marketing report TBD, it will be nice to see where the gaps in the general public's understanding are.

BC Hydro Response

BC Hydro will be tracking the gaps in knowledge as suggested.

2. Table 4. - Noted that 25% of the average home in the sweet spot for residential Net Metering.

BC Hydro Response

Comment noted.

3. 6.4 - Energy price is based on the average SOP price and therefore the T&D variance is minimal.

BC Hydro response

That is correct.

4. 7.1 Incentives - Differentiate between Net Metering and FIT incentives. Sask 20% rebate Net Metering and Ont is $0.549/kwh MicroFIT. There are also Federal tax incentives on top of the state incentives in the US.

BC Hydro Response

This has been reflected in the text of the document. The pricing has been corrected. We have included both state and federal incentives together.

5. 7.1 Interconnection – The new simplified process for BCH Net Metering 18kw and below was a huge success and a major step in the right direction. It should be noted as such.

BC Hydro Response

No comment required.

6. Table 7 – Ontario number includes MicroFIT and RESOP which should be noted.

BC Hydro Response

It has been corrected in the report.

7. 8.1 – Building and Electrical permits should be addressed separately.

BC Hydro Response

Distinction between building and electrical permits has been made in Section 8, Table 10.

8. Table 10 Standardization – It should be noted that under the simplified connection rules for PV, this has been accomplished and has proven very beneficial.

BC Hydro Response

This comment has been reflected in Table 10.

9. 8.3.1 Capacity – The increase to 100kw should be tied to load offset.

BC Hydro Response

BC Hydro will be conducting further analysis on increasing the NM cap to 100kW and the impacts on BC Hydro's system, non-participating ratepayers, and customers.

10. 10.2 – Collaborate with DSM

BC Hydro Response

The Net Metering and Small-scale DG teams will continue to collaborate with Power Smart on offerings that impact the same market base.

Regards, Joanne McKenna

April 29, 2013

Mr. Eric Redmond
Micro Green Hydro
Email address: [redacted]

Re: BC Hydro Net Metering and Distributed Generation Report Draft

Dear Mr. Redmond, thank-you for providing BC Hydro with your comments on our Draft Net Metering Evaluation Report. We have provided responses to your three points below:

Q1. Section 6.4 Energy Price –
Section 6.4 states "In 2011, for example, only four customers were paid for net annual energy deliveries. This represented 57,730 kWh of energy and $4,711 in payments...". This does not seem to include Zdenek Los' 50kW hydro plant, which has a capacity factor of 90% and produces approximately 400,000 kWh per year. The majority of this energy is sold to the BC Hydro grid.

As well, this section states "The assumption of 70% firm and 30% non-firm [energy] is generous to RS 1289 customers". Mr Los' hydro plant produces the majority of energy sold under Net Metering, and his plant is undersized for the size of creek. His plant operates at a very high capacity factor of 90%, thus the assumption of 30% non-firm power is likely high. Typical SOP power projects have a capacity factor of 40%, resulting in a substantially higher non-firm energy ratio.

BC Hydro Response
BC Hydro is reluctant to speak about a particular customer's circumstances. BC Hydro has reviewed its F2011 data included in the 2011 RS 1289 application and is satisfied that the information is correct.

BC Hydro accepts that, generally speaking, hydro plants are likely to have a higher capacity factor than small-scale photovoltaic generation (solar panels). The vast majority of RS 1289 generation is small-scale photovoltaic and, as noted, the capacity factor for this type of generation is relatively low, much lower than the 70% firm assumption attributed to the Standing Offer Program. While some generators may have a higher capacity factor, the large majority of RS 1289 generators are less than 70 % and BC Hydro expects that to remain the case into the foreseeable future. BC Hydro does not believe it would be appropriate to adjust the Energy Price for each customer based on the actual capacity factor as this would be contradictory to the principle of rate simplicity.

Q2. Inflation – The cost of maintaining and operating micro projects is very high. BC Hydro has suggested creating a Micro SOP program under the current SOP framework for micro projects. The failure of the SOP to adjust the full energy prices to inflation means small projects may not be sustainable for more than 10 to 20 years (as operating cost increases outpace the limited indexing of energy prices under the SOP). A simple financial model for a 100kW hydro project regarding this issue was provided to BC Hydro (emailed on January 23, 2013). Most small developers would prefer to be paid at the SOP levelized energy price and have the price indexed to CPI, as opposed to a higher energy price of which only 50% is indexed to CPI. Many small developers will not be able to take the risk of developing a micro project without full indexing.

BC Hydro Response
As noted in section 8 of the Report, (see table 9) inflation rates were identified as a barrier to small scale projects. In particular, the concern was that BC Hydro escalates at 50% of CPI in the SOP process causing a financial barrier for some small developers. Recommendation B7 of the Report states that BC Hydro is committed to "*explore how BC Hydro applies energy price escalation rates for small scale projects and determine if an alternative approach may be appropriate*".

3. CEBC letter of April 19th, 2013 –
I would like to state I agree with and support all items addressed in the Clean Energy BC letter of April 19, 2013. These include:

a) Sizing net metering projects based on available energy resources, not customer load.
b) Developing a local approach to determine net metering project capacity limits, such as limiting a project's capacity to the minimum substation load
c) Increasing the net metering project capacity limit to 500kW
d) Having micro project power acquisition under the jurisdiction of the BCUC
e) Fully indexing net metering energy prices

BC Hydro Response
Please see BC Hydro's response to CEBC letter dated April 29th, 2013 attached to this response.

Regards, Joanne

April 29, 2013

Mr. Ben Giudici
Riverside Energy Systems
Email: [redacted]

Dear Mr. Giudici:

Thank-you for providing BC Hydro with your comments on the Net Metering (NM) Draft Evaluation Report.

In your letter, you had posed eight questions below is BC Hydro's response:

Q1. Avoided costs to BC Hydro were in the range of $55,000 from a total of 228NM projects. This is about $240 per project at an extremely low adoption rate of 0.01%. How these would avoided costs change if the NM adoption rate became higher?

BC Hydro Response
The $55,000 maximum avoided cost of RS 1289 Energy Price vs LRMC estimate referenced in the F2011 Application, page 4, was an upper bound limit amount reflecting the increase in cost or benefit of Net Metering energy under a scenario in which all net metering generation production is available for purchase, instead of RS 1289 customers using their energy production primarily to offset their own load. As noted in the Report, Net Metering does not have a material effect on BC Hydro's load-resource balance (LRB) and, since the F2011 application BC Hydro's LRBs demonstrate that BC Hydro has sufficient energy to meet the needs of its customers in the near term.

BC Hydro provides further explanation to the RS 1289 energy value in section 6.1 of the Report. As stated, BC Hydro will continue to monitor the value of Net Metering to BC Hydro and non-participating customers and its impact on the LRB and other costs.

Q2. What would need to happen in order for BC Hydro to be willing to include RS1289 and RS 1300 energy contributions in their Load Resource Balance?

BC Hydro Response
The impact of Net Metring on the LRB is discussed in section 6.1 of the Report. At this time, the installed Net Metering capacity and the volume of energy generated by RS 1289 customers is simply too small to result in any appreciable effect on the LRB or avoided cost benefits to BC Hydro and other ratepayers. BC Hydro will continue to monitor the impact of Net Metering on the LRB and avoided costs as customer participation grows and the installed capacity increases.

Q3. BC Hydro from the start has viewed RS1289 and RS1300 as "load displacement programs"; a means for customers to reduce their consumption and save money on their bills, and not contenders for any significant "excess" energy production. The Power Smart Program has provided rebates and incentives for reducing consumption through more efficient lighting, more efficient appliances, etc. Power Smart representatives insist that NM projects cannot qualify under their program because NM is "generation". So here in my view is a corporate contradiction. Are NM projects "load displacements" and "consumption reduction" or are they "sources of generation"? Calling them one so as to exclude them from Power Smart support, and then calling them the other to preclude their contribution to energy supply is confusing and frustrating for potential adopters. I have heard this feedback from many of my clients.

BC Hydro Response
BC Hydro views RS 1289 as a rate with the primary purpose of allowing participating customers the opportunity to generate clean electricity for their own consumption. BC Hydro does not view RS 1289 as a supply resource. Regardless whether or not RS 1289 is "load displacement, BC Hydro does not offer any PowerSmart incentives at this time, specifically to RS 1289 customers. RS 1289 customers may, as BC Hydro customers, be eligible for PowerSmart programs that are available to other BC Hydro customers of the same class (e.g. residential offers).

Please note that RS 1300 is the general service rate schedule for customers with demand less than 35 kW and not a load displacement program as suggested in your question.

Q4. Why is there so much concern for non-participating rate payers and the appearance of providing some advantage to NM participants? NM participants assume risk and large project costs. NM Non-participants are free to become NM participants if they so choose. Why is there not a similar concern for non-participants in the Power Smart program having to bear any costs in BC Hydro delivering rebates and incentives to Power Smart participants? For example as a residential rate payer, I do not have access to the more broad sweeping Power Smart support a commercial or industrial customer does.

BC Hydro Response
BC Hydro is concerned with ensuring that non-participating customers do not incur costs caused by RS 1289 unless there is corresponding value to those customers, as well as other benefits to BC Hydro. This is the same concern BC Hydro has with all of its rates and programs. What are the costs and what are the benefits? Power Smart programs aimed at industrial customers, for example, have demonstrated value to all ratepayers by incenting large industrial customers to generate their own electricity or install energy efficient machinery and equipment, thereby reducing the amount of electricity BC Hydro must generate or buy, a cost- effective benefit to all ratepayers. At this time, the value of RS 1289 is minimal to non-participating ratepayers, (see section 6.1 of the Report).

Q5. The concerns regarding feeder infrastructure and protection systems requiring upgrading to support larger NM projects are valid and well taken. Has BC Hydro consulted with other jurisdictions in North America, Canada, or Europe with more NM history and higher uptake rates to determine how they have or are resolving these issues?

BC Hydro Response
Yes, BC Hydro has consulted with utilities in other jurisdictions with more (small) distribution generation history and higher uptake rates to determine how some of the safety, reliability and power quality issues can be resolved.

Q6. Are SOP adopters typically industrial or commercial level operations with access to business tax write offs or other cost reducing means not generally available to residential NM adopters? If so what can be done to level the playing field? [NTD do we list the criteria and leave it at that? As I am not sure that we can do anything to level the playing field – we can outline what we're proposing to do in the report.

BC Hydro Response
BC Hydro does not take into account the tax benefits or "write-offs" that a customer or developer may realize.

Q7. Ontario's FIT program pays 51 cents/kwh presently so adopter benefit is about 5x higher than RS1289; yet their adoption rate is a staggering 86x greater than BC!! Are Alberta, Saskatchewan, and California adopter benefits really 3, 6, and 119 times respectively more lucrative than BC? The relationship between incentives and adoption rates seem to be exponential. Is this a case of a little stimulus going a long way?

BC Hydro Response

BC Hydro agrees that the Net Metering experiences in other jurisdictions appear to demonstrate that incentives combined with higher electricity rates result in higher participation rates than in B.C. It may be the case that

increases in participation rates may not be linear as suggested. However in BC Hydro's view, the key factor in determining whether or not to offer incentives is the economic value of Net Metering to BC Hydro and its ratepayers, not simply increased participation rates,(see section 6.1 of the Report).

Q8. The extremely low 0.01% adoption rate in BC is stark and disturbing given our jurisdiction has 15-20% more solar potential than Germany or Japan (two of the world's most aggressive adopters of solar). Is it possible adoption rates via RS1289, RS1300, and other programs could accelerate with minor rate changes, small tax benefits, or other incentives (eg. Power Smart recognition); allowing adopters to a make a more significant contribution to Policy Action No. 20 of the 2002 BC Energy Plan?

BC Hydro Response

Solar power has grown rapidly in countries such as Germany and Japan due to feed-in tariffs and other subsidies aimed at stimulating the renewable energy sector. These tariffs are similar to those used for Ontario's FIT and microFIT programs with relatively high prices (about 50¢ to 55¢ per kWh) being paid for solar energy. It should be noted a small proportion (10-20 per cent) of the power generation in Germany and Japan comes from renewable sources, unlike British Columbia. In fact, 98 per cent of BC Hydro's electricity generation in F2012 came from clean or renewable sources. It should also be noted that the electricity rates paid by customers and energy costs in jurisdictions such as Germany are higher than in B.C.

Regards,

Joanne McKenna

BC hydro

Re: BCUC Order No. G-57-12

Net Metering Evaluation Report No. 3

Appendix C

Marketing and Communications Materials

GENERATING CLEAN ELECTRICITY TO OFFSET YOUR CONSUMPTION

BC Hydro has a Net Metering Program for residential and commercial customers who have on-site generation up to 50 kW.

What is Net Metering?

The Net Metering Program allows BC Hydro's residential and commercial customers to connect a small generating unit using a clean or renewable resource to the BC Hydro distribution system. If customers generate more electricity than they use, they will receive a credit from BC Hydro that goes onto their account.

Only technologies that meet B.C.'s Clean Energy Act are eligible.

Net Metering contributes to the development of more Distributed Generation in B.C.

For more information and to apply, please visit:
bchydro.com/netmetering or contact **net.metering@bchydro.com**.

BC hydro
FOR GENERATIONS

GDS12-143

Prepared For
JOHN DOE
1234 ANYNAME ST
ANYTOWN BC V6B 5A1

Billing Date	Account Number
Sep 07, 2012	6670 667
Pay By	**Please Pay**
Sep 29, 2012	**$77.73**

Invoice Number:
111006038968

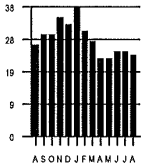
Meter Reading Information

Electric:

Meter #	4624432
Jul 05	5343
Aug 03	6061
30 days	718

Next meter reading on or about Sep 04

kWh Daily Average Usage per Billing Period



Daily Average Comparison

Aug 2011	27 kWh
Aug 2012	24 kWh

Take action to save electricity and money. Call 604 431 9463 or visit bchydro.com/powersmart

Other questions? Call the numbers displayed in the Customer Service area at the top of this bill.

Customer Service

Phone: (604) 224-9376 **Power Out?** 1-888-769-3766
Mail to: BC Hydro, PO Box 9501 Stn Terminal, Vancouver BC, V6B 4N1

The Equal Payment Plan shows the amount due at the bottom of this bill. Any details shown directly below are for your information only.

Previous Bill

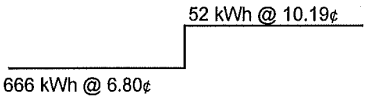
Balance payable from your previous bill	81.73
Thank you for your payment Jul 17, 2012	85.00CR
Balance from your previous bill f	**$3.27CR**

BC Hydro

Electric Charges

Jul 05 to Aug 03 (Residential Conservation Rate 1101)	
Basic Charge: 30 days @ $0.15050 /day	4.52*
Usage Charge[1]	
Step 1: 666 kW.h @ $0.06800 /kW.h	45.29*
Step 2: 52 kW.h @ $0.10190 /kW.h	5.30*
Rate Rider at 5.0%	2.76*
Regional transit levy: 30 days @ $0.06240 /day	1.87*
* HST	7.16
BC HST Residential Energy Credit	4.05CR
	$62.85

Your total consumption for the billing period is 718 kW.h and your Conservation Rate breakdown is as follows:



Your Step 1 threshold of 666 kW.h is prorated based on 30 days

[1]For more information on the Conservation Rate visit **bchydro.com/conservationrate**

Page 1 of 2

WD 04

Return this portion with your payment
ALL PAYMENTS SHOULD BE MADE PAYABLE TO BC HYDRO

Billing Date	Account Number
Sep 07, 2012	6670 667
Pay By	**Please Pay**
Sep 29, 2012	**$77.73**
	Amount Paid

19 JOHN DOE
1234 ANYNAME ST
ANYTOWN BC V6B 5A1

71 00 000006670 667 000007773 000008100

Prepared For
JOHN DOE
1234 ANYNAME ST
ANYTOWN BC V6B 5A1

Billing Date
Sep 07, 2012

Account Number
6670 667

Page 2

Invoice Number:
111006038968

Taxes	The following is a summary of taxes billed to your account since your last invoice:		
	HST at 12 % on 59.74	7.16	
Equal Payment	Installment		81.00
	Charges as detailed above	f	3.27CR
			$77.73
	Status to date:		
	Cost of energy	***$309.40***	
	Monthly installments	***$405.00***	
	Anniversary date March 2013		
		Balance payable	**$77.73**

Never forget another bill. We'll send you an email reminder when your online bill is due. Switch to paperless billing today at **bchydro.com/youraccount** and register for Bill Reminder.

The Net Metering program is designed for residential and commercial customers. By generating clean electricity at your home or business you can offset your consumption, reduce your electricity bill and sell any excess power to BC Hydro. To learn more about net metering, including how to apply, please visit **www.bchydro.com/netmetering**

Knowledge is power: get outage updates on your iPhone, BlackBerry or other web-enabled devices. Visit **bchydro.com/mobile** for details.

To pay by credit card, visit **bchydro.com/payments** for details about how to make a payment through Paymentus, a third party bill payment service. Paymentus charges a fee for this service. Or call Paymentus at 1 877 543 8357.

Page 2 of 2

19 JOHN DOE
1234 ANYNAME ST
ANYTOWN BC V6B 5A1

71 00 000006670 667 000007773 000008100

HYDROWEB
inform.engage.connect.

HydroWeb ... Net Metering Program Helps Customers Offset Electrical Load

December 17, 2012
Business; Environment

BC Hydro's Net Metering customers are some of the most creative and committed when it comes to developing innovative projects to offset their electrical load.

"BC Hydro strives to make the interconnection process as simple as possible to enable our Net Metering customers to take control of their energy use," said **Alevtina Akbulatova**, Net Metering Specialist. "We do this by providing an opportunity for one-on-one discussions with customers so that we better understand their expectations to achieve self-generation."

The Net Metering program has been in place since 2004 and currently has 200 participating customers. The residential and small commercial customers offset their electrical load first and, then sell any excess energy back to BC Hydro.

Below are three stories depicting how some of BC Hydro's Net Metering customers take advantage of this program in order to live sustainably.

Ann and Gord Baird: Living a sustainable lifestyle on Vancouver Island

About eight years ago, Gord and Ann Baird, embarked on a new journey with Gord's two young children, and Ann's parents. Their goal was to build a sustainable home for their new multigenerational family. They wanted to demonstrate that a low carbon home and lifestyle was not only possible, but highly desirable.

"Using solar energy to power our sustainable home and lifestyle fit our values of living within the local limits of what nature provides," said Ann.

Eco-Sense, as they call their home, is an award winning home featuring solar Photovoltaic (PV), solar thermal hot water, energy and water conservation, composting toilets, rainwater harvesting, grey-water re-use, living roof, earthen floors, food gardens and chickens, all integrated into their exceptionally beautiful and affordable example of earthen architecture.

Above: The Baird's home.

It was important to the Bairds to fuel their home and lifestyle with renewable sustainable energy from the sun. Going with a grid tie system allowed for fewer solar panels and they could sell their extra electricity to BC Hydro in the summer, and then buy back some electricity in the winter. However, the Baird's produce more electricity than they consume on an annual basis.

The couple consults on system design and gives regular tours of their home to groups including building officials, politicians, schools groups, bankers, social activists, engineers and architects.

Above: The Baird family at Eco-Sense.

Community Greenhouse: Sustainable living in Invermere

Bill Swan has been working in the renewable energy sector for eight years from his base in Invermere. Bill, a project leader with Groundswell Network Society, partnered with the David Thompson Secondary School (DTSS) to realize a common objective: to encourage greater food security in their community while maintaining a low carbon footprint.

A community garden concept was an obvious choice, however, with a school's schedule, leaving the garden untended all summer long was not an option. The two parties combined their efforts to develop a community greenhouse to create awareness around the environmental and cost issues associated with food production and transportation, and the value of growing food close to its end customer.

The greenhouse itself is a sustainable structure that utilizes a rain water catchment and water recycling system, as well as harnessing solar energy through various processes. The greenhouse is a 2.5 kW solar PV project that continues to expand. This community of motivated students and individuals continue to fundraise to increase the size of the project. Bill believes that this type of investment changes the way that people relate to their own energy consumption and results in improved energy management.

This model provides students, teachers and the community with an understanding of the value of growing food locally and sustainably. The facility has had over 6,000 visitors.

Above: Invermere's community greenhouse.

T'Sou-ke First Nation solar projects demonstrate solar options for the community

The T'Sou-ke First Nation on Vancouver Island wanted to use solar energy to power three large structures on reserve. With sponsorship from B.C.'s Innovative Clean Energy fund and Day4Energy, the 75 kW project became a reality.

"Using solar energy is consistent with First Nations traditions and values. This project demonstrates that First Nations can take a prominent role in leading the way back to living sustainably," said Chief Gordon Planes.

Ed Knaggs, with Home Energy Solutions (HES) PV, took a unique approach to the project that included a three-month training program offered to interested T'sou-ke First Nation members, who then worked side-by-side with the contractor to install solar on the three buildings.

These four separate projects demonstrate a variety of systems: the Canoe Shed, a 40 kW project with a straight grid-tie; the Band Administration office, a 22 kW ground mounted PV with an additional 7 kW on the roof utilizes a grid tie with a back-up battery for storing unused solar energy; and, the Fisheries building, a 6 kW call to grid net metering project.

"This project was more than a typical PV installation because we were welcomed into a society that cares about their future," explained Ed. "The people from T'Sou-ke nation were some of the best I've ever worked with and we remain friends to this day."

The project has been so successful that the T'sou-ke First Nation offers tours to schools and governments from across Canada, as well as in Europe.

Above: A T'Sou-ke First Nation solar project.

Learn more about the Net Metering program, please visit bchydro.com/netmetering.

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[redacted]

Note: Employees' comments redacted.

[redacted]

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Last Updated: December 19, 2012 by Maniezzo, Jennifer
Content Owner: McKenna, Joanne

News

February 1, 2013

Customers go greener with help of the Net Metering program

Posted by Chelsea Watt

BC Hydro's Net Metering customers are some of the most creative and committed when it comes to developing innovative projects to offset their electrical load. Net metering lets residential and commercial customers connect a small generating unit, like solar panels, to the BC Hydro grid. Customers can then generate their own electricity to meet their needs, and sell any excess energy back to BC Hydro. 200 customers are already taking part in the program.

The program is designed to be as simple as possible for customers to start controlling their energy use, says Alevtina Akbulatova, a specialist with the program. By providing the opportunity for one-on-one discussion, customers can help BC Hydro understand their goals and expectations for self-generation.

Those goals for participating customers vary, but for all of them, net metering offers a chance to be in control and engaged with their electricity use in an exciting way.

And three of our customers are making big strides towards changing their entire energy outlook.

The Baird family is living sustainably in their "Eco-Sense" home.

Eco-Sense and sustainable living find a home on Vancouver Island

Living more sustainably was the goal for the Baird family. About eight years ago, Gord and Ann Baird, embarked on a new journey with Gord's two young children, and Ann's parents. Their goal was to build a sustainable home for their new multi-generational family. They wanted to demonstrate that a low carbon home and lifestyle was not only possible, but highly desirable.

"Using solar energy to power our sustainable home and lifestyle fit our values of living within the local limits of what nature provides," said Ann.

Eco-Sense, as they call their home, is an award-winning home featuring solar photovoltaic (PV), solar thermal hot water, energy and water conservation, composting toilets, rainwater harvesting, grey-water re-use, living roof, earthen floors, food gardens and chickens, all integrated into their exceptionally beautiful and affordable example of earthen architecture.

For the Bairds, it was important to fuel their home and lifestyle with renewable sustainable energy from the sun. Going with a grid-tie system meant fewer solar panels and the chance to send their extra electricity to BC Hydro in the summer and then take back electricity in the winter. However, since the Bairds produce more electricity than they consume on an annual basis, they also enjoy additional savings on their electricity bill.

Invermere's community greenhouse.

Invermere raises awareness with community greenhouse

Bill Swan has been working in the renewable energy sector for eight years from his base in Invermere. A project leader with Groundswell Network Society, he partnered with the David Thompson Secondary School to realize a common goal: to encourage greater food security in their community while maintaining a low carbon footprint.

A community garden concept was an obvious choice, however, with a school's schedule, leaving the garden untended all summer long when students and staff are away wasn't an option. Instead, they combined their efforts to develop a community greenhouse, with the aim of creating awareness around the environmental and cost issues associated with food production and transportation, and the value of growing food close to its end customer.

The greenhouse itself is a sustainable structure that utilizes a rainwater catchment and water recycling system, and harnesses solar energy through various processes. Today, it's a 2.5 kilowatt (kW) solar photovoltaic project that's had more than 6000 visitors, and it continues to expand. Motivated students and individuals continue to fundraise to increase the size. For his part, Swan believes that this type of investment changes the way that people relate to their own energy consumption and results in improved energy management.

A T'Sou-ke First Nation solar project.

T'Sou-ke First Nation solar projects demonstrate solar options for the community

The T'Sou-ke First Nation on Vancouver Island wanted to use solar energy to power three large structures on reserve. With sponsorship from B.C.'s Innovative Clean Energy Fund and Day4Energy, the 75 kilowatt undertaking became a reality.

"Using solar energy is consistent with First Nations traditions and values. These projects demonstrate that First Nations can take a prominent role in leading the way back to living sustainably," said Chief Gordon Planes about the project.

Ed Knaggs, with Home Energy Solutions (HES) PV, took a unique approach to this initiative that included a three-month training program offered to interested T'sou-ke First Nation members, who then worked alongside the contractor to install solar generation on the three buildings.

Together, these four separate projects demonstrate a variety of systems:

- the Canoe Shed, a 40kW project, uses a straight grid-tie;
- the Band Administration office, which is a 22kW ground-mounted photovoltaic with an additional 7 kW on the roof, uses a grid tie with a back-up battery for storing unused solar energy; and,
- the Fisheries building is a 6 kW solar PV that is a call to grid net metering project.

"This project was more than a typical PV installation because we were welcomed into a society that cares about their future," says Knaggs.

The project has been so successful that the T'sou-ke First Nation offers tours to schools and governments from across Canada, as well as in Europe

About the Net Metering program

Find out more about BC Hydro's Net Metering program, including how to apply.

Chelsea Watt is a writer-editor with bchydro.com.

Last Modified: Feb 1, 2013

Net Metering program – Feb 28 2013

Audience

BC Hydro customers

Objectives

- To identify the level of awareness that BC Hydro customers have for the Net Metering program.
- To understand what type of marketing and educational efforts customers would like to see help improve their awareness.

Intro Text

BC Hydro has had a Net Metering Program since 2004. Certain customer classes are eligible for this program. We would like to gauge your current level of awareness and feedback on this program.

This study should take you about five minutes to complete. As a token of our appreciation, you will be automatically entered into our monthly prize draw once your survey responses have been submitted.

Thanks for taking the time to participate.

Questions

1. Have you heard about BC Hydro's Net Metering program?
   - Yes
   - No [skip to Q4]

2. Where did you learn about the Net Metering program?
   Select all that apply
   - BC Hydro website
   - Government website
   - Word of mouth (i.e. family, friends, colleagues)
   - Other, please specify

3. Tell us what you know about the program. The Net Metering program …
   Select all that apply
   - allows me to install clean electricity resources (wind, water, sun).
   - reduces my electricity bill
   - allows me to send electricity to BC Hydro's grid
   - allows me to install solar panels on my roof
   - enables me to measures my electricity to and from the grid (with the use of smart metering)
   - can pay me for annual excess energy
   - has low costs to connect (for the majority of projects)
   - offers a simple application process

   [Skip to Q5]

4. How would you like to learn about the program?
   Select all that apply
   - BC Hydro website
   - Emails
   - BC Hydro's e-newsletter Connect
   - Community newspaper
   - Webinar
   - Other, please specify _____

5. What interests you about BC Hydro's Net Metering program? Please rate each statement according to your interest level (1 being not at all interested and 10 being extremely interested).

	1	2	3	4	5	6	7	8	9	10
I can generate electricity for my own use										
My electricity bill is reduced										
The electricity I generate is clean										
Net metering is consistent with my lifestyle of sustainable living										
I can get paid for my annual access generation										
Upfront costs to connect to the grid are low										

6. Please select the response that best describes where you are at in regards to the Net Metering program.
   - Yes, I'm interested in pursuing a net metering project, but I would like to learn more [skip to Conclusion]
   - I'm currently planning a net metering project [skip to Conclusion]
   - I'm currently a BC Hydro Net Metering customer [skip to Conclusion]
   - I'm currently a BC Hydro Net Metering developer [skip to Conclusion]
   - I don't currently understand the benefits of the BC Hydro's Net Metering program [skip to Conclusion]
   - The Net Metering program is not of interest or applicable to me

7. Why is the Net Metering program ***not*** of interest to you?
   - Open ended text box

Conclusion

Thanks again for completing this survey!

Your responses have been received and you have been entered into our monthly draw.

Net Metering
Marketing and Communication
Spring 2013

BC Hydro's Net Metering (NM) program is designed for those customers who wish to generate clean electricity at their home or small business. Primary audience groups include BC Hydro residential and commercial customers who have a desire to install on-site generating capacity no greater than 50kW. When the amount of self-generation exceeds the customer load on an annual basis, BC Hydro pays the Rate Schedule 1289 (RS 1289) Energy Price to the customer for the excess generation.

Since its inception in 2004, NM has led to the development of 248 in-service customer projects. The majority of these projects are solar (90%); however, small hydro (4%), wind (3%), wind and solar (2%) and biogas (1%) technologies are being used by participants.

BC Hydro hopes to raise awareness about and increase participation in the NM program through communications and marketing efforts aimed at target audience groups.

Marketing & Communications Goals

BC Hydro's goal is to increase awareness of the NM Program. BC Hydro has developed and implemented a marketing and communications plan that focuses on building program awareness with BC Hydro customers and stakeholders, ensuring customers have the information they need to participate and reducing barriers to participation.

BC Hydro has the following communication and marketing goals:

- Promote NM as a way customers can demonstrate leadership in sustainability and taking more control of their own energy needs.
- Eliminate "lack of awareness" as a barrier to participation in the Net Metering rate. by utilizing multiple marketing channels to target those customers most likely to be early adopters of clean energy technologies. For example, leverage the awareness and marketing efforts of other BC Hydro product offerings including and not limited to Power Smart Programs and the Standing Offer Program.
- Communicate the easy and low cost steps to participate in the Net Metering rate.

Audience Groups

The Net Metering program continues to target BC Hydro customers who are likely to be early adopters of renewable energy technologies.

Potential Net Metering Customers: Potential customers tend to be BC Hydro customers, home owners and businesses that already have a focus on environmental sustainability. Typically, net metering subscribers have the interest and aptitude to build or contract self-generation technologies for their home or for a small community project. A significant driver for applicants is the desire to reduce their own environmental footprint. Moreover, it allows these customers to share their values with friends and family by demonstrating, through example, their level of commitment to living sustainably.

Net Metering Subscribers: These are BC Hydro customers that currently participate in the NM program and who can share their experience with others and who may have suggestions for program improvements in the future. NM subscribers have gone through the entire application process, a meter has been exchanged and special billing has adjusted their bill to the NM tariff rate.

Contractors and Service Providers of Renewable Technologies: This group includes owners of manufacturing facilities that build or manufacture eligible distributed generation technologies, or they are contracted by BC Hydro net metering customers to manage the engineering and design aspects of their project. These projects can range in size, and tend to be customized solutions based on customer or technology class.

First Nations Communities: The relationship between clean energy generation, nature and living sustainably aligns with First Nations culture and values. Some remote e First Nations communities are off-grid and self-generate and/or have a demonstrated interest in self-generation technologies.

Media: Regional and national media outlets may have an interest in profiling or commenting on BC Hydro's net metering program and self-generation technologies.

Regulatory Participants: This group includes individuals and organizations that participate in BCUC regulatory proceedings and interested in the Net Metering rate, including environmental organizations and IPPs.

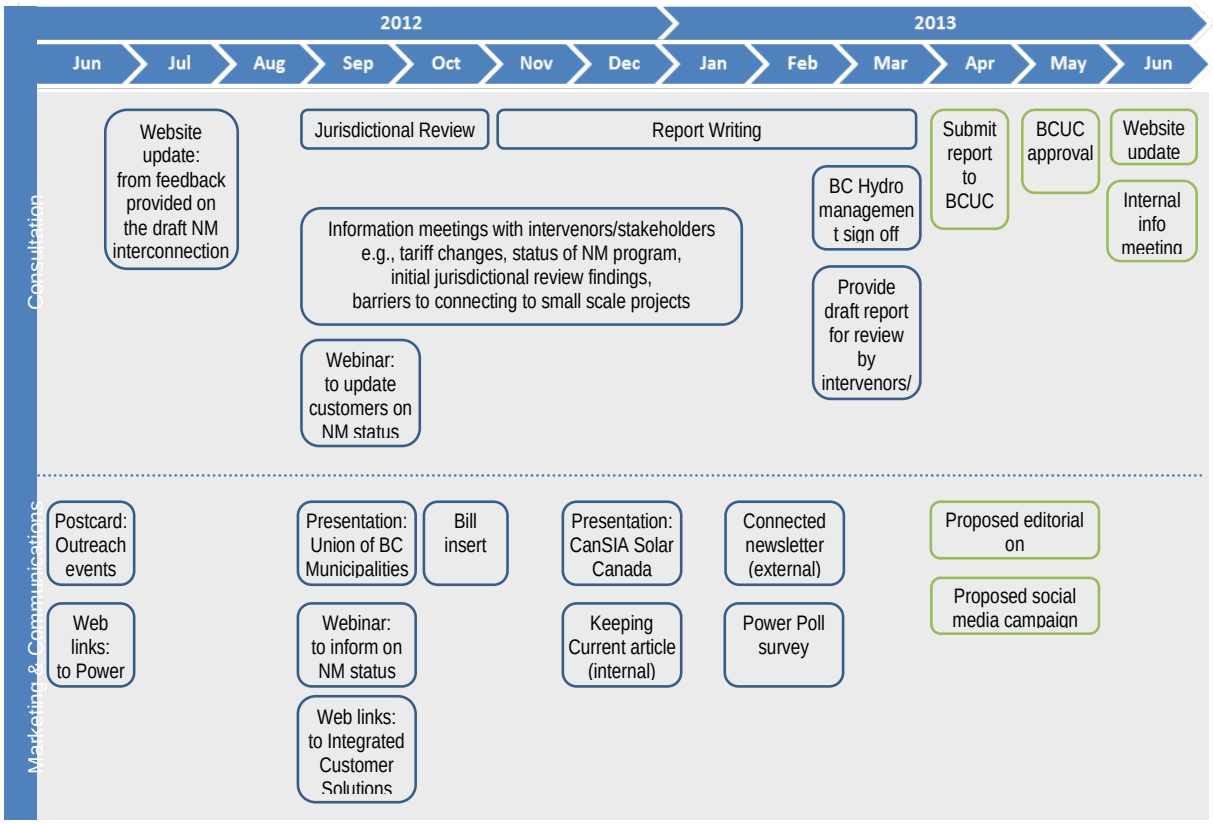
BC Hydro Employees: Employees can act as ambassadors to support BC Hydro's promotional efforts. Through technical expertise and an in-depth understanding of the subject matter, in some cases, BC Hydro employees can promote and construct their own projects.

Marketing & Communications Activities

Throughout 2012 and up to March 2013, BC Hydro concentrated on communicating changes in the program and seeking input from interested parties to better understand the barriers associated with the NM program and to discuss how these barriers might be reduced. As part of the decision made by the Commission Order G-57-12, a request to increase marketing efforts to help build program awareness and educate customers on the energy efficiency benefits of the NM program was issued to BC Hydro.

From September 1, 2012 to March 31, 2013, BC Hydro completed various consultation and marketing tactics (see table below) to ensure stakeholders were made aware of the program changes defined in Commission's Order G-57-12 and to invite input on potential barriers to the NM program and to the development of small-scale DG <1MW.

Summary of Net Metering (NM) Consultation and Marketing Activities



Completed Marketing Activities

Activity	Audience Group	Time	Status
Net Metering Website - Enhanced the NM website www.bchydro.com/netmetering - Sought feedback on the updated draft of NM interconnection requirements	General public, BC Hydro customers, contractors, existing NM customers, intervenors	Summer 2012	Completed
Promotional Postcard - Developed postcards with information about the NM program with links to the updated website and distributed them at Power Smart booths throughout the province, UBCM and outreach events.	General public	Summer 2012	Completed
Promotional Bill Insert - Information on NM including website link was provided in customer bills, reaching approximately 1 million residential customers and 5,000 small commercial customers.	BC Hydro customers	Fall 2012	Completed

Activity	Audience Group	Time	Status
Presentations to promote NM - Organized public presentations to promote NM program, including UBCM in Victoria in October 2012 and participation in a jurisdictional panel at CanSIA in Dec 2012 highlighting BC's NM Program.	General public, BC Hydro customers, contractors, existing NM customers, intervenors	Fall 2012 through Spring 2013	Completed
Keeping Current Story (internal employee marketing) - Published a story highlighting three NM customers to internal audience groups (approximately 5,000 BC Hydro employees)	BC Hydro employees	Winter 2012	Completed
Connected E-newsletter (external) - Published a story highlighting three NM customers to approximately 200,000 BC Hydro customers.	BC Hydro customers	Winter 2012	Completed
Power Poll Survey - Identified BCH customer awareness of program.	BC Hydro customers	Spring 2013	Completed

Upcoming Marketing Activities

Tactic	Audience Group	Time	Status
Website Updates - Update website with, Q&A, information from jurisdictional review, net metering report and consultation summary	General public, BC Hydro customers, contractors, NM customers, intervenors	Spring 2013	Planned
Information session for internal stakeholders - Organize internal meeting to communicate NM & SOP program changes to Key Account Managers, who can then communicate the information and promote NM to their customers.	BCH Key Account Managers	Spring 2013	Planned
Community/ Regional editorial - Identify opportunity to promote customer project	BC Hydro customers, contractors, NM customers, intervenors	Spring 2013	Planned
URL links to and from Power Smart programs - Raise the profile of NM by developing a presence on the Power Smart website, including hyperlinks to the Net Metering Program web page.	BC Hydro customers, contractors, NM customers, intervenors	Summer 2012	Completed
Social Media - Identify and participate in special interest groups	BC Hydro customers, contractors, NM customers, intervenors	Spring 2013	Planned

Key Findings of F2013 Marketing & Communications Efforts

Media Coverage of the BC Hydro Net Metering Program

A media search was completed on the BC Hydro Net Metering Program for the period of June 16, 2004 to February 15 2013 (*see Appendix A*). Over eight years there were 86 articles, letters and opinions published by community newspapers across B.C.

As expected, the highest media interest is recorded at the start of the program in 2004/2005 with 28 articles. The interest heightens throughout 2007 to 2010, as a result of government initiatives to promote the 2007 BC Energy Plan, and then the 2010 Clean Energy Act.

Throughout 2011, and the first half of 2012, the media coverage dropped as BC Hydro focuses their efforts to resolve stakeholder barriers related to the Net Metering program. In 2012/2013 there were only seven media mentions, even though specific marketing efforts were implemented to promote the program.

Market Survey Results

An in-house survey was completed through BC Hydro's Research Services on March 11, 2013. Of the 900 BC Hydro customers solicited to participate in BC Hydro's online "Power Poll Survey", 357 customers completed the survey.

The purpose of the survey was to gauge the level of program awareness with BC Hydro customers, which extended to marketing channel preferences.

The majority of those surveyed did not understand the benefits of the BC Hydro NM program (40%). Another 39% responded that they were interested in pursuing a NM project, but would like more information to learn about the benefits of the program. 19% felt that the NM program was not applicable to them. The remaining respondents were net meter subscribers (1%), or were customers currently planning a NM project (1%).

The majority of participants learned about the NM program through the BC Hydro website and through word-of-mouth (40%). The survey results indicate that customers do not have a clear understanding of the BC Hydro NM program. In particular, the potential impact of NM on a customer's BC Hydro electricity bill and overall electricity costs was not well understood. Additionally, there is a lack of understanding about the simplicity of the application process and low connection costs. These findings demonstrate a continued need to address these customer knowledge gaps.

The data compiled for the Power Poll survey is located in the appendices of this report.

Recommendations for F2014 Marketing & Communications Efforts

Through intelligence gathering and evaluation of F2013 marketing and communication efforts, BC Hydro has identified improvements and actions to undertake to incorporate into the program in F2014.

- Promote the NM program by featuring it prominently on BC Hydro's web home page from time-to-time and by ensuring the information is accessible from key Power Smart and other pages. Continue to review the web content to ensure messaging addresses audience needs.

- Leverage opportunities to promote Net Metering with Power Smart programs, particularly targeting customers who are demonstrating leadership by undertaking more complex energy efficiency and conservation initiatives.

- Increase the frequency of promotions to encourage customer recall and keep the conversation going. The Power Poll survey indicated that participants would be interested in learning more about the program through the BC Hydro website, as well as through email and the Connected newsletter.

- Encourage profiles in community and industry media by encouraging community media photo opportunity with customers/developers when projects have been successfully completed. Pitch to community newspaper editors and journalists that focus on energy topics for their community.

- Identify and plan appropriate public speaking engagements and events to promote the NM program throughout the year.

- Additional program awareness can be accomplished through the development of ads and editorials in community newspapers and targeted industry media. This may require a more significant budget to support.

Measures of Success

To determine the success of its marketing activities for the NM program, BC Hydro will:

- Track the amount and type of media coverage the program receives each year.
- Identify public interest in the NM program by tracking the number and type of inquiries received through the Net Metering web page.
- Identify program interest by comparing the annual and total amount of applicants filed.

BC hydro

Re: BCUC Order No. G-57-12

Net Metering Evaluation Report No. 3

Appendix D

Jurisdictional Review

Net Metering – Jurisdicitional Review and Benchmarking Analysis

Jurisdiction	Utility / Program	Maximum Generator Size	Clean Technology Requirement	Residential Rate for Load Offset	Customer Paid for Excess Energy?	Generators Limited to Load Size?	Incentives	Program Communications	Interconnection Application Cost	Interconnection Requirements (paid by customer)	Interconnection Upgrades / Cost Responsibility	Process Length (from application to operation)
Nova Scotia	**Nova Scotia Power** Enhanced Net Metering	Class 1: 100 kW (residential & commercial) Class 2: > 100 kW to 1 MW (commercial & industrial)	Yes	7.38¢/kWh for first 200 kWh, then 11.76¢/kWh	Yes 12.6¢/kWh	Yes	None	Dedicated pages on utility website; well organized with links to all relevant documents including a process flowchart	None $750 for Class2, plus $10 to $15k deposit for interconenction study	Accessible, visible disconnect Anti-islanding protection	Customer pays for meter changeout Upgrades include transfer trip and feeder protection	Not specified
Quebec	**Hydro-Quebec** Net Metering	20 kW (single phase) or annual load if lower than threshold 50 kW (3 phase)	Yes	7.5¢/kWh	No - energy credit is carried for 2 years	Yes	None	Dedicated pages on utility website	$400	Accessible disconnect not likely required for self-contained meters	Meter and other costs paid for by utility	Less than 1 month
Ontario	**Ontario Power Authority** MicroFIT	10 kW	Biogas, biomass, landfill gas, solar, wind and hydro	7.7 to 11.7¢/kWh	Yes - paid 11¢/kWh to 55¢/kWh for all energy produced (depending on technology)	No	None	Dedicated website with recent news & clear information (including videos) for process and requirements	None	Accessible, visible disconnect May require SCADA indication of status of disconnect device	Customer pays for meter; charge varies by distributor e.g. $208 for EnWin Utilities	20 to 25 weeks
Manitoba	**Manitoba Hydro** DRIP (Distributed Resource Interconnection Procedures)	Typically < 10 kW (no hard limit)	No	6.8¢/kWh	Yes 6.8¢/kWh	Yes	None	Website has extensive discussion of complexity and cost of connecting generators	$0	Need for accessible disconnect at discretion of electrical inspector Utility unconcerned about disconnect for inverters	Utility pays for new meter Customer pays for upgrades if required	Less than 1 month
Saskatchewan	**SaskPower** Net Metering	100 kW	Micro-hydro, wind, solar PV, biomass, flare gas and waste heat	~ 10¢/kWh	No	No	3.5% interest rate reduction on loans up to $50k with bank partner Rebate of 20% of installed cost up to $20k	Dedicated pages on utility website	$315	Accessible disconnect at entrance; may require additional disconnect for generation to avoid load outages Anti-islanding protection	Customer pays for meter changeout; typical cost is $300 to $500	Typically 6 months from first contact to operation; application review and study is about 2 months
Alberta	All Utilities - **ENMAX, Epcor and ATCO** Micro-Generator Regulation	Mini: < 10 kW Small: up to 150 kW Large: > 150 kW and under 1 MW	Solar, hydro, wind, biomass and fuel cells	~10.5¢/kWh for regulated rate option (based on 2011/12 rates)	Yes ranges from 6¢/kWh to 15¢/kWh	Yes	None	Alberta Utilities Commission website; clear guidebook for connection	None	ENMAX requires accessible disconnect Transfer trip may be required if maximum generation approaches minimum feeder load	Utility pays for meter Only extraordinary costs recoverable (excludes conductor and transformer changes)	5 weeks
British Columbia	**FortisBC** Net Metering	50 kW	Yes	8.8¢/kWh for first 1,600 kWh, then 12.95¢/kWh	Yes, in cases where a positive net excess generation at the end of the calendar year	No	None	Dedicated webpage with links to FAQs, tariff, application, guidelines and I/C agreement	None	FBC requires visible disconnect, generator switch, protective relay and anti-islanding protection	Upgrade may be required if customer has a dedicated transformer	Typically 8 to 10 weeks for simple projects

Net Metering – Jurisdicitional Review and Benchmarking Analysis

Jurisdiction	Utility / Program	Maximum Generator Size	Clean Technology Requirement	Residential Rate for Load Offset	Customer Paid for Excess Energy?	Generators Limited to Load Size?	Incentives	Program Communications	Interconnection Application Cost	Interconnection Requirements (paid by customer)	Interconnection Upgrades / Cost Responsibility	Process Length (from application to operation)
British Columbia	**BC Hydro** Net Metering	25 kW - simple 50 kW	Yes	6.9¢/kWh for first 1,350 kWh, then 10.34¢/kWh	Yes 9.99¢/kWh	No	None	Dedicated pages on website; dedicated interconnection requirement document	None	Customer must provide single line diagram and inverter data; additional requirement if generator > 30 kW Synchronous and primary service users charged for actual I/C costs	Visible, lockable disconnect is optional; no entry to customer premises required	Typically 8 to 10 weeks for simple projects
California	**Southern California Edison** Net Metering	30 kW - simplified 1 MW - others	Yes	15¢/kWh for first 400 kWh, then 30¢/kWh	Yes - at spot market rates (~4¢/kWh) Customer can roll credit over indefinitely	Yes	California Solar Initiative provides $200/kW installed 30% U.S. Federal Income Tax Credit	NM site not immediately obvious from homepage, but documents include sample applications and diagrams	Simple: $0 Others: $800	Visible, accessible disconnect required; may require transfer trip communications	Vary from transfer trip, transformer replacements and service drop reconductoring Utility pays for meter changeout	Not available
California	**Pacific Gas & Electric** Net Metering	30 kW - simplified 1 MW - others	Solar, wind, biogas and fuel cells	15¢/kWh for first 400 kWh, then 30¢/kWh	Yes - at spot market rates (~4¢/kWh) Customer can roll credit over indefinitely	Yes	California Solar Initiative provides $200/kW installed 30% U.S. Federal Income Tax Credit	Well designed website with organized information and easy access (two clicks from homepage to dedicated site)	$100 for simple $600 for supplemental $3,000 to $5,000 for detailed	Visible, accessible disconnect required Utility will determine need for transfer trip with communication costs borne by customer	Vary from transfer trip, transformer replacements and service drop reconductoring Utility pays for meter (up to $230)	Simple: 5 to 15 days Others: 2 months
California	**San Diego Gas & Electric** Net Energy Metering	30 kW - simplified 1 MW - others	Yes	15¢/kWh for first 400 kWh, then 30¢/kWh	Yes - at spot market rates (~4¢/kWh) Customer can roll credit over indefinitely	Yes	California Solar Initiative provides $200/kW installed 30% U.S. Federal Income Tax Credit	Well designed and organized website; one click from homepage to dedicated site	Simple: $0 Others: $800	No disconnect swith required for generators > 30 kW; interconnection switch required for larger projects	Potential costs if customer has a dedicated transformer which requires upgrading	Not available
Oregon	**Portland General and PacifiCorp**	Level 1: < 25 kW certified Level 2: < 2 MW certified Level 3: < 2 MW uncertified	Yes, solar, wind, hydro, biomass, LFG, fuel cells and anaerobic digestion	7.5¢/kWh	No - energy credit carried for 12 months at retail rates; therafter, credit accrues at avoided cost for low income customers	No	Oregon Energy Trust: $0.75/W installed up to $5,000 Oregon Income Tax Credit: $2.10/W up to $6,000 30% U.S. Federal Income Tax Credit	Dedicated pages at utility website accessible from homepage	Level 1: $0 Level 2: $50 + $1/kW Level 3: $100 + $2/kW	No costs borne by Level 1 customers May be some costs for Level 2 customers	Level 2 and 3 customers will bear upgrade costs	Level 1: 1 month Level 2 & 3: approx. 2 months

Net Metering – Jurisdicitional Review and Benchmarking Analysis

Jurisdiction	Utility / Program	Maximum Generator Size	Clean Technology Requirement	Residential Rate for Load Offset	Customer Paid for Excess Energy?	Generators Limited to Load Size?	Incentives	Program Communications	Interconnection Application Cost	Interconnection Requirements (paid by customer)	Interconnection Upgrades / Cost Responsibility	Process Length (from application to operation)
Washington	**Puget Sound Energy** Net Metering	100 kW	Yes, wind, solar, biogas, CHP/cogen and fuel cells	~ 8.5¢/kWh	No - energy credit carried for 12 months; thereafter, credit reverts to utility	No	Washington Renewable Energy Advantage Program (REAP) of 15-18¢/kWh up to $2,000/year 30% U.S. Federal Income Tax Credit	Webiste has a simple page (one click from homepage) which is informative and outlines a clear process	Varies	Customers bears costs for systems > 5 kW	Upgrade costs borne by customer when upgrades are needed	About 3 weeks for 5 kW
Vermont	**Green Mountain Power** (largest utility) Net Metering	500 kW 20 kW for CHP systems	Yes, including anerobic digesters and biogas	15¢/kWh	No - energy credit carried for 12 months; thereafter, credit reverts to utility	No	No sales tax on any portion of a renewable energy system Government bonus structure requires utilities to pay about 6 ¢/kWh for all energy produced 30% U.S. Federal Income Tax credit State Incentive program of $0.75/W installed Low interest loan program	Easily accessible utility webpage; easy to understand industry association website	$0 < 15 kW $300 for > 15 kW	Utility accessible, lockable, visible break disconnect switch required for > 15 kW	No upgrade costs borne by customer for generating systems < 15 kW	10 days for solar under 150 kW; 30 days for other projects < 150 kW < 10 kW is only a registration process and is very fast
New Jersey	**Public Service Enterprise Group**	Level 1: < 10 kW certified Level 2: < 2 MW certified Level 3: < 2 MW uncertified	No, but incentives have 'clean' criteria	9 to 11¢/kWh	Yes - after 12 months paid at avoided cost of wholesale power	Yes	30% U.S. Federal Income Tax Credit State sales tax exemption for solar equipment and installation.	Well designed and easily found webpages on individual utility website	Level 1: $0 Level 2: $50 + $1/kW Level 3: $100 + $2/kW	disconnect switch	Upgrade costs borne by Level 2 and 3 customers	Level 1: 4 to 6 weeks
Florida	**Florida Power & Light** Net Metering	Tier 1: 10 kW Tier 2: 100 kW Tier 3: 2 MW	No, but incentives have 'clean' criteria	9.5¢/kWh	Yes - at end of 12 months paid at avoided cost rate of about 6¢/kWh	Yes	State grant of up to $20k for capital ($2/W). 30% U.S. Federal Income Tax Credit	Well designed and easily found webpages on utility website	Tier 1: $0 Tier 2: $400 Tier 3: $1,000	Customers may bear some costs for < 10 kW Customers pay costs for > 10 kW	Upgrade costs borne by Tier 2 and 3 customers	8 to 10 weeks

BC hydro

Re: BCUC Order No. G-57-12

Net Metering Evaluation Report No. 3

Appendix E

Analysis of Small-Scale Offers Up to 15 MW

Analysis of Small-Scale Offers Up to15 MW

Issue	Details	RS 1289 - Net Metering (current)	Revised RS 1289 - Net Metering (up to 100 kW for General Service customers)	Proposed Micro SOP (50 kW to 1MW)	Existing SOP (50 kw to 15 MW)
Application Process	Recent amendments to the 1289 Tariff have combined the application form and the NM agreement	1-page application form and, for inverter based projects below 27 kW. For project above 27 kW and all synchronous/ induction application form, single line diagram, site plan, and more equipment information required. For synchronous and primary service customers – may require more review; cost recovery.	Same as current NM process.	Simplify SOP application process, reduce amount of information required from the proponent (as compared to the SOP).	Standard SOP process. No change.
Impacts		No impact	No impact	Minimal increase to SOP administrative costs	SOP administrative costs
EPA Contract term	Some project proponents have asked for shorter contract terms with an option to extend	No EPA. Customer may discontinue participation in rate at any time.	No EPA. Customer may discontinue participation in rate at any time.	Consider a more flexible term.	20-40 years. No change.
Contractual Arrangements	Document that governs obligation of the seller.	Terms and conditions in the tariff.	Terms and conditions in the tariff.	Consider a simplified form of EPA relative to existing SOP EPA.	Full form EPA. No change.
Impacts		No impact	No impact	Need to review whether any cost shifting impacts (e.g. costs that would usually be recovered over long term of EPA) + ensure no material risk changes if EPA form simplified.	N/A

Includes input from Interveners

Issue	Details	RS 1289 - Net Metering (current)	Revised RS 1289 - Net Metering (up to 100 kW for General Service customers)	Proposed Micro SOP (50 kW to 1MW)	Existing SOP (50 kw to 15 MW)
Delivery Req'ts	Majority of project proponents prefer no delivery requirements	Non-firm. No delivery requirements.	Non-firm. No delivery requirements.	Same as Existing SOP.	Non-firm. No delivery requirements. If proponent doesn't deliver for 2 consecutive years, can terminate EPA. COD must be within 3 years of EPA signing.
Impacts		No impact	No impact	No impact	No impact
Technical Interconnection Requirements	Customers remarking on onerous interconnection requirements	Existing Net Metering Interconnection Requirements	Existing Net Metering Interconnection Requirements	Review Distribution Interconnection. Clarify the reduced requirements for projects up to 1 MW (completed in revised NMIR document)	Distribution Interconnection requirements, has been simplified with fewer equipment requirements for generators 50 kW to 1 MW. No change.
Impact		No impact	No anticipated impact	No anticipated impact	No anticipated impact
Interconnection Study	Customers remarking on high costs	N/A	For projects above 50 kW (if NM size is extended above 50 kW), screening / study designed for small projects at a lower fixed fee.	BC Hydro exploring possibility of reducing interconnection study costs by using modified screening study and timing for payment.	Prescribed in rules. No change.
Impact		No impact	No impact if fixed fee does not result in material cost shifting to non- participating customers on aggregated basis.	No impact if changes do not result in material cost shifting to non-participating customers.	Screening $5K Impact/Facility Study $20-65K.

Issue	Details	RS 1289 - Net Metering (current)	Revised RS 1289 - Net Metering (up to 100 kW for General Service customers)	Proposed Micro SOP (50 kW to 1MW)	Existing SOP (50 kw to 15 MW)
Network Upgrade	Project proponent provides NU security for the entire cost, including BC Hydro's portion. Currently this is refunded about 90 days after COD, but this changed to a gradual refund over 5 years because of a D-side policy change	Not relevant. Customer is responsible for the costs to upgrade their existing service to be large enough to accommodate proposed NM installation. BC Hydro is responsible for network changes when total generator size is less than service size	Same as current RS 1289. BCH contemplating developing a $X/kW installed capacity mechanism similar to the SOP.	BC Hydro exploring payment options & timing for participants to pay for their NU costs.	Prescribed in rules. BCH pays $150/kW installed capacity. No change.
Impact		No impact	No impact if no cost shifting or increased risk to non-participating customers.	Impact to BC Hydro and non-participating ratepayers not known at this time, more study is required.	No impact.
Metering	Cost of meters, CTs and VTs (IPPs lease meters from BCH and supply CTs/VTs, customers are provided meters and CTs/VTs by BCH and then pay for them)	One smart meter, same as the customer's load meter No additional meter is required. Meter is provided by BCH. For large service BCH supplies CTs/VTs as part of load service.	Same as existing RS 1289.	Potentially use Smart Meter as revenue meter.	IPP pays for meter installation and CTs/VTs, and then leases meter from BCH. IPP pays for telecom. No change.
Impact		No cost to the customer to install or read the meter. Assuming it is an existing service. For new service customer pays BCH for meter and VTs/CTs if required.	Same as existing RS 1289.	Modest cost savings for Smart meters. More analysis is required to determine cost savings and impacts to customers and BCH. IPP to pay for CTs/VTs .	No impacts.
BCH Incentives	Customer-owned generation that receives load displacement or DSM funding is not eligible for other supply side opportunities.	No incentives contemplated in short term.	No incentives contemplated in short term.	Same as Existing SOP.	Customer owned generation that receives load displacement or DSM funding is not eligible for SOP.

Includes input from Interveners

Issue	Details	RS 1289 - Net Metering (current)	Revised RS 1289 - Net Metering (up to 100 kW for General Service customers)	Proposed Micro SOP (50 kW to 1MW)	Existing SOP (50 kw to 15 MW)
Impact		No incentives contemplated	No incentives contemplated		
Inflation in SOP	BC Hydro's 50% CPI in the SOP process causes financial barrier for some small developers	Not relevant	Not relevant	Consider lower energy price to small scale developers while increasing CPI to 100%	Existing process remains as is
Impact		No Impact	No Impact	Requires further study to understand financial risk to BC Hydro and ratepayers if payment changes.	No Impact
Regulatory	Any supply side process should be under BCUC process vs. removing small scale projects from scrutiny of BCUC	RS 1289 is BCUC approved tariff.	RS 1289 is BCUC approved tariff.	Exempt per Clean Energy Act.	Exempt per *Clean Energy Act.*
Impact		No impact	No impact	No impact.	No impact

BC hydro

Re: BCUC Order No. G-57-12

Net Metering Evaluation Report No. 3

Appendix F

Distributed Generation Business Models

BC hydro

Distributed Generation Business Models

1. Customer Self-generator – Customer owns and operates the DG asset which is installed behind the meter. Installation is sized to meet customer-specific demand and provide energy to the customer. A hybrid model is often implemented whereby assets are sized to provide surplus power which can be dispatched to the grid. This is similar to RS 1289 and load displacement offers.

2. Customer Energy Supplier – Customer owns and operates the DG asset which is installed on customer premises. Customer agrees to provide power back to the grid at a specific rate $/MWh which is tied to market pricing. This is a supply-side opportunity similar to the SOP.

3. Customer Energy Supplier (Feed in Tariff) – Customer owns and operates the DG asset which is installed behind the meter. Customer agrees to provide power back to the grid at a premium rate (relative to market pricing) that is often tied to innovative or emerging DG technology, e.g., fuel cells, anaerobic digesters.

4. Integrated Energy Management Solution – This is a “solutions” oriented model involving bundled offerings (Energy Efficiency, DG, Demand Response) tailored to customer needs. Involves innovative pricing and integrated contracts for supply and demand side products. This model is similar to the Integrated Power Offer (**IPO**) and BC Hydro’s new Integrated Customer Solutions (**ICS**) process.

5. Joint Utility Customer Ownership – This involves customer ownership of customer-site DG facilities, typically combined heat and power, with electricity generated dispatched to the grid and heat (steam) provided to the customer. This could involve a joint venture involving public utility, customer, and other third parties (e.g., IPPs).

6. Utility Owned Customer Directed – The utility owns and operates customer sited DG assets which are primarily targeted to supply power specific to the customer, although surplus power can also be dispatched directly to the grid. This model could be used in situations where a community is in a remote or under-serviced area with poor capacity/reliability, and the utility provides the solution (e.g., provides diesel generation.).

7. Utility Aggregator – This model is enabled by Smart Grid Smart metering infrastructure and suggests that the utility will be able to dispatch both customer demand response and DG resources according to the market and reliability factors. Essentially this model can be viewed as a “virtual peaker plant” with potential to sell aggregated supply on the wholesale market.