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July 7, 2017

British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, B.C.
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Attention: Mr. Patrick Wruck, Commission Secretary and Manager, Regulatory Support

Dear Mr. Wruck:

Re: FortisBC Inc. (FBC)

Project No. 1598911

Application for Community Solar Pilot Project

Response to the British Columbia Utilities Commission (BCUC or the Commission) Information Request (IR) No. 1

On April 26, 2017, FBC filed the Application referenced above. In accordance with Commission Order G-89-17 setting out the Regulatory Timetable for the review of the Application, FBC respectfully submits the attached response to BCUC IR No. 1.

If further information is required, please contact Corey Sinclair at 250-469-8038.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments

cc (email only): Registered Parties

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A. COMMUNITY SOLAR PILOT OPPORTUNITY AND PURPOSE

1.0 Reference: COMMUNITY SOLAR PILOT OPPORTUNITY

Exhibit B-1, Application, Section 1, p. 1; FortisBC Energy Inc. Inquiry into the Offering of Products and Services in Alternative Energy Solutions and Other Initiatives, Order G-201-12 and Report dated December 27, 2012, pp. 6–17

Purpose of the Community Solar Pilot Project (CSPP)

FortisBC Inc. (FBC) states the following on page 1 of the Application:

> The CSPP is not a significant source of energy in the context of FBC's overall requirements; the Program is driven by customer considerations…The Program will provide customers with a new renewable energy option, and provide information to consider in the development of potential expanded offerings in the future.

FBC further states on page 1 of the Application that "there is no existing or mid-term power supply shortfall driving the need for solar energy".

1.1 What other service offerings have FBC provided in the past which have not been driven by public need? Please describe these service offerings.

Response:

FBC interprets "public need" in the context of this question to refer to the ability of the Company to deliver on its primary obligation to deliver electricity to its customers in a safe and cost effective manner. Even though the CSPP is not a "public need" by this definition, there are a number of programs and rates that are offered by the Company driven either by direction or customer request. Rates that have specifically been implemented in response to customer preference include the Net Metering rate (RS95), the Stand-by Rate (RS37), the Green Power Rider (RS85). In addition, The Residential Conservation Rate (RS01) and the various Time-of-Use schedules have been put in place as either the default rate or an optional offering but are not required to provide service or mitigate rate increases to customers in general.

1.2 Please confirm, or explain otherwise, that FBC does not consider the purpose of the CSPP as being either a new generation resource or a demand-side management (DSM) activity.

Response:

FBC does not consider the CSPP to be a demand-side management activity. FBC does consider the CSPP to be a new generation resource, since, as a practical matter, it delivers energy into the FBC system that is used to meet customer load. However, due to timing, the CSPP was not included in the recommended resource portfolio contained in the Company's most recent Long-Term Electric Resource Plan (LTERP).

On December 27, 2012, the Commission issued Order G-201-12 and accompanying report regarding the FortisBC Energy Inc. (FEI) Inquiry into the Offering of Products and Services in Alternative Energy Solutions (AES) and Other New Initiatives (AES Inquiry Report).

On pages 6–7 of the AES Inquiry Report, the Commission outlined the following key principles and guidelines:

- Only regulate where required;
- Regulation should not impede competitive markets;
- Regulation is required when:
    - Natural monopoly characteristics are present and there is a need to regulate to protect the public interest; and/or
    - Legislation (such as the *Utilities Commission Act* or the *Clean Energy Act*), required an activity to be regulated.

1.3 Please confirm, or explain otherwise, that the CSPP would appropriately be characterized as a new service offering and/or a new business activity.

Response:

The approval of the CSPP would not result in a new business activity for FBC. FBC is primarily engaged in the delivery of electricity to its customers and this would remain unchanged. While the resource relied upon to meet customers' load varies, the generation source is largely invisible to the end customer and could be FBC owned generation or purchases from other suppliers. The CSPP differs only in that it provides the opportunity for a customer to specify that some portion of their load is notionally met with the output from the solar resource, and is priced accordingly. In this regard, the CSPP is similar in nature to the renewable natural gas (RNG)

service offering available to customers of FEI whereby bio-methane injected into the pipeline system can be purchased by customers at a premium rate.

1.4 Please discuss how the proposed CSPP aligns with each of the principles and guidelines established in the AES Inquiry Report. Please identify and address each principle and guideline outlined in the AES Inquiry Report in this response.

Response:

The *Inquiry into the Offering of Products and Services in Alternative Energy Solutions and Other New Initiatives* (AES Inquiry) examined, in part, issues with respect to the scope and nature of regulation of new business activities which are not related to the provision of products and services normally considered to be traditional utility activities. As noted in the response to BCUC IR 1.1.3 above, FBC does not consider the production of energy for sale to customers by the Ellison solar array to be a new business activity – only a new resource that is offered for sale at a premium in recognition of the resource used.

One of the overarching issues in the AES Inquiry was to establish principles and guidelines for determining the need for regulation. If the need for regulation is established, then the form that regulation should take would be considered.

In the case of the CSPP, FBC is asking for no special consideration concerning the regulation of the Project. Project and related rate approval is being requested with the understanding that the resource and rates fall firmly under the regulation of the Commission just as any other rate offer would.

Therefore, in terms of the noted principles and guidelines, the Company submits that regulation is required and is already present for the reasons given in the bulleted list in the preamble to question 1.1.3. While a competitive market exists for the construction and operation of generation facilities of all types, there is no reasonable prospect of a competitive alternative to the utility-customer relationship typified by the existing manner in which energy is produced and delivered to the retail customers of FBC, whether from existing resources or the addition of new resources, solar or otherwise.

However, to be responsive to the question, FBC has reviewed the "Summary of Directives, Determinations and Recommendations" provided in Appendix H to the AES Inquiry Report and provides the following summary:

There are five sections, of which three – CNG Activities, LNG Activities, Thermal Energy Services – are not relevant to the CSPP. Of the remaining two – Other Findings and

Determinations and Other Recommendations – FBC has found only two items that are applicable to entities other than FEI. These are "The FEU and other utilities considering a new business activity should follow the example provided by the Biomethane Service Introduction in any future applications." and "Sharing of services among affiliates should be done on the basis of the higher of market pricing or the fully allocated cost in accordance with the Principles and Guidelines and an approved Code of Conduct and Transfer Pricing Policy."

FBC believes that its Application is consistent with the first item, and that the second item is not applicable in this context.

2.0 Reference: COMMUNITY SOLAR PILOT OPPORTUNITY

Exhibit B-1, Executive Summary, p. ES-1

Renewable Energy Certificate market

FBC states on page ES-1 of the Application that it "seeks approval for two rate options that will provide customers with an opportunity for including solar power in the mix of energy used to power their home or business."

2.1 Did FBC consider offering an unbundled renewable energy certificate (REC) product to its customers as an alternative to the CSPP? If not, why not? If yes, please explain why this option was not pursued.

Response:

FBC did not consider offering an unbundled renewable energy certificate (REC). The objective of the Project is specifically to provide customers with an option to meet a portion of their load with an identifiable solar resource in response to customer interest and for FBC to gain insight into the operation of the CSPP. The objective is not the general promotion of alternate renewable resources, which, given the context of FBC's existing resources, does not make sense. The sale of an REC product does not meet the stated objectives of the Project.

2.2 Would FBC characterize the CSPP as providing a bundled renewable electricity product, meaning that the environmental attributes of solar generation are bundled with regulated electrical energy? Please explain.

Response:

FBC would not make such a characterization. It is unclear how environmental attributes become bundled with regulated electrical energy as a practical matter in meeting customer load or setting rates, and the source of energy is not a consideration in the setting of rates that are currently available to customers.

2.3 Does FBC plan on having the environmental attributes from the CSPP certified by an environmental standards agency for renewable low-impact electricity products, such as EcoLogo? Please explain why or why not.

Response:

Certification is generally obtained if there is a need to demonstrate that a project is providing green power. Some form of certificate would then be available in the amount of the project's generation. This certificate has potential uses outside of the Program's intent to provide certain customers with a solar option.

Since this is a solar facility and meets the definition of BC Clean, FBC does not believe any certification is required in this case. In addition, since the Project is driven by customer interest, FBC does not believe there is a requirement to obtain the certificates in order to meet the Program objectives.

2.4 Please discuss the potential impact the CSPP will have on the REC market. In particular, does FBC consider there to be a potentially negative impact on the REC market as a result of the CSPP?

Response:

FBC is not aware of an active REC market in BC. However, customers do have other alternatives to offset their electricity use through the purchase of "green" energy products, such as those available from Bullfrog Power[1].

[1] https://www.bullfrogpower.com/products-solutions/.

B. CUSTOMER FEEDBACK AND ENGAGEMENT

3.0 Reference: CUSTOMER FEEDBACK AND ENGAGEMENT
Exhibit B-1: Section 2, pp. 2–3; Appendices D and E
Customer surveys

FBC states on page 2 of the Application: "In order to gauge customer interest and preferences toward a FBC solar energy offering, the Company contracted Sentis Market Research Inc. (Sentis) to conduct two research surveys – one completed in February 2016 and the second in December 2016."

3.1 Please provide the total cost incurred by FBC, both in terms of external and internal resources, to conduct, analyze and report on the customer surveys.

Response:

The total cost incurred was approximately $60 thousand. External costs amounted to $56 thousand and internal costs are estimated at $4 thousand.

3.2 Aside from the February and December 2016 customer surveys conducted, did FBC undertake any other methods of research and/or consultation to assess the level of customer interest in a solar energy offering? If yes, please describe these other methods and the findings.

Response:

Research and consultation activities undertaken that were specific to gathering customer input on solar offerings were limited to the two surveys.

The Company did discuss solar options during Resource Planning Advisory Group sessions in advance of filing the 2016 LTERP, and reviewed publicly available material, but has relied primarily on feedback received from the surveys of its own customers to gauge the level of support for its CSPP proposal. FBC undertook research activities that were appropriate in scope for a pilot project and in consideration of the overall cost of the Program. Part of the reason for running the Program as a pilot is to collect customer feedback and gauge interest in the CSPP structure. As such, more extensive consultation was not viewed as necessary.

3.2.1 If FBC did not undertake any other methods of research and/or consultation, please explain why not.

Response:

Please refer to the response to BCUC IR 1.3.2.

On page 2 of the Application, FBC states that the February 2016 survey was of 506 residential customers and 217 commercial customers.

On page 3 of the Application, FBC states that during November and December 2016, it conducted an online survey of 305 residential and 102 commercial customers.

3.3 What is the total number of FBC residential customers and the total number of FBC commercial customers who would be eligible to participate in the CSPP?

Response:

FBC has approximately 116,000 residential and 15,000 Commercial customers. Of these, a relatively small number of customers on Radio-off and TOU rates and customers with non-communicating meters would be excluded from participation.

3.3.1 Based on the above response, please provide the percentage of residential customers and the percentage of commercial customers who were surveyed in each of the February and December 2016 surveys.

Response:

Residential representation is 0.7% (506+305)/116,000.

Commercial representation is 2.0% (217+102)/15,000.

As described in the response to BCUC IR 1.3.5, the margins of error associated with the February 2016 sample sizes at the 95 percent confidence level are 6.7 percent for Commercial and 4.4 percent for Residential.

3.4 Please confirm, or explain otherwise, that the participants for both the February and December surveys were chosen randomly.

Response:

Residential and commercial participants from Canada Post FSAs (forward sortation areas) corresponding to FBC's electrical service areas were randomly chosen for both waves of research. Prospective participants were telephoned and asked if they would be interested in participating in an online survey about alternative energy sources. Those willing to participate were emailed a unique link to the survey.

3.5 From the February 29, 2016 survey, please provide the following information:

- A copy of the survey questions; and
- A table showing the margins of error associated with each sample size at the 95 percent confidence level.

Response:

Please refer to Attachment 3.5 for the requested survey.

The margins of error (M.O.E) associated with each sample size at the 95 percent confidence level are shown in the table below:

	Sample Size	M.O.E
Residential	506	+/- 4.4%
Commercial	217	+/- 6.7%

On page 2 of the Application, FBC states that it was "interested in assessing residential and commercial customer interest in, and willingness to pay for, electricity from solar PV [photovoltaic] installations, both at the 'community level' and the 'rooftop level'."

3.6 As part of the February 2016 or the December 2016 surveys, please explain if FBC asked questions related to the level of customers' price sensitivity to participate in a community solar project.

Response:

FBC did not ask questions regarding customer price sensitivity to participate in a community solar project in either survey. The necessary line of questioning was omitted because there were no definitive contribution amounts available at the time the research was conducted. Instead, FBC research focused on customer awareness, knowledge, attitudes and the general appeal of electricity generated from alternative solar PV investment options.

3.6.1 If no, please explain why not.

Response:

Please refer to the response to BCUC IR 1.3.6.

3.6.2 If yes, please explain if FBC provided customers in the survey with ranges of potential rates to gauge the dollar value at which customers would consider subscribing to a community solar project.

Response:

Not applicable, please refer to the response to BCUC IR 1.3.6.

FBC further states on page 2 of the Application: "Key results of the survey indicate broad support for FBC to begin offering solar energy as an alternative to help meet customer demand, with three-quarters of both residential and commercial customers stating that FBC should offer solar."

3.7 Please clarify if FBC's statement in the above preamble means that three-quarters of customers stated that FBC should offer solar or that three-quarters of customers stated that they would subscribe to a solar offering.

Response:

The response by customers reflects an opinion that FBC should offer a solar option to its customers but does not indicate that if such an option were provided those customers would necessarily take part.

However, the survey results also indicate that of those who think that FBC should offer solar electric energy as an alternative, 10 percent would definitely consider contributing a small amount on a monthly basis to help offset the increased cost of generating solar energy and 31 percent might consider it. Given the relatively small amount of energy provided by the Project FBC continues to anticipate full subscription and that the level of interest from the survey provides sufficient support to move forward with the CSPP.

On page 8 of the February 2016 survey results provided as Appendix D to the Application, it states that 42 percent of residential customers are "likely" to consider joining a community solar project in the next 3 to 5 years. Of this 42 percent, 15 percent are "very likely" and 27 percent are "somewhat likely". The results are similar for commercial customers.

3.8 Please explain why FBC considers these survey results to indicate a sufficient level of customer interest to support implementing the CSPP.

Response:

Please refer to the response to BCUC IR 1.3.7.

3.9 How low would the percentage of "likely" respondents need to have been for FBC to conclude that the CSPP does not have adequate support at this time? Please explain.

Response:

FBC has not assigned a decision point such as contemplated in the question to this factor. However, FBC would be unlikely to undertake the Project if it could not reasonably expect the output to be subscribed. From a conservative perspective, given that the CSPP is expected to produce approximately 290,000 kWh each year, and assuming that residential customers use on average 11,000 kWh/year and chose to purchase 10 percent from the CSPP, only 0.22 percent of residential customers would be required to fully subscribe the Project. (290,000 kWh/1100 kWh/ 116,000 customers x 100 percent).

FBC has also considered the Nelson Solar Garden, which is approximately half the size of the CSPP and is fully subscribed with a customer base of approximately 10,000.

Page 11 of Appendix D states the following:

> Among those who think FortisBC should offer solar electric energy as an alternative, 10% would definitely consider contributing a small amount on a monthly basis to help offset the increased cost of generating solar energy – 31% might consider it. 42% said that they would not consider it.

3.10 With regard to the above statement, please quantify in dollars the "small amount" which 10 percent of the customers surveyed would "definitely" consider to offset the increased cost of generating solar energy.

Response:

"Small amount," was the term used in the February 2016 survey and was not specifically defined. What constitutes a small amount would be subject to the interpretation of the individual respondent.

3.11 Please discuss why FBC considers a 10 percent "definitely" response level and a 31 percent "might" response level to be an adequate indication of customer interest to support implementing the CSPP.

Response:

Please refer to the response to BCUC IR 1.3.9.

3.12 At approximately what percentage of customers surveyed stating that they would "not consider it" would FBC have concluded that the CSPP is not adequately supported at this time? Please explain.

Response:

Please refer to the response to BCUC IR 1.3.9.

The December 2016 survey results were filed by FBC as Appendix E to the Application.

3.13 Please explain why the cover page of the December 2016 survey results in Appendix E states "Interim Draft Report".

Response:

The Interim Draft Report was a condensed version of the full report made available by the external research partner. FBC attached the condensed version of the report in error. The final version has been provided in Attachment 3.14 in response to BCUC IR 1.3.14.

3.14 Does FBC have the "final" report? If not, why not? If yes, please provide the final report (if the final report differs from the report provided as Appendix E to the Application).

Response:

Please refer to Attachment 3.14 for the final report.

On page 10 of the December 2016 survey results in Appendix E, it states that customers were presented with two options for how they could pay for a rooftop solar electric system, including purchasing a solar panel for $1,300 and leasing solar panels for $115 per year.

On page 16 of the December 2016 survey results, it states: "Both residential and commercial customers consider rooftop solar more appealing than community solar."

3.15 Please explain whether, similar to the question regarding rooftop solar, customers were asked if they would consider purchasing a community solar panel for a certain dollar value, and how likely they would be to do so.

Response:

Survey respondents were not asked about purchasing community solar panels for a certain dollar amount. No definitive dollar amounts for community solar installations were available at the time of the research so price sensitivity was not investigated. The research focused on customer awareness, knowledge, attitudes and the general appeal of alternative solar installation and investment options.

3.15.1 If yes, please provide the question asked related to this, including the purchase price quoted, and explain how the price per panel was derived.

Response:

Please refer to the response to BCUC IR 1.3.15.

3.15.2 If this question was not asked, please explain why not. As part of this response, please explain how the comparison of rooftop and community solar is reasonable in the absence of purchase price comparisons.

Response:

For this research study, FBC was interested in evaluating the relative appeal of rooftop solar versus a community solar installation, under two billing options. No definitive dollar amounts for community solar installations were available at the time the research was conducted. FBC believes the approach it took provided practical insight into the relative preference consumers have for different implementation strategies.

On page 8 of the February 2016 survey results, it states that 42 percent of residential customers and 41 percent of commercial customers are likely to consider joining a community solar project in the next three to five years.

On page 14 of the December 2016 survey results, it states: "The primary driver to participate in a community solar installation is financial, particularly among commercial customers."

On page 4 of the Application, FBC states: "Both interest in renewable energy technologies generally, and solar PV systems in particular, are increasing. This is partially in response to the falling cost of solar PV components."

3.16 Given the survey results regarding the timing of when customers would likely consider joining a solar project and the importance of cost considerations to customers, please discuss whether FBC considered delaying the implementation of the CSPP for a couple more years to take advantage of potentially lower costs and greater customer interest in solar energy.

Response:

The Company believes there is sufficient support for the CSPP at this time to fully subscribe the output. As such, there is no reason to delay implementation and a delay was not contemplated.

3.17 Please confirm, or explain otherwise, that FBC is planning to hold stakeholder consultation workshops over the summer related to its upcoming rate design application.

Response:

Confirmed.

3.17.1 If confirmed, please discuss whether FBC has considered obtaining additional customer feedback on the proposed CSPP as part of these workshops.

Response:

It is not the intention of FBC to solicit additional feedback on the CSPP during the COSA and RDA open houses. The CSPP Application has already been filed with the Commission and FBC is hopeful that a Decision will be issued prior to the filing of the Rate Design Application.

C. PROJECT DESCRIPTION

4.0 Reference: PROJECT DESCRIPTION
Exhibit B-1, Section 4.1, p. 5
Location

On page 5 of the Application, FBC states:

> Preliminary discussions with authorities at the Kelowna Airport have not uncovered any concerns on the part of the airport with the proximity of the array. FBC will seek NAV Canada approval for the location of the CSPP as part of the permitting process. Also as part of the permitting process, the Company has sent letters describing the Project details to landowners in close proximity to the Project location.

4.1 Has FBC received, or does it expect to receive, any feedback from the above parties or other parties?

Response:

FBC provided notification of the proposed CSPP to the residents that are in close proximity to the Ellison Substation. The only response received was from the Quail Ridge Residents Association.

FBC met with the Quail Ridge Residents Association to discuss the CSPP. The Quail Ridge Residents Association was looking for further information in order to gain a better understanding of the customer benefits and of the community benefits. No concerns were raised regarding the aesthetics of the proposed CSPP.

4.1.1 If feedback has been received, were any concerns raised by the parties? If yes, what were the concerns and how has FBC addressed them.

Response:

As discussed in the response to BCUC IR 1.4.1, no concerns have been raised.

5.0 Reference: PROJECT DESCRIPTION

Exhibit B-1, Section 4.3, p. 7

Operations and maintenance expenses

On page 7 of the Application, FBC states that it expects that operations and maintenance (O&M) expenses for the facility will begin at $9 thousand in 2019 and escalate at two percent inflation thereafter.

5.1 Please provide a breakdown and description of the $9 thousand O&M expenses, including all assumptions made in determining this amount.

Response:

During the development of the Project scope and estimate, FBC consulted with its sister company Tucson Electric Power (TEP). TEP has considerable experience with developing solar installations as their community-scale solar resources have a combined capacity of 254 megawatts.

Based on their feedback, FBC expects to have to replace 7-8 panels annually due to performance issues. Replacing a single panel would require two to three hours for a two-person crew. The cost to diagnose and replace these panels is the bulk of the submitted annual O&M expense (approximately $8 thousand).

Additionally, TEP recommends a single annual inspection which can be completed by a single worker (approximately $1 thousand).

5.2 Please confirm, or explain otherwise, that the $9 thousand is forecast to be incurred regardless of the level of customer subscription (i.e. the amount is not variable based on the number of customers subscribed in the program).

Response:

FBC confirms that the forecasted O&M expenses for the facility will be incurred regardless of the level of customer subscription.

6.0 Reference: PROJECT DESCRIPTION

Exhibit B-1, pp. 7, 16

Marketing and promotion

FBC states on page 7 of the Application that it will begin promoting the CSPP as it nears completion.

FBC further states on page 16 of the Application:

> Promotion will initially be limited to a series of news releases, along with a website presence, Twitter announcement, and e-mail to the Company's E-billing customers. Should these steps fail to reach full subscription to the Program, the Company will consider additional means of customer communication such as messaging via a paper bill insert.

6.1 Please discuss how much FBC plans to spend annually on marketing and administration (i.e. billing, maintaining a customer waitlist, etc.) for the CSPP.

Response:

FBC does not anticipate that the limited activities related to the CSPP will have any material costs. Billing for the CSPP customers and any activities related to customer outreach can be accommodated within the normal activities of existing staff already performing those functions.

6.2 Are the marketing and administration costs included in the estimated $9 thousand of annual O&M costs? If not, please explain why not.

Response:

No. The forecast O&M is only for work associated with the physical array. Please also refer to the response to BCUC IR 1.6.1.

6.3 Aside from messaging via a paper bill insert, please describe any additional marketing FBC would consider undertaking to increase subscription to the CSPP.

Response:

Except for the possibility of the bill insert, FBC does not envision activities beyond the news releases, the FBC website, Twitter, and e-mail as noted in the reference.

6.4 In an event where the program is not fully subscribed and FBC proceeds with additional forms of customer communication and marketing, what would be the likely maximum amount of additional costs that FBC would consider spending on these activities?

Response:

Any additional costs are not expected to be material or even incremental to those that are part of routine customer communication. FBC maintains a Twitter presence, website, and ongoing customer communication effort. Use of these existing resources to highlight the CSPP would be incorporated into these activities in the same manner as any messaging that FBC chooses to incorporate. The Company does not expect to make specific media buys to produce advertising materials that would result in incremental costs specific to the CSPP.

6.5 What steps does FBC plan to take to ensure that customers have a full understanding of the CSPP, including its cost and bill impacts, prior to subscribing?

Response:

FBC plans to post details on the CSPP webpage that will fully explain the Program. In addition, a customer that wishes to enroll in the Program will be required to contact FBC customer service personnel to provide the details of participation. This interaction will include a full explanation of the Program and an opportunity to address any questions or concerns that a customer may have.

7.0 Reference: PROJECT DESCRIPTION

Exhibit B-1: Section 4.5, p. 7; Appendix B-2

Energy production

On page 7 of the Application, FBC states:

> The expected annual energy output of the CSPP in the first year is approximately 290,000 kilowatt-hour (kWh), or about 400 kWh for each of the 720 panels. This output is expected to decline at approximately 0.5 per cent annually, which is typical for solar panels.

7.1 Please explain if FBC anticipates any downtime in the energy output of the CSPP in a typical year, such as from lack of sunshine, maintenance or other factors.

Response:

The 290,000 kWh anticipated output was arrived at in consideration of the amount of available sunshine in the region, the technical capacity of the array, and the minimal amount of annual maintenance required. In other words, it represents that actual expected output of the CSPP in the first year and all assumptions are factored into the financial model used to calculate the proposed rates.

7.1.1 Please confirm, or explain otherwise, that the 290,000 kWh expected annual energy output of the CSPP in the first year has taken into account all anticipated downtime of the CSPP.

Response:

Please refer to the response to BCUC IR 1.7.1.

7.1.2 Please confirm, or explain otherwise, that all anticipated downtime of the CSPP has been factored into the financial model provided in Appendix B-2 of the Application.

Response:

Please refer to the response to BCUC IR 1.7.1.

7.2 Please explain how FBC determined the 290,000 kWh estimate for energy output and describe all assumptions made in arriving at this estimate.

Response:

The expected annual energy output was calculated as the product of peak DC output of the CSPP (241.2 kW) and the solar potential value for the Kelowna region (1,203 kWh/year/kW).

8.0 Reference: REGULATORY TREATMENT

Exhibit B-1, p. 8

2014–2019 Performance-based Ratemaking Plan

FBC states on page 8 of the Application that it operates under the terms of a Performance-based Ratemaking Plan (PBR) during the period from 2014–2019, which was approved by the Commission pursuant to Order G-139-14.

FBC further states the following on page 8 of the Application:

> FBC will include the capital costs of the CSPP, estimated at $961 thousand, within the 2017 formula capital spending envelope, and the O&M expense, estimated at $9 thousand starting in 2019, within the 2019 formula O&M envelope. The timing of including the capital costs in rate base will depend on the level of FBC's actual 2017 capital expenditures….
>
> Under the terms of the PBR Plan, only the allowed formula capital expenditure levels are included in rate base during the PBR term, unless the actual expenditures exceed the prescribed dead band…

8.1 Please provide FBC's total projected capital expenditures for 2017 (excluding capital expenditures that are outside the PBR formula-driven spending envelope).

Response:

FBC currently expects its 2017 formula capital expenditures to be approximately $60 million, or about $13.2 million above the approved formula amount of $46.793 million (inclusive of Pension and OPEB Expense). The 2017 Projected capital expenditures will be confirmed or revised in FBC's Annual Review for 2018 Rates, which is expected to be filed in early August 2017.

This level of formula capital expenditures will be above the one-year 10 per cent capital dead band by approximately $8.5 million[2].

[2] The 10 percent dead band threshold is $46.793 million x 1.1 = $54.472 million and the excess capital expenditure within the dead band is therefore $54.472 million – $46.793 million = $4.679 million. The estimated expenditure variance is $13.2 million, of which approximately $8.5 million is over the dead band.

8.2 Does FBC project that it will be exceeding the capital dead-band (either the one-year or cumulative dead-band) in 2017?

Response:

Please refer to the response to BCUC IR 1.8.1.

8.2.1 If yes, please provide the expected amount by which FBC projects to exceed the dead-band.

Response:

Please refer to the response to BCUC IR 1.8.1.

8.2.2 If no, please provide the amount by which FBC projects to be over the formula capital-spending amount for 2017, and by how much the projected 2017 capital spending is below the capital dead-band.

Response:

Please refer to the response to BCUC IR 1.8.1.

8.3 In the event that FBC is projecting to exceed the capital dead-band in 2017, please discuss whether it would be appropriate to defer capital spending on the CSPP to a future year.

Response:

No, FBC does not believe that the timing of the CSPP should be determined in the context of its formula capital expenditures. As explained at page 10 of the Application:

> The pricing for the Program is designed to recover the incremental revenue requirement of the CSPP from Program participants over its 40 year expected

life. The rates that accompany this Application are designed to effectively offset the initial capital costs and ongoing incremental costs of the Program in the Company's revenue requirement determination over the assumed life of the Project.

In other words, regardless of when the CSPP is added to rate base, when fully subscribed all costs will be borne by Program participants.

FBC also notes that, once the one-year dead band is exceeded in 2017, the two-year dead band comes into play in 2018 such that capital expenditures can only be 5 percent above the formula before the capital dead band is exceeded in 2018. Because of this, FBC considers it likely that the dead band will be exceeded again in 2018, and possibly also in 2019 (the last year of the current PBR term).

FBC states the following on page 8 of the Application:

> Although FBC is not seeking any incremental funding for the capital expenditures or O&M expense associated with this Program, the Company recognizes that the 2013 base capital expenditures, and the formula capital under PBR, did not anticipate expenditures on new generation resources such as the CSPP, or other new resources.

8.4 Please explain if FBC plans to re-prioritize other capital expenditures (i.e. defer other capital expenditures) in order to incorporate the capital expenditures for the CSPP into its capital spending for 2017 (or 2018 if completion of the project is delayed).

Response:

No, the CSPP will be completed without deferring other capital expenditures.

Please also refer to the response to BCUC IR 1.8.3, explaining that FBC does not believe that the timing of the CSPP should be determined in the context of its formula capital expenditures.

8.4.1 If yes, please describe the capital expenditures which FBC plans to defer and the impact of deferring these capital expenditures, if any, on FBC's ability to provide safe and reliable service to customers.

Response:

Please refer to the response to BCUC IR 1.8.4.

9.0 Reference: REGULATORY TREATMENT

Exhibit B-1, Table 5-1, pp. 1, 8–9; FBC 2016 Long Term Electric Resource Plan (LTERP) and Long Term Demand-side Management (LT DSM) Plan proceeding, Exhibit B-2, BCUC IR 11.6, 20.2

***Utilities Commission Act* (UCA) section 44.2 requirements**

FBC states on page 8 of the Application that the PBR Plan "did not anticipate expenditures on new generation resources such as the CSPP, or other new resources" and that FBC is therefore seeking acceptance of the capital expenditures pursuant to section 44.2 of the UCA.

In Table 5-1 on page 9 of the Application, FBC outlines the requirements under section 44.2 of the UCA, including consideration of its most recent LTERP and the interests of persons who receive or may receive service from the utility.

With regard to objective (e) in Table 5-1, FBC "submits the Solar Pilot Project is in the interests of its customers."

9.1 Please confirm, or explain otherwise, that the primary public interest justification for the CSPP is customer interest in solar energy.

Response:

Confirmed.

9.2 Notwithstanding the potential level of customer interest in solar energy, please provide other rationale to support the CSPP being in the public interest. As part of this response, please specifically address if the CSPP is expected to result in greenhouse gas reductions.

Response:

The CSPP is being proposed primarily because FBC's research involving its own customers, the current level of interest in the FBC net metering program, and publicly available customer perception data regarding the emergence of solar technology in North America lead the Company to believe that a certain portion of its customer base will want solar energy as an option, and may not have the ability or desire to install it themselves. Generally speaking, while customer desire is a consideration in the development of a rate or program, it would not be sufficient in itself to put such a project or rate in place. However, since the CSPP is designed to recover the associated costs from only those customers that participate in the Program the

Company has proceeded with the Application. The CSPP is not expected to result in greenhouse gas reductions. FBC resources are overwhelmingly renewable in nature, consisting of either the Company's embedded hydroelectric generation, long-term contracts that are themselves hydro based, and supplemented with purchases from other resources largely based in the hydro rich Pacific Northwest. The greenhouse gas reduction rationale for the installation of solar resources that may exist in other jurisdictions is not a factor in British Columbia.

With regard to objective (c) in Table 5-1, FBC states that it is "not a prescribed utility for the purpose of the CEA [Clean Energy Act]" and further states that the CSPP is "nevertheless consistent with Sections 6 and 19 of the CEA."

9.3 Please confirm, or explain otherwise, that the CSPP is not necessary for FBC to meet either its own clean energy objectives or to meet any clean energy objectives put forth by government.

Response:

Confirmed.

9.4 Please explain whether the CSPP will impact FBC's percentage of clean electricity generation.

Response:

The output of the CSPP will likely offset hydro-based energy purchases and therefore will have little to no effect on FBC's overall percentage of clean generation.

9.4.1 As part of the above response, please explain whether FBC's current resource stack is considered to be 100 percent clean.

Response:

FBC estimates that 95 percent of 2017 forecast load, after planned DSM, will be served by Clean and Renewable Resources.

FBC states on page 1 of the Application:

> The CSPP is not a significant source of energy in the context of FBC's overall requirements; the Program is driven primarily by customer considerations… The Program will provide customers with a new renewable energy option, and provide information to consider in the development of potential expanded offerings in the future.

FBC further references its most recent LTERP on page 1 of the Application and states that there is no "existing or mid-term power supply shortfall driving the need for solar energy".

In response to BCUC IR 11.6 in the FBC 2016 LTERP and LT DSM Plan proceeding, FBC states that the "community solar pilot project is not being relied upon to meet the load forecast and is not included in the recommended resource portfolio." FBC also states that it considers the CSPP to be consistent with the action item in the LTERP which states: "Continue to monitor the energy planning environment".

In response to BCUC IR 20.2 in the LTERP and LT DSM Plan proceeding, FBC states that "there are no other generation capital expenditures expected in the next four years that FBC intends to construct or extend to serve the estimated demand."

9.5 Please confirm, or explain otherwise, that the CSPP is a new generation source to the extent that if the CSPP is not fully subscribed, the energy generated by the solar panels will be added to FBC's existing resource portfolio.

Response:

Please refer to the response to BCUC IR 1.1.2.

9.6 Given FBC's statement in response to BCUC IR 20.2 in the LTERP and LT DSM Plan proceeding that it does not expect to construct or extend other generation capital expenditures in the next four years, does this indicate that FBC considers it unlikely that the CSPP program offering would be expanded at the end of the two-year pilot period?

Response:

Whether or not the Program is expanded will depend on how the Program is received and performs through the pilot period. The CSPP is viewed in isolation from the LTERP since the energy it will produce is not required to meet customer load, and were FBC forecasting an energy deficiency it is unlikely that a resource similar to the CSPP would be the option of choice to meet the need. The decision to request the continuation of a community solar option will be linked to the objectives of the Program. As stated in the Application, the proposed CSPP will provide an opportunity for those customers not able to install a PV system, such as those that live in rental properties, MURBs, or townhomes, or that cannot afford the up-front capital costs, with a new renewable energy option. If the level of customer interest is not sufficient in the view of the Company and/or the Commission to justify making the Program permanent, then the Company will not apply to do so.

9.6.1 If yes, does this indicate that FBC considers there to be a fairly high level of uncertainty as to the success of the CSPP, particularly with regard to customer subscription? Please discuss.

Response:

As discussed in the response to BCUC IR 1.9.6, the CSPP is not being relied upon as a resource for the LTERP. The Company believes that the output of the Project will be fully subscribed.

9.7 Please discuss the appropriateness of applying to expand the CSPP program at the end of two years given that FBC has not included additional generation capital expenditures within the next four years as part of its LTERP and LT DSM Plan.

Response:

The CSPP is a customer driven project that does not rely upon the energy it produces as a justification for either proceeding with the initial installation covered by the current Application, or any future expansion that might occur within the planning horizon of the LTERP.

For this reason, FBC considers the CSPP and the LTERP to be unrelated and while they should not, and do not, conflict with each other, complete alignment should not be expected. If the CSPP had to be considered within the criteria used in the LTERP to select the optimal set of resources to meet FBC's load, it would not be built.

9.7.1 As part of the above response, please comment on whether there may be a misalignment between the CSPP and LTERP and DSM Plan.

Response:

Please refer to the response to BCUC IR 1.9.7.

D. PROGRAM DESCRIPTION

10.0 Reference: PRICING METHODOLOGY AND RATE SCHEDULES

Exhibit B-1, Section 6.2, p. 10

Pricing methodology

FBC states on page 10 of the Application:

> FBC has designed two pricing mechanisms that could ultimately be used in the Program…While two pricing options have been developed, FBC proposes to offer only the FortisBC Virtual Solar option to customers at this time. The reasons for this approach is that this type of rate option was preferred by surveyed customers, and that a single option is easier to manage both administratively and in matching Program output to customer usage.

10.1 Given the relatively short term of the pilot project, the benefits of offering the single rate option (i.e. Rate Schedule 85A), and that FBC is proposing to only offer Rate Schedule 85A initially, please explain why it would not be more appropriate for the Commission to approve only Rate Schedule 85A at this time.

Response:

FBC has requested approval of both rate options in the interest of regulatory efficiency. Approval of both rates at this time provides the Company with the ability to offer the Solar Offset rate in the future without the need for an additional regulatory application and process. Both rates are based on the same information and are equivalent in terms of pricing. Introduction of the second rate part way through the pilot period will not complicate the analysis and will in fact provide additional information about rate structure preference and administration. However, while this information may prove interesting, the additional administration and billing complexity can be avoided if the Project is fully subscribed with the single rate being proposed at this time.

10.2 Please discuss the risk that the data derived from the two-year pilot program will be more difficult to analyze and reach conclusions on if FBC introduces the second rate schedule option partway through the pilot.

Response:

Please refer to the response to BCUC IR 1.10.1.

11.0 Reference: RATE DESCRIPTIONS

Exhibit B-1: Section 6.3.1, p. 11; Appendix B-1, p. 1

Depreciation rate

FBC states the following on page 11 of the Application:

> The average service life of the Solar Photovoltaic Panels of 40 years was determined primarily based on panel degradation rates. Modern monocrystalline solar panels such as those proposed to be installed in the CSPP typically show output degradation of about 0.5 per cent per year. Based on this, the panels are still expected to be producing over 80% of rated output at the end of 40 years. The average service life of the substation and the communication equipment is 50 years and 15 years respectively in line with standard industry practice.

11.1 Please confirm, or explain otherwise, that an average service life of 40 years for the Solar PV Panels is consistent with the average service life utilized by other US GAAP-reporting entities for this type of asset.

Response:

Not confirmed. FBC did not determine the average service life by surveying other US GAAP-reporting entities, nor does it consider this to be an appropriate practice since FBC would not have insight into the individual circumstances of each entity.

The average service life of 40 years for the solar PV panels was determined based on a published research on the degradation rate of photovoltaic modules and system[3] completed by the National Renewable Energy Laboratory (NREL), which is a national laboratory of the US Department of Energy.

The research undertaken by NREL complied nearly 2000 measurements of degradation rate on individual modules or systems of various photovoltaic technologies, and showed that the degradation rate of monocrystalline panels, which is the technology proposed for this Project, has an average degradation rate of 0.5 percent per year. NREL also suggested that the panels are typically considered failed if the output is declined by more than 20 percent. Therefore, at a degradation rate of 0.5 percent per year for monocrystalline panels, the panels are considered to end-of-life at approximately 40 years as the output will decline by almost 20 percent at that time.

FBC considers the Project as a pilot and the degradation rate under localized environment will be monitored closely by FBC.

[3] http://www.nrel.gov/docs/fy12osti/51664.pdf

11.2 Please explain the research/analysis undertaken by FBC to ensure that 40 years is an appropriate average service life to assign to the Solar PV Panels, particularly given that the PV Panels are a relatively new technology.

Response:

Please refer to the response to BCUC IR 1.11.1.

11.3 Please discuss the risk of obsolescence associated with the PV Panels.

Response:

FBC is not sure what definition of "obsolescence" is contemplated in the question.

The PV Panels will not become "obsolete" in the sense that they will continue to produce electricity for a very long time barring complete failure. In this sense, future PV Panels are not likely to render the CSPP panels obsolete since they too will simply produce electricity.

If "obsolescence" means that the CSPP panels become less efficient than newer panels, then, like most technology, they will become "obsolete" almost immediately after installation. This is the case with all solar installations.

As discussed in FBC's response to BCUC IR 1.11.1, given the panels are expected to be still producing at least 80 percent of the rated output at the end of 40 years, FBC believes it is appropriate to determine a levelized rate for the Project based on a 40-year average service life.

11.3.1 Please discuss the appropriateness of calculating the levelized rate for the CSPP using a 40-year analysis period in the context of potential obsolescence issues.

Response:

Please refer to the response to BCUC IR 1.11.3.

11.4 Please provide the anticipated warranty period for the Solar PV Panels and discuss how this warranty period compares to industry standards.

Response:

The industry standard for panel warranty is as follows:

- Linear Power Output Warranty – 25 Years
- Product Warranty – 10 Years

FBC reviewed the above warranties for a number of suppliers, including, but not limited to, Canadian Solar, HESPV, REC Solar and SunPower.

FBC is planning to use Canadian Solar panels for its CSPP which provides the industry standard warranty noted above.

11.5 Given FBC's statement in the above preamble that the communication equipment has an average service life of 15 years, please confirm, or explain otherwise, that FBC has included the cost of replacing the communication equipment as part of the 40-year levelized rate analysis.

Response:

FBC confirms that the communication equipment for the CSPP has an average service life of 15 years. The financial analysis submitted for the Application did not include the replacement cost for this equipment, which is approximately $3,700 (to be replaced in year 15 and 30). The financial analysis also did not include the cost of replacing the inverters as discussed in ICG IR 1.4.4, which is estimated to be approximately $8,000 per inverter and to be replaced between 10 to 20 years (average 15 years) depending on the environment.

FBC has revised the financial analysis to include the replacement cost for both the communication equipment and the inverters as discussed above. The table below shows a summary of the revised financial analysis. The revised financial analysis and the accompanying excel model for the revised analysis are being filed in an Errata to the Application, submitted concurrently with these IR responses.

	Original as Filed	Revised Financial Analysis
PV of Incremental Revenue Requirement (40 years)	$877,490	$933,072
Virtual Solar Panel Option – Annual Rate ($/panel/yr)	$81.00	$86.00
Virtual Solar Panel Option – Monthly Rate ($/panel/mth)	$6.70	$7.20
Solar Offset Option ($/kWh)	$0.231/kWh	$0.246/kWh

On page 1 of Appendix B-1 to the Application, FBC states:

> Attached as Appendix B-2 is the revenue requirements analysis for the proposed Community Solar Pilot Project (CSPP) over a 40 year period. The 40 year analysis period is chosen as the average composite depreciation rate is 2.45 percent based on the asset categories that account for the Project capital.

11.6 Please provide the same revenue requirements analysis as was provided in Appendix B-2, with the accompanying working excel model, using a 25-year analysis period (i.e. under the assumption that the incremental revenue requirement is recovered from CSPP customers over 25 years instead of 40 years).

Response:

Please refer to Attachment 11.6 for the financial analysis. The accompanying working excel model is provided in Confidential Attachment 11.6 filed under separate cover.

Please note that Attachment 11.6 (both the financial analysis and the confidential working excel model for the 25-year recovery period) include the revisions per BCUC IR 1.11.5.

11.6.1 Please clearly indicate what the monthly and annual rate would be under a 25-year scenario for the FortisBC Virtual Solar rate option. Please also indicate what the rate would be under the FortisBC Solar Offset option.

Response:

The table below shows the comparison of the monthly and annual rate for the FortisBC Virtual Solar rate option and the $/kWh rate for the FortisBC Solar Offset option, between the 40-year scenario and the 25-year recovery scenario. Please refer to the response to BCUC IR 1.11.6 for the Revenue Requirement analysis of the 25-year recovery scenario.

Please note that the financial analysis for both the original 40-year recovery period and the 25-year recovery period are revised according to BCUC IR 1.11.5. All the numbers in the table below are based on the revised financial analysis.

	25-yr Recovery	40-yr Recovery
Virtual Solar Panel Option – Monthly Rate ($/panel/month)	$8.20	$7.20
Virtual Solar Panel Option – Annual Rate ($/panel/yr)	$99.00	$86.00
Solar Offset Option ($/kWh)	$0.282/kWh	$0.246/kWh

11.7 If FBC were to amend the proposed rate schedules to charge rates based on a 25-year recovery period instead of the proposed 40-year period, please discuss the potential viability of the CSPP.

Response:

The intention of the Project is to recover all costs from the Program participants. As seen in the response to BCUC IR 1.11.6.1, if FBC is to set rates to recover all costs in a 25-year period instead of 40-year period, then the rates will be approximately 15 percent higher. FBC believes that potential customers will be price sensitive and that higher prices will make it more challenging for the Program to reach full subscription.

As discussed in FBC's response to BCUC IR 1.11.2, the panels are expected to be still producing electricity at more than 80 percent of the rated output at the end of a 40-year period, therefore, FBC does not believe it is reasonable to recover all costs from participants in 25 years when the panels are still considered to be useful for another 15 years, and at the same time increasing the risk of not fully subscribing the Program.

12.0 Reference: RATE DESCRIPTIONS

Exhibit B-1, Section 6.3.5, pp. 11–12; British Columbia Hydro and Power Authority (BC Hydro) Electric Tariff Sixteenth Revision Effective April 1, 2016, Rate Schedule 3808

Power Purchase Displacement Rates

On pages 11–12 of the Application, FBC states:

> The BC Hydro Power Purchase Agreement (BCH PPA) has been assumed as the resource to value energy displacement cost due to solar generation. Also, a future renewal of the BCH PPA has been assumed. The year F2017 (1st April 2016 to 31st March 2017) BC Hydro rate of $46.99 / MWh has been effectively increased by the rate increase of 3.5 percent effective April 1, 2017 (F2018) and 3 percent effective April 1, 2018 (F2019). Thereafter, FBC has assumed the B.C. Government's set target rate increases of 2.6 percent for each year until F2024 and 3 percent for the remaining period of the analysis.

12.1 Given that FBC has estimated the average service life of the Solar PV Panels at 40 years, please explain why FBC is not using the long run marginal cost, as provided in FBC's 2016 LTERP and LT DSM Plan to value the energy displacement cost from solar generation.

Response:

FBC's proposed LRMC as provided in the 2016 LTERP cannot be used to value the energy displacement cost from solar generation since, in general, the timing of the generation does not help to meet FBC's energy and capacity load-resource gaps, as explained in the LTERP proceeding, Exhibit B-2, responses to BCUC IRs 1.24.2 and 1.36.3.

As such, the appropriate evaluation for the energy displacement cost from solar generation is based on avoided BC Hydro PPA energy costs since, on a planning basis, this is what is expected to be displaced.

12.2 Please confirm, or explain otherwise, that the $46.99 per MWh cost quoted in the above preamble is based on BC Hydro's F2017 Rate Schedule 3808 Tranche 1 energy price.

Response:

Confirmed.

12.3 Please explain which source(s) of energy from FBC's resource stack the solar generated energy would likely be replacing.

Response:

Please refer to the response to BCUC IR 1.12.1.

13.0 Reference: RATE DESCRIPTIONS

Exhibit B-1, Section 6.3.6, p. 13

FortisBC Virtual Solar Panel (Rate Schedule 85A)

FBC states the following on page 12 of the Application:

> Under the FortisBC Virtual Solar option (Rate Schedule 85A), the output of a defined number of panels from the solar array would be directly linked to a single customer. The customer would then receive a consumption credit equal to a portion of the actual total output of the Ellison solar array in proportion to the number of subscribed panels to the total number of panels in the CSPP…The value of the power to the customer depends on the rate under which the customer is normally billed as compared to the lease payment the customer is making.

13.1 Please confirm, or explain otherwise, that a customer who elects to subscribe to the CSPP would still be billed under the customer's existing rate schedule for its energy consumption (i.e. a residential customer would still be billed under Rate Schedule 1).

Response:

Confirmed.

13.2 Please provide the amount of energy in kWh an average residential customer in FBC's service area consumes in an average year.

Response:

FBC does not have data available to describe an "average year", however, residential mean annual consumption has been approximately 11,000 kWh for several years.

13.2.1 Based on an average residential customer's energy consumption, please provide the annual savings in energy costs under each of the pricing options by completing the tables below. The excel workbook is attached with these IRs.

1

Virtual Solar Option

(based on annual subscription of $81/panel)

	Energy bill if no solar panels ($)	Energy bill with one solar panel ($)	Total bill (cost of energy + cost of panel) ($)	Total savings or (cost) ($)
Year 1				
Year 5				
Year 10				
Year 20				
Year 30				
Year 40				

Solar Offset Option

(based on cost of solar energy at $0.231/kWh)

	Energy bill if no solar offset ($)	Total bill with solar offset (cost of non-solar energy + solar energy subscribed) ($)			Total savings or (cost) ($)		
		10% of consumption subscribed	50% of consumption subscribed	100% of consumption subscribed	10% of consumption subscribed	50% of consumption subscribed	100% of consumption subscribed
Year 1							
Year 5							
Year 10							
Year 20							
Year 30							
Year 40							

2

3

4 **Response:**

5 The following provides FBC rates escalated at 2.0 percent inflation.

Virtual Solar Option

(based on annual subscription of $86/panel)

	Energy bill if no solar panels ($)	Energy bill with one solar panel ($)	Total bill (cost of energy + cost of panel) ($)	Total savings or (cost) ($)
Year 1	$ 1,271	$ 1,229	$ 1,315	-44
Year 5	$ 1,376	$ 1,332	$ 1,418	-42
Year 10	$ 1,519	$ 1,471	$ 1,557	-38
Year 20	$ 1,851	$ 1,796	$ 1,882	-31
Year 30	$ 2,257	$ 2,193	$ 2,279	-22
Year 40	$ 2,751	$ 2,677	$ 2,763	-12

Assumptions:

- FBC Rates escalated at 2.0% annual inflation
- 11,000 kWh consumption with 78% in Tier 1.
- Solar energy assumed to be deducted from Tier 1 except in 100% Solar Offset
- 0.5% degradation of solar output
- Rate updated as per Errata 1

Solar Offset Option

(based on cost of solar energy at $0.246/kWh)

	Energy bill if no solar offset ($)	Total bill with solar offset (cost of non-solar energy + solar energy subscribed) ($)			Total savings or (cost) ($)		
		10% of consumption subscribed	50% of consumption subscribed	100% of consumption subscribed	10% of consumption subscribed	50% of consumption subscribed	100% of consumption subscribed
Year 1	$ 1,271	$ 1,428	$ 2,056	$ 2,706	-157	-785	-1,435
Year 5	$ 1,376	$ 1,523	$ 2,114	$ 2,706	-148	-739	-1,330
Year 10	$ 1,519	$ 1,654	$ 2,194	$ 2,706	-135	-675	-1,187
Year 20	$ 1,851	$ 1,957	$ 2,378	$ 2,706	-105	-526	-855
Year 30	$ 2,257	$ 2,326	$ 2,602	$ 2,706	-69	-345	-449
Year 40	$ 2,751	$ 2,776	$ 2,876	$ 2,706	-25	-124	45

1

2

3 If FBC rates were instead escalated at 4.0 percent, the result would be as follows:

Virtual Solar Option

(based on annual subscription of $86/panel)

	Energy bill if no solar panels ($)	Energy bill with one solar panel ($)	Total bill (cost of energy + cost of panel) ($)	Total savings or (cost) ($)
Year 1	$ 1,296	$ 1,253	$ 1,339	-44
Year 5	$ 1,516	$ 1,467	$ 1,553	-37
Year 10	$ 1,844	$ 1,787	$ 1,873	-28
Year 20	$ 2,730	$ 2,649	$ 2,735	-5
Year 30	$ 4,041	$ 3,927	$ 4,013	28
Year 40	$ 5,982	$ 5,821	$ 5,907	75

Assumptions:

- FBC Rates escalated at 4.0% annual inflation
- 11,000 kWh consumption with 78% in Tier 1.
- Solar energy assumed to be deducted from Tier 1 except in 100% Solar Offset
- 0.5% degradation of solar output
- Rate updated as per Errata 1

Solar Offset Option

(based on cost of solar energy at $0.246/kWh)

	Energy bill if no solar offset ($)	Total bill with solar offset (cost of non-solar energy + solar energy subscribed) ($)			Total savings or (cost) ($)		
		10% of consumption subscribed	50% of consumption subscribed	100% of consumption subscribed	10% of consumption subscribed	50% of consumption subscribed	100% of consumption subscribed
Year 1	$ 1,296	$ 1,451	$ 2,070	$ 2,706	-155	-774	-1,410
Year 5	$ 1,516	$ 1,651	$ 2,192	$ 2,706	-135	-676	-1,190
Year 10	$ 1,844	$ 1,950	$ 2,374	$ 2,706	-106	-529	-862
Year 20	$ 2,730	$ 2,757	$ 2,864	$ 2,706	-27	-134	24
Year 30	$ 4,041	$ 3,951	$ 3,589	$ 2,706	90	452	1,335
Year 40	$ 5,982	$ 5,718	$ 4,663	$ 2,706	264	1,318	3,276

13.3 Based on FBC's proposed pricing model, please calculate how long it would take the average residential customer to start earning a return on its investment on the CSPP (i.e. the length of time before the customer would start to save money on their energy bill). Please show all calculations and explain all assumptions.

Response:

A customer will begin to see a benefit (as defined as the time before the customer would start to save money on their energy bill) at the point where the output of a solar panel (degraded over time) multiplied by the rate charged for the energy (escalated by some annual factor) is equal to the annual cost of the panel ($86).

The table below demonstrates this outcome under the assumption that rates will increase annually at the rate of inflation used in the model included in the Application of 2 percent and also at 4 percent.

In this example, for simplicity, the rate used is the Residential Exempt rate (RS03), currently $0.11749/kWh.

The annual panel output values are calculated by: $kWh * (1-d)^{n-1}$

Where:

kWh = the annual kWh production in year 1,
d = the annual degradation rate (0.5%)
n = year

The rate applicable in a given year is calculated by: $r * (1+e)^{n}$

Where:

r = the RS03 rate in effect at the end of year 0,
e = the annual escalation rate
n = year

The differing exponents in the two expressions are necessary to correct for the fact that the rate changes at the beginning of the year while the panel output value is for the total output summed at the end of the year.

The table demonstrates the impact of the rate escalation factor assumption on the prospect of saving money on annual bills. In the 2 percent scenario, the point at which the customer will save enough to offset the panel cost occurs after year 40, while in the 4 percent scenario this offset occurs after year 17.

Year	Annual kWh Output of a single panel (degraded at 0.5% annually) (a)	Per kWh Rate escalated at 2% (b)	Implied value of Annual Output (a x b)	Per kWh Rate escalated at 4% (c)	Implied value of Annual Output (a x c)
0		0.11749		0.11749	
1	403	0.11984	$48	0.12219	$49
2	401	0.12224	$49	0.12708	$51
3	399	0.12468	$50	0.13216	$53
4	397	0.12717	$50	0.13745	$55
5	395	0.12971	$51	0.14295	$56
6	393	0.1323	$52	0.14867	$58
7	391	0.13495	$53	0.15462	$60
8	389	0.13765	$54	0.1608	$63
9	387	0.1404	$54	0.16723	$65
10	385	0.14321	$55	0.17392	$67
11	383	0.14607	$56	0.18088	$69
12	381	0.14899	$57	0.18812	$72
13	379	0.15197	$58	0.19564	$74
14	378	0.15501	$59	0.20347	$77
15	376	0.15811	$59	0.21161	$79
16	374	0.16127	$60	0.22007	$82
17	372	0.1645	$61	0.22887	$85
18	370	0.16779	$62	0.23802	$88
19	368	0.17115	$63	0.24754	$91
20	366	0.17457	$64	0.25744	$94
21	365	0.17806	$65	0.26774	$98
22	363	0.18162	$66	0.27845	$101
23	361	0.18525	$67	0.28959	$105
24	359	0.18896	$68	0.30117	$108
25	357	0.19274	$69	0.31322	$112
26	356	0.19659	$70	0.32575	$116
27	354	0.20052	$71	0.33878	$120
28	352	0.20453	$72	0.35233	$124
29	350	0.20862	$73	0.36642	$128
30	348	0.21279	$74	0.38108	$133
31	347	0.21705	$75	0.39632	$137
32	345	0.22139	$76	0.41217	$142
33	343	0.22582	$78	0.42866	$147
34	342	0.23034	$79	0.44581	$152
35	340	0.23495	$80	0.46364	$158
36	338	0.23965	$81	0.48219	$163
37	336	0.24444	$82	0.50148	$169
38	335	0.24933	$83	0.52154	$175
39	333	0.25432	$85	0.5424	$181
40	331	0.25941	$86	0.5641	$187

1
2

14.0 Reference: INDIVIDUAL CUSTOMER SUBSCRIPTIONS

Exhibit B-1: Section 6.4, pp. 12–13; Appendix A, Rate Schedule 85A

FortisBC Virtual Solar Panel (Rate Schedule 85A)

On page 13 of the Application, FBC states:

> In the event that a material change in a customer's consumption will result in the persistent accumulation of unused output on an annual basis, FBC may require the customer to reduce the number of panels subscribed such that other customers will have access to them.

14.1 Please clarify what FBC would consider to be a "material change in a customer's consumption."

Response:

It is not the intent of this passage that it be parsed into individual components. Read together, the passage is intended to convey that a change in consumption is material if it results in the persistent accumulation of unused output.

In practical application, were such a situation to arise, FBC would work with the customer to determine whether the lower level of consumption will persist such that unused output will become the norm for the premise. A reduction in the number of panels would be appropriate if the lower consumption would result in the annual output of at least one panel being superfluous to the customers needs.

14.2 Please clarify when FBC would consider a customer to have a "persistent accumulation of unused output."

Response:

Please refer to the response to BCUC IR 1.14.1.

On the second page of Rate Schedule 85A of Appendix A to the Application, it states:

5. In the event that there is a balance in the kWh Bank at March 31, the balance will be reduced to zero. In the case where there is a balance in the kWh Bank at March 31, and the balance has been reduced to zero, FortisBC shall be deemed to have purchased that amount of electricity from the Customer, and shall pay the Customer for that electricity at the rate determined in accordance with Clause 6 below. If such amounts are not large, they will be carried forward and included in the billing calculation for the next period at the discretion of the Company.

6. The rate paid for electricity represented by kWh remaining in the kWh Bank at the billing period immediately following March 31 in each year shall be the BC Hydro 3808 Tranche 1 energy rate in effect at the time.

14.3 With regard to a balance in the kWh bank at March 31, please clarify what FBC considers to be an amount that is not large and would be carried forward and included in the billing calculation for the next period.

Response:

The kWh Bank will be zeroed at March 31st unless it is expected that it can be used in the subsequent billing period. This effectively gives a customer an additional month to maximize the value of the banked output.

14.4 Please explain why the rate proposed to be paid to customers is the BC Hydro 3808 Tranche 1 energy rate.

Response:

The use of the BC Hydro RS 3808 Tranche 1 rate (currently 4.475 cents per kWh plus a 5 percent rate rider) is consistent with the valuation used for other ad-hoc deliveries to the FBC system, and best reflects the value of the unused output to the Company. Although the 3808 rate may not be the least cost resource available to the Company at any given time, it does represent a consistent short term option for purchasing incremental energy and on an annual planning basis is used as the resource to balance load and resources in the Annual Electric Contracting Plan, as accepted by the Commission. It provides a consistent valuation for the unused output regardless of the rate schedule under which the customer normally receives service.

FBC states the following on page 12 of the Application:

> Assuming that the rates associated with the Project became permanent, this fee would not increase over time but, subject to periodic review, may need to be reduced in response to changes in Program participation or the competitiveness of the Program with other renewable options such as rooftop solar that may decrease in cost during the life of the Program.

14.5 In an event where the capital and/or operating costs at the conclusion of the CSPP end up being higher than forecast in this Application, please explain why FBC would not propose to increase the Rate Schedule 85A rate going forward.

Response:

The rates included in the Application are based on reasonable assumptions and tied to a construction contract that is fixed in nature. FBC believes that for a pilot project with benefits to all customers and the potential for a small impact only if not all costs are recovered (refer to the response to BCUC IR 1.16.1), early adopters of the Program should continue to receive the certainly of price that is a feature of the pricing structure. FBC has stated in response to BCSEA IR 1.12.4 that "FBC would not adjust the rate upward once the rates are set. If the initial capital cost exceeds the current estimate materially (or is lower), FBC would adjust the CSPP rate accordingly prior to offering it to customers." but continues to believe that once the rates are set they should not be subject to a future increase.

14.5.1 As part of this response, please discuss the fairness of not increasing the rate from the perspective of FBC's non-solar subscribing ratepayers.

Response:

Please refer to the response to BCUC IR 1.14.5.

14.6 Please confirm, or explain otherwise, that if the solar fee were reduced in the future, the fee would no longer be reflective of the levelized cost of the solar

offering and therefore part of the program's cost would be transferred to all ratepayers.

Response:

Confirmed. However, were the Program participation to drop substantially as a result of these competitive pressures, costs would be transferred to non-participants as well. The Company would need to balance these outcomes to best serve the interests of customers overall.

14.6.1 If confirmed, please explain why decreasing the fee would be appropriate from the perspective of FBC's non-solar subscribing ratepayers.

Response:

Please refer to the response to BCUC IR 1.14.6.

15.0 Reference: RATE SCHEDULES AND TERMS AND CONDITIONS

Exhibit B-1, Section 6.6, pp. 14-15

Term and cancellation

FBC states on page 14 of the Application: "After the initial 12 month term, customers can elect to leave the Program without penalty."

15.1 Please explain why FBC chose an initial 12 month term for subscribing to the CSPP.

Response:

The 12 month period was chosen as it is consistent with the requirements of the Company's Net Metering Program and provides customers with a full year of consumption and production to determine what the impact of participation in the CSPP will mean for their particular account.

15.2 Please explain what the penalty is for customers leaving the CSPP within the initial 12 month term. As part of this response, please explain if there is a penalty for customers who move out of the FBC service area within the initial 12 month term of the CSPP.

Response:

There are no penalties contemplated as part of the Program. However, customers should not be permitted to enroll and leave on a seasonal basis in order to maximize the benefit of the solar generation. This is the rationale for the 12 month term.

15.3 Please confirm, or explain otherwise, that a customer under the FortisBC Virtual Solar option can at any time reduce the number of panels they are subscribed to without penalty as long as they are subscribed to at least one panel.

Response:

Confirmed.

16.0 Reference: PROGRAM COST RECOVERY

Exhibit B-1, Section 1, p. 1

Sensitivity analysis

FBC states on page 1 of the Application: "To the extent there is less than a full subscription, there will be costs associated with the CSPP that will not be recovered from participants that will be recovered from other customers."

16.1 Please provide in a fully functional excel workbook the levelized rate impact to FBC ratepayers under a scenario where there is zero subscription to the CSPP and at the end of the two-year pilot project FBC decides to terminate the program.

Response:

FBC clarifies that the rates proposed are designed to recover all costs over a 40-year period (i.e., the annual revenue requirement of the Project over the 40 years). Therefore, should the Project not be fully subscribed in each year during the 40-year period, the portion that is not recovered in each year from the participants will be recovered from FBC general customers in that year. As such, in the scenario as described in the question above, the revenue requirements during the first two years with zero subscription will also be recovered from FBC general customers.

If the Project has no subscription and is terminated, then the levelized rate impact of the entire Project to FBC general customers will be a 0.017 percent increase over the 2017 approved revenue requirement. The table below shows the year-over-year rate impact of the Project in the first five years of the 40-year analysis period. FBC anticipates a slight reduction to the revenue requirement during the first two years of the Project deriving mainly from the capital cost allowance related to the Project. Please refer to Attachment 16.1 for a working excel workbook for the calculations of the year-over-year rate impact and the levelized rate impact over 40 years.

Please note that the financial analysis for the Project is revised as described in the Errata to the Application, filled concurrently with these IR responses. The rate impacts shown in the table below are based on the revised financial analysis.

	2017	2018	2019	2020	2021
% Increase to 2017 Approved Revenue Requirement (G-180-16)	(0.018%)	(0.002%)	0.013%	0.020%	0.023%
Incremental % Increase (Year-over-Year)	(0.018%)	0.015%	0.015%	0.007%	0.003%
Levelized % Increase to 2017 Approved Revenue Requirement (Over 40 years)	0.017%				

E. PROJECT ALTERNATIVES

17.0 Reference: PROJECT ALTERNATIVES
Exhibit A2-1, Nelson Hydro Community Solar Garden
Nelson Hydro Community Solar Garden

Provided as Exhibit A2-1 is the "Frequently Asked Questions" sheet from Nelson Hydro's website regarding its Community Solar Garden.

Certain aspects of Nelson Hydro's Community Solar Garden are summarized as follows:

- Investment in the project is for a term of 25 years;
- There was a minimum level of subscription required prior to construction of the solar garden; and
- Customers who wish to subscribe to the solar offering must pay for the full cost of the solar panel upfront, either through a lump sum payment or through the use of on-bill financing/loan.

17.1 Please discuss whether FBC considered offering a community solar program similar to Nelson Hydro's solar program.

Response:

FBC is aware of the Nelson Hydro project and considers the CSPP to be similar in that customers have the benefit of virtual ownership of a given number of panels and the right to the actual output of the panels to use as an offset to consumption. However, unlike the Nelson Hydro project, the CSPP does not require a contract or a sizable up-front payment which FBC believes could serve as deterrents to participation.

17.1.1 If yes, please explain why this type of program was considered less appropriate than the proposed CSPP.

Response:

Please refer to the response to BCUC IR 1.17.1.

17.1.2 If no, please explain why not.

Response:

Please refer to the response to BCUC IR 1.17.1.

17.2 If FBC were to require customers to pay the full capital cost of the PV panel up front (as well as any other applicable capital costs), please provide the cost per panel which a customer would be required to pay. Please provide all calculations and assumptions.

Response:

The present value of the annual revenue requirement for the Project over 40 years is $933,072[4]; therefore, if FBC were to require participating customers to pay all costs associated with the Project up front, then the cost per panel will be $1,295.93. FBC has provided a revised financial model confidentially in an Errata to the Application, submitted concurrently with these IR responses. Please refer to the table below for the calculation:

Line	Particulars	Reference	Solar Pilot
1	Total PV of Annual Revenue Requirement (40 years)	Errata, Revised Financial Analysis, Line 18	$933,072
2	Total Number of Panels	Errata, Revised Financial Analysis, Line 19	720
3	Upfront Payment per Panel ($/panel)	Line 1 / Line 2	$1,295.93

17.3 Please discuss whether FBC would consider revising its proposed CSPP in one or both of the following ways to mitigate the risk that the CSPP costs will be passed on to all ratepayers as a result of lack of subscription to the program:

- Including a minimum subscription requirement prior to commencing construction of the CSPP, such as requiring that the CSPP be 75 percent subscribed prior to commencing construction; and/or

[4] The present value of the annual revenue requirement for the Project is revised as per the detail listed in BCUC IR 1.11.5.

- Extending the term of the subscription from a minimum of 12 months to a minimum of 5 years (or some other time period).

Response:

FBC has proposed the Project as described in the Application because it believes the Project initially will be fully subscribed.

However, both of the possible revisions suggested above would further mitigate the risk to other customers and could be implemented if required by the Commission.

18.0 Reference: PROJECT ALTERNATIVES

Exhibit B-1, Section 4.2, Table 4-1, p. 7

Treatment of CSPP costs

On page 7 of the Application, FBC provides the following table which shows the total estimated capital cost of the CSPP:

Table 4-1: Capital Cost Estimate

Item	Amount
Engineering and Construction	$ 858,284
FBC Communications & Consultation	42,500
Contingency	44,368
AFUDC	15,592
Project Total	**$ 960,744**

FBC further states on page 7 of the Application that it expects that the O&M for the facility will begin at $9 thousand in 2019 and escalate at two percent inflation thereafter.

18.1 Please discuss whether FBC would consider, as an alternative to including the CSPP capital and O&M costs as part of the PBR Plan formula-spending, creating a separate deferral account to record the costs and revenues associated with the CSPP.

Response:

FBC does not see the rationale for creating such a deferral account and does not believe that there would be any advantage to doing so. Furthermore, accounting for the CSPP in this manner would be inconsistent with the proposed rate calculations. The design of the CSPP rates is such that the revenue requirements and revenues collected are equal, not on an annual basis, but on a present value basis over the 40-year life of the project, as shown in lines 24 through 27 of the Revenue Requirements Analysis in Appendix B-2 of the Application.

The use of such a deferral account is problematic for two reasons. First, the deferral account would be required to persist over the entire life of the Project because the cumulative costs and revenues will not match from year to year. FBC does not view a deferral account of such longevity to be a preferred or even a practical solution.

Second, due to the discounting of the differential cost and revenue streams inherent in the present value calculation, even at the end of the Project life, the deferral account would contain a non-zero balance, requiring a final disposition of the balance, which is inconsistent with the initial rate calculation premise.

18.1.1 If yes, please describe how FBC would record revenues and expenses within the deferral account and what would be included in the deferral account. If possible, please also provide a hypothetical example based on the assumption of full subscription to the CSPP as to how the additions/reductions to the deferral account would be recorded annually.

Response:

Please refer to the response to BCUC IR 1.18.1.

18.1.2 If FBC would not consider separately tracking the costs and revenues associated with the CSPP in a deferral account, please explain why not.

Response:

Please refer to the response to BCUC IR 1.18.1.

Attachment 3.5

Client and project number	FortisBC 15092
Stated Survey Topic	Alternative Energy
Target Survey Length	12 minutes
Target Market and Sample Size	500 Residential; 200 Commercial
Study Email	xxxx@sentissurvey.com
Email invites and reminders:	TBD
Programming Dates	TBD
Field Dates (soft and full launch, reminder and final deadline)	TBD
Deliverables & Dates	TBD
Incentives	$1,000 in Visa Gift Cards
Other	This will be a phone recruit to online survey

DRAFT 9, December 17

PHONE RECRUIT SCRIPT - RESIDENTIAL

Hi, this is [NAME] calling from Sentis Research on behalf of FortisBC. How are you today? We're doing research on alternative energy sources and would like input from FortisBC customers. Please be assured, we are not trying to sell anything.

S1A. Are you the person or one of the people responsible for paying your electricity bill and making choices about home energy use?

YES
NO
REFUSED | RECORD AS HOUSEHOLD REFUSAL

IF NO: May I speak to that person?

IF YES AND PERSON COMES TO PHONE, RE-INTRODUCE
IF YES, BUT NOT AVAILABLE, ARRANGE CALLBACK
IF MAYBE OR HESITATES, THEN USE PERSUADERS
IF FIRM NO, THANK AND TERMINATE

PERSUADERS

- We're asking customers for their input so that FortisBC can make the most informed decisions about future energy services.
- We're asking customers to participate in a 10-12 minute online survey about alternative energy. As a token of appreciation we're giving away $1,000 in prizes. Those who participate are entered into a prize draw to win a grand prize of a $500 Visa Gift Card, one of three $100 gift cards, or one of four $50 gift cards.
- This is a confidential research project – not a sales call. All feedback customers provide is anonymous and used for research and planning purposes only.
- This phone call only takes a few minutes – it's just to confirm we're talking to the right person and to get their email address.
- You can verify the legitimacy of this project by contacting Roy Mokha at FortisBC: (778) 578-8095
- You can complete the survey any time between today and ENTER DATE.
- Sentis is a professional research company commissioned by FortisBC to assist with this research. We are based in downtown Vancouver.

WHEN TARGET RESPONDENT IS ON THE LINE REINTRODUCE THEN ASK:

S1B. Given that the research is about energy sources, may I ask what the primary heat source of your home is? READ IF NECESSARY

Natural Gas
Electricity (including air source heat pumps)
Wood
Bottled Propane
Oil
Solar
Other (specify)
Don't know

THANK AND TERMINATE IF SOLAR SELECTED IN S1B: 'Given that this research is being conducted among customers who use other types of energy sources, that will be my last question today. Thank you very much for your time.

S2. Would you be interested in participating in a 10 to 12 minute online research survey? You can do so any time between today and DATE. If you complete the survey in the next 48 hours you'll be entered into an early bird prize to win an iPad mini.

All customers who complete the survey by DATE will be entered into a draw to win a grand prize of a $500 Visa gift card, one of three $100 gift cards, or one of four $50 gift cards.

YES | CONTINUE SCREENERS
MAYBE OR HESITATES | CONTINUE TO QUESTIONS
FIRM NO | THANK AND TERMINATE – RECORD AS RESPONDENT REFUSAL

QUESTIONS. Are there any questions I can answer that would help you decide whether or not to participate?

USE PERSUADERS AS NECESSARY

Before I ask for your email address, I just have to confirm a few details:

S3. May I confirm that you are currently a FortisBC electricity customer?

YES | CONTINUE TO S4
NO | THANK AND TERMINATE
PREFER NOT TO ANSWER | THANK AND TERMINATE

S4. Are you or any member of your immediate family or household employed in the following sectors: (READ LIST)

Utility company	[THANK AND TERMINATE]
Natural gas company	[THANK AND TERMINATE]
Electricity company	[THANK AND TERMINATE]
Market research company	[THANK AND TERMINATE]
Newspaper, radio, or TV network	[THANK AND TERMINATE]
Utility regulatory body	[THANK AND TERMINATE]
No/none	[CONTINUE S5 EMAIL]

S5 EMAIL. May I have your email address to send you the link to the survey?

YES | GO TO S7 RECORD EMAIL ADDRESS
NO | HAVE DECIDED NOT TO DO IT | THANK AND TERMINATE
RESPONDENT SAYS THEY DON'T HAVE EMAIL ADDRESS | GO TO S6 PHONE
RESPONDENT INSISTS ON DOING SURVEY BY PHONE | GO S6 TO PHONE

S6 PHONE. Would you rather complete the survey by phone with me now?

YES | GO TO PHONE
NO | THANK AND TERMINATE

S7 RECORD EMAIL ADDRESS.
Let me repeat that back just so I know I've got it correct [USE ALPHA AS NECESSARY]

In the next hour or so, you'll receive an email from Sentis Research with the subject line: Help FortisBC plan our energy future. If you do not see the email in your inbox, then please check your junk mail folder.

S8. Would you also be interested in being contacted by email for other FortisBC research like this in the future?

YES
NO

EMAIL SEND/SIGN OFF

I'd like to thank you for your help today. Your feedback will help FortisBC best meet the needs of its customers.

Have a great day/ evening.

ONLINE SURVEY INTRODUCTION/ LANDING PAGE [NOTE: HEADINGS NOT TO APPEAR ON SCREEN]

Thank you again for participating in this survey about energy and alternative energy sources. All of your responses are confidential, anonymous and will be used only by FortisBC to ensure it meets the energy needs of its customers.

RESIDENTIAL

HOME CHARACTERISTICS

Given that this a survey about energy, we first have some questions about the home you live in.

RQ1. Are you currently living in …?

An apartment or a condominium in a multi-unit building
A townhouse, duplex or triplex
A single detached home
Other (specify) ☐

RQ2. Do you own or rent your home?

Own
Rent

RQ3. Including yourself, how many people live in your home?

One
Two
Three
Four or more

RQ4. How long have you lived in your home?

☐ years

RQ5. Approximately how old is your home? *An estimate is fine*

[ ] years old

RQ6. What is the approximate square footage of your home?

[ ] square feet

RQ7. What is the primary heat source for your home?

Natural Gas
Electricity (including air source heat pumps)
Wood
Bottled Propane
Oil
Other (specify)
Don't know

IMPRESSIONS OF FORTISBC AND OTHER ORGANIZATIONS

RQ8. What is your overall impression of the following organizations? Please rate each on a scale where 1 means 'not at all favourable' and 10 means 'very favourable'.

RANDOMIZE ORDER OF LIST

RQ8A. BC Hydro
RQ8B. FortisBC
RQ8C. Telus
RQ8D. Shaw
RQ8E. Rogers

PAST USE OF ADAPTATION OF ENERGY EFFICIENCY MEASURES

RQ9. Have you done any of the following in the past two years? Please

Improved your home's insulation
Installed energy efficient light bulbs
Installed an energy efficient hot water heater
Installed water-efficient showerheads and/or toilets
Installed a tankless water heater
Installed new windows
Installed an energy efficient furnace
Installed a heat pump
Replaced old appliances with more energy efficient ones (e.g., Energy Star appliances)
Other (specify)

ASSUMPTIONS ABOUT SOURCE OF FORTISBC ELECTRICITY AND RENEWABLE ENERGY

RQ10. From which of the following sources do you feel FortisBC generates the majority of its electricity?

RANDOMIZE ORDER

Natural Gas
Hydro
Coal
Wind
Don't know

RQ11. Which of the following would you consider to be clean and renewable energy sources? Select all that apply.

Wind
Solar
Coal
Natural Gas
Hydro
Geothermal
None of these are renewable energy sources
Don't know

AWARENESS/FAMILIARITY WITH SOLAR ENERGY

RQ12. Are you familiar with solar photovoltaic ("solar PV") technology to provide power to homes and businesses?

Yes, I am familiar with this technology and have a good understanding of it
Yes, I am familiar with this technology, but my understanding is limited
No, I am not familiar with it, but have heard of it
No, never heard of this before

RQ13. Have you ever considered installing solar PV panels at your home?

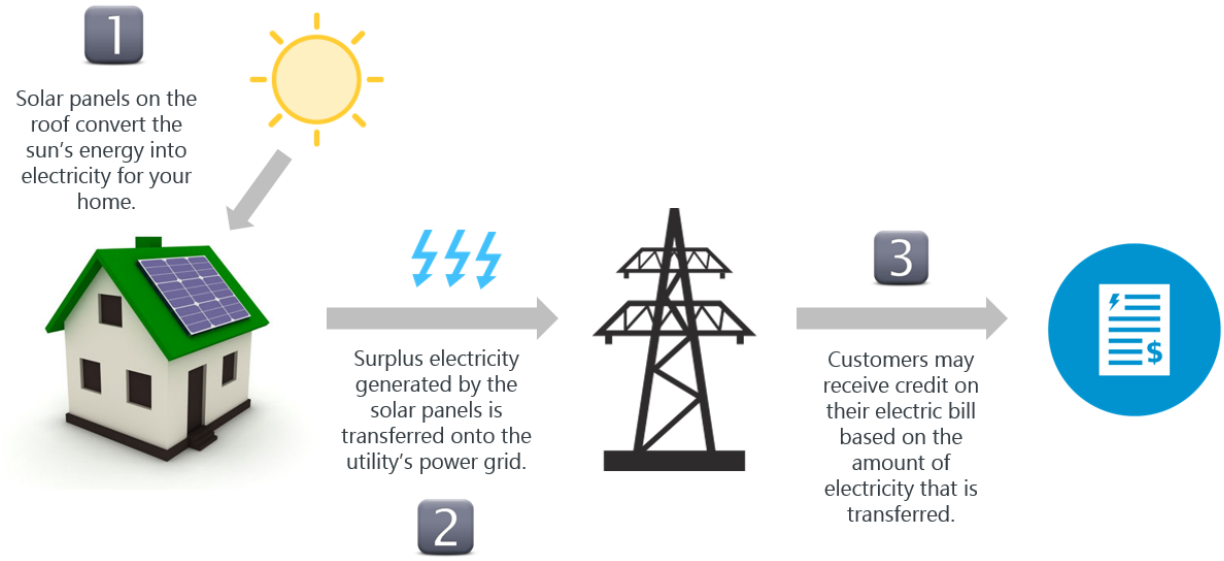
Yes, I have looked into it quite a bit
Yes, I have considered, but have not really looked into it
No, I haven't considered it

PERCEIVED SOLAR BENEFTIS AND DRAWBACKS

Solar photovoltaic electric energy systems work by converting the sun's energy into electricity using solar panels. There are two kinds of solar electric systems that we are interested in today.

One is a rooftop system. This is how it works. [SHOW IMAGE WITH TEXT]

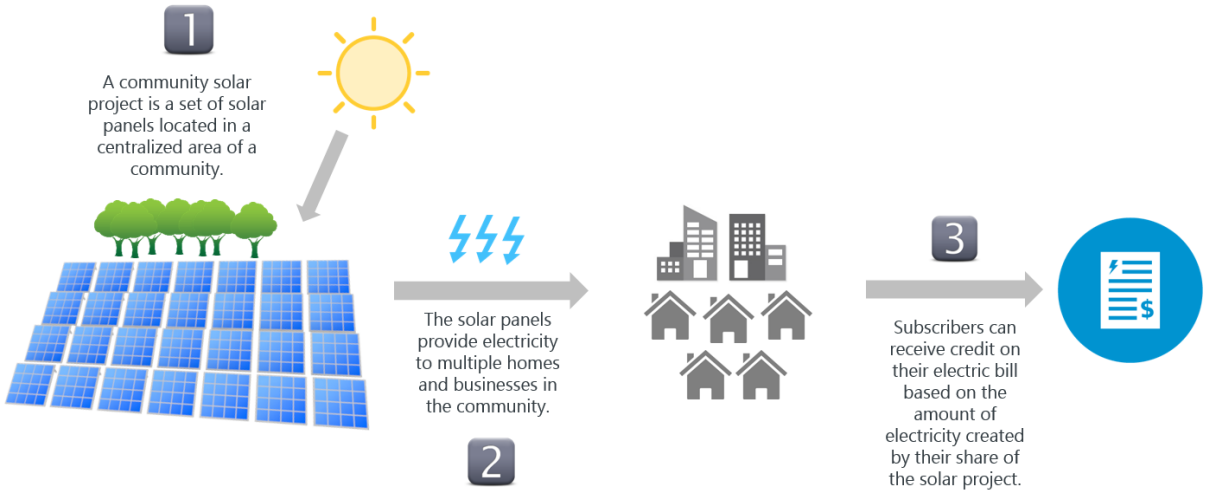
The solar panels on the roof convert the sun's energy into electricity for your home. When the solar panels aren't producing electricity – for example, at night – electricity is provided to your home by your utility service. Any surplus electricity generated by the solar panels is transferred onto the utility's power grid, and customers may receive credit on their electric bill based on the amount of electricity that is transferred.



Here are some images of what rooftop solar electric systems look like.

The other type of solar electric is a **community solar project**.

A community solar project is a set of solar panels located in a centralized area of a community. The solar panels provide electricity to multiple homes and businesses in the community. It is possible for homes and businesses can subscribe to a share of the community solar project. Subscribers may receive credit on their electric bill based on the amount of electricity created by their share of the community solar project.



Here are some images of what community solar projects look like.

Now that you've had a chance to see how the two types of solar electric systems work - rooftop and community solar - we're going to ask you a few questions about them.

The first set of questions are about the **rooftop solar electric system.**

INSERT SCHEMATIC FOR ROOFTOP SOLAR

RQ14. Based on the description provided, and what you might already know or have heard about rooftop solar electric technology, how likely are you to consider installing solar panels at your home in the next 3 to 5 years?

Very likely to consider
Somewhat likely
Somewhat unlikely
Very unlikely to consider
Don't know

RQ15. [ASK IF RQ14 IS VERY OR SOMEWHAT LIKELY] What is the main reason you are likely to consider installing **rooftop solar electric** panels in the next 3 to 5 years? Are there any other reasons?

I will save money on my electric bill
It's affordable to install
It will reduce my energy use
It will preserve water and other resources currently used to generate electricity
It will provide me with a reliable and secure source of energy
It will provide me with energy independence
It will reduce greenhouse house gas (GHG) emissions
Other - specify

RQ16. [ASK IF RQ14 IS VERY OR SOMEWHAT UNLIKELY] What is the main reason you are not likely to consider installing **rooftop solar electric** panels in the next 3 to 5 years? Are there any other reasons?

It won't save enough money on my electricity bill
Don't want panels on my roof
Want to wait for further improvements in the technology
Don't trust that the system will work at my home
It will be too expensive to install
It will take too long for my investment to payback

It may not be reliable
Will be selling my home/ moving soon
Other - specify

RQ17. Approximately how much would you expect to save on your household electric bill if you installed rooftop solar panels?

Less than 10%
10% to less than 20%
20% to less than 30%
30% to less than 40%
40% to less than 50%
50% or more
Don't know

RQ18. If you installed rooftop solar panels, how long do you think it would take to get a full payback on your investment?

1 to 2 years
2 to 3 years
3 to 4 years
5 to 6 years
7 to 8 years
9 to 10 years
10 years or longer

RQ19. There are different options for how customers could pay for a rooftop solar electric system. Please consider each option and choose the one that you would find most appealing. Keep in mind that rooftop solar panel systems typically last 25 years.

RANDOMIZE OPTIONS

You could buy your panels and have them installed by FortisBC
You could buy your panels and have them installed by a third party provider
You could lease the panels from FortisBC
You could lease the panels from a third party provider
Not sure of which option I would choose
We will definitely not be installing solar panels in the next 3 to 5 years

The next set of questions are about the **community solar project.**

INSERT SCHEMATIC FOR COMMUNTIY SOLAR HERE

RQ20. Based on the description provided, and what you might already know or have heard about community solar gardens, how likely are you to consider joining a community solar project in the next 3 to 5 years, assuming one was available to your community?

Very likely to consider
Somewhat likely
Somewhat unlikely
Very unlikely to consider
Don't know

RQ21. [ASK IF RQ20 IS VERY OR SOMEWHAT LIKELY] What is the main reason you are likely to join a community solar project in the next 3 to 5 years? Are there any other reasons?

I will save money on my electric bill
It will be affordable to join
It will reduce my energy use
It will preserve water and other resources currently used to generate electricity
It will provide me with a reliable and secure source of energy
It will provide me with energy independence
It will reduce greenhouse house gas (GHG) emissions
I want to be part of a green project in my community
Other - specify

RQ22. [ASK IF RQ20 IS VERY OR SOMEWHAT UNLIKELY] What is the main reason you are not likely to join a community solar project in the next 3 to 5 years? Are there any other reasons?

It won't save enough money on my electricity bill
Want to wait for further improvements in the technology
Don't trust that the system will work at my home
It will be too expensive
It may not be reliable
Other - specify

RQ23. Approximately how much would you expect to save on your household electric bill if you joined a community solar project?

Less than 10%
10% to less than 20%
20% to less than 30%
30% to less than 40%
40% to less than 50%
50% or more
Don't know

RQ24. If you subscribed to a community solar project, how long do you think it would take to get a full payback on your investment?

1 to 2 years
2 to 3 years
3 to 4 years
5 to 6 years
7 to 8 years
9 to 10 years
10 years or longer
Don't know

WHO WOULD CONSUMERS PREFER TO DEAL WITH/ ROLE THAT FORTISBC SHOULD PLAY

The next series of questions apply to both rooftop solar systems and community solar projects.

RQ25. If you were to decide to become a solar power user, who would you prefer your service provider to be?

FortisBC
A private solar energy company
A heating contractor
Prefer to own and operate myself
Other (specify)
Don't know

RQ26. And why would you prefer [INSERT RESPONSE FROM RQ26] to be your provider?

RECORD VERBATIM

RQ27. Regardless of your own intentions to use solar energy, do you think FortisBC should offer solar electric energy as an alternative to help meet customer demand?

Yes	| CONTINUE TO RQ28
Maybe	| CONTINUE TO RQ28
No	| SKIP TO RQ29
Don't know	| SKIP TO RQ31

RQ28. Currently, it costs more to generate power using solar energy than using other types of energy available to FortisBC, like hydro. Would you consider contributing a small amount on a monthly basis to help offset the increased cost?

Yes	| SKIP TO RQ31
Maybe	| SKIP TO RQ31
No	| CONTINUE TO RQ29
Don't know	| SKIP TO RQ31

RQ29. [ASK ONLY IF RQ28=NO] And why would you not consider contributing a small amount on a monthly basis to help offset the increased cost?

RECORD VERBATIM

RQ30. [ASK ONLY IF NO TO RQ27] And why do you have that view?

RECORD VERBATIM

RQ31. Thinking about the next 3 to 5 years, do you think the cost of electricity will…

Increase significantly
Increase somewhat
Stay the same
Decrease somewhat
Decrease significantly
Don't know

OTHER DEMOGRAPHICS

And just a few final questions for classification purposes.

RQ32. Into which of the following categories does your age fall?

18 to 24
25 to 34
35 to 44
45 to 54
55 to 64
65 or older
Prefer not to answer

RQ33. What was your approximate annual family income in 2014?

Less than $40,000
$40,000 to less than $50,000
$50,000 to less than $60,000
$60,000 to less than $70,000
$70,000 to less than $80,000
$80,000 to less than $100,000
$100,000 to less than $150,000
$150,000 or more
Don't know
Prefer not to answer

RQ34. What is your gender?

Male
Female

RANDOMIZE RQ35 AND RQ36

RQ35. Which of the following best describes you when it comes to vehicles powered solely by electricity?

You are likely to buy or lease an electric vehicle in the next 1 or 2 years
You would like to buy or lease an electric vehicle but the cost is currently too high
You are unlikely to buy or lease an electric vehicle in the foreseeable future
You already own or lease an electric vehicle
Don't know
Prefer not to answer

RQ36. Which of the following best describes you when it comes to hybrid vehicles, which are powered by a combination of electricity and gasoline?

You are likely to buy or lease a hybrid vehicle in the next 1 or 2 years
You would like to buy or lease a hybrid vehicle but the cost is currently too high
You are unlikely to buy or lease a hybrid vehicle in the foreseeable future
You already own or lease a hybrid vehicle
Don't know
Prefer not to answer

FOLLOW UP RESEARCH. Would you be interested in being contacted to participate in future FortisBC research projects?

PHONE RECRUIT SCRIPT – COMMERCIAL

Hi, this is [NAME] calling from Sentis Research on behalf of FortisBC. How are you today? We're doing research on alternative energy sources and would like input from FortisBC customers. Please be assured, we are not trying to sell anything.

S1. Are you the person or one of the people responsible for paying your organization's electricity bill and making choices about your organization's energy use?

YES
NO
REFUSED | RECORD AS ORGANIZATION REFUSAL

IF NO: May I speak to that person?

IF YES AND PERSON COMES TO PHONE, RE-INTRODUCE
IF YES, BUT NOT AVAILABLE, ARRANGE CALLBACK
IF MAYBE OR HESITATES, THEN USE PERSUADERS
IF FIRM NO, THANK AND TERMINATE

PERSUADERS

- We're asking customers for their input so that FortisBC can make the most informed decisions about future energy services.
- We're asking customers to participate in a 10-12 minute online survey about alternative energy. As a token of appreciation we're giving away $1,000 in prizes. Those who participate are entered into a prize draw to win a grand prize of a $500 Visa Gift Card, one of three $100 gift cards, or one of four $50 gift cards.
- This is a confidential research project – not a sales call. All feedback customers provide is anonymous and used for research and planning purposes only.
- This phone call only takes a few minutes – it's just to confirm we're talking to the right person and to get their email address.
- You can verify the legitimacy of this project by contacting Roy Mokha at FortisBC: (778) 578-8095
- You can complete the survey any time between today and ENTER DATE.
- Sentis is a professional research company commissioned by FortisBC to assist with this research. We are based in downtown Vancouver.

WHEN TARGET RESPONDENT IS ON THE LINE REINTRODUCE THEN ASK:

S1B. Given that the research is about energy sources, may I ask what the primary heat source for your business is? READ IF NECESSARY

Natural Gas
Electricity (including air source heat pumps)
Wood
Bottled Propane
Oil
Solar
Other (specify)
Don't know

THANK AND TERMINATE IF SOLAR SELECTED IN S1B: 'Given that this research is being conducted among customers who use other types of energy sources, that will be my last question today. Thank you very much for your time.

S2. Would you be interested in participating in a 10 to 12 minute online survey? You can do so any time between today and DATE. If you complete the survey in the next 48 hours you'll be entered into an early bird prize to win an iPad mini.

All customers who complete the survey by DATE will be entered into a draw to win a grand prize of a $500 Visa gift card, one of three $100 gift cards, or one of four $50 gift cards.

YES | CONTINUE SCREENERS
MAYBE OR HESITATES | CONTINUE TO QUESTIONS
FIRM NO | THANK AND TERMINATE – RECORD AS RESPONDENT REFUSAL

QUESTIONS. Are there any questions I can answer that would help you decide whether or not to participate?

USE PERSUADERS AS NECESSARY

Before I ask for your email address, I just have to confirm a few details:

S3. May I confirm that you are currently a FortisBC electricity customer?

YES | CONTINUE TO S4
NO | THANK AND TERMINATE
PREFER NOT TO ANSWER | THANK AND TERMINATE

S4. De your organization fall into any of the following categories: (READ LIST)

Utility company	[THANK AND TERMINATE]
Natural gas company	[THANK AND TERMINATE]
Electricity company	[THANK AND TERMINATE]
Market research company	[THANK AND TERMINATE]
Newspaper, radio, or TV network	[THANK AND TERMINATE]
Utility regulatory body	[THANK AND TERMINATE]
No/none	[CONTINUE S5 EMAIL]

S5 EMAIL. May I have your email address to send you the link to the survey?

YES | GO TO S7 RECORD EMAIL ADDRESS
NO | HAVE DECIDED NOT TO DO IT | THANK AND TERMINATE
RESPONDENT SAYS THEY DON'T HAVE EMAIL ADDRESS | GO TO S6 PHONE
RESPONDENT INSISTS ON DOING SURVEY BY PHONE | GO S6 TO PHONE

S6 PHONE. Would you rather complete the survey by phone with me now?

YES | GO TO PHONE
NO | THANK AND TERMINATE

S7 RECORD EMAIL ADDRESS.
Let me repeat that back just so I know I've got it correct [USE ALPHA AS NECESSARY]

In the next hour or so, you'll receive an email from Sentis Research with the subject line: Help FortisBC plan our energy future. If you do not see the email in your inbox, then please check your junk mail folder.

S8. Would you also be interested in being contacted by email for other FortisBC research like this in the future?

YES
NO

EMAIL SEND/SIGN OFF

I'd like to thank you for your help today. Your feedback will help FortisBC best meet the needs of its customers.

Have a great day/ evening.

ONLINE SURVEY INTRODUCTION/ LANDING PAGE [NOTE: HEADINGS NOT TO APPEAR ON SCREEN]

Thank you again for participating in this survey about energy and alternative energy sources. All of your responses are confidential, anonymous and will be used only by FortisBC to ensure it meets the energy needs of its customers.

COMMERCIAL

BUSINESS CHARACTERISTICS

Given that this a survey about energy, we first have some questions about the building your organization operates in.

BQ1. Which of the following best describes the type of building, facility or business served by your FortisBC account?

Automotive
Educational Facility
Food Store
Health Care Facility
Lodging
Manufacturing/Agriculture
Office Building and Mixed-use Building
Public Assembly
Restaurant
Retail and Personal Services
Warehouse
Other (specify) [ ]
Don't know

BQ2. How many buildings does your organization occupy?

One
Two
Three
Four
Five or more
Don't know

BQ3. Approximately how many total square feet of space does your organization occupy? Even if you don't know the exact square footage, an estimate is fine.

[ ] square feet

Don't know

BQ4. How many FTE (full-time equivalent) employees do you have?

2 to 19 employees
20 to 50 employees
51 to 150 employees
151 to 300 employees
300+ employees
Don't know

BQ5. And does your organization…

Own or co-own the entire building(s) it occupies
Own or co-own part of the building(s) it occupies
Lease or sub-lease the building (s) it occupies
Don't know

BQ6. What is the primary heat source for the building (s) your organization occupies?

Natural Gas
Electricity (including air source heat pumps)
Wood
Bottled Propane
Oil
Other (specify)
Don't know

IMPRESSIONS OF FORTISBC AND OTHER ORGANIZATIONS

BQ7. What is your overall impression of the following organizations? Please rate each on a scale where 1 means 'not at all favourable' and 10 means 'very favourable'.

RANDOMIZE ORDER OF LIST

BQ7A. BC Hydro
RQ7B. FortisBC
BQ7C. Telus
BQ7D. Shaw
BQ7E. Rogers

PAST USE OF ADAPTATION OF ENERGY EFFICIENCY MEASURES

BQ8. Does your organization have any of the following installed in your buildings? Please choose all that apply.

Energy efficient lighting
A programmable thermostat
Lighting controls that automatically turn lights down or off in unoccupied areas
Automatic shut-off or hibernation for equipment for equipment not in use – e.g., computers, printers
A policy that requires employees to shut off equipment when not in use
Maintenance of the heating system on an annual or more frequent basis
Other (specify)
Don't know

ASSUMPTIONS ABOUT SOURCE OF FORTISBC ELECTRICITY AND RENEWABLE ENERGY

BQ9. From which of the following sources do you feel FortisBC generates the majority of its electricity?

RANDOMIZE ORDER

Natural Gas
Hydro
Coal
Wind
Don't know

BQ10. Which of the following would you consider to be clean and renewable energy sources? Select all that apply.

Wind
Solar
Coal
Natural Gas
Hydro
Geothermal
None of these are renewable energy sources
Don't know

AWARENESS/FAMILIARITY WITH SOLAR ENERGY

BQ11. Are you familiar with solar photovoltaic technology to provide power to homes and businesses?

Yes, I am familiar with this technology and have a good understanding of it
Yes, I am familiar with this technology, but my understanding is limited
No, I am not familiar with it, but have heard of it
No, never heard of this before

BQ12. Has your organization ever considered installing solar panels at your business?

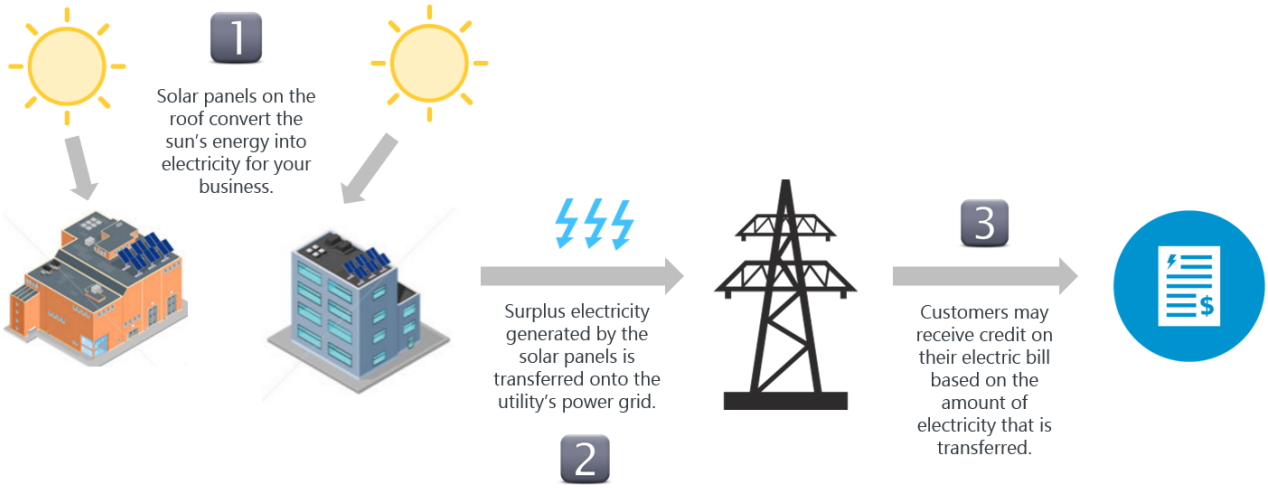
Yes, we've looked into it quite a bit
Yes, we've considered it, but have not really looked into it
No, we haven't considered it

PERCEIVED SOLAR BENEFTIS AND DRAWBACKS

Solar electric energy systems work by converting the sun's energy into electricity using solar panels. There are two kinds of solar electric systems.

One is a rooftop system. This is how it works. [SHOW IMAGE WITH TEXT]

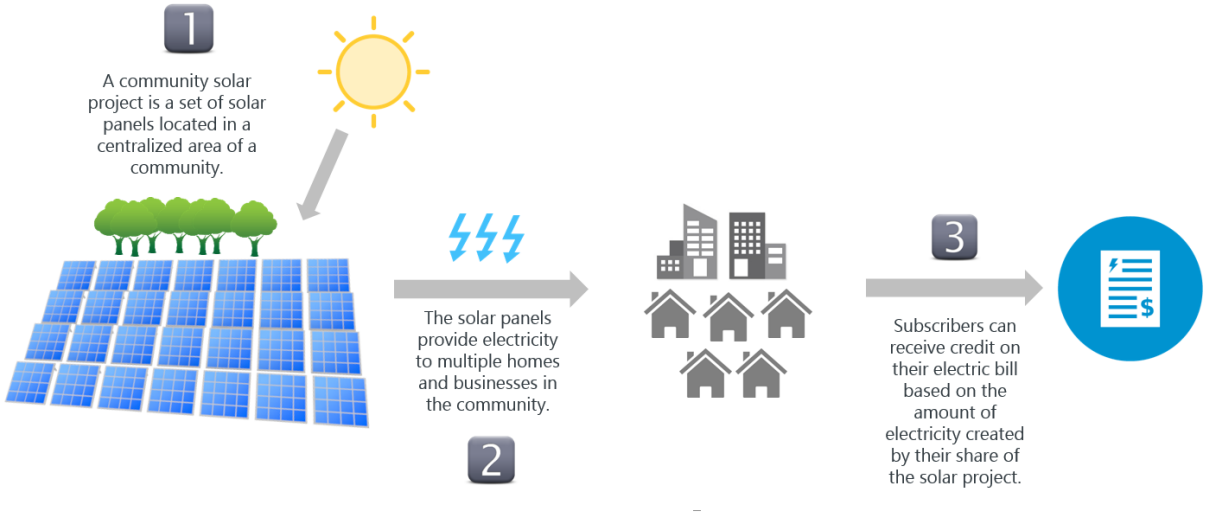
The solar panels on the roof convert the sun's energy into electricity for your business. When the solar panels aren't producing electricity – for example, at night – electricity is provided to your business by your utility service. Any surplus electricity generated by the solar panels is transferred onto the utility's power grid, and customers may receive credit on their electric bill based on the amount of electricity that is transferred.



Here are some images of what rooftop solar electric systems look like.

The other type of solar electric is a **community solar project**.

A community solar project is a set of solar panels located in a centralized area of a community. The solar panels provide electricity to multiple homes and businesses in the community. Homes and businesses can subscribe to a share of the community solar project. Subscribers may receive credit on their electric bill based on the amount of electricity created by their share of the community solar project.



Here are some images of what community solar projects look like.

Now that you've had a chance to see how the two types of solar electric systems work - rooftop and community solar - we're going to ask you a few questions about them.

The first set of questions are about the **rooftop solar electric system.**

INSERT SCHEMATIC FOR ROOFTOP SOLAR

BQ13. Based on the description provided, and what you might already know or have heard about rooftop solar electric technology, how likely is your organization to consider installing solar panels in the next 3 to 5 years?

Very likely to consider
Somewhat likely
Somewhat unlikely
Very unlikely to consider
Don't know

BQ14. [ASK IF BQ13 IS VERY OR SOMEWHAT LIKELY] What is the main reason your organization is likely to consider installing **rooftop solar electric** panels in the next 3 to 5 years? Are there any other reasons?

We will save money on our electric bill
It's affordable to install
It will reduce our energy use
It will preserve water and other resources currently used to generate electricity
It will provide us with a reliable and secure source of energy
It will provide us with energy independence
It will reduce greenhouse house gas (GHG) emissions
Other – specify
Don't know

BQ15. [ASK IF BQ13 IS VERY OR SOMEWHAT UNLIKELY] What is the main reason your organization is not likely to consider installing **rooftop solar electric** panels in the next 3 to 5 years? Are there any other reasons?

It won't save enough money on our electricity bill
Don't want panels on our roof
Want to wait for further improvements in the technology
Don't trust that the system will work for our building/facility
It will be too expensive to install

It will take too long for our investment to payback
It may not be reliable
Will be selling the business/ moving soon
Other - specify

BQ16. Approximately how much would you expect to save on your organization's electric bill if you installed rooftop solar panels?

Less than 10%
10% to less than 20%
20% to less than 30%
30% to less than 40%
40% to less than 50%
50% or more
Don't know

BQ17. If your organization installed rooftop solar panels, how long do you think it would take to get a full payback on your investment?

1 to 2 years
2 to 3 years
3 to 4 years
5 to 6 years
7 to 8 years
9 to 10 years
10 years or longer
Don't know

BQ18. There are different options for how organizations could pay for a rooftop solar electric system. Please consider each option and choose the one that you would find most appealing. Keep in mind that rooftop solar panel systems typically last 25 years.

RANDOMIZE OPTIONS

You could buy the panels and have them installed by FortisBC
You could buy the panels and have them installed by a third party provider
You could lease the panels from FortisBC
You could lease the panels from a third party provider
Not sure of which option I would choose
We will definitely not be installing solar panels in the next 3 to 5 years

The next set of questions are about the **community solar project.**

INSERT SCHEMATIC FOR COMMUNTIY SOLAR HERE

BQ19. Based on the description provided, and what you might already know or have heard about community solar projects, how likely is your organization to consider joining a community solar project in the next 3 to 5 years, assuming one was available to your community?

Very likely to consider
Somewhat likely
Somewhat unlikely
Very unlikely to consider
Don't know

BQ20. [ASK IF BQ19 IS VERY OR SOMEWHAT LIKELY] What is the main reason you organization is likely to consider joining a community solar project in the next 3 to 5 years? Are there any other reasons?

Save money on our electric bill
It will be affordable to join
It will reduce our energy use
It will preserve water and other resources currently used to generate electricity
It will provide us with a reliable and secure source of energy
It will provide us with energy independence
It will reduce greenhouse house gas (GHG) emissions
We want to be part of a green movement in my community
Other - specify

BQ21. [ASK IF BQ19 IS VERY OR SOMEWHAT UNLIKELY] What is the main reason your organization is not likely to consider joining a community solar garden the next 3 to 5 years? Are there any other reasons?

It won't save enough money on our electricity bill
Want to wait for further improvements in the technology
Don't trust that the system will work at for our building/facility
It will be too expensive
It may not be reliable
Other - specify

BQ22. Approximately how much would you expect to save on your household electric bill if you joined a community solar project?

Less than 10%
10% to less than 20%
20% to less than 30%
30% to less than 40%
40% to less than 50%
50% or more
Don't know

BQ23. If you subscribed to a community solar project, how long do you think it would take to get a full payback on your investment?

1 to 2 years
2 to 3 years
3 to 4 years
5 to 6 years
7 to 8 years
9 to 10 years
10 years or longer
Don't know

BQ24. Who would you prefer to be the owner of the community solar project?

FortisBC
The subscribers to the community solar project
A third-party business
Other (specify)
Don't know

WHO WOULD CONSUMERS PREFER TO DEAL WITH/ ROLE THAT FORTISBC SHOULD PLAY

The next series of questions apply to both rooftop solar systems and community solar projects.

BQ25. If your organization were to decide to become a solar power user, who would you prefer your service provider to be?

FortisBC
A private solar energy company
A heating contractor
Prefer to own and operate myself
Other (specify)
Don't know

BQ26. And why would you prefer [INSERT RESPONSE FROM BQ25] to be your provider?

RECORD VERBATIM

BQ27. Regardless of your own intentions to use solar energy, do you think FortisBC should offer solar electric energy as an alternative to help meet customer demand?

Yes	| CONTINUE TO BQ28
Maybe	| CONTINUE TO BQ28
No	| SKIP TO BQ29
Don't know	| SKIP TO BQ31

BQ28. Currently, it costs more to generate power using solar energy than using other types of energy available to FortisBC, like hydro. Would you consider contributing a small amount on a monthly basis to help offset the increased cost?

Yes	| SKIP TO BQ31
Maybe	| SKIP TO BQ31
No	| CONTINUE TO BQ29
Don't know	| SKIP TO BQ31

BQ29. [ASK ONLY IF BQ28=NO] And why would you not consider contributing a small amount on a monthly basis to help offset the increased cost?

RECORD VERBATIM

BQ30. [ASK ONLY IF NO TO BQ27] And why do you have that view?

RECORD VERBATIM

OTHER DEMOGRAPHICS

And just a few final questions for classification purposes.

BQ31. Which of the following best describes your role at your organization?

Accountant/Controller
Business manager/ General Manager/ Administrator
CEO/President
CFO
COO
Owner
Partner
Vice President/ Senior executive
Other (Specify)

BQ32. How long has your organization been in business?

Less than 2 years
2 years to less than 5 years
5 years to less than 10 years
10 years to less than 20 years
20 years or longer
Don't know

BQ33. Into which of the following categories does your age fall?

18 to 24
25 to 34
35 to 44
45 to 54
55 to 64
65 or older
Prefer not to answer

FOLLOW UP RESEARCH. Would you be interested in being contacted to participate in future FortisBC research projects?

Attachment 3.14

Solar Energy Research Results

Prepared for:
Roy Mokha

December 12, 2016 FULL REPORT

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Contents

Objectives & Methodology

Objectives & Methodology

Objectives

The research was conducted among FortisBC residential and commercial electricity customers and addresses the following objectives:

- Assess familiarity with solar panels as a power source for homes and businesses
- Measure past consideration of installing solar panels and participating in a community solar installation
- Measure current interest in installing rooftop solar with net metering
- Determine reasons why customers are interested in/not interested in installing rooftop solar panels
- Gauge customer preferences regarding purchasing versus leasing solar panels
- Measure current interest in participating in a community solar installation
- Determine reasons why customers are interested in/not interested in participating in a community solar installation
- Measure the relative appeal of rooftop versus community solar
- Collect home and business demographics

Objectives & Methodology

Methodology

- A phone recruit-to-online survey methodology was employed for this study.
- The sample was composed of phone listings for residents and commercial enterprises from FSAs corresponding to FortisBC's electrical service areas. Prospective participants were telephoned and asked if they would be interested in participating in an online survey about alternative energy sources. Interested participants were emailed a unique link to the survey.
- To qualify for the survey, respondents had to have been the person responsible for paying their household's (business') electric bill and be the decision maker for their household's (business') home energy use. They also had to be a FortisBC electricity customer and not currently using solar energy system as a primary heat source.
- To enhance response rates, email reminders were sent to those who had not completed the survey within 5 days of receiving the email invitation. Respondents who completed the survey were entered into a draw to win one of the following: a grand prize of $500 Visa gift card, one of three $100 Visa gift cards, or one of four $50 gift cards.
- The survey was administered from November 9 to December 2, 2016. The phone recruit-to-online survey conversion for the residential sample was 74% while the commercial sample was 52%. A total of 305 surveys were completed with residential customers and 102 surveys with commercial customers.
- The margins of error (M.O.E) associated with each sample size at the 95% confidence level is shown in the table below:

	Sample Size	M.O.E
Residential	305	+/- 5.6%
Commercial	102	+/- 9.7%

- At the data processing stage, the residential survey data was weighted by age to bring it in line with that of household maintainers in the selected FSAs.
- No weighting was necessary for the commercial survey data.

Summary, Implications, Recommendations

Summary, Implications, Recommendations

What Sparks Customers to Seek Out Information on Solar

- Compared to the initial survey on solar energy conducted on behalf of FortisBC in January 2016, residential and commercial customer consideration of using solar panels has increased. Just under two-thirds of residential customers (versus 46% in the previous survey) have considered solar – with 16% having looked into it quite a bit. Half of commercial customers (versus 30% in the previous survey) have considered solar – with 17% having looked into it quite a bit.
- While the results of this survey indicate that both residential and commercial customers are motivated to consider solar based on a desire to save money, the results also illustrate, among residential customers, what sparks a serious interest in solar versus a more moderate interest.
- The table below shows differences between those who have previously looked into solar quite a bit and those who have considered it but have not really looked into it.

Residential Customers	Have looked into solar quite a bit	Have considered but not really looked into it
% with favourable impression of **FortisBC**	36%	55%
% with favourable impression of **BC Hydro**	24%	45%
% indicating **energy independence is main reason** likely to consider rooftop solar	30%	15%

- Those who have previously looked into solar quite a bit are less likely to have favourable impressions of utility companies and are more likely to cite energy independences at the main reason they are likely to consider rooftop solar.

Summary, Implications, Recommendations

What Makes Customers Likely to Consider Rooftop Solar

- In both the January 2016 survey and the current survey, customers were shown an infographic explaining how rooftop solar panels work and how they may impact customer electricity bills. However, in the current survey, the concept of net metering was explicitly introduced.
- Compared to the January 2016 survey, commercial customers are less likely to consider installing solar panels (51% in the January 2016 survey, 44% in the current survey.) This is due, however, to an increase in the percentage of commercial customers who are 'somewhat unlikely' to consider installing them. The percentage of commercial customers who are 'very likely' to consider installing panels actually increased from 17% in the previous survey to 23% in the current survey.
- Compared to the January 2016 survey, residential customers are **more likely to** consider installing solar panels (41% in the January 2016 survey, 47% in the current survey). Further, there has also been an increase in the percentage of residential customers who are 'very likely' to consider installing rooftop solar panels – 15% in the previous survey, 23% in the current survey.
- While the prospect of saving money is a key driver of consideration, the results illustrate what also drives interest among those residential customers most likely to consider rooftop solar. The table on the slide that follows shows the main reasons why residential customers are 'very likely' to consider rooftop solar versus 'somewhat likely' to consider rooftop solar.

Summary, Implications, Recommendations

What Makes Customers Likely to Consider Rooftop Solar, cont'd

Residential Customers' Main Reasons for Considering Rooftop Solar	Very likely to consider rooftop solar	Somewhat likely to consider rooftop
% indicating **energy independence**	25%	9%
% indicating **reduced energy consumption**	6%	21%
% indicating **to save money overall**	26%	26%

- Both groups are equally likely to cite monetary savings as the main reason they are likely to consider rooftop solar. However, those with the strongest intentions to consider rooftop solar are more likely to cite energy independence as the main reason, while those with weaker intentions are more likely to cite reduced energy consumption as the main reason.
- These results indicate that, in the current marketplace, the residential consumer most likely to seek out information on rooftop solar and most likely to consider rooftop solar with net metering is a consumer who has less favourable impressions of utility companies and is seeking energy independence from these companies.
- Given that these consumers are further down the purchase funnel, they will be the ones most likely to attend to messaging about rooftop solar offerings. FortisBC needs to be mindful of these consumers' impressions and motivations if it moves forward with a solar rooftop offering.

Summary, Implications, Recommendations

Barriers to Considering Rooftop Solar

- The main reason residential and commercial customers are not likely to consider installing rooftop solar panels is that the up-front costs will be too high. No commercial customers, and only a few residential customers, cite a lack of monetary savings as the main reason that they are unlikely to install rooftop solar panels. If the main objection has to do with cost as opposed to savings, then incentive programs that defray the upfront cost of solar panels should have a substantial impact on consumer motivation to adopt rooftop solar. Also, communications illustrating how the investment pays back over time (or incrementally) should be effective.
- This should be more effective than communications that highlight the length of time for full payback on the investment. Industry sources estimate that a full payback on rooftop panels range from 15 to 25 years. Most consumers do not find these payback times compelling given how much can change over that time – e.g., moving one's home or business, new technologies, etc.

Rooftop Solar: Purchase vs. Leasing

- The table below summarizes the results for the likelihood that customers would consider rooftop solar panels under each of three scenario presented in the survey.

Rooftop Solar Scenario	Residential Customers Likely to Consider Rooftop Solar	Commercial Customers Likely to Consider Rooftop Solar
Initial Presentation (no reference to purchase or lease)	47%	44%
Purchase panels for $1,300	35%	47%
Lease panels for $115 per year	41%	40%

Summary, Implications, Recommendations

Rooftop Solar: Purchase vs. Leasing, cont'd

- Both residential and commercial customers express similar levels of interest in rooftop solar overall and in a scenario in which the solar panels could be leased for $115 per year. However, residential customers' interest in purchasing rooftop solar panels for $1,300 is lower than the level of interest expressed by commercial customers.
- In explaining why they are unlikely to consider purchasing rooftop solar panels, residential customers were equally likely to cite a lack of affordability and the length of the payback time. However, customers who initially indicated that they are likely to consider rooftop solar (but indicated that they are unlikely to purchase them at $1,300) were more likely to cite length of payback as a reason than lack of affordability. This is further evidence that the incremental payback of the investment needs to be reinforced.

What Makes Customers Likely to Consider Community Solar

- Only 18% of residential customers and 12% of commercial customers have previously considered participating in a community solar garden. This is due in part to the current levels of awareness of community solar installations – 37% of residential customers, and 39% of commercial customers had previously heard of community solar.
- Despite these relatively low levels of awareness of community solar, interest in participating in a community solar installation is comparable to interest in rooftop solar panels. Among residential customers, 49% are likely to consider participating in a community solar installation, 47% are likely to consider rooftop solar panels. Among commercial customers, the figures are 47% and 44%, respectively.
- Among both customer groups – but particularly among commercial customers, interest in community solar is driven primarily by the prospect of saving money overall. However, among both customer groups, the prospect of being part of a green project in the community is a relatively strong secondary motivator.
- The fact that being part of a green project in the community emerged as a stronger motivator than GHG emissions and resource conservation may be because the community project is something very tangible and immediate to customers – one can see the installation, whereas the other outcomes are less tangible and more long-term.

Summary, Implications, Recommendations

Rooftop Solar versus Community Solar

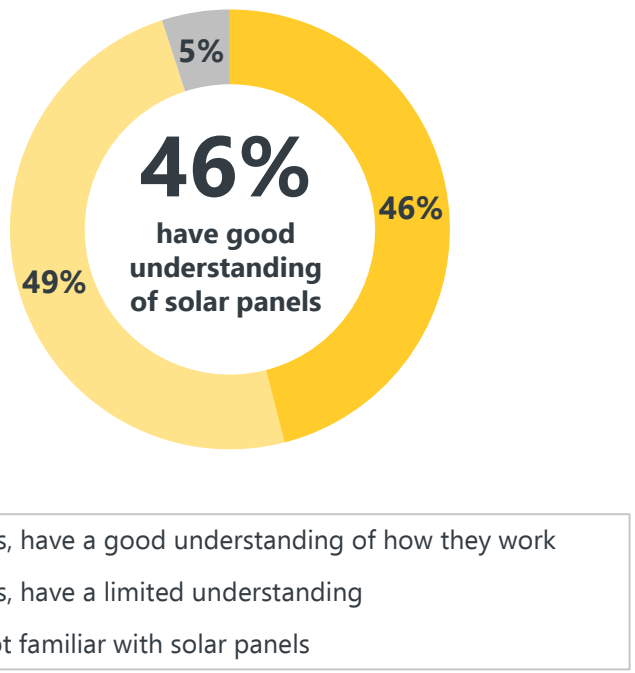
- Despite the fact that the majority of residential (58%) and commercial customers (53%) expect to pay more for rooftop solar panels than panels in the community solar installation, both customer groups currently consider rooftop solar more appealing than community solar.
- The relative appeal of these options does depend on how much customers have previously considered community solar. Among residential customers who have previously considered rooftop solar, 50% consider both rooftop and community solar equally appealing and only 18% consider rooftop more appealing. Among those who have heard of community solar (but have not considered it) only 20% consider both options equally appealing and 47% consider rooftop solar more appealing. This suggests that the more consumers learn about community solar the more they will view it a viable alternative to rooftop solar.
- The results point to the relative appeal of the prospect of owning or leasing solar panels – whether they are rooftop panels or in a community solar installation – compared to purchasing a percentage of one's electricity needs from a community solar installation. When the percentage purchase option was introduced, the appeal of community solar relative to rooftop decreased – even among those who had previously considered it.
- When the percentage purchase option was tested against the option of purchasing or leasing panels in the community solar installation, only 15% of residential customers considered the percentage purchase option more appealing, and 29% considered the purchase/lease option more appealing. Among commercial customers the figures were 10% and 39%, respectively.
- Consumers likely need more information regarding how purchasing a percentage of their electricity needs from the installation would work. Even among those likely to consider participating in a community solar installation over half (55%) are not sure what percentage of their electricity they would consider purchasing from the installation.

Detailed Findings

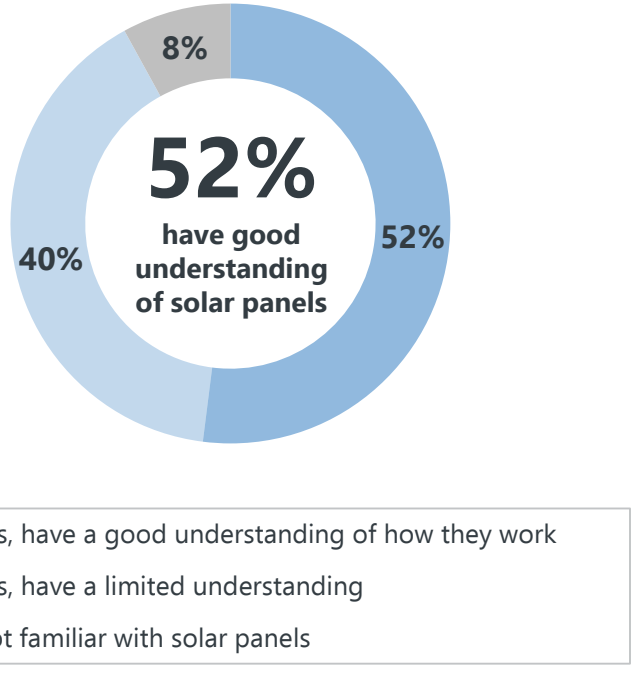
Familiarity with Solar Panels

- Just under half of residential customers (46%) indicate that they have a good understanding of how solar panels work – with the most of the balance indicating that they are familiar with solar panels but have a limited understanding of how they work.
- At 52%, commercial customers are somewhat more likely than residential customers to indicate that they have a good understanding of how solar panels work.
- A small percentage of residential and commercial customers are not familiar with solar panels.

Residential



Commercial



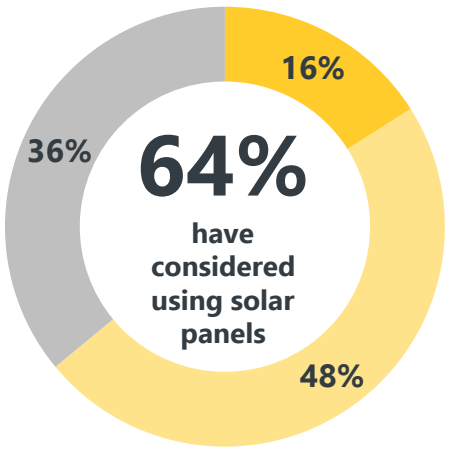
Base: Residential (305), Commercial (102)

RQ9/BQ8: Are you familiar with solar panels as a way to provide power to homes and businesses?

Past Consideration of Solar

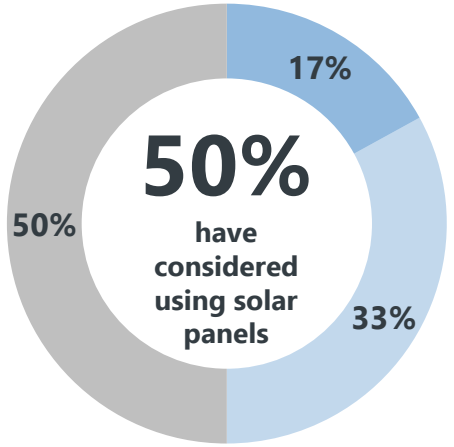
- Just under two-thirds of residential customers have considered using solar panels – with 16% having looked into it quite a bit.
- Past consideration of solar is lower among commercial customers, at 50%. However, like residential customers, 17% of commercial customers have looked into it quite a bit.
- Relative to the first solar survey conducted in January 2016, consideration of solar has increased among both customer groups. Among residential customers, consideration has increased from 46% to 64%. Among commercial customers it has increased from 30% to 50%.

Residential



- Yes, have looked into it quite a bit
- Yes, have considered but not really looked into it
- No, have not considered

Commercial



- Yes, have looked into it quite a bit
- Yes, have considered it, but not really looked into it
- No, have not considered

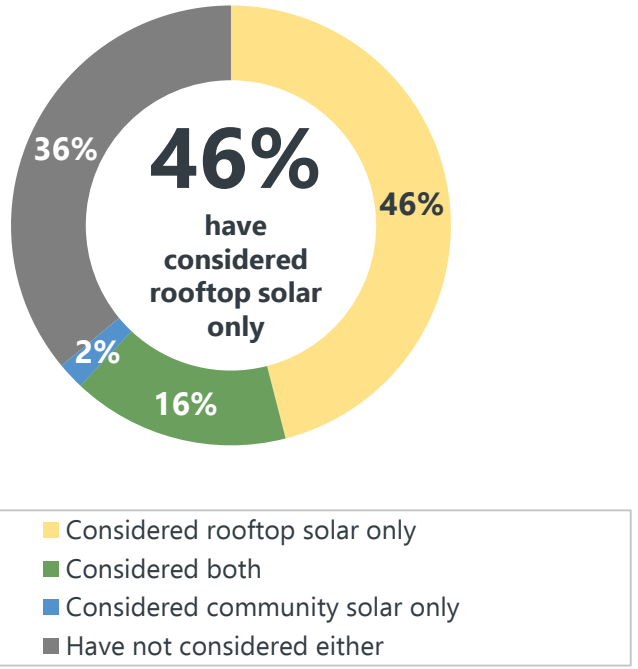
Base: Residential (305), Commercial (102)

RQ10/BQ9: Have you ever considered using solar panels to generate energy for your home/business?

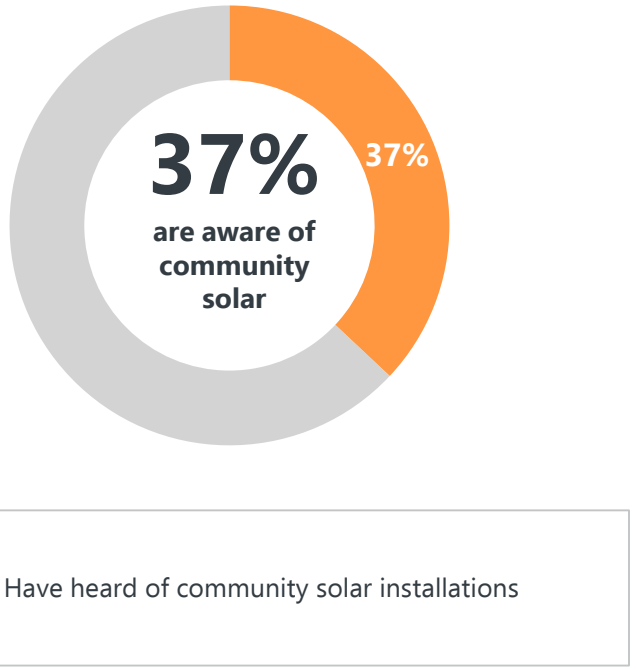
Past Consideration of Solar: Residential

- Just under half of residential customers (46%) have considered installing rooftop solar panels only. Two-in-ten have considered participating in a community solar installation.
- Awareness of community solar is currently a barrier to consideration – only 37% of residential customers have heard of community solar installations.
- Among residents who are aware of community solar installations, just under half have considered participating in one.

Type of Solar Considered



Awareness of Community Solar Installations



Base: Residential (305)

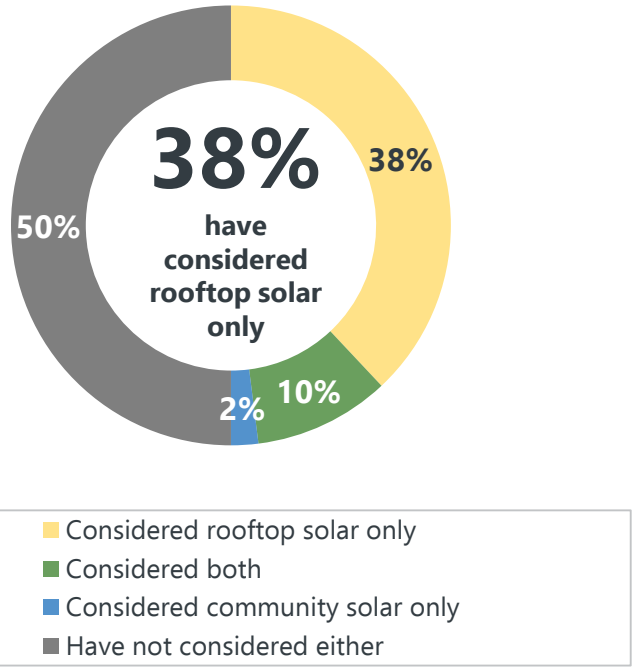
RQ11a/b: Have you considered installing rooftop solar panels/participating in a community solar installation?

RQ12: Before this survey, had you heard of community solar installations?

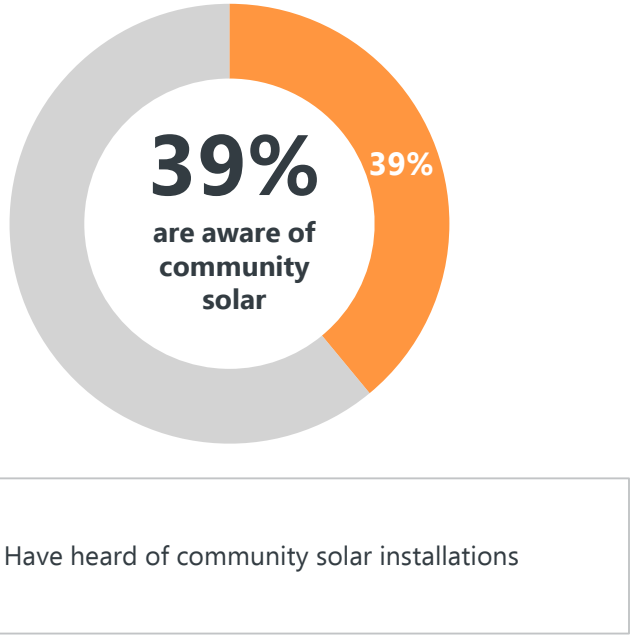
Past Consideration of Solar: Commercial

- As is the case with residential customers, the vast majority of commercial customers who have considered using solar panels have only considered installing a rooftop solar system.
- Like residential customers, 6-in-10 commercial customers were not aware of community solar installations before the survey.

Type of Solar Considered



Awareness of Community Solar Installations



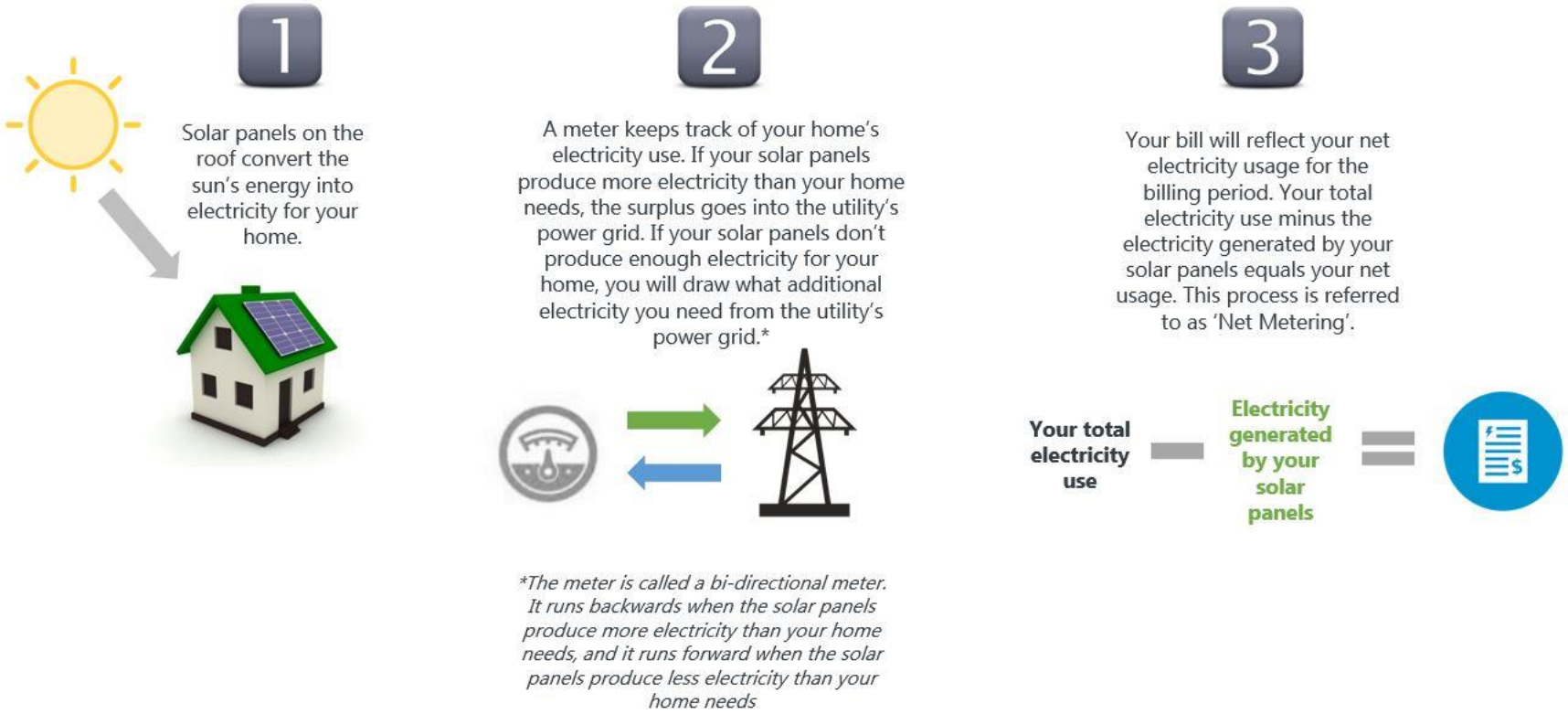
Base: Commercial (102)

BQ10a/b: Have you considered installing rooftop solar panels/participating in a community solar installation?

BQ11: Before this survey, had you heard of community solar installations?

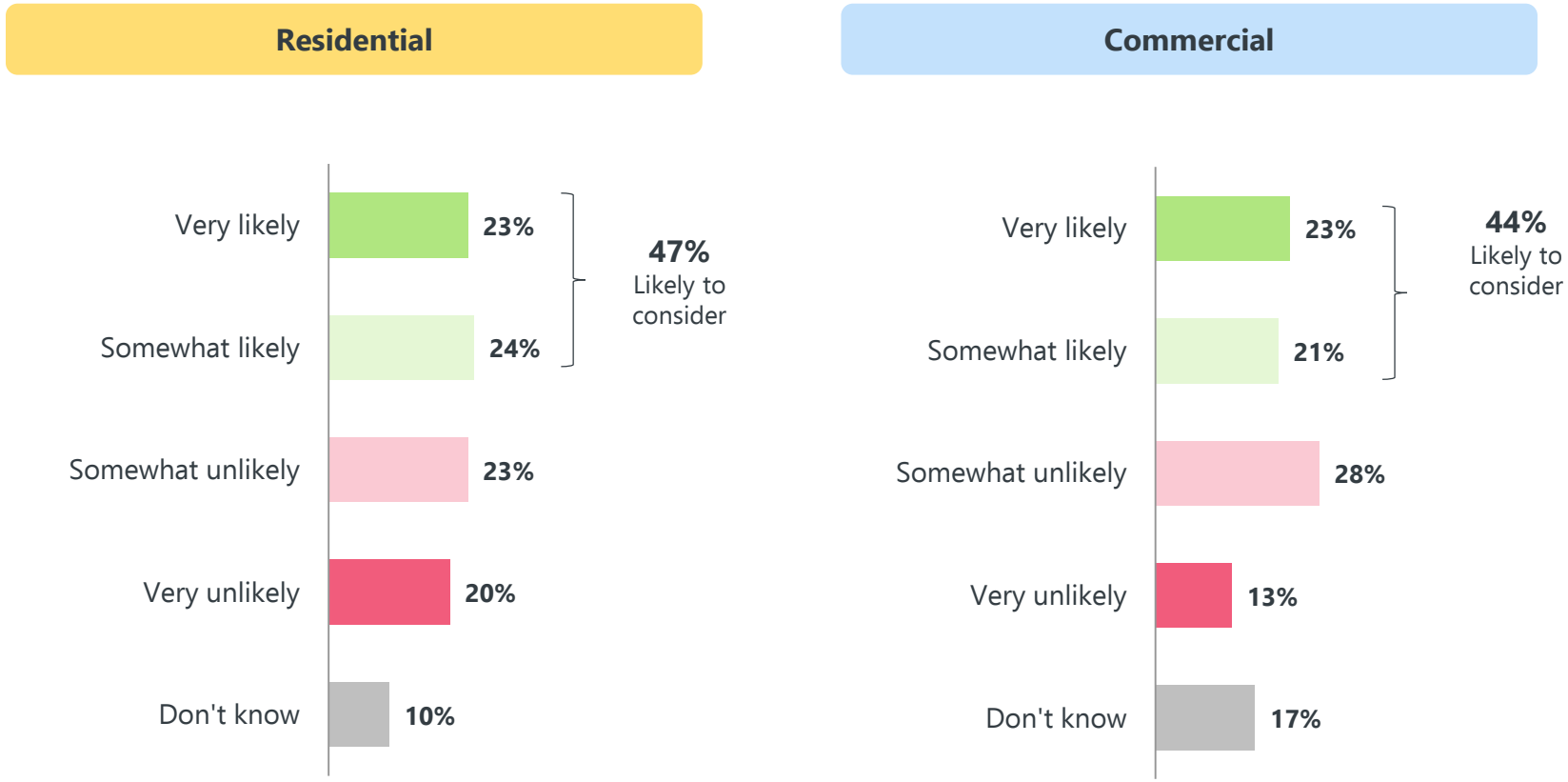
Interest in Rooftop Solar

- Customers were shown this infographic which explained how net metering works and how net metering impacts their electricity bill.
- The infographic was adapted accordingly for commercial customers.



Current Consideration of Installing Rooftop Solar Panels

- Just under half of residential customers (47%) indicate that that they are likely to consider installing solar panels at their home in the next 3 to 5 years – 23% are very likely to consider it.
- Similarly, 44% of commercial customers indicate that they are likely to consider installing solar panels for their business in the next 3 to 5 years, including 23% who are very likely to consider it.

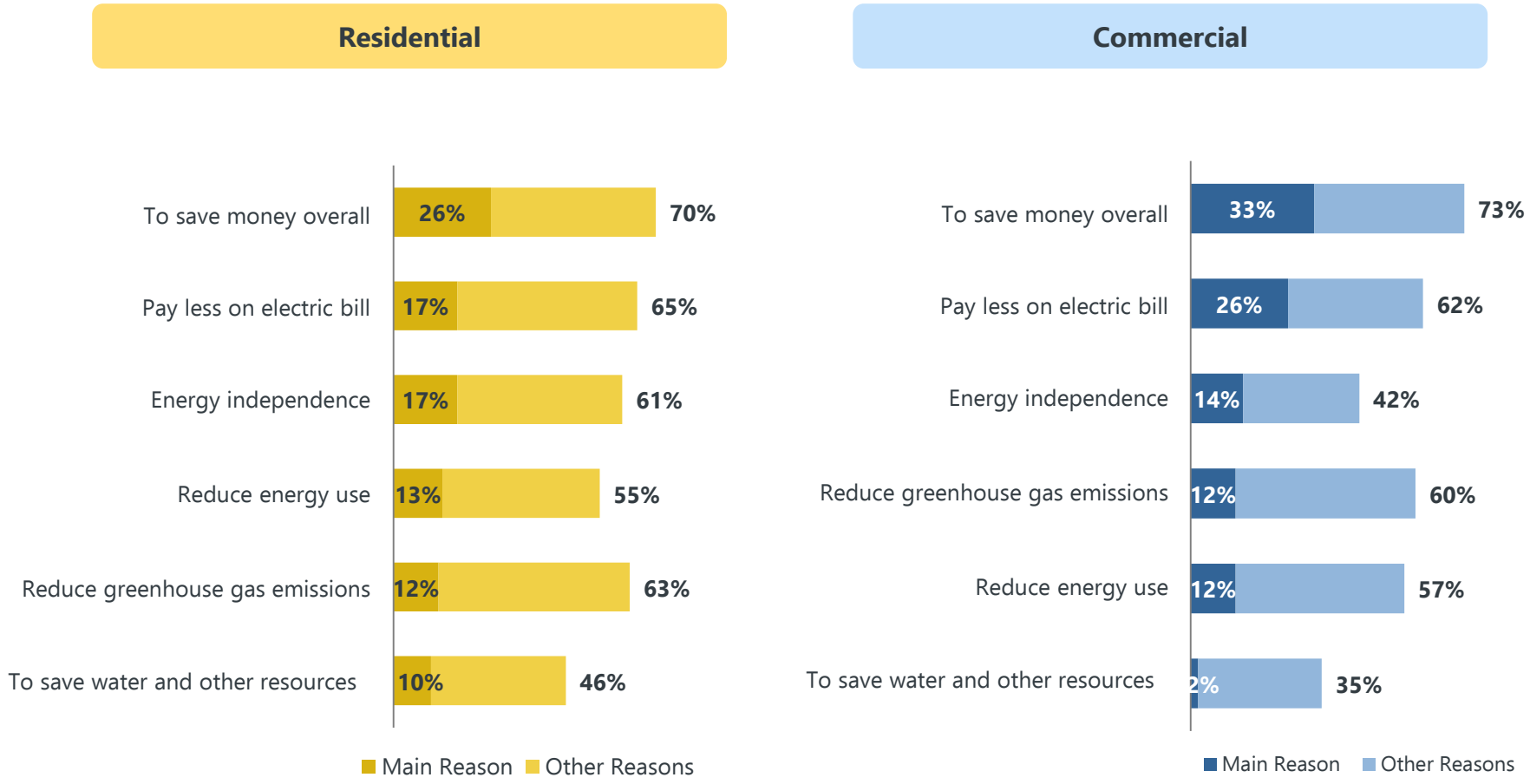


Base: Residential (305), Commercial (102)

RQ13/BQ12: Based on the description provided, and what you might already know or have heard about rooftop solar electric technology, how likely are you to consider installing solar panels [if residential: at your home] in the next 3 to 5 years?

Reasons Likely to Consider Rooftop Solar

- While the prospect of saving money is the strongest motivator for considering rooftop solar among both residential and commercial customers, being able to reduce energy use and reduce greenhouse gas emissions are important secondary motivators among both customer groups.
- Energy independence is a weaker motivator among commercial customers, perhaps because they are less likely than residential customers to consider this a realistic outcome.

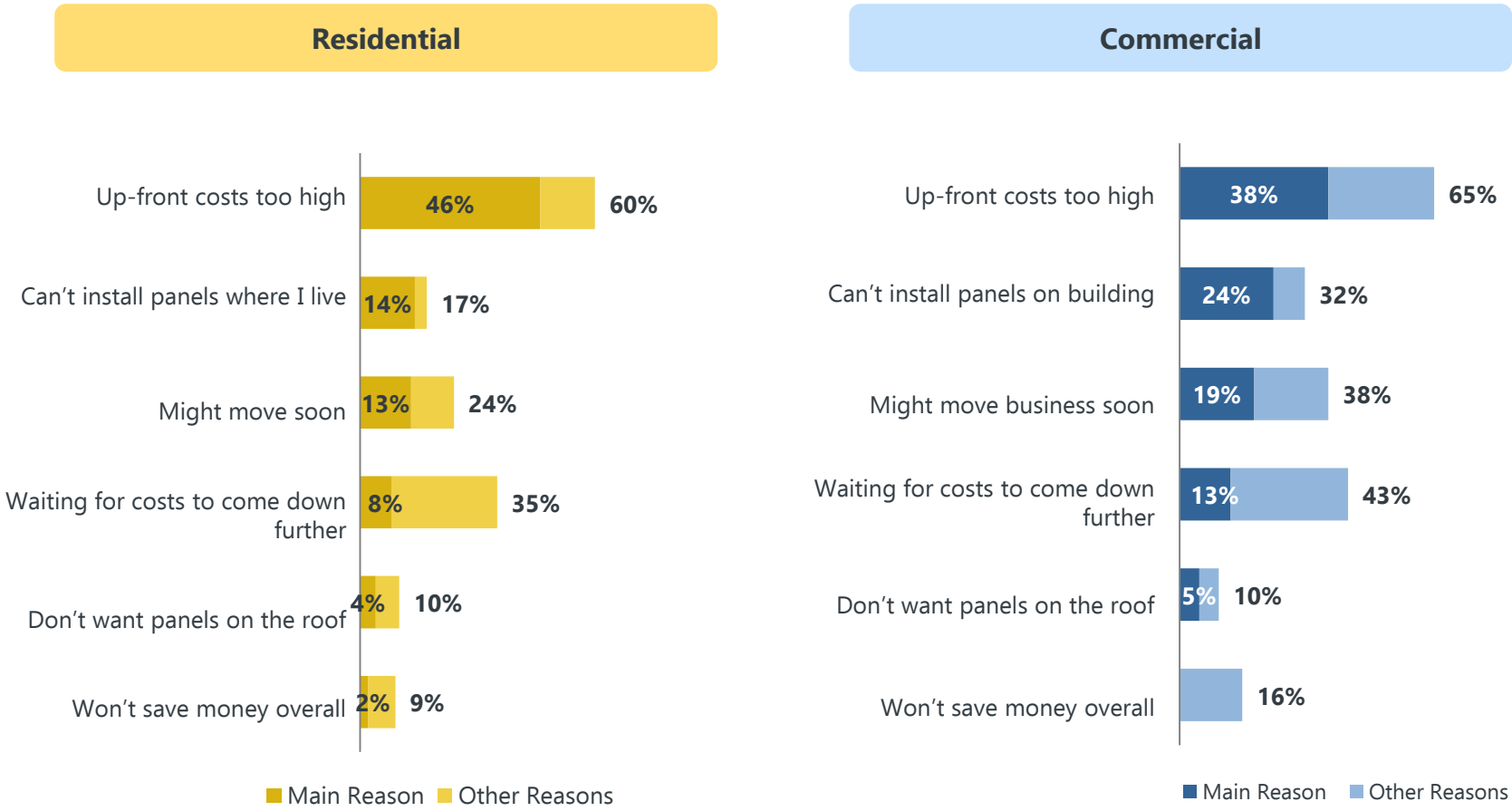


Base: Residential Likely to Consider (119), Commercial Likely to Consider (42)

RQ14a/BQ13a: What is the main reason [you are/your organization is] likely to consider installing rooftop solar electric panels in the next 3 to 5 years? Select only one. / RQ14b/BQ13b. Are there any other reasons? Select all that apply.

Reasons Unlikely to Consider Rooftop Solar

- The main reason that both residential and commercial customers are unlikely to consider installing rooftop solar in the next 3 to 5 years is that they perceive the up front costs to be too high.
- Secondary reasons include the prospect of moving, not being able to install solar panels, and wanting to wait for the costs to come down further.
- Commercial customers were more likely than residential customers to cite an inability to install panels on their building(s) as a reason why they are unlikely to install solar panels in the next 3 to 5 years.
- A small percentage of customers are not likely to consider installing rooftop solar because they believe that it won't save them money overall.

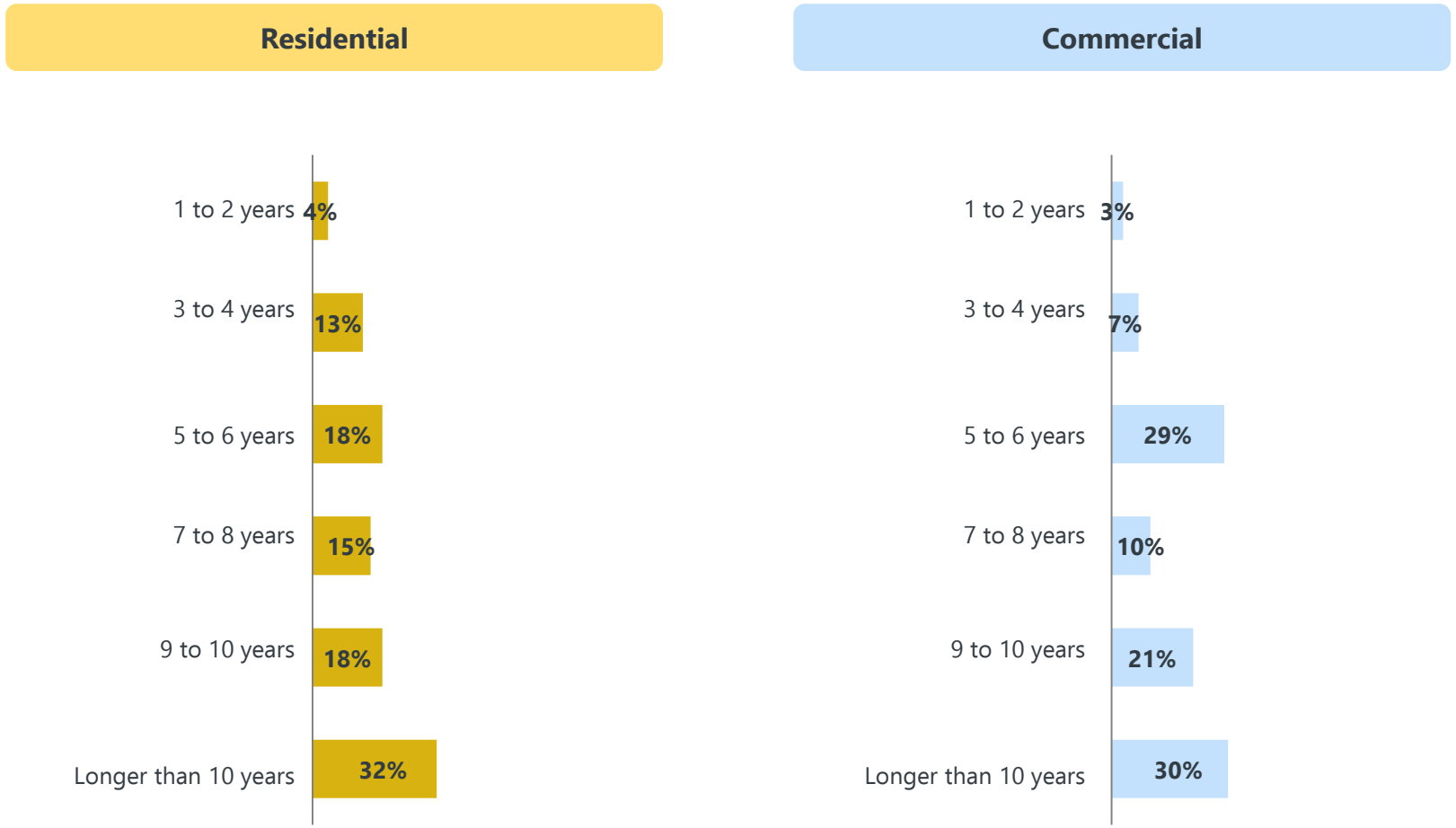


Base: Residential Not Likely to Consider (155), Commercial Unlikely to Consider (37)

RQ15a/BQ14a: What is the main reason [you are/your organization] is not likely to consider installing rooftop solar electric panels in the next 3 to 5 years? Select only one. / RQ15b/BQ14b. Are there any other reasons? Select all that apply.

Expected Length of Time to Get Full Payback on Investment

- The vast majority of customers expect to get a full payback on their investment in 5 years or more. In fact, broadly one-third expect to earn the full payback in over 10 years.



Base: Residential (305), Commercial (102)

RQ16/BQ15: If you installed rooftop solar panels, how long do you think it would take to get a full payback on your investment?

Interest in Rooftop Solar Purchase/Lease Options – Residential

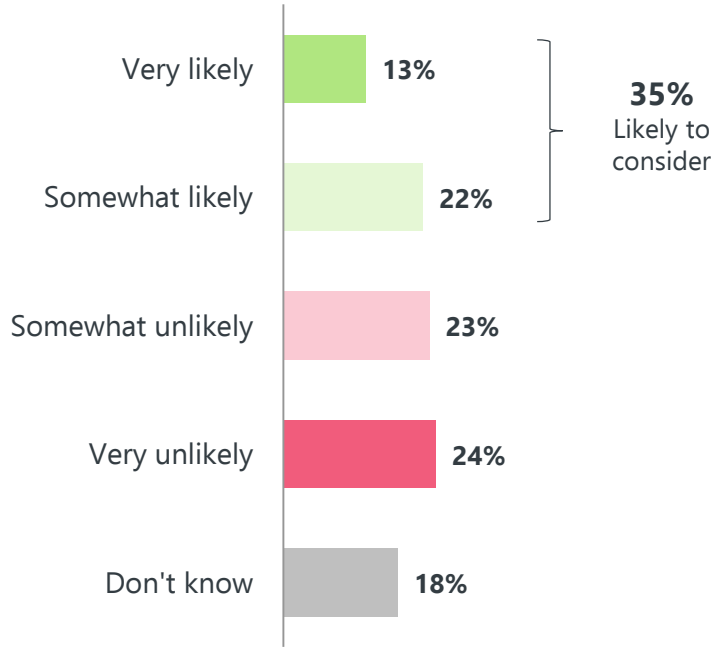
Customers were presented with two options for how they could pay for a rooftop solar electric system and asked how likely they would be to consider installing rooftop solar in the next 3 to 5 years:

A) "You could purchase solar panels for $1,300. Thereafter, your annual energy cost would fall by $50 in the first year and more in the future as electricity rates increase"

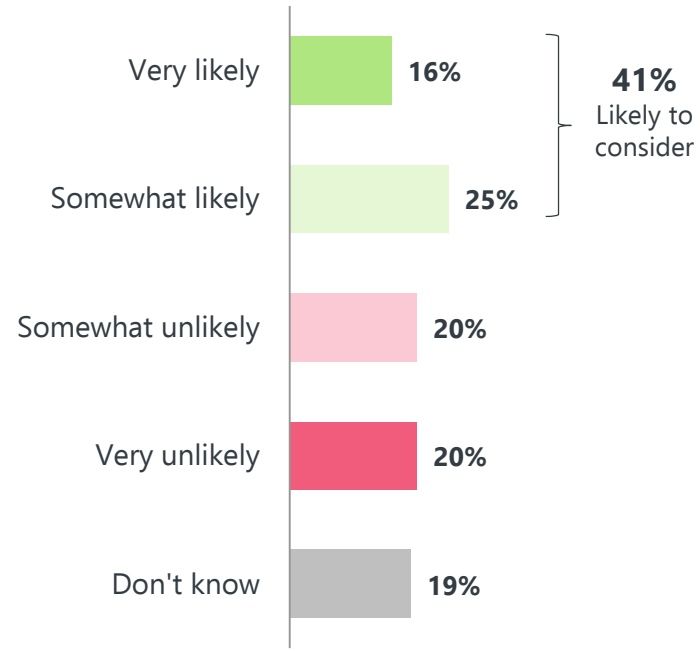
B) "You could lease solar panels for $115 per year. Thereafter, your annual energy cost would fall by $50 in the first year, and more in the future as electricity rates increase."

- Just over one-third (35%) of residential customers indicate that they are likely to consider purchasing the rooftop solar panels in the next 3 to 5 years – 47% are unlikely.
- The leasing option is somewhat more appealing with 41% indicating that they are likely and 40% indicating that they are unlikely.
- With both options, 2-in-10 residential customers indicate that they don't know whether or not they would consider installing rooftop solar panels.

Rooftop Solar Panel PURCHASE Option



Rooftop Solar Panel LEASE Option



Base: Residential (305)

RQ17a/RQ17b: How likely are you to consider installing solar panels at your home in the next 3 to 5 years assuming the following: [PURCHASE/LEASE OPTION]

Reasons for Being Likely/Unlikely to Consider Purchasing Solar Panels – Residential

- The main reason residential customers are very likely to consider purchasing the panels is that they view the panels as being affordable.
- Those who are somewhat likely to consider purchasing the panels cite both affordability as well as uncertainty regarding future costs.
- Those who are unlikely to consider purchasing the panels are most likely to cite a long payback time and a lack of affordability as the main reasons they are unlikely to consider purchasing the panels.

Reason VERY LIKELY to consider purchasing	% (n=32)
Panels are affordable	55%
Want to reduce GHG emissions/ help the environment	12%
Good investment	11%

Reason SOMEWHAT LIKELY to consider purchasing	% (n=59)
Uncertain about future costs/ electricity rates	23%
Panels are affordable	20%
Depends/ Need more information	11%
Cost of purchasing not affordable	9%
Want to reduce GHG emissions/ help the environment	7%
Good investment	5%

Reason UNLIKELY to consider purchasing	% (n=159)
Payback is too long	28%
Cost of purchasing not affordable	27%
Not a good investment/ won't save money	14%
Savings need to be more than $50	9%
Can't install panels where I live	9%
May move/don't own home	8%
Not worth the cost of maintenance/ hassle	6%

Base: Residential

RQ18a/RQ18b: And why would you be [likely/unlikely to consider this option?

Reasons for Being Likely/Unlikely to Consider Leasing Solar Panels – Residential

- The main reason residential customers are very likely to consider leasing the panels is that they view leasing as the more affordable option.
- Those who are somewhat likely to consider leasing view it as the more affordable option but they also need more information about the leasing contract.
- Those who are unlikely to consider leasing the panels are most likely to cite a lack of affordability and a lack of cost savings as the main reasons they are unlikely to consider the leasing option.

Reason VERY LIKELY to consider leasing	% (n=39)
Leasing is more affordable	35%
Like the idea of leasing	22%
Need more information about leasing contract	15%
Solar panels save money	15%
Want to reduce GHG emissions/help the environment	12%

Reason SOMEWHAT LIKELY to consider leasing	% (n=71)
Leasing is more affordable	22%
Need more information about leasing contract	13%
Like the idea of leasing	10%
Solar panels save money	8%
Want to reduce GHG emissions/ help the environment	8%
Leasing not affordable	6%

Reason UNLIKELY to consider leasing	% (n=140)
Leasing not affordable	19%
Not a good investment/ won't save money	18%
Prefer to buy panels	12%
Payback is too long	9%
Can't install panels where I live	7%
Need more information about leasing contract	7%
May move/ don't own home	7%

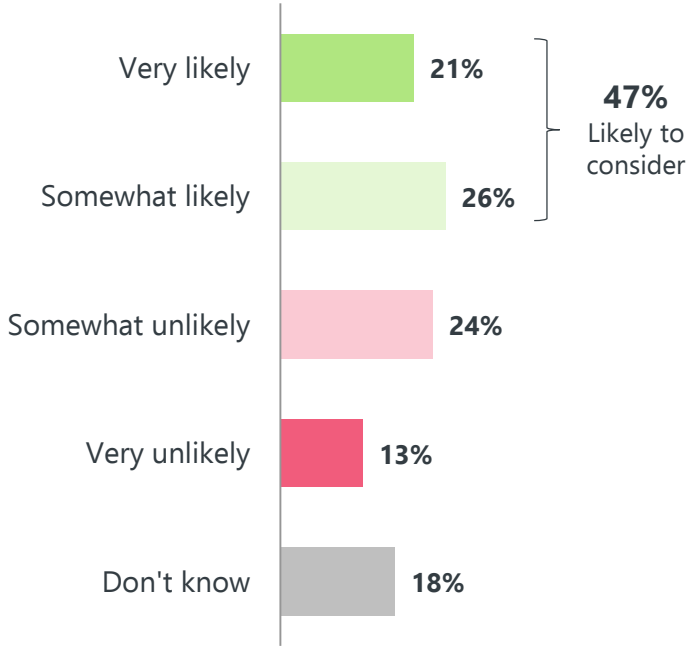
Base: Residential

RQ18a/RQ18b: And why would you be [likely/unlikely to consider this option?

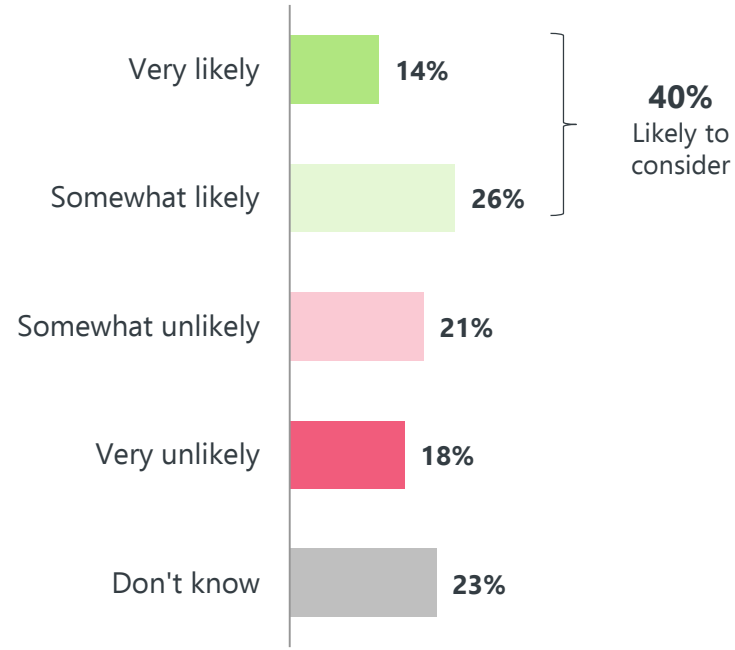
Interest in Rooftop Solar Purchase/Lease Options – Commercial

- Commercial customers are more likely than residential customers to consider purchasing solar panels (at a cost of $1,300). Just under half of commercial customers (47%) indicate that they are likely to consider purchasing rooftop solar panels in the next 3 to 5 years. Compare this with 35% of residential customers.
- The leasing option is somewhat less appealing than the purchase option – with 40% of commercial customers indicating that they are likely to consider the leasing option in the next 3 to 5 years.
- As is the case with residential customers, 2-in-10 commercial customers indicate that they don't know whether or not they would consider it.

Rooftop Solar Panel PURCHASE Option



Rooftop Solar Panel LEASE Option



Base: Commercial (102)

BQ17a/BQ17B: How likely are you to consider installing solar panels at your business in the next 3 to 5 years assuming the following: [PURCHASE/LEASE OPTION]

Reasons for Being Likely/Unlikely to Consider Purchasing Solar Panels – Commercial

- The main reason commercial customers are very likely to consider purchasing the panels is that they view the panels as being affordable.
- Those who are somewhat likely to consider purchasing are divided on their affordability, and they also need more information.
- Those who are unlikely to consider purchasing the panels are most likely to cite a long payback time as the main reason they are unlikely to consider purchasing the panels.

Reason VERY LIKELY to consider purchasing	% (n=14)
Panels are affordable	64%
Good investment	14%
Want to reduce GHG emissions/ help the environment	7%

Reason SOMEWHAT LIKELY to consider purchasing	% (n=59)
Panels are affordable	23%
Depends/ Need more information	19%
Cost of purchasing not affordable	19%
Payback is too long	12%
Want to reduce GHG emissions/ help the environment	7%
Good investment	8%

Reason UNLIKELY to consider purchasing	% (n=42)
Payback is too long	33%
Don't own building	17%
Cost of purchasing not affordable	17%
Doesn't save money	10%
Can't install panels on building	9%
Not worth the cost of maintenance/ hassle	7%

Base: Residential

RQ18a/RQ18b: And why would you be [likely/unlikely to consider this option?

Reasons for Being Likely/Unlikely to Consider Leasing Solar Panels – Commercial

- The main reason commercial customers are very likely to consider leasing the panels is that they view leasing as the more affordable option.
- Those who are somewhat likely to consider leasing need more information about the leasing contract.
- Those who are unlikely to consider leasing the panels are most likely to cite a lack of affordability, a preference to buy the solar panels and that they don't own their building as the main reasons they are unlikely to consider the leasing option.

Reason VERY LIKELY to consider leasing	% (n=21)
Leasing is more affordable	48%
Like the idea of leasing	24%
No upfront cost	24%
Want to reduce GHG emissions/help the environment	10%

Reason SOMEWHAT LIKELY to consider leasing	% (n=26)
Need more information about leasing contract	46%
Like the idea of leasing	13%
Leasing not affordable	15%
Solar panels save money	8%
Want to reduce GHG emissions/ help the environment	8%
No upfront cost	8%

Reason UNLIKELY to consider leasing	% (n=34)
Leasing not affordable	18%
Don't own building	18%
Not interested in leasing/ prefer to buy	15%
Does not save money/ not a good investment	12%
Payback is too long	9%
Can't install panels on building	9%
Savings need to be more than $50	6%

Base: Residential

RQ18a/RQ18b: And why would you be [likely/unlikely to consider this option?

Interest in Community Solar

- Customers were presented with a description of a community solar installation as well as several images of these installations.

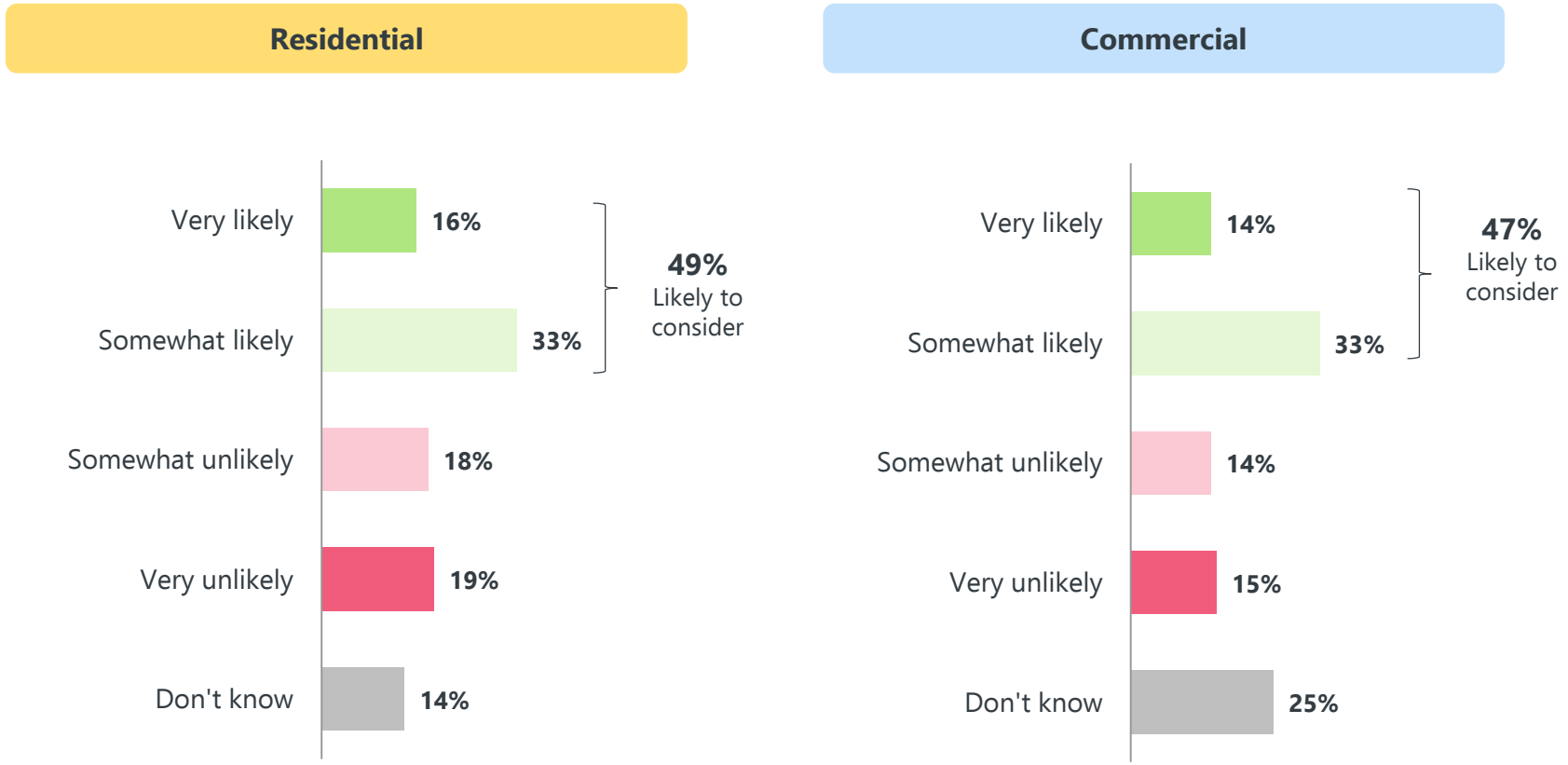
Description of Community Solar Installation

"A community solar installation is not located on your property. It is a larger solar installation that is shared by a number of electricity customers. Customers can participate in a community solar installation in different ways. One way is to purchase or lease individual solar panels, and receive bill credits just like you would if the solar panels were installed [at your home/ on your building(s) or facilities].

If you participated in a community solar installation, you would not have solar panels installed [on your home/ on your building(s) or facilities] and you could keep your share of the community solar installation [if you moved/if your organization moved] within the FortisBC service area. Otherwise, you would sell your share."

Current Consideration of Community Solar

- Just under half of residential and commercial customers indicate that they are likely to consider participating in a community solar installation in the next 3 to 5 years.
- A higher percentage of residential customers (37%) than commercial customers (29%) indicate that they are not likely to consider participating in a community solar installation. Commercial customers are more likely to indicate that they don't know whether or not they would participate (25%), compared to residential customers (14%).

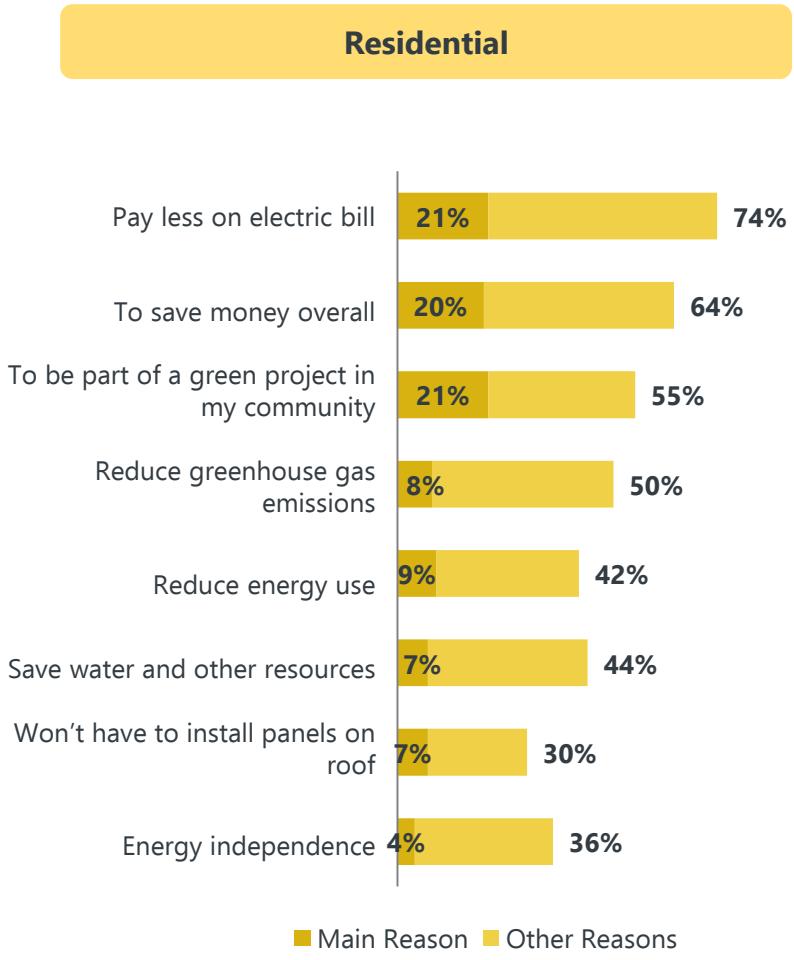


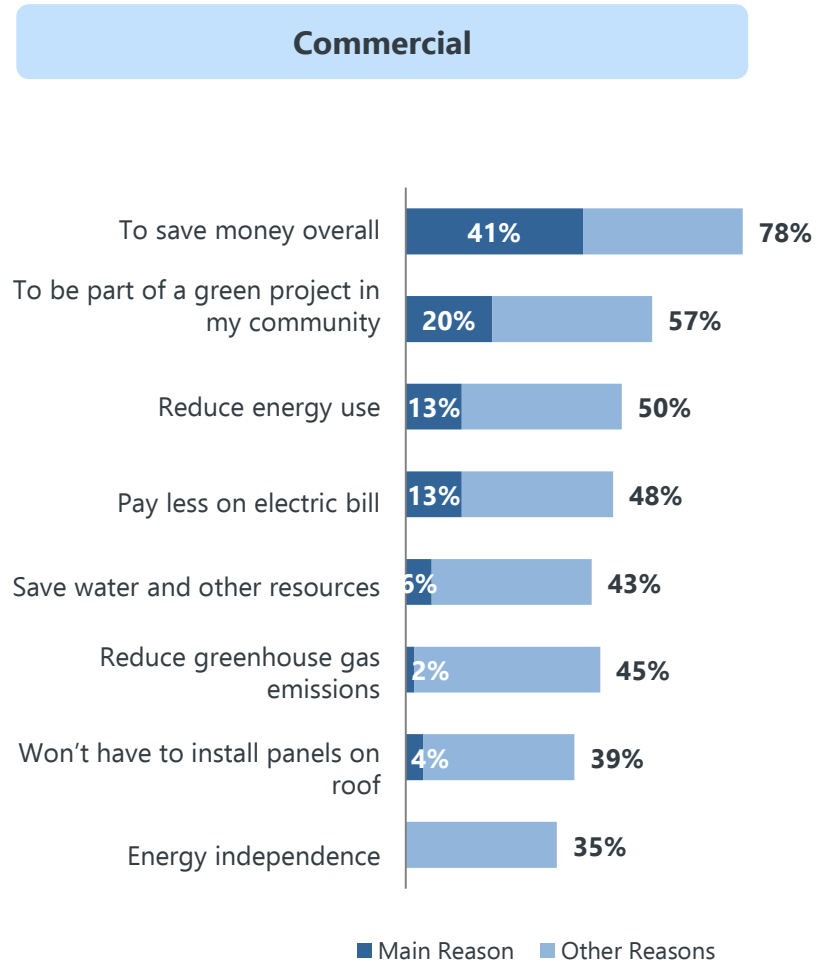
Base: Residential (305), Commercial (102)

RQ19/BQ18: Based on the description provided, and what you might already know or have heard about community solar installations, how likely are you to consider participating in a community solar installation in the next 3 to 5 years?

Reasons Likely to Consider Community Solar

- The primary driver to participate in a community solar installation is financial, particularly among commercial customers.
- However, being part of a green project in the community ranked high among the reasons residential and commercial customers gave for considering joining a community solar installation.
- As is the case with rooftop solar, energy conservation and greenhouse gas emission reduction are important secondary motivators.



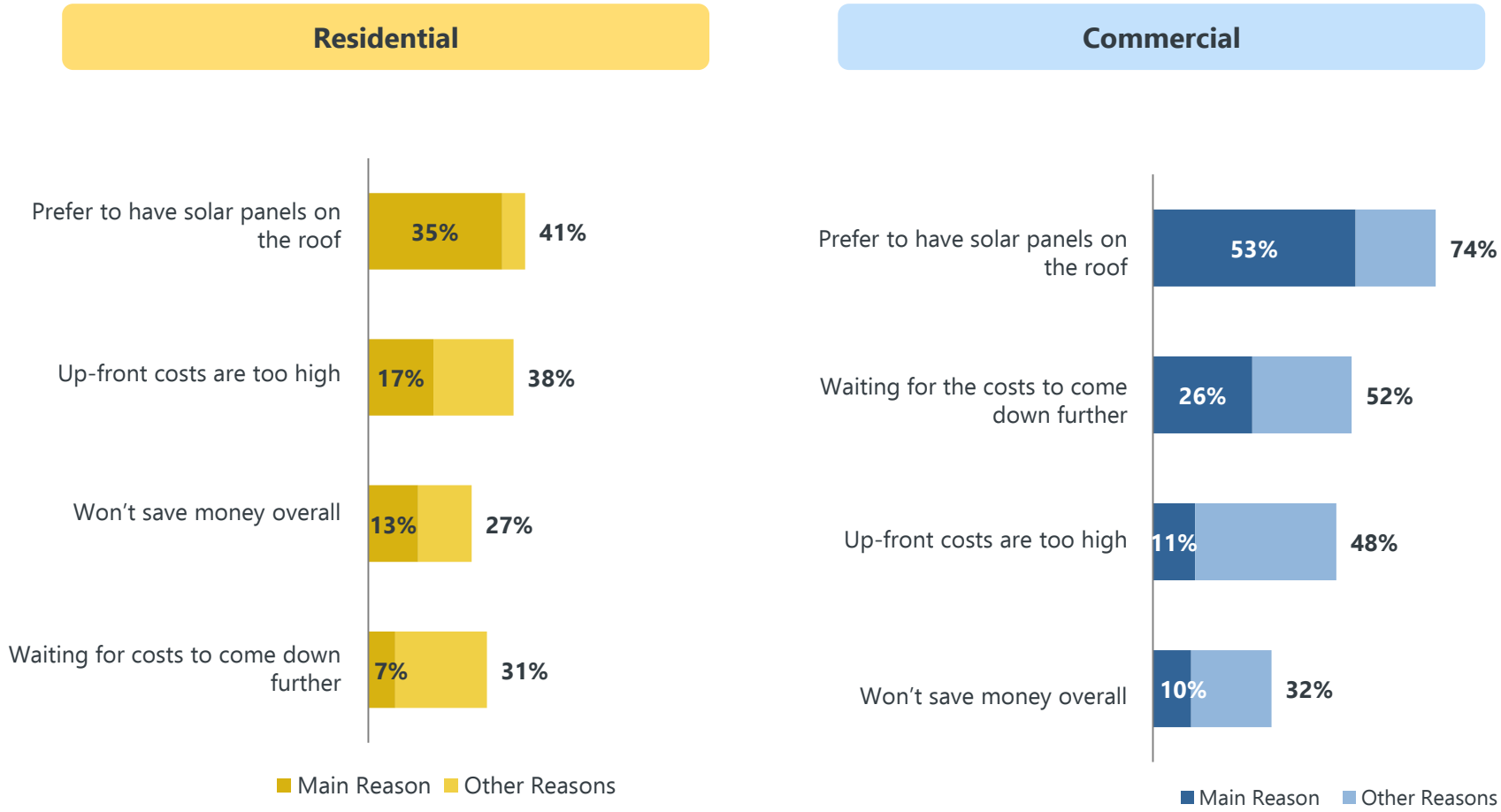


Base: Residential Likely to Consider (144), Commercial Likely to Consider (46)

RQ20a/BQ19a: What is the main reason [you are/your organization is] likely to consider participating in a community solar installation in the next 3 to 5 years? Select only one. / RQ20b/BQ19b. Are there any other reasons? Select all that apply.

Reasons Unlikely to Consider Community Solar

- Among both residential and commercial customers, their main reason for being unlikely to participate in a community solar installation in the next 3 to 5 years is that they would prefer to have solar panels installed on their roof.



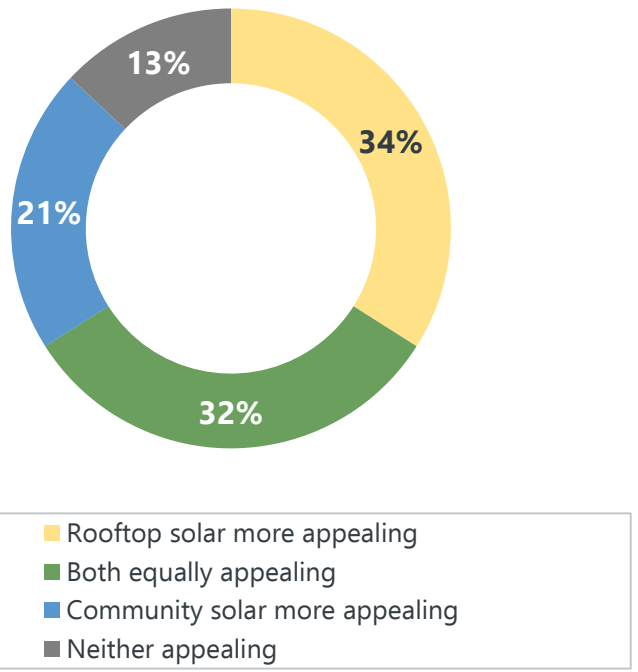
Base: Residential Not Likely to Consider (115), Commercial Not Likely to Consider (19)

RQ21a/BQ20a: What is the main reason [you are/your organization is] not likely to consider participating in a community solar installation in the next 3 to 5 years? Select only one. / RQ21b/BQ20b. Are there any other reasons? Select all that apply.

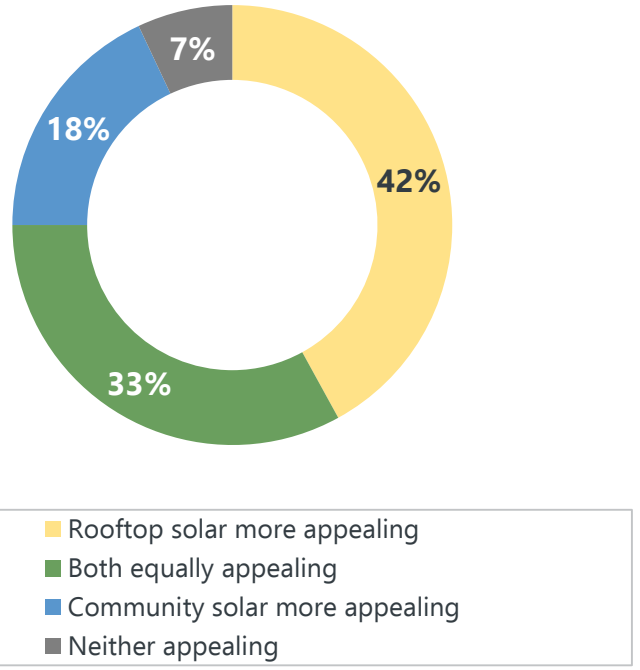
Comparing Rooftop and Community Solar

- Both residential and commercial customers consider rooftop solar more appealing than community solar.
- Among residential customers, 34% consider rooftop solar more appealing, while 21% consider community solar more appealing.
- The difference is more pronounced among commercial customers, with 42% considering rooftop solar more appealing versus 18% considering community solar more appealing.
- A relatively small percentage of customers indicate that they do not find either option appealing. This suggests that customers generally do not have concerns with the reliability of solar panels as reliable generators of electricity. If this were the case, there would likely have been a higher percentage of customers indicating that neither option is appealing.
- The majority of both residential (58%) and commercial customers (53%) expect to pay less for solar panels in a community solar installation than rooftop solar panels. Only 15% of both customer groups expect to pay more for solar panels in a community solar installation.

Residential



Commercial



Base: Residential (305), Commercial (102)

RQ22/BQ21: And thinking about these two options – a community solar installation and a rooftop solar system – do you...

Comparing Rooftop and Community Solar with % Purchase Option

- Customers were presented with the option of purchasing a percentage of their electricity needs from a community solar installation.
- They were then asked to indicate the relative appeal of rooftop and community solar.

Description of Purchasing a Percentage of Electricity Needs from a Community Solar Installation

"Another way to participate in a community solar installation is to purchase a percentage of your electricity needs from the solar installation. **The price of power from the solar installation would be fixed for 30 years, but initially would be higher than current electricity rates**. Over time, the cost would be about the same with this option as with purchasing or leasing community solar panels."

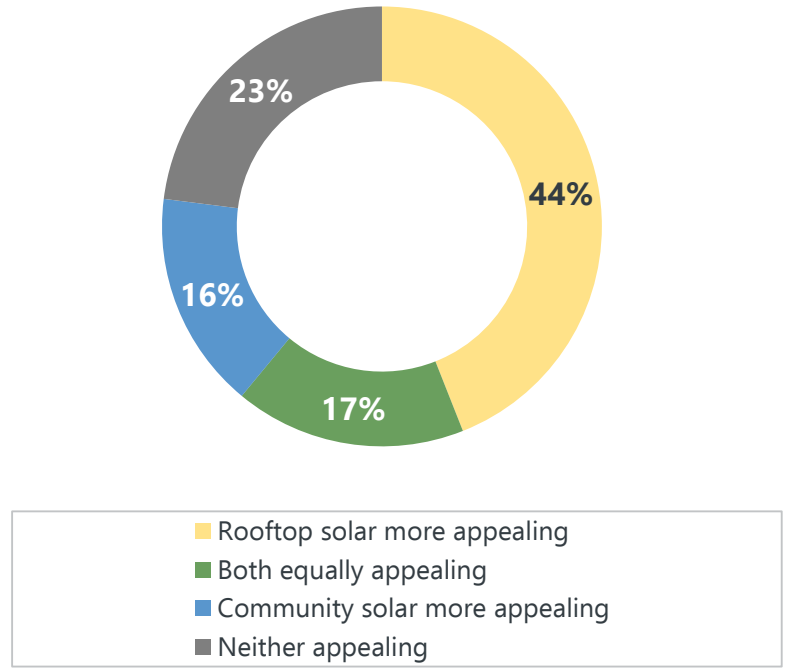
Current electricity rates are about 13 cents per kilowatt hour (kWh). Electricity rates from the solar installation would be 26 cents per kilowatt hour - but they would be fixed for 30 years.

ONLY INCLUDED FOR RESIDENTIAL CUSTOMERS: he average residential customer uses about 1,000 kWh of electricity per month.

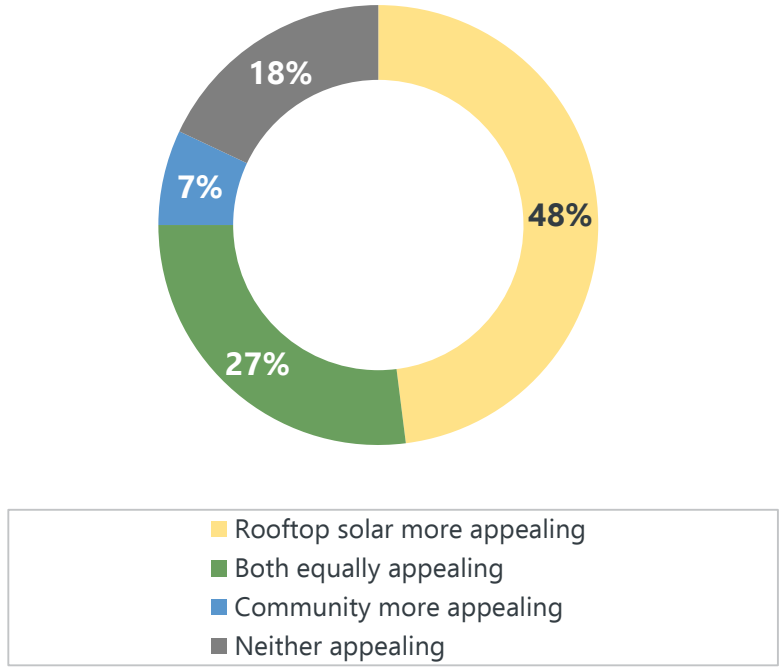
Comparing Rooftop and Community Solar with % Purchase Option

- Introducing the option of purchasing a percentage of one's electricity needs from community solar installation decreases the appeal of community solar relative to rooftop solar.
- With this option, 44% of residential customers consider rooftop solar more appealing than community solar; 34% consider rooftop solar more appealing than community solar when the "purchase a percent" option is not offered.
- Similarly, 48% of commercial customers consider rooftop solar more appealing than community solar; 42% consider rooftop solar more appealing than community solar when the "purchase a percent" option is not offered.

Residential



Commercial



Base: Residential (305), Commercial (102)

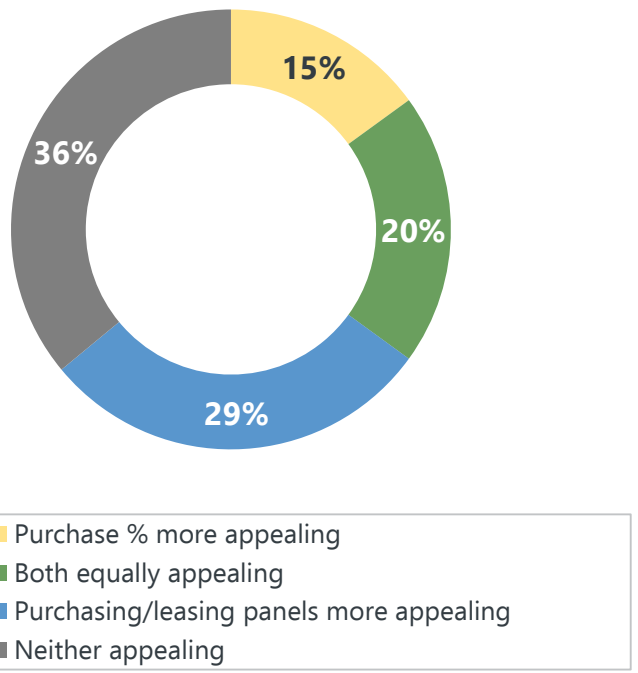
RQ25/BQ24: And thinking about these two options – purchasing a percentage of your electricity from the community solar installation and the rooftop solar system – do you...

Community Solar Installation: Purchasing a % of Electricity in the Installation vs. Purchasing/Leasing Solar Panels in the Installation

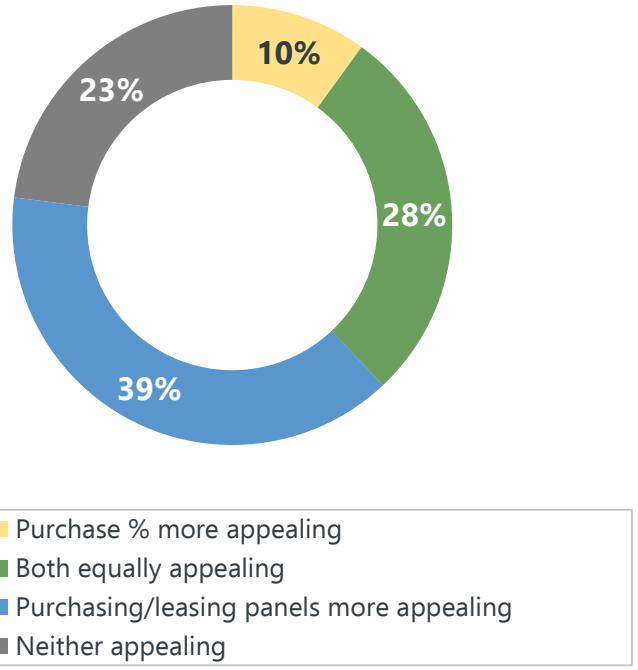
*Customers were asked to indicate the relative appeal of **purchasing a percentage of their electricity** from the solar installation and **purchasing/leasing solar panels** in the community solar installation.*

- Both residential and commercial customers consider the purchase/lease option more appealing than the option of purchasing a percentage of electricity from the community solar installation.
- However, there is a notable percentage of customers – particularly residential customers – who do not consider either option appealing.
- Customers generally do not have a very clear preference regarding what percentage of their electricity they would consider purchasing from a community solar installation – 58% of residential customers, and 50% of commercial customers indicated that they don't know.

Residential



Commercial



Base: Residential (305), Commercial (102)

RQ26/BQ25: And thinking about these two options – purchasing a percentage of your electricity from the community solar installation and purchasing/leasing solar panels from the community solar installation – do you consider...

Respondent Profile

Residential Customer Profile

	Residential Customers				
	Total	Interest in Rooftop Solar		Interest in Community Solar	
		Likely to participate	Unlikely to participate	Likely to participate	Unlikely to participate
Base	305	119	155	144	115
	%	%	%	%	%
Gender					
Male	46	49	44	48	47
Female	54	51	56	52	53
Age					
25-34	10	9	8	9	7
35-44	22	34	10	26	21
45-54	21	24	18	20	22
55-64	20	15	22	18	21
65+	28	18	42	27	29
Income					
Less than $40,000	13	11	15	11	11
$40,000 to <$50,000	9	8	11	11	9
$50,000 to <$60,000	10	11	10	7	12
$60,000 to <$70,000	5	6	3	5	6
$70,000 to <$80,000	9	8	13	14	6
$80,000 to <$100,000	13	13	13	12	17
$100,000 to <$150,000	15	15	14	14	15
$150,000 or more	8	14	3	11	5
Prefer not to answer	16	15	19	15	19

Residential Customer Profile

	Residential Customers				
	Total	Interest in Rooftop Solar		Interest in Community Solar	
		Likely to participate	Unlikely to participate	Likely to participate	Unlikely to participate
Base	305	119	155	144	115
	%	%	%	%	%
Home ownership					
Own	93	95	92	95	95
Rent	7	5	8	5	5
Type of Residence					
Apartment/Condo	6	3	7	6	4
Townhouse/duplex/triplex	7	3	8	6	10
Single detached home	88	95	85	88	86
Primary Heat Source					
Natural gas	58	53	64	60	59
Electricity (baseboard heaters)	17	16	15	16	13
Electricity (heatpump)	14	15	14	15	14
Wood	7	11	4	5	9
Oil	1	2	0	1	1
Other	3	4	2	2	4

Commercial Customer Profile

	Commercial Customers				
	Total	Interest in Rooftop Solar		Interest in Community Solar	
		Likely to participate	Unlikely to participate	Likely to participate	Unlikely to participate
Base	102	44	41	48	29
	%	%	%	%	%
Role					
Ownder	36	41	32	33	39
Business manager/General manager	24	20	28	27	25
CEO/President	17	25	12	23	18
Accountant/Controller	8	5	10	8	4
Partner	8	5	8	6	4
CFO	2	2	2	2	0
Other	4	2	8	0	11
Age					
25-34	8	7	8	12	7
35-44	13	16	10	12	11
45-54	27	25	35	27	29
55-64	24	39	25	38	36
65+	15	14	20	10	14
Prefer not to answer	1	0	2	0	4
Building ownership					
Own/co-own entire building	63	75	59	60	66
Own/co-own part of the building	2	2	0	2	3
Lease/sublease	34	23	39	38	28
Prefer not to answer	1	0	2	0	3

Commercial Customer Profile

	Commercial Customers				
	Total	Interest in Rooftop Solar		Interest in Community Solar	
		Likely to participate	Unlikely to participate	Likely to participate	Unlikely to participate
Base	102	44	41	48	29
	%	%	%	%	%
Primary Heat Source for Building					
Natural Gas	59	50	63	58	59
Electricity (baseboard heaters)	14	20	12	17	17
Electricity (heat pump)	16	16	17	15	14
Wood	2	2	2	2	3
Propane	3	5	0	2	3
Other	7	7	5	6	3

Attachment 11.6

FortisBC Inc.
Community Solar Pilot Project
April 2017
($000s), unless otherwise stated

Line	Particulars	Reference	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2032	2037	2041
1	**Cost of Service**															
2	Power Purchase Expense		(1)	(14)	(15)	(15)	(15)	(15)	(16)	(16)	(17)	(17)	(17)	(20)	(22)	(24)
3	Operation & Maintenance	Line 35	0	1	9	9	9	9	9	9	10	10	10	11	12	13
4	Property Taxes	Line 40	-	2	2	2	3	3	4	4	4	4	4	4	5	5
5	Depreciation Expense	Line 64	-	39	39	39	39	39	39	39	39	39	39	40	40	41
6	Income Taxes	Line 100	(69)	(80)	(30)	(4)	8	15	17	19	19	19	17	14	13	15
7	Earned Return	Line 84	6	64	61	59	56	54	51	49	46	44	42	32	21	12
8	**Incremental Annual Revenue Requirement**	Sum of Line 2 to Line 7	**(64)**	**12**	**66**	**90**	**100**	**104**	**105**	**103**	**101**	**99**	**95**	**81**	**69**	**61**
9	PV of Revenue Requirement (After-tax WACC of 5.97%)	Line 8 / (1 + Line 86)^Yr	(61)	10	56	71	75	74	70	65	60	55	50	32	21	14
10	**Total PV of Annual Revenue Requirement**	Sum of Line 9	***913***													
11																
12	Annual Energy Generation (kWh)		23,697	282,939	281,524	280,116	278,716	277,322	275,935	274,556	273,183	271,817	270,458	263,764	257,235	252,129
13	PV of Annual Energy Generation (kWh)	Line 12 / (1 + Line 86)^Yr	22,361	251,935	236,543	222,092	208,523	195,783	183,822	172,591	162,047	152,146	142,851	104,230	76,050	59,100
14	Total PV of Annual Energy Generation (kWh)	Sum of Line 13	3,237,775													
15	**Levelized Energy Rate - 25 yrs ($/kWh)**	**Line 10 x 1000 / Line 14**	**0.282**													
16																
17	**Lease Payment Calculation (25-year Term)**															
18	**Annual Lease Payment - 25 years**	**Line 10 x [Line 86/(1-(1+Line 86)^-yr)]**	**71.263**													
19	Total Number of Panels		720													
20	**Lease Payment per panel per year**	**Line 18 / Line 19**	**0.099**													
21	**Lease Payment per panel per month**	**Line 20 / 12**	**0.0082**													
22																
23	**Revenue Requirement Check:**															
24	Revenue Requirement	Line 8	(64)	12	66	90	100	104	105	103	101	99	95	81	69	61
25	Revenue to be collected from Participating Customers	Line 18 (Fixed Annual Lease Payment)	71	71	71	71	71	71	71	71	71	71	71	71	71	71
26	Variance	Line 25 - Line 24	136	59	5	(19)	(29)	(33)	(33)	(32)	(30)	(27)	(23)	(10)	2	10
27	PV of Revenue Variance	Line 26 / (1 + Line 86)^Yr	128	53	4	(15)	(22)	(23)	(22)	(20)	(18)	(15)	(12)	(4)	1	2
28	**Total PV of Revenue Variance**	**Sum of Line 27**	**-**	***--> Should be zero (all revenue is all collected from participating customers over 25 years, thus no rate impact to non-participating customers***												
29																
30	**Operation & Maintenance**															
31	Labour Costs		0	2	10	10	10	11	11	11	11	12	12	13	14	16
32	Non-Labour Costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	Total Gross O&M Expenses	Line 31 + Line 32	0	2	10	10	10	11	11	11	11	12	12	13	14	16
34	Less: Capitalized Overhead	Overhead Rate of 15%	(0)	(0)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
35	**Net O&M Expenses**	Line 33 + Line 34	0	1	9	9	9	9	9	9	10	10	10	11	12	13
36																
37	**Property Taxes**															
38	General, School and Other		-	2	2	2	2	2	3	3	3	3	3	3	4	4
39	1% in Lieu of General Municipal Tax[1]	1% of Line 8	-	-	(1)	0	1	1	1	1	1	1	1	1	1	1
40	**Total Property Taxes**	Line 38 + Line 39	-	2	2	2	3	3	4	4	4	4	4	4	5	5
41	1 - Calculation is based on the second preceding year, e.g. 2019 is based on 2017 revenue															
42																
43	**Capital Spending**															
44	Project Capital Spending[2]		945	-	-	-	-	-	-	-	-	-	29	37	35	-
45	AFUDC		16	-	-	-	-	-	-	-	-	-	-	-	-	-
46	Total Annual Capital Spending & AFUDC	Sum of Line 44 to 47	961	-	-	-	-	-	-	-	-	-	29	37	35	-
47	Cost of Removal		-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	Total Annual Project Cost - Capital	Line 46 + Line 47	961	-	-	-	-	-	-	-	-	-	29	37	35	-
49																
50	**Total Project Cost (incl. AFUDC)**	**Sum of Line 46**	**1,062**													
51	**Net Project Cost (incl. AFUDC and Removal)**	**Sum of Line 48**	**1,062**													
52	2 - Excluding capitalized overhead; First year of analysis includes all prior year spending															
53																

54	**Gross Plant in Service (GPIS)**														
55	GPIS - Beginning	Preceding Year, Line 59	-	961	961	963	964	966	967	969	970	972	974	988	1,008	1,028
56	Additions to Plant[3]		961	0	2	2	2	2	2	2	2	2	31	39	37	2
57	Retirements		-	-	-	-	-	-	-	-	-	-	(24)	(27)	(24)	-
58	Net Addition to Plant	Sum of Line 56 to 57	961	0	2	2	2	2	2	2	2	2	7	11	14	2
59	GPIS - Ending	Line 55 + Line 58	961	961	963	964	966	967	969	970	972	974	981	1,000	1,022	1,031
60	3 - Includes capitalized overhead															
61																
62	**Accumulated Depreciation**															
63	Accumulated Depreciation - Beginning	Preceding Year, Line 67	-	-	(39)	(77)	(116)	(154)	(193)	(232)	(271)	(310)	(349)	(522)	(695)	(835)
64	Depreciation Expense[4]	Line 55 @ 4%	-	(39)	(39)	(39)	(39)	(39)	(39)	(39)	(39)	(39)	(39)	(40)	(40)	(41)
65	Retirements		-	-	-	-	-	-	-	-	-	-	24	27	24	-
66	Cost of Removal		-	-	-	-	-	-	-	-	-	-	-	-	-	-
67	Accumulated Depreciation - Ending	Sum of Line 63 to 66	-	(39)	(77)	(116)	(154)	(193)	(232)	(271)	(310)	(349)	(364)	(534)	(712)	(876)
68	4 - Depreciation & Amortization Expense calculation is based on opening balance x depreciation rate of individual assets; The composite rate of all assets addition to plant is 4%															
69																
70	**Rate Base and Earned Return**															
71	Gross Plant in Service - Beginning	Line 55	-	961	961	963	964	966	967	969	970	972	974	988	1,008	1,028
72	Gross Plant in Service - Ending	Line 59	961	961	963	964	966	967	969	970	972	974	981	1,000	1,022	1,031
73																
74	Accumulated Depreciation - Beginning	Line 63	-	-	(39)	(77)	(116)	(154)	(193)	(232)	(271)	(310)	(349)	(522)	(695)	(835)
75	Accumulated Depreciation - Ending	Line 67	-	(39)	(77)	(116)	(154)	(193)	(232)	(271)	(310)	(349)	(364)	(534)	(712)	(876)
76																
77	Net Plant in Service, Mid-Year	(Sum of Lines 71 to Line 75) / 2	480	942	904	867	830	793	756	718	681	644	621	466	311	174
78	Adjustment to 13-month average	[5]	(399)	-	-	-	-	-	-	-	-	-	-	-	-	-
79	Cash Working Capital	Line 59 x FBC CWC/Closing GPIS %	1	1	1	1	1	1	1	1	1	1	1	1	2	2
80	**Total Rate Base**	**Sum of Line 77 to 79**	**83**	**943**	**905**	**868**	**831**	**794**	**757**	**720**	**683**	**645**	**623**	**468**	**313**	**175**
81																
82	Equity Return	Line 80 x ROE x Equity %	3	35	33	32	30	29	28	26	25	24	23	17	11	6
83	Debt Component	[6]	3	29	28	27	26	25	24	23	21	20	19	15	10	5
84	**Total Earned Return**	**Line 82 + Line 83**	**6**	**64**	**61**	**59**	**56**	**54**	**51**	**49**	**46**	**44**	**42**	**32**	**21**	**12**
85	Return on Rate Base %	Line 84 / Line 80	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%	6.79%
86	After- Tax Weighted Average Cost of Capital (WACC)	[7]	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%	5.97%
87	5 - (Line 58 + Line 64) x [(Days In-service/365)-1/2]															
88	6 - Line 80 x (LTD Rate x LTD% + STD Rate x STD %)															
89	7 - ROE Rate x Equity Component + [(STD Rate x STD Portion) + (LTD Rate x LTD Portion)] x (1- Income Tax Rate)]															
90																
91	**Income Tax Expense**															
92	Earned Return	Line 84	6	64	61	59	56	54	51	49	46	44	42	32	21	12
93	Deduct: Interest on debt	Line 83	(3)	(29)	(28)	(27)	(26)	(25)	(24)	(23)	(21)	(20)	(19)	(15)	(10)	(5)
94	Add: Depreciation Expense		-	39	39	39	39	39	39	39	39	39	39	40	40	41
95	Deduct: Overhead Capitalized Expenses for Tax Purposes		(0)	(0)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
96	Deduct: Capital Cost Allowance	Line 108	(199)	(301)	(154)	(81)	(44)	(25)	(15)	(10)	(8)	(6)	(13)	(14)	(12)	(4)
97	Taxable Income After Tax	Sum of Line 92 to 96	(196)	(228)	(84)	(12)	24	41	50	53	54	55	47	41	37	41
98	Income Tax Rate		26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%
99																
100	**Total Income Tax Expense**	Line 97 / (1 - Line 98) x Line 98	**(69)**	**(80)**	**(30)**	**(4)**	**8**	**15**	**17**	**19**	**19**	**19**	**17**	**14**	**13**	**15**
101																
102	**Capital Cost Allowance**															
103	Opening Balance	Proceeding Year, Line 109	-	746	445	291	210	167	142	126	116	108	102	81	65	56
104	Additions to Plant		961	-	-	-	-	-	-	-	-	-	29	37	35	-
105	Add: Cost of Removal		-	-	-	-	-	-	-	-	-	-	-	-	-	-
106	Less: AFUDC		(16)	-	-	-	-	-	-	-	-	-	-	-	-	-
107	Net Addition for CCA	Sum of Line 104 through 106	945	-	-	-	-	-	-	-	-	-	29	37	35	-
108	**CCA (Composite CCA Rate @ 42.19%)**	**[Line 103 + (Line 107/2)] x CCA Rate**	**(199)**	**(301)**	**(154)**	**(81)**	**(44)**	**(25)**	**(15)**	**(10)**	**(8)**	**(6)**	**(13)**	**(14)**	**(12)**	**(4)**
109	Closing Balance	Line 103 + Line 107 + Line 108	746	445	291	210	167	142	126	116	108	102	118	104	87	52

Attachment 11.6

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

FILED CONFIDENTIALLY

Attachment 16.1

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(accessible by opening the Attachments Tab in Adobe)