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April 1, 2021

Mr. Patrick Wruck
Commission Secretary and Manager
Regulatory Support
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

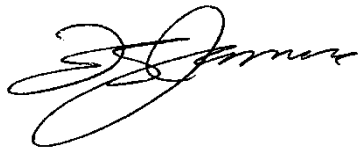
RE: Project No. 1599147
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
2020 Street Lighting Rate Application (the Application)

BC Hydro writes in compliance with Commission Order No. G-43-21 to provide its responses to Round 2 information requests as follows:

Exhibit B-6	Responses to Commission IRs
Exhibit B-7	Responses to Interveners IRs
Exhibit B-5-2	Revision to Responses to Round 1 Intervener IRs – MHPOABC IRs 1.1A, 1.1B and 1.2G

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

Yours sincerely,



Fred James
Chief Regulatory Officer

ch/rh

Enclosure

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

Topic: Rate Schedule 1701 – Overhead Street Lighting

BC Hydro's response to BCAC/BCCA 1.1.1 stated:

> "Yes, the street lights under RS 1755 are materially different than the street lights under RS 1701 and so the replacement of these lights would also be materially different. In particular, BC Hydro undertook a replacement program to replace mercury vapour (MV) and other older technology street lights under RS 1701 with high pressure sodium (HPS) street lights in the 1990s. As a result, almost all RS 1701 street lights are now HPS; LED luminaires can replace the HPS luminaires using the same arms, except in cases where the arm has reached the end of its service life. This is not true for street lights under RS 1755 where the ***majority*** of the lights remain MV and the arms are different and not suitable for LED luminaire installation. ***As a result, it is assumed that in all cases, the arms must be replaced*** to enable the installation of LED luminaires.
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> In addition, RS 1755 Group 1 ***lights are installed on customer owned poles and it is likely that many of these poles would not meet BC Hydro's current pole standards*** that ensure our crews can work safely with the lights to undertake installation and maintenance. The Group 3 lights are installed on BC Hydro owned poles and given the ages of the poles it is ***likely*** that many of these poles would also not meet current standards. It is therefore ***assumed*** that 20 percent of poles for Group 1 and Group 3 lights under RS 1755 would require pole replacement. Group 2 lights are installed on BC Hydro poles that are part of the distribution system so would not require pole replacement. In any event, ***all RS 1755 poles would have to be tested*** and require pole maintenance since they would not be maintained as part of the distribution system." (emphasis added)

2.13.1 Please provide BC Hydro's rationale, applied in the 1990s, to justify replacing mercury vapour (MV) and other older technology street lights under RS 1701 with high pressure sodium (HPS) street lights while choosing not to do so for RS 1755. Please also provide reference to documents that provided the justification at the time of replacement for RS 1701 and foregoing replacement for RS 1755.

RESPONSE:

Please refer to BC Hydro's response to BCAC IR 1.12.3 and its Attachment 1 for records which indicate that BC Hydro did initiate a campaign for RS 1755 customers in and around 1993 for the conversion of lights to high pressure sodium technology.

Please refer to Attachment 1 of BC Hydro's response to ZONE II RPG IR 1.1.3 and Attachment 1 of BC Hydro's response to ZONE II RPG 1.1.3.1 for available records regarding the replacement of RS 1701 lights with high pressure sodium technology.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

Topic: Rate Schedule 1701 – Overhead Street Lighting

BC Hydro's response to BCAC/BCCA 1.1.1 stated:

> "Yes, the street lights under RS 1755 are materially different than the street lights under RS 1701 and so the replacement of these lights would also be materially different. In particular, BC Hydro undertook a replacement program to replace mercury vapour (MV) and other older technology street lights under RS 1701 with high pressure sodium (HPS) street lights in the 1990s. As a result, almost all RS 1701 street lights are now HPS; LED luminaires can replace the HPS luminaires using the same arms, except in cases where the arm has reached the end of its service life. This is not true for street lights under RS 1755 where the ***majority*** of the lights remain MV and the arms are different and not suitable for LED luminaire installation. ***As a result, it is assumed that in all cases, the arms must be replaced*** to enable the installation of LED luminaires.
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2.13.2 Please provide the total cost of the MV to HPS replacement work for RS 1701 done in the 1990s. Please break out the costs for arm replacement, pole testing and pole replacement included in that total cost.

RESPONSE:

The only record BC Hydro has been able to locate on this matter is Commission Order No. G-51-89, which can be found as Attachment 1 to BC Hydro's response to ZONE II RPG IR 1.1.3.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

Topic: Rate Schedule 1701 – Overhead Street Lighting

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2.13.3 Please quantify what is meant by **"**street lights under RS 1755 where the ***majority*** of the lights remain MV". Specify the number of RS 1755 lights that remain MV, and the number(s) of lights that are either HPS, LED luminaires or some other technology.

RESPONSE:

Please refer to Table 10 of the BC Hydro 2020 Street Light Rates Application for quantities of Mercury Vapour (MV) versus High Pressure Sodium (HPS) installed under each group of RS 1755. Based on Table 10, 97 per cent of the RS 1755 lights are MV with the balance being HPS.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

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2.13.4 Given that a ***majority*** of RS 1755 street lights remain MV, please explain why it is appropriate for BC Hydro to assume that in ***all*** cases it will be necessary to replace arms. Explain why RS 1755 in the minority category (i.e. non-MV) all are assumed to require new arms.

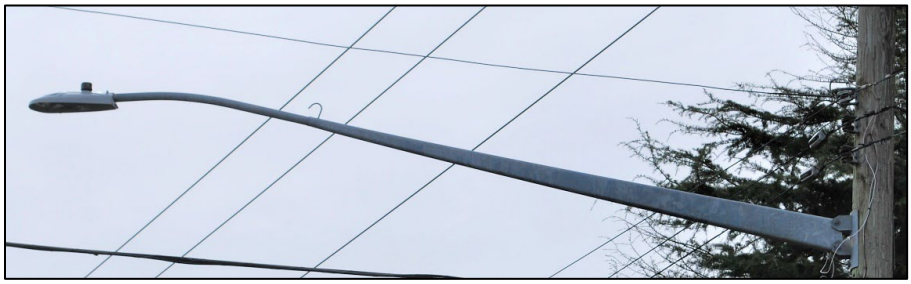
RESPONSE:

The designs of the mercury vapour and high pressure sodium lights and brackets (arms) used for RS 1755 are not compatible with today's HPS or LED street light luminaires. This is illustrated in Figure 1 and Figure 2 below. As such, the

replacement of RS 1755 lights would result in the replacement of both the luminaire and the bracket.

Figure 1: MV & HPS RS 1755 Outdoor Lights

Figure 2: LED Street Light on a 2.4m Long Bracket (shorter brackets available)



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2.13.5 Please explain the logic behind BC Hydro's belief that it's ***likely that many of these*** [customer owned] ***poles would not meet BC Hydro's current pole standards*** to the assumption that 20 percent of such poles will require replacement. Provide references to documents that support the 20% assumption.

RESPONSE:

Wood poles that are installed and maintained by BC Hydro typically fail inspection criteria at a rate of 2 per cent to 6 per cent during scheduled inspections and

maintenance that occur 20 to 29 years after pole installation and every 10 years thereafter.

BC Hydro has observed that customers often do not inspect and maintain their poles on a regular frequency. Furthermore, given that RS 1755 was closed in 1975 to additional lights, RS 1755 Group 1 and Group 3 poles are at least 45 years old.

BC Hydro believes that customer owned poles are near end-of-life and that a significant percentage would not meet BC Hydro's inspection criteria to allow them to remain in service. For these reasons BC Hydro has assumed for the purpose of the business case and termination decision that 20 per cent of RS 1755 Group 1 and Group 3 poles would require immediate replacement if RS 1755 was to be continued.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

Topic: Rate Schedule 1701 – Overhead Street Lighting

BC Hydro's response to BCAC/BCCA 1.1.1 stated:

> "Yes, the street lights under RS 1755 are materially different than the street lights under RS 1701 and so the replacement of these lights would also be materially different. In particular, BC Hydro undertook a replacement program to replace mercury vapour (MV) and other older technology street lights under RS 1701 with high pressure sodium (HPS) street lights in the 1990s. As a result, almost all RS 1701 street lights are now HPS; LED luminaires can replace the HPS luminaires using the same arms, except in cases where the arm has reached the end of its service life. This is not true for street lights under RS 1755 where the ***majority*** of the lights remain MV and the arms are different and not suitable for LED luminaire installation. ***As a result, it is assumed that in all cases, the arms must be replaced*** to enable the installation of LED luminaires.
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2.13.6 Does the 20% replacement assumption apply equally to Group 1 and Group 3 poles? If not, please provide the expected replacement percentage for each of Group 1 and 3 t% average across both Groups.

RESPONSE:

No, the 20 per cent replacement assumption would not likely apply equally across the two groups because some of the Group 3 poles are documented in BC Hydro's asset management system and they would have been inspected, maintained and replaced as per BC Hydro standards. However, BC Hydro does not have enough

information to accurately estimate the differences in percentages between the two groups. An overall 20 per cent allowance was used to estimate the number of poles that would likely be replaced if all units from both groups were inspected and tested to BC Hydro standards.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

Topic: Rate Schedule 1701 – Overhead Street Lighting

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2.13.7 Please reconcile the statement that "***all*** RS 1755 poles would have to be tested" with the Table on PDF 4 stating that pole testing would be "***one time for 67.4% of RS 1755 poles***".

RESPONSE:

To ensure that BC Hydro can safely replace RS 1755 lights, all poles that carry these lights must be inspected and tested to provide assurance to crews that the poles will not fail during or after the light replacements. Because Group 2 poles and a portion of the Group 3 poles are in BC Hydro's asset management system as BC Hydro owned, these poles have already been inspected and tested or

recently replaced. The remainder of poles supporting RS 1755, estimated at 67.4 per cent, have no record of inspection, testing nor replacement and would require this work prior to having the RS 1755 light replaced.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

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2.13.8 Please provide the calculation and BC Hydro's thinking behind the highly precise 67.4% pole testing expectation.

RESPONSE:

The figure of 67.4 per cent is based on a calculation used for BC Hydro's Street Light Replacement Program implementation phase business case. The business case uses a population of 4,984 RS 1755 lights.[1] BC Hydro's asset management

[1] **Note that the number of lights had dropped to 4,970 units by the time that BC Hydro 2020 Rate Application was submitted (refer to Table 10 of the Application).**

system, at that time showed RS 1755 lights mounted on 1,623 poles that are owned and maintained by BC Hydro.

This implies that BC Hydro has not tested 4,984 – 1,623 = 3,361 units or 67.4 per cent of the poles total poles that have an RS 1755 light installed.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

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2.13.9 Please revise the Table on PDF 4 by adding a new "Number of Units" column showing the number of arms, pole tests, pole replacements and poles maintained, and a new column showing the total cost for each Item and the grand total of the four Items for all of RS 1755.

RESPONSE:

Please find below the updated table as requested. Note that these costs are not total costs to convert the RS 1755 lights to LED, just the incremental above and beyond what RS 1701 units would cost to convert to LED.

Incremental Units and Costs for RS 1755 Replacement as compared to RS 1701			
Item	**No. of Units[1]**	**Unit Cost ($)**	**Total Cost ($000's)**
New arm (all RS 1755 lights)	**4,984**	**250**	**1,246**
Pole testing (one time for 67.4 per cent of RS 1755 poles)	**3,361**	**75**	**252**
Pole replacement (20 per cent of RS 1755 poles tested)	**672**	**5,000**	**3,360**
Pole maintenance (every 10 years)	**4,984**	**75**	**374**
Total Incremental Units and Costs	**14,001**		**5,232**

1. Figures based on populations at the time when the BC Hydro Street Light Replacement Program implementation business case was approved. Current figures may differ.

13.0 Reference: Exhibit B-5, PDF p. 3, BCAC/BCCA IR 1.1.1

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2.13.10 Please confirm that for arm, light and pole replacements done by BC Hydro in the 1990s in the change from MV to HPS all of the costs of that work were recovered exclusively from RS 1701 customers. If not confirmed, please explain to what extent those costs were recovered and from which customer groups.

RESPONSE:

Please refer BC Hydro's response to ZONE II RPG IR 1.1.3, and to its Attachment 1, which provides Commission Order No. G-51-89, dated October 19, 1989. This Order provided BCUC approval for:

"B.C. Hydro to adjust the rates in Rate Schedule 1701 - Overhead Street Lighting by reducing charges for High Pressure Sodium units and to increase rates for Mercury Vapour units due to changes in the capital costs"

Although BC Hydro has not been able to locate detailed records as to the nature and extent of the costs referenced in the order, it is apparent that BC Hydro did apply to the BCUC, and the BCUC approved, adjustments to RS 1701 rates to reflect changes to the capital costs of the lighting technology.

14.0 Reference: Exhibit B-5, PDF p. 7, BCAC/BCCA IR 1.1.4

Topic: Rate Schedule 1701 – Overhead Street Lighting

BC Hydro's response to BCAC/BCCA 1.1.4 stated:

> "As noted in section 6.1 of the Application, in addition to the potential rate impacts to RS 1755 customers of BC Hydro undertaking the conversion of RS 1755 lights, the provision of outdoor lighting using privately owned lamp standards in order to illuminate private property is a competitive service that can be provided by many service providers. As a result, it is not a service that is appropriately provided on a rate regulated basis by BC Hydro. Equipment and installation services are readily available from private sector organizations and BC Hydro's view is that private sector organizations are better positioned than BC Hydro is to offer a competitive service to install outdoor lighting on private property.**"**

2.14.1 In what year did "provision of outdoor lighting using privately owned lamp standards in order to illuminate private property" first become a competitive service that can be provided by many service providers? Please provide support for the BC Hydro's view in that regard.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 2.35.5.

14.0 Reference: Exhibit B-5, PDF p. 7, BCAC/BCCA IR 1.1.4

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BC Hydro's response to BCAC/BCCA 1.1.4 stated:

> "As noted in section 6.1 of the Application, in addition to the potential rate impacts to RS 1755 customers of BC Hydro undertaking the conversion of RS 1755 lights, the provision of outdoor lighting using privately owned lamp standards in order to illuminate private property is a competitive service that can be provided by many service providers. As a result, it is not a service that is appropriately provided on a rate regulated basis by BC Hydro. Equipment and installation services are readily available from private sector organizations and BC Hydro's view is that private sector organizations are better positioned than BC Hydro is to offer a competitive service to install outdoor lighting on private property.**"**

2.14.2 Given BC Hydro's view that provision of outdoor lighting using privately owned lamp standards in order to illuminate private property is "not a service that is appropriately provided on a rate regulated basis by BC Hydro" why did BC Hydro not apply for the changes in the year identified by BC Hydro in response to 14.1 above?

RESPONSE:

BC Hydro applies for consent to terminate RS 1755 Service at this time because of the major capital investment that would be required to continue the Service, the associated risk to BC Hydro ratepayers of stranded assets, and the existence of alternatives to RS 1755 Service for those who want to continue to have outdoor lighting of their private property.

15.0 Reference: Exhibit B-5, PDF p. 9, BCAC/BCCA IR 1.2.2

Topic: Rate Schedule 1755 – Private Outdoor Lighting (Closed)

BC Hydro's response to BCAC/BCCA 1.2.2 stated:

> "In the case of lighting of private property previously served by BC Hydro pursuant to Rate Schedule 1755, ***BC Hydro may in its sole discretion authorize*** service to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property." (emphasis added)

2.15.1 Is it BC Hydro's intention to exercise completely unfettered discretion over whether service will be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property? If so, what would prevent arbitrary decisions that may advantage some customers and discriminate against others?

RESPONSE:

As stated in BC Hydro's response to BCUC IR 1.5.9, BC Hydro has the right to determine whether the street light will be installed on a pole that is part of BC Hydro's distribution system. However, BC Hydro does its best to accommodate customer requests for installation of street lights on its poles.

BC Hydro's response to BCUC IR 1.5.6 describes situations in which BC Hydro would not be able to continue to provide RS 1701 service at certain locations. These situations may also result in BC Hydro's inability to allow the migration of a RS 1755 Group 2 customer to RS 1701.

We note that RS 1755 Group 2 light fixtures are already mounted on BC Hydro's distribution poles and it is expected that very few RS 1755 Group 2 customers will be unable to migrate their service to RS 1701. However, there may be situations when migration may not be acceptable. For example, a planned road widening project may require relocation of a pole to a location that no longer illuminates the area required by the customer. BC Hydro also notes that these situations already occur.

Please also refer to BC Hydro's response to BCUC IR 1.5.10.1 for a discussion of dispute resolution processes should there be a disagreement between BC Hydro's designer and the customer.

16.0 Reference: Exhibit B-5, PDF pp. 19-20, BCAC/BCCA IR 1.2.7

Topic: Rate Schedule 1755 – Private Outdoor Lighting (Closed)

2.16.1 Please revise the Table on PDF 20 to expressly state that it refers only to RS 1755 Program Costs and excludes all RS 1701 costs.

RESPONSE:

As stated in BC Hydro's response to BCAC IR 1.2.7, the table refers only to RS 1755 Program Costs and excludes all RS 1701 costs. Please refer to BC Hydro's response BCAC IR 2.16.2 for the requested revision.

16.0 Reference: Exhibit B-5, PDF pp. 19-20, BCAC/BCCA IR 1.2.7

Topic: Rate Schedule 1755 – Private Outdoor Lighting (Closed)

2.16.2 Please revise the Table on PDF 20 by adding lines below "labour" and "Materials" to show the breakdown within each of those two categories to reflect costs of arm replacement, pole testing, pole replacement and pole maintenance.

RESPONSE:

BC Hydro has revised the table included in its response to BCAC IR 1.2.7 to show the requested breakdown of the "Labour" and "Materials" lines.

Further to BC Hydro's response to BCAC IR 2.16.1, the table includes the costs that would be required for BC Hydro to continue offering service under RS 1755 by replacing all the existing lights under this service with LEDs and excludes all RS 1701 costs.

Costs to continue offering service under RS 1755	Total Request Amount ($M)
Direct Deployment Costs (Materials + Installation)	
Labour	
- Labour Costs - Remove HPS, Install LED, Wiring, Photocell - Reactive Conversion	0.08
- Labour Costs - Remove HPS, Install LED, Wiring, Photocell - Proactive Conversion	0.49
- Labour Costs - ACA Pole remed. to accommodate new heads	0.22
- Labour Costs - Replace Arm	0.16
- Pole Testing	0.25
- Pole Replacement (Labour + Material)	3.36
Materials	
- Material Costs - HPS Equivalent LED - weighted average based on count in wattage	1.08
- Material Costs - Photocell	0.09
- Material Costs - Arm	1.06
Indirect Program Costs	
Program Management	0.07
Deployment Management	0.17
Supporting Technology	0.23
Customer Engagement	0.06
Other (Change Management, Material Management, Procurement, Regulatory	0.03
Dismantling	0.36
Total Program Costs before Loadings and Contingency	**7.72**
Contingency	1.09
Inflation	0.42
Capital Overhead	1.05
Program Expected Cost	**10.28**
Program Reserve (Loaded)	1.40
Requested Total Authorized	**11.67**

16.0 Reference: Exhibit B-5, PDF pp. 19-20, BCAC/BCCA IR 1.2.7

Topic: Rate Schedule 1755 – Private Outdoor Lighting (Closed)

2.16.3 Please explain why "Dismantling" costs are not included in "Labour".

RESPONSE:

"Dismantling" costs are not included in 'labour' because the dismantling portion of the labour costs has different accounting treatment than the installation portion of the labour costs, therefore needs to be identified separately. The labour costs associated with removing the old asset cannot be capitalized and are accounted for via a dismantling account.

16.0 Reference: Exhibit B-5, PDF pp. 19-20, BCAC/BCCA IR 1.2.7

Topic: Rate Schedule 1755 – Private Outdoor Lighting (Closed)

2.16.4 Please describe the "Supporting Technology" of $230,000 and explain why it is not already reflected in existing rates.

RESPONSE:

The supporting technology costs noted in the table included in BC Hydro's response to BCAC IR 1.2.7 would only be required if BC Hydro were to continue offering service under RS 1755 and replace those lights with LEDs.

As noted in BC Hydro's response to CONV IR 1.1.5, the supporting technology costs included as part of the program are specifically required for the transition of street light technology from HPS to LEDs; hence, they are neither accounted for nor included within the existing rates.

The supporting technology changes include modifications to BC Hydro's existing systems to enable Customers to select the type of LED street light that they want installed, to enable field crews to have the required information and enable them to capture data in the field (related to the new street light or related assets), as well as to support the reporting and tracking of the work to ensure compliance with the Federal PCB Regulations. The changes required to support the replacement of RS 1755 lights would be incremental to those required to manage the replacement of RS 1701 lights because there are more individual RS 1755 customers and RS 1755 lights are modeled and managed differently than the RS 1701 lights in BC Hydro's systems.

16.0 Reference: Exhibit B-5, PDF pp. 19-20, BCAC/BCCA IR 1.2.7

Topic: Rate Schedule 1755 – Private Outdoor Lighting (Closed)

2.16.5 Please explain why "Contingency" of more than 14% is required in addition to "Inflation", "Capital Overhead" and "Program Reserve".

RESPONSE:

The Contingency amount, value and per cent, was calculated via Monte Carlo sensitivity analysis (please refer to BC Hydro's response to BCUC IR 1.8.1) and is in addition to Inflation, Capital Overhead and Program Reserve, all of which are required because they are associated with different cost elements. Below are definitions for each:

Contingency: in BC Hydro's response to BCUC IR 1.8.12 the following definition from the Association for the Advancement of Cost Engineering International was provided: "Contingency – An amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, and / or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs…"

Inflation: is included in the cost model to account for the anticipated increase in costs in future years resulting from inflation.

Capital Overhead: is calculated as percentage of the Program's costs in order to cover other BC Hydro costs that are attributable to capital projects but not directly charged to the project due to the administrative burden.

Program Reserve: also in BC Hydro's response to BCUC IR 1.8.12 the following definition from the Association for the Advancement of Cost Engineering International was provided: "Reserve is an amount added to an estimate to allow for discretionary management purposes outside of the defined scope of the project as otherwise estimated. Unlike contingency, the estimated reserve is not expected to be spent unless management so directs, and a reserve is generally not included in all estimates…"

17.0 Reference: Exhibit B-5, PDF p. 39, BCAC/BCCA IR 1.4.2

Topic: Legal Context

BC Hydro's response to BCAC/BCCA IR 1.2.7 stated:

> The $83.3 million authorized cost estimate includes the scope for converting all RS 1701 and RS 1755 lights to LEDs. The decision to terminate RS 1755 was made subsequent to the business case being approved.

2.17.1 On what date did BC Hydro approve the business case for converting all RS 1701 and RS 1755 lights to LEDs?

RESPONSE:

BC Hydro's Board of Directors certified the Directors' Resolution to approve the Program on March 5, 2020.

17.0 Reference: Exhibit B-5, PDF p. 39, BCAC/BCCA IR 1.4.2

Topic: Legal Context

BC Hydro's response to BCAC/BCCA IR 1.2.7 stated:

> The $83.3 million authorized cost estimate includes the scope for converting all RS 1701 and RS 1755 lights to LEDs. The decision to terminate RS 1755 was made subsequent to the business case being approved.

2.17.2 On what date did BC Hydro make the decision to terminate RS 1755 service?

RESPONSE:

The decision to terminate the RS 1755 service was confirmed on June 1, 2020.

17.0 Reference: Exhibit B-5, PDF p. 39, BCAC/BCCA IR 1.4.2

Topic: Legal Context

BC Hydro's response to BCAC/BCCA IR 1.2.7 stated:

> The $83.3 million authorized cost estimate includes the scope for converting all RS 1701 and RS 1755 lights to LEDs. The decision to terminate RS 1755 was made subsequent to the business case being approved.

2.17.3 What was the logic to first approving a business case that included RS 1755 and then subsequently deciding to terminate the service entirely? Please discuss what events subsequent to the approval of the business case resulted in the decision to terminate RS 1755 service.

RESPONSE:

The business case for the Street Light Replacement Program was developed with the primary intent of removing all BC Hydro-owned HPS and MV street lights to meet Federal PCB Regulations. RS 1755 lighting comprises only around 5 per cent of BC Hydro-owned street lights. Given the comparably small numbers, the analysis supporting the investment decision assumed a like-for-like replacement of RS 1755 lights with LEDs, though with an allowance for the replacement of BC Hydro-owned poles for RS 1755 Group 3 lights that had reached end of life. The approval of the Replacement Program's Implementation Phase business case enabled the Replacement Program to progress into its Implementation Phase.

Following the business case approval, BC Hydro more carefully assessed the benefits, costs and risks associated with maintaining RS 1755 Service. This assessment included the following:

- **The history of RS 1755 including its closure to new Customers 45 years ago;**
- **The number of remaining RS 1755 accounts by Group;**
- **The characteristics and typical bills of RS 1755 Customers;**
- **The costs to install LED outdoor lighting to illuminate private property;**
- **Options to mitigate impacts to RS 1755 customers of terminating RS 1755 Service;**
- **The regulatory implications of terminating or maintaining RS 1755 Service,**

- **The BC Hydro ratepayer risk of stranded assets associated with the major BC Hydro investment required to maintain RS 1755 Service, given that Customers have no obligation to continue to take RS 1755 Service and, in most cases, can obtain private outdoor lighting at lower lifecycle cost that BC Hydro anticipates we could offer; and**

- **The cost and potential rate impacts of the major investment required of BC Hydro to bring RS 1755 Service into compliance with the PCB Regulation.**

In consideration of the above BC Hydro concluded that we should terminate RS 1755 Service.

22.0 Reference: Exhibit B-4, BCUC 1.2.1

The Response states: "On the assumption that the pole space required by each light continues to be available for use, BC Hydro determined that its operating costs associated with RS 1703 lights were approximately recovered by the contact charge as currently approved. Such costs are limited to removing the street light or transferring the street light from the old pole to the new one in the event of pole replacement."

2.22.1 Please confirm that BC Hydro's review of the contact charge under RS 1703 is based on a "marginal cost" approach (i.e., what additional costs does BC Hydro incur in allowing the streetlight owner to attach its fixture to BC Hydro's pole) as opposed to fully allocated cost approach as is used for most other classes of ratepayers.

RESPONSE:

BC Hydro's review of the RS 1703 contact charge considered the total average costs incurred by BC Hydro for the work required to attach and remove customer owned street lighting fixtures on BC Hydro owned poles.

Marginal costs are commonly defined as the cost of producing (or saving) one additional unit of output. As the contact charge related costs are not associated with any change in output, they are not consistent with the definition of marginal costs. They are average costs per pole that do not change based on the number of poles.

The estimation of costs for the contact charge are consistent with the fully allocated cost of service approach as they are calculated based on the total average cost of removing a street light or transferring the street light from the old pole to the new one in the event of pole replacement. However, BC Hydro's fully allocated cost of service studies also employ additional methodological steps and outputs that are not required to identify the contact charge related costs. Specifically, our fully allocated cost of service studies analyze BC Hydro's historic revenue requirements cost including the cost of infrastructure (e.g., transmission) that benefit all ratepayers and allocate these shared costs to our different rate classes using BCUC approve allocation methods. As the costs associated with the contact charge are readily identifiable, these additional methodologies used in the fully allocated cost of service studies are not required or applicable.

BC Hydro notes that service under RS 1703 is part of its customer owned street lighting rate class and the energy charge component of RS 1703 is based on a fully allocated cost of service for this class of service.

22.0 Reference: Exhibit B-4, BCUC 1.2.1

The Response states: "On the assumption that the pole space required by each light continues to be available for use, BC Hydro determined that its operating costs associated with RS 1703 lights were approximately recovered by the contact charge as currently approved. Such costs are limited to removing the street light or transferring the street light from the old pole to the new one in the event of pole replacement."

2.22.1 Please confirm that BC Hydro's review of the contact charge under RS 1703 is based on a "marginal cost" approach (i.e., what additional costs does BC Hydro incur in allowing the streetlight owner to attach its fixture to BC Hydro's pole) as opposed to fully allocated cost approach as is used for most other classes of ratepayers.

2.22.1.1 If confirmed, please explain why such an approach is appropriate.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.22.1.

22.0 Reference: Exhibit B-4, BCUC 1.2.1

The Response states: "On the assumption that the pole space required by each light continues to be available for use, BC Hydro determined that its operating costs associated with RS 1703 lights were approximately recovered by the contact charge as currently approved. Such costs are limited to removing the street light or transferring the street light from the old pole to the new one in the event of pole replacement."

2.22.1 Please confirm that BC Hydro's review of the contact charge under RS 1703 is based on a "marginal cost" approach (i.e., what additional costs does BC Hydro incur in allowing the streetlight owner to attach its fixture to BC Hydro's pole) as opposed to fully allocated cost approach as is used for most other classes of ratepayers.

2.22.1.2 If not confirmed, please explain why.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.22.1.

22.0 Reference: Exhibit B-4, BCUC 1.2.1

The Response states: "On the assumption that the pole space required by each light continues to be available for use, BC Hydro determined that its operating costs associated with RS 1703 lights were approximately recovered by the contact charge as currently approved. Such costs are limited to removing the street light or transferring the street light from the old pole to the new one in the event of pole replacement."

2.22.2 Why is it reasonable to assume that the pole space required by each light continues to be available for use?

RESPONSE:

As for RS 1701 and RS 1755 street lights, the RS 1703 street lights are attached in the space reserved for BC Hydro usage and are not attached within the telecom space or space that could be used by a third-party. Customers that are eligible to take service under RS 1703 are allowed to install these lights in the space reserved for BC Hydro use based on legacy considerations.

To install a street light on a pole that "continues to be available for use" therefore means that:

1. **Having a street light on a pole doesn't impact the operation and maintenance of BC Hydro equipment, other than removing or transferring the street light during pole replacements; and**
2. **BC Hydro does not adjust our equipment to accommodate the street light (for example, we do not move BC Hydro equipment on the pole or install a taller pole to accommodate the street light).**

If these conditions cannot be met, the pole is not available, or no longer available, for use under RS 1703. However, this rarely has been an issue.

23.0 Reference: Exhibit B-5, BCOAPO 1.1.2 and BCOAPO 1.1.2.1

The response to BCOAPO 1.1.2 states: "the street light is not attached within the telecom space or space that could be used for a third party".

The response to BCOAPO 1.1.2.1 states: "In addition, as RS 1701 street lights are installed on BC Hydro poles that are part of BC Hydro's distribution system and not installed for the purpose of providing street lighting, BC Hydro doesn't incur any incremental costs related to use of the pole."

2.23.1 Please explain more fully why (per BCOAPO 1.1.2) the street lights under RS 1701 are not attached within space that could be used by a third party.

RESPONSE:

The majority of poles (approximately 86 per cent) on the BC Hydro distribution system are jointly owned by BC Hydro and TELUS. BC Hydro and TELUS have established a telecom space on the pole located below the secondary voltage conductors that:

- **Is exclusively reserved for BC Hydro, TELUS and third-party telecom lines and equipment; and**
- **Allows attachment of telecom lines and equipment without violating minimum safety clearances from primary and secondary voltage distribution lines.**

BC Hydro and TELUS have agreed not to attach non-telecom equipment such as street lights in this space so that those safety clearances are preserved. There are no non-telecom third-party spaces currently established on distribution poles.

BC Hydro street lights can usually be attached to a pole clear of the telecom space, thereby keeping the telecom space on the pole free for BC Hydro, TELUS and third-party telecom lines and equipment.

23.0 Reference: Exhibit B-5, BCOAPO 1.1.2 and BCOAPO 1.1.2.1

The response to BCOAPO 1.1.2 states: "the street light is not attached within the telecom space or space that could be used for a third party".

The response to BCOAPO 1.1.2.1 states: "In addition, as RS 1701 street lights are installed on BC Hydro poles that are part of BC Hydro's distribution system and not installed for the purpose of providing street lighting, BC Hydro doesn't incur any incremental costs related to use of the pole."

2.23.2 Please explain why in the case of RS 1703 the rate is based on the assumption that the pole space required by each light continues to be available for use (per BCUC 1.2.1) while in the case of RS 1701 the rate is based on the assumption that the space used could not be used by a third party?

RESPONSE:

For service under both RS 1703 and RS 1701, street lights are attached to BC Hydro poles in the space reserved for BC Hydro usage and are not attached within the telecom space or space that could be used for a third party. In all cases this requires that the pole continues to be available for use as described in BC Hydro's response to BCOAPO IR 2.22.2.

23.0 Reference: Exhibit B-5, BCOAPO 1.1.2 and BCOAPO 1.1.2.1

The response to BCOAPO 1.1.2 states: "the street light is not attached within the telecom space or space that could be used for a third party".

The response to BCOAPO 1.1.2.1 states: "In addition, as RS 1701 street lights are installed on BC Hydro poles that are part of BC Hydro's distribution system and not installed for the purpose of providing street lighting, BC Hydro doesn't incur any incremental costs related to use of the pole."

2.23.3 What costs (i.e., the types of costs), if any, associated with the use of the pole space are included in the RS 1701 rate?

RESPONSE:

The costs associated with the use of the poles are captured within the distribution related costs allocated to BC Hydro owned street light rate class. These costs are independent of the Replacement Program and are reflected in the proposed RS 1701 LED Rates through Table G-5 Revenue Without Replacement Program column.

23.0 Reference: Exhibit B-5, BCOAPO 1.1.2 and BCOAPO 1.1.2.1

The response to BCOAPO 1.1.2 states: "the street light is not attached within the telecom space or space that could be used for a third party".

The response to BCOAPO 1.1.2.1 states: "In addition, as RS 1701 street lights are installed on BC Hydro poles that are part of BC Hydro's distribution system and not installed for the purpose of providing street lighting, BC Hydro doesn't incur any incremental costs related to use of the pole."

2.23.4 Are third parties seeking to attach/contact their equipment/property to BC Hydro's distribution poles charged for the right to do so?

RESPONSE:

Yes, BC Hydro charges third-parties seeking to attach/contact their equipment/property to BC Hydro's distribution poles.

23.0 Reference: Exhibit B-5, BCOAPO 1.1.2 and BCOAPO 1.1.2.1

The response to BCOAPO 1.1.2 states: "the street light is not attached within the telecom space or space that could be used for a third party".

The response to BCOAPO 1.1.2.1 states: "In addition, as RS 1701 street lights are installed on BC Hydro poles that are part of BC Hydro's distribution system and not installed for the purpose of providing street lighting, BC Hydro doesn't incur any incremental costs related to use of the pole."

2.23.4 Are third parties seeking to attach/contact their equipment/property to BC Hydro's distribution poles charged for the right to do so?

2.23.4.1 If yes, are the charges for use of the pole determined on the same basis as the used of poles charge included in the RS 1701 rate?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.23.3 where we state that a contact charge is not applied as part of the RS 1701 rate.

23.0 Reference: Exhibit B-5, BCOAPO 1.1.2 and BCOAPO 1.1.2.1

The response to BCOAPO 1.1.2 states: "the street light is not attached within the telecom space or space that could be used for a third party".

The response to BCOAPO 1.1.2.1 states: "In addition, as RS 1701 street lights are installed on BC Hydro poles that are part of BC Hydro's distribution system and not installed for the purpose of providing street lighting, BC Hydro doesn't incur any incremental costs related to use of the pole."

2.23.4 Are third parties seeking to attach/contact their equipment/property to BC Hydro's distribution poles charged for the right to do so?

2.23.4.1 If yes, are the charges for use of the pole determined on the same basis as the used of poles charge included in the RS 1701 rate?

2.23.4.2 If not, why not?

RESPONSE:

RS 1701 rates already recover all the costs incurred by BC Hydro to provide service under RS 1701, so a contact charge is not required for these street lights.

24.0 Reference: Exhibit B-5, CEC 1.8.1; BCOAPO 1.11.3 & BCOAPO 1.14.2

2.24.1 Is the expected cost to convert RS 1701 and RS 1755 Group 2 lights to LEDs of $63.5 M (as noted in BCOAPO 1.11.3) meant to represent the Total Installed Cost of $63 M noted in BCOAPO 1.14.2 ($63 M = $693.50 x 90,850)?

RESPONSE:

No. The Total Expected Cost of $63.5 million is based on the cost and streetlight count assumptions from the revised Replacement Program at the time of the decision to terminate RS 1755 and only convert RS 1755 Group 2 street lights to LED. The Total Installed Cost of $63 million, as noted in BC Hydro's response to BCOAPO IR 1.14.2 ($693.51 x 90,850 = $63 million), contains revised information developed since BC Hydro's decision to terminate RS 1755 related to the cost of luminaires and counts of streetlights to be converted.

24.0 Reference: Exhibit B-5, CEC 1.8.1; BCOAPO 1.11.3 & BCOAPO 1.14.2

2.24.1 Is the expected cost to convert RS 1701 and RS 1755 Group 2 lights to LEDs of $63.5 M (as noted in BCOAPO 1.11.3) meant to represent the Total Installed Cost of $63 M noted in BCOAPO 1.14.2 ($63 M = $693.50 x 90,850)?

2.24.1.1 If not, please explain the difference between the two values in terms of what costs are included in each.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.24.1, which includes an explanation of the difference.

24.0 Reference: Exhibit B-5, CEC 1.8.1; BCOAPO 1.11.3 & BCOAPO 1.14.2

2.24.2 What is the authorized cost of converting RS 1701 and RS 1755 Group 2 lights to LEDs after reserve is added?

RESPONSE:

The authorized cost of converting the RS 1701 and RS 1755 Group 2 lights to LEDs, including reserve, is $72.1 million.

24.0 Reference: Exhibit B-5, CEC 1.8.1; BCOAPO 1.11.3 & BCOAPO 1.14.2

2.24.3 For purpose of the pricing model, please explain why it is appropriate to use the expected cost as opposed to the authorized cost.

RESPONSE:

For the pricing model, BC Hydro used the expected cost because that is what BC Hydro expects the Street Light Replacement Program to cost.

The authorized cost includes reserve, which as noted in BC Hydro's response to BCUC IR 1.8.12 is defined as "…an amount added to an estimate to allow for discretionary management purposes outside of the defined scope of the project as otherwise estimated. Unlike contingency, the estimated reserve is not expected to be spent unless management so directs, and a reserve is generally not included in all estimates…" Since BC Hydro does not expect to spend the reserve amount, BC Hydro believes it is not appropriate to include it in the pricing model.

25.0 Reference: Exhibit B-5, BCOAPO 1.12.1
Exhibit B-4, BCUC, 1.9.2, Pricing Model

The Response to BCOAPO 1.12.1 states: "The total investment-related costs in Table G-6 are calculated in order to determine the amount of annual depreciation to be included in the rate calculation. This includes the $693.51 per unit total installed cost under the Replacement program as identified above, but also the $158.55 Net Book Value of the existing street light arms that are not installed as part of the Replacement Program but continue to depreciate."

2.25.1 Please explain why it is necessary to include the undepreciated value of the existing street light arms Table G-6. Hasn't this cost already been included in the existing RS 1701 rate?

RESPONSE:

While the average RS 1701 rate is determined based on the marginal differences from existing costs, the undepreciated value of the existing street light arms is included in Table G-6 because it is used in the calculation of the rate variation associated with different wattage street lights.

This calculation uses a bottom-up approach to determine the street lighting cost components that vary with wattage and the cost components that do not, then uses this information to determine by how much the rate should be higher or lower than the average rate for each wattage category.

For clarity, BC Hydro confirms that the inclusion of the undepreciated value of the existing street light arms in Table G-6 does not impact the total revenue collected under BC Hydro's proposed RS 1701 LED Rate.

25.0 Reference: Exhibit B-5, BCOAPO 1.12.1
Exhibit B-4, BCUC, 1.9.2, Pricing Model

The Response to BCOAPO 1.12.1 states: "The total investment-related costs in Table G-6 are calculated in order to determine the amount of annual depreciation to be included in the rate calculation. This includes the $693.51 per unit total installed cost under the Replacement program as identified above, but also the $158.55 Net Book Value of the existing street light arms that are not installed as part of the Replacement Program but continue to depreciate."

2.25.2 If the cost of the existing street light arms was excluded from Table G-6 would it: i) change the average LED rate in Table G-6 (and if so how) or ii) simply change the current value (96.9%) of the "% of Calc. Additional Cost Contribution" in the Pricing Model so as to yield the same average LED rate. Please fully explain the basis for the response.

RESPONSE:

If the cost of the existing street light arms was excluded from Table G-6 it would cause neither of the changes described in the IR. Instead, the Shared Costs would increase on Excel row 68 of the "Pricing_Model" Tab by a corresponding amount to off-set the reduction in depreciation cost. This is a component of the Shared and Electrical Infrastructure costs on line 14 of Table G-6. The same average rate would be calculated since the same revenue requirement, determined from the marginal cost analysis, would need to be recovered. Also, since both the Shared Cost and the existing arm depreciation costs do not vary with street light wattage, the wattage category rates would also remain unchanged.

26.0 Reference: Exhibit B-4, BCUC 1.8.11
Exhibit B-5, BCOAPO 1.9.2
Exhibit B-1, Appendix G, Table G-3

The response to BCUC 1.8.11 states:

"The marginal resource changed from Revelstoke Unit 6 in 2037 to Simple Cycle Gas Turbine (SCGT) in 2038, based on the updated capacity LRBs as presented in Table D-2 and Table D-4 in the October 3, 2019 filing 20-Year Load Forecast, as part of BC Hydro Fiscal 2020 to Fiscal 2021 Revenue Requirements Application (F2020-F2021 RRA)."

The response to BCOAPO 1.9.2 refers to BC Hydro's response to AMPC IR 1.5.8, included in Exhibit B-6 to the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, which states:

"From fiscal 2023 to fiscal 2031, BC Hydro expects to be in a deficit position for generation capacity with only existing and committed resources. During this period the capacity avoided cost is based on the next most cost-effective generation capacity resource on a unit capacity cost basis which is Revelstoke Unit 6. The Previous Application outlined the cost of Revelstoke Unit 6 at approximately $60 per kW-year (fiscal 2018$). This value is based on the unit capacity cost of Revelstoke Unit 6 ($51/kW-year F2016$ at point of interconnection) adjusted with delivery to the Lower Mainland and for energy benefits.

From fiscal 2032 onwards, load is forecast to exceed the capability of planned generation resources including Revelstoke Unit 6. The capacity avoided cost from this point onwards is based on Simple Cycle Gas Turbine (SCGT). Its cost is estimated at $123 per kW-year (fiscal 2018$), based on the unit capacity cost of SCGT in Kelly Lake/Nicola area derived from engagement with industry experts in 2014-2015. The $123 per kW-year figure is composed of $80/kW-year F2016$ at point of interconnection and adjusted with delivery to the Lower Mainland, GHG costs, and adjusted for energy impacts."

2.26.1 The period over which Revelstoke is deemed to be the marginal resource differs as between the response to BCUC 1.8.11 and the response to BCOAPO 1.9.2 (i.e., AMPC 1.5.8 from the F2020/F2021 RRA). Please reconcile.

RESPONSE:

The difference in the period over which Revelstoke is deemed to be the marginal resource is due to the different capacity load resource balances (LRB) to reflect updated supply and demand information.

The capacity LRB used in BC Hydro's response to AMPC IR 1.5.8 from BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application was presented in BC Hydro's response to BCUC IR 1.15.3, included in Exhibit B-5 of that proceeding, and was filed with the BCUC on June 6, 2019.

The capacity LRB used in BC Hydro's response to BCUC IR 1.8.11 was presented in Appendix D of the 20-Year Load Forecast and was filed with the BCUC on October 3, 2019.

26.0 Reference: Exhibit B-4, BCUC 1.8.11
Exhibit B-5, BCOAPO 1.9.2
Exhibit B-1, Appendix G, Table G-3

The response to BCUC 1.8.11 states:

"The marginal resource changed from Revelstoke Unit 6 in 2037 to Simple Cycle Gas Turbine (SCGT) in 2038, based on the updated capacity LRBs as presented in Table D-2 and Table D-4 in the October 3, 2019 filing 20-Year Load Forecast, as part of BC Hydro Fiscal 2020 to Fiscal 2021 Revenue Requirements Application (F2020-F2021 RRA)."

The response to BCOAPO 1.9.2 refers to BC Hydro's response to AMPC IR 1.5.8, included in Exhibit B-6 to the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, which states:

"From fiscal 2023 to fiscal 2031, BC Hydro expects to be in a deficit position for generation capacity with only existing and committed resources. During this period the capacity avoided cost is based on the next most cost-effective generation capacity resource on a unit capacity cost basis which is Revelstoke Unit 6. The Previous Application outlined the cost of Revelstoke Unit 6 at approximately $60 per kW-year (fiscal 2018$). This value is based on the unit capacity cost of Revelstoke Unit 6 ($51/kW-year F2016$ at point of interconnection) adjusted with delivery to the Lower Mainland and for energy benefits.

From fiscal 2032 onwards, load is forecast to exceed the capability of planned generation resources including Revelstoke Unit 6. The capacity avoided cost from this point onwards is based on Simple Cycle Gas Turbine (SCGT). Its cost is estimated at $123 per kW-year (fiscal 2018$), based on the unit capacity cost of SCGT in Kelly Lake/Nicola area derived from engagement with industry experts in 2014-2015. The $123 per kW-year figure is composed of $80/kW-year F2016$ at point of interconnection and adjusted with delivery to the Lower Mainland, GHG costs, and adjusted for energy impacts."

2.26.2 Please clarify whether the Generation & Bulk Transmission Capacity Marginal Unit Cost in Table G-3 actually includes any costs specifically for Bulk Transmission other than losses.

RESPONSE:

Yes. the Generation & Bulk Transmission Capacity Marginal Unit Cost in Table G-3 do include costs specifically for Bulk Transmission other than losses.

Prior to fiscal 2031, the system is in a capacity surplus according to the updated capacity Load Resource Balance as presented in Appendix D of the October 3, 2019 filing of the 20-Year Load Forecast, filed as Exhibit B-15 as part of BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application (F2020-F2021 RRA). Market price is used as the Generation & Bulk Transmission Capacity Marginal Unit Cost. During the system capacity deficit period starting fiscal 2031, the Generation & Bulk Transmission Capacity Marginal Unit Cost includes costs specifically for Bulk Transmission other than losses, and its breakdown in real dollars is as detailed in the table below:

Unit Capacity Cost ($/kW-year F2018 real)	Revelstoke Unit 6 (REV6)	Simple Cycle Gas Turbine (SCGT)
Generation	49	100
Bulk Transmission (note)	5	18
Transmission Losses	6	5
Total	60	123
Applicability Period	F2031 to F2037	F2038 and beyond

Note: Bulk Transmission for REV6 was based on the cost estimate for the Nicola to Vaseux Lake Capacitor project, for SCGT was based on the Cost of Incremental Firm Transmission cost estimate from the Kelly Lake region to Lower Mainland region.

Starting from fiscal 2031, the nominal dollar of Generation & Bulk Transmission Capacity Marginal Unit Cost in column D of Table G-3 was based on the total fiscal 2018 real cost presented above.

26.0 Reference: Exhibit B-4, BCUC 1.8.11
Exhibit B-5, BCOAPO 1.9.2
Exhibit B-1, Appendix G, Table G-3

The response to BCUC 1.8.11 states:

"The marginal resource changed from Revelstoke Unit 6 in 2037 to Simple Cycle Gas Turbine (SCGT) in 2038, based on the updated capacity LRBs as presented in Table D-2 and Table D-4 in the October 3, 2019 filing 20-Year Load Forecast, as part of BC Hydro Fiscal 2020 to Fiscal 2021 Revenue Requirements Application (F2020-F2021 RRA)."

The response to BCOAPO 1.9.2 refers to BC Hydro's response to AMPC IR 1.5.8, included in Exhibit B-6 to the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, which states:

"From fiscal 2023 to fiscal 2031, BC Hydro expects to be in a deficit position for generation capacity with only existing and committed resources. During this period the capacity avoided cost is based on the next most cost-effective generation capacity resource on a unit capacity cost basis which is Revelstoke Unit 6. The Previous Application outlined the cost of Revelstoke Unit 6 at approximately $60 per kW-year (fiscal 2018$). This value is based on the unit capacity cost of Revelstoke Unit 6 ($51/kW-year F2016$ at point of interconnection) adjusted with delivery to the Lower Mainland and for energy benefits.

From fiscal 2032 onwards, load is forecast to exceed the capability of planned generation resources including Revelstoke Unit 6. The capacity avoided cost from this point onwards is based on Simple Cycle Gas Turbine (SCGT). Its cost is estimated at $123 per kW-year (fiscal 2018$), based on the unit capacity cost of SCGT in Kelly Lake/Nicola area derived from engagement with industry experts in 2014-2015. The $123 per kW-year figure is composed of $80/kW-year F2016$ at point of interconnection and adjusted with delivery to the Lower Mainland, GHG costs, and adjusted for energy impacts."

2.26.2 Please clarify whether the Generation & Bulk Transmission Capacity Marginal Unit Cost in Table G-3 actually includes any costs specifically for Bulk Transmission other than losses.

2.26.2.1 If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.26.2.

26.0 Reference: Exhibit B-4, BCUC 1.8.11
Exhibit B-5, BCOAPO 1.9.2
Exhibit B-1, Appendix G, Table G-3

The response to BCUC 1.8.11 states:

"The marginal resource changed from Revelstoke Unit 6 in 2037 to Simple Cycle Gas Turbine (SCGT) in 2038, based on the updated capacity LRBs as presented in Table D-2 and Table D-4 in the October 3, 2019 filing 20-Year Load Forecast, as part of BC Hydro Fiscal 2020 to Fiscal 2021 Revenue Requirements Application (F2020-F2021 RRA)."

The response to BCOAPO 1.9.2 refers to BC Hydro's response to AMPC IR 1.5.8, included in Exhibit B-6 to the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, which states:

"From fiscal 2023 to fiscal 2031, BC Hydro expects to be in a deficit position for generation capacity with only existing and committed resources. During this period the capacity avoided cost is based on the next most cost-effective generation capacity resource on a unit capacity cost basis which is Revelstoke Unit 6. The Previous Application outlined the cost of Revelstoke Unit 6 at approximately $60 per kW-year (fiscal 2018$). This value is based on the unit capacity cost of Revelstoke Unit 6 ($51/kW-year F2016$ at point of interconnection) adjusted with delivery to the Lower Mainland and for energy benefits.

From fiscal 2032 onwards, load is forecast to exceed the capability of planned generation resources including Revelstoke Unit 6. The capacity avoided cost from this point onwards is based on Simple Cycle Gas Turbine (SCGT). Its cost is estimated at $123 per kW-year (fiscal 2018$), based on the unit capacity cost of SCGT in Kelly Lake/Nicola area derived from engagement with industry experts in 2014-2015. The $123 per kW-year figure is composed of $80/kW-year F2016$ at point of interconnection and adjusted with delivery to the Lower Mainland, GHG costs, and adjusted for energy impacts."

2.26.2 Please clarify whether the Generation & Bulk Transmission Capacity Marginal Unit Cost in Table G-3 actually includes any costs specifically for Bulk Transmission other than losses.

2.26.2.2 If yes, with respect to Table G-3, please provide a breakdown of Generation vs. Bulk Transmission capacity costs and explain the basis for the Bulk Transmission capacity cost values used.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.26.2.

27.0 Reference: Exhibit B-4, BCUC 1.12.4
Exhibit B-5, BCAC 1.5.1

2.27.1 Please explain why it is appropriate to apply the Supplemental Charge to RS 1755-Group 2 customers as none of the existing street light assets/costs that are being retired early as a result of the Replacement Program were originally incurred on their behalf.

RESPONSE:

BC Hydro determined that it is preferable to have all customers taking service under RS 1701 be subject to the same charges. Maintaining different treatments for a small group of street lights would increase administrative costs and minimizing administrative complexity will benefit all customers. The same principle applies to new RS 1701 street lights that are added during or after the Street Light Replacement Program. On the other hand, RS 1701 street lights that are removed prior to March 31, 2024 will no longer be subject to the charge.

28.0 Reference: Exhibit B-5, BCOAPO 1.10.1, 1.10.2 and 1.10.3
Exhibit B-5, SURREY, 1.4.2

The Response to BCOAPO 1.10.1 states:

"Re-lamping activities most commonly include replacement of failed lamps but also include luminaire cleaning and, if required, replacement of a failed luminaire, photocell, bracket and/or wiring run back to the BC Hydro secondary distribution system."

The Response to BCOAP 1.10.2 states:

"The actual street light maintenance costs were higher because the number of spot repairs experienced were higher than what BC Hydro had planned for. BC Hydro saw an increasing number of spot repairs over the past five years because we discontinued the practice of group re-lamping of street lights in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

The response to BCOAPO 1.10.3 states:

"The Maintenance Savings reported for each year in Table G-5 were determined by comparing the High Pressure Sodium (HPS) street light historical maintenance budget average with the LED street lights ongoing costs. The LED street light ongoing costs include amortization of LED failure replacement, dismantling cost of failed LED street lights and allowance to clean all LED street lights after 10 years of ownership."

The response to SURREY 1.4.2 states: "The budgeted amount reported in Table G-1 represents the anticipated cost to address RS 1701 street light failures experienced during each fiscal year. Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

2.28.1 Given that BC Hydro discontinued the practice of group re-lamping in F2014, were the budget values for F2016-F2020 based entirely on estimates as to the number of spot repairs that would be required in the absence of any pro-active re-lamping?

RESPONSE:

The street lighting budgets for fiscal 2016 to fiscal 2020 were based on the estimated number of spot repairs without allowances for proactive group re-lamping.

28.0 Reference: Exhibit B-5, BCOAPO 1.10.1, 1.10.2 and 1.10.3
Exhibit B-5, SURREY, 1.4.2

The Response to BCOAPO 1.10.1 states:

"Re-lamping activities most commonly include replacement of failed lamps but also include luminaire cleaning and, if required, replacement of a failed luminaire, photocell, bracket and/or wiring run back to the BC Hydro secondary distribution system."

The Response to BCOAP 1.10.2 states:

"The actual street light maintenance costs were higher because the number of spot repairs experienced were higher than what BC Hydro had planned for. BC Hydro saw an increasing number of spot repairs over the past five years because we discontinued the practice of group re-lamping of street lights in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

The response to BCOAPO 1.10.3 states:

"The Maintenance Savings reported for each year in Table G-5 were determined by comparing the High Pressure Sodium (HPS) street light historical maintenance budget average with the LED street lights ongoing costs. The LED street light ongoing costs include amortization of LED failure replacement, dismantling cost of failed LED street lights and allowance to clean all LED street lights after 10 years of ownership."

The response to SURREY 1.4.2 states: "The budgeted amount reported in Table G-1 represents the anticipated cost to address RS 1701 street light failures experienced during each fiscal year. Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

2.28.1 Given that BC Hydro discontinued the practice of group re-lamping in F2014, were the budget values for F2016-F2020 based entirely on estimates as to the number of spot repairs that would be required in the absence of any pro-active re-lamping?

2.28.1.1 If not, what was the basis for the F2016-F2020 maintenance budgets?

RESPONSE:

Please refer to BC Hydro's response to BPOAPO IR 2.28.1.

28.0 Reference: Exhibit B-5, BCOAPO 1.10.1, 1.10.2 and 1.10.3
Exhibit B-5, SURREY, 1.4.2

The Response to BCOAPO 1.10.1 states:

"Re-lamping activities most commonly include replacement of failed lamps but also include luminaire cleaning and, if required, replacement of a failed luminaire, photocell, bracket and/or wiring run back to the BC Hydro secondary distribution system."

The Response to BCOAP 1.10.2 states:

"The actual street light maintenance costs were higher because the number of spot repairs experienced were higher than what BC Hydro had planned for. BC Hydro saw an increasing number of spot repairs over the past five years because we discontinued the practice of group re-lamping of street lights in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

The response to BCOAPO 1.10.3 states:

"The Maintenance Savings reported for each year in Table G-5 were determined by comparing the High Pressure Sodium (HPS) street light historical maintenance budget average with the LED street lights ongoing costs. The LED street light ongoing costs include amortization of LED failure replacement, dismantling cost of failed LED street lights and allowance to clean all LED street lights after 10 years of ownership."

The response to SURREY 1.4.2 states: "The budgeted amount reported in Table G-1 represents the anticipated cost to address RS 1701 street light failures experienced during each fiscal year. Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

2.28.2 How were the costs for equipment replacement as a result of re-lamping activities (per BCOAPO 1.10.1) accounted for in the F2016-F2020 budgets? For example, i) Was the total capital cost of the new equipment included in the maintenance budget and assumed to be expensed in the that year, ii) Was an allowance for amortization of this equipment included in the maintenance budget for the year (similar to the way equipment replacement costs are included in the LED street lights ongoing costs) or iii) were such costs excluded from the historical maintenance budget (per Table G-1) and treated as a capital addition in each year's overall budget?

RESPONSE:

The budgeted maintenance costs for fiscal 2016 to fiscal 2020 spot repairs included allowances for replacement of lamps, luminaire cleaning, and the occasional replacement of a street light component such as a luminaire, photocell, or bracket (arm). All of these maintenance costs are expensed in the year they are incurred because replacement of lamps, luminaire cleaning, and the occasional replacement of a component are not considered a complete street light asset replacement and therefore do not qualify to be capitalized.

28.0 Reference: Exhibit B-5, BCOAPO 1.10.1, 1.10.2 and 1.10.3
Exhibit B-5, SURREY, 1.4.2

The Response to BCOAPO 1.10.1 states:

"Re-lamping activities most commonly include replacement of failed lamps but also include luminaire cleaning and, if required, replacement of a failed luminaire, photocell, bracket and/or wiring run back to the BC Hydro secondary distribution system."

The Response to BCOAP 1.10.2 states:

"The actual street light maintenance costs were higher because the number of spot repairs experienced were higher than what BC Hydro had planned for. BC Hydro saw an increasing number of spot repairs over the past five years because we discontinued the practice of group re-lamping of street lights in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

The response to BCOAPO 1.10.3 states:

"The Maintenance Savings reported for each year in Table G-5 were determined by comparing the High Pressure Sodium (HPS) street light historical maintenance budget average with the LED street lights ongoing costs. The LED street light ongoing costs include amortization of LED failure replacement, dismantling cost of failed LED street lights and allowance to clean all LED street lights after 10 years of ownership."

The response to SURREY 1.4.2 states: "The budgeted amount reported in Table G-1 represents the anticipated cost to address RS 1701 street light failures experienced during each fiscal year. Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014 in anticipation of a conversion to LED street lights in the near future."

2.28.2 How were the costs for equipment replacement as a result of re-lamping activities (per BCOAPO 1.10.1) accounted for in the F2016-F2020 budgets? For example, i) Was the total capital cost of the new equipment included in the maintenance budget and assumed to be expensed in the that year, ii) Was an allowance for amortization of this equipment included in the maintenance budget for the year (similar to the way equipment replacement costs are included in the LED street lights ongoing costs) or iii) were such costs excluded from the historical maintenance budget (per Table G-1) and treated as a capital addition in each year's overall budget?

2.28.2.1 Based on the response, please comment on whether the cost comparison referred to in BCOAPO 1.10.3 appropriately

reflects the "savings" in equipment replacement costs over the 20 year period (i.e., do the historic budget costs for maintenance include the costs for equipment replacement in similar manner to the way they have been included in the maintenance cost for LED street lights?).

RESPONSE:

As indicated in BC Hydro's response to BCOAPO IR 2.28.2, annual budgeted maintenance costs include allowances for the replacements of components such as luminaires, photocells and bracket (arms) during spot repairs. As such, Maintenance Savings indicated in BC Hydro's response to BPOAPO IR 1.10.3 and as shown in Table G-5 of Appendix G of the 2020 Street Lighting Rate Application take into consideration street light component replacements as part of the annual budgeted maintenance costs for High Pressure Sodium street lights.

29.0 Reference: Exhibit B-5, BCOAPO 1.11.3, 1.11.4, and 1.11.4.3

The Response to BCOAPO 1.11.4 states: "The $3 million per year is based on the total Program's one-time investment costs without an allowance for financing costs associated with the unamortized balance of the Program's investment costs."

The response to BCOAPO 1.11.4.3 states: "Table G-5 of the Application already includes finance charge carrying costs based on the historic level of these charges recovered from RS 1701 customers. In particular, the column labelled Revenue without Replacement Program ($ million) in Table G-5 is the total RS 1701 revenue in fiscal 2021 inclusive of finance charges and these amounts are carried through all 20 years of the model."

2.29.1 Please confirm that, in principle, the financing costs included in the currently recovered from RS 1701 customers are intended to recover the costs of "financing" the assets currently used by RS 1701 customers.

RESPONSE:

BC Hydro confirms that financing costs are recovered from all ratepayers including RS 1701 customers through BC Hydro's Revenue Requirements Applications.

29.0 Reference: Exhibit B-5, BCOAPO 1.11.3, 1.11.4, and 1.11.4.3

The Response to BCOAPO 1.11.4 states: "The $3 million per year is based on the total Program's one-time investment costs without an allowance for financing costs associated with the unamortized balance of the Program's investment costs."

The response to BCOAPO 1.11.4.3 states: "Table G-5 of the Application already includes finance charge carrying costs based on the historic level of these charges recovered from RS 1701 customers. In particular, the column labelled Revenue without Replacement Program ($ million) in Table G-5 is the total RS 1701 revenue in fiscal 2021 inclusive of finance charges and these amounts are carried through all 20 years of the model."

2.29.1 Please confirm that, in principle, the financing costs included in the currently recovered from RS 1701 customers are intended to recover the costs of "financing" the assets currently used by RS 1701 customers.

2.29.1.1 If not confirmed, please explain why.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.29.1.

29.0 Reference: Exhibit B-5, BCOAPO 1.11.3, 1.11.4, and 1.11.4.3

The Response to BCOAPO 1.11.4 states: "The $3 million per year is based on the total Program's one-time investment costs without an allowance for financing costs associated with the unamortized balance of the Program's investment costs."

The response to BCOAPO 1.11.4.3 states: "Table G-5 of the Application already includes finance charge carrying costs based on the historic level of these charges recovered from RS 1701 customers. In particular, the column labelled Revenue without Replacement Program ($ million) in Table G-5 is the total RS 1701 revenue in fiscal 2021 inclusive of finance charges and these amounts are carried through all 20 years of the model."

2.29.2 Please confirm that the $63.5 M in costs for the replacement program (per BCOAPO 1.11.3) are incremental costs over and above those reflected in the revenue requirements used to determine the current RS 1701 rate.

RESPONSE:

Not Confirmed. The $63.5 million Expected Cost to convert RS 1701 and RS 1755 Group 2 lights to LEDs is reflected in the RS 1701 LED rate, as an input to Table G-5 of the Application.

29.0 Reference: Exhibit B-5, BCOAPO 1.11.3, 1.11.4, and 1.11.4.3

The Response to BCOAPO 1.11.4 states: "The $3 million per year is based on the total Program's one-time investment costs without an allowance for financing costs associated with the unamortized balance of the Program's investment costs."

The response to BCOAPO 1.11.4.3 states: "Table G-5 of the Application already includes finance charge carrying costs based on the historic level of these charges recovered from RS 1701 customers. In particular, the column labelled Revenue without Replacement Program ($ million) in Table G-5 is the total RS 1701 revenue in fiscal 2021 inclusive of finance charges and these amounts are carried through all 20 years of the model."

2.29.2 Please confirm that the $63.5 M in costs for the replacement program (per BCOAPO 1.11.3) are incremental costs over and above those reflected in the revenue requirements used to determine the current RS 1701 rate.

2.29.2.1 If not confirmed, please explain why and also explain why the amortization is included as an increment cost in Table G-5.

RESPONSE:

Amortization is included in Table G-5 because the BC Hydro's proposed RS 1701 LED rates are intended to recover the costs of the Replacement Program from RS 1701 Customers.

The amortization included in Table G-5 is the incremental amortization for the assets to be installed in the Replacement Program. BC Hydro tracks the net book value (NBV) of street lighting assets as mass assets in its asset database and the net book value of the street lighting assets to be removed is calculable, as is the net book value of the assets that will replace them. This is used as a cost input in the determination of the RS 1701 LED rates to be charged. The rates are designed so that revenues from RS 1701 Customers will offset the capitalized costs of the Replacement Program.

29.0 Reference: Exhibit B-5, BCOAPO 1.11.3, 1.11.4, and 1.11.4.3

The Response to BCOAPO 1.11.4 states: "The $3 million per year is based on the total Program's one-time investment costs without an allowance for financing costs associated with the unamortized balance of the Program's investment costs."

The response to BCOAPO 1.11.4.3 states: "Table G-5 of the Application already includes finance charge carrying costs based on the historic level of these charges recovered from RS 1701 customers. In particular, the column labelled Revenue without Replacement Program ($ million) in Table G-5 is the total RS 1701 revenue in fiscal 2021 inclusive of finance charges and these amounts are carried through all 20 years of the model."

2.29.3 Please confirm that the $63.5 M will be spent over a period up to F2024 but for purposes of including the costs in the proposed RS 1701 rate the costs have been amortized over a period of 20 years or 40 years depending on the asset.

RESPONSE:

Confirmed. The $63.5 million will be spent over a period up to fiscal 2024 and, with the exception of the costs below, the costs included in the RS 1701 rate will be amortized over 20 or 40 years, as appropriate:

- **Dismantling costs will be accounted for in a dismantling account; and**
- **Program costs that are not eligible for capitalization will be expensed when incurred.**

29.0 Reference: Exhibit B-5, BCOAPO 1.11.3, 1.11.4, and 1.11.4.3

The Response to BCOAPO 1.11.4 states: "The $3 million per year is based on the total Program's one-time investment costs without an allowance for financing costs associated with the unamortized balance of the Program's investment costs."

The response to BCOAPO 1.11.4.3 states: "Table G-5 of the Application already includes finance charge carrying costs based on the historic level of these charges recovered from RS 1701 customers. In particular, the column labelled Revenue without Replacement Program ($ million) in Table G-5 is the total RS 1701 revenue in fiscal 2021 inclusive of finance charges and these amounts are carried through all 20 years of the model."

2.29.4 Since RS 1701 includes a share of the financing cost for the assets included in BC Hydro's revenue requirement as used for rate setting purposes, please explain more fully why, if the costs of the Replacement Program are amortized for purposes of including the incremental cost of the Program in the rate calculation, the rate calculation shouldn't also include, in each year, the financing costs associated with the unamortized balance of the Replacement Programs costs.

RESPONSE:

Finance charges are allocated to the various rate classes and are not determined on a rate class basis. They include finance charges for projects and programs that apply more broadly than to a single rate class and may apply to all rate classes. BC Hydro believes that if specific program finance charges are assigned to RS 1701 for inclusion in RS 1701 rates alone, without also backing-out all finance charges that are not directly attributable to RS 1701, this will result in double recovery of some portion of the finance charges from RS 1701 customers.

30.0 Reference: Exhibit B-1, Appendix G, Tables G-5 & G-6
Exhibit B-4, BCUC 1.9.2, Pricing Model

2.30.1 Please explain why the calculation of the proposed LED rates is based on equating: i) the total revenues from the new LED rates over the 20 year period with ii) the anticipated total revenues from the existing rates less the total of the savings in each year over the same 20 year period, as opposed to equating the net present value of the two different streams using BC Hydro's average cost of capital (or an alternative discount rate which BC Hydro considers more appropriate).

RESPONSE:

BC Hydro does not believe that equating the net present value of the two different streams (i.e., the total revenues from the new LED rates over the 20-year period and the anticipated total revenues from the existing rates less the total of the savings in each year over the same 20-year period) to determine the pricing would be as informative. Inflating both streams by the assumed RRA increases, which is assumed to match inflation, results in rates that will adjust should inflation be higher or lower than expected. The use of NPV requires a discount rate to be assumed for the 20-year period and would mean that a new approval would be required if the discount rate assumption needs to be changed.

Equating the net present values of the two streams using a discount rate of 6 per cent results in LED rates that are 16 cents higher per month than presented in Table 6 of the Application as shown in the following table.

	Average	< 51 Watts	51-80 Watts	81-120 Watts	> 120 Watts
Street Light Charge – amortization basis	**20.66**	**15.08**	**18.77**	**23.50**	**27.57**
Street Light Charge - NPV basis (6% DR)	**20.83**	**15.24**	**18.94**	**23.67**	**27.74**
Difference	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**

31.0 Reference: Exhibit B-1, Appendix G, Tables G-5 & G-6
Exhibit B-4, BCUC 1.9.2, Pricing Model

2.31.1 Please provide an alternative pricing/LED rate derivation model where: i) costs and savings are in the model in the year they are incurred (e.g. the Replacement Program costs are not amortized but included in the year the dollars are spent) and ii) the LED rates are derived so as to equate the net present value of the revenues from the LED rates with the net present value of the total revenues from the existing rates less the total of the savings in each year over the 20 year period analysis period using BC Hydro current average cost of capital (or an alternative discount rate which BC Hydro considers more appropriate).

RESPONSE:

When using the costs and savings in the model in the year they are incurred (i.e., not based on amortization), equating the net present value (NPV) of the revenues from the LED rates with the net present value of the total revenues from the existing rates less the total of the savings in each year over the 20-year period analysis period, and using a 6 per cent discount rate, results in rates that are $3.76 per month per street light higher than those included in the Table 6 of the Application as shown in the following Table:

	Average	< 51 Watts	51-80 Watts	81-120 Watts	> 120 Watts
Street Light Charge – amortization basis	**20.66**	**15.08**	**18.77**	**23.50**	**27.57**
Street Light Charge – cashflow NPV (6% DR)	**24.43**	**18.84**	**22.54**	**27.27**	**31.34**
Difference	**3.76**	**3.76**	**3.76**	**3.76**	**3.76**

BC Hydro applied the amortization approach consistent with our Revenue Requirement Application approach where impacts to rates are driven by impact to our expenses, which includes asset amortization, and not by capital expenditures.

32.0 Reference: Exhibit B-5, BCSEA 1.1.8 and 1.1.10

The Response to BCSEA states: "While changing the rate design within a rate class may result in a change to revenue to cost ratio for that rate class, it does not constitute rate rebalancing unless BC Hydro was seeking to shift costs between rate classes to get closer to unity in the revenue to cost ratio."

The UCA states:

"58(1) In this section, "revenue-cost ratio" means the amount determined by dividing a public utility's revenues from a class of customers during a period of time by the public utility's costs to serve that class of customers during the same period of time.

58(7) The commission may not set rates for a public utility for the purpose of changing the revenue-cost ratio for a class of customers except on application by the public utility."

2.32.1 Does rate rebalancing result from: i) shifting the allocation of costs between rate classes (as suggested by the response to BCSEA 1.1.8) or ii) shifting (through the setting of rates) the revenue requirement recovery between rate classes?

RESPONSE:

Rate rebalancing refers to the setting of rates for the purpose of changing the revenue-cost ratio for a class of customers. As BC Hydro rates are set to recover costs, setting of rates for the purpose of changing revenue-cost ratios will shift costs between rate classes.

32.0 Reference: Exhibit B-5, BCSEA 1.1.8 and 1.1.10

The Response to BCSEA states: "While changing the rate design within a rate class may result in a change to revenue to cost ratio for that rate class, it does not constitute rate rebalancing unless BC Hydro was seeking to shift costs between rate classes to get closer to unity in the revenue to cost ratio."

The UCA states:

"58(1) In this section, "revenue-cost ratio" means the amount determined by dividing a public utility's revenues from a class of customers during a period of time by the public utility's costs to serve that class of customers during the same period of time.

58(7) The commission may not set rates for a public utility for the purpose of changing the revenue-cost ratio for a class of customers except on application by the public utility."

2.32.2 Please explain how changing rate design within a rate class may result in a change to the revenue cost ratio for that rate class.

RESPONSE:

In the case of the proposed RS 1701 LED Rate, the proposed rate design may incidentally impact the revenue-to-cost ratio for the customer owned street lighting rate class to the extent that the changes to the revenues do not perfectly offset the changes in costs and savings associated with the Replacement Program. Examples of how this situation could arise include differences in timing between planned and actual implementation, and differences between the actual and assumed customer selection of LED street lights wattage.

BC Hydro considers such potential differences to be unavoidable given the size and scope of the Replacement Program. The approach taken to design the proposed RS 1701 LED Rate is intended to contain the costs and benefits of the Replacement Program to RS 1701 customers to the extent practical and is not designed or intended to impact the revenue-to-cost ratio of any rate class.

32.0 Reference: Exhibit B-5, BCSEA 1.1.8 and 1.1.10

The Response to BCSEA states: "While changing the rate design within a rate class may result in a change to revenue to cost ratio for that rate class, it does not constitute rate rebalancing unless BC Hydro was seeking to shift costs between rate classes to get closer to unity in the revenue to cost ratio."

The UCA states:

"58(1) In this section, "revenue-cost ratio" means the amount determined by dividing a public utility's revenues from a class of customers during a period of time by the public utility's costs to serve that class of customers during the same period of time.

58(7) The commission may not set rates for a public utility for the purpose of changing the revenue-cost ratio for a class of customers except on application by the public utility."

2.32.3 Please confirm that if the change in rates for the RS 1701 class matches the change in BC Hydro's revenue requirement as a result of the Replacement Program then, in principle, the rates for BC Hydro's other customer class will be unaffected.

RESPONSE:

BC Hydro designed the Proposed RS 1701 LED rates with the intention of not impacting other rate classes. Through the use of the marginal cost model and the supplemental charge, described in Appendix G, we strove to develop pricing such that RS 1701 customers will bear all the costs, and obtain all the benefits of the Replacement Program.

In the interest of rate stability, customer certainty and regulatory efficiency, BC Hydro's proposed RS 1701 LED rates are based on a 20-year analysis period that takes into account the costs and savings of the Replacement Program over the longer term. In practice, the timing of costs and benefits over twenty years are unlikely to be perfectly matched. For any given revenue requirement application test year, the timing of revenues and costs associated with the Replacement Program may vary and this could affect BC Hydro's revenue requirements. BC Hydro considers such variations to be unavoidable on a project of such size and scope. Over the twenty year analysis time frame, such variations are expected to balance out such that other ratepayers are unaffected by the Replacement Program.

32.0 Reference: Exhibit B-5, BCSEA 1.1.8 and 1.1.10

The Response to BCSEA states: "While changing the rate design within a rate class may result in a change to revenue to cost ratio for that rate class, it does not constitute rate rebalancing unless BC Hydro was seeking to shift costs between rate classes to get closer to unity in the revenue to cost ratio."

The UCA states:

"58(1) In this section, "revenue-cost ratio" means the amount determined by dividing a public utility's revenues from a class of customers during a period of time by the public utility's costs to serve that class of customers during the same period of time.

58(7) The commission may not set rates for a public utility for the purpose of changing the revenue-cost ratio for a class of customers except on application by the public utility."

2.32.3 Please confirm that if the change in rates for the RS 1701 class matches the change in BC Hydro's revenue requirement as a result of the Replacement Program then, in principle, the rates for BC Hydro's other customer class will be unaffected.

2.32.3.1 If not confirmed please explain why.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.32.3.

33.0 Reference: Exhibit B-5, CEC 1.5.2

Preamble: The question asked "From which party or parties was the difference between the Budget and the Actual (Maintenance) costs recovered". The response states: "BC Hydro's Street Lighting maintenance costs were recovered through BC Hydro's revenue requirements applications in accordance with the allocation of costs across BC Hydro rate classes."

2.33.1 Please confirm that it was the Budget costs that would have been included in BC Hydro's revenue requirements application.

RESPONSE:

Confirmed.

33.0 Reference: Exhibit B-5, CEC 1.5.2

Preamble: The question asked "From which party or parties was the difference between the Budget and the Actual (Maintenance) costs recovered". The response states: "BC Hydro's Street Lighting maintenance costs were recovered through BC Hydro's revenue requirements applications in accordance with the allocation of costs across BC Hydro rate classes."

2.33.2 Please also confirm that to extent Actual Maintenance costs exceeded the Budget and were not recovered through rates, the difference would be reflected in BC Hydro's actual net income and would not be subject to future recovery from customers.

RESPONSE:

Not confirmed.

Historic differences between budgeted and actual maintenance costs for street lights have been offset by reductions in other maintenance.

33.0 Reference: Exhibit B-5, CEC 1.5.2

Preamble: The question asked "From which party or parties was the difference between the Budget and the Actual (Maintenance) costs recovered". The response states: "BC Hydro's Street Lighting maintenance costs were recovered through BC Hydro's revenue requirements applications in accordance with the allocation of costs across BC Hydro rate classes."

2.33.2 Please also confirm that to extent Actual Maintenance costs exceeded the Budget and were not recovered through rates, the difference would be reflected in BC Hydro's actual net income and would not be subject to future recovery from customers.

2.33.2.1 If not confirmed, please explain why.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 2.33.2.

34.0 Reference: Exhibit B-5, SURREY 1.3.1.1.3

The Response states:

"Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.34.1 Please clarify whether, in the case of breakage, the customer is just responsible for the cost of the materials required to make the fixture operate or whether the customer is also responsible for the labour costs associated with making the fixture operate.

RESPONSE:

The customer would be responsible for both the material and labour costs to restore the luminaire and/or street light to service.

34.0 Reference: Exhibit B-5, SURREY 1.3.1.1.3

The Response states:

"Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.34.2 Please explain the rationale for BC Hydro's approach to cost recovery in the event street lights or components fail due to breakage.

RESPONSE:

BC Hydro has not proposed any material changes to the tariff language regarding breakage. The language in Special Condition No. 7 is included in Special Condition No. 6 in the currently approved RS 1701.

35.0 Reference: Exhibit B-4, BCUC 1.13.5

The response states: "at their discretion, Group 1 customers can reuse these poles for the installation of privately-owned lighting provided that the poles are in suitable condition for continued use."

2.35.1 Whose role is it to determine if "the poles are in suitable condition for continued use"?

RESPONSE:

The customer must determine whether a RS 1755 Group 1 pole is in suitable condition for continued use. The condition of the pole can be evaluated by a wood pole inspector and/or a design consultant agency that would recommend the type and wattage of light to install and would be able to determine if the pole is suitable to support the privately owned lighting to be installed.

36.0 Reference: Exhibit B-4, BCUC 1.13.6
Exhibit B-5, BCOAPO 1.15.2.2

The Response to BCOAPO 1.15.2.2 states:

"BC Hydro's view is that examining amendments to the Electric Tariff to allow Residential Customers the option to take Small General Service for part of their electric use would be complex and require consideration of matters beyond the scope of this Application. Such an examination would encompass a number of different Tariff provisions and may also have implications to BC Hydro's revenues and therefore for all ratepayers, as the Residential and Small General Service Rate Schedules differ in meaningful ways, including charges and availability."

2.36.1 Is there any practical reason (other than the current wording of tariff) why it is appropriate for Small General Service customers to have access to lighting service through an unmetered connection but not Residential customers?

RESPONSE:

Any customer, including one who already has a Residential Service account, could set up a new Small General Service account for unmetered load, so long as the unmetered load met the special conditions of the Rate Schedule 1300, and met the definition of General Service.

The special conditions for Rate Schedule 1300 regarding unmetered load include the requirement that BC Hydro can estimate to its satisfaction the Energy used in kilowatt hours over a period of two months based on the connected load and the hours of use.

The definition of General Service includes that the Service be for any other use not specifically provided for in the Electric Tariff. This means that Small General Service is not available for Service to Dwellings.

36.0 Reference: Exhibit B-4, BCUC 1.13.6
Exhibit B-5, BCOAPO 1.15.2.2

The Response to BCOAPO 1.15.2.2 states:

"BC Hydro's view is that examining amendments to the Electric Tariff to allow Residential Customers the option to take Small General Service for part of their electric use would be complex and require consideration of matters beyond the scope of this Application. Such an examination would encompass a number of different Tariff provisions and may also have implications to BC Hydro's revenues and therefore for all ratepayers, as the Residential and Small General Service Rate Schedules differ in meaningful ways, including charges and availability."

2.36.2 Please explain more fully: i) why amendments to the Electric Tariff to allow Residential Customers the option to take Small General Service for part of their electric use would be complex and ii) how material the implications for BC Hydro's revenues would be.

RESPONSE:

BC Hydro understands this information request to be in regard to two potential scenarios:

(a) Allowing Residential Service Customers to choose to take either a Residential Service Rate (e.g., RS 1101), or Small General Service on an unmetered basis (i.e., RS 1300), or

(b) Allowing some portion of Residential Service to a Dwelling to be billed under Rate Schedule 1300 on an unmetered basis.

BC Hydro is unable to provide an assessment of the impacts of these scenarios at this time, as they interact with fundamental aspects of Residential Service rate design Availability, Metering, Rates and Charges. Such an assessment would need to be informed by standard rate design principles and approaches including customer feedback, cost of service, legal analysis and Bonbright criteria assessment.

As noted in our response to BCOAPO IR 2.36.1, any customer, including one who already has a Residential Service account, could request a new, stand alone Small General Service account for unmetered load so long as it met the requirements of the Electric Tariff.

37.0 Reference: Exhibit B-5, BCUC 1.2.2

The Response notes that the amended availability for RS 1701 is as follows:

"For lighting of private property where BC Hydro owns, installs and maintains the luminaires, controls, conductors, brackets, and poles where the light is mounted on a BC Hydro distribution system pole that is on public property.

In the case of lighting of private property previously served by BC Hydro pursuant to Rate Schedule 1755, BC Hydro may in its sole discretion authorize service to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property."

2.37.1 Would a new customer/connection to BC Hydro's system be able to obtain lighting for private property where BC Hydro owns, installs and maintains the luminaires, controls, conductors, brackets, and poles and the light is to be mounted on a BC Hydro distribution system pole that is on public property?

RESPONSE:

Yes, BC Hydro has proposed an amendment to the eligibility criteria of RS 1701 to enable a new customer/connection request for a light to be mounted on a BC Hydro distribution pole located on public property to illuminate private property.

37.0 Reference: Exhibit B-5, BCUC 1.2.2

The Response notes that the amended availability for RS 1701 is as follows:

"For lighting of private property where BC Hydro owns, installs and maintains the luminaires, controls, conductors, brackets, and poles where the light is mounted on a BC Hydro distribution system pole that is on public property.

In the case of lighting of private property previously served by BC Hydro pursuant to Rate Schedule 1755, BC Hydro may in its sole discretion authorize service to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property."

2.37.1 Would a new customer/connection to BC Hydro's system be able to obtain lighting for private property where BC Hydro owns, installs and maintains the luminaires, controls, conductors, brackets, and poles and the light is to be mounted on a BC Hydro distribution system pole that is on public property?

2.37.1.1 Is such eligibility solely at BC Hydro discretion (similar to the treatment of former RS 1755 customers seeking RS 1701 service using a BC Hydro distribution pole located on private property)? If not, why not?

RESPONSE:

For lighting of public property by lights mounted on BC Hydro distribution poles, all street light requests shall be assessed through the same eligibility criteria. BC Hydro has discretion in respect of ensuring the lights meet our criteria and requirements, and if so, BC Hydro will not deny the installation of a street light.

For lighting of private property please refer to BC Hydro's response to BCAC IR 1.2.2.

37.0 Reference: Exhibit B-5, BCUC 1.2.2

The Response notes that the amended availability for RS 1701 is as follows:

"For lighting of private property where BC Hydro owns, installs and maintains the luminaires, controls, conductors, brackets, and poles where the light is mounted on a BC Hydro distribution system pole that is on public property.

In the case of lighting of private property previously served by BC Hydro pursuant to Rate Schedule 1755, BC Hydro may in its sole discretion authorize service to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property."

2.37.2 It appears from the second sentence in the preamble that only lighting of private property previously served by BC Hydro pursuant to Rate Schedule 1755, is eligible to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property. Please confirm whether this is the case or whether a new customer/connection would be eligible to receive service under RS 1701 for the lighting of private property from a light that is mounted on a BC Hydro distribution system pole that is on non-public property.

RESPONSE:

Lighting of private property previously served by BC Hydro pursuant to RS 1755 Group 2 is eligible to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property.

A shown in the Availability section of RS 1701, included in Appendix B of the Application, at its sole discretion BC Hydro may authorize service to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property.

37.0 Reference: Exhibit B-5, BCUC 1.2.2

The Response notes that the amended availability for RS 1701 is as follows:

"For lighting of private property where BC Hydro owns, installs and maintains the luminaires, controls, conductors, brackets, and poles where the light is mounted on a BC Hydro distribution system pole that is on public property.

In the case of lighting of private property previously served by BC Hydro pursuant to Rate Schedule 1755, BC Hydro may in its sole discretion authorize service to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property."

2.37.2 It appears from the second sentence in the preamble that only lighting of private property previously served by BC Hydro pursuant to Rate Schedule 1755, is eligible to be provided from a light that is mounted on a BC Hydro distribution system pole that is on non-public property. Please confirm whether this is the case or whether a new customer/connection would be eligible to receive service under RS 1701 for the lighting of private property from a light that is mounted on a BC Hydro distribution system pole that is on non-public property.

2.37.2.1 If new customers/connections are not eligible, please explain why and what is the basis for a different treatment of BC Hydro-owned distribution poles depending on whether they are on public or private property.

RESPONSE:

BC Hydro stopped any new light additions on private property since the closure of RS 1755 on January 1, 1975, and BC Hydro has no plans to expand lighting service to private property.

BC Hydro's intention is to offer lighting service only when the luminaires are mounted on poles that are part of BC Hydro's distribution system, which in most cases are located on public property. However, BC Hydro has proposed to allow lighting when poles are on private property, when suitable for this purpose, to enable RS 1755 Group 2 customers to transition their service to RS 1701 and, therefore, mitigate the customer impact of the proposed termination of RS 1755.

11.0 Topic: Proposed Supplemental Charge

Reference: Exhibit B-5, BC Hydro Response to BCSEA IR 1.1.3.2, 1.2.1, 1.1.1.2, 1.1.10

"BC Hydro confirms that for F2019 211.9 per cent was reasonable estimate for the revenue to cost ratio for RS 1701." [BCSEA IR 1.1.3.2, pdf p.232]

BC Hydro states:

> "Directionally, we do not expect that recovering the $6.55 million from all ratepayers instead of from RS 1701 customers would bring the revenue to cost ratio near unity. This expectation is in consideration of the relative magnitude of the expected revenue from the proposed supplemental charge (~ $2.2 million per year), the revenue from RS 1701 (~ $25 million per year), and the current revenue to cost ratio for the BC Hydro Owned Street Light Rate Class (> 200 per cent)." [Exhibit B-5, BC Hydro Response to BCSEA IR 1.2.1, pdf p.245, underline added]

BC Hydro states:

> "The LED Replacement Program will reduce energy use and will reduce peak demand, and the savings associated with this reduction are reflected in the proposed RS 1701 rates as described in section 1.2 of Appendix G of the Application. The savings from energy and peak demand that are passed on to RS 1701 customers in the proposed RS 1701 rates are directly calculated using BC Hydro's marginal cost of energy and capacity. As such this approach does align with the Bonbright fairness and economic efficiency criteria.
>
> The supplemental charge is unrelated to the energy and demand savings associated with the LED lighting technology. The supplemental charge is intended to address the unrecovered depreciation of existing lights removed before the end of their useful life. The supplemental charge is calculated directly from the unrecovered depreciation, as discussed in section 2.1 of Appendix G, and therefore its calculation is cost based and does align with the Bonbright fairness criteria." [BCSEA 1.1.12, pdf p.242, underline added]

BC Hydro acknowledges that "there is nothing in the legal/regulatory framework that prohibits BC Hydro taking the revenue to cost ratio of a rate class into consideration when designing rates or from proposing an amendment to a rate schedule that incidentally happens to change the revenue to cost ratio of the associated rate class." [BCSEA 1.1.10, pdf p.240, underline added]

2.11.1 Please confirm, or otherwise explain, that if the BCUC was to reject the proposed Supplemental Charge the revenue to cost

ratio of the RS 1701 rate class would be expected to remain above unity.

RESPONSE:

BC Hydro confirms that we expect the revenue-to-cost ratio of the BC Hydro owned street lighting rate class to remain above unity even if the BCUC does not approve the supplemental charge on a final basis.

11.0 Topic: Proposed Supplemental Charge

Reference: Exhibit B-5, BC Hydro Response to BCSEA IR 1.1.3.2, 1.2.1, 1.1.1.2, 1.1.10

"BC Hydro confirms that for F2019 211.9 per cent was reasonable estimate for the revenue to cost ratio for RS 1701." [BCSEA IR 1.1.3.2, pdf p.232]

BC Hydro states:

> "Directionally, we do not expect that recovering the $6.55 million from all ratepayers instead of from RS 1701 customers would bring the revenue to cost ratio near unity. This expectation is in consideration of the relative magnitude of the expected revenue from the proposed supplemental charge (~ $2.2 million per year), the revenue from RS 1701 (~ $25 million per year), and the current revenue to cost ratio for the BC Hydro Owned Street Light Rate Class (> 200 per cent)." [Exhibit B-5, BC Hydro Response to BCSEA IR 1.2.1, pdf p.245, underline added]

BC Hydro states:

> "The LED Replacement Program will reduce energy use and will reduce peak demand, and the savings associated with this reduction are reflected in the proposed RS 1701 rates as described in section 1.2 of Appendix G of the Application. The savings from energy and peak demand that are passed on to RS 1701 customers in the proposed RS 1701 rates are directly calculated using BC Hydro's marginal cost of energy and capacity. As such this approach does align with the Bonbright fairness and economic efficiency criteria.
>
> The supplemental charge is unrelated to the energy and demand savings associated with the LED lighting technology. The supplemental charge is intended to address the unrecovered depreciation of existing lights removed before the end of their useful life. The supplemental charge is calculated directly from the unrecovered depreciation, as discussed in section 2.1 of Appendix G, and therefore its calculation is cost based and does align with the Bonbright fairness criteria." [BCSEA 1.1.12, pdf p.242, underline added]

BC Hydro acknowledges that "there is nothing in the legal/regulatory framework that prohibits BC Hydro taking the revenue to cost ratio of a rate class into consideration when designing rates or from proposing an amendment to a rate schedule that incidentally happens to change the revenue to cost ratio of the associated rate class." [BCSEA 1.1.10, pdf p.240, underline added]

2.11.2 In determining whether to approve or reject the proposed Supplemental Charge, could the BCUC take into consideration

that denial would leave the RS 1701 rate class with a revenue to cost ratio above unity?

RESPONSE:

For clarity, BC Hydro first notes that the revenue-to-cost ratio for the BC Hydro owned street light rate class is expected to remain above unity irrespective of the Commission's final determination on the supplemental charge.

The Commission has the jurisdiction to consider cost of service, including revenue-to cost-ratios, in their determination on BC Hydro's proposed RS 1701 LED rate.

However, if the Commission were to not approve the supplemental charge on a final basis, this would have the effect of imposing costs associated with the Replacement Program on other rate classes. BC Hydro's view is that the benefits and costs of the Replacement Program should be contained to RS 1701 customers, as the Replacement Program is being implemented for these customers alone. No other BC Hydro rate class requires or will benefit from the Replacement Program expenditures.

As the supplemental charge reflects costs directly attributable to the Replacement Program, BC Hydro submits that it is just and reasonable that the supplemental charge applies to RS 1701. Similarly, BC Hydro's proposed RS 1701 LED rates are reduced by the entire amount of the electricity savings arising from the Replacement Program. BC Hydro does not propose to pass these savings on to any other rate class, as no other rate class requires or benefits from the Replacement Program.

11.0 Topic: Proposed Supplemental Charge

Reference: Exhibit B-5, BC Hydro Response to BCSEA IR 1.1.3.2, 1.2.1, 1.1.1.2, 1.1.10

"BC Hydro confirms that for F2019 211.9 per cent was reasonable estimate for the revenue to cost ratio for RS 1701." [BCSEA IR 1.1.3.2, pdf p.232]

BC Hydro states:

> "Directionally, we do not expect that recovering the $6.55 million from all ratepayers instead of from RS 1701 customers would bring the revenue to cost ratio near unity. This expectation is in consideration of the relative magnitude of the expected revenue from the proposed supplemental charge (~ $2.2 million per year), the revenue from RS 1701 (~ $25 million per year), and the current revenue to cost ratio for the BC Hydro Owned Street Light Rate Class (> 200 per cent)." [Exhibit B-5, BC Hydro Response to BCSEA IR 1.2.1, pdf p.245, underline added]

BC Hydro states:

> "The LED Replacement Program will reduce energy use and will reduce peak demand, and the savings associated with this reduction are reflected in the proposed RS 1701 rates as described in section 1.2 of Appendix G of the Application. The savings from energy and peak demand that are passed on to RS 1701 customers in the proposed RS 1701 rates are directly calculated using BC Hydro's marginal cost of energy and capacity. As such this approach does align with the Bonbright fairness and economic efficiency criteria.
>
> The supplemental charge is unrelated to the energy and demand savings associated with the LED lighting technology. The supplemental charge is intended to address the unrecovered depreciation of existing lights removed before the end of their useful life. The supplemental charge is calculated directly from the unrecovered depreciation, as discussed in section 2.1 of Appendix G, and therefore its calculation is cost based and does align with the Bonbright fairness criteria." [BCSEA 1.1.12, pdf p.242, underline added]

BC Hydro acknowledges that "there is nothing in the legal/regulatory framework that prohibits <u>BC Hydro</u> taking the revenue to cost ratio of a rate class into consideration when designing rates or from proposing an amendment to a rate schedule that incidentally happens to change the revenue to cost ratio of the associated rate class." [BCSEA 1.1.10, pdf p.240, underline added]

2.11.3 Would BC Hydro agree that while the Supplemental Charge aligns with the Bonbright fairness criteria on a marginal cost basis, denial

of the proposed Supplemental Charge aligns with the Bonbright fairness criteria on an average cost basis?

RESPONSE:

The approach proposed by BC Hydro aligns with the Bonbright fairness criteria by assigning the costs and benefits of the Replacement Program, of which the supplemental charge is only one example, to RS 1701 customers.

Specifically, with regards to the supplemental charge, it is intended to address cost associated with capital assets that are to be removed and replaced for the sole purpose of providing service to BC Hydro owned street light customers under RS 1701. Recovery of the undepreciated value of these assets from RS 1701 customers therefore represents a fair apportionment of the costs to customers who benefited from these assets and avoids undue discrimination associated from recovering these costs from customers who did not benefit from them.

Given this, BC Hydro's view is that denying final approval of the supplemental charge would not align with the Bonbright Criteria, irrespective of whether marginal costs, average costs, or both types of costs are considered.

BC Hydro acknowledges that the revenue-to-cost ratio of the BC Hydro owned street light rate class is above unity, and that in the context of an application to change revenue to cost ratios, moving the revenue-to-cost ratio closer to unity would align with the Bonbright fairness criteria. However, the Street Light Rates Application is not an application to change revenue-to-cost ratios, and its scope with respect to the proposed RS 1701 LED Rate is limited to the impact of the Replacement Program.

14.0 Reference: Exhibit B-5, CEC 1.9.2

Table 9 Illustrative RS 1701 Customer Bill Impacts

Time		Customer 1	Customer 2	Customer 3
	Number of Lights	10	54	758
Today	Current Bill	$212 / mo.	$1,120 / mo.	$15,805 / mo.
Illustrative new pricing	Street Light Charge	$209 / mo.	$1,090 / mo.	$15,401 / mo.
	Supplemental Charge	$20 / mo.	$111 / mo.	$1,562 / mo.
	Total Bill	$229 / mo.	$1,201 / mo.	$16,963 / mo.
	Bill Impact	+$17 / mo.	+$81 / mo.	+$1,160 / mo.

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

1.9.2 Please confirm or otherwise explain the CEC's understanding that if the deployment schedule were to last for 8 quarters starting immediately, illustrative Customer 2 would experience a bill increase of $81/month for 24 months, and a net bill reduction of $30/month thereafter, resulting in a breakeven 65 months after completion, i.e. $81*24months = $1944 increase and $1944/$30 per month reduction =65 months

RESPONSE:

Not confirmed. The illustrative example in Table 9 of the Application is intended to show the approximate bill impact for customers whose street lights are converted to LED at the start of the Replacement Program, assuming like for like replacement of existing lights with wattage equivalent LED lights. The supplemental charge for Customer 2 of $111 per month is assumed to be recovered over 35 months from May 1, 2021 through to March 31, 2024 regardless of when the LED street lights are deployed for the customer.

In practice, the bill impacts for any individual customer will depend not only on the supplemental charge but also on the wattage of their existing lights and the wattage chosen for the LED lights.

If BC Hydro were to change the installation schedule such that the Replacement Program is completed in 24 months rather than 35 months, and the unrecovered depreciation of the existing lights is approved to be recovered through a supplemental charge in effect over 24 months, all else being equal, the monthly supplemental charge would increase from $111 per month to approximately $162 per month.

BC Hydro notes that changes to the schedule could impact costs. It is unclear what the impact would be of adopting the implementation schedule described in this information request on the cost of the Replacement Program, or how this could change the proposed RS 1701 rates.

2.14.1 Is it correct to understand that Customer 2 would pay an additional $81/month for 35 months (relative to current bill), and then have a net reduction of $30/month relative to their current bill?

RESPONSE:

Confirmed.

14.0 Reference: Exhibit B-5, CEC 1.9.2

Table 9 Illustrative RS 1701 Customer Bill Impacts

Time		Customer 1	Customer 2	Customer 3
	Number of Lights	10	54	758
Today	Current Bill	$212 / mo.	$1,120 / mo.	$15,805 / mo.
Illustrative new pricing	Street Light Charge	$209 / mo.	$1,090 / mo.	$15,401 / mo.
	Supplemental Charge	$20 / mo.	$111 / mo.	$1,562 / mo.
	Total Bill	$229 / mo.	$1,201 / mo.	$16,963 / mo.
	Bill Impact	+$17 / mo.	+$81 / mo.	+$1,160 / mo.

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

1.9.2 Please confirm or otherwise explain the CEC's understanding that if the deployment schedule were to last for 8 quarters starting immediately, illustrative Customer 2 would experience a bill increase of $81/month for 24 months, and a net bill reduction of $30/month thereafter, resulting in a breakeven 65 months after completion, i.e. $81*24months = $1944 increase and $1944/$30 per month reduction =65 months

RESPONSE:

Not confirmed. The illustrative example in Table 9 of the Application is intended to show the approximate bill impact for customers whose street lights are converted to LED at the start of the Replacement Program, assuming like for like replacement of existing lights with wattage equivalent LED lights. The supplemental charge for Customer 2 of $111 per month is assumed to be recovered over 35 months from May 1, 2021 through to March 31, 2024 regardless of when the LED street lights are deployed for the customer.

In practice, the bill impacts for any individual customer will depend not only on the supplemental charge but also on the wattage of their existing lights and the wattage chosen for the LED lights.

If BC Hydro were to change the installation schedule such that the Replacement Program is completed in 24 months rather than 35 months, and the unrecovered depreciation of the existing lights is approved to be recovered through a supplemental charge in effect over 24 months, all else being equal, the monthly supplemental charge would increase from $111 per month to approximately $162 per month.

BC Hydro notes that changes to the schedule could impact costs. It is unclear what the impact would be of adopting the implementation schedule described in this information request on the cost of the Replacement Program, or how this could change the proposed RS 1701 rates.

2.14.1 Is it correct to understand that Customer 2 would pay an additional $81/month for 35 months (relative to current bill), and then have a net reduction of $30/month relative to their current bill?

2.14.1.1 If yes, please confirm or otherwise explain that the breakeven from the customer's viewpoint would occur at 94.5 months or about 8 years.

RESPONSE:

BC Hydro interprets this question to be asking how long it would take for an illustrative RS 1701 customer's bill savings associated with the change in the monthly RS 1701 Rate per fixture arising from changing to an LED unit, to offset the supplemental charge. We note this is not a break even analysis as the term is commonly understood, which compares capital investment costs to savings. RS 1701 customers do not own and have not made a capital investment in the LED street light asset. The supplemental charge reflects the cost of removing existing lights before the end of their useful life and does not reflect BC Hydro's capital investment in the Replacement Program. BC Hydro's capital investment in the Replacement Program is recovered through the RS 1701 monthly Rate per fixture.

This notwithstanding, BC Hydro calculates that it will take ($111/mo.) * (35 mo.) / ($30/ mo.) = 130 months after the start of the supplemental charge for Customer 2 to pay back the total supplemental charges from the light charge savings.

14.0 Reference: Exhibit B-5, CEC 1.9.2

Table 9 Illustrative RS 1701 Customer Bill Impacts

Time		Customer 1	Customer 2	Customer 3
	Number of Lights	10	54	758
Today	Current Bill	$212 / mo.	$1,120 / mo.	$15,805 / mo.
Illustrative new pricing	Street Light Charge	$209 / mo.	$1,090 / mo.	$15,401 / mo.
	Supplemental Charge	$20 / mo.	$111 / mo.	$1,562 / mo.
	Total Bill	$229 / mo.	$1,201 / mo.	$16,963 / mo.
	Bill Impact	+$17 / mo.	+$81 / mo.	+$1,160 / mo.

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

1.9.2 Please confirm or otherwise explain the CEC's understanding that if the deployment schedule were to last for 8 quarters starting immediately, illustrative Customer 2 would experience a bill increase of $81/month for 24 months, and a net bill reduction of $30/month thereafter, resulting in a breakeven 65 months after completion, i.e. $81*24months = $1944 increase and $1944/$30 per month reduction =65 months

RESPONSE:

Not confirmed. The illustrative example in Table 9 of the Application is intended to show the approximate bill impact for customers whose street lights are converted to LED at the start of the Replacement Program, assuming like for like replacement of existing lights with wattage equivalent LED lights. The supplemental charge for Customer 2 of $111 per month is assumed to be recovered over 35 months from May 1, 2021 through to March 31, 2024 regardless of when the LED street lights are deployed for the customer.

In practice, the bill impacts for any individual customer will depend not only on the supplemental charge but also on the wattage of their existing lights and the wattage chosen for the LED lights.

If BC Hydro were to change the installation schedule such that the Replacement Program is completed in 24 months rather than 35 months, and the unrecovered depreciation of the existing lights is approved to be recovered through a supplemental charge in effect over 24 months, all else being equal, the monthly supplemental charge would increase from $111 per month to approximately $162 per month.

BC Hydro notes that changes to the schedule could impact costs. It is unclear what the impact would be of adopting the implementation schedule described in this information request on the cost of the Replacement Program, or how this could change the proposed RS 1701 rates.

2.14.2 Please provide, for a range of customer light replacement level scenarios (# of lights by wattage) and scenarios for supplemental charges spread out over both 35 months and 72 months, scenarios for reduced street light charges by 10% and 15% over 72 months and in each case show the approximate breakeven period over which BC Hydro's investment will breakeven and how much revenue and cost BC Hydro will be have from its lighting customers in each scenario at and after the point of breakeven.

RESPONSE:

BC Hydro interprets this question to be asking how long it would take for an illustrative RS 1701 customer's bill savings associated with the change in the monthly RS 1701 Rate per fixture arising from changing to an LED unit, to offset the supplemental charge under various hypothetical scenarios. We note this is not a break even analysis as the term is commonly understood, which compares capital investment costs to savings. RS 1701 customers do not own and have not made a capital investment in the LED street light asset. The supplemental charge reflects the cost of removing existing lights before the end of their useful life and does not reflect BC Hydro's capital investment in the Replacement Program.

BC Hydro's capital investment in the Replacement Program is recovered through the RS 1701 monthly Rate per fixture.

BC Hydro cannot reduce the street light charges by 10 per cent or 15 per cent without rebalancing rates between rate classes while maintaining revenue neutrality. Please refer to BC Hydro's response to ZONE II RPG IR 2.4.2.

Please refer to BCUC IR 2.32.1 for a range of scenarios that recover the undepreciated value of the existing street lights over different time periods, including 35 months and 72 months.

To be responsive, BC Hydro calculates that for Customer 2 to pay back the total supplemental charges from the light charge savings were the street light rate to charge recover 100 per cent, 90 per cent or 85 per cent of required revenue. The results are illustrative only as changing the rate in this manner will have impacts on other rate classes and rate rebalancing is not being sought as part of the Application. The calculated payback of the supplemental charge with the rate savings is shown on line 12.

Illustrative RS 1701 Customer2 Bill Impacts

			1	2	3	4	5	6
1	**Number of Lights**	**-**	**54**	**54**	**54**	**54**	**54**	**54**
2	**Current Bill**	**$/mo**	**1120**	**1120**	**1120**	**1120**	**1120**	**1120**
3	**Street Light Charge**	**$/mo**	**1090**	**981**	**927**	**1090**	**981**	**927**
4	**% of required Charge**	**%**	**100%**	**90%**	**85%**	**100%**	**90%**	**85%**
5	**Savings**	**$/mo**	**30**	**139**	**194**	**30**	**139**	**194**
6	**Supplemental Charge**	**$/mo**	**111**	**111**	**111**	**54**	**54**	**54**
7	**Months**	**mo**	**35**	**35**	**35**	**72**	**72**	**72**
8	**Monthly Amount**	**$/mo**	**2.06**	**2.06**	**2.06**	**1.00**	**1.00**	**1.00**
9	**Total SC**	**$**	**3893**	**3893**	**3893**	**3893**	**3893**	**3893**
10	**Total Bill**	**$/mo**	**1201**	**1092**	**1038**	**1144**	**1035**	**981**
11	**Bill Impact**	**$/mo**	**81**	**-28**	**-82**	**24**	**-85**	**-139**
12	**Payback SC with Savings**	**Mo**	**130**	**28**	**20**	**130**	**28**	**20**

14.0 Reference: Exhibit B-5, CEC 1.9.2

Table 9 Illustrative RS 1701 Customer Bill Impacts

Time		Customer 1	Customer 2	Customer 3
	Number of Lights	10	54	758
Today	Current Bill	$212 / mo.	$1,120 / mo.	$15,805 / mo.
Illustrative new pricing	Street Light Charge	$209 / mo.	$1,090 / mo.	$15,401 / mo.
	Supplemental Charge	$20 / mo.	$111 / mo.	$1,562 / mo.
	Total Bill	$229 / mo.	$1,201 / mo.	$16,963 / mo.
	Bill Impact	+$17 / mo.	+$81 / mo.	+$1,160 / mo.

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

1.9.2 Please confirm or otherwise explain the CEC's understanding that if the deployment schedule were to last for 8 quarters starting immediately, illustrative Customer 2 would experience a bill increase of $81/month for 24 months, and a net bill reduction of $30/month thereafter, resulting in a breakeven 65 months after completion, i.e. $81*24months = $1944 increase and $1944/$30 per month reduction =65 months

RESPONSE:

Not confirmed. The illustrative example in Table 9 of the Application is intended to show the approximate bill impact for customers whose street lights are converted to LED at the start of the Replacement Program, assuming like for like replacement of existing lights with wattage equivalent LED lights. The supplemental charge for Customer 2 of $111 per month is assumed to be recovered over 35 months from May 1, 2021 through to March 31, 2024 regardless of when the LED street lights are deployed for the customer.

In practice, the bill impacts for any individual customer will depend not only on the supplemental charge but also on the wattage of their existing lights and the wattage chosen for the LED lights.

If BC Hydro were to change the installation schedule such that the Replacement Program is completed in 24 months rather than 35 months, and the unrecovered depreciation of the existing lights is approved to be recovered through a supplemental charge in effect over 24 months, all else being equal, the monthly supplemental charge would increase from $111 per month to approximately $162 per month.

BC Hydro notes that changes to the schedule could impact costs. It is unclear what the impact would be of adopting the implementation schedule described in this information request on the cost of the Replacement Program, or how this could change the proposed RS 1701 rates.

2.14.3 The CEC is working with the UBCM and the UBCM is working for a grouping of municipalities, which have reported that the proposed street lighting charges do not appear to comport with their experience on changing out lighting for streetlights that they own and for which they experience immediate savings and early breakeven point. Would BC Hydro please make time in this process to work with the CEC to help address this specific type of municipal customer experience and help explain and reconcile the differences?

RESPONSE:

BC Hydro would not support a regulatory process specifically to address the type of municipal customer experience described in the information request given the following:

- **BC Hydro invites any customer, and their authorized representatives, to contact us regarding questions about their bills and charges. Municipalities may reach us directly via email (LightingSupport@bchydro.com) or phone 1 833 828 2224 (between 8 a.m. and 4 p.m. Monday to Friday). Enquiries can**

be made directly to BC Hydro at any time, and do not require participation in a regulatory proceeding; and

- **A municipality's experience converting their own lighting to LED technology is not comparable to BC Hydro's Replacement Program, as further described BC Hydro's response to VERNON IR 1.5.1**

14.0 Reference: Exhibit B-5, CEC 1.9.2

Table 9 Illustrative RS 1701 Customer Bill Impacts

Time		Customer 1	Customer 2	Customer 3
	Number of Lights	10	54	758
Today	Current Bill	$212 / mo.	$1,120 / mo.	$15,805 / mo.
Illustrative new pricing	Street Light Charge	$209 / mo.	$1,090 / mo.	$15,401 / mo.
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	Total Bill	$229 / mo.	$1,201 / mo.	$16,963 / mo.
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Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

1.9.2 Please confirm or otherwise explain the CEC's understanding that if the deployment schedule were to last for 8 quarters starting immediately, illustrative Customer 2 would experience a bill increase of $81/month for 24 months, and a net bill reduction of $30/month thereafter, resulting in a breakeven 65 months after completion, i.e. $81*24months = $1944 increase and $1944/$30 per month reduction =65 months

RESPONSE:

Not confirmed. The illustrative example in Table 9 of the Application is intended to show the approximate bill impact for customers whose street lights are converted to LED at the start of the Replacement Program, assuming like for like replacement of existing lights with wattage equivalent LED lights. The supplemental charge for Customer 2 of $111 per month is assumed to be recovered over 35 months from May 1, 2021 through to March 31, 2024 regardless of when the LED street lights are deployed for the customer.

In practice, the bill impacts for any individual customer will depend not only on the supplemental charge but also on the wattage of their existing lights and the wattage chosen for the LED lights.

If BC Hydro were to change the installation schedule such that the Replacement Program is completed in 24 months rather than 35 months, and the unrecovered depreciation of the existing lights is approved to be recovered through a supplemental charge in effect over 24 months, all else being equal, the monthly supplemental charge would increase from $111 per month to approximately $162 per month.

BC Hydro notes that changes to the schedule could impact costs. It is unclear what the impact would be of adopting the implementation schedule described in this information request on the cost of the Replacement Program, or how this could change the proposed RS 1701 rates.

2.14.4 Please provide a scenario whereby BC Hydro absorbs the costs for the street lighting changes as if it were a DSM program allocated to all customers.

RESPONSE:

Hypothetically, if certain elements of the Replacement Program costs could be classified as "non rate" costs (i.e., those costs that are not considered as a condition for service or payment for service) and if they met the definition of "demand-side measures" (DSM) as set out in the *Utilities Commission Act* (by reference to the definition in the *Clean Energy Act*), then BC Hydro may be able to put forward a DSM expenditure schedule for acceptance. Any such expenditure schedule would also need to meet the requirements of the Demand Side Measures Regulation (B.C. Reg. 326/2008) which requires a DSM portfolio to be "adequate" and "cost-effective" as defined in that regulation.

However, BC Hydro has not proposed to treat any of the costs incurred under the Replacement Program as DSM expenditures in this Application nor has it determined that it is appropriate to do so.

1.0 Reference: BC Hydro Response to MHPOABC IR 1.1.A: and MHPOABC IR 1.1.G

In its response to MHPOABC IR 1.1.A, BC Hydro writes in part: (emphases added)

> "BC Hydro is unable to provide the number of *manufactured home parks* with BC Hydro accounts because we do not maintain a unique identifier for *manufactured homes* in our customer database. They are classified the same as houses, duplexes or row homes in our system.

"BC Hydro, however, maintains an identifier for *mobile homes."*

In a footnote to IR 1.1.G, BC Hydro writes*: (emphases added)*

> "1 BC Hydro notes that *manufactured home parks* are different than *mobile home parks*, which are to be billed under General Service rates."

We are confused by the distinction BC Hydro makes between manufactured home parks, mobile home parks, manufactured homes and mobile homes as no such distinction exists in the industry.

For information/clarification, there has been a three decades evolution in industry terminology from "trailers" to "mobile homes" to "manufactured homes." Similarly, "trailer courts/parks" have evolved through "mobile home parks" and "manufactured home parks" to the contemporary term: "manufactured home communities (MHCs)."

This evolution has been the result in part of manufactured homes being built for about the last 30 years to a national standard equivalent to the building code for a detached home. Among other mandated requirements, the Canadian Z240 standard requires 2x4 or 2x6 construction, full insulation, 25 year roofs, gyproc walls, and ten year construction guarantees. They are eligible for CMHC backed 25 year mortgages.

They do not have wheels. They do not have hitches. They are hauled by special trucks to their sites in a manufactured home community and installed by crane in what likely will be their permanent destination.

There are also "modular homes" that are built in an indoor facility, the same as manufactured homes. However, modular homes are placed on permanent foundations on land owned by the home owner. Modular homes are not found in MHCs, as the home owner is renting the land.

2.1.1 Please provide BC Hydro's definitions of:

- manufactured homes

- manufactured home parks
- mobile homes
- mobile home parks

RESPONSE:

Please refer to BC Hydro's revised response to MHPOABC IR 1.1.A which confirms its identifier of "mobile homes" includes manufactured homes and the identifier of "mobile home parks" includes manufactured home parks. BC Hydro does not delineate manufactured home parks from mobile home parks.

This response seeks to provide further clarification on the definitions of "mobile home" and "mobile home park" used within our systems.

BC Hydro defines "Mobile Home" as follows:

- **Separately metered, self-contained living unit manufactured as a unit and intended to be situated in a place other than where it was manufactured;**
- **The unit may be in a mobile home park development or on an independent tract of land;**
- **The unit may have a home-based business where energy is used for non-residential purposes; and**
- **Includes houseboats that are individually metered homes floating on water, kept stationary and tethered to land, alone or in a float home community or marina.**

BC Hydro defines "Mobile Home Park" as follows:

- **Electricity service on a tract of land with a number of mobile homes, either permanent or temporary, where electricity is used in common areas or facilities other than within the individual units (i.e., exterior lighting, laundry rooms, games room) or one meter is used to measure electricity consumption for the whole park.**

This is mostly consistent with MHPOABC's definition of "manufactured home community" provided in the preamble with the exception that BC Hydro's definition of mobile home includes houseboats and that there is no delineation based on whether the mobile home is on a permanent or non-permanent foundation.

2.0 Reference: BC Hydro Response to MHPOABC IR 1.1.A

In its response to MHPOABC IR 1.1.A, BC Hydro writes in part:

> ". . . we do not maintain a unique identifier for manufactured homes in our customer database. They are classified the same as houses, duplexes or row homes in our system.
>
> "BC Hydro, however, maintains an identifier for mobile homes."

2.2.1 Given the confusion created by BC Hydro's different definitions as noted in IR 2.1, we request the number of "manufactured home parks" and separately the number of "mobile home parks" with BC Hydro accounts. For greater clarity of this request, each MHC will have a BC Hydro account for the MHC, separate from accounts for each home owner in the community. Our request is for the information on MHC accounts, not home owner accounts.

RESPONSE:

Please refer to BC Hydro's revised response to MHPOABC IR 1.1.A which confirms its identifier of "mobile homes" includes manufactured homes and the identifier of "mobile home parks" includes manufactured home parks. BC Hydro does not delineate manufactured home parks from mobile home parks.

As such the table below, that was provided in BC Hydro's response to MHPOABC IR 1.1.A, represents the number of manufactured home community accounts as requested by this IR. These account numbers do not include individual mobile home units.

Region	Account
Lower Mainland	**323**
Northern	**280**
Southern Interior	**601**
Vancouver Island	**577**
Total	**1,781**

BC Hydro notes that some mobile home parks may have more than one common use area account. The actual number of mobile home parks is likely less than the number of accounts.

3.0 Reference: BC Hydro Response to MHPOABC IR 1.2.C, 1.2.E, 1.2.F, 1.2.F, and 1.2.G

BC Hydro's responses to these requests either refer exclusively to "manufactured home parks," or imply their responses are confined to "manufactured home parks," thus may not apply to all manufactured home communities or to "mobile home parks" using BC Hydro's definitions.

2.3.1 Do these responses apply equally to BC Hydro's definitions of "manufactured home parks" and "mobile home parks?"

RESPONSE:

Please refer to BC Hydro's revised response to MHPOABC IR 1.1.A which confirms its identifier of "mobile homes" includes manufactured homes and the identifier of "mobile home parks" includes manufactured home parks. BC Hydro does not delineate manufactured home parks from mobile home parks.

Yes. BC Hydro's response to MHPOABC IRs 1.2.C, 1.2.D, 1.2.E, 1.2.F and 1.2.G apply equally to all RS 1755 customers, including mobile home parks and other residential and commercial customers.

3.0 Reference: BC Hydro Response to MHPOABC IR 1.2.C, 1.2.E, 1.2.F, 1.2.F, and 1.2.G

BC Hydro's responses to these requests either refer exclusively to "manufactured home parks," or imply their responses are confined to "manufactured home parks," thus may not apply to all manufactured home communities or to "mobile home parks" using BC Hydro's definitions.

2.3.2 If not, please clarify the response to each of MHPOABC's IRs 1.2.C, 1.2.E, 1.2.F, and 1.2.G, explaining the differences in their application to BC Hydro's two categories of MHCs.

RESPONSE:

Please refer to BC Hydro's revised response to MHPOABC IR 1.1.A which confirms its identifier of "mobile homes" includes manufactured homes and the identifier of "mobile home parks" includes manufactured home parks. BC Hydro does not delineate manufactured home parks from mobile home parks.

As stated in BC Hydro's response to MHPOABC IR 2.3.1, the responses to the referenced Information Requests are applicable to all residential and commercial customers, including mobile home parks.

Please also refer to BC Hydro's responses to MHPOABC IR 2.4.1 which provides more details related to the rates applicable to manufactured home parks and mobile home parks, respectively.

4.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Our questions in MHPOABC IR 1.2.G were:

> What are/will be the appropriate rate schedules?
>
> What options might manufactured home park owners have with respect to these schedules?

BC Hydro's response was to refer to **CEC IR 1.10.1,** for a breakdown of rate classes. Their response to **IR CEC IR 1.10.1** provided no information relative to either of our questions above.

2.4.1 What are the appropriate rate schedules for manufactured home parks?

RESPONSE:

This response also answers MHPOABC IRs 2.4.2, 2.4.3 2.4.4, 2.4.5 and 2.4.6.

Please refer to BC Hydro's revised response to MHPOABC IR 1.1.A which confirms its identifier of "mobile homes" includes manufactured homes and the identifier of "mobile home parks" includes manufactured home parks. BC Hydro does not delineate manufactured home parks from mobile home parks.

BC Hydro currently has eight rate classes which are used to group customers with similar load profiles and similar interconnection characteristics on the basis that such customers will generally cause BC Hydro to incur similar costs to provide service. The eight rate classes are: Residential, Small General Service (SGS), Medium General Service (MGS), Large General Service (LGS), Irrigation, BC Hydro Owned Street Lighting, Customer Owned Street Lighting and Transmission. There are a number of rate schedules under each rate class.

There is not a dedicated rate class or rate schedule for mobile homes and mobile home parks. The Electric Tariff does not make specific reference to manufactured home parks; however, it includes mobile home parks as a General Service as cited in the General Service definition below:

> **Service for business, commercial, institutional or industrial use, including use in nursing homes, boarding houses, rooming houses, common areas of multiple occupancy buildings, recreational establishments, marinas and yacht clubs, hotels, motels, <u>mobile home parks</u> and similar establishments or parts thereof, or for any other use not specifically provided for in the Electric Tariff.**

The rate schedules available and appropriate for mobile homes and mobile home parks are explained below:

1. Mobile home parks serviced by a single meter

If there is a single meter for the entire mobile home park, including the individual Dwellings, the mobile home park in its entirely is billed under one of the General Service rates in Table 1 below depending on its location, consumption level, metered voltage and transformer ownership.

Table 1: Default General Service rates

Zone I		
SGS	**Peak demand under 35 kW**	**RS 1300, RS 1301, RS 1310, RS 1311**
MGS	**Peak demand between 35 and 150 kW and annual consumption less than 550,000 kWh**	**RS 1500, RS 1501, RS 1510, RS 1511**
LGS	**Peak demand greater than 150 kW or annual consumption greater than 550,000 kWh**	**RS 1600, RS 1601, RS 1610, RS 1611**
Zone IB		
General Service (35 kW and Over)		**RS 1200, RS 1201, RS 1210, RS 1211**
General Service (under 35 kW)		**RS 1300, RS 1301, RS 1310, RS 1311**
Zone II		
General Service (35 kW and Over)		**RS 1255, RS 1256, RS 1265, RS 1266**
General Service (under 35 kW)		**RS 1234**

Note: the rate schedules within each rate class is determined by whether the service is metered at primary or secondary voltage and either BC Hydro or the customer owns the transformer.

2. Mobile home Dwellings

If a mobile home Dwelling is individually metered, whether it is located in a mobile home park or on an independent tract of land, the Dwelling is serviced under one of the single residential service rate schedules in Table 2 below.

Table 2: Default Single Residential Service rates

Zone I	**Integrated Service Area**	**RS 1101**
Zone IB	**District of Bella Bella**	**RS 1151**
Zone II	**Non-Integrated Area excluding District of Bella Bella**	**RS 1107**

3. Common area of mobile home parks

If mobile home Dwellings are individually metered, the common areas of the mobile home parks are service under one of the General Service rate schedules in Table 1 above.

Rate Options for RS 1755 customers

Following termination of RS 1755, a light installed by a mobile home park would be billed under one of the General Service rates in Table 1 above.

However, a RS 1755 Group 2 light could be billed under RS 1701 should the BC Hydro distribution pole be suitable for continued illumination of private property and the customer chooses to continue the service.

4.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Our questions in MHPOABC IR 1.2.G were:

> What are/will be the appropriate rate schedules?
>
> What options might manufactured home park owners have with respect to these schedules?

BC Hydro's response was to refer to **CEC IR 1.10.1,** for a breakdown of rate classes. Their response to **IR CEC IR 1.10.1** provided no information relative to either of our questions above.

2.4.2 What are the appropriate rate schedules for mobile home parks?

RESPONSE:

Please refer to BC Hydro's response to MHPOABC IR 2.4.1.

4.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Our questions in MHPOABC IR 1.2.G were:

> What are/will be the appropriate rate schedules?
>
> What options might manufactured home park owners have with respect to these schedules?

BC Hydro's response was to refer to **CEC IR 1.10.1,** for a breakdown of rate classes. Their response to **IR CEC IR 1.10.1** provided no information relative to either of our questions above.

2.4.3 What will be the appropriate rate schedules for manufactured home parks?

RESPONSE:

Please refer to BC Hydro's response to MHPOABC IR 2.4.1.

4.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Our questions in MHPOABC IR 1.2.G were:

> What are/will be the appropriate rate schedules?
>
> What options might manufactured home park owners have with respect to these schedules?

BC Hydro's response was to refer to **CEC IR 1.10.1,** for a breakdown of rate classes. Their response to **IR CEC IR 1.10.1** provided no information relative to either of our questions above.

2.4.4 What will be the appropriate rate schedules for mobile home parks?

RESPONSE:

Please refer to BC Hydro's response to MHPOABC IR 2.4.1.

4.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Our questions in MHPOABC IR 1.2.G were:

> What are/will be the appropriate rate schedules?
>
> What options might manufactured home park owners have with respect to these schedules?

BC Hydro's response was to refer to **CEC IR 1.10.1,** for a breakdown of rate classes. Their response to **IR CEC IR 1.10.1** provided no information relative to either of our questions above.

2.4.5 What options will manufactured home park owners have with respect to these schedules?

RESPONSE:

Please refer to BC Hydro's response to MHPOABC IR 2.4.1.

4.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Our questions in MHPOABC IR 1.2.G were:

> What are/will be the appropriate rate schedules?
>
> What options might manufactured home park owners have with respect to these schedules?

BC Hydro's response was to refer to **CEC IR 1.10.1,** for a breakdown of rate classes. Their response to **IR CEC IR 1.10.1** provided no information relative to either of our questions above.

2.4.6 What options will mobile home park owners have with respect to these schedules?

RESPONSE:

Please refer to BC Hydro's response to MHPOABC IR 2.4.1.

5.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Given BC Hydro's differentiation between manufactured home parks and mobile home parks and given our explanation that all such "parks" in BC are manufactured home communities,

2.5.1 Will BC Hydro place all MHCs in the same rate class?

RESPONSE:

Please refer to BC Hydro's revised response to MHPOABC IR 1.1.A which confirms its identifier of "mobile homes" includes manufactured homes and the identifier of "mobile home parks" includes manufactured home parks. BC Hydro does not delineate manufactured home parks from mobile home parks.

Please refer to BC Hydro's response to MHPOABC IR 2.4.1 regarding the appropriate rate classes and rate schedules for mobile home parks based on the Electric Tariff. Lighting installed by the park owner to replace RS 1755 Group 1 and Group 3 private outdoor lighting service would be billed at the appropriate General Service rate based on the park's electricity consumption and demand characteristics.

BC Hydro does not have the flexibility to change eligibility criteria of its rate classes and rate schedules without a thorough analysis of customer impacts, engagement with customers and stakeholders, and formal review by the BCUC. This was not contemplated within the scope of the Street Light Rate Application and, therefore, would need to be considered in a separate proceeding to determine if a change of the current Electric Tariff is warranted.

5.0 Reference: BC Hydro Response to MHPOABC IR 1.2.G

Given BC Hydro's differentiation between manufactured home parks and mobile home parks and given our explanation that all such "parks" in BC are manufactured home communities,

2.5.2 If the answer to 2.5.1 is no, please explain why it is necessary to retain the irrelevant distinction and resultant confusion by having two different categories for the same type of account.

RESPONSE:

Please refer to BC Hydro's revised response to MHPOABC IR 1.1.A which confirms its identifier of "mobile homes" includes manufactured homes and the identifier of "mobile home parks" includes manufactured home parks. BC Hydro does not delineate manufactured home parks from mobile home parks.

Please refer to BC Hydro's response to MHPOABC IR 2.4.1 which indicates that all manufactured home parks serviced by a single meter are billed under General Service rates. Similarly, General Service rates are applicable to electricity consumption of the common use areas of the park if the residential Dwellings are individually metered.

6.0 Reference: BC Hydro Response to MHPOABC IR 1.2.C

MHPOABC IR 1.2.C stated in part:

> "Manufactured Home Parks are neither residential nor commercial/strata relative to BC Hydro's RS 1755 Customer Types by Group (Ref. Table 12, page 45) ... these parks, while private property, provide affordable housing for an estimated 60,000 BC households."

BC Hydro's response to MHPOABC IR 1.2.C reads in part:

> "In Table 12 of BC Hydro's Application, RS 1755 lighting in manufactured home parks could be included within either Residential or Commercial/Strata depending on the rate the park is billed under."

2.6.1 Please provide details of the Residential and Commercial/Strata rate classes, including the criteria used by BC Hydro to determine the rate class into which a manufactured home community would be placed.

RESPONSE:

Multi-unit residential developments serviced under a single meter are billed under Residential Service rates. If Dwellings are individually metered, the customer may elect to receive service for common areas of the development under either Residential Service or General Service.

Commercial or mixed-used developments are billed under General Service rates. Individual residential Dwellings within a mixed-use development are billed under Residential Service rates when individually metered.

Where General Service rates are applicable, the specific rate schedule depends on the consumption and demand characteristics of the premises.

Mobile home parks are defined as General Services under the Electric Tariff. Please refer to BC Hydro's response to MHPOABC IR 2.4.1 which describes the rate schedules applicable to mobile home parks, as well as the eligibility criteria for Small General Service, Medium General Service and Large General Service rates.

7.0 Reference: BC Hydro Response to MHPOABC IR 1.2.C and 1.2.G

There are approximately 900 manufactured home communities in BC, providing affordable housing to an estimated 60,000 households. MHCs constitute a meaningful number of accounts for BC Hydro; however, they are "force-fit" into one of two categories (residential or commercial/strata), neither of which reflect their unique nature. An MHC BC Hydro account covers the supply of hydro services to the infrastructure of the MHC, not the homes. Stated otherwise, the provision of hydro to the MHC infrastructure is one of the services provided to home owners, similar to snow removal, landscaping of common areas, garbage/recycling services, etc. Thus, MHCs are neither residential nor commercial/strata entities.

2.7.1 Given these facts and their unique nature, please explain why manufactured home communities are not in a separate rate class.

RESPONSE:

The determination of BC Hydro's rate classes is made though regulatory proceedings, subject to BCUC approval. BC Hydro's current rate classes have most recently been approved by Commission Order Nos. G-47-16 and G-110-10.

The determination of rate classes is based on the electricity load characteristics that impact BC Hydro's costs of providing service. For example, the transmission service rate class does not make use of BC Hydro's distribution system, therefore distribution related costs should not be allocated to transmission service customers, and a separate rate class is justifiable. Likewise, BC Hydro owned street lighting customers make use of BC Hydro owned lighting equipment, therefore costs of such equipment should be allocated to BC Hydro owned street light customers, and a separate rate class is justifiable.

While BC Hydro acknowledges that manufactured home communities are unique from other types of housing in a number of respects including affordability and the services provided to homeowners, it isn't immediately apparent that they are unique in terms of electrical load characteristics that impact BC Hydro's cost of service. However, we are open to considering the issue as part of a future cost of service proceeding. We note that the determination of rate classes is outside the scope of the Street Lighting Rates Application.

7.0 Reference: BC Hydro Response to MHPOABC IR 1.2.C and 1.2.G

There are approximately 900 manufactured home communities in BC, providing affordable housing to an estimated 60,000 households. MHCs constitute a meaningful number of accounts for BC Hydro; however, they are "force-fit" into one of two categories (residential or commercial/strata), neither of which reflect their unique nature. An MHC BC Hydro account covers the supply of hydro services to the infrastructure of the MHC, not the homes. Stated otherwise, the provision of hydro to the MHC infrastructure is one of the services provided to home owners, similar to snow removal, landscaping of common areas, garbage/recycling services, etc. Thus, MHCs are neither residential nor commercial/strata entities.

2.7.2 Please describe the pros and cons of establishing a manufactured home community rate class.

RESPONSE:

Generally, the creation of a separate rate class can influence the outcomes of rate rebalancing and rate design applications. However, as BC Hydro has no plans to make an application for rate rebalancing, the only impact of a separate rate class for manufactured home communities would be in respect of rate design.

BC Hydro is unable to assess the pros and cons of establishing a manufactured home community rate class absent extensive analysis of the electrical load characteristics and cost of service to such customers. If such customers have unique electrical load characteristic and cost of service, then a new rate design may be warranted, as it is a longstanding and widely accepted principle that electricity rate design should reflect the utility's cost of service. Extensive analysis would be required to assess whether a unique rate design is justified and what its pricing might be.

BC Hydro notes that the determination of BC Hydro rate classes goes beyond the scope the of the Street Lighting Rates Application. However, we do commit to inviting MHPOABC to any upcoming rate design engagement and consultation sessions that BC Hydro will host in respect of future rate design that could impact manufactured home communities.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

On page 4 of Appendix B to BC Hydro's 2020 Street Lighting Rate Application ("Application"), BC Hydro provides proposed revisions to the Rate Schedule 1701 ("RS 1701") Tariff Sheet. The proposed changes to Special Condition 4, "Fixture Removal", are shown below:

4. Fixture Removal

~~When, at the Customer's request, a new fixture replaces an existing fixture, t~~The Customer will pay to BC Hydro the original cost of the existing fixture~~,~~ less any accumulated depreciation, and the cost incurred by BC Hydro in ~~of~~ removing the existing fixture under the following circumstances:

(a) When the lighting fixture is removed, or removed and replaced with another lighting fixture, at the request of the Customer; or

(b) When BC Hydro has exercised its rights to Terminate Service because the Customer fails to comply with the Electric Tariff and/or Service Agreement, and BC Hydro elects to remove the lighting fixtures.

This Special Condition is not applicable when the request to remove or replace a light fixture is made by a Customer within one year of taking Service at a Premises at which lighting service is illuminating private property and was already provided under RS 1701, or when BC Hydro terminates RS 1701 Service in accordance with Special Condition No. 8.

2.1.1 Please confirm if the City's obligations to pay (as described in Special Condition #4) are distinguishable from its obligation with respect to payment of the Early Removal Fee (or if both refer to the same thing).

RESPONSE:

BC Hydro confirms the proposed obligations described under Special Condition No. 4 represent the Early Removal Fee.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
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2.1.1.1 Would the Early Removal Fee be applied differently in any of the following circumstances:

2.1.1.1.1 when a streetlight is removed entirely from a pole;

RESPONSE:

This response also answers SURREY IRs 2.1.1.1.2 and 2.1.1.1.3 which includes responses to SURREY IRs 2.1.1.1.3.1 and 2.1.1.1.3.2.

The proposed Early Removal Fee is intended to recover the incremental costs resulting from a customer's request to remove a street light prior to its full depreciation, which includes the undepreciated value of the removed street light and the labour for removal. The situations in which the Early Removal Fee applies depend on whether the customer's request results in incremental costs to BC Hydro.

If a customer requests a street light to be removed early, whether it is replaced with a new luminaire or not, an Early Removal Fee will apply.

In addition, there is no cost to install a new street light to replace the old one as the installation cost is included in the RS 1701 monthly charge.

In cases where a customer will use the existing fixture, such as in the case of a requested redirection or relocation, then Special Condition No. 5 will apply and the customer will pay the full cost of relocating or redirecting fixtures, but will not be charged an Early Removal Fee.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
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4. Fixture Removal

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(a) When the lighting fixture is removed, or removed and replaced with another lighting fixture, at the request of the Customer; or

(b) When BC Hydro has exercised its rights to Terminate Service because the Customer fails to comply with the Electric Tariff and/or Service Agreement, and BC Hydro elects to remove the lighting fixtures.

This Special Condition is not applicable when the request to remove or replace a light fixture is made by a Customer within one year of taking Service at a Premises at which lighting service is illuminating private property and was already provided under RS 1701, or when BC Hydro terminates RS 1701 Service in accordance with Special Condition No. 8.

2.1.1.1 Would the Early Removal Fee be applied differently in any of the following circumstances:

2.1.1.1.2 when a fixture is being replaced at the request of the Customer (e.g. for a brighter or dimmer light);

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.1.1.1.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
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4. Fixture Removal

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(a) When the lighting fixture is removed, or removed and replaced with another lighting fixture, at the request of the Customer; or

(b) When BC Hydro has exercised its rights to Terminate Service because the Customer fails to comply with the Electric Tariff and/or Service Agreement, and BC Hydro elects to remove the lighting fixtures.

This Special Condition is not applicable when the request to remove or replace a light fixture is made by a Customer within one year of taking Service at a Premises at which lighting service is illuminating private property and was already provided under RS 1701, or when BC Hydro terminates RS 1701 Service in accordance with Special Condition No. 8.

2.1.1.1 Would the Early Removal Fee be applied differently in any of the following circumstances:

2.1.1.1.3 when a streetlight is being modified (e.g. the streetlight arm is extended); and

2.1.1.1.3.1 a fixture is being replaced at the request of the Customer; as opposed to when

2.1.1.1.3.2 the fixture remains the same?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.1.1.1.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
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4. Fixture Removal

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(a) When the lighting fixture is removed, or removed and replaced with another lighting fixture, at the request of the Customer; or

(b) When BC Hydro has exercised its rights to Terminate Service because the Customer fails to comply with the Electric Tariff and/or Service Agreement, and BC Hydro elects to remove the lighting fixtures.

This Special Condition is not applicable when the request to remove or replace a light fixture is made by a Customer within one year of taking Service at a Premises at which lighting service is illuminating private property and was already provided under RS 1701, or when BC Hydro terminates RS 1701 Service in accordance with Special Condition No. 8.

2.1.2 Please confirm if, other than the situations described in Special Condition 4 (Fixture Removal), if there will be any circumstance, or after any period before the 20 year asset service life, where an RS 1701 customer will not be required to pay an Early Removal Fee.

RESPONSE:

This response also addresses SURREY IRs 2.1.3 and 2.1.3.1.

A customer is not required to pay an Early Removal Fee for street lights that are replaced due to failure to operate under proposed new Special Condition 7 or are removed due to BC Hydro terminating the service under proposed new Special Condition 8.

If a customer requests to remove a street light after the light is fully depreciated (e.g., 20 years for LED street lights), the proposed new Special Condition 4 states the customer will pay the following:

(a) Original cost of the existing fixture, less any accumulated depreciation

- **If the fixture is fully depreciated, the customer will pay $0.**

(b) The cost incurred by BC Hydro of removing the existing fixture

- **The labour costs to remove the fixture. Please refer to BC Hydro's response to SURREY IR 2.1.5 for the estimated labour costs of removal.**

Please also refer to BC Hydro's response to BCUC IR 2.20.5.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

In BC Hydro's Response to Intervener Information Request No. 1 ("Intervener Response No. 1") to City of Surrey Information Request ("IR") No. 1.3.1, BC Hydro confirms that:

> "The cost of the street light (including luminaire, photocell, arm etc.) is depreciated over the expected life of the components and the depreciation amount is included in the calculation of the RS 1701 rate over a 20-year period."

In BC Hydro's Intervener Response No. 1 to BCSEA IR 1.5.1, BC Hydro confirms that:

> "The Early Removal Fee will be based on the total value of the street light less the depreciated portion based on the duration of the service, plus the removal labour cost."

2.1.3 If an RS 1701 customer requests the removal of a Light Emitting Diode ("LED") streetlight in its twenty-first year of operation, after the total value of the streetlight has been recovered by BC Hydro, but prior to the replacement of the LED fixture with a new one, will BC Hydro charge an Early Removal Fee?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.1.2.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
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Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

In BC Hydro's Response to Intervener Information Request No. 1 ("Intervener Response No. 1") to City of Surrey Information Request ("IR") No. 1.3.1, BC Hydro confirms that:

> "The cost of the street light (including luminaire, photocell, arm etc.) is depreciated over the expected life of the components and the depreciation amount is included in the calculation of the RS 1701 rate over a 20-year period."

In BC Hydro's Intervener Response No. 1 to BCSEA IR 1.5.1, BC Hydro confirms that:

> "The Early Removal Fee will be based on the total value of the street light less the depreciated portion based on the duration of the service, plus the removal labour cost."

2.1.3 If an RS 1701 customer requests the removal of a Light Emitting Diode ("LED") streetlight in its twenty-first year of operation, after the total value of the streetlight has been recovered by BC Hydro, but prior to the replacement of the LED fixture with a new one, will BC Hydro charge an Early Removal Fee?

2.1.3.1 If "yes", please explain how the Early Removal Fee will be calculated. Will it include any depreciation cost in addition to the removal labour cost?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.1.2.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

Special Condition 7, "Term of Service Agreement", is deleted in its entirety and is replaced with a new Special Condition 8, "Termination of Service".

The current Special Condition 7, "Term of Service Agreement", provides for a five-year service agreement commitment by the customer. The term of service is renewable for periods of five years. The proposed changes are shown below.

~~7.~~8. ~~Term of Service Agreement~~Termination of Service

~~The term of the initial Service Agreement under this Rate Schedule will be not more than five years; renewal periods will be for five years.~~

BC Hydro may terminate service under this Rate Schedule 1701 at any time in its sole discretion so long as it provides a minimum of 24 months' notification to Customer.

On page 4 of Appendix B to the BC Hydro Application, the RS 1701 rate for a 150 watt H.P. sodium vapour ("HPS") unit is $23.14 per fixture, per month, as shown below:

Rate	Per fixture per month as set out below:	
	50 watt or less LED unit	$15.08
	51 to 80 watt LED unit	$18.77
	81 to 120 watt LED unit	$23.50
	greater than 120 watt LED unit	$27.57
	*100 watt H.P. sodium vapour unit	$19.40
	*150 watt H.P. sodium vapour unit	$23.14
	*200 watt H.P. sodium vapour unit	$26.72

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.3.2, BC Hydro confirmed that the depreciation cost is $40.26 per year as shown below:

Item	Amount
Average Fixture cost	**$852.06**
Depreciation cost	**$40.26/ year**
Depreciation **Luminaires, photocell** **Arms**	 **20 years** **40 years**

In BC Hydro's Response to BCUC Information Requestion No. 1 ("BCUC Response No. 1"), Attachment 1 to IR 1.9.2 provides BC Hydro's calculation for LED replacement costs as shown below. Cell reference "C27" contains the text "Installation - LBR" and the value "153.76" is provided in the same row of data.

	A	B	C	D	E	F	G	H	I
22	21	II	**LED REPLACEMENT COSTS**		Average	<51 W	51 - 80 W	81 - 120 W	>120 W
23	22		Luminaire Cost	$/Unit	212.47	127.85	172.79	272.85	272.85
24	23		PH-Cell	$/Unit	18.75	18.75	18.75	18.75	18.75
25	24		ACA pole remediation (chemical treatment/repairs)	$/Unit	44.44	44.44	44.44	44.44	44.44
26	25		Arm replacements Incl. LBR	$/Unit	2.85	2.85	2.85	2.85	2.85
27	26		Installation - LBR	$/Unit	153.76	153.76	153.76	153.76	153.76
28	27		Subtotal	$/Unit	432.26	347.65	392.59	492.65	492.65
29	28		Direct Costs Contingency	$/Unit	64.65	51.99	58.71	73.68	73.68
30	29		Indirect Costs (including contingency)	$/Unit	95.10	76.48	86.37	108.38	108.38
31	30		Subtotal	$/Unit	592.01	476.12	537.67	674.71	674.71
32	31		Inflation costs	$/Unit	28.23	22.71	25.64	32.18	32.18
33	32		Subtotal	$/Unit	620.24	498.83	563.31	706.88	706.88
34	33		Overhead (Distribution capital O/H)	$/Unit	73.27	58.93	66.54	83.50	83.50
35	34		Total Installed cost	$/Unit	693.51	557.76	629.86	790.39	790.39

City of Surrey understands that under the current RS 1701, Special Condition 7, if an RS 1701 customer requested that BC Hydro remove an HPS streetlight at the end of its sixth year of operation, that customer would be required to pay $23.14 per month for 4 years (48 months) to the end of the current 5-year term. This commitment charge would total $1,110.72 (not including applicable taxes).

2.1.4 Please provide further clarification and corrected information if this calculated charge of $1,110.72 (not including applicable taxes) is incorrect.

RESPONSE:

BC Hydro confirms that the calculated charge of $1,110.72 is incorrect. Please refer to BC Hydro's response to SURREY IR 2.1.5 for an illustrative calculation of the Early Removal Fee.

Currently, RS 1701 customers sign the Overhead Street Lighting Service Agreement (Agreement) when it first takes service under RS 1701. Prior to the introduction of the Street Light Information Management (SLIM) system any subsequent additions, modifications and removals were undated in Appendix A of the Agreement. After SLIM was introduced, customer street light change requests are submitted through SLIM and Appendix A is no longer updated.

Please refer to section 5.4.3 of the Application and BC Hydro's response to BCUC IR 1.5.8 where BC Hydro explained this Special Condition is obsolete in practice because BC Hydro does not have complete records of all RS 1701 customers' agreement anniversary dates.

In BC Hydro's view, when a customer requests to remove a street light prior to its full depreciation, the Early Removal Fee shall apply to recover BC Hydro's incremental costs. The customer is not required to fulfill the monthly fee for the remaining term of the service agreement for a light that has been removed.

The proposed new Special Condition 8 Termination of Service provides BC Hydro the discretion to terminate the RS 1701 service when it can no longer practically continue the RS 1701 service at certain locations, e.g., a relocation or alteration of a pole or the distribution system in an area goes underground. Under the proposed new Special Condition 8, Customers will be provided with a minimum of 24-month notification to seek alternative lighting.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

If an RS 1701 customer requests that BC Hydro remove an LED streetlight at the end of its sixth year of operation, that customer would be required to pay $40.26 per year for 14 years ($563.64) plus the labour cost to remove the streetlight. If the labour cost is estimated to be equivalent to the installation cost, this would be $153.76. Therefore, the estimated Early Removal Fee calculation is $717.40 (not including applicable taxes).

2.1.5 Does $153.76 equate to BC Hydro's expected Early Removal Fee labour cost per fixture?

RESPONSE:

This response also addresses SURREY IRs 2.1.5.1, 2.1.6 and 2.1.7.1.

No. The $153.76 labour value is the average program cost for the proactive replacement of a single fixture which relies on cost savings achieved by the volume of replacements being done during the provincial LED replacement deployment.

The cost to remove a street light after the Replacement Program is approximately $400 to $600, and this does not include the undepreciated value of the street light. When a customer requests the early removal of a single fixture, the fee estimated at the time of request takes into consideration the labour to remove the LED street light in addition to the crew's travel and setup time, vehicle costs, and overhead costs such as design and office administration costs.

Using the above removal costs, as well as approximate depreciations costs that were included in BC Hydro's response to SURREY IR 1.3.2, the estimated Early Removal Fee for this scenario would be calculated as follows:

Depreciation	**$40.26 x 6 years =**	**$241.56**
Original Installed cost less Depreciation:	**$852.06 - $241.56 =**	**$610.50**
Cost incurred to remove fixture		**$400 to $600**
Total Cost		**$1,010.50 to $1,210.50**

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

If an RS 1701 customer requests that BC Hydro remove an LED streetlight at the end of its sixth year of operation, that customer would be required to pay $40.26 per year for 14 years ($563.64) plus the labour cost to remove the streetlight. If the labour cost is estimated to be equivalent to the installation cost, this would be $153.76. Therefore, the estimated Early Removal Fee calculation is $717.40 (not including applicable taxes).

2.1.5 Does $153.76 equate to BC Hydro's expected Early Removal Fee labour cost per fixture?

2.1.5.1 If "no", please provide BC Hydro's expected Early Removal Fee labour cost per fixture and explain what accounts for the difference.

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.1.5.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

If an RS 1701 customer requests that BC Hydro remove an LED streetlight at the end of its sixth year of operation, that customer would be required to pay $40.26 per year for 14 years ($563.64) plus the labour cost to remove the streetlight. If the labour cost is estimated to be equivalent to the installation cost, this would be $153.76. Therefore, the estimated Early Removal Fee calculation is $717.40 (not including applicable taxes).

2.1.6 Please provide further clarification and corrected information if this calculated charge of $717.40 (not including applicable taxes) is incorrect.

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.1.5.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

If an RS 1701 customer requests that BC Hydro remove an LED streetlight at the end of its sixth year of operation, that customer would be required to pay $40.26 per year for 14 years ($563.64) plus the labour cost to remove the streetlight. If the labour cost is estimated to be equivalent to the installation cost, this would be $153.76. Therefore, the estimated Early Removal Fee calculation is $717.40 (not including applicable taxes).

2.1.7 Is the assessment (in questions 1.4 and 1.6) of the current RS 1701 renewable 5-year term obligations (resulting in $1,110.72) and the proposed Early Removal Fee (resulting in $717.40) correct?

RESPONSE:

No. Please refer to BC Hydro's response to SURREY IR 2.1.4 for an explanation of the application of the Early Removal Fee and termination of service.

1.0 A. RATE DESIGN

Reference: Exhibit B (Application), BC Hydro's Draft Orders, Appendix B, pp. 1 and 4 {PDF pp. 81, 82, and 84/363};
Exhibit B-5, (BC Hydro Response to Intervener Information Request No. 1), BC Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.1, p. 2 {PDF p. 253/525};
Exhibit B-5 (BC Hydro Response to Intervener Information Request No. 1), City of Surrey, Information Request No. 1.3.1, p. 1, and 1.3.2, p 1. {PDF pp. 381, 386/525}; and
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.9.2, Attachment 1 {PDF p. 170/382}.

If an RS 1701 customer requests that BC Hydro remove an LED streetlight at the end of its sixth year of operation, that customer would be required to pay $40.26 per year for 14 years ($563.64) plus the labour cost to remove the streetlight. If the labour cost is estimated to be equivalent to the installation cost, this would be $153.76. Therefore, the estimated Early Removal Fee calculation is $717.40 (not including applicable taxes).

2.1.7 Is the assessment (in questions 1.4 and 1.6) of the current RS 1701 renewable 5-year term obligations (resulting in $1,110.72) and the proposed Early Removal Fee (resulting in $717.40) correct?

2.1.7.1 If "no", please provide a corrected comparison scenario.

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.1.5.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.3.1.1.2, BC Hydro states:

> "Further, in general once an asset is fully depreciated BC Hydro considers it as requiring replacement."

BC Hydro in response to BCSEA IR No. 1.5.8 also states:

> "If an LED fixture continues to operate after the period over which the costs have been depreciated, that asset could continue to be used by BC Hydro to provide street lighting service. However, in general BC Hydro considers the assets to be due for replacement once the costs have been fully depreciated."

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.4.2, BC Hydro states:

> "Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014…"

In BC Hydro's BCUC Response No. 1 to BCUC IR No. 1.8.9, BC Hydro states:

> "Beyond fiscal 2040, the LED luminaires would be expected to have higher failure rates requiring replacement and BC Hydro does not have information on whether these assets would be replaced as breakage occurs or through a mass replacement program."

2.2.1 Does BC Hydro intend to reinstate a planned maintenance (proactive group re-lamping) to replace the streetlight components after the end of their service life which is understood to be within its twenty-first year of operation?

RESPONSE:

The maintenance strategy after the first 20 years of operation has not yet been determines and will depend on several factors that are not known at this time, including:

- **The actual failure rates and performance of the LED luminaires at that time. If the luminaires remain reliable and light output continues to meet the requirements committed by BC Hydro to its customers at time of conversion, BC Hydro may continue to operate the lights indefinitely. Failed units would be replaced reactively with newer technology units subject to efficiency, cost effectiveness and impact on customer bills. Over time, the original LED luminaires will slowly transition to the newer technologies as they fail; and**
- **New and developing technologies. After 20 years, newer technologies could result in even more reliable and lower operating cost units with other added benefits unknown at this time. Operating benefits and new demand from its customer base may compel BC Hydro to convert the entire fleet at some point to this newer technology to the benefit of BC Hydro and its street light customers.**

Regardless of the developments of newer technologies, BC Hydro will continually monitor the performance of the original LED units and adjust the maintenance strategy as required to ensure the assets remain reliable and provide the performance expected from them by customers.

It is unlikely that individual components within each original LED luminaire will be replaced after 20 years of operation as parts may no longer be available from the manufacturers and the reliability or condition of other parts not replaced during such activities could result in an unreliable luminaire in the field.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.3.1.1.2, BC Hydro states:

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BC Hydro in response to BCSEA IR No. 1.5.8 also states:

> "If an LED fixture continues to operate after the period over which the costs have been depreciated, that asset could continue to be used by BC Hydro to provide street lighting service. However, in general BC Hydro considers the assets to be due for replacement once the costs have been fully depreciated."

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.4.2, BC Hydro states:

> "Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014…"

In BC Hydro's BCUC Response No. 1 to BCUC IR No. 1.8.9, BC Hydro states:

> "Beyond fiscal 2040, the LED luminaires would be expected to have higher failure rates requiring replacement and BC Hydro does not have information on whether these assets would be replaced as breakage occurs or through a mass replacement program."

2.2.1 Does BC Hydro intend to reinstate a planned maintenance (proactive group re-lamping) to replace the streetlight components after the end of their service life which is understood to be within its twenty-first year of operation?

2.2.1.1 If “yes”, please describe the program that BC Hydro intends to implement to replace streetlight components after the end of their service life.

RESPONSE:

Please refer to BC Hydro’s response to SURREY IR 2.2.1.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

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> "If an LED fixture continues to operate after the period over which the costs have been depreciated, that asset could continue to be used by BC Hydro to provide street lighting service. However, in general BC Hydro considers the assets to be due for replacement once the costs have been fully depreciated."

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.4.2, BC Hydro states:

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In BC Hydro's BCUC Response No. 1 to BCUC IR No. 1.8.9, BC Hydro states:

> "Beyond fiscal 2040, the LED luminaires would be expected to have higher failure rates requiring replacement and BC Hydro does not have information on whether these assets would be replaced as breakage occurs or through a mass replacement program."

2.2.1 Does BC Hydro intend to reinstate a planned maintenance (proactive group re-lamping) to replace the streetlight components after the end of their service life which is understood to be within its twenty-first year of operation?

2.2.1.2 If “yes”, please also describe the anticipated timing for implementation of the program.

RESPONSE:

Please refer to BC Hydro response to SURREY IR 2.2.1.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

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> "Beyond fiscal 2040, the LED luminaires would be expected to have higher failure rates requiring replacement and BC Hydro does not have information on whether these assets would be replaced as breakage occurs or through a mass replacement program."

2.2.2 If, according to BC Hydro's Intervener Response No. 1 to BCSEA IR No. 1.5.8, BC Hydro elects to continue operating streetlight fixtures after their 20 year depreciation period, will BC Hydro credit the RS 1701 customer for subsequent payments that are

attributable to the depreciation cost in excess of the streetlight's value?

RESPONSE:

BC Hydro will not credit the RS 1701 customer for subsequent payments that are attributable to the depreciation cost.

RS 1701 Customers do not own the street lights and BC Hydro offers Service under RS 1701 as an alternative to customers installing their own street lights and taking service under RS 1702. The rates for service under RS 1701 are calculated over a 20-year period; however, assets will continue to be removed, installed or replaced at all times throughout this period.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

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2.2.2 If, according to BC Hydro's Intervener Response No. 1 to BCSEA IR No. 1.5.8, BC Hydro elects to continue operating streetlight fixtures after their 20 year depreciation period, will BC Hydro credit the RS 1701 customer for subsequent payments that are

attributable to the depreciation cost in excess of the streetlight's value?

2.2.2.1 If "no", what is the rationale for retaining any portion of payments that are attributable to the value of the streetlight, once the full value of the streetlight has already been recovered by BC Hydro?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.2.2.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3 Please describe the relationship, if any, between events or activities attributable to the RS 1701 customer, events or activities attributable to BC Hydro, and *force majeure* events, which lead to damage of the RS 1701 streetlight, and the term "breakage" used in Special Condition No. 7 of RS 1701.

RESPONSE:

BC Hydro would expect the customer to pay for repairs where the customer's activities or the activities of its residents result in breakage or damage to street lights. In the case of force majeure events, responsibilities for repair costs would depend on the nature of the events and whether they would be attributable to the customer. In the case of damage attributed to BC Hydro, BC Hydro would not be pursuing customers to cover breakage of street lights.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.1 Would theft of all or any portion of a streetlight be considered a form of "breakage" that BC Hydro will require RS 1701 customers to pay for?

RESPONSE:

Yes, a theft of all or any portion of a streetlight is considered a form of "breakage" as it is not considered an inherent defect or malfunction.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.2 Would damage due to force of nature, including by extraordinary precipitation or wind, be defined as "breakage" that BC Hydro will require RS 1701 customers to pay for repairs?

RESPONSE:

No, damage due to force of nature, including by extraordinary precipitation or wind, would not be defined as "breakage" that BC Hydro will require RS 1701 customers to pay for repairs.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.3 Would damage from a motor vehicle collision be defined as "breakage" that BC Hydro will require RS 1701 customers to pay for repairs?

RESPONSE:

No, damage from a motor vehicle collision would not be defined as "breakage" that BC Hydro would require RS 1701 customers to pay for.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.3 Would damage from a motor vehicle collision be defined as "breakage" that BC Hydro will require RS 1701 customers to pay for repairs?

2.2.3.3.1 If "yes", will BC Hydro also make a claim for compensation from the Insurance Corporation of British Columbia ("ICBC") for damage repairs?
2.2.3.3.1.1 If "no", please explain why not.

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.2.3.3 which indicates damage from a motor vehicle collision is not damage that BC Hydro would require RS 1701 customer to pay for.

BC Hydro makes claims for compensation from ICBC where its equipment, including electrical equipment, is damaged through motor vehicle accidents.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.4 If a contractor is working for the RS 1701 customer, and causes damage to the BC Hydro streetlight, would this be considered "breakage" that BC Hydro would require RS 1701 customers to pay for repairs?

RESPONSE:

If the contractor is working for the RS 1701 customer and this contractor causes the damage, this would be considered breakage and BC Hydro would require RS 1701 the customer to pay for repairs.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.5 If a contractor is working for a different person or entity within the geographic boundaries of the RS 1701 customer, and causes damage to the BC Hydro streetlight, would this be considered "breakage" that BC Hydro would require RS 1701 customers to pay for repairing?

RESPONSE:

Yes, damage caused to a BC Hydro streetlight by a contractor working for a different person or entity, other than for BC Hydro, within the geographic boundaries of the RS 1701 customer would be considered breakage and the RS 1701 customer would be required to pay for the repair. However, if the party responsible for the damage was identified and BC Hydro was successful in recovering the costs of repairs, BC Hydro would refund these breakage costs to the street light customer.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.6 If irregular transmission of electrical power supplied by BC Hydro, including power surges, causes a streetlight to fail, would this be considered "breakage" that BC Hydro would require RS 1701 customers to pay for repairs?

RESPONSE:

No, if irregular transmission of electrical power supplied by BC Hydro, including power surges, causes a streetlight to fail, this would not be considered "breakage" that BC Hydro would require RS 1701 customers to pay for repairs.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In response to City of Surrey IR No. 1.3.1.1.3 BC Hydro states:

> "Per Special Condition No. 7 of RS 1701, BC Hydro will, without charge, replace lamps street lights or components that fail to operate, unless breakage is the reason for such failure in which case the Customer will be charged the cost of the material required to make the fixture operate. Vandalism would be considered to be "breakage", but malfunction would not."

2.2.3.6.1 If damage is caused to a streetlight in any other manner by BC Hydro, would this be considered "breakage" that BC Hydro would require RS 1701 customers to pay for repairing?

RESPONSE:

No, if damage to the street light is caused by BC Hydro, this would not be considered breakage and BC Hydro would not require RS 1701 customers to pay for these repairs.

2.0 B. ASSET OWNERSHIP

Reference: Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request 1.8.9, {PDF p. 157/382}; Exhibit B-5 (BC Hydro Response No. 1) to City of Surrey, Information Request No. 1.3.1.1.2, p. 1 {PDF p. 384/525}; No. 1.4.2, p. 1 {PDF p. 393/525}; No. 1.3.1.1.3, p. 1 {PDF p. 385/525}; No. 1.3.1.1.1, p. 1 {PDF p. 383/525}; No. 1.3.2, p. 1 {PDF p. 386/525}; and to British Columbia Sustainable Energy Association ("BCSEA"), Information Request No. 1.5.8, pp. 1-2 {PDF pp. 267-268/525}; No. 1.5.1, pp. 1-3 {PDF pp. 252-254/525}.

In BC Hydro's Intervener Response No. 1 to BCSEA IR 1.5.1, BC Hydro confirms that it retains ownership of the streetlights when it states "BC Hydro also cannot transfer the removed street lights to RS 1701 customers." In BC Hydro's Intervener Response No. 1 to City of Surrey IR 1.3.1.1.1 BC Hydro also confirms that is continues to own the streetlight fixture asset after the full cost of the equipment is recovered by BC Hydro.

2.2.4 Please explain BC Hydro's rationale if it believes that it is appropriate for the cost of "breakage" to be paid by the RS 1701 customer, rather than the asset owner, BC Hydro, when such breakage is beyond the RS 1701 customer's ability to avert and influence?

RESPONSE:

A street light that fails to operate due to an inherent defect or malfunction will be the responsibility of BC Hydro to repair. Any "breakage" or missing street light is not considered a defect or malfunction but is a result of external factors. While BC Hydro acknowledges that a customer cannot control this type of breakage, it notes that BC Hydro cannot either. As a result, it is a question of risk allocation.

As noted by BC Hydro, this provision is already in BC Hydro's Electric Tariff and no material changes are being requested to this provision in this application. However, BC Hydro's perspective is that BC Hydro installs street lights at a customer's request and in the locations specified by the customer. Therefore, BC Hydro has determined that it is a customer's responsibility to take reasonable care to protect the light and to pay for the cost of any broken, missing or damaged streetlight.

3.0 C. MAINTENANCE COSTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to City of Surrey, Information Request No. 1.4.2, p. 2 {PDF p. 393/525}; No. 1.4.5, p. 1 {PDF p. 401/525}; Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request No. 1.9.2, Attachment 1 {PDF p. 170/382}; and Exhibit B-1 (Application), Section 5.2.1, p. 27 {PDF p. 33/363}.

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.4.2, BC Hydro states:

> "Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014…"

In BC Hydro's BCUC Response No. 1 to BCUC IR No. 1, Attachment 1 to IR 1.9.2 provides BC Hydro's calculation of maintenance costs as shown below. Cell reference "C48" contains the text "LED Spot Failure Replacement Costs (includes 12% overhead) and washing".

	A	B	C	D	E	F	G	H	I
48	47		**Maintenance Costs:**						
49	48		LED Spot Failure Replacement Costs (includes 12% overhead) and washing	$/Unit/Yr	6.10	6.10	6.10	6.10	6.10
50	49		Total Maintenance Cost	$/Unit/Yr	6.10	6.10	6.10	6.10	6.10
51	50		Total Cost Excluding Electricity	$/Unit/Yr	46.79	40.01	43.61	51.64	51.64
52	51		Total Annual Maintenance Cost	$/yr	4,233,975	208,713	2,047,679	1,856,800	121,499

On page 27 of the Application, BC Hydro states the average value of maintenance savings "is estimated to be $1.2M per year."

2.3.1 Does the $1.2M per year average annual value of maintenance savings assume any planned maintenance being undertaken?

RESPONSE:

No, the maintenance savings that would have been spent would have covered only high pressure sodium spot repairs – failed units that usually require a lamp replacement and luminaire cleaning and/or the occasional replacement of street light components such as a failed luminaire, photocell or bracket (arm).

3.0 C. MAINTENANCE COSTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to City of Surrey, Information Request No. 1.4.2, p. 2 {PDF p. 393/525}; No. 1.4.5, p. 1 {PDF p. 401/525}; Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request No. 1.9.2, Attachment 1 {PDF p. 170/382}; and Exhibit B-1 (Application), Section 5.2.1, p. 27 {PDF p. 33/363}.

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52	51		Total Annual Maintenance Cost	$/yr	4,233,975	208,713	2,047,679	1,856,800	121,499

On page 27 of the Application, BC Hydro states the average value of maintenance savings "is estimated to be $1.2M per year."

2.3.2 Will BC Hydro undertake planned maintenance of LED streetlight fixtures within the 20-year expected life cycle?

RESPONSE:

Yes, if the LED luminaires perform as expected, BC Hydro has planned for cleaning of units after 10 years of service. Given the expected low frequency of failures expected, the balance of maintenance will be reactive spot repairs as failures are reported to BC Hydro by its customers.

3.0 C. MAINTENANCE COSTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to City of Surrey, Information Request No. 1.4.2, p. 2 {PDF p. 393/525}; No. 1.4.5, p. 1 {PDF p. 401/525}; Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request No. 1.9.2, Attachment 1 {PDF p. 170/382}; and Exhibit B-1 (Application), Section 5.2.1, p. 27 {PDF p. 33/363}.

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On page 27 of the Application, BC Hydro states the average value of maintenance savings "is estimated to be $1.2M per year."

2.3.2 Will BC Hydro undertake planned maintenance of LED streetlight fixtures within the 20-year expected life cycle?

2.3.2.1 If "yes", please describe the frequency and planned maintenance activities BC Hydro intends to undertake.

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.3.2. The scheduled cleaning mentioned will be after 10 years of service.

3.0 C. MAINTENANCE COSTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to City of Surrey, Information Request No. 1.4.2, p. 2 {PDF p. 393/525}; No. 1.4.5, p. 1 {PDF p. 401/525}; Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request No. 1.9.2, Attachment 1 {PDF p. 170/382}; and Exhibit B-1 (Application), Section 5.2.1, p. 27 {PDF p. 33/363}.

In BC Hydro's Intervener Response No. 1 to City of Surrey IR No. 1.4.2, BC Hydro states:

> "Planned maintenance (proactive group re-lamping) was cancelled in fiscal 2014…"

In BC Hydro's BCUC Response No. 1 to BCUC IR No. 1, Attachment 1 to IR 1.9.2 provides BC Hydro's calculation of maintenance costs as shown below. Cell reference "C48" contains the text "LED Spot Failure Replacement Costs (includes 12% overhead) and washing".

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51	50		Total Cost Excluding Electricity	$/Unit/Yr	46.79	40.01	43.61	51.64	51.64
52	51		Total Annual Maintenance Cost	$/yr	4,233,975	208,713	2,047,679	1,856,800	121,499

On page 27 of the Application, BC Hydro states the average value of maintenance savings "is estimated to be $1.2M per year."

2.3.2 Will BC Hydro undertake planned maintenance of LED streetlight fixtures within the 20-year expected life cycle?

2.3.2.2 If "yes", is any proportion of the average value of maintenance savings, estimated to be $1.2M per year, attributable to the anticipated planned maintenance activities for LED streetlight fixtures?

RESPONSE:

As indicated in Table G-5 of Appendix G of the Application, the annual Maintenance Savings are reduced in years fiscal 2031 through fiscal 2033 to reflect the added expense of cleaning street lights proactively.

3.0 C. MAINTENANCE COSTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to City of Surrey, Information Request
No. 1.4.2, p. 2 {PDF p. 393/525};
No. 1.4.5, p. 1 {PDF p. 401/525};
Exhibit B-4 (BC Hydro Response to BCUC Information Request No. 1), Information Request
No. 1.9.2, Attachment 1 {PDF p. 170/382}; and
Exhibit B-1 (Application), Section 5.2.1, p. 27 {PDF p. 33/363}.

In BC Hydro Intervener Response No. 1 to City of Surrey IR No. 1.4.5, BC Hydro states:

> "BC Hydro's view is that the RS 1701 rates should be established on a permanent basis through the current proceeding, in the interest of rate stability, customer understanding and acceptance, and regulatory efficiency."

2.3.3 If the actual average maintenance savings is higher, or lower, than the $1.2M per year estimate, at what threshold(s) would BC Hydro take action to apply to change RS 1701? Are there any other actions that Hydro would consider?

RESPONSE:

BC Hydro's view is that the RS 1701 rates should be approved on a permanent basis through the current proceeding, for the reasons noted in the preamble to this information request.

BC Hydro does not have a maintenance cost threshold that would trigger an application to change RS 1701 pricing. While maintenance costs will vary from year to year, over the long run we expect the values used in the Application to be reasonable.

BC Hydro's periodic revenue requirements applications are the mechanism used to return any unplanned savings to, and to collect any unplanned costs from, BC Hydro ratepayers.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.14.3 regarding depreciation of investment related costs, BC Hydro states:

> "The depreciation of investment related costs on line 7 of Table G-6 also includes a small amount of $0.43/ unit/ year for Street Light Information Management (SLIM) sustainment costs."

2.4.1 Please describe BC Hydro's plans, if any, to upgrade the SLIM system user interface and functionality, in addition to simply sustainment, what those enhancements may be, and the planned timeline.

RESPONSE:

BC Hydro started to engage street lighting customers in 2018 to understand their experience, challenges and expectations of the street lighting service. Based on customer feedback received, we made a number of function and usability enhancements to the Street Light Information Management (SLIM) system including:

- **Added "Dimmable" services for RS 1702;**
- **Added RS 1703 to SLIM;**
- **Updated online form fields to improve usability;**
- **Updated all system notification emails to improve customer understanding;**
- **Added controls and additional messaging to improve the accuracy of information submitted to BC Hydro, e.g., description of the location of the street light;**
- **Added request completion notification emails;**
- **Added an additional free text field for customers to enter their own reference ID for convenience;**

- **Added additional email notification options for customers to manage notification recipients;**
- **Created a new opt-in daily report to show all street light repair requests submitted within a customer's boundaries; and**
- **Added LED street lights to support the Street Light Replacement Program.**

Some of the foundational technologies of SLIM are reaching end of life. BC Hydro has initiated a SLIM Technology Upgrade project which is expected to go live in early 2022. Most upgrades will be backend enhancements to reduce processing complexity, improve system efficiency and enhance cyber security protections. The main user interface enhancement will be replacing the outdated web map technology with an enhanced version which will have a larger map and clearer display of street lights.

As stated in BC Hydro's response to BCUC IR 1.14.2, in addition to system improvements, BC Hydro recognizes that some customers are not frequent SLIM users and may not be familiar with the system. A detailed step by step manual was developed and published in SLIM for customers to reference. Customers who do not prefer to self-serve can also email or call BC Hydro's Business Account Services team in the contact centre to submit their street light service requests. BC Hydro also created a new online form for citizens to submit street light repair requests directly to BC Hydro.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.6.1, Public Attachment 1, BC Hydro highlights key progress to date which includes "analyzed smart controller technologies."

2.4.2 Does BC Hydro plan to install smart street lighting controller technology?

RESPONSE:

This response also answers SURREY IRs 2.4.2, 2.4.2.1, 2.4.2.1.1, 2.4.3, 2.4.3.1, 2.4.3.1.1 and 2.4.3.1.2.

No, BC Hydro does not plan on installing, nor has is procured, smart street lighting technology (Adaptative Street Lighting Controls (ASLC)) as part of the Street Light Replacement Program.

BC Hydro has elected to proceed with basic photocells that have a 20-year design life. However, as noted in BC Hydro's response to BCUC IR 1.3.5 the luminaires procured by BC Hydro have the capacity to add an ASLC in the future.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.6.1, Public Attachment 1, BC Hydro highlights key progress to date which includes "analyzed smart controller technologies."

2.4.2 Does BC Hydro plan to install smart street lighting controller technology?

2.4.2.1 If "yes", please describe the planned schedule for deployment (including locations).

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.4.2.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.6.1, Public Attachment 1, BC Hydro highlights key progress to date which includes "analyzed smart controller technologies."

2.4.2.1.1 If BC Hydro has already procured the smart controller technology, which supplier will be providing the technology?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.4.2.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.6.1, Public Attachment 1, BC Hydro highlights key progress to date which includes "analyzed smart controller technologies."

2.4.3 Will BC Hydro be installing nodes compatible with the chosen streetlight fixture model's seven-pin ANSI C136.41 compliant socket?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.4.2.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.6.1, Public Attachment 1, BC Hydro highlights key progress to date which includes "analyzed smart controller technologies."

2.4.3 Will BC Hydro be installing nodes compatible with the chosen streetlight fixture model's seven-pin ANSI C136.41 compliant socket?

2.4.3.1 If "yes", is BC Hydro able to share the available data with RS 1701 customers through the smart controller technology platform?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.4.2.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.6.1, Public Attachment 1, BC Hydro highlights key progress to date which includes "analyzed smart controller technologies."

2.4.3.1 If "yes", is BC Hydro able to share the available data with RS 1701 customers through the smart controller technology platform?

2.4.3.1.1 If "yes", what actions (if any) would the RS 1701 customer have to perform before it is able to be able to ingest the data?

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.4.2.

4.0 D. FUTURE SYSTEM ENHANCEMENTS

Reference: Exhibit B-5 (BC Hydro Response No. 1), to British Columbia Old Age Pensioners' Organization et al. ("BCOAPO") Information Request
No. 1.14.3, p. 1 {PDF p. 205/525};
No. 1.6.1 Public Attachment 1, p. 11 {PDF p. 126/525}.

In BC Hydro's Intervener Response No. 1 to BCOAPO IR No. 1.6.1, Public Attachment 1, BC Hydro highlights key progress to date which includes "analyzed smart controller technologies."

2.4.3 Will BC Hydro be installing nodes compatible with the chosen streetlight fixture model's seven-pin ANSI C136.41 compliant socket?

2.4.3.1 If "yes", is BC Hydro able to share the available data with RS 1701 customers through the smart controller technology platform?

2.4.3.1.2 If "no", is BC Hydro able to share the available data, in whole or in part, with RS 1701 customers by another means?

2.4.3.1.2.1 If "yes", please describe how BC Hydro would share the available data with RS 1701 customers.

RESPONSE:

Please refer to BC Hydro's response to SURREY IR 2.4.2.

1.0 Reference: Application pages 13-14, Federal PCB Regulation, Response to BCOAPA IR 1.6.1, BC Hydro Business case

2.1.1 The Application states on page 14, lines 1-2 that testing of street lights would not be cost-effective. Please describe the process by which such testing would occur.

RESPONSE:

PCB testing of street light luminaire components would be destructive in nature and could not be completed in the field. Luminaires would have to be removed and sent to a facility for disassembly and testing. A replacement street light luminaire would need to be installed at the location in the field to ensure that lighting is provided to BC Hydro customers.

Verification of PCBs in street lights could also be completed by visiting each street light to determine/confirm the manufacture year of each unit, as BC Hydro does not have records that include this data. Lights found to be manufactured in 1982 or later would be deemed as PCB free while units manufactured before 1982 would be considered as containing PCBs and would be replaced with a new High Pressure Sodium (HPS) street light. BC Hydro studied this approach in the Street Light Replacement Program Business Case (Alternative 2) (refer to Attachment 1 to BC Hydro's response to BCOAPO IR 1.6.1) and determined that it was not a preferred option due to the cost of visiting every street light, the high ongoing costs of sustaining HPS street lights, and the desire of street light customers to have the lights converted to LEDs.

1.0 Reference: Application pages 13-14, Federal PCB Regulation, Response to BCOAPA IR 1.6.1, BC Hydro Business case

2.1.2 In concluding that the testing would not be cost effective, what steps did BC Hydro take to determine what the cost of such testing would be?

RESPONSE:

Please refer to BC Hydro's response to VERNON IR 2.1.1.

Because PCB testing would be destructive in nature and could not be conducted in the field, simple replacement of street lights with suspected PCBs with units that are PCB free would be most cost effective approach.

1.0 Reference: Application pages 13-14, Federal PCB Regulation, Response to BCOAPA IR 1.6.1, BC Hydro Business case

2.1.3 In concluding that the testing would not be cost effective, did BC Hydro undertake and sort of procurement process to determine potential cost or methodology of the testing?

RESPONSE:

Please refer to BC Hydro's response to VERNON IR 2.1.1. BC Hydro has not undertaken a procurement process to determine potential cost or methodology of the testing as this testing would be destructive in nature.

2.0 Reference: Application page 15, section 3.4, Jurisdiction Review

2.2.1 Please identify the hearings and/or orders from the other jurisdictions that are the basis for this part of the application.

RESPONSE:

BC Hydro did not review hearing decisions and orders to establish the Jurisdictional Review referenced in section 3.4, rather it reviewed rates published in the utilities' tariffs and/ or directly contacted representatives of the utilities.

3.0 Reference: Application page 20, lines 12-15; Appendix G, page 8, lines 8-9

2.3.1 Please identify the pricing information obtained from the multi-phase procurement process and multiple procurement events referenced on page 20.

RESPONSE:

The pricing information received from the procurements completed by BC Hydro included:

- **Prices for the supply of street lights and photocells: unit pricing for the different wattage/colour temperature LED street lights offered by BC Hydro as well as for the photocells; and**
- **Prices for installation services: unit pricing for the various field activities required for the Street Light Replacement Program, such as for the replacement of street lights and the replacement of arms.**

3.0 Reference: Application page 20, lines 12-15; Appendix G, page 8, lines 8-9

2.3.2 Please provide specifics of the "historical actual costs" used to estimate the Programs direct costs as referenced in Appendix G, page 8 and in Table G-4.

RESPONSE:

The labour unit cost used in estimating the direct labour costs is a blended unit cost of the external street light contractor unit cost and the internal BC Hydro resources unit cost. The external street light contractor unit cost is an average across all contractors supporting the Replacement Program and is based on multiple installation services procurement events. The internal BC Hydro resources unit cost is based on the historical actual HPS street lights spot repair labour unit cost.

4.0 Reference: Application page 28, lines 1-3

2.4.1 What is inflation rate assumed and explain basis for that assumption?

RESPONSE:

The inflation rate during fiscal 2021 to fiscal 2024 is assumed to be 2.1 per cent in fiscal 2021 and 2 per cent in fiscal 2022 to fiscal 2024 based the B.C. CPI outlook by fiscal year from the B.C. Budget of February 2019. The CPI after fiscal 2024 is assumed to be 2 per cent based on the BC Hydro forecast for capital projects.

5.0 Reference: Application p. 28, lines 24-26

2.5.1 Please produce copy of relevant IFRS standards referenced.

RESPONSE:

The relevant IFRS standard is provided as Attachment 1. The applicable paragraphs for the loss on retirement are paragraphs 67 and 68.

INTERNATIONAL ACCOUNTING STANDARD 16
property, plant and equipment

CONTENTS

Objective

1 The objective of this Standard is to prescribe the accounting treatment for property, plant and equipment so that users of the financial statements can discern information about an entity's investment in its property, plant and equipment and the changes in such investment. The principal issues in accounting for property, plant and equipment are the recognition of the assets, the determination of their carrying amounts and the depreciation charges and impairment losses to be recognised in relation to them.

Scope

2 This Standard shall be applied in accounting for property, plant and equipment except when another Standard requires or permits a different accounting treatment.

3 This Standard does not apply to:

(a) property, plant and equipment classified as held for sale in accordance with IFRS 5 *Non-current Assets Held for Sale and Discontinued Operations*.

(b) biological assets related to agricultural activity other than bearer plants (see IAS 41 *Agriculture*). This Standard applies to bearer plants but it does not apply to the produce on bearer plants.

(c) the recognition and measurement of exploration and evaluation assets (see IFRS 6 *Exploration for and Evaluation of Mineral Resources*).

(d) mineral rights and mineral reserves such as oil, natural gas and similar non-regenerative resources.

However, this Standard applies to property, plant and equipment used to develop or maintain the assets described in (b)–(d).

4 [Deleted]

5 An entity using the cost model for investment property in accordance with IAS 40 *Investment Property* shall use the cost model in this Standard for owned investment property.

Definitions

6 The following terms are used in this Standard with the meanings specified:

A *bearer plant* is a living plant that:

(a) is used in the production or supply of agricultural produce;

(b) is expected to bear produce for more than one period; and

(c) has a remote likelihood of being sold as agricultural produce, except for incidental scrap sales.

(Paragraphs 5A–5B of IAS 41 elaborate on this definition of a bearer plant.)

***Carrying amount* is the amount at which an asset is recognised after deducting any accumulated depreciation and accumulated impairment losses.**

***Cost* is the amount of cash or cash equivalents paid or the fair value of the other consideration given to acquire an asset at the time of its acquisition or construction or, where applicable, the amount attributed to that asset when initially recognised in accordance with the specific requirements of other IFRSs, eg IFRS 2 *Share-based Payment*.**

***Depreciable amount* is the cost of an asset, or other amount substituted for cost, less its residual value.**

***Depreciation* is the systematic allocation of the depreciable amount of an asset over its useful life.**

***Entity-specific value* is the present value of the cash flows an entity expects to arise from the continuing use of an asset and from its disposal at the end of its useful life or expects to incur when settling a liability.**

***Fair value* is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. (See IFRS 13 *Fair Value Measurement*.)**

An *impairment loss* is the amount by which the carrying amount of an asset exceeds its recoverable amount.

***Property, plant and equipment* are tangible items that:**

(a) are held for use in the production or supply of goods or services, for rental to others, or for administrative purposes; and

(b) are expected to be used during more than one period.

***Recoverable amount* is the higher of an asset's fair value less costs to sell and its value in use.**

The *residual value* of an asset is the estimated amount that an entity would currently obtain from disposal of the asset, after deducting the estimated costs of disposal, if the asset were already of the age and in the condition expected at the end of its useful life.

***Useful life* is:**

(a) the period over which an asset is expected to be available for use by an entity; or

(b) the number of production or similar units expected to be obtained from the asset by an entity.

Recognition

7 The cost of an item of property, plant and equipment shall be recognised as an asset if, and only if:

(a) it is probable that future economic benefits associated with the item will flow to the entity; and

(b) the cost of the item can be measured reliably.

8 Items such as spare parts, stand-by equipment and servicing equipment are recognised in accordance with this IFRS when they meet the definition of property, plant and equipment. Otherwise, such items are classified as inventory.

9 This Standard does not prescribe the unit of measure for recognition, ie what constitutes an item of property, plant and equipment. Thus, judgement is required in applying the recognition criteria to an entity's specific circumstances. It may be appropriate to aggregate individually insignificant items, such as moulds, tools and dies, and to apply the criteria to the aggregate value.

10 An entity evaluates under this recognition principle all its property, plant and equipment costs at the time they are incurred. These costs include costs incurred initially to acquire or construct an item of property, plant and equipment and costs incurred subsequently to add to, replace part of, or service it. The cost of an item of property, plant and equipment may include costs incurred relating to leases of assets that are used to construct, add to, replace part of or service an item of property, plant and equipment, such as depreciation of right-of-use assets.

Initial costs

11 Items of property, plant and equipment may be acquired for safety or environmental reasons. The acquisition of such property, plant and equipment, although not directly increasing the future economic benefits of any particular existing item of property, plant and equipment, may be necessary for an entity to obtain the future economic benefits from its other assets. Such items of property, plant and equipment qualify for recognition as assets because they enable an entity to derive future economic benefits from related assets in excess of what could be derived had those items not been acquired. For example, a chemical manufacturer may install new chemical handling processes to comply with environmental requirements for the production and storage of dangerous chemicals; related plant enhancements are recognised as an asset because without them the entity is unable to manufacture and sell chemicals. However, the resulting carrying amount of such an asset and related assets is reviewed for impairment in accordance with IAS 36 *Impairment of Assets*.

Subsequent costs

12 Under the recognition principle in paragraph 7, an entity does not recognise in the carrying amount of an item of property, plant and equipment the costs of the day-to-day servicing of the item. Rather, these costs are recognised in profit or loss as incurred. Costs of day-to-day servicing are primarily the costs of labour and consumables, and may include the cost of small parts. The purpose of these expenditures is often described as for the 'repairs and maintenance' of the item of property, plant and equipment.

13 Parts of some items of property, plant and equipment may require replacement at regular intervals. For example, a furnace may require relining after a specified number of hours of use, or aircraft interiors such as seats and galleys may require replacement several times during the life of the airframe. Items of property, plant and equipment may also be acquired to make a less frequently recurring replacement, such as replacing the interior walls of a building, or to make a nonrecurring replacement. Under the recognition principle in paragraph 7, an entity recognises in the carrying amount of an item of property, plant and equipment the cost of replacing part of such an item when that cost is incurred if the recognition criteria are met. The carrying amount of those parts that are replaced is derecognised in accordance with the derecognition provisions of this Standard (see paragraphs 67–72).

14 A condition of continuing to operate an item of property, plant and equipment (for example, an aircraft) may be performing regular major inspections for faults regardless of whether parts of the item are replaced. When each major inspection is performed, its cost is recognised in the carrying amount of the item of property, plant and equipment as a replacement if the recognition criteria are satisfied. Any remaining carrying amount of the cost of the previous inspection (as distinct from physical parts) is derecognised. This occurs regardless of whether the cost of the previous inspection was identified in the transaction in which the item was acquired or constructed. If necessary, the estimated cost of a future similar inspection may be used as an indication of what the cost of the existing inspection component was when the item was acquired or constructed.

Measurement at recognition

15 An item of property, plant and equipment that qualifies for recognition as an asset shall be measured at its cost.

Elements of cost

16 The cost of an item of property, plant and equipment comprises:

(a) its purchase price, including import duties and non-refundable purchase taxes, after deducting trade discounts and rebates.

(b) any costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management.

(c) the initial estimate of the costs of dismantling and removing the item and restoring the site on which it is located, the obligation for which an entity incurs either when the item is acquired or as a consequence of having used the item during a particular period for purposes other than to produce inventories during that period.

17 Examples of directly attributable costs are:

(a) costs of employee benefits (as defined in IAS 19 *Employee Benefits*) arising directly from the construction or acquisition of the item of property, plant and equipment;

(b) costs of site preparation;

(c) initial delivery and handling costs;

(d) installation and assembly costs;

(e) costs of testing whether the asset is functioning properly, after deducting the net proceeds from selling any items produced while bringing the asset to that location and condition (such as samples produced when testing equipment); and

(f) professional fees.

18 An entity applies IAS 2 *Inventories* to the costs of obligations for dismantling, removing and restoring the site on which an item is located that are incurred during a particular period as a consequence of having used the item to produce

inventories during that period. The obligations for costs accounted for in accordance with IAS 2 or IAS 16 are recognised and measured in accordance with IAS 37 *Provisions, Contingent Liabilities and Contingent Assets.*

19 Examples of costs that are not costs of an item of property, plant and equipment are:

(a) costs of opening a new facility;

(b) costs of introducing a new product or service (including costs of advertising and promotional activities);

(c) costs of conducting business in a new location or with a new class of customer (including costs of staff training); and

(d) administration and other general overhead costs.

20 Recognition of costs in the carrying amount of an item of property, plant and equipment ceases when the item is in the location and condition necessary for it to be capable of operating in the manner intended by management. Therefore, costs incurred in using or redeploying an item are not included in the carrying amount of that item. For example, the following costs are not included in the carrying amount of an item of property, plant and equipment:

(a) costs incurred while an item capable of operating in the manner intended by management has yet to be brought into use or is operated at less than full capacity;

(b) initial operating losses, such as those incurred while demand for the item's output builds up; and

(c) costs of relocating or reorganising part or all of an entity's operations.

21 Some operations occur in connection with the construction or development of an item of property, plant and equipment, but are not necessary to bring the item to the location and condition necessary for it to be capable of operating in the manner intended by management. These incidental operations may occur before or during the construction or development activities. For example, income may be earned through using a building site as a car park until construction starts. Because incidental operations are not necessary to bring an item to the location and condition necessary for it to be capable of operating in the manner intended by management, the income and related expenses of incidental operations are recognised in profit or loss and included in their respective classifications of income and expense.

22 The cost of a self-constructed asset is determined using the same principles as for an acquired asset. If an entity makes similar assets for sale in the normal course of business, the cost of the asset is usually the same as the cost of constructing an asset for sale (see IAS 2). Therefore, any internal profits are eliminated in arriving at such costs. Similarly, the cost of abnormal amounts of wasted material, labour, or other resources incurred in self-constructing an asset is not included in the cost of the asset. IAS 23 *Borrowing Costs* establishes criteria for the recognition of interest as a component of the carrying amount of a self-constructed item of property, plant and equipment.

22A Bearer plants are accounted for in the same way as self-constructed items of property, plant and equipment before they are in the location and condition necessary to be capable of operating in the manner intended by management. Consequently, references to 'construction' in this Standard should be read as covering activities that are necessary to cultivate the bearer plants before they are in the location and condition necessary to be capable of operating in the manner intended by management.

Measurement of cost

23 The cost of an item of property, plant and equipment is the cash price equivalent at the recognition date. If payment is deferred beyond normal credit terms, the difference between the cash price equivalent and the total payment is recognised as interest over the period of credit unless such interest is capitalised in accordance with IAS 23.

24 One or more items of property, plant and equipment may be acquired in exchange for a non-monetary asset or assets, or a combination of monetary and non-monetary assets. The following discussion refers simply to an exchange of one non-monetary asset for another, but it also applies to all exchanges described in the preceding sentence. The cost of such an item of property, plant and equipment is measured at fair value unless (a) the exchange transaction lacks commercial substance or (b) the fair value of neither the asset received nor the asset given up is reliably measurable. The acquired item is measured in this way even if an entity cannot immediately derecognise the asset given up. If the acquired item is not measured at fair value, its cost is measured at the carrying amount of the asset given up.

25 An entity determines whether an exchange transaction has commercial substance by considering the extent to which its future cash flows are expected to change as a result of the transaction. An exchange transaction has commercial substance if:

(a) the configuration (risk, timing and amount) of the cash flows of the asset received differs from the configuration of the cash flows of the asset transferred; or

(b) the entity-specific value of the portion of the entity's operations affected by the transaction changes as a result of the exchange; and

(c) the difference in (a) or (b) is significant relative to the fair value of the assets exchanged.

For the purpose of determining whether an exchange transaction has commercial substance, the entity-specific value of the portion of the entity's operations affected by the transaction shall reflect post-tax cash flows. The result of these analyses may be clear without an entity having to perform detailed calculations.

26 The fair value of an asset is reliably measurable if (a) the variability in the range of reasonable fair value measurements is not significant for that asset or (b) the probabilities of the various estimates within the range can be reasonably assessed and used when measuring fair value. If an entity is able to measure reliably the fair value of either the asset received or the asset given up, then the fair value of the asset given up is used to measure the cost of the asset received unless the fair value of the asset received is more clearly evident.

27 [Deleted]

28 The carrying amount of an item of property, plant and equipment may be reduced by government grants in accordance with IAS 20 *Accounting for Government Grants and Disclosure of Government Assistance*.

Measurement after recognition

29 An entity shall choose either the cost model in paragraph 30 or the revaluation model in paragraph 31 as its accounting policy and shall apply that policy to an entire class of property, plant and equipment.

Cost model

30 After recognition as an asset, an item of property, plant and equipment shall be carried at its cost less any accumulated depreciation and any accumulated impairment losses.

Revaluation model

31 After recognition as an asset, an item of property, plant and equipment whose fair value can be measured reliably shall be carried at a revalued amount, being its fair value at the date of the revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Revaluations shall be made with sufficient regularity to ensure that the carrying amount does not differ materially from that which would be determined using fair value at the end of the reporting period.

32–33 [Deleted]

34 The frequency of revaluations depends upon the changes in fair values of the items of property, plant and equipment being revalued. When the fair value of a revalued asset differs materially from its carrying amount, a further revaluation is required. Some items of property, plant and equipment experience significant and volatile changes in fair value, thus necessitating annual revaluation. Such frequent revaluations are unnecessary for items of property, plant and equipment with only insignificant changes in fair value. Instead, it may be necessary to revalue the item only every three or five years.

35 When an item of property, plant and equipment is revalued, the carrying amount of that asset is adjusted to the revalued amount. At the date of the revaluation, the asset is treated in one of the following ways:

(a) the gross carrying amount is adjusted in a manner that is consistent with the revaluation of the carrying amount of the asset. For example, the gross carrying amount may be restated by reference to observable market data or it may be restated proportionately to the change in the carrying amount. The accumulated depreciation at the date of the revaluation is adjusted to equal the difference between the gross carrying amount and the carrying amount of the asset after taking into account accumulated impairment losses; or

(b) the accumulated depreciation is eliminated against the gross carrying amount of the asset.

The amount of the adjustment of accumulated depreciation forms part of the increase or decrease in carrying amount that is accounted for in accordance with paragraphs 39 and 40.

36 If an item of property, plant and equipment is revalued, the entire class of property, plant and equipment to which that asset belongs shall be revalued.

37 A class of property, plant and equipment is a grouping of assets of a similar nature and use in an entity's operations. The following are examples of separate classes:

(a) land;
(b) land and buildings;
(c) machinery;
(d) ships;
(e) aircraft;
(f) motor vehicles;
(g) furniture and fixtures;
(h) office equipment; and
(i) bearer plants.

38 The items within a class of property, plant and equipment are revalued simultaneously to avoid selective revaluation of assets and the reporting of amounts in the financial statements that are a mixture of costs and values as at different dates. However, a class of assets may be revalued on a rolling basis provided revaluation of the class of assets is completed within a short period and provided the revaluations are kept up to date.

39 If an asset's carrying amount is increased as a result of a revaluation, the increase shall be recognised in other comprehensive income and accumulated in equity under the heading of revaluation surplus. However, the

increase shall be recognised in profit or loss to the extent that it reverses a revaluation decrease of the same asset previously recognised in profit or loss.

40 If an asset's carrying amount is decreased as a result of a revaluation, the decrease shall be recognised in profit or loss. However, the decrease shall be recognised in other comprehensive income to the extent of any credit balance existing in the revaluation surplus in respect of that asset. The decrease recognised in other comprehensive income reduces the amount accumulated in equity under the heading of revaluation surplus.

41 The revaluation surplus included in equity in respect of an item of property, plant and equipment may be transferred directly to retained earnings when the asset is derecognised. This may involve transferring the whole of the surplus when the asset is retired or disposed of. However, some of the surplus may be transferred as the asset is used by an entity. In such a case, the amount of the surplus transferred would be the difference between depreciation based on the revalued carrying amount of the asset and depreciation based on the asset's original cost. Transfers from revaluation surplus to retained earnings are not made through profit or loss.

42 The effects of taxes on income, if any, resulting from the revaluation of property, plant and equipment are recognised and disclosed in accordance with IAS 12 *Income Taxes*.

Depreciation

43 Each part of an item of property, plant and equipment with a cost that is significant in relation to the total cost of the item shall be depreciated separately.

44 An entity allocates the amount initially recognised in respect of an item of property, plant and equipment to its significant parts and depreciates separately each such part. For example, it may be appropriate to depreciate separately the airframe and engines of an aircraft. Similarly, if an entity acquires property, plant and equipment subject to an operating lease in which it is the lessor, it may be appropriate to depreciate separately amounts reflected in the cost of that item that are attributable to favourable or unfavourable lease terms relative to market terms.

45 A significant part of an item of property, plant and equipment may have a useful life and a depreciation method that are the same as the useful life and the depreciation method of another significant part of that same item. Such parts may be grouped in determining the depreciation charge.

46 To the extent that an entity depreciates separately some parts of an item of property, plant and equipment, it also depreciates separately the remainder of the item. The remainder consists of the parts of the item that are individually not significant. If an entity has varying expectations for these parts, approximation techniques may be necessary to depreciate the remainder in a manner that faithfully represents the consumption pattern and/or useful life of its parts.

47 An entity may choose to depreciate separately the parts of an item that do not have a cost that is significant in relation to the total cost of the item.

48 The depreciation charge for each period shall be recognised in profit or loss unless it is included in the carrying amount of another asset.

49 The depreciation charge for a period is usually recognised in profit or loss. However, sometimes, the future economic benefits embodied in an asset are absorbed in producing other assets. In this case, the depreciation charge constitutes part of the cost of the other asset and is included in its carrying amount. For example, the depreciation of manufacturing plant and equipment is included in the costs of conversion of inventories (see IAS 2). Similarly, depreciation of property, plant and equipment used for development activities may be included in the cost of an intangible asset recognised in accordance with IAS 38 *Intangible Assets*.

Depreciable amount and depreciation period

50 The depreciable amount of an asset shall be allocated on a systematic basis over its useful life.

51 The residual value and the useful life of an asset shall be reviewed at least at each financial year-end and, if expectations differ from previous estimates, the change(s) shall be accounted for as a change in an accounting estimate in accordance with IAS 8 *Accounting Policies, Changes in Accounting Estimates and Errors*.

52 Depreciation is recognised even if the fair value of the asset exceeds its carrying amount, as long as the asset's residual value does not exceed its carrying amount. Repair and maintenance of an asset do not negate the need to depreciate it.

53 The depreciable amount of an asset is determined after deducting its residual value. In practice, the residual value of an asset is often insignificant and therefore immaterial in the calculation of the depreciable amount.

54 The residual value of an asset may increase to an amount equal to or greater than the asset's carrying amount. If it does, the asset's depreciation charge is zero unless and until its residual value subsequently decreases to an amount below the asset's carrying amount.

55 Depreciation of an asset begins when it is available for use, ie when it is in the location and condition necessary for it to be capable of operating in the manner intended by management. Depreciation of an asset ceases at the earlier of the date that the asset is classified as held for sale (or included in a disposal group that is classified as held for sale) in accordance with IFRS 5 and the date that the asset is derecognised. Therefore, depreciation does not cease when the asset becomes idle or is retired from active use unless the asset is fully depreciated. However, under usage methods of depreciation the depreciation charge can be zero while there is no production.

56 The future economic benefits embodied in an asset are consumed by an entity principally through its use. However, other factors, such as technical or commercial obsolescence and wear and tear while an asset remains idle, often result in the diminution of the economic benefits that might have been obtained from the asset. Consequently, all the following factors are considered in determining the useful life of an asset:

(a) expected usage of the asset. Usage is assessed by reference to the asset's expected capacity or physical output.

(b) expected physical wear and tear, which depends on operational factors such as the number of shifts for which the asset is to be used and the repair and maintenance programme, and the care and maintenance of the asset while idle.

(c) technical or commercial obsolescence arising from changes or improvements in production, or from a change in the market demand for the product or service output of the asset. Expected future reductions in the selling price of an item that was produced using an asset could indicate the expectation of technical or commercial obsolescence of the asset, which, in turn, might reflect a reduction of the future economic benefits embodied in the asset.

(d) legal or similar limits on the use of the asset, such as the expiry dates of related leases.

57 The useful life of an asset is defined in terms of the asset's expected utility to the entity. The asset management policy of the entity may involve the disposal of assets after a specified time or after consumption of a specified proportion of the future economic benefits embodied in the asset. Therefore, the useful life of an asset may be shorter than its economic life. The estimation of the useful life of the asset is a matter of judgement based on the experience of the entity with similar assets.

58 Land and buildings are separable assets and are accounted for separately, even when they are acquired together. With some exceptions, such as quarries and sites used for landfill, land has an unlimited useful life and therefore is not depreciated. Buildings have a limited useful life and therefore are depreciable assets. An increase in the value of the land on which a building stands does not affect the determination of the depreciable amount of the building.

59 If the cost of land includes the costs of site dismantlement, removal and restoration, that portion of the land asset is depreciated over the period of benefits obtained by incurring those costs. In some cases, the land itself may have a limited useful life, in which case it is depreciated in a manner that reflects the benefits to be derived from it.

Depreciation method

60 The depreciation method used shall reflect the pattern in which the asset's future economic benefits are expected to be consumed by the entity.

61 The depreciation method applied to an asset shall be reviewed at least at each financial year-end and, if there has been a significant change in the expected pattern of consumption of the future economic benefits embodied in the asset, the method shall be changed to reflect the changed pattern. Such a change shall be accounted for as a change in an accounting estimate in accordance with IAS 8.

62 A variety of depreciation methods can be used to allocate the depreciable amount of an asset on a systematic basis over its useful life. These methods include the straight-line method, the diminishing balance method and the units of production method. Straight-line depreciation results in a constant charge over the useful life if the asset's residual value does not change. The diminishing balance method results in a decreasing charge over the useful life. The units of production method results in a charge based on the expected use or output. The entity selects the method that most closely reflects the expected pattern of consumption of the future economic benefits embodied in the asset. That method is applied consistently from period to period unless there is a change in the expected pattern of consumption of those future economic benefits.

62A A depreciation method that is based on revenue that is generated by an activity that includes the use of an asset is not appropriate. The revenue generated by an activity that includes the use of an asset generally reflects factors other than the consumption of the economic benefits of the asset. For example, revenue is affected by other inputs and processes, selling activities and changes in sales volumes and prices. The price component of revenue may be affected by inflation, which has no bearing upon the way in which an asset is consumed.

Impairment

63 To determine whether an item of property, plant and equipment is impaired, an entity applies IAS 36 *Impairment of Assets*. That Standard explains how an entity reviews the carrying amount of its assets, how it determines the recoverable amount of an asset, and when it recognises, or reverses the recognition of, an impairment loss.

64 [Deleted]

Compensation for impairment

65 Compensation from third parties for items of property, plant and equipment that were impaired, lost or given up shall be included in profit or loss when the compensation becomes receivable.

66 Impairments or losses of items of property, plant and equipment, related claims for or payments of compensation from third parties and any subsequent purchase or construction of replacement assets are separate economic events and are accounted for separately as follows:

(a) impairments of items of property, plant and equipment are recognised in accordance with IAS 36;

(b) derecognition of items of property, plant and equipment retired or disposed of is determined in accordance with this Standard;

(c) compensation from third parties for items of property, plant and equipment that were impaired, lost or given up is included in determining profit or loss when it becomes receivable; and

(d) the cost of items of property, plant and equipment restored, purchased or constructed as replacements is determined in accordance with this Standard.

Derecognition

67 The carrying amount of an item of property, plant and equipment shall be derecognised:

(a) on disposal; or

(b) when no future economic benefits are expected from its use or disposal.

68 The gain or loss arising from the derecognition of an item of property, plant and equipment shall be included in profit or loss when the item is derecognised (unless IFRS 16 *Leases* requires otherwise on a sale and leaseback). Gains shall not be classified as revenue.

68A However, an entity that, in the course of its ordinary activities, routinely sells items of property, plant and equipment that it has held for rental to others shall transfer such assets to inventories at their carrying amount when they cease to be rented and become held for sale. The proceeds from the sale of such assets shall be recognised as revenue in accordance with IFRS 15 *Revenue from Contracts with Customers*. IFRS 5 does not apply when assets that are held for sale in the ordinary course of business are transferred to inventories.

69 The disposal of an item of property, plant and equipment may occur in a variety of ways (eg by sale, by entering into a finance lease or by donation). The date of disposal of an item of property, plant and equipment is the date the recipient obtains control of that item in accordance with the requirements for determining when a performance obligation is satisfied in IFRS 15. IFRS 16 applies to disposal by a sale and leaseback.

70 If, under the recognition principle in paragraph 7, an entity recognises in the carrying amount of an item of property, plant and equipment the cost of a replacement for part of the item, then it derecognises the carrying amount of the replaced part regardless of whether the replaced part had been depreciated separately. If it is not practicable for an entity to determine the carrying amount of the replaced part, it may use the cost of the replacement as an indication of what the cost of the replaced part was at the time it was acquired or constructed.

71 The gain or loss arising from the derecognition of an item of property, plant and equipment shall be determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

72 The amount of consideration to be included in the gain or loss arising from the derecognition of an item of property, plant and equipment is determined in accordance with the requirements for determining the transaction price in paragraphs 47–72 of IFRS 15. Subsequent changes to the estimated amount of the consideration included in the gain or loss shall be accounted for in accordance with the requirements for changes in the transaction price in IFRS 15.

Disclosure

73 The financial statements shall disclose, for each class of property, plant and equipment:

(a) the measurement bases used for determining the gross carrying amount;

(b) the depreciation methods used;

(c) the useful lives or the depreciation rates used;

(d) the gross carrying amount and the accumulated depreciation (aggregated with accumulated impairment losses) at the beginning and end of the period; and

(e) a reconciliation of the carrying amount at the beginning and end of the period showing:

(i) additions;

(ii) assets classified as held for sale or included in a disposal group classified as held for sale in accordance with IFRS 5 and other disposals;

(iii) acquisitions through business combinations;

(iv) increases or decreases resulting from revaluations under paragraphs 31, 39 and 40 and from impairment losses recognised or reversed in other comprehensive income in accordance with IAS 36;

(v) impairment losses recognised in profit or loss in accordance with IAS 36;

(vi) impairment losses reversed in profit or loss in accordance with IAS 36;

(vii) depreciation;

(viii) the net exchange differences arising on the translation of the financial statements from the functional currency into a different presentation currency, including the translation of a foreign operation into the presentation currency of the reporting entity; and

(ix) other changes.

74 The financial statements shall also disclose:

(a) the existence and amounts of restrictions on title, and property, plant and equipment pledged as security for liabilities;

(b) the amount of expenditures recognised in the carrying amount of an item of property, plant and equipment in the course of its construction;

(c) the amount of contractual commitments for the acquisition of property, plant and equipment; and

(d) if it is not disclosed separately in the statement of comprehensive income, the amount of compensation from third parties for items of property, plant and equipment that were impaired, lost or given up that is included in profit or loss.

75 Selection of the depreciation method and estimation of the useful life of assets are matters of judgement. Therefore, disclosure of the methods adopted and the estimated useful lives or depreciation rates provides users of financial statements with information that allows them to review the policies selected by management and enables comparisons to be made with other entities. For similar reasons, it is necessary to disclose:

(a) depreciation, whether recognised in profit or loss or as a part of the cost of other assets, during a period; and

(b) accumulated depreciation at the end of the period.

76 In accordance with IAS 8 an entity discloses the nature and effect of a change in an accounting estimate that has an effect in the current period or is expected to have an effect in subsequent periods. For property, plant and equipment, such disclosure may arise from changes in estimates with respect to:

(a) residual values;

(b) the estimated costs of dismantling, removing or restoring items of property, plant and equipment;

(c) useful lives; and

(d) depreciation methods.

77 If items of property, plant and equipment are stated at revalued amounts, the following shall be disclosed in addition to the disclosures required by IFRS 13:

(a) the effective date of the revaluation;

(b) whether an independent valuer was involved;

(c) [deleted]

(d) [deleted]

(e) for each revalued class of property, plant and equipment, the carrying amount that would have been recognised had the assets been carried under the cost model; and

(f) the revaluation surplus, indicating the change for the period and any restrictions on the distribution of the balance to shareholders.

78 In accordance with IAS 36 an entity discloses information on impaired property, plant and equipment in addition to the information required by paragraph 73(e)(iv)–(vi).

79 Users of financial statements may also find the following information relevant to their needs:

(a) the carrying amount of temporarily idle property, plant and equipment;

(b) the gross carrying amount of any fully depreciated property, plant and equipment that is still in use;

(c) the carrying amount of property, plant and equipment retired from active use and not classified as held for sale in accordance with IFRS 5; and

(d) when the cost model is used, the fair value of property, plant and equipment when this is materially different from the carrying amount.

Therefore, entities are encouraged to disclose these amounts.

Transitional provisions

80 The requirements of paragraphs 24–26 regarding the initial measurement of an item of property, plant and equipment acquired in an exchange of assets transaction shall be applied prospectively only to future transactions.

80A Paragraph 35 was amended by *Annual Improvements to IFRSs 2010–2012 Cycle*. An entity shall apply that amendment to all revaluations recognised in annual periods beginning on or after the date of initial application of that amendment and in the immediately preceding annual period. An entity may also present adjusted comparative information for any earlier periods presented, but it is not required to do so. If an entity presents unadjusted comparative information for any earlier periods, it shall clearly identify the information that has not been adjusted, state that it has been presented on a different basis and explain that basis.

80B In the reporting period when *Agriculture: Bearer Plants* (Amendments to IAS 16 and IAS 41) is first applied an entity need not disclose the quantitative information required by paragraph 28(f) of IAS 8 for the current period. However, an entity shall present the quantitative information required by paragraph 28(f) of IAS 8 for each prior period presented.

80C An entity may elect to measure an item of bearer plants at its fair value at the beginning of the earliest period presented in the financial statements for the reporting period in which the entity first applies *Agriculture: Bearer Plants* (Amendments to IAS 16 and IAS 41) and use that fair value as its deemed cost at that date. Any difference between the previous carrying amount and fair value shall be recognised in opening retained earnings at the beginning of the earliest period presented.

Effective date

81 An entity shall apply this Standard for annual periods beginning on or after 1 January 2005. Earlier application is encouraged. If an entity applies this Standard for a period beginning before 1 January 2005, it shall disclose that fact.

81A An entity shall apply the amendments in paragraph 3 for annual periods beginning on or after 1 January 2006. If an entity applies IFRS 6 for an earlier period, those amendments shall be applied for that earlier period.

81B IAS 1 *Presentation of Financial Statements* (as revised in 2007) amended the terminology used throughout IFRSs. In addition it amended paragraphs 39, 40 and 73(e)(iv). An entity shall apply those amendments for annual periods beginning on or after 1 January 2009. If an entity applies IAS 1 (revised 2007) for an earlier period, the amendments shall be applied for that earlier period.

81C IFRS 3 *Business Combinations* (as revised in 2008) amended paragraph 44. An entity shall apply that amendment for annual periods beginning on or after 1 July 2009. If an entity applies IFRS 3 (revised 2008) for an earlier period, the amendment shall also be applied for that earlier period.

81D Paragraphs 6 and 69 were amended and paragraph 68A was added by *Improvements to IFRSs* issued in May 2008. An entity shall apply those amendments for annual periods beginning on or after 1 January 2009. Earlier application is permitted. If an entity applies the amendments for an earlier period it shall disclose that fact and at the same time apply the related amendments to IAS 7 *Statement of Cash Flows*.

81E Paragraph 5 was amended by *Improvements to IFRSs* issued in May 2008. An entity shall apply that amendment prospectively for annual periods beginning on or after 1 January 2009. Earlier application is permitted if an entity also applies the amendments to paragraphs 8, 9, 22, 48, 53, 53A, 53B, 54, 57 and 85B of IAS 40 at the same time. If an entity applies the amendment for an earlier period it shall disclose that fact.

81F IFRS 13, issued in May 2011, amended the definition of fair value in paragraph 6, amended paragraphs 26, 35 and 77 and deleted paragraphs 32 and 33. An entity shall apply those amendments when it applies IFRS 13.

81G *Annual Improvements 2009–2011 Cycle*, issued in May 2012, amended paragraph 8. An entity shall apply that amendment retrospectively in accordance with IAS 8 *Accounting Policies, Changes in Accounting Estimates and Errors* for annual periods beginning on or after 1 January 2013. Earlier application is permitted. If an entity applies that amendment for an earlier period it shall disclose that fact.

81H *Annual Improvements to IFRSs 2010–2012 Cycle*, issued in December 2013, amended paragraph 35 and added paragraph 80A. An entity shall apply that amendment for annual periods beginning on or after 1 July 2014. Earlier application is permitted. If an entity applies that amendment for an earlier period it shall disclose that fact.

81I *Clarification of Acceptable Methods of Depreciation and Amortisation* (Amendments to IAS 16 and IAS 38), issued in May 2014, amended paragraph 56 and added paragraph 62A. An entity shall apply those amendments prospectively for annual periods beginning on or after 1 January 2016. Earlier application is permitted. If an entity applies those amendments for an earlier period it shall disclose that fact.

81J IFRS 15 *Revenue from Contracts with Customers*, issued in May 2014, amended paragraphs 68A, 69 and 72. An entity shall apply those amendments when it applies IFRS 15.

81K *Agriculture: Bearer Plants* (Amendments to IAS 16 and IAS 41), issued in June 2014, amended paragraphs 3, 6 and 37 and added paragraphs 22A and 80B–80C. An entity shall apply those amendments for annual periods beginning on or after 1 January 2016. Earlier application is permitted. If an entity applies those amendments for an earlier period, it shall disclose that fact. An entity shall apply those amendments retrospectively, in accordance with IAS 8, except as specified in paragraph 80C.

81L IFRS 16, issued in January 2016, deleted paragraphs 4 and 27 and amended paragraphs 5, 10, 44 and 68–69. An entity shall apply those amendments when it applies IFRS 16.

Withdrawal of other pronouncements

82 This Standard supersedes IAS 16 *Property, Plant and Equipment* (revised in 1998).

83 This Standard supersedes the following Interpretations:

(a) SIC-6 *Costs of Modifying Existing Software*;

(b) SIC-14 *Property, Plant and Equipment — Compensation for the Impairment or Loss of Items*; and

(c) SIC-23 *Property, Plant and Equipment — Major Inspection or Overhaul Costs*.

6.0 Reference: Re App G, Table G-4 and pages 9-10

2.6.1 Advise if the "program management" referenced in the fifth row of Table G-4 is the same as the "project management" referenced on Appendix G, page 9, line 5.

RESPONSE:

Yes, the "program management" referenced in the fifth row of Table G-4 is the same as the "project management" referenced on Appendix G, page 9, line 5.

6.0 Reference: Re App G, Table G-4 and pages 9-10

2.6.2 Re p. 9; What is difference between "managing and coordinating the program's activities (line 6) and "coordinating" with contractors and internal field crews" (line 9)

RESPONSE:

"Managing and Coordinate the program's activities (line 6)" refers to the program and project management activities requiring coordination across the various workstreams, such as regulatory, procurement, technology, customer service, and deployment management.

Whereas, "'coordinating' with contractors and internal field crews (line 9)" refers to the coordination required with field crews on the actual installation of LED street lights.

6.0 Reference: Re App G, Table G-4 and pages 9-10

2.6.3 Re p. 10, line 2; what were the modifications to existing technology solutions referred to?

RESPONSE:

Further to the information provided in the Street Light Replacement Program's business case that is included as Attachment 1 to BC Hydro's response to BCOAPO IR 1.6.1, the modifications to the existing technology solutions include the functionality to:

- **Enable the tracking of the interactions with customers, including tracking their LED selections to ensure that the right LED is installed in each location for each customer;**
- **Reflect the LED lights in the "jobs" (work orders) for fields crews to ensure that the field crews know what light to install, to obtain information from the field about the assets and to ensure that the asset records are updated;**
- **Efficiently manage the updates to the billing records as the LEDs are installed;**
- **Provide the reporting required to support the management of the program; and**
- **Enable customers to log their streetlight requests, e.g., requests for additional lights with the appropriate wattage / colour temperature LED.**

6.0 Reference: Re App G, Table G-4 and pages 9-10

2.6.4 What does the "capital overhead" consist of that is referred to in Table G-4? Does it include items that can be used other than in the Program?

RESPONSE:

Please refer to BC Hydro's response to BCAC IR 2.16.5.

7.0 Reference: Application pages 12-14; Section 3, Background and Need for RS 1701 Changes

2.7.1 When and where was the most recent new (not replacement) HPS installed by BC Hydro for street lighting?

RESPONSE:

BC Hydro believes the last new HPS street light was installed on February 10, 2021 in Fort Nelson.

7.0 Reference: Application pages 12-14; Section 3, Background and Need for RS 1701 Changes

2.7.2 If any new HPS light for street lighting was installed after the PCB Regulation came into effect in 2008, why did BC Hydro not instead install an alternative, such as LED lights?

RESPONSE:

BC Hydro is not an early adopter of LED technology and such a change requires careful consideration of evolving technologies and standardization of equipment given concerns about pricing, unit reliability and future maintenance. LED street lighting technology has advanced considerably, and pricing has also reduced considerably since 2008.

Implementing the replacement program in 2008 would not have changed the requirement to design a rate for LED street lights and have the rate approved by the BCUC.

8.0 Reference: Application App E, p. 25 of 110, and Application page 27

2.8.1 When was the package of slides contained in Exhibit E prepared?

RESPONSE:

The package of slides contained in Appendix E was prepared in advance of the workshop session held on August 12, 2020.

8.0 Reference: Application App E, p. 25 of 110, and Application page 27

2.8.2 The slide on page 25 of 110 of Appendix E states that the "illustrative annual saving" for maintenance under the RS 1701 rate will be $1.3 million. At lines 18-19 of page 27 of the Application it is stated that the average value of maintenance savings is $1.2 million. Which figure is correct? What is the basis for the answer?

RESPONSE:

This response also answers to VERNON IRs 2.8.3 and 2.8.4. The maintenance cost savings, electricity cost savings and capital costs provided in the Application are the correct figures in each case. All rate design materials presented during the August 12, 2020 workshop were illustrative and BC Hydro reiterated during the workshop that the rate materials being presented were preliminary.

8.0 Reference: Application App E, p. 25 of 110, and Application page 27

2.8.3 The slide on page 25 of 110 of Appendix E states that the "illustrative annual savings" to electricity under the RS 1701 rate will be $1.9 million. At lines 4-15 of the Application it is stated that energy savings will be approximately $1.1 million per year, and capacity savings will be $1.1 million per year. What is the correct figure for "electricity savings", as that term was used on page 25 of 110 of Appendix E? What is the basis for the answer?

RESPONSE:

Please refer to BC Hydro's response to VERNON IR 2.8.2.

8.0 Reference: Application App E, p. 25 of 110, and Application page 27

2.8.4 The slide on page 25 of 110 of Appendix E states that the "illustrative" annual capital cost under the RS 1701 rate will be $2.6 million. At lines 21-24 of the Application it is stated that the "total one-time investment costs" of the Program are expected to be $3 million per year after the Program is fully implemented. What is the correct figure for capital costs, as that term was used on page 25 of 110 of Appendix E? What is the basis for the answer?

RESPONSE:

Please refer to BC Hydro's response to VERNON IR 2.8.2.

9.0 Reference: BCH response to BCSEA IR 1.5.1

2.9.1 Please identify and disclose the CSA standards that BC Hydro says would be applicable to equipment used by non-utility customers?

RESPONSE:

BC Hydro understands that luminaires utilized by non-utility customers must be certified in accordance with CSA C22.2 No. 250.0-18 Luminaires.

9.0 Reference: BCH response to BCSEA IR 1.5.1

2.9.2 In what way is BC Hydro's equipment configured differently from CSA certified units?

RESPONSE:

BC Hydro street lights have the neutral terminal connected to the ground terminal within the luminaire to accommodate utility grounding/bonding practices. For units that are CSA certified, the ground and neutral terminals are electrically separate.

Due to this exception to CSA C22.2 No. 250.0 Luminaires, BC Hydro street lights do not have a CSA certification label on the luminaire.

10.0 Reference: BCH response to City of Surrey IR 1.3.2

2.10.1 What is average actual service life of LEDs before they experience failure?

RESPONSE:

BC Hydro can not verify the actual service life of LED Luminaires before they experience failure. Most LED suppliers indicate that LED lights will last 20 years. However, this can depend on the following factors:

- **Light output. Over time the LED luminaire accumulates dirt that reduces light output. This can be resolved by scheduling cleaning during the life of the units. Light output can also decrease due to degradation of optic components over several years of service; and**
- **Unit failures. A small percentage of units will fail in-service as luminaire components reach end of life prior to the expected 20-year life of the units.**

Please refer to BC Hydro's response to BCUC IR 2.19.7 for failure rates anticipated per year of service.

1.0 Reference: Exhibit B-5, BCAC IR 1.3.1

In BC Hydro's response to BCAC IR 1.3.1, BC Hydro provides the following table:

	BC Hydro-owned street lighting		Customer-owned street lighting			Traffic Lights		Unmetered Small General Service
	RS 1701	RS 1755	RS 1702		RS 1703	RS 1704		
			Unmetered	Metered		Unmetered	Metered	
Number of Customers	380	2,795	187	73	8	96	31	483
Number of Accounts	577	3,118	328	398	9	5,032	346	19,055
Number of Lights	87,933	4,848	242,557	n/a	23,350	n/a	n/a	n/a
Annual Revenue ($ millions)	$21.86	$1.24	$16.57	$0.40	$1.35	$1.33	$0.22	$13.80
GWh per Year	43.44	3.84	143.56	3.53	9.2	11.81	1.94	85.99

2.1.1 Provide additional details to this table by providing the same information for each of the various BC Hydro regions and also by integrated and non-integrated areas (Zone IB and II).

RESPONSE:

Please see the table below for a breakdown of BC Hydro's street lighting services and unmetered Small General Services by region and non-integrated areas. Please note that customers with services in both integrated and non-integrated areas are grouped under one of the integrated area regions and excluded from the non-integrated areas.

BC Hydro notes that there is a slight data variation from our response to BCAC IR 1.3.1 due to back-dated account or billing adjustments made after the original data was extracted.

	BC Hydro-owned street lighting		Customer-owned street lighting			Traffic Lights		Unmetered Small General Service
	RS 1701	RS 1755	RS 1702		RS 1703	RS 1704		
			Unmetered	Metered		Unmetered	Metered	
Number of Customers	**379**	**2,795**	**181**	**72**	**8**	**96**	**30**	**476**
Lower Mainland	**77**	**684**	**54**	**31**	**2**	**41**	**19**	**150**
Vancouver Island	**90**	**546**	**51**	**22**	**5**	**23**	**6**	**171**
South Interior	**98**	**713**	**45**	**16**	**0**	**13**	**4**	**99**
North	**93**	**833**	**31**	**3**	**1**	**18**	**1**	**54**
Non-Integrated Areas	**21**	**19**	**0**	**0**	**0**	**1**	**0**	**2**
Number of Accounts	**576**	**3,118**	**320**	**397**	**9**	**5,032**	**341**	**19,051**
Lower Mainland	**114**	**769**	**89**	**264**	**2**	**3,434**	**138**	**12,262**
Vancouver Island	**126**	**609**	**141**	**77**	**5**	**481**	**14**	**4,557**
South Interior	**162**	**791**	**57**	**52**	**0**	**980**	**188**	**1,612**
North	**146**	**926**	**33**	**4**	**2**	**133**	**1**	**617**
Non-Integrated Areas	**28**	**23**	**0**	**0**	**0**	**4**	**0**	**3**

	BC Hydro-owned street lighting		Customer-owned street lighting			Traffic Lights		Unmetered Small General Service
	RS 1701	RS 1755	RS 1702		RS 1703	RS 1704		
			Unmetered	Metered		Unmetered	Metered	
Number of Lights	**87,978**	**4,814**	**243,205**	**n/a**	**23,783**	**n/a**	**n/a**	**n/a**
Lower Mainland	**35,192**	**1,346**	**161,360**	**n/a**	**11,554**	**n/a**	**n/a**	**n/a**
Vancouver Island	**19,675**	**872**	**53,717**	**n/a**	**11,167**	**n/a**	**n/a**	**n/a**
South Interior	**17,314**	**1,168**	**16,378**	**n/a**	**0**	**n/a**	**n/a**	**n/a**
North	**14,514**	**1,402**	**11,750**	**n/a**	**1,062**	**n/a**	**n/a**	**n/a**
Non-Integrated Areas	**1,283**	**26**	**0**	**n/a**	**0**	**n/a**	**n/a**	**n/a**
Annual Revenue ($ millions)	**$21.94**	**$1.25**	**$16.54**	**$0.39**	**$1.35**	**$1.34**	**$0.22**	**$13.58**
Lower Mainland	**8.74**	**0.34**	**11.86**	**0.28**	**0.65**	**0.90**	**0.10**	**6.99**
Vancouver Island	**4.93**	**0.22**	**3.04**	**0.07**	**0.65**	**0.10**	**0.01**	**4.57**
South Interior	**4.23**	**0.30**	**0.90**	**0.05**	**0.00**	**0.29**	**0.12**	**1.42**
North	**3.72**	**0.36**	**0.74**	**0.00**	**0.04**	**0.04**	**0.00**	**0.59**
Non-Integrated Areas	**0.32**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**
GWh per Year	**43.74**	**3.87**	**143.56**	**3.50**	**9.20**	**11.88**	**1.95**	**89.44**
Lower Mainland	**17.09**	**1.05**	**101.34**	**2.45**	**4.45**	**8.04**	**0.85**	**43.70**
Vancouver Island	**9.73**	**0.69**	**27.11**	**0.59**	**4.47**	**0.91**	**0.06**	**31.93**
South Interior	**8.35**	**0.92**	**8.16**	**0.46**	**0.00**	**2.55**	**1.04**	**9.68**

	BC Hydro-owned street lighting		**Customer-owned street lighting**			**Traffic Lights**		**Unmetered Small General Service**
	RS 1701	**RS 1755**	**RS 1702**		**RS 1703**	**RS 1704**		
			Unmetered	**Metered**		**Unmetered**	**Metered**	
North	**7.99**	**1.11**	**6.95**	**0.01**	**0.28**	**0.37**	**0.00**	**4.09**
Non-Integrated Areas	**0.57**	**0.10**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.05**

2.0 Reference: Exhibit B-5, BCAC IR 1.11.3 Attachment 1; Exhibit B-1 (Application), Table 4, page 22.

In BC Hydro's response to BCAC IR 1.11.3 Attachment 1, BC Hydro provides a map of the Non-Integrated Areas (NIA) showing 9 different regions within the NIA. On page 22 of the Application, BC Hydro provides Table 4:

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

2.2.1 What is the schedule for implementing LED street lighting according to Table 4 (LED Street Lighting Installation Plan) and the NIA map showing nine zones/areas in BC Hydro's response to BCAC IR 1.11.3 Attachment 1 (page 5 of 5)?

RESPONSE:

This response also answers ZONE II RPG IRs 2.2.2, 2.6.2, 2.6.4, 2.6.5 and 2.6.5.1.

Please also refer to BC Hydro's response to BCUC IR 2.20.6 regarding BC Hydro's plans for finalizing the deployment schedule.

As mentioned in Review Session Undertaking No. 18[1] in the proceeding for BC Hydro's Fiscal 2022 Revenue Requirements Application, BC Hydro's Street Light Replacement Program has a high-level and preliminary deployment schedule for converting all BC Hydro-owned street lights under Rate Schedule 1701 (Overhead Street Lights) to LEDs over the next two and a half years. BC Hydro has based this schedule on BC Hydro's installation service contractors and internal crews' installation capacity.

In alignment with BC Hydro's F2021 Service Plan priorities, BC Hydro recognizes that communities in the Non-Integrated Areas (NIA) rely on diesel generation and that there would be immediate benefits from converting street lights to LEDs,

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[1] **Undertaking No. 18 included in exhibit B-9 of BC Hydro's Fiscal 2022 Revenue Requirements Application available at: https://www.bcuc.com/Documents/Proceedings/2021/DOC_61683_B-9-BCH-Undertakings-Public.pdf**

such as reduced diesel consumption and diesel generation savings as well as reduced greenhouse gas emissions.

BC Hydro is engaging with our street light customers, installation service contractors, and internal field resources to refine the deployment schedule specifically related to NIA communities and anticipates having a tentative schedule for NIA around this summer.

BC Hydro is also looking for opportunities to convert the street lights in NIA communities earlier, for example, by leveraging other planned trips to complete work in these communities.

Decisions related to choosing which NIA communities to prioritize will be based upon a number of factors, including the number of lights that need converting and the capacity of the crews going there, timing of other trips to those communities (e.g., for other work and/or to repair failed lights), travel time and logistics, weather and seasonality

Additionally, BC Hydro is now completing all repairs to our street lights under Rate Schedule 1701 with LEDs, including in NIA communities.

2.0 Reference: Exhibit B-5, BCAC IR 1.11.3 Attachment 1; Exhibit B-1 (Application), Table 4, page 22.

In BC Hydro's response to BCAC IR 1.11.3 Attachment 1, BC Hydro provides a map of the Non-Integrated Areas (NIA) showing 9 different regions within the NIA. On page 22 of the Application, BC Hydro provides Table 4:

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

2.2.2 How will BC Hydro choose which NIA communities to prioritize first in the scheduling of the LED street lighting implementation?

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.2.1.

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

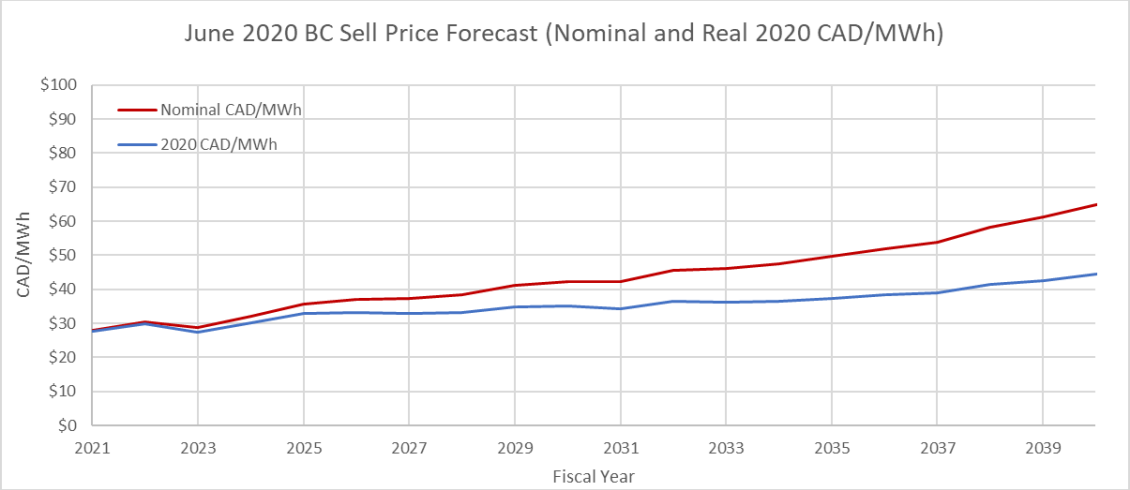
In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.1 Please provide a chart showing BC Hydro's forecast of the market sell price at the US/BC border.

RESPONSE:

The following chart shows BC Hydro's June 2020 sell price forecast at the U.S./B.C. border in both nominal and real 2020 Canadian dollars per MWh.


June 2020 BC Sell Price Forecast (Nominal and Real 2020 CAD/MWh)
$100
$90
$80
$70
$60
$50
$40
$30
$20
$10
$0
CAD/MWh
Nominal CAD/MWh
2020 CAD/MWh
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
Fiscal Year

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.2 Did BC Hydro undertake any sensitivity analysis on energy savings for different Mid-C price forecasts? If so, please provide this analysis.

RESPONSE:

Below BC Hydro provides a sensitivity analysis of Table G-3 of the Application, using the BC Hydro June 2020 low and high Mid-C energy price scenarios. As

shown below, the average values of electricity savings are $1.8 million per year in the low scenario and $2.6 million per year in the high scenario. For comparison purposes we note that the value used in the Application is $2.3 million per year, as shown in Table G-3.

Below is Table G-3 using the low scenario for the marginal cost of energy.

Fiscal Year	Demand Reduction (kW)	Energy Reduction (MWh)	Low Scenario of Marginal Cost per Unit ($/MWh)	Generation Capacity Marginal Unit Cost ($/kW-yr)	Distribution Capacity Marginal Unit Cost ($/kW-yr)	Non-bulk Transmission Marginal Unit Cost ($/kW-yr)	Energy Savings ($M)	Capacity Savings ($M)	Total Savings ($M)
2021	330	1,385	27.9	40.7	26.1	52.2	0.0	0.0	0.1
2022	2,255	9,471	29.9	41.5	26.6	53.2	0.3	0.3	0.6
2023	5,206	21,865	26.1	42.4	27.1	54.3	0.6	0.6	1.2
2024	6,611	27,768	25.4	43.2	27.7	55.4	0.7	0.8	1.5
2025	6,661	27,978	24.9	44.1	28.2	56.5	0.7	0.9	1.6
2026	6,661	27,978	26.0	45.0	28.8	57.6	0.7	0.9	1.6
2027	6,661	27,978	26.9	45.9	29.4	58.8	0.8	0.9	1.6
2028	6,661	27,978	27.5	46.8	30.0	59.9	0.8	0.9	1.7
2029	6,661	27,978	28.8	47.7	30.6	61.1	0.8	0.9	1.7
2030	6,661	27,978	28.7	48.7	31.2	62.4	0.8	0.9	1.7
2031	6,661	27,978	28.2	78.4	31.8	63.6	0.8	1.2	1.9
2032	6,661	27,978	30.5	79.9	32.4	64.9	0.9	1.2	2.0
2033	6,661	27,978	30.6	81.5	33.1	66.2	0.9	1.2	2.1
2034	6,661	27,978	30.6	83.2	33.7	67.5	0.9	1.2	2.1

Fiscal Year	Demand Reduction (kW)	Energy Reduction (MWh)	Low Scenario of Marginal Cost per Unit ($/MWh)	Generation Capacity Marginal Unit Cost ($/kW-yr)	Distribution Capacity Marginal Unit Cost ($/kW-yr)	Non-bulk Transmission Marginal Unit Cost ($/kW-yr)	Energy Savings ($M)	Capacity Savings ($M)	Total Savings ($M)
2035	**6,661**	**27,978**	**30.3**	**84.8**	**34.4**	**68.8**	**0.8**	**1.3**	**2.1**
2036	**6,661**	**27,978**	**31.2**	**86.5**	**35.1**	**70.2**	**0.9**	**1.3**	**2.2**
2037	**6,661**	**27,978**	**32.1**	**88.3**	**35.8**	**71.6**	**0.9**	**1.3**	**2.2**
2038	**6,661**	**27,978**	**33.2**	**184.6**	**36.5**	**73.1**	**0.9**	**2.0**	**2.9**
2039	**6,661**	**27,978**	**34.7**	**188.3**	**37.3**	**74.5**	**1.0**	**2.0**	**3.0**
2040	**6,661**	**27,978**	**33.8**	**192.0**	**38.0**	**76.0**	**0.9**	**2.0**	**3.0**
Average	**6,049**	**25,407**	**29.4**	**79.7**	**31.7**	**63.4**	**0.7**	**1.1**	**1.8**

Note: Numbers may not add up due to rounding

Below is Table G-3 using the high scenario for the marginal cost of energy.

Fiscal Year	Demand Reduction (kW)	Energy Reduction (MWh)	High Scenario of Marginal Cost per Unit ($/MWh)	Generation Capacity Marginal Unit Cost ($/kW-yr)	Distribution Capacity Marginal Unit Cost ($/kW-yr)	Non-bulk Transmission Marginal Unit Cost ($/kW-yr)	Energy Savings ($M)	Capacity Savings ($M)	Total Savings ($M)
2021	330	1,385	27.9	40.7	26.1	52.2	0.0	0.0	0.1
2022	2,255	9,471	31.9	41.5	26.6	53.2	0.3	0.3	0.6
2023	5,206	21,865	35.8	42.4	27.1	54.3	0.8	0.6	1.4
2024	6,611	27,768	44.5	43.2	27.7	55.4	1.2	0.8	2.1
2025	6,661	27,978	51.9	44.1	28.2	56.5	1.5	0.9	2.3
2026	6,661	27,978	55.5	45.0	28.8	57.6	1.6	0.9	2.4
2027	6,661	27,978	57.8	45.9	29.4	58.8	1.6	0.9	2.5
2028	6,661	27,978	57.1	46.8	30.0	59.9	1.6	0.9	2.5
2029	6,661	27,978	60.3	47.7	30.6	61.1	1.7	0.9	2.6
2030	6,661	27,978	60.1	48.7	31.2	62.4	1.7	0.9	2.6
2031	6,661	27,978	60.3	78.4	31.8	63.6	1.7	1.2	2.8
2032	6,661	27,978	62.2	79.9	32.4	64.9	1.7	1.2	2.9
2033	6,661	27,978	61.6	81.5	33.1	66.2	1.7	1.2	2.9

Fiscal Year	Demand Reduction (kW)	Energy Reduction (MWh)	High Scenario of Marginal Cost per Unit ($/MWh)	Generation Capacity Marginal Unit Cost ($/kW-yr)	Distribution Capacity Marginal Unit Cost ($/kW-yr)	Non-bulk Transmission Marginal Unit Cost ($/kW-yr)	Energy Savings ($M)	Capacity Savings ($M)	Total Savings ($M)
2034	**6,661**	**27,978**	**61.8**	**83.2**	**33.7**	**67.5**	**1.7**	**1.2**	**3.0**
2035	**6,661**	**27,978**	**62.9**	**84.8**	**34.4**	**68.8**	**1.8**	**1.3**	**3.0**
2036	**6,661**	**27,978**	**63.5**	**86.5**	**35.1**	**70.2**	**1.8**	**1.3**	**3.1**
2037	**6,661**	**27,978**	**64.4**	**88.3**	**35.8**	**71.6**	**1.8**	**1.3**	**3.1**
2038	**6,661**	**27,978**	**65.7**	**184.6**	**36.5**	**73.1**	**1.8**	**2.0**	**3.8**
2039	**6,661**	**27,978**	**69.0**	**188.3**	**37.3**	**74.5**	**1.9**	**2.0**	**3.9**
2040	**6,661**	**27,978**	**69.8**	**192.0**	**38.0**	**76.0**	**2.0**	**2.0**	**4.0**
Average	**6,049**	**25,407**	**56.2**	**79.7**	**31.7**	**63.4**	**1.5**	**1.1**	**2.6**

Note: Numbers may not add up due to rounding

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.2 Did BC Hydro undertake any sensitivity analysis on energy savings for different Mid-C price forecasts? If so, please provide this analysis.

2.3.2.1 What is the confidence level of long-term 20-year price forecasts at Mid-C? Please explain.

RESPONSE:

BC Hydro does not associate a confidence level with its long-term Mid-C price forecast. Market electricity prices are subject to a number of uncertain conditions including economic, environmental, technological, and policy considerations. Not all of these are conducive to an assignment of a confidence level.

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.2 Did BC Hydro undertake any sensitivity analysis on energy savings for different Mid-C price forecasts? If so, please provide this analysis.

2.3.2.2 Using this current Mid-C Price Forecast and/or Market Sell Price Forecast at the US/BC border, update columns C (Marginal Energy Cost) and G (Energy Savings) and recalculate Table G-3 and Table G-5 of the Application.

RESPONSE:

BC Hydro clarifies that, as described in section 1.2.1 of Appendix G of the Application, the energy marginal price used in the Application is the June 2020 forecast sell price at the U.S./B.C. border, which is calculated as the forecast Mid-C market price minus wheeling fees and transmission losses.

The forecast sell price is appropriate for valuing the energy savings from the Replacement Program because it represents the value of energy sales to BC Hydro. In contrast, the Mid-C market price alone does not represent the value BC Hydro receives from energy sales.

Nonetheless, to be responsive we have estimated the average energy savings and the average total savings of the Replacement Program (please refer to the last line of Table G-3) assuming the energy savings are valued at the Mid-C market price. The average energy savings and the average of total program savings over the twenty year period increased from $1.1 million to $1.4 million, and from $2.2 million to $2.5 million, respectively.

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.2 Did BC Hydro undertake any sensitivity analysis on energy savings for different Mid-C price forecasts? If so, please provide this analysis.

2.3.2.2 Using this current Mid-C Price Forecast and/or Market Sell Price Forecast at the US/BC border, update columns C (Marginal Energy Cost) and G (Energy Savings) and recalculate Table G-3 and Table G-5 of the Application.

2.3.2.2.1 Based on these current forecasts what is the impact on LED rates? Please explain.

RESPONSE:

As described in BC Hydro's response to ZONE II RPG IR 2.3.2.2, the June 2020 forecast sell price at U.S./B.C. border used in the Application is the appropriate price to value the Replacement Program energy savings, at this represents the value BC Hydro receives for energy sales. The Mid-C market price alone is not appropriate to use to value the energy savings of the Replacement Program as it does not represent the value BC Hydro receives for energy sales.

Nonetheless, to be responsive we estimate that if the value of energy is assumed to be the Mid-C market price alone, this would lead to a reduction by 20 cents/light/month for the RS 1701 LED rates.

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.3 Will the calculated energy savings and final customer rates be based on the June 2020 Market Price Forecast or the latest price forecast once the BCUC issues its Decision on the LED Street Lighting Application? Please explain.

RESPONSE:

BC Hydro requests BCUC approval of the Proposed RS 1701 LED Rate as filed. These rates consider the value of energy savings based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling.

In the interest of regulatory efficiency, rate stability and certainty, BC Hydro submits that the RS 1701 Rate should be set on a final basis through the current proceeding, based on the inputs and methodologies described in the Application and examined through the proceeding, subject to future change only for BCUC approved revenue requirements increases or decreases, and the removal of the supplemental charge when the Replacement Program completes.

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.4 Explain why BC Hydro chose the ABB Spring 2020 Power Reference Case forecast.

RESPONSE:

BC Hydro's price forecast development process includes consideration of multiple forecasts from Hitachi-ABB (ABB), IHS Markit, the Northwest Power and Conservation Council and other entities where available, and the latest

information related to market forwards. The ABB forecast was chosen as the basis or starting point for developing the BC Hydro forecast given the comparability of ABB's forecast with forecasts from other entities and the compatibility of the ABB's forecast modelling tool and data with other models used by BC Hydro.

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.4 Explain why BC Hydro chose the ABB Spring 2020 Power Reference Case forecast.

2.3.4.1 Did BC Hydro consider other forecasts and if so, please provide the rationale why these were not considered?

RESPONSE:

As described in BC Hydro's response to ZONE II RPG IR 2.3.4, BC Hydro considers and compares forecasts from other consultants and entities (including IHS Market and Northwest Power and Conservation Council) and market forwards in developing its market price forecast and associated high and low scenarios.

3.0 Reference: Exhibit B-5, BCOAPO IR 1.8.2; Zone II RPG IR 1.7.1; Exhibit B-1 (Application), page 27.

The Application states on page 27:

> "BC Hydro estimates that the energy savings resulting from the Replacement Program will be approximately 28 GWh/year after it is fully implemented. These savings are valued at BC Hydro's marginal cost of energy, which is approximated by the wholesale market price, at an average $1.1 million per year."

In BC Hydro's response to BCOAPO, BC Hydro provides the following chart showing the June 2020 Mid-C Price Forecast:

In response to Zone II RPG IR 1.7.1, BC Hydro states that "the Marginal Cost per Unity (column C in Table G-3) reflects BC Hydro's forecast of the market sell price at the US/BC border. This price used in the Application is based on the ABB Spring 2020 Power Reference Case forecast of the market price at the Mid-Columbia (Mid-C) market, adjusted for transmission costs associated with line losses and wheeling."

2.3.4.1 Did BC Hydro consider other forecasts and if so, please provide the rationale why these were not considered?

2.3.4.1.1 Did these other forecasts produce similar price results? What was the % differences in the forecasts?

RESPONSE:

Comparison of the BC Hydro June 2020 Mid-C price forecast with a more recent forecast from IHS Markit leads to an average difference of less than $4/MWh over the 20-year period from 2021 to 2040 (approximately 10 per cent difference on average). That forecast lies between the low and high BC Hydro scenarios except for the first couple of years when it is lower.

Please refer to BC Hydro's response to ZONE II RPG IR 2.3.2.1 which describes the uncertainty associated with such forecasts.

4.0 Reference: Exhibit B-5, BCOAPO IR 1.13.3; BCSEA IR 1.1.1, 1.1.3.1, 1.1.3.2; City of Surrey IR 1.2.2.1.1; 2019 FACOS Study, page 11 of Appendix A.

On page 11 of Appendix A of the 2019 FACOS Study, BC Hydro provides the Summary of Costs by Functions and Revenue to Cost Ratios:

Summary of Costs by Functions and Revenue to Cost Ratios

Rate Class	Generation Costs	Transmission Costs	Distribution Costs	Customer Care Costs	Total Cost	Total Revenue	Revenue - Cost ($ million)	Revenue:Cost Ratios	R/C Ratios last filed (F2018)	R/C Ratio change from last filed (note 1)
Residential	1,108.1	432.5	528.9	72.3	2,141.8	2,025.2	-116.6	94.6%	93.8%	0.8%
GS Under 35 kW	226.4	71.9	101.4	7.9	407.6	492.6	85.0	120.9%	121.3%	-0.4%
MGS < 150 kW	192.7	56.9	71.3	2.0	322.9	371.7	48.7	115.1%	114.3%	0.8%
LGS > 150 kW	615.9	174.2	152.8	2.3	945.3	968.0	22.8	102.4%	102.9%	-0.5%
Irrigation	3.4	0.1	4.0	0.1	7.6	6.3	-1.3	83.4%	72.0%	11.4%
Street Lighting BCH	3.0	1.2	6.1	0.4	10.7	22.6	11.9	211.9%	210.5%	1.4%
Street Lighting Cust	11.1	4.5	4.9	0.5	20.9	18.5	-2.4	88.4%	92.8%	-4.4%
Transmission	741.8	195.1	0.0	1.6	938.6	890.3	-48.2	94.9%	96.1%	-1.2%
Total	2,902.3	936.4	869.4	87.1	4,795.2	4,795.2	0.0	100.0%		

In BC Hydro's responses to BCSEA, BC Hydro confirmed that RS 1701 accounts for about 95 per cent of the total number of street lights in the BC Hydro Owned Street Lighting rate class. The remaining 5 per cent are for service under RS 1755. BC Hydro confirms that for F2019 211.9 per cent was reasonable estimate for the revenue to cost ratio for RS 1701.

In BC Hydro's response to the City of Surrey, BC Hydro states that based on the fully allocated cost of service methodology, in fiscal 2019 revenue from BC Hydro-owned street light service, which includes RS 1701, exceeds the cost allocated to that service as reflected by a revenue to cost ratio 211.9 per cent.

In BC Hydro's response to BCOAPO, BC Hydro states:

> "At this time BC Hydro does not have a planned filing date for a rate design application that will apply the results of the fully allocated cost of service study to all rate classes in a single application."

2.4.1 If and when BC Hydro files a rate design application that will result in changes to the R/C ratio for the Street Lighting Class, will BC Hydro commit to filing an application to adjust the Street Lighting, BC Hydro Owned rates in this Application? Please provide the reasoning.

RESPONSE:

If BC Hydro were to file an application for rate rebalancing, we anticipate that it would include a request to the BCUC to change rates with the goal of bring the revenue to cost ratios of all our rate classes, including BC Hydro-owned streetlighting, within a range of reasonableness near unity. How this would be achieved would be the subject of the application and BCUC determination.

4.0 Reference: Exhibit B-5, BCOAPO IR 1.13.3; BCSEA IR 1.1.1, 1.1.3.1, 1.1.3.2; City of Surrey IR 1.2.2.1.1; 2019 FACOS Study, page 11 of Appendix A.

On page 11 of Appendix A of the 2019 FACOS Study, BC Hydro provides the Summary of Costs by Functions and Revenue to Cost Ratios:

Summary of Costs by Functions and Revenue to Cost Ratios

Rate Class	Generation Costs	Transmission Costs	Distribution Costs	Customer Care Costs	Total Cost	Total Revenue	Revenue - Cost ($ million)	Revenue:Cost Ratios	R/C Ratios last filed (F2018)	R/C Ratio change from last filed (note 1)
Residential	1,108.1	432.5	528.9	72.3	2,141.8	2,025.2	-116.6	94.6%	93.8%	0.8%
GS Under 35 kW	226.4	71.9	101.4	7.9	407.6	492.6	85.0	120.9%	121.3%	-0.4%
MGS < 150 kW	192.7	56.9	71.3	2.0	322.9	371.7	48.7	115.1%	114.3%	0.8%
LGS > 150 kW	615.9	174.2	152.8	2.3	945.3	968.0	22.8	102.4%	102.9%	-0.5%
Irrigation	3.4	0.1	4.0	0.1	7.6	6.3	-1.3	83.4%	72.0%	11.4%
Street Lighting BCH	3.0	1.2	6.1	0.4	10.7	22.6	11.9	211.9%	210.5%	1.4%
Street Lighting Cust	11.1	4.5	4.9	0.5	20.9	18.5	-2.4	88.4%	92.8%	-4.4%
Transmission	741.8	195.1	0.0	1.6	938.6	890.3	-48.2	94.9%	96.1%	-1.2%
Total	2,902.3	936.4	869.4	87.1	4,795.2	4,795.2	0.0	100.0%		

In BC Hydro's responses to BCSEA, BC Hydro confirmed that RS 1701 accounts for about 95 per cent of the total number of street lights in the BC Hydro Owned Street Lighting rate class. The remaining 5 per cent are for service under RS 1755. BC Hydro confirms that for F2019 211.9 per cent was reasonable estimate for the revenue to cost ratio for RS 1701.

In BC Hydro's response to the City of Surrey, BC Hydro states that based on the fully allocated cost of service methodology, in fiscal 2019 revenue from BC Hydro-owned street light service, which includes RS 1701, exceeds the cost allocated to that service as reflected by a revenue to cost ratio 211.9 per cent.

In BC Hydro's response to BCOAPO, BC Hydro states:

> "At this time BC Hydro does not have a planned filing date for a rate design application that will apply the results of the fully allocated cost of service study to all rate classes in a single application."

2.4.2 Provide street lighting rates under RS 1701 and RS 1755, based on the following R/C ratios: 95%, 100%, 150%, 175%, 250%.

RESPONSE:

Holding all else equal, rates for any rate class would change in proportion to changes to their revenue-to-cost ratio. Under an all else equal scenario, rates at a revenue to cost ratio of 100 per cent would be half those of rates at a revenue-to cost-ratio of 200 per cent.

However, in practice the setting of rates for the purpose of changing the revenue-to-cost ratio would be the determined through a BC Hydro application to the Commission for rate rebalancing, which would consider a number of factors. Revenue-to-cost ratios cannot be changed for a single rate class in isolation. Changes to revenue-to-cost ratios requires rate re-balancing and reallocation of costs between rate classes. There are a number of approaches that can be taken to rate rebalancing with the appropriate approach being determined through a BC Hydro application for rate rebalancing followed by BCUC determination.

5.0 Reference: Exhibit B-5, Zone II RPG IR 1.4.1.1

In BC Hydro's response to Zone II RPG, it stated that:

> Instead of a third pilot in the Northern Interior, BC Hydro contacted other utilities that had installations in very extreme weather conditions. We are confident that the street lights will perform satisfactorily in these locations.

2.5.1 Provide details of BC Hydro's contacts with the other utilities. Include any documentation (reports, emails, memos, etc.) of these communications.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 2.19.2.1.

BC Hydro did not seek consent to publicly release the information obtained from these communications. In the time available we are unable to contact all relevant parties to determine confidentiality of any content and obtain consent to release.

6.0 Reference: Exhibit B-1 (Application), Table 4, page 22; Exhibit B-5, Zone II RPG IR 1.6.1, 1.6.1.1, 1.6.1.1.2, 1.6.1.1.3, 1.6.1.1.7; Exhibit B-2-2 (F2022 RRA Appendices), Appendix Q (Fiscal 2021 BC Hydro Service Plan) Goal 4 (Help Make Renewable, Clean Power British Columbia's Leading Energy Source).

From the Application, Table 4 shows the LED Street Lighting Installation Plan:

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

In BC Hydro's response to Zone II RPG 1.6.1, BC Hydro states that:

> Table 4 is a high level and preliminary deployment schedule based on the installation capacity of BC Hydro's installation service contractors and internal crew.
>
> The actual deployment schedule will be adjusted to enable a cost-efficient roll-out considering the timing of BC Hydro receiving customer selections, geographical distribution of the street lights and field crews, field crew capacity, seasonality, etc. Furthermore, it should be noted that when HPS lights fail, if BC Hydro has the customer's LED selection, the light will be converted reactively to an LED street light.

Furthermore, in BC Hydro's responses to Zone II RPG IR 1.6.1.1, 1.6.1.1.2 and 1.6.1.1.3, BC Hydro states that Table 4 is not the final deployment schedule. As well, BC Hydro states that:

> BC Hydro notes that cost of energy varies by community across the NIA. In recognition of the higher cost of energy in some NIA communities, the Program is continuing to evaluate opportunities to convert the lights in these communities to LEDs earlier in the deployment period. However, this will be done in consideration of managing an overall cost-efficient deployment.

In response to Zone II RPG IR 1.6.1.1.7, BC Hydro states that:

> The actual deployment schedule will be based upon several factors, including but not limited to: timing of receiving LED selections from

individual customers and other customers within geographical areas, geography (e.g., location of lights and crews within the province), weather/seasonal impacts, and field crew capacity.

According to BC Hydro's Goal 4:

> As part of the CleanBC plan, partner with the Province and the federal government to implement the Remote Community Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

2.6.1 Given BC Hydro's F2021 Service Plan priorities for reducing diesel generation, why was diesel savings from installing LED street lights earlier in the deployment schedule not considered as part of BC Hydro's installation schedule? Please explain.

RESPONSE:

Diesel savings from installing LED street lights was one of the factors considered in the development of the preliminary deployment schedule for the Street Light Replacement Program (Program). The preliminary schedule was focused on identifying locations that would be easily accessible to verify the Program's processes, performance of the Installation Services Contractors and the products.

As indicated in BC Hydro's response to ZONE II RPG IR 2.2.1, BC Hydro is currently refining the Program's deployment schedule, which includes evaluating various inputs and factors which will influence and affect the schedule and roll-out of LEDs. The diesel savings from installing LED street lights is one of those factors, and BC Hydro is continuing to look into opportunities to replace the street lights in NIA communities earlier in the deployment schedule.

6.0 Reference: Exhibit B-1 (Application), Table 4, page 22; Exhibit B-5, Zone II RPG IR 1.6.1, 1.6.1.1, 1.6.1.1.2, 1.6.1.1.3, 1.6.1.1.7; Exhibit B-2-2 (F2022 RRA Appendices), Appendix Q (Fiscal 2021 BC Hydro Service Plan) Goal 4 (Help Make Renewable, Clean Power British Columbia's Leading Energy Source).

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Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
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In BC Hydro's response to Zone II RPG 1.6.1, BC Hydro states that:

> Table 4 is a high level and preliminary deployment schedule based on the installation capacity of BC Hydro's installation service contractors and internal crew.
>
> The actual deployment schedule will be adjusted to enable a cost-efficient roll-out considering the timing of BC Hydro receiving customer selections, geographical distribution of the street lights and field crews, field crew capacity, seasonality, etc. Furthermore, it should be noted that when HPS lights fail, if BC Hydro has the customer's LED selection, the light will be converted reactively to an LED street light.

Furthermore, in BC Hydro's responses to Zone II RPG IR 1.6.1.1, 1.6.1.1.2 and 1.6.1.1.3, BC Hydro states that Table 4 is not the final deployment schedule. As well, BC Hydro states that:

> BC Hydro notes that cost of energy varies by community across the NIA. In recognition of the higher cost of energy in some NIA communities, the Program is continuing to evaluate opportunities to convert the lights in these communities to LEDs earlier in the deployment period. However, this will be done in consideration of managing an overall cost-efficient deployment.

In response to Zone II RPG IR 1.6.1.1.7, BC Hydro states that:

> The actual deployment schedule will be based upon several factors, including but not limited to: timing of receiving LED selections from

individual customers and other customers within geographical areas, geography (e.g., location of lights and crews within the province), weather/seasonal impacts, and field crew capacity.

According to BC Hydro's Goal 4:

> As part of the CleanBC plan, partner with the Province and the federal government to implement the Remote Community Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

2.6.2 Confirm or explain otherwise if BC Hydro also considers the avoided diesel generation savings of $300/MWh in the NIA in the installation of energy efficient LED street lighting in managing an overall cost-efficient deployment. If not, please explain.

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.2.1.

6.0 Reference: Exhibit B-1 (Application), Table 4, page 22; Exhibit B-5, Zone II RPG IR 1.6.1, 1.6.1.1, 1.6.1.1.2, 1.6.1.1.3, 1.6.1.1.7; Exhibit B-2-2 (F2022 RRA Appendices), Appendix Q (Fiscal 2021 BC Hydro Service Plan) Goal 4 (Help Make Renewable, Clean Power British Columbia's Leading Energy Source).

From the Application, Table 4 shows the LED Street Lighting Installation Plan:

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
Total	2,450	9,350	12,300	12,700	9,100	9,000	10,400	10,200	7,500	4,700	3,150

In BC Hydro's response to Zone II RPG 1.6.1, BC Hydro states that:

> Table 4 is a high level and preliminary deployment schedule based on the installation capacity of BC Hydro's installation service contractors and internal crew.
>
> The actual deployment schedule will be adjusted to enable a cost-efficient roll-out considering the timing of BC Hydro receiving customer selections, geographical distribution of the street lights and field crews, field crew capacity, seasonality, etc. Furthermore, it should be noted that when HPS lights fail, if BC Hydro has the customer's LED selection, the light will be converted reactively to an LED street light.

Furthermore, in BC Hydro's responses to Zone II RPG IR 1.6.1.1, 1.6.1.1.2 and 1.6.1.1.3, BC Hydro states that Table 4 is not the final deployment schedule. As well, BC Hydro states that:

> BC Hydro notes that cost of energy varies by community across the NIA. In recognition of the higher cost of energy in some NIA communities, the Program is continuing to evaluate opportunities to convert the lights in these communities to LEDs earlier in the deployment period. However, this will be done in consideration of managing an overall cost-efficient deployment.

In response to Zone II RPG IR 1.6.1.1.7, BC Hydro states that:

> The actual deployment schedule will be based upon several factors, including but not limited to: timing of receiving LED selections from

individual customers and other customers within geographical areas, geography (e.g., location of lights and crews within the province), weather/seasonal impacts, and field crew capacity.

According to BC Hydro's Goal 4:

> As part of the CleanBC plan, partner with the Province and the federal government to implement the Remote Community Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

2.6.3 Provide an updated LED Installation Plan (Table 4), if there have been any changes.

RESPONSE:

Below is an updated version of the LED Installation Plan (Table 4).

Region	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland	1,341	3,957	5,443	5,017	2,123	4,858	4,131	4,606	1,619	955
Northern Interior (including Non-Integrated Areas)	564	32	398	536	339	101	4,733	4,141	2,401	3,707
Southern Interior		3,144	4,705	3,000	3,636	1,819				
Vancouver Island	1,983	6,234	3,949	3,776	2,147	3,194				
Grand Total	**3,888**	**13,367**	**14,495**	**12,329**	**8,245**	**9,972**	**8,864**	**8,747**	**4,020**	**4,662**

Note that Lower Mainland North and South regions are consolidated as Lower Mainland and that the Non-Integrated Areas are included within the Northern Interior region.

6.0 Reference: Exhibit B-1 (Application), Table 4, page 22; Exhibit B-5, Zone II RPG IR 1.6.1, 1.6.1.1, 1.6.1.1.2, 1.6.1.1.3, 1.6.1.1.7; Exhibit B-2-2 (F2022 RRA Appendices), Appendix Q (Fiscal 2021 BC Hydro Service Plan) Goal 4 (Help Make Renewable, Clean Power British Columbia's Leading Energy Source).

From the Application, Table 4 shows the LED Street Lighting Installation Plan:

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
Lower Mainland North	-	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	750	-
Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
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Furthermore, in BC Hydro's responses to Zone II RPG IR 1.6.1.1, 1.6.1.1.2 and 1.6.1.1.3, BC Hydro states that Table 4 is not the final deployment schedule. As well, BC Hydro states that:

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In response to Zone II RPG IR 1.6.1.1.7, BC Hydro states that:

> The actual deployment schedule will be based upon several factors, including but not limited to: timing of receiving LED selections from

individual customers and other customers within geographical areas, geography (e.g., location of lights and crews within the province), weather/seasonal impacts, and field crew capacity.

According to BC Hydro's Goal 4:

> As part of the CleanBC plan, partner with the Province and the federal government to implement the Remote Community Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

2.6.4 Advise when the actual deployment schedule (Table 4) will be finalized and whether it will be done in consultation with any NIA communities?

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.2.1.

6.0 Reference: Exhibit B-1 (Application), Table 4, page 22; Exhibit B-5, Zone II RPG IR 1.6.1, 1.6.1.1, 1.6.1.1.2, 1.6.1.1.3, 1.6.1.1.7; Exhibit B-2-2 (F2022 RRA Appendices), Appendix Q (Fiscal 2021 BC Hydro Service Plan) Goal 4 (Help Make Renewable, Clean Power British Columbia's Leading Energy Source).

From the Application, Table 4 shows the LED Street Lighting Installation Plan:

Table 4 LED Street Lighting Installation Plan – number of street lights replaced per quarter

Region	Q3F21	Q4F21	Q1F22	Q2F22	Q3F22	Q4F22	Q1F23	Q2F23	Q3F23	Q4F23	Q1F24
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Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
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In BC Hydro's response to Zone II RPG 1.6.1, BC Hydro states that:

> Table 4 is a high level and preliminary deployment schedule based on the installation capacity of BC Hydro's installation service contractors and internal crew.
>
> The actual deployment schedule will be adjusted to enable a cost-efficient roll-out considering the timing of BC Hydro receiving customer selections, geographical distribution of the street lights and field crews, field crew capacity, seasonality, etc. Furthermore, it should be noted that when HPS lights fail, if BC Hydro has the customer's LED selection, the light will be converted reactively to an LED street light.

Furthermore, in BC Hydro's responses to Zone II RPG IR 1.6.1.1, 1.6.1.1.2 and 1.6.1.1.3, BC Hydro states that Table 4 is not the final deployment schedule. As well, BC Hydro states that:

> BC Hydro notes that cost of energy varies by community across the NIA. In recognition of the higher cost of energy in some NIA communities, the Program is continuing to evaluate opportunities to convert the lights in these communities to LEDs earlier in the deployment period. However, this will be done in consideration of managing an overall cost-efficient deployment.

In response to Zone II RPG IR 1.6.1.1.7, BC Hydro states that:

> The actual deployment schedule will be based upon several factors, including but not limited to: timing of receiving LED selections from

individual customers and other customers within geographical areas, geography (e.g., location of lights and crews within the province), weather/seasonal impacts, and field crew capacity.

According to BC Hydro's Goal 4:

> As part of the CleanBC plan, partner with the Province and the federal government to implement the Remote Community Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

2.6.5 Provide details on how BC Hydro will evaluate opportunities to convert LED lights in the NIA earlier in the deployment period.

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.2.1.

6.0 Reference: Exhibit B-1 (Application), Table 4, page 22; Exhibit B-5, Zone II RPG IR 1.6.1, 1.6.1.1, 1.6.1.1.2, 1.6.1.1.3, 1.6.1.1.7; Exhibit B-2-2 (F2022 RRA Appendices), Appendix Q (Fiscal 2021 BC Hydro Service Plan) Goal 4 (Help Make Renewable, Clean Power British Columbia's Leading Energy Source).

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Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
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Furthermore, in BC Hydro's responses to Zone II RPG IR 1.6.1.1, 1.6.1.1.2 and 1.6.1.1.3, BC Hydro states that Table 4 is not the final deployment schedule. As well, BC Hydro states that:

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According to BC Hydro's Goal 4:

> As part of the CleanBC plan, partner with the Province and the federal government to implement the Remote Community Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

2.6.5 Provide details on how BC Hydro will evaluate opportunities to convert LED lights in the NIA earlier in the deployment period.

2.6.5.1 What criteria will BC Hydro use in the evaluation? Please explain.

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.2.1.

6.0 Reference: Exhibit B-1 (Application), Table 4, page 22; Exhibit B-5, Zone II RPG IR 1.6.1, 1.6.1.1, 1.6.1.1.2, 1.6.1.1.3, 1.6.1.1.7; Exhibit B-2-2 (F2022 RRA Appendices), Appendix Q (Fiscal 2021 BC Hydro Service Plan) Goal 4 (Help Make Renewable, Clean Power British Columbia's Leading Energy Source).

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Lower Mainland South	-	1,600	2,400	2,400	2,400	2,400	4,800	4,600	3,300	750	-
Vancouver Island	1,250	2,800	5,000	4,800	3,200	3,200	1,500	-	-	-	-
North Interior	400	550	-	-	-	-	2,900	4,400	3,000	3,200	3,150
South Interior	800	3,200	3,700	4,300	2,300	2,200	-	-	-	-	-
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In response to Zone II RPG IR 1.6.1.1.7, BC Hydro states that:

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individual customers and other customers within geographical areas, geography (e.g., location of lights and crews within the province), weather/seasonal impacts, and field crew capacity.

According to BC Hydro's Goal 4:

> As part of the CleanBC plan, partner with the Province and the federal government to implement the Remote Community Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

2.6.6 Does BC Hydro consider how improved lighting might contribute to enhanced safety in remote communities in developing the actual deployment schedule?

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.2.1 which indicates that the deployment schedule is being refined specifically as related to NIA communities. BC Hydro anticipates having a tentative schedule for NIA available in summer 2021. Safety is one of the factors that will be taken into account when developing this refined schedule.

7.0 Reference: Exhibit B-5, Zone II RPG IR 1.7.1.2, 1.7.4; Exhibit B-2-2 BC Hydro F22 RRA Appendices, Appendix M (Fiscal 2022 Demand-Side Management Program), Section C: Portfolio-Wide Assumptions, page 67.

In response to Zone II RPG IR 1.7.1.2, BC Hydro states:

> The marginal energy costs in Table G-3 Column C are based on costs in BC Hydro's integrated system only.
>
> As RS 1701 is a postage stamp rate across both the Non-Integrated Areas and integrated areas, using the marginal energy cost from the integrated areas may introduce some uncertainty. However, this impact is expected to be modest as the street lights in Non-Integrated Areas only account for approximately 1.5 per cent of the number of street lights and associated energy usage of RS 1701, as described in BC Hydro's response to ZONE II RPG IR 1.7.4.

Furthermore, in response to Zone II RPG IR 1.7.4, BC Hydro provides the following table the value of the total electricity savings attributable to LED replacement of street lights in Non-Integrate Areas are estimated as below:

Fiscal Year	Street Light Demand Reduction of NIA (kW)	Street Light Energy Reduction of NIA (MWh)	Marginal Cost Reduction of NIA		
			Capacity ($M)	Energy ($ million)	Total ($ million)
2021	5	21	0.00	0.00	0.00
2022	34	142	0.00	0.00	0.01
2023	78	328	0.01	0.01	0.02
2024	99	417	0.01	0.01	0.03
2025	100	420	0.01	0.01	0.03
2026	100	420	0.01	0.02	0.03
2027	100	420	0.01	0.02	0.03
2028	100	420	0.01	0.02	0.03
2029	100	420	0.01	0.02	0.03
2030	100	420	0.01	0.02	0.03
2031	100	420	0.02	0.02	0.04

Fiscal	Street Light	Street Light	Marginal Cost Reduction of NIA		
2032	100	420	0.02	0.02	0.04
2033	100	420	0.02	0.02	0.04
2034	100	420	0.02	0.02	0.04
2035	100	420	0.02	0.02	0.04
2036	100	420	0.02	0.02	0.04
2037	100	420	0.02	0.02	0.04
2038	100	420	0.03	0.02	0.05
2039	100	420	0.03	0.03	0.06
2040	100	420	0.03	0.03	0.06

Note: Numbers may not add up due to rounding.

BC Hydro acknowledges that the marginal value of electricity in the non-integrated areas is different than it is in the integrated system. For example, there is no transmission in the non-integrated areas therefore marginal costs related to transmission are not applicable. Further, the marginal costs of energy and distribution is community specific and varies across the non-integrated areas. Nonetheless, BC Hydro concludes the use of the marginal values based on the integrated system is reasonable for the purpose of developing the proposed RS 1701 rates given the rates are postage stamp and the number of lights in the non-integrated areas is modest compared to the total number of lights overall.

In BC Hydro's F2022 Revenue Requirements Application in Appendix M, Section C (Portfolio-Wide Assumptions), the Equivalent Avoided Cost of Diesel generation in the Non-Integrated Area is $300 per MWh (F2021$).

2.7.1 Confirm if the calculation of NIA electricity savings in the table above is consistent with how BC Hydro evaluates its NIA Demand Side Management energy cost savings, including using $300/MWh (F2021$) as the equivalent avoided cost of diesel. If not, please explain why the analysis differs.

RESPONSE:

BC Hydro confirms that the calculation of the value of electricity savings in Table G-3 of the Application is not consistent with how BC Hydro valued the NIA Demand-Side Management energy savings in Appendix M of BC Hydro's F2022 Revenue Requirements Application.

This Application uses the integrated system-wide marginal energy and demand costs because BC Hydro does not have location specific marginal energy and

demand cost estimates. Developing such estimates can be resource intensive and is not considered warranted given the Application is for postage stamp rates that apply across our service territory.

7.0 Reference: Exhibit B-5, Zone II RPG IR 1.7.1.2, 1.7.4; Exhibit B-2-2 BC Hydro F22 RRA Appendices, Appendix M (Fiscal 2022 Demand-Side Management Program), Section C: Portfolio-Wide Assumptions, page 67.

In response to Zone II RPG IR 1.7.1.2, BC Hydro states:

> The marginal energy costs in Table G-3 Column C are based on costs in BC Hydro's integrated system only.
>
> As RS 1701 is a postage stamp rate across both the Non-Integrated Areas and integrated areas, using the marginal energy cost from the integrated areas may introduce some uncertainty. However, this impact is expected to be modest as the street lights in Non-Integrated Areas only account for approximately 1.5 per cent of the number of street lights and associated energy usage of RS 1701, as described in BC Hydro's response to ZONE II RPG IR 1.7.4.

Furthermore, in response to Zone II RPG IR 1.7.4, BC Hydro provides the following table the value of the total electricity savings attributable to LED replacement of street lights in Non-Integrate Areas are estimated as below:

Fiscal Year	Street Light Demand Reduction of NIA (kW)	Street Light Energy Reduction of NIA (MWh)	Marginal Cost Reduction of NIA		
			Capacity ($M)	Energy ($ million)	Total ($ million)
2021	5	21	0.00	0.00	0.00
2022	34	142	0.00	0.00	0.01
2023	78	328	0.01	0.01	0.02
2024	99	417	0.01	0.01	0.03
2025	100	420	0.01	0.01	0.03
2026	100	420	0.01	0.02	0.03
2027	100	420	0.01	0.02	0.03
2028	100	420	0.01	0.02	0.03
2029	100	420	0.01	0.02	0.03
2030	100	420	0.01	0.02	0.03
2031	100	420	0.02	0.02	0.04

Fiscal	Street Light	Street Light	Marginal Cost Reduction of NIA		
2032	100	420	0.02	0.02	0.04
2033	100	420	0.02	0.02	0.04
2034	100	420	0.02	0.02	0.04
2035	100	420	0.02	0.02	0.04
2036	100	420	0.02	0.02	0.04
2037	100	420	0.02	0.02	0.04
2038	100	420	0.03	0.02	0.05
2039	100	420	0.03	0.03	0.06
2040	100	420	0.03	0.03	0.06

Note: Numbers may not add up due to rounding.

BC Hydro acknowledges that the marginal value of electricity in the non-integrated areas is different than it is in the integrated system. For example, there is no transmission in the non-integrated areas therefore marginal costs related to transmission are not applicable. Further, the marginal costs of energy and distribution is community specific and varies across the non-integrated areas. Nonetheless, BC Hydro concludes the use of the marginal values based on the integrated system is reasonable for the purpose of developing the proposed RS 1701 rates given the rates are postage stamp and the number of lights in the non-integrated areas is modest compared to the total number of lights overall.

In BC Hydro's F2022 Revenue Requirements Application in Appendix M, Section C (Portfolio-Wide Assumptions), the Equivalent Avoided Cost of Diesel generation in the Non-Integrated Area is $300 per MWh (F2021$).

2.7.1.1 Confirm, or explain otherwise, that the NIA electricity savings estimated in the table above was calculated based on the marginal cost of the equivalent avoided diesel generation in the NIA ($300/MWh in F2021$). If not, please recalculate the table using $300/MWh (F2021$).

RESPONSE:

Below we provide an update to the table previously provided in BC Hydro's response to ZONE II RPG IR 1.7.4 under the following assumptions:

- **A marginal cost of energy $300/MWh in each year of the twenty year analysis time frame;**

- **A marginal cost of capacity of zero $/kW in each year of the twenty-year analysis time frame; and**
- **The same distribution of lamp wattage in the NIA as in the integrated system.**

Fiscal	Street Light	Street Light	Marginal Cost Reduction		
Year	Demand Reduction of NIA (kW)	Energy Reduction of NIA (MWh)	Capacity ($M)	Energy ($M)	Total ($M)
2021	5	21	-	0.01	0.01
2022	34	142	-	0.04	0.04
2023	78	328	-	0.10	0.10
2024	99	417	-	0.12	0.12
2025	100	420	-	0.13	0.13
2026	100	420	-	0.13	0.13
2027	100	420	-	0.13	0.13
2028	100	420	-	0.13	0.13
2029	100	420	-	0.13	0.13
2030	100	420	-	0.13	0.13
2031	100	420	-	0.13	0.13
2032	100	420	-	0.13	0.13
2033	100	420	-	0.13	0.13
2034	100	420	-	0.13	0.13
2035	100	420	-	0.13	0.13
2036	100	420	-	0.13	0.13
2037	100	420	-	0.13	0.13
2038	100	420	-	0.13	0.13
2039	100	420	-	0.13	0.13
2040	100	420	-	0.13	0.13

7.0 Reference: Exhibit B-5, Zone II RPG IR 1.7.1.2, 1.7.4; Exhibit B-2-2 BC Hydro F22 RRA Appendices, Appendix M (Fiscal 2022 Demand-Side Management Program), Section C: Portfolio-Wide Assumptions, page 67.

In response to Zone II RPG IR 1.7.1.2, BC Hydro states:

> The marginal energy costs in Table G-3 Column C are based on costs in BC Hydro's integrated system only.
>
> As RS 1701 is a postage stamp rate across both the Non-Integrated Areas and integrated areas, using the marginal energy cost from the integrated areas may introduce some uncertainty. However, this impact is expected to be modest as the street lights in Non-Integrated Areas only account for approximately 1.5 per cent of the number of street lights and associated energy usage of RS 1701, as described in BC Hydro's response to ZONE II RPG IR 1.7.4.

Furthermore, in response to Zone II RPG IR 1.7.4, BC Hydro provides the following table the value of the total electricity savings attributable to LED replacement of street lights in Non-Integrate Areas are estimated as below:

Fiscal Year	Street Light Demand Reduction of NIA (kW)	Street Light Energy Reduction of NIA (MWh)	Marginal Cost Reduction of NIA		
			Capacity ($M)	Energy ($ million)	Total ($ million)
2021	5	21	0.00	0.00	0.00
2022	34	142	0.00	0.00	0.01
2023	78	328	0.01	0.01	0.02
2024	99	417	0.01	0.01	0.03
2025	100	420	0.01	0.01	0.03
2026	100	420	0.01	0.02	0.03
2027	100	420	0.01	0.02	0.03
2028	100	420	0.01	0.02	0.03
2029	100	420	0.01	0.02	0.03
2030	100	420	0.01	0.02	0.03
2031	100	420	0.02	0.02	0.04

Fiscal	Street Light	Street Light	Marginal Cost Reduction of NIA		
2032	100	420	0.02	0.02	0.04
2033	100	420	0.02	0.02	0.04
2034	100	420	0.02	0.02	0.04
2035	100	420	0.02	0.02	0.04
2036	100	420	0.02	0.02	0.04
2037	100	420	0.02	0.02	0.04
2038	100	420	0.03	0.02	0.05
2039	100	420	0.03	0.03	0.06
2040	100	420	0.03	0.03	0.06

Note: Numbers may not add up due to rounding.

BC Hydro acknowledges that the marginal value of electricity in the non-integrated areas is different than it is in the integrated system. For example, there is no transmission in the non-integrated areas therefore marginal costs related to transmission are not applicable. Further, the marginal costs of energy and distribution is community specific and varies across the non-integrated areas. Nonetheless, BC Hydro concludes the use of the marginal values based on the integrated system is reasonable for the purpose of developing the proposed RS 1701 rates given the rates are postage stamp and the number of lights in the non-integrated areas is modest compared to the total number of lights overall.

In BC Hydro's F2022 Revenue Requirements Application in Appendix M, Section C (Portfolio-Wide Assumptions), the Equivalent Avoided Cost of Diesel generation in the Non-Integrated Area is $300 per MWh (F2021$).

2.7.2 Confirm, or explain otherwise, that NIA electricity savings based on the equivalent avoided cost of diesel generation ($300/MWh in F2021$), are not included in the RS 1701 Marginal Cost analysis and calculation of the LED Rate and Effective Rate shown in Table G-6.

RESPONSE:

BC Hydro confirms that a value of 300 $/MWh was not used as an input to Table G-6 of the Application.

7.0 Reference: Exhibit B-5, Zone II RPG IR 1.7.1.2, 1.7.4; Exhibit B-2-2 BC Hydro F22 RRA Appendices, Appendix M (Fiscal 2022 Demand-Side Management Program), Section C: Portfolio-Wide Assumptions, page 67.

In response to Zone II RPG IR 1.7.1.2, BC Hydro states:

> The marginal energy costs in Table G-3 Column C are based on costs in BC Hydro's integrated system only.
>
> As RS 1701 is a postage stamp rate across both the Non-Integrated Areas and integrated areas, using the marginal energy cost from the integrated areas may introduce some uncertainty. However, this impact is expected to be modest as the street lights in Non-Integrated Areas only account for approximately 1.5 per cent of the number of street lights and associated energy usage of RS 1701, as described in BC Hydro's response to ZONE II RPG IR 1.7.4.

Furthermore, in response to Zone II RPG IR 1.7.4, BC Hydro provides the following table the value of the total electricity savings attributable to LED replacement of street lights in Non-Integrate Areas are estimated as below:

Fiscal Year	Street Light Demand Reduction of NIA (kW)	Street Light Energy Reduction of NIA (MWh)	Marginal Cost Reduction of NIA		
			Capacity ($M)	Energy ($ million)	Total ($ million)
2021	5	21	0.00	0.00	0.00
2022	34	142	0.00	0.00	0.01
2023	78	328	0.01	0.01	0.02
2024	99	417	0.01	0.01	0.03
2025	100	420	0.01	0.01	0.03
2026	100	420	0.01	0.02	0.03
2027	100	420	0.01	0.02	0.03
2028	100	420	0.01	0.02	0.03
2029	100	420	0.01	0.02	0.03
2030	100	420	0.01	0.02	0.03
2031	100	420	0.02	0.02	0.04

Fiscal	Street Light	Street Light	Marginal Cost Reduction of NIA		
2032	100	420	0.02	0.02	0.04
2033	100	420	0.02	0.02	0.04
2034	100	420	0.02	0.02	0.04
2035	100	420	0.02	0.02	0.04
2036	100	420	0.02	0.02	0.04
2037	100	420	0.02	0.02	0.04
2038	100	420	0.03	0.02	0.05
2039	100	420	0.03	0.03	0.06
2040	100	420	0.03	0.03	0.06

Note: Numbers may not add up due to rounding.

BC Hydro acknowledges that the marginal value of electricity in the non-integrated areas is different than it is in the integrated system. For example, there is no transmission in the non-integrated areas therefore marginal costs related to transmission are not applicable. Further, the marginal costs of energy and distribution is community specific and varies across the non-integrated areas. Nonetheless, BC Hydro concludes the use of the marginal values based on the integrated system is reasonable for the purpose of developing the proposed RS 1701 rates given the rates are postage stamp and the number of lights in the non-integrated areas is modest compared to the total number of lights overall.

In BC Hydro's F2022 Revenue Requirements Application in Appendix M, Section C (Portfolio-Wide Assumptions), the Equivalent Avoided Cost of Diesel generation in the Non-Integrated Area is $300 per MWh (F2021$).

2.7.3 Confirm, or explain otherwise, that incorporating NIA electricity savings, based on the equivalent avoided cost of diesel generation ($300/MWh in F2021$) may result in a reduction in the RS 1701 LED Rate and Effective Rate.

RESPONSE:

BC Hydro is unable to confirm the extent to which incorporating NIA electricity savings based on the marginal energy costs in the NIA would impact the RS 1701 LED Rate and Effective Rate.

The cost of diesel varies by year and by community. The fuel mix in NIA communities also varies and is not exclusively diesel; for example, some NIA communities are primarily hydro electric generation and other NIA communities

have biomass generation. In addition, the mix of street lights, their wattage and their energy savings is likely to vary community by community.

Holding all else equal and applying the assumptions described in BC Hydro's response to ZONE II RPG IR 2.7.1.1, the Proposed RS 1701 rates would be reduced by 8 cents / month / street light.

7.0 Reference: Exhibit B-5, Zone II RPG IR 1.7.1.2, 1.7.4; Exhibit B-2-2 BC Hydro F22 RRA Appendices, Appendix M (Fiscal 2022 Demand-Side Management Program), Section C: Portfolio-Wide Assumptions, page 67.

In response to Zone II RPG IR 1.7.1.2, BC Hydro states:

> The marginal energy costs in Table G-3 Column C are based on costs in BC Hydro's integrated system only.
>
> As RS 1701 is a postage stamp rate across both the Non-Integrated Areas and integrated areas, using the marginal energy cost from the integrated areas may introduce some uncertainty. However, this impact is expected to be modest as the street lights in Non-Integrated Areas only account for approximately 1.5 per cent of the number of street lights and associated energy usage of RS 1701, as described in BC Hydro's response to ZONE II RPG IR 1.7.4.

Furthermore, in response to Zone II RPG IR 1.7.4, BC Hydro provides the following table the value of the total electricity savings attributable to LED replacement of street lights in Non-Integrate Areas are estimated as below:

Fiscal Year	Street Light Demand Reduction of NIA (kW)	Street Light Energy Reduction of NIA (MWh)	Marginal Cost Reduction of NIA		
			Capacity ($M)	Energy ($ million)	Total ($ million)
2021	5	21	0.00	0.00	0.00
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2024	99	417	0.01	0.01	0.03
2025	100	420	0.01	0.01	0.03
2026	100	420	0.01	0.02	0.03
2027	100	420	0.01	0.02	0.03
2028	100	420	0.01	0.02	0.03
2029	100	420	0.01	0.02	0.03
2030	100	420	0.01	0.02	0.03
2031	100	420	0.02	0.02	0.04

Fiscal	Street Light	Street Light	Marginal Cost Reduction of NIA		
2032	100	420	0.02	0.02	0.04
2033	100	420	0.02	0.02	0.04
2034	100	420	0.02	0.02	0.04
2035	100	420	0.02	0.02	0.04
2036	100	420	0.02	0.02	0.04
2037	100	420	0.02	0.02	0.04
2038	100	420	0.03	0.02	0.05
2039	100	420	0.03	0.03	0.06
2040	100	420	0.03	0.03	0.06

Note: Numbers may not add up due to rounding.

BC Hydro acknowledges that the marginal value of electricity in the non-integrated areas is different than it is in the integrated system. For example, there is no transmission in the non-integrated areas therefore marginal costs related to transmission are not applicable. Further, the marginal costs of energy and distribution is community specific and varies across the non-integrated areas. Nonetheless, BC Hydro concludes the use of the marginal values based on the integrated system is reasonable for the purpose of developing the proposed RS 1701 rates given the rates are postage stamp and the number of lights in the non-integrated areas is modest compared to the total number of lights overall.

In BC Hydro's F2022 Revenue Requirements Application in Appendix M, Section C (Portfolio-Wide Assumptions), the Equivalent Avoided Cost of Diesel generation in the Non-Integrated Area is $300 per MWh (F2021$).

2.7.3.1 Please provide the impact of NIA electricity cost savings, using an equivalent avoided cost of diesel generation of $300/MWh (F2021$) on RS 1701 rates.

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.7.3.

7.0 Reference: Exhibit B-5, Zone II RPG IR 1.7.1.2, 1.7.4; Exhibit B-2-2 BC Hydro F22 RRA Appendices, Appendix M (Fiscal 2022 Demand-Side Management Program), Section C: Portfolio-Wide Assumptions, page 67.

In response to Zone II RPG IR 1.7.1.2, BC Hydro states:

> The marginal energy costs in Table G-3 Column C are based on costs in BC Hydro's integrated system only.
>
> As RS 1701 is a postage stamp rate across both the Non-Integrated Areas and integrated areas, using the marginal energy cost from the integrated areas may introduce some uncertainty. However, this impact is expected to be modest as the street lights in Non-Integrated Areas only account for approximately 1.5 per cent of the number of street lights and associated energy usage of RS 1701, as described in BC Hydro's response to ZONE II RPG IR 1.7.4.

Furthermore, in response to Zone II RPG IR 1.7.4, BC Hydro provides the following table the value of the total electricity savings attributable to LED replacement of street lights in Non-Integrate Areas are estimated as below:

Fiscal Year	Street Light Demand Reduction of NIA (kW)	Street Light Energy Reduction of NIA (MWh)	Marginal Cost Reduction of NIA		
			Capacity ($M)	Energy ($ million)	Total ($ million)
2021	5	21	0.00	0.00	0.00
2022	34	142	0.00	0.00	0.01
2023	78	328	0.01	0.01	0.02
2024	99	417	0.01	0.01	0.03
2025	100	420	0.01	0.01	0.03
2026	100	420	0.01	0.02	0.03
2027	100	420	0.01	0.02	0.03
2028	100	420	0.01	0.02	0.03
2029	100	420	0.01	0.02	0.03
2030	100	420	0.01	0.02	0.03
2031	100	420	0.02	0.02	0.04

Fiscal	Street Light	Street Light	Marginal Cost Reduction of NIA		
2032	100	420	0.02	0.02	0.04
2033	100	420	0.02	0.02	0.04
2034	100	420	0.02	0.02	0.04
2035	100	420	0.02	0.02	0.04
2036	100	420	0.02	0.02	0.04
2037	100	420	0.02	0.02	0.04
2038	100	420	0.03	0.02	0.05
2039	100	420	0.03	0.03	0.06
2040	100	420	0.03	0.03	0.06

Note: Numbers may not add up due to rounding.

BC Hydro acknowledges that the marginal value of electricity in the non-integrated areas is different than it is in the integrated system. For example, there is no transmission in the non-integrated areas therefore marginal costs related to transmission are not applicable. Further, the marginal costs of energy and distribution is community specific and varies across the non-integrated areas. Nonetheless, BC Hydro concludes the use of the marginal values based on the integrated system is reasonable for the purpose of developing the proposed RS 1701 rates given the rates are postage stamp and the number of lights in the non-integrated areas is modest compared to the total number of lights overall.

In BC Hydro's F2022 Revenue Requirements Application in Appendix M, Section C (Portfolio-Wide Assumptions), the Equivalent Avoided Cost of Diesel generation in the Non-Integrated Area is $300 per MWh (F2021$).

2.7.4 In addition to basing the marginal cost model on the integrated system, what other assumptions and/or simplifications did BC Hydro make in its marginal cost model analysis?

RESPONSE:

The analysis in Table G-3 assumes the system wide average wattage change applies to individual street lights. BC Hydro recognizes that the wattage distribution of an individual RS 1701 customer may not match the distribution across BC Hydro's service territory. In particular, small communities with few lights and no highways may have relatively lower wattage lights than larger communities that illuminate highways.

Because the marginal economic model was used to estimate the total system wide impacts of the Replacement Program, this assumption has no impact on the

accuracy of the calculated rates. It could, however, introduce inaccuracies if the model results were applied to subset of RS 1701 customers, as was done for BC Hydro's response to ZONE II IR 2.7.3.

7.0 Reference: Exhibit B-5, Zone II RPG IR 1.7.1.2, 1.7.4; Exhibit B-2-2 BC Hydro F22 RRA Appendices, Appendix M (Fiscal 2022 Demand-Side Management Program), Section C: Portfolio-Wide Assumptions, page 67.

In response to Zone II RPG IR 1.7.1.2, BC Hydro states:

> The marginal energy costs in Table G-3 Column C are based on costs in BC Hydro's integrated system only.
>
> As RS 1701 is a postage stamp rate across both the Non-Integrated Areas and integrated areas, using the marginal energy cost from the integrated areas may introduce some uncertainty. However, this impact is expected to be modest as the street lights in Non-Integrated Areas only account for approximately 1.5 per cent of the number of street lights and associated energy usage of RS 1701, as described in BC Hydro's response to ZONE II RPG IR 1.7.4.

Furthermore, in response to Zone II RPG IR 1.7.4, BC Hydro provides the following table the value of the total electricity savings attributable to LED replacement of street lights in Non-Integrate Areas are estimated as below:

Fiscal Year	Street Light Demand Reduction of NIA (kW)	Street Light Energy Reduction of NIA (MWh)	Marginal Cost Reduction of NIA		
			Capacity ($M)	Energy ($ million)	Total ($ million)
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2027	100	420	0.01	0.02	0.03
2028	100	420	0.01	0.02	0.03
2029	100	420	0.01	0.02	0.03
2030	100	420	0.01	0.02	0.03
2031	100	420	0.02	0.02	0.04

Fiscal	Street Light	Street Light	Marginal Cost Reduction of NIA		
2032	100	420	0.02	0.02	0.04
2033	100	420	0.02	0.02	0.04
2034	100	420	0.02	0.02	0.04
2035	100	420	0.02	0.02	0.04
2036	100	420	0.02	0.02	0.04
2037	100	420	0.02	0.02	0.04
2038	100	420	0.03	0.02	0.05
2039	100	420	0.03	0.03	0.06
2040	100	420	0.03	0.03	0.06

Note: Numbers may not add up due to rounding.

BC Hydro acknowledges that the marginal value of electricity in the non-integrated areas is different than it is in the integrated system. For example, there is no transmission in the non-integrated areas therefore marginal costs related to transmission are not applicable. Further, the marginal costs of energy and distribution is community specific and varies across the non-integrated areas. Nonetheless, BC Hydro concludes the use of the marginal values based on the integrated system is reasonable for the purpose of developing the proposed RS 1701 rates given the rates are postage stamp and the number of lights in the non-integrated areas is modest compared to the total number of lights overall.

In BC Hydro's F2022 Revenue Requirements Application in Appendix M, Section C (Portfolio-Wide Assumptions), the Equivalent Avoided Cost of Diesel generation in the Non-Integrated Area is $300 per MWh (F2021$).

2.7.4 In addition to basing the marginal cost model on the integrated system, what other assumptions and/or simplifications did BC Hydro make in its marginal cost model analysis?

2.7.4.1 Please explain and provide the rationale for each of the assumptions and/or simplifications made.

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 2.7.4.