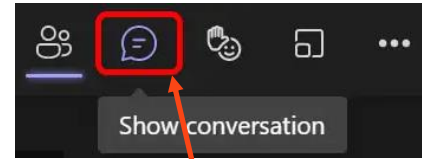


Welcome to the Net Metering Industry Workshop

We'll be getting started shortly

How to participate

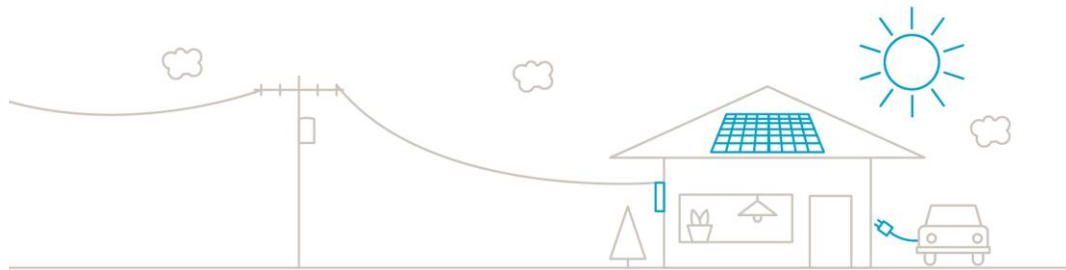
- Let us know you're here. **Please enter your first name, last name, and organization in the chat.**
- Video and microphone have been turned off to save bandwidth and eliminate background noise
- The chat function is available for questions and comments
- A copy of this presentation will made available following this session



Click on this icon
to access the chat

Net Metering Industry Workshop

April 5, 2023



Workshop Agenda

Time	Agenda item	Presenter
8:00 – 8:30	Welcome and net metering update	Jenn Shum, Senior Program Manager
8:30 – 9:15	Upcoming rate application <ul style="list-style-type: none">• Summary of jurisdictional review and your feedback	Taver Bahrami, Senior Regulatory Advisor
9:15 – 9:45	Application process improvements	Jenn Shum, Senior Program Manager Ty Ding, Senior Engineer Shah Rahman, Asset Management Planning Leader
9:45 – 10:00	Wrap up and next steps	Jenn Shum, Senior Program Manager

Objectives for Today's Session

- Provide an update on BC Hydro's net metering service
- Provide a summary of how other North American utilities are evolving their net metering services
- Explore potential changes to our net metering service and seek your feedback
- Provide tips and tricks for a smoother application process

Net Metering Service Update

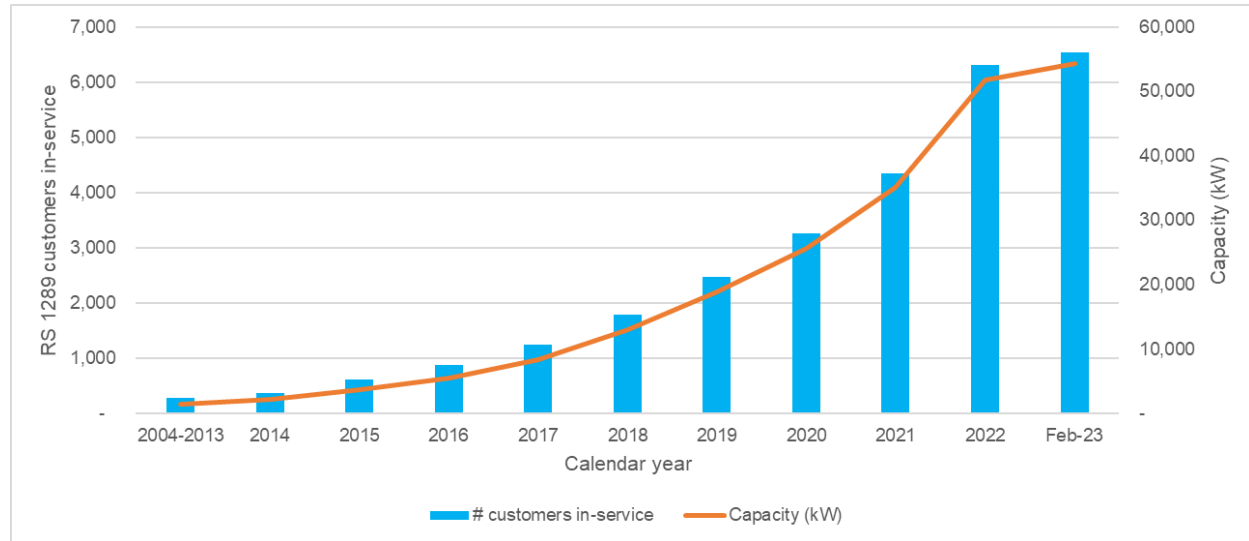
Jenn Shum, Senior Program Manager

Net Metering Service Update

The number of net metering customers has grown significantly over the past four years

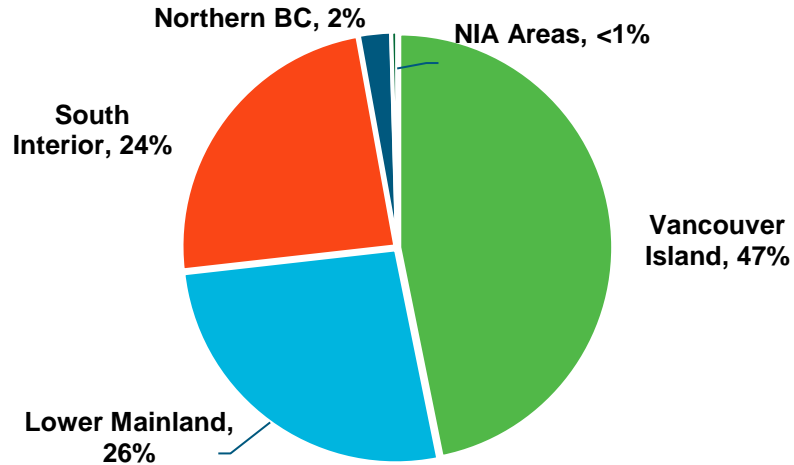
- As of February 2023, there are approximately **6,500** net metering customers.
- Total connected generation capacity is approximately **55 MW**.

Equivalent to powering ~40,000 electric vehicles using Level 1 charging



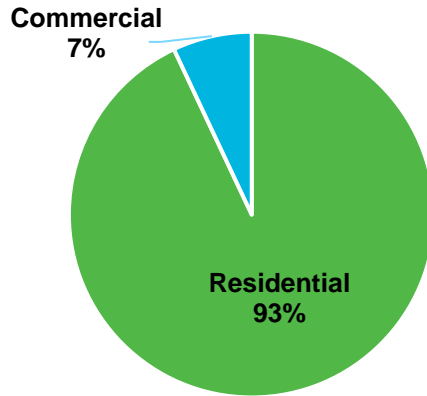
Net Metering Customers

Participation by region



Net Metering Customers

Participation by sector



- Residential customers enrolled in net metering consume about 40% more electricity than the average residential customer
- Average bill of a residential solar net metering customer is \$138 per month
- Average bill of a residential non-net metering customer is \$94 per month.

Net Metering Projects

Types of projects



Simple Net Metering

For inverter-based projects up to 27 kW in size with a self-contained revenue meter for service 200A or less

91% of applications



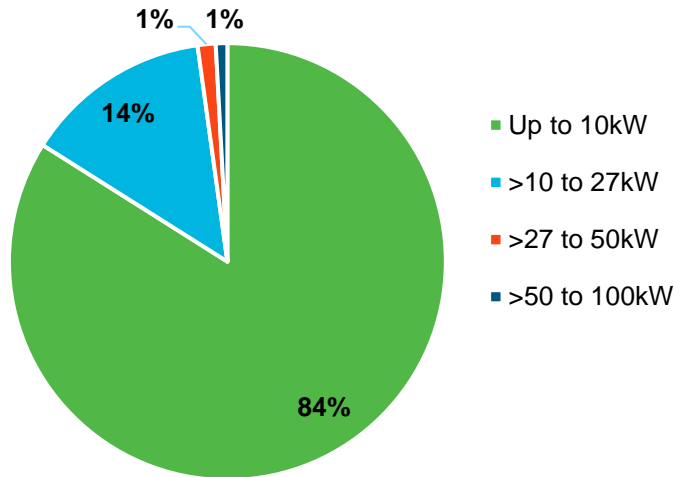
Complex Net Metering

All other projects up to 100 kW

9% of applications

Net Metering Projects

Project size



	Residential %	Commercial %
Up to 10 kW	95%	5%
>10 to 27 kW	86%	14%
>27 to 50 kW	33%	67%
>50 to 100 kW	12%	88%

Net Metering Generation Technology

Generation technology	# of customers	Residential %	Commercial %
Solar	6,513	93%	7%
Hydro	17	41%	59%
Wind	9	33%	66%
Wind / Solar	5	40%	60%
Hydro / Solar	2	100%	0%
Biogas	1	100%	0%
Total	6,547		



Net Metering Excess Generation

	2019	2020	2021	2022
# of Net Metering Customers	2,473	3,268	4,352	6,302
# of Customers Received Payout	621	355	350	446
Excess Generation (MWh)	4,550	2,815	4,333	3,676
Transitional / Mid-C energy price (¢/ kWh)	9.99	9.99 / 4.87	9.99 / 2.85	9.99 / 6.19
Total Annual Payment (\$)	\$454,588	\$280,627	\$414,384	\$345,314

Net Metering Excess Generation

- **Excess hydro generation**
 - On average, 64% of hydro customers received annual payments, representing 71% of annual payments.
 - In 2022, payments for hydro generation averaged \$24,500 per customer, with a high of \$76,000.
- **Excess solar generation**
 - On average, 13% of solar customers received annual payments representing the majority of the remaining 29% of annual payments.
 - In 2022, payments for solar generation averaged \$238 per customer, with a high of \$6,200.



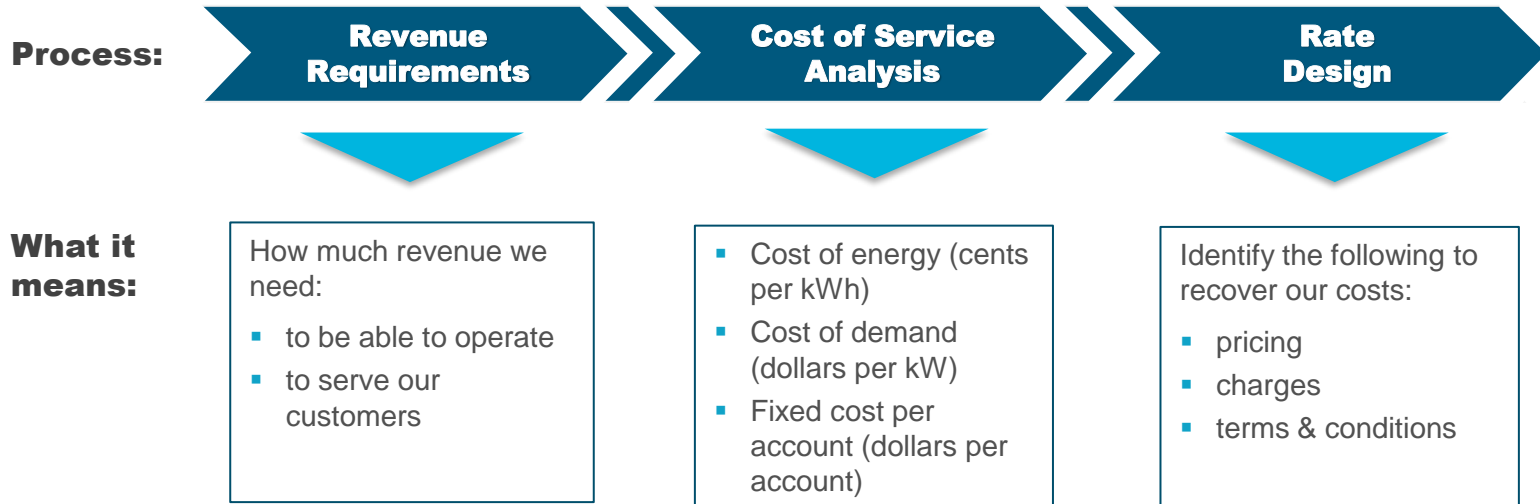
Upcoming Rate Application

Summary of Jurisdictional Review & Your Feedback

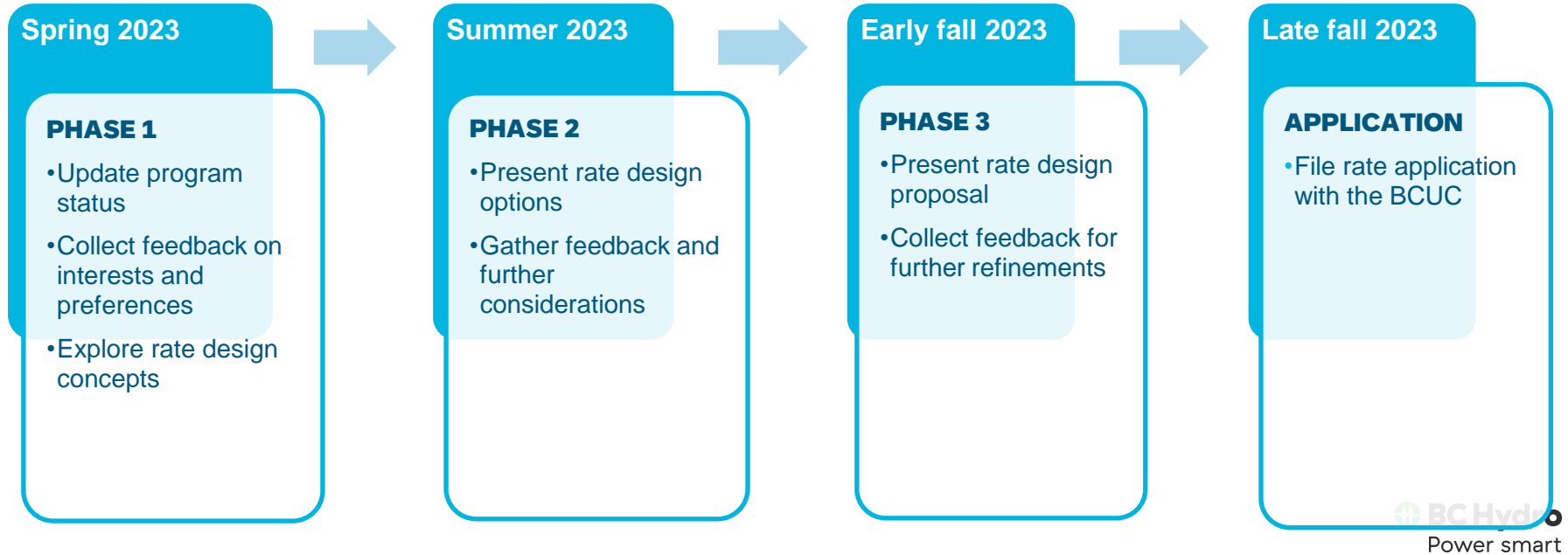
Taver Bahrami, Senior Regulatory Advisor

What is Rate Design?

Rate design refers to pricing, charges, and terms & conditions of service



Net Metering Rate Design Consultation



Jurisdictional Scan of Net Metering Offerings

The Brattle Group studied the evolution of Net Metering programs in 13 Canadian and US jurisdictions

Alberta	Arizona	California	Florida	Hawaii
Illinois	Minnesota	New York	North Carolina	Nova Scotia
Ontario	Oregon	Saskatchewan		

Areas of Focus

We've distilled the results of the jurisdictional review into five areas of focus

- **Compensation mechanisms**
 - How excess energy is treated
- **Rate Design Modifications**
 - How to price imports and exports
- **Eligibility Criteria**
 - Who can join and virtual net metering
- **Planning Resource**
 - Providing compensation for grid services to net metering customers
 - Offering programs to reward addition of battery storage solutions
- **Moving Away from a One Size Fits All**
 - Having multiple net metering rates apply to different customer groups

Compensation Mechanisms

Compensation Mechanism	Description	Metering Requirements
Traditional Net Metering	<ul style="list-style-type: none"> A customer's self-generation offsets energy consumption at the home or business. Any excess generation is sent back to the utility and credited on the customer's bill as kWh generation credits. Excess kWh credits that remain on the annual anniversary date are compensated at an average annual market price (¢ per kWh). 	Can be implemented with legacy utility meters as excess generation simply "rolls back" the meter
Net Billing	<ul style="list-style-type: none"> Customer's self-generation offsets energy consumption at the home or business first. Any excess generation is sent back to the utility and compensated at a pre-determined rate (¢ per kWh) that may differ from the utility's retail rate. Generation and consumption are "netted" at a pre-determined "netting interval". This can be instantaneous, hourly, daily, etc. Some jurisdictions also impose "non-bypassable" charges (components of the rate that cannot be avoided). 	Requires a smart meter for netting intervals shorter than a billing cycle
Buy All – Sell All	<ul style="list-style-type: none"> Customers pay for all their energy consumption at the utility's retail rate. Customers are compensated for all their self-generation at a pre-determined rate. 	Requires the solar array to be separately metered



Trends in Compensation Mechanisms (1)

Most jurisdictions are moving to net billing with updates to the compensation rate for excess energy

- Many jurisdictions maintain the retail rate as the export rate for small customers, meaning overall compensation for solar customers is almost unchanged relative to traditional net metering.
- Other jurisdictions compensate exports at an avoided cost, with many different methodologies to calculate avoided cost. Methodologies include:
 - “Avoided Cost Calculators” that set the value based on historical observed avoided costs in various categories (Energy, T&D, GHG)
 - “Value of Solar” which sets the value based on a projection of long-term value streams of solar
 - Other methods such as setting the value based on the avoided utility scale solar cost

Trends in Compensation Mechanisms (2)

When moving to net billing – an appropriate netting interval must be determined

The netting interval determines how imports and exports are measured

- Several jurisdictions use instantaneous netting, which is the most accurate and cost-reflective method
- Some jurisdictions use hourly or monthly netting, which are seen as simpler to understand and lead to higher compensation relative to instantaneous netting
 - Longer netting intervals are more beneficial for net metering customers as there is more scope for exports to offset imports (e.g., daily netting would allow generation during the day to offset imports at night, but hourly netting would not allow this)

Compensation Mechanism

Feedback Questions

- Please rank each compensation mechanism in your order of preference
 - for **residential** customers
 - for **commercial** customers
- If there is a different compensation mechanism that you'd like BC Hydro to consider, please specify and rank that mechanism as well.

Rate Design Modifications

Rate Design Modifications	Notes
Time-of-Use (TOU)	<ul style="list-style-type: none">• The value of a kWh is based on the time of day.• Typically, between 2 to 3 pricing periods.
Increasing fixed charges	<ul style="list-style-type: none">• Typically, a fixed daily charge to recover customer costs.
Demand Charges	<ul style="list-style-type: none">• Requires a demand capable meter.
Grid Access Charges	<ul style="list-style-type: none">• Some jurisdictions assess a fee from net metering customers to reflect the costs they impose on the T&D system• Fee may be a fixed monthly fee or a per-kW installed solar fee
Grid Services Payment	<ul style="list-style-type: none">• Some jurisdictions pay NEM customers additional compensation to reflect grid services they provide or to reflect avoided T&D costs• Payment is typically per-kW of installed solar

Trends in Rate Design Modifications

Several jurisdictions are redesigning rates for ALL customers in parallel with changes to the compensation mechanism

- This allows implementation of more cost-reflective rates for net metering customers without the appearance of discriminatory/preferential pricing.
- The new rates typically contain higher fixed charges and a highly differentiated TOU component.
- Some even have demand charges, such as Hawaii's new rate.
- Utilities in many jurisdictions have attempted to impose Grid Access Charges (GACs) on solar customers.
 - Some of these have succeeded, but they are highly contentious, and many have been vetoed or struck down.
 - GACs are seen as discriminatory as they are targeted only at solar customers.
 - A similar impact can be achieved by creating rates with higher fixed charges for all customers.

Rate Design Modifications

Feedback Questions

- Please rank each rate design modification in your order of preference
- If there is a rate design modification that we did not mention that you would like BC Hydro to consider, please specify and rank it.

Net Metering Eligibility Varies By Jurisdiction

Eligibility criteria	Notes
Eligible technologies	<ul style="list-style-type: none">• Eligible technologies vary by jurisdiction.• Some limit qualifying technology to renewables while others allow all customer-owned generators.
Applicable customer classes	<ul style="list-style-type: none">• Most jurisdictions allow both residential and commercial customer classes to be eligible.
Individual customer capacity limit	<ul style="list-style-type: none">• Some jurisdictions set system capacity limits to regulate the size of individual installations.• Capacity limits can be defined either in terms of load or as a percentage of annual demand.
Program size cap	<ul style="list-style-type: none">• Some jurisdictions have aggregate net metering caps limiting the total amount of installed net metered generating capacity.• Caps are typically defined as a percent of the jurisdiction's load/peak demand in a reference year.
Virtual net metering	<ul style="list-style-type: none">• Some jurisdictions allow subscribers across more than one meter to receive net metering credits according to their share of the generation.
Third party ownership	<ul style="list-style-type: none">• Some jurisdictions are taking steps to enable/allow third party ownership of generation to reduce upfront costs so that more customers can afford to participate (e.g. by renting or leasing their generating equipment).

Eligibility Criteria

Feedback Questions

- Should BC Hydro consider changes to the eligibility criteria to enable virtual net metering?
- Should BC Hydro consider changes to the eligibility criteria to facilitate more renting/leasing arrangements?
- What is a reasonable capacity limit for BC Hydro to consider?
- Should BC Hydro consider a capacity limit based on load or % of annual demand?
- Please mention any other eligibility criteria changes you'd like BC Hydro to consider.

Trends in Other Factors Effecting Compensation

Providing a suite of programs to allow net metering customers to provide grid services

- These programs are similar to Demand Response programs and reward dispatchability and peak reduction.
- They incentivize the addition of battery storage.
 - Battery storage with time-of-use rates can provide a new customer revenue stream.

Planning Resources

Feedback Questions

- What options should BC Hydro consider to recognize and enhance the value of net metering?
- If there is an option that we didn't mention that you'd like us to explore, please mention it.

Moving away from the current “one size fits all” approach

- BC Hydro recognizes that some of the options discussed above may work better for certain groups of customers than others.

Moving away from the current “one size fits all” approach

Feedback Questions

- Should BC Hydro explore applying the options discussed to different customer groups?
- What different customer groups should BC Hydro consider?

Application Process Improvements

Jenn Shum, Senior Program Manager

Ty Ding, Senior Engineer, Distribution Asset Planning

Shah Rahman, Asset Management Planning Leader

Application Process Improvements

General notes

- Confirm the validity of the customer's email address, and that the MyHydro profile is linked to the appropriate site address.
- For inverters that aren't on the dropdown list, please upload the inverter data sheet/CSA certificate.

Home > Accounts > MyHydro > Connection requests > Net metering application

Net metering application

If you're interested in installing a new or expanded generating system as part of our net metering program, begin your application below. If your contractor has already created a draft application on your behalf, refer to the bottom of the page to continue a draft application.

Application type > Contractor Info > Generating system > Submit

Start a new net metering application

Before you begin:

- Make sure you've read about the [net metering installation process](#)
- Have the following information ready:
 - BC Hydro account number
 - Meter number
 - Generating system specifications
- The application takes approximately 10-15 minutes to complete.
- Note that unsubmitted applications won't be saved

Application type

- **What is your role?**
 - I'm the contractor
 - I'm the customer
- **Project type**
 - New generator
 - Addition to an existing generator
 - Replacement of an existing generator

Cancel **Next**

Application Process Improvements

Inspection report

- Required for interconnection approval
- Must identify the net metering installation

TECHNICAL SAFETY BC

**ELECTRICAL CONTRACTOR AUTHORIZATION & DECLARATION OF COMPLIANCE
ELECTRICAL INSPECTION REQUEST**

Permit Number: Requested Inspection Date: November 18, 2022
Inspection Type: ASSESS: EL: Final Conceal Date:

Additional Information

Name of Licensed Electrical Contractor:

Site Address on Permit: Unit or Suite: Civic Number:
Street Name: Street Type: Province: BC
City: Postal Code:

Non-compliances corrected Date non-compliance corrected:

Notes/Work Description for this inspection request: **Install 48 x 370=17.8 kW solar grid-tie system** consisting with rapid-shutdown, constituting two solar circuits. These two solar circuits feed a 10.0kW Fronius inverter that feeds an 80 amp fused disconnect. The solar system feeds a splitter installed by others. Incoming electrical service work done by others under EL:

FSR Information

FSR Name: FSR Class:

Preferred Method of Communication - Type:
Preferred Method of Communication - Info:

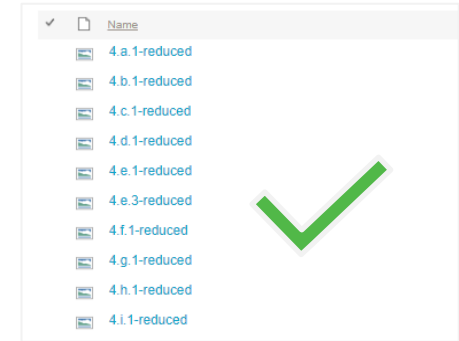
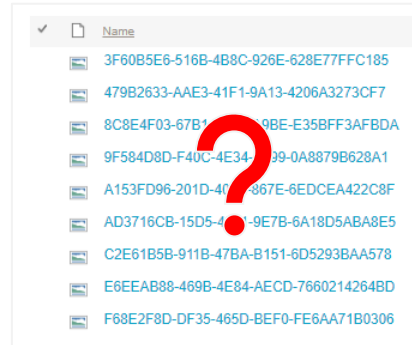
FSR Declaration

I am the Field Safety Representative for the above licensed contractor and hereby declare that the electrical installation authorized under the above mentioned permit is safe to inspect and has been installed to comply with the Safety Standards Act and Regulations of British Columbia.

Tips to Speed Up the Technical Review

Supporting documents and photos should be properly named

- Field verification (FV) photos should be named according to Section 4 of the form
 - *4.d. Inverter nameplate*
- If multiple pictures are for the same item, include an additional suffix
 - *4.d.1. Inverter nameplate*



Tips to Speed Up the Technical Review

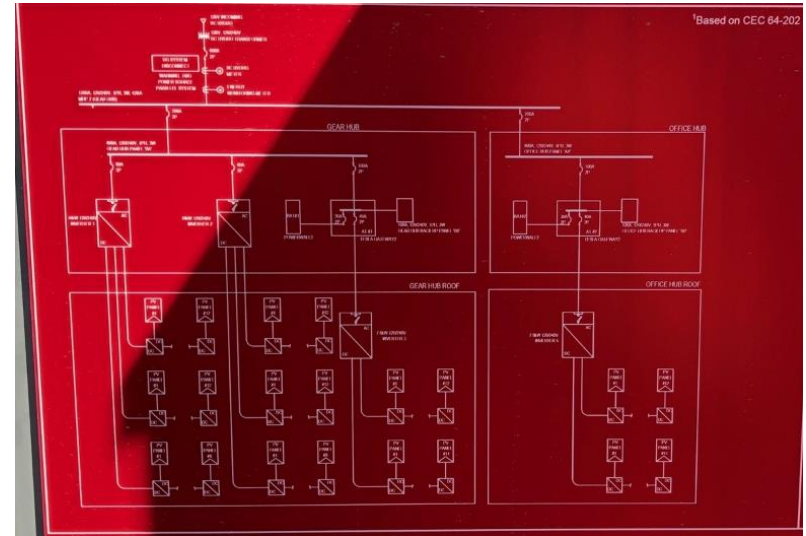
Information must be consistent across all documentation and the installation

- Common inconsistencies we've seen include:
 - Inverter model does not match between application form, single line diagram (SLD) and FV photos.
 - Number of inverters does not match between the application form and SLD
 - Equipment ID, location, and labelling is inconsistent between SLD, site plan, FV photos, and the installation.
- Changes should be made across all the relevant documents where applicable.

Tips to Speed Up the Technical Review

FV photos should be legible and identifiable

- The higher the resolution, the better.
- Show that the label has been placed at the appropriate location



What and where?

Tips to Speed Up the Technical Review

Act on and respond to every request

- Unaddressed or partially addressed items add unnecessary rounds of review and result in longer turnaround times.
- Use writing response to each request as a self check step to make sure every request has been addressed before resubmittal
- Refer to the sample single line diagram and site plan for a fulsome list of documentation requirements
 - [Single line diagram \(SLD\)](#)
 - [Site plan](#)

Tips to Speed Up the Technical Review

Provide additional information proactively where applicable

- When a site has transfer switch connected back-up generators, provide the transfer switch working mode, manual, and nameplate photos.
- When energy storage and/or hybrid inverters are used, provide a description of anti-islanding function to prevent energizing deenergized BC Hydro system, relevant supporting documents, and photo proof (E.g. Snapshots from controller, settings, etc.)

Complex Application Review Process Simplification

Poll question

What if BC Hydro does not request to review single line diagrams, site plans, and field verification photos?

- Great!
- I have concerns
- No comment

Complex Application Review Process Simplification

We're looking into simplifying the review process for complex applications

Specifically, for applications that meet the two conditions below:

- Solar generation without energy storage; **and**
- Inverters are CSA C22.2 No. 107.1 certified and comply with rules in CSA CC22.3 No. 9

For these applications, we're looking into **not requiring** a single line diagram, site plan, and field verification photographs for BC Hydro review, unless otherwise requested. Installers are deemed to follow all codes from the Canadian Electrical Code, Part I.

As of today, approximately 90% of complex application installs solar without energy storage. This potential simplified process will improve the application approval process and turnaround time.

Do you have any thoughts or concerns with this simplified process?

Wrap Up and Next Steps

Jenn Shum, Senior Program Manager

Wrap Up and Next Steps

We want to hear from you!

- Rate application feedback requested by April 21st
 - You'll be receiving an email shortly with a link to a feedback form to continue providing feedback on the topics discussed today, and to let us know if there are other topics of interest we haven't covered.
 - A copy of the presentation will be posted on our website for your reference.

Wrap Up and Next Steps

We want to hear from you!

- Depth interviews
 - We'd like to better understand you and your customer's experience with net metering. If you're interested, please complete the relevant section on the feedback form.
- Complex application review process simplification
 - We'll regroup on your feedback provided today and will share next steps when ready.

Wrap Up and Next Steps

Upcoming engagement activities

- We'll be putting together rate design options based on the feedback we've received
- We plan to invite you to a follow up workshop in the summer to present rate options to learn more before finalizing the proposed rate options.
- In the meantime, further questions or comments on the net metering rate design application can be emailed to net.metering@bchydro.com.

