BC Hydro
Power smart

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August 7, 2019

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: British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Fleet Electrification Rate Application

BC Hydro writes to file its Application pursuant to sections 58 to 60 of the *Utilities Commission Act* (**UCA**) for approval of Rate Schedules 164x – Overnight Rate (150 kW and over) and 165x - Demand Transition Rate (150 kW and over) for use for charging of electric fleet vehicles and vessels. These new services are in response to customer requests for fleet charging rates and support the electrification of commercial fleet vehicles and vessels.

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

Yours sincerely,

(for) Fred James
Chief Regulatory Officer

ac/tl

Enclosure

BC Hydro Fleet Electrification Rate Application

August 7, 2019

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1 Introduction and Need for Fleet Electrification Rates

BC Hydro files its Fleet Electrification Rate Application (**Application**) with the British Columbia Utilities Commission (**Commission** or **BCUC**) to seek approval of new rates for two new services pursuant to sections 58 to 60 of the *Utilities Commission Act* (**UCA**).

1.1 Purpose of Application

The purpose of the Application is to request Commission approval of rates for two new optional services at demand equal or greater than 150 kW with the goal of encouraging fleet electrification. The first is referred to as the "**Overnight Rate**", and the second is referred to as the "**Demand Transition Rate**". The Overnight Rate has a time of use demand charge, as it does not have a demand charge during the overnight period, and it has a flat energy charge. This rate is intended for depot and overnight charging of fleet vehicles and vessels. The Demand Transition Rate provides demand charge relief for a fixed period of years. The Demand Transition Rate is intended for in route and daytime charging of fleet vehicles and vessels.

BC Hydro has received customer and stakeholder feedback suggesting that the availability of the new services be expanded to include providers of third party fast charging services to electric passenger vehicles. While BC Hydro understands the interest in rate design for a range of applications, BC Hydro proposes the availability as described in this Application, because any rate application for third party fast charging services to passenger vehicles should be informed by the B.C Government's response to the BCUC recommendations contained in its Phase Two Report of the Inquiry into the Regulation of Electric Vehicle Charging Service (**Inquiry**) which deals largely with the regulatory considerations arising in the public fast charging market. The outcome of this Inquiry will directly affect the types and scope of the rates BC Hydro may put forward for approval in respect of public fast charging. As a result, it would not be effective or efficient to apply for optional

services and rates for third party providers of fast charging services in advance of understanding the regulatory framework that will apply to those circumstances.

1.2 Need for the Optional Rates

This section describes an identified need for optional rates for new fleet charging services that would otherwise be charged under the Large General Service (**LGS**) Rate. Offering new rates for fleet charging services will support the electrification of fleet vehicles and vessels in BC Hydro's service territory.

Electric fleet charging as described in this Application does not currently exist in BC Hydro's service territory. While there are BC Hydro customers who are using electric vehicles in their fleets, their charging needs have been below 150 kW.

In 2016, road transportation accounted for approximately 17 Mt CO_2e which represents 27 per cent of the total greenhouse gas emissions in B.C.[1] BC Hydro has been engaging with public transportation providers to understand how BC Hydro can support the reduction of greenhouse gases in British Columbia through the conversion of their fleets from fossil fuels to clean electricity.

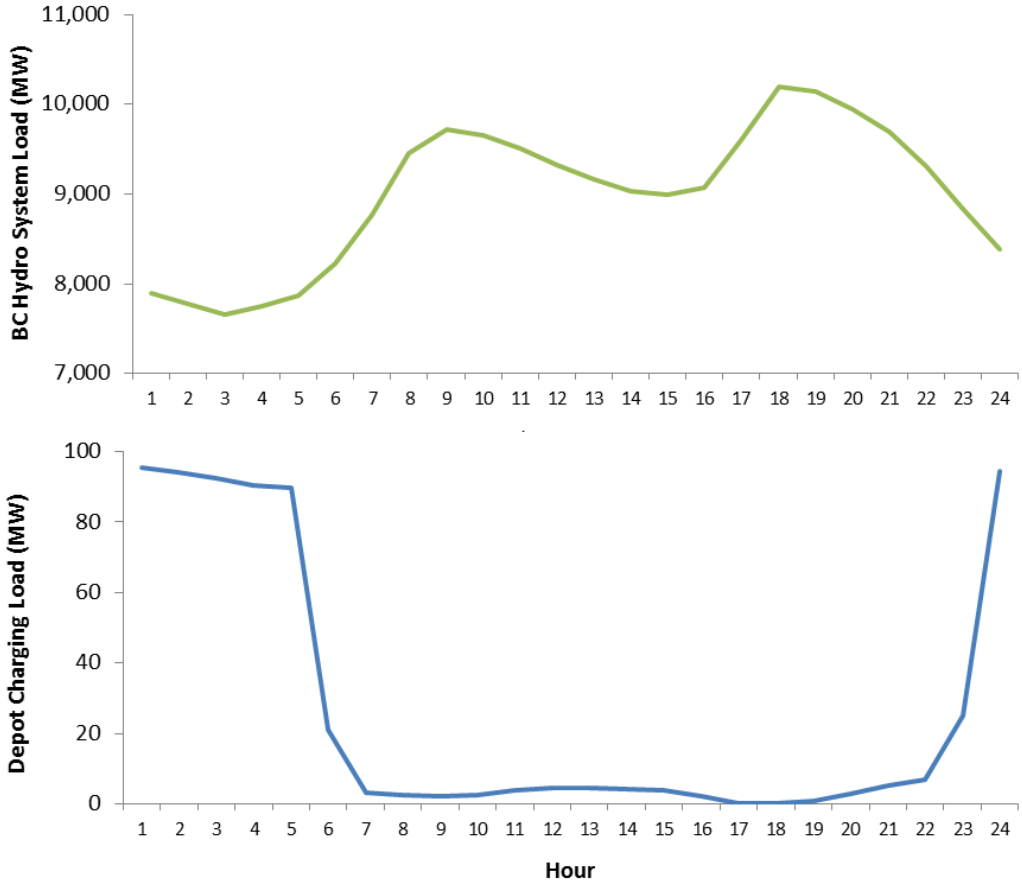
Absent a new rate design, the load associated with charging fleet vehicles or vessels would be charged under BC Hydro's LGS Rate. This rate includes demand charges based on the customer's maximum demand during the billing period. Potential fleet charging customers, such as public transit providers, have indicated that the LGS Rate demand charge is a barrier to converting their fleets to electric operation. In the early stages of battery electric fleet conversion from fossil fuel to electricity, the characteristics of the charging load can result in demand charges that make up a higher proportion of a customer's bill than is typical for LGS Rate customers. This is due to the fact until the entire fleet is converted to electricity, charger utilization may be low. The impact of demand charges on the economics of transportation charging

[1] http://www.env.gov.bc.ca/soe/indicators/sustainability/print_ver/envreportbc_ghg_emissions_Dec2018.pdf.

is a challenge that a number of jurisdictions across North America have identified. A detailed discussion of what other jurisdictions have done to mitigate the impacts of demand charges is discussed in section 2.2.

BC Hydro has modelled both the proposed Overnight Rate and Demand Transition Rate based on illustrative transit bus fleets with load projections informed by discussions with Translink and BC Transit. BC Hydro has identified two distinct charging scenarios that buses may use to meet their operational needs. The first scenario is referred to as depot charging which involves vehicles charging at a central depot. Each charger is expected to have a rated capacity of between 50 kW and 150 kW, with multiple chargers installed at each depot. Charging is expected to take place primarily in the overnight hours so the buses are ready for the next day's routes. In some instances the buses will need to charge at the depot during the day to meet operational needs.

Figure 1 Illustrative Load Profile of Depot Charging Load



As illustrated in Figure 1, fleet charging load at depots can occur outside of BC Hydro system peak hours.

The second charging scenario is referred to as in route charging whereby vehicles will charge for approximately 10 minutes at stops on a route equipped with chargers with rated capacity of up to 450 kW. This charging will occur during the fleet's operating hours.

Figure 2 Illustrative Load Profile of an In Route Charging Station

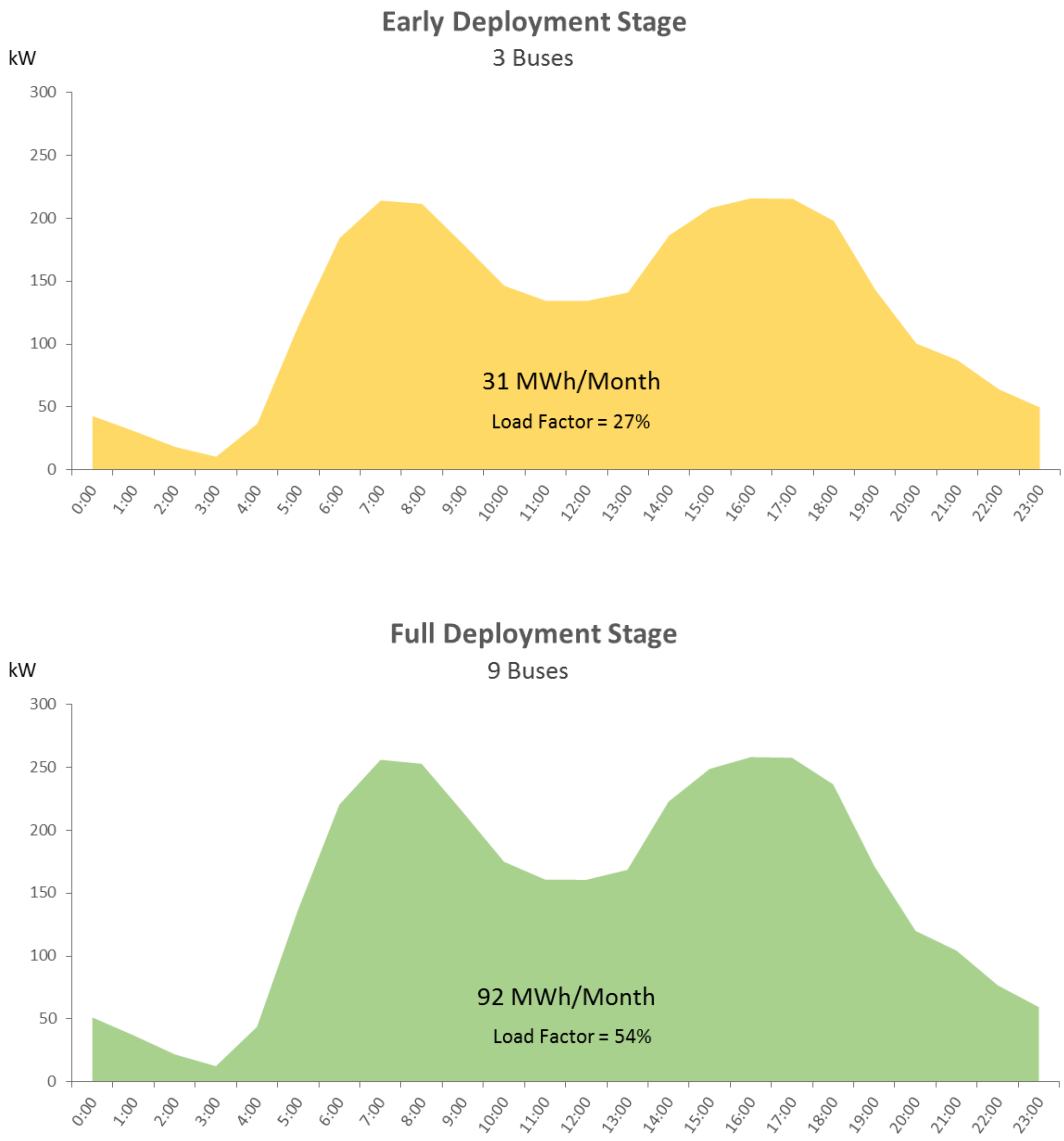


Figure 2 shows illustrative load profiles of an in route charging station that assumes load factor is lower in the early stages of the deployment of electric fleet vehicles compared to full deployment. As more vehicles are electrified and taking advantage of the installed infrastructure the load factor increases.

1.2.1 Policy Goals

In November 2018, British Columbia's *Climate Change Accountability Act* was passed and sets legislated targets of a 40 per cent reduction in carbon emissions from 2007 levels by 2030, a 60 per cent reduction from 2007 levels by 2040, and an 80 per cent reduction in emissions by 2050. On December 5, 2018, the B.C. Government released its CleanBC plan[2] (**CleanBC**) aimed at reducing greenhouse gas emissions in British Columbia. The plan identifies further efforts in cleaner public transportation as an action to help the reduction of greenhouse gases. Included in the B.C Government's Mandate letter to BC Hydro dated February 21, 2019, is a request that BC Hydro ensure that its operations align with the B.C Government's new climate plan.[3]

1.2.2 Customer Requests for Fleet Charging Rates

BC Hydro has had requests from Translink and BC Transit for alternative rates to the LGS Rate that would help mitigate the impact of demand charges to support the electrification of bus fleets:

- Translink is looking to introduce electric buses into their fleet in support of achieving a target of an 80 per cent or greater reduction in greenhouse gas emissions and 100 per cent renewable energy by 2050. Translink will need to replace approximately 860 buses by 2030, of which two-thirds would require in route charging and one-third would require depot charging. By 2040, Translink will be replacing a total of approximately 1,500 buses. A copy of Translink's letter setting out Translink plans, support, and preference for rates that mitigate the impacts of the demand charge while fleets ramp up as well as rates that encourage overnight charging is attached in Appendix C to this Application; and

[2] https://blog.gov.bc.ca/app/uploads/sites/436/2019/02/CleanBC_Full_Report_Updated_Mar2019.pdf
[3] https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/accountability-reports/openness-accountability/bch-mandate-letter-2019-2020.pdf

- BC Transit has committed to meet or exceed the Province's greenhouse gas reduction targets. The importance of meeting these greenhouse gas reduction targets was highlighted in Minister Trevena's Mandate Letter to the BC Transit Board date January 29, 2019.[4] To meet these targets BC Transit has a 10-year fleet replacement strategy to replace approximately 1,200 existing buses and expand the fleet by about 350 buses by 2030 with battery electric buses. BC Transit plans on solely using depot charging to meet the charging needs of their fleet. BC Transit has enquired as to rate options that would encourage shifting their depot charging to the overnight hours. A copy of BC Transit's letter setting out BC Transit plans, support, and preference for rates that encourage overnight charging is attached in Appendix C to this Application. Recently, BC Transit has publicly announced its plans to implement a low carbon fleet program.[5]

BC Hydro understands that the availability of the new services and rates described in this Application are important considerations in developing the business cases and informing investment decisions for BC Transit's and Translink's plans to electrify their fleets. The new services and rates described in this Application will contribute to BC Transit's and Translink's respective long term strategies to reduce greenhouse gases related to the operation of their fleet in support of the B.C. Government's greenhouse gas reduction targets.

The Vancouver Fraser Port Authority (**VFPA**) is responsible for Canada's largest Port and has also indicated that electrification of port activities provides a significant opportunity to reduce the Port of Vancouver's greenhouse gas emissions. The VFPA indicates that demand charges have been identified as a significant barrier to the

[4]. The Mandate Letter is available at the following link https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/organizational-structure/crown-corporations/mandate-letters/bc_transit.pdf.

[5] Please see BC Transit Media release July 29 2019 at the following link https://www.bctransit.com/media/releases-and-advisories?nid=1529705248190.

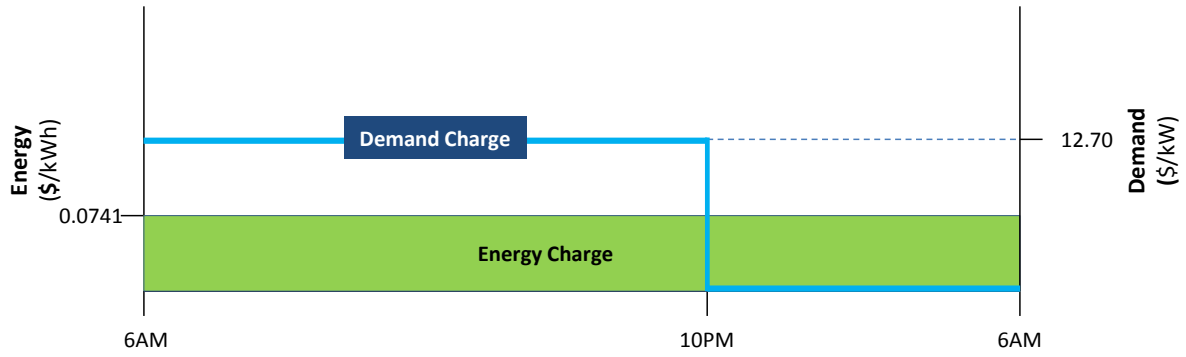
electrification of port fleets. A copy of VFPA's support letter for BC Hydro's proposed rates is provided in Appendix C.

1.3 Overview of Overnight Rate

The proposed Overnight Rate would be available to BC Hydro customers that are businesses, government agencies or other organizations that own, or lease, and operate electric fleet vehicles or vessels, for separately metered charging with maximum demand equal to or greater than 150 kW. Figure 3 provides a schematic of the proposed Overnight Rate fiscal 2022. The rate is proposed to be effective April 1, 2021. The rate is estimated to have the following pricing in fiscal 2022:

- A demand charge of $12.70 /kW applies to monthly maximum demand set between 6:00 a.m. and 9:59 p.m., daily. The level of the demand charge is the same as the level of the demand charge used in BC Hydro's LGS Rate, and is escalated each year by the general rate increase;
- No demand charge applies to monthly maximum demand set between the hours of 10:00 p.m. and 5:59 a.m., daily;
- The flat energy charge of 7.41 c/kWh applies to energy usage at any time of day. As explained in section 4.2, the level of energy charge is higher than the level energy charge used in BC Hydro's LGS Rate. The energy charge is escalated each year by the general rate increase; and
- The basic charge is 27.52 cents per day in fiscal 2022 escalated in each following year by the general rate increase, which is the same as the Basic Charge used in the BC Hydro's LGS Rate.

Figure 3 Proposed Overnight Rate Design Schematic



The rate is designed to fully recover BC Hydro's cost of service and may also provide economic benefits to ratepayers. Customer bill savings under the Overnight Rate relative to the LGS Rate may be up to 60 per cent, depending on the extent to which a customer can manage their load to avoid demand charges. The Overnight Rate is proposed to be offered on an ongoing basis.

The rate is not proposed for Medium General Service Customers (**MGS**) with new fleet charging load as there have been no Customer requests for such a rate option. Further, from a practical perspective it is unlikely a customer looking to charge their fleet would qualify for MGS as the expectation is most fleet chargers would require charging capacity in excess of the maximum demand of the MGS rate which is 150 kW.

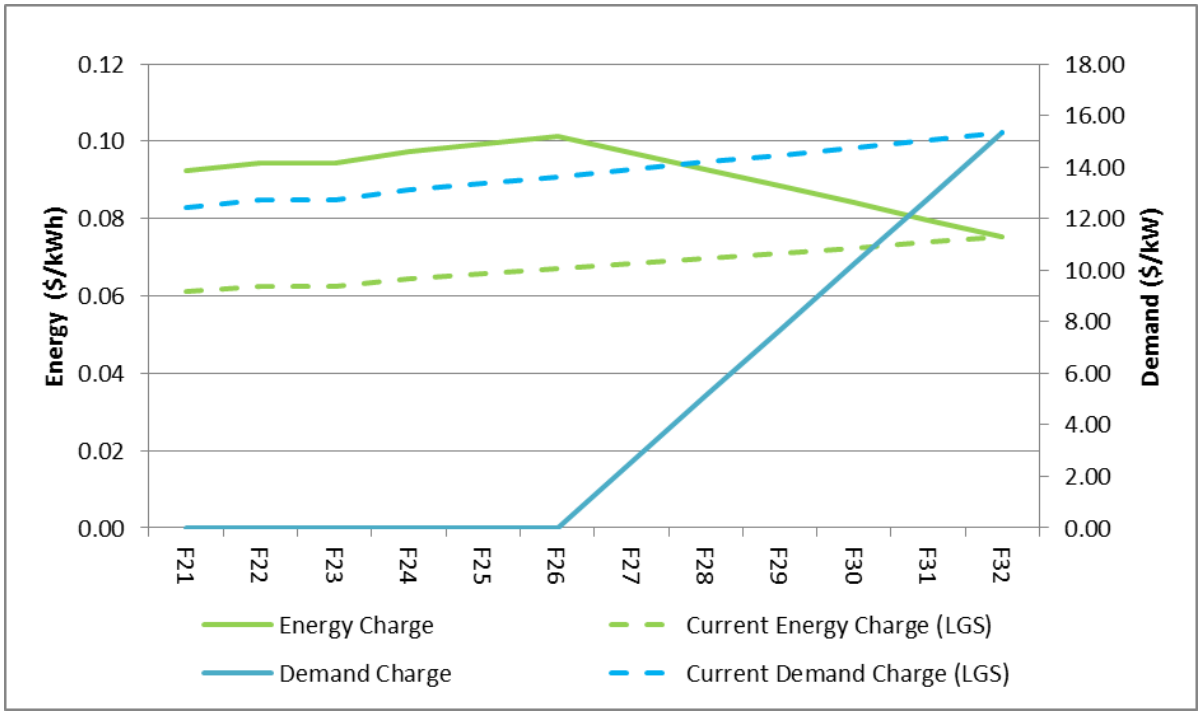
1.4 Overview of Demand Transition Rate

The proposed Demand Transition Rate would be available to BC Hydro customers that are businesses, government agencies or other organizations that own, or lease, and operate electric fleet vehicles or vessels, for separately metered charging with maximum demand equal to or greater than 150 kW.

A schematic of the proposed Demand Transition Rate is shown in Figure 4. The rate design has the following pricing, in fiscal 2021 dollars. The rate is proposed to be effective April 1, 2020:

- No demand charge applies for the first six years that the rate is proposed to be offered (from fiscal 2021 to fiscal 2026);
- The demand charge transitions from $0/kW to the LGS Rate Demand Charge over six years, starting in fiscal 2027 and ending in fiscal 2032;
- A flat energy charge of 9.24 cents per kWh in fiscal 2021, escalated each year by the general rate increase, applies for the first six years that the rate is proposed to be offered. The level of this energy charge is higher than the level of the energy charge that applies to the existing LGS rate (6.10 c/kWh in fiscal 2021);
- The energy charge transitions to the LGS energy charge over six years, starting in fiscal 2027 and ending in fiscal 2032;
- The basic charge is 26.92 cents per day in fiscal 2021 escalated in each following year by the general rate increase, which aligns with the Basic Charge used in the BC Hydro's LGS Rate; and
- The Demand Transition rate terminates in fiscal 2032, by which time the pricing of the rate has fully transitioned to the LGS Rate pricing.

Figure 4 Proposed Demand Transition Rate Design Schematic



The Demand Transition Rate would support in route and daytime charging. The Demand Transition Rate provides demand charge relief over the early years of fleet conversion from fossil fuels to electricity.

The Demand Transition Rate, as proposed, is justified on an economic basis. Because the incremental revenues from this new type of load exceed BC Hydro's marginal costs of service, it will provide benefits to ratepayers over time. The Demand Transition Rate does not recover its full embedded cost of service, and for this reason the Demand Transition Rate would transition to the LGS Rate over six years. Bill savings for customers that take service under this rate are sensitive to the timing and load factor of the new load.

1.5 Legal and Regulatory Context

1.5.1 Rate-Setting under the Utilities Commission Act

The rate setting function of the BCUC is governed by sections 58 to 60 of the UCA:

- Section 58 of the UCA addresses the process by which the BCUC is engaged to determine (on its own motion or on Application by a public utility or interested person) that existing rates in effect or any rates charged or attempted to be charged for a service by a public utility are unjust, unreasonable, insufficient, unduly discriminatory or in contravention of the UCA, the regulations or any other law. The BCUC may, after a hearing, determine the just, reasonable and sufficient rates to be observed and in force. Pursuant to subsection 58(2), if the BCUC makes such a determination, the BCUC must, by order, set the rates;
- Section 58.1 of the UCA addresses rate-rebalancing, and is not applicable to this Application;
- Subsections 59(1) to (4) and section 60 inform the BCUC's decision-making and specify the criteria the BCUC is to consider in setting rates. Section 60 also provides for a public utility to have different classes of service; and
- Subsection 59(5) specifies the circumstances in which a rate is "unjust" or "unreasonable".

The BCUC has considerable discretion in designing rates pursuant to sections 59 and 60 of the UCA. Subsection 60(1) (b) provides that in setting a rate under the UCA the BCUC "must have due regard to the setting of a rate that: (i) is not unjust and unreasonable within the meaning of section 59; (ii) provides the public utility for which the rate is set a fair and reasonable return on any expenditure made by it to reduce energy demand; and (iii) encourages public utilities to increase efficiency, reduce costs and enhance performance".

In the case of rates that are intended to advance a public policy purpose, such as reduction of GHGs, the Commission has determined that they must be able to stand independently on an economic or cost-of-service basis, regardless of the merits of the public policy purpose.[6] The proposed Overnight Rate has a cost-of-service basis and, as proposed, also provides benefits to ratepayers (i.e., an economic basis). The proposed Demand Transition Rate, as proposed, will provide benefits to ratepayers and so it also has an economic basis. It follows that both rates, as proposed, would be lawful and are within the Commission's jurisdiction to approve.

As noted, stakeholder feedback with regard to this Application indicated a desire to expand the availability of the proposed services, and rates, to customers that provide charging services to third-parties. In BC Hydro's view expanding the availability of the proposed services to that customer segment would materially reduce the likelihood that ratepayers would benefit from them and thus undermine their lawfulness.

For ease of reference, in the remainder of this Application, the legal test that BC Hydro will refer to for whether the rate proposed in this Application should be approved is whether they are ‘fair, just, reasonable and not unduly discriminatory’.

1.5.2 Bonbright’s Rate Design Criteria

In its decision concerning BC Hydro’s 2008 Residential Inclining Block Application, the Commission found Bonbright’s eight rate design criteria to be consistent with the UCA test of ‘fair, just and not unduly discriminatory’ and form an appropriate foundation for rate structures.[7]

[6] See for example section 7.1 of the Commission's decision regarding BC Hydro's 2015 Rate Design Application, where the Commission considered its jurisdiction to establish rates to advance the public policy purpose of mitigating poverty through preferential rates for low-income customers.

[7] In the Matter of BC Hydro and Power Authority: Residential Inclining Block Rate Application’ Reasons for Decision to Order No. G-124-08, dated September 24, 2008, page 51.

Consistent with the approach taken in the 2015 Rate Design Application, BC Hydro assesses all eight Bonbright Criteria. These eight criteria can be broadly grouped as follows:

1. Economic Efficiency – price signals that encourage efficient use and discourage inefficient use;
2. Fairness – fair apportionment of costs among customers, no undue discrimination;
3. Practicality - customer understanding and acceptance, practical and cost effective to implement; and
4. Stability – revenue and rate stability.

BC Hydro assesses the proposed rates against these criteria in sections 4.4 and 5.4.

1.6 Proposed Regulatory Process

BC Hydro proposes one round of Commission and Intervener Information Requests (**IRs**), with a subsequent submissions on the merits as shown below.

Table 1 Proposed Regulatory Process

Filing of Application	August 7, 2019
Round 1 Commission and Intervener IRs	September 16, 2019
BC Hydro Responses to Round 1 IRs	October 30, 2019
Intervener Written Submissions	November 22, 2019
BC Hydro Reply Submissions	December 2, 2019

BC Hydro proposes an extended timeline between filing of our Application and the completion of Round 1 IRs due to the concurrent proceeding underway on BC Hydro's Revenue Requirements Application.

BC Hydro requests approval of the new rates for two new services by February 2020 in order to implement the Demand Transition Rate by April 1, 2020 and the Overnight Rate by April 1, 2021.

The additional year proposed for Overnight Rate implementation is to allow for changes required in BC Hydro's metering and billing systems to measure and bill time varying demand charges. This timeline also aligns with customers' current electric bus fleets deployment plan. Please refer to section 4.5 for more information on the Overnight Rate implementation considerations.

BC Hydro hosted a customer and stakeholder engagement workshop on fleet electrification rate design on May 28, 2019.[8] We have provided a copy of this Application to participants in the May 28 workshop.

1.7 Orders Sought

BC Hydro seeks an order approving the Overnight Rate RS 164x (150 kW and Over) – Overnight Rate and the Demand Transition RS 165x – (150 kW and Over) - Demand Transition Rate as shown in the rate schedules contained in Appendix B of this Application. The Overnight Rate will be effective as an ongoing rate as of April 1, 2021 and the Demand Transition Rate will be effective as a time-limited rate from April 1, 2020 to March 31, 2032. As of April 1, 2032 any Customers served under the Demand Transition Rate will be migrated to RS16xx or the otherwise applicable rate. A draft order is contained in Appendix A.

The addition of RS 164x and 165x into BC Hydro's Electric Tariff would result in changes in the Table of Contents and pagination. These are purely tariff administrative changes. Accordingly, the draft order will direct BC Hydro to file all updated tariff sheets within 15 business days of the date of the Commission order.

[8] Please refer to Appendix G for the Stakeholder Engagement Fleet Electrification Rate Design Workshop slides, Summary Notes and Feedback Form.

1.8 Communications

All communications regarding this proceeding should be addressed to:

Anthea Jubb Manager, Regulatory and Rates BC Hydro 16th Floor 333 Dunsmuir Street Vancouver, BC V6B 5R3 Telephone: 604-623-3545 Email: bchydroregulatorygroup@bchydro.com	Brandon Mewhort Solicitor & Counsel BC Hydro 16th Floor 333 Dunsmuir Street Vancouver, BC V6B 5R3 Telephone: 604-623-4557 Email: brandon.mewhort@bchydro.com

2 Background

2.1 Policy Context

BC Hydro is guided by the B.C. Government mandate letter as well as CleanBC, which outlines plans to achieve greenhouse-gas reductions within the transportation sector. Of particular relevance to this Application, CleanBC calls for an “ever-greater portion of our…. commercial vehicle fleets [to be] powered by clean B.C. Electricity” (see CleanBC, page 17). As the primary supplier of clean electricity within the Province, BC Hydro has a key role to play in supporting the transition to electric vehicles while achieving the greenhouse-gas reduction targets within the CleanBC plan.

BC Hydro and B.C. Government also have a mandate to keep electricity rates affordable. The rates proposed in this Application align with and support the B.C. Government’s climate plan in that that they help remove barriers to the electrification of the transportation sector to displace the use of fossil fuels and reduce greenhouse gases. They also contribute to both BC Hydro and B.C Government’s affordability mandate by protecting ratepayers from cost shifting, and providing ratepayer benefits over time.

Please see Appendix D for the Letter of Support for this Application from the Ministry of Energy, Mines and Petroleum Resources.

2.2 Jurisdiction Review

2.2.1 Common Rate Features

BC Hydro reviewed several jurisdictions where electric vehicle rates for fleet charging are being offered or are being reviewed for approval. These rates seek to encourage electric vehicle adoption by reducing or removing economic barriers. These rates may also have other objectives such as encouraging electric vehicle charging loads to shift to periods that are less costly for the utility to serve. The following are common features of these rates:

- Time of use (**TOU**) energy charges and in some cases TOU demand charges;[9]
- Lower energy charges and no demand charges during the overnight period which provide opportunity for lower cost electric vehicle charging during the overnight period; and
- Examples of either no demand charge or demand charge relief on a temporary basis (e.g., for a five-year period). In the latter case, demand charges may be phased back in over a transition period (e.g., for the following five-year period).

2.2.2 Case Studies

The following summarizes rates related to fleet electrification from a sample of American utilities.[10]

[9] Please refer to Appendix H which provides an explanation of the rationale for TOU pricing in these jurisdictions.

[10] Please refer to Appendix H for additional information on policy context and EV rates in these jurisdictions.

2.2.2.1 Hawaii

In March 2019, the Hawaii Public Utility Commission approved a special TOU rate electric bus charging pilot program for a period of five years and available for up to 20 fleet charging customers. As shown in Table 2 below, the rate offers lower TOU prices during mid-day (9:00 a.m.to 5:00 p.m.), when solar is abundant, and during the overnight period (10:00 p.m. to 9:00 a.m.). The peak period is during the evening (5:00 p.m. to 10:00 p.m.) and peak energy rates are almost twice the off-peak energy rates. The TOU demand charge only applies during the peak period.

2.2.2.2 California

Liberty Utilities

Table 2 shows Rate Schedule A-3 which is a seasonal TOU rate that is mandatory for customers with loads greater than 200 kW. The rate includes applicability to buses and stations for the purposes of fleet charging. TOU energy prices are higher in the peak period (6.907 cents/kWh during 5:00 p.m. to 10:00 p.m. in the winter, 7.306 cents/kWh during 10 a.m. to 10:00 p.m. in the summer) and lower in the off-peak period (5.445 cents/kWh during 10:00 p.m.to7 a.m. in the winter, 5.523 cents/kWh during 10:00 p.m. to 10:00 a.m. in the summer). There is a mid-peak period in the winter (7:00 a.m. to 5:00 p.m.) with TOU energy price of 6.813 cents/kWh. In the winter, a demand charge is applicable in the peak period ($7.95 /kW/month during 5:00 p.m. to 10:00 p.m.) and in the mid-peak period ($2.99 /kW/month during 7:00 a.m. to 5:00 p.m.). There are no demand charges during the overnight off-peak period in the winter. In the summer, the demand charge of $13.12 per kW/month only applies during the peak period (10:00 a.m. to 10:00 p.m.).

*Pacific Gas and Electric (**PG&E**)*

PG&E's proposed commercial EV rate schedule eliminates demand charges and instead uses a monthly subscription pricing model which may offer more affordable

charging, simpler pricing structure and improved certainty and budgeting. For Rate Schedule CEV-L-S, the monthly subscription rate is billed at $183.86 per 50 kW of connected load. Customers choose their subscription level, based on charging needs.

Energy usage is billed based on TOU pricing when charging is cheapest during mid-day at approximately 9 cents/kWh, when PG&E has higher levels of renewable energy generation. The energy price is highest during the 4:00 p.m. to 10:00 p.m. peak period at 30 cents/kWh. The energy price is 11 cents/kWh during the remaining hours.

*Southern California Edison (**SCE**)*

Table 2 below shows the pricing for rate schedule TOU-EV-8. These rates have a five-year introductory period with no demand charges, a five year intermediate demand charge phase-in period, followed by stable demand charges that will be lower than those in SCE's non-EV existing commercial rates.

Table 2 Fleet Charging Rate Jurisdictional Review

Utility	Rate	Season	Peak Price	Mid-Peak Price	Off-Peak Price	Customer Charge	Availability
Hawaiian Electric Company	E-Bus-P TOU Energy TOU Demand	All year	Energy 27.0655 c/kWh (5:00 p.m. to 10:00 p.m.) Demand $26.50 $/kW/ month	Energy 14.3541 c/kWh (9:00 a.m. to 5:00 p.m.) Demand $0 $/kW/ month	Energy 15.6688 c/kWh (10:00 p.m. to 9:00 a.m.) Demand $0 $/kW/month	$5 ($/month)	For electric on-road bus charging facilities with existing host commercial account on LGS rate
Liberty Utilities (serves communities in California Including Lake Tahoe)	A-3 TOU Energy TOU Demand TOU Energy	Summer Winter	Energy 7.306 c/kWh (10:00 a.m. to 10:00 p.m.) Demand $13.12 $/kW/month Energy 6.907 c/kWh (5:00 p.m. to 10:00 p.m.)	Energy 6.813 c/kWh (7:00 a.m. to 5:00 p.m.)	Energy 5.523 c/kWh (10:00 p.m. to 10:00 a.m.) Energy 5.445 c/kWh (10:00 p.m. to 7:00 a.m.)	$455.59 ($/month)	Customers with demand greater than 200 kW. Includes Bus Fleet Charging Stations
	TOU Demand		Demand $7.95 $/kW/month	Demand $2.99 $/kW/month	Demand $0 $/kW/month		

Utility	Rate	Season	Peak Price	Mid-Peak Price	Off-Peak Price	Customer Charge	Availability
Pacific Gas and Electric	Proposed CEV-L-S TOU Energy No Demand Charge	All year	Energy 30.267 c/kWh (4:00 p.m. to 10:00 p.m.)		Energy 11.079 c/kWh (2:00 p.m. to 4:00 p.m., 10:00 p.m. to 9:00 a.m.) Super Off-Peak 8.882 c/kWh (9:00 a.m. to 2:00 p.m.)	Monthly Subscription charge $183.86 per 50 kW of connected load	For fleet and public charging with charging capacities >100 kW
Southern California Edison (SCE)	TOU EV-8 TOU Energy No demand charge first 5 years	Summer	Energy 46.20 c/kWh (4:00 p.m. to 9:00 p.m. weekdays)	Energy 25.58 c/kWh (4:00 p.m. to 9:00 p.m. weekends)	Energy 11.77 c/kWh (All Except4:00 p.m. to 9:00 p.m. all days)	$125.25 ($/month)	For customers with demand between 21 kW and 500 kW solely for fleet and public charging

Utility	Rate	Season	Peak Price	Mid-Peak Price	Off-Peak Price	Customer Charge	Availability
	Year 6 to Year 10 Phase-in Demand Charges Year 11+ Return to energy and demand charges	Winter		Energy 29.11 c/kWh (4:00 p.m. to 9pm all days)	Energy 12.58 c/kWh (9:00 p.m. to 8:00 a.m.) Energy Super-off Peak6.73 c/kWh (8:00 a.m. to 4:00 p.m.)		

2.2.2.3 Summary

Based on the case studies, TOU energy rates provide an opportunity for EV charging loads to be shifted to periods with cheaper prices. TOU demand rates apply during peak periods or during the day, which allow for demand charge free EV charging overnight. Demand transition rates allow a period of demand charge relief to help during the initial years when EV charging has low utilization and poor load factor.

2.3 Customer and Stakeholder Engagement

BC Hydro held meetings with customers who could potentially be eligible for the rate design options being explored. Additionally BC Hydro held a workshop on the morning of May 28, 2019 with customers and stakeholder groups to review rate design options for fleet electrification in order to gather feedback to inform its proposals.

2.3.1 Customer Engagement

BC Hydro has engaged with Translink and BC Transit since December 2018 concerning the development of Fleet Transportation Rates. Both Translink and BC Transit indicated that the impacts of demand charges in the LGS Rate are a barrier to their electrification objectives. Translink's concerns were related to both depot charging and in route charging.

With respect to in route charging, Translink raised concerns that if they converted their fleet to electricity under the current LGS Rate, they would experience prohibitively high charging costs per bus in the early years of fleet conversion. This would occur because similar maximum billing demand may apply regardless of the number of buses that utilize a single charger. At this early stage of fleet conversion, a rate that offers demand charge relief may provide sufficient electricity bill savings to encourage fleet electrification. As more of the bus fleet is electrified, each charger will be used by a greater number of buses. This will reduce the average charging

cost per bus, to the point where average costs would be the same under the Demand Transition Rate or the LGS Rate. At this mature stage of fleet conversion, a demand charge relief rate is no longer needed.

In respect to depot charging, both Translink and BC Transit asked if there were benefit to BC Hydro if customers could shift their depot charging load outside of BC Hydro's peak period. They indicated that if there were an incentive to shift their charging load outside of BC Hydro's peak periods, they could potentially adjust their operations to shift load out of BC Hydro's peak period while still ensuring their fleet would be ready for the next day's routes. A TOU demand rate that applies demand charges during the day only could provide benefits to the customer in the form of bills savings, and cost reductions to BC Hydro by shifting load outside of peak times.

BC Hydro has also had discussions with BC Ferries and SeaSpan and they have indicated an interest in potentially converting their Vessels to electric fuel.

2.3.2 Stakeholder Workshop

As noted above in section 1.6, a Stakeholder workshop was held on May 28, 2019 to solicit feedback on the potential new services and rate options.[11]

Invitations to the workshop were sent to stakeholder groups and Commission staff who have been involved in previous rate design proceedings. Invitations were also sent to existing customers who may qualify for the rates, i.e., those providing public transportation or those believed to have large fleets of vehicles, and to groups with an interest in electric vehicles. The workshop was attended in-person by 16 participants, including customers, stakeholder groups and Commission staff, and another 19 people registered to participate via webcast.

[11] Please refer to Appendix G for the Stakeholder Engagement Fleet Electrification Rate Design Workshop slides, Summary Notes and Feedback Form.

The workshop provided participants with the context[12] for BC Hydro's exploration of rate design options for fleet electrification as well as the outcomes of its customer consultation[13]. Further, BC Hydro provided an overview of its jurisdictional review of similar type rates being used by other utilities[14]. Lastly the workshop reviewed a number of rate design options, addressing questions and seeking input from participants. A copy of the presentation and the summary notes of the workshop are included in Appendix G.

Participants were asked to complete a BC Hydro feedback form which included questions on specific areas where customer and stakeholder input was needed. The feedback form also allowed participants to provide any comments they had on the rate design options. The feedback forms received are included in Appendix G. BC Hydro received feedback forms from six stakeholders (BCUC Staff, BCSEA, BC Transit, Tesla, ChargePoint and Seaspan).

BC Hydro considered the input received during the workshop and through the feedback forms received and provides the following responses.

Three stakeholders (Tesla, ChargePoint, and BCSEA) suggested BC Hydro expand the availability of the rate proposals to other charging applications such as passenger vehicle charging. For the reasons described in section 1.1 and 1.5.1 BC Hydro is not proposing to include passenger vehicle charging in the scope of this Application.

Seaspan suggested that BC Hydro expand the definition of fleets to include marine fleets that may charge from shore side terminals. Seaspan also provided comment that BC Hydro should consider adding an interruptible rate option. BC Hydro agrees that it would be appropriate that the proposed Overnight and Demand Transition

[12] This is discussed in section 2.1 Policy Context above.
[13] This is discussed in section 3.1 Customer Engagement above.
[14] This is discussed in section 2.2 Jurisdiction Review above.

Rates would be available to fleet vessels as this would be consistent with intent of the Application to support fleet electrification. With respect to Seaspan's request for interruptible rates, BC Hydro notes that it has interruptible Shore Power rates available to eligible vessels under both distribution (RS 1280) and transmission (RS 1891) services. BC Hydro has not received requests from customers for an interruptible rate for fleet vehicles.

Commission staff, BCSEA and Tesla also provided suggestions with respect to monitoring and evaluation of the proposed rates. BC Hydro provides its proposed monitoring and evaluation plan in section 7.

A number of stakeholders provided feedback specific to the proposed Demand Transition Rate design. Updates to its rate designs as a result of the feedback are noted in section 5.6, along with input that was not considered and the reasons for not advancing the suggestions.

The Vancouver Fraser Port Authority attended the stakeholder workshop, and as indicated in section 1.2.2, it provided a support letter for BC Hydro's proposed rates contained in Appendix C.

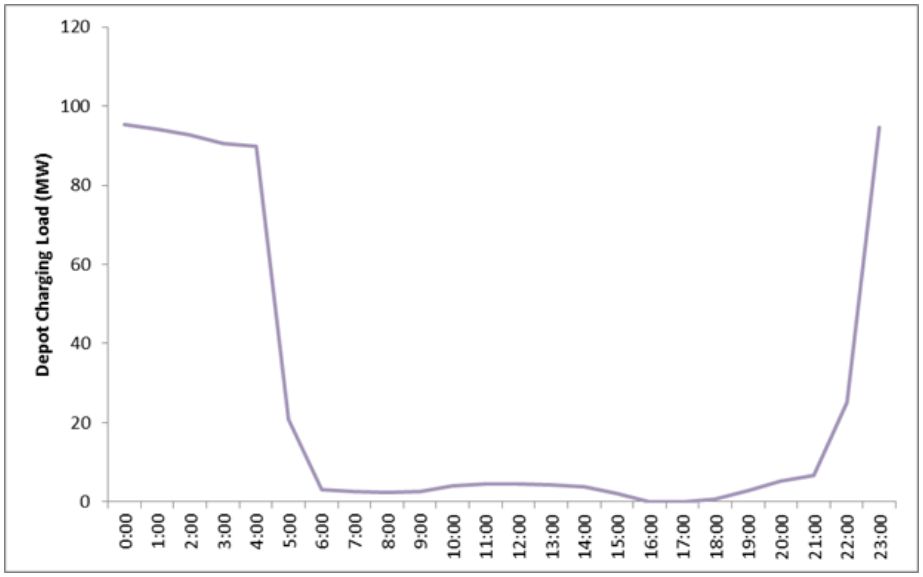
3 Characteristics of Prospective Charging Loads

The designs of the Overnight Rate and the Demand Transition Rate were informed by prospective load characteristics for electric transit buses. A summary of the characteristics of the prospective load is provided below. The rate designs were not informed by load characteristics for vessels. However, BC Hydro has broadened availability to include customers that own and operate electric fleet vessels given that both BC Ferries and SeaSpan have plans to electrify part of their fleet. As noted in section 7, BC Hydro proposes a three year evaluation to assess actual charging load characteristics.

3.1 Prospective Depot Charging Load Characteristics and Potential Bill Savings

Figure 5 shows the prospective twenty four hour load shape of depot charging once transit bus fleet conversion is substantially complete which is expected no earlier than fiscal 2029. Most depot charging demand will occur in the overnight period when BC Hydro's system has spare capacity. Demand may reach 100 MW.

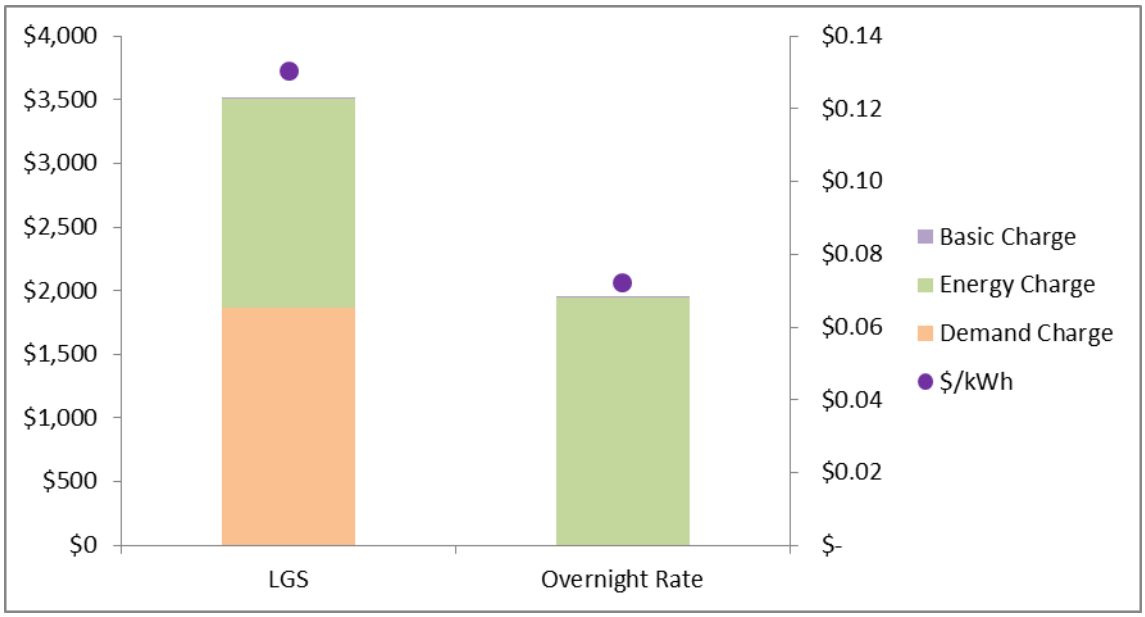
Figure 5 Prospective Depot Charging Demand and Load Shape



Prospective depot charging annual energy usage may reach 100,000 MWh annually by fiscal 2029.

Figure 6 provides illustrative comparison of monthly electricity bills for two transit buses with depot charging load characteristics billed under the LGS Rate and Overnight Rate in fiscal 2021. The analysis is based on two buses and travel distance of 375 kilometers a day.

Figure 6 Illustrative Monthly Electricity Bill for Depot Charging of Electric Buses under LGS Rate and Overnight Rate in Fiscal 2021



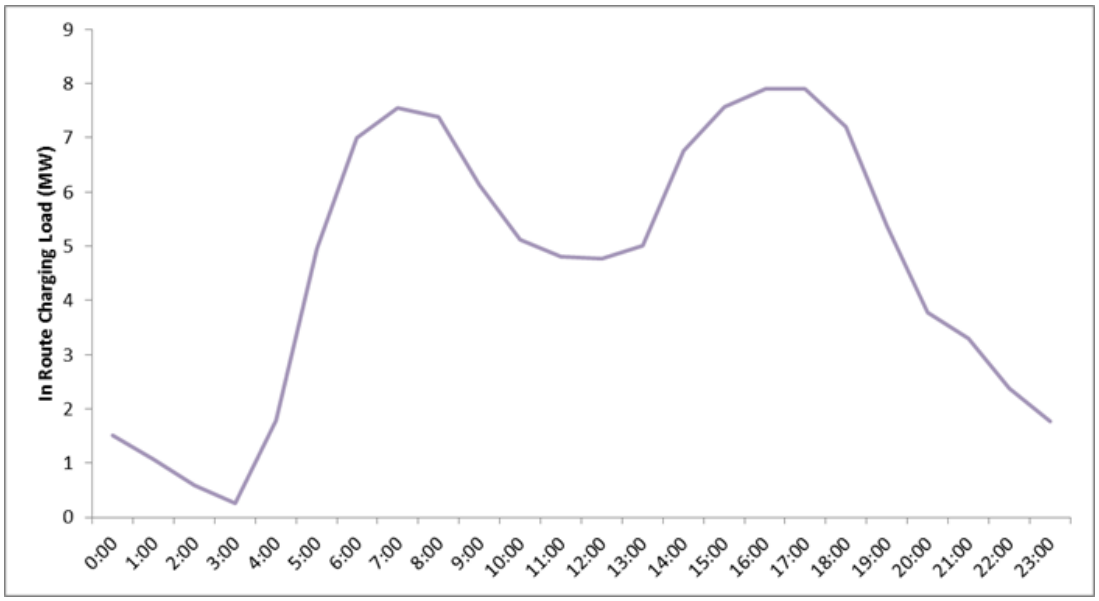
As shown in Figure 6, under the LGS Rate the monthly bill is approximately $3,700 of which over half is associated with demand charges. The average unitized cost of electricity is approximately $0.13/kWh. Under the proposed Overnight Rate the monthly bills is approximately $2,000 with no demand charges, assuming the Customer is able to shift most of their load into the overnight period, and the average unitized cost of electricity is approximately $0.7 /kWh.

The main factor that impacts the potential bill savings is the extent to which customers can shift their demand into the overnight period. The maximum potential bill savings relative to the LGS Rate is estimated to be approximately 60 per cent, under the scenario where 100 per cent of load occurs between the hours of 10:00 p.m. and 6:00 a.m.

3.2 Prospective In Route Charging Load Characteristics and Potential Bill Savings

Figure 7 shows the prospective in route charging demand and twenty four hour load shape once transit bus fleet conversion is substantially complete, which is expected no earlier than fiscal 2029. As shown, most in route charging demand occurs during the day. In route charging demand may reach 8 MW, which is approximately one-tenth the magnitude of prospective depot charging load.

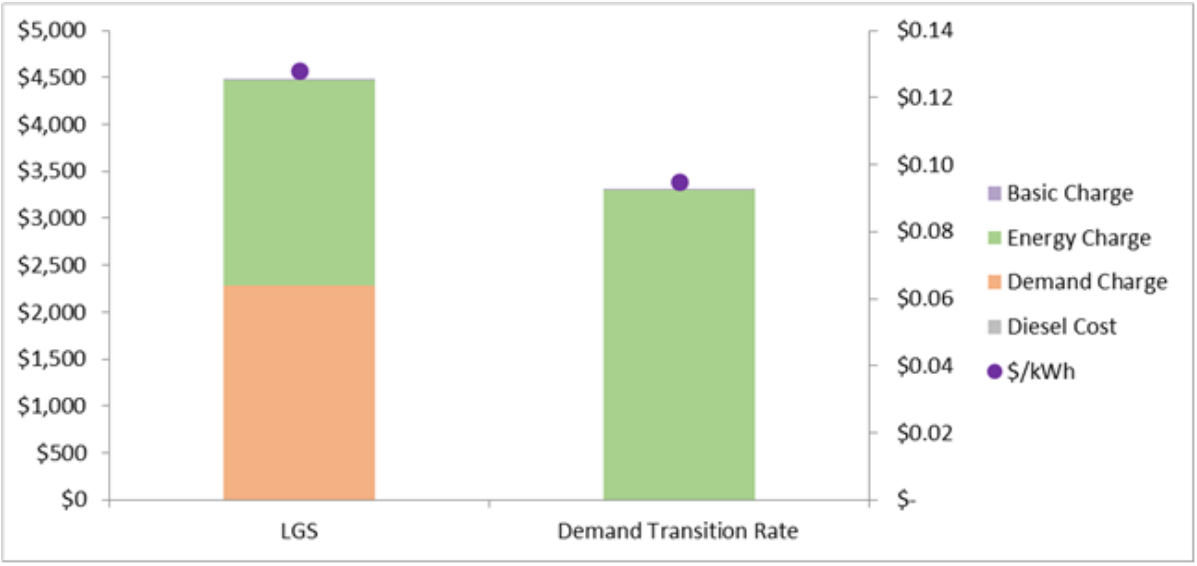
Figure 7 Prospective In Route Charging Demand and Load Shape



Prospective in route charging annual energy usage may reach 23,000 MWh annually by fiscal 2029.

Figure 8 provides illustrative comparison of monthly electricity costs for two transit buses with in-route charging load characteristics billed under the LGS Rate or Demand Transit Rate in fiscal 2022. The analysis is based on an average of two buses and travel distance of 246 kilometers a day.

Figure 8 Illustrative Monthly Electricity Bill for In Route Charging of Electric Buses under LGS Rate and Demand Transition Rate in Fiscal 2022



As shown in Figure 8, under the LGS Rate the monthly electricity bill is approximately $4,500 of which half is associated with demand charges. The average unitized cost of electricity is approximately $0.13/kWh. Under the proposed Demand Transition Rate the monthly bills is approximately $3,500 with no demand charges, and the average unitized cost of electricity is approximately $0.9/kWh.

Potential bill savings under the Demand Transition rate are sensitive to the timing and load factor of the in route charging load. The potential bills savings are greatest for low load factor load in the six years during which demand charges do not apply. Bill savings diminish at higher load factors, and once the demand charges start to apply in fiscal 2027. Table 3 provides a summary of illustrative bill savings in

fiscal 2026 and fiscal 2031 assuming load factor of 30 per cent in fiscal 2026 and 52 per cent in fiscal 2031.

Table 3 Illustrative Bill Savings by Year and Load Factor for In Route Charging under Demand Transition Rate, Relative to LGS

Year	F2026 (%)	F2031 (%)
Load Factor in the year	30	52
Participant Bill Savings in the Year	22	nil

4 BC Hydro's Overnight Rate Proposal

4.1 Overnight Rate Terms and Conditions

Shown below are proposed key Terms and Conditions of the Overnight Rate followed by a discussion of their intent. Note that some but not all Terms and Conditions are the same as those of the Demand Transition Rate (see section 5.1). Terms and Conditions that match those of the existing LGS rate are not repeated here. Please see Appendix B for Rate Schedule 164x for all proposed terms and conditions. Rates are estimated for fiscal 2022.

Availability: For Customers who qualify for General Service where the Customer is a business, government agency or other organization. For use only for separately metered charging of Electric Fleet Vehicles or Vessels owned or leased by, and operated by, the Customer, at Maximum Demand equal to or greater than 150 kW.

Applicability: Rate Zone 1

Rates: Basic Charge: 27.52 ¢ per day

plus

Demand Charge:

$12.70 per kW of Billing Demand per Billing Period

plus

Energy Charge:

7.41 ¢ per kWh

Definitions:

1. Billing Demand

The Billing Demand will be the highest kW Demand between the hours 06:00 and 21:59 daily in the Billing Period.

3. Electric Fleet Vehicle or Vessel

A Vehicle or Vessel that

(i) is powered entirely or partially by electricity; and

(ii) is part of a group of similar Vehicles or Vessels that are used for similar purposes.

4. Vehicle

A vehicle used for transportation, not run on rails, and includes, without limitation, buses, medium duty trucks and heavy duty trucks.

5. Vessel

A watercraft used for transportation and includes, without limitation, passenger and vehicle ferries, tugs and barge transportation.

Special Conditions

1. Metering

Metering Equipment with both Demand and Energy measurement capability will be installed. Only charging of Electric Fleet Vehicles or Vessels and related equipment will be served under these rate schedules.

2. Migration

Customers taking service under these rate schedules will not be migrated to Rate Schedules 1300, 1301, 1310, or 1311 (Small General Service) or Rate Schedules 1500, 1501, 1510 or 1511 (Medium General Service) due to changes in load size. BC Hydro will review this Special Condition in its evaluation report planned for the third year after which the rate commences

3. Concurrent Service under other Rate Schedules

BC Hydro will not provide service to equipment installed for service under these rate schedules under any other rate schedule except Rate Schedule 1901.

The Availability, Definition of Electric Fleet Vehicle or Vessel, and Metering Special Condition are intended to ensure this rate schedule applies to the new service for which it was designed, which is charging of electric fleets with Maximum Demand equal or greater than 150 kW. As noted in section 1.2, this new type of electrical load does not currently exist in BC Hydro's service territory. Broadening the availability to include existing electrical loads would reduce the economic benefits to ratepayers.

The Special Condition on Metering also includes language to ensure that appropriate metering capability is installed.

The Rates, the definition of the Demand Charge and Billing Demand are intended to provide demand charge relief during the overnight period when BC Hydro's system has spare capacity while still recovering BC Hydro's cost of service. Therefore, the Overnight Rate has a TOU demand charge Figure 3 in section 1.3 provides a schematic of the proposed pricing. The proposed demand charge level is the same as the level of the demand charge used in BC Hydro's LGS Rate. The basic charge is 27.52 cents per day, which aligns with the Basic Charge used in the BC Hydro's LGS Rate. The proposed flat energy charge of 7.41 c/kWh applies to energy usage at any time of day, which is higher than the energy charge used in BC Hydro's LGS Rate as it was calculated to recover BC Hydro's residual embedded cost of service.

The Special Condition on Migration is intended to allow a period of time to establish the normal operating patterns of this new Service, without the potential instability of migration to another rate schedule.

The Special Condition on Concurrent Service under other Rate Schedules is intended to ensure that Customers under these rate schedules do not also participate in other optional rates that may be offered by BC Hydro, as this could reduce the economic benefits to ratepayers.

4.2 Overnight Rate Cost of Service Justification

BC Hydro calculated cost recovery for this rate using our results of our F2017 Fully Allocated Cost of Service Study, prospective depot charging load characteristics (see section 3.1), and proposed Overnight Rate pricing (see section 4.1).

The Overnight Rate design is justified on a cost of service basis. BC Hydro has filed Fully Allocated Cost of Service studies with the BC Utilities Commission since 2007, and these publicly available studies include our embedded cost of service estimates. A substantial portion of BC Hydro's embedded costs of service are determined by the system peak. The method of allocating system peak related costs is referred to as the four coincident peak method. This method allocates transmission and

generation demand related costs based on the extent to which an electrical load contributes to the hourly system peaks in the four winter months of November through February. This method is well established. BCUC initially directed its use in Commission Order No. G-111-07 issued September 18, 2007, and again approved its use in Commission Order No. G-47-16 pursuant to BC Hydro's F2016 Cost of Service Study. For additional information see Appendix F.

As shown in Figure 3, depot charging load is expected to occur overnight and not be coincident with BC Hydro's peak demand periods. It is therefore reasonable to design a rate for new load that reflects the fact that its cost of service is lower than the cost to serve a typical Large General Service load.

The Overnight Rate is intended to reflect the costs to serve this new overnight charging load, while meeting customer needs for demand charge relief. The design applies the LGS Rate Demand Charge between 6:00 a.m. and 10:00 p.m. and no demand charge overnight. The energy charge is flat and its level is calculated residually to recover the cost of service, including any demand related costs not recovered by the demand charge.

BC Hydro estimates that serving this new load served under the Overnight Rate as it is proposed will result in a Revenue to Cost ratio of 104 per cent in fiscal 2029. Because the Overnight Rate, as proposed, has stable pricing that strongly encourages a stable load shape comprised on primarily overnight load, the Revenue to Cost ratio is also expected to be stable. For comparison purposes, note that BC Hydro's most recent Fully Allocated Cost Study (**FACOS**) based on fiscal 2017 actual data calculated the Revenue to Cost ratio for the LGS rate class to be 103.9 per cent.

The Overnight Rate, as proposed, is expected to recover costs and result in fair allocation of costs. The rate is proposed to be offered on an ongoing basis. Please see Appendix F for additional discussion on cost recovery for the Overnight Rate.

4.3 Overnight Rate Economic Justification

BC Hydro calculated the economic impacts on ratepayers using our estimated marginal costs of distribution capacity and energy (see Appendix E), incremental implementation costs (see section 4.5), depot charging prospective load characteristics (see section 3.1)[15] and proposed Overnight Rate pricing (see section 4.1).

The Overnight Rate design is justified on an economic basis. BC Hydro estimates that the incremental revenues received from new load served under the Overnight Rate will meet or exceed the marginal cost of serving new load. Therefore, ratepayers will not be harmed, and are expected to benefit from the new load, even if that new load is billed at a lower rate than existing load.

BC Hydro calculated the extent to which incremental revenues from the proposed Overnight Rate design will recover or exceed marginal costs under several scenarios. These results are provided in Appendix E. In all scenarios the marginal energy cost was set to the Mid-C market price forecast. Generation and transmission capacity marginal costs were excluded from the overnight period since these costs are driven by the system peak which occurs in the early evening. Scenario analysis was undertaken on a range of marginal distribution capacity costs, as these costs will depend on the specific size and location of the account. The base case reported below assumes that the marginal distribution capacity cost is the contribution provided by BC Hydro under the distribution extension policy (section 8.3 of the Electric Tariff). This is explained in more detail in Appendix E.

The results of the analysis for the base case indicate a positive ratepayer impact for each of the five, ten and fifteen year time periods with the Ratepayer Benefit Cost

[15] Given the uncertainty in the timing of the depot load, the depot load used in this analysis is illustrative only and subject to further development.

Ratios above one.[16] This analysis is based on the conservative assumption that the Customer shifts 100 per cent of their load into the overnight period.

Table 4 Overnight Rate Ratepayer Impact

Time Period (Years)	Ratepayer Benefit Cost Ratio
5	1.13
10	1.43
15	1.42

4.4 Overnight Rate Bonbright Assessment

Shown below is BC Hydro's assessment of how the Overnight Rate performs against the Bonbright Rate Design Criteria.

Table 5 Assessment of Overnight Rate against the Bonbright Rate Design Criteria

Bonbright Criteria	2015 RDA Grouping	Performance	Remarks
• Price signals to encourage efficient use and discourage inefficient use	Economic Efficiency	Good	The price encourages usage during the overnight period when BC Hydro's system has spare capacity.
• Fair apportionment of costs among customers	Fairness	Good	There are sufficient revenues to recover embedded costs. In addition, incremental revenues exceed marginal costs resulting in benefits to all ratepayers.
• Avoid undue discrimination	Fairness	Good	The rate is available to all fleet charging loads.
• Customer understanding and acceptance; practical and cost effective to implement	Practicality	Good/Fair	The rate is simple for customers to understand. Time varying demand charges requires metering and billing system changes
• Freedom from controversies as to proper interpretation	Practicality	Good	The rate is simple for customers to understand and for BC Hydro to explain.

[16] The Ratepayer Benefit Cost Ratio is the ratio of the net present value of revenue divided by the net present value of marginal cost over each time period.

Bonbright Criteria	2015 RDA Grouping	Performance	Remarks
• Recovery of the revenue requirement	Stability	Good	Fleet electrification is expected to result in a new source of stable long term revenue for BC Hydro.
• Revenue stability	Stability	Good	The rate would be offered on an on-going basis and should provide relatively stable revenues for overnight charging load.
• Rate stability	Stability	Good	The rate is stable and only changes with general rate increases.

4.5 Overnight Rate Implementation Consideration

BC Hydro's current distribution smart meters only record and display one maximum demand register during each billing period – typically one Month for Large General Service accounts. The demand register is reset to zero on the meter read date for the next billing period. Customers are charged for the Maximum Demand during each billing period. To implement the Overnight Rate, daily daytime and overnight demand records from the meter are required to apply demand charge only on Maximum Demand during 6:00 a.m. and 10:00 p.m.

BC Hydro is exploring a range of metering and billing solutions to implement the Overnight Rate. These options include leveraging the metering and billing solutions for Transmission Service Rates, utilizing meter interval data from distribution smart meters and perform manual billing, and initiating a technology infrastructure upgrade to fully automate the processing of meter interval data to enable time-based energy and demand billing, web presentation and reporting.

The metering and billing solutions for Transmission Service Rates are certified to provide time-based demand billing. However, this solution is not scalable to other distribution rate customers and customers will not be able to take advantage of the full suite of online tools in MyHydro that were enabled by the distribution Smart Meter Infrastructure. The system enhancement costs of this solution would be fully allocated to the Overnight Rate.

The other two options require Measurement Canada's approval on calculating time-based Maximum Demands from meter interval data. BC Hydro is reaching out to its smart meter vendor and Measurement Canada to source a certified distribution smart metering solution. On the billing side, if billing is performed manually, the cost of billing administration will be based on the number of accounts under the Overnight Rate. Initiating a technology infrastructure upgrade to fully automated time-based billing, web presentation and reporting provides the best scalability and customer experience as this solution would enable time-based energy and demand billing capability for all metered distribution rates and customers will be able to access the online MyHydro energy information and tools.

BC Hydro is assessing different implementation options and will determine the best and most cost effective option for all ratepayers to deliver the Overnight Rate. For the purpose of this Application, BC Hydro included the estimate of $350,000 of utilizing the transmission metering and billing solution in the cost of service and economic analysis of the Overnight Rate presented in sections 4.2 and 4.3.
BC Hydro is proposing the Overnight Rate to be effective in April 2021 to meet customer needs as well as allowing for time to complete the most critical metering and system changes required.

5 BC Hydro's Demand Transition Rate Proposal

5.1 Demand Transition Rate Terms and Conditions

Shown below are proposed key Terms and Conditions of the Demand Transition Rate followed by a discussion of their intent. Note that some but not all Terms and Conditions are the same as those of the Overnight Rate (see section 4.1). Terms and Conditions that match those of the existing LGS rate are not repeated here. Please see Appendix B for Rate Schedule 165x for all proposed terms and conditions. Rates are for fiscal 2021.

Availability: For Customers who qualify for General Service where the Customer is a business, government agency or other organization. For use only for separately metered charging of Electric Fleet Vehicles or Vessels owned or leased by, and operated by, the Customer, at Maximum Demand equal to or greater than 150kW.

Applicability: Rate Zone 1

Termination: These Rate Schedules will terminate effective March 31, 2032. As of April 1, 2032 customers will be migrated to RS16xx or the otherwise applicable rate.

Rates: Basic Charge: 26.92 ¢ per day

plus

Demand Charge:

$0 per kW of Billing Demand until March 31, 2026

plus

Energy Charge:

9.24 ¢ per kWh

Definitions:

3. Electric Fleet Vehicle or Vessel

A Vehicle or Vessel that

(i) is powered entirely or partially by electricity; and

(ii) is part of a group of similar Vehicles or Vessels that are used for similar purposes.

4. Vehicle

A vehicle used for transportation, not run on rails, and includes, without limitation, buses, medium duty trucks and heavy duty trucks.

5. Vessel

A watercraft used for transportation and includes, without limitation, passenger and vehicle ferries, tugs and barge transportation.

Special Conditions

1. Demand and Energy Charge Pricing

The Demand and Energy Charge Pricing over the period that this rate schedule is in effect is provided in the following table.

No Demand Charge shall apply to Customers receiving service under this Rate Schedule for the first six years of the rate, from April 1, 2020 to March 31, 2026. As of April 1, 2026 the Demand Charge will be transitioned to the RS16xx Demand Charge over six years and completed by March 31, 2032, unless otherwise authorized by the Commission.

The Energy Charge will be subject to general rate increases during the period of April 1, 2020 to March 31, 2026. As of April 1, 2026 the Energy Charge will be transitioned to the RS 16xx Energy Charge over six years, to March 31, 2032, unless otherwise authorized by the Commission.

Effective Date	Fiscal Year	Demand Charge ($)	Energy Charge
April 1, 2020	*F2021*	*0*	*9.24 ¢ per kWh*
April 1, 2021	*F2022*	*0*	*F2021 Energy Charge x RRA increase*
April 1, 2022	*F2023*	*0*	*F2022 Energy Charge x RRA increase*
April 1, 2023	*F2024*	*0*	*F2023 Energy Charge x RRA increase*
April 1, 2024	*F2025*	*0*	*F2024 Energy Charge x RRA increase*
April 1, 2025	*F2026*	*0*	*F2025 Energy Charge x RRA increase*
April 1, 2026	*F2027*	*F2026 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge]/6*	*F2026 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge]/6*
April 1, 2027	*F2028*	*F2027 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge]/6*	*F2027 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge]/6*
April 1, 2028	*F2029*	*F2028 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge]/6*	*F2028 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge]/6*
April 1, 2029	*F2030*	*F2029 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge]/6*	*F2029 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge]/6*
April 1, 2030	*F2031*	*F2030 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge]/6*	*F2030 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge]/6*
April 1, 2031	*F2032*	*F2032 LGS Demand Charge*	*F2032 LGS Energy Charge*

2. Metering

Metering Equipment with both Demand and Energy measurement capability will be installed. Only charging of Electric Fleet Vehicles or Vessels and related equipment will be served under this rate schedule.

3. Migration

Customers taking service under these rate schedules will not be migrated to Rate Schedules 1300, 1301, 1310, or 1311 (Small General Service) or Rate Schedules 1500, 1501, 1510 or 1511 (Medium General Service) due to changes in load size. BC Hydro will review this Special Condition in its evaluation report planned for the third year after which the rate commences.

4. Concurrent Service under other Rate Schedules

BC Hydro will not provide service to equipment installed for service under these rate schedules under any other rate schedule except Rate Schedule 1901.

The Availability, Definition of Electric Fleet Vehicle or Vessel, and Metering Special condition are intended to ensure this rate schedule applies to the new service for which it was designed, which is charging of electric fleets with Demand greater than 150 kW. As noted in section 1.2, this new type of electrical load does not currently exist in BC Hydro's service territory. Broadening the availability to include existing electrical loads would reduce the economic benefits to ratepayers.

The intent of the Special Condition on Demand and Energy Pricing is as follows, and as depicted in Figure 4 in section 1.4:

- No demand charge applies for the first six years that the rate is proposed to be offered (From fiscal 2021 to fiscal 2026);
- The demand charge transitions from $0/kW to the LGS demand charge over six years, starting in fiscal 2027 and ending in fiscal 2032;
- A flat energy charge of 9.24 cents per kWh in fiscal 2021, escalated each year by the general rate increase, applies for the first six years that the rate is proposed to be offered. The Demand Transition Rate energy charge was

calculated as the blended average unitized (per kWh) price of both energy and demand assuming the LGS rate class average load factor.[17] As a result the Demand Transition Rate Energy Charge is higher than the level of the energy charge that applies to the existing LGS rate (6.10 c/kWh in fiscal 2021);

- The energy charge transitions to the LGS energy charge over six years, starting in fiscal 2027 and ending in fiscal 2032;
- The basic charge is 26.92 cents per day in fiscal 2021 escalated in each following year by the general rate increase, which aligns with the Basic Charge used in the BC Hydro's LGS Rate.

The intent of the Termination provision is the Demand Transition Rate terminates in fiscal 2032, by which time the pricing of the rate will have fully transitioned to the standard LGS Rate pricing.

The Special Condition on Metering is intended to ensure that appropriate metering capability is installed to bill for rates as proposed and to ensure that the rate schedule applies only to the service for which is it intended, i.e., fleet charging load.

The Special Condition on Migration is intended to allow the new load expected a period of time to establish normal operating conditions without the potential instability of migration to another rate schedule.

The Special Condition on Concurrent Service under other Rate Schedules is intended to ensure that Customers under these rate schedules do not also participate in other optional rates that may be offered by BC Hydro, as this could reduce the economic benefits to ratepayers

[17] The following explains the derivation in more detail. The 9.24 cents per kWh is based on an estimate of the F2020 LGS blended average price multiplied by the F2021 RRA increase. The F2020 LGS blended average price is estimated by multiplying the F2018 LGS class kWh and kW by the F2020 LGS energy and demand charge respectively and dividing this revenue by the F2018 LGS class kWh. This rate calculation is undertaken so that the demand transition rate is revenue neutral to the LGS rate based on the LGS class consumption and load, and therefore the class average load factor.

5.2 Demand Transition Rate Cost of Service Justification

BC Hydro calculated cost recovery for this rate using our results of our F2017 Fully Allocated Cost of Service Study, prospective in route load characteristics (see section 3.2), and pricing as described in section 5.1.

The extent to which revenues from the Demand Transition Rate recover BC Hydro's embedded cost of service is sensitive to the load factor of the new load served under this rate, which in turn depends on the schedule and configuration fleet conversion. Table 6 below shows the estimated Revenue to Cost ratio for the Demand Transition Rate at three points in time, assuming the load factors shown. BC Hydro notes there is considerable uncertainty about the actual timing and load factor of load served under the Demand Transition Rate.

For comparison purposes, note that BC Hydro's most recent FACOS study based on fiscal 2017 actual data calculated the Revenue to Cost ratio for the LGS rate class to be 103.9 per cent

Table 6 Demand Transition Rate Recovery of Embedded Cost of Service

Year	F2024 (%)	F2029 (%)	F2032 (%)
Load Factor	15	30	50
Estimated Revenue to Cost Ratio	43	84	105

As shown in Table 6, BC Hydro estimates that the Demand Transition Rate recovers BC Hydro's embedded cost occurs when the load factor reaches 50 per cent.

BC Hydro notes that even during the period where BC Hydro does not fully recovery its embedded cost of service, all ratepayers are still better off if the incremental revenue from this proposed new Service exceeds BC Hydro marginal costs to serve the new load. This economic justification for the Demand Transition Rate is provided below in section 5.3.

5.3 Demand Transition Rate Economic Justification

BC Hydro calculated the economic impacts on ratepayers using our estimated marginal costs of non-bulk transmission capacity, distribution capacity, and energy (see Appendix E), incremental implementation costs (see section 5.6), prospective load (see section 3)[18] and proposed Demand Transition Rate pricing (see section 5.1).

The Demand Transition Rate is justified on an economic basis. BC Hydro estimates under the base case reported below that the incremental revenues received from new load served under the Demand Transition Rate will exceed the marginal cost of serving new load in the ten and fifteen year time periods. Therefore, ratepayers benefit from the new load in the medium and longer term, even if that new load is at a lower rate than existing load for a period of time.

BC Hydro assumed that the marginal energy cost is the Mid-C market price forecast. Generation and transmission capacity marginal costs were included in the analysis of in route charging since these costs are driven by the system peak which occurs in the early evening. An additional scenario was developed regarding the marginal distribution capacity cost, as this cost will depend on the specific size and location of the new accounts. The base case reported below assumes that the marginal distribution capacity cost is the contribution provided by BC Hydro under the distribution extension policy (section 8.3 of the Electric Tariff). In the additional scenario, the system wide distribution marginal capacity cost was used. This is explained in more detail in Appendix E.

[18] Given the uncertainty regarding the timing of in route load, for illustrative purposes BC Hydro has assumed that this load begins to take service in fiscal 2021 and that the load factor improves over time as shown in Table 7. The in route load used in the following analysis is illustrative only and subject to further development.

Table 7 below shows the estimated Ratepayer Benefit Cost Ratio for the Demand Transition Rate over five, ten and fifteen year time periods.[19] BC Hydro notes there is considerable uncertainty about the actual timing of load factor and load served under the Demand Transition rate.

Table 7 Demand Transition Rate Ratepayer Impacts

Time Period for Load Factor	F2021 - F2025	F2026 - F2029	F2030 - F2034
Load Factor	15%	30%	52%
Time Period used for Ratepayer Benefit Cost Analysis	5 Years F2020-F2024	10 Years F2020-F2029	15 Years F2020-F2034
Ratepayer Benefit Cost Ratio	0.74	1.04	1.16

As shown in Table 7, BC Hydro expects benefits to ratepayers if the new load that takes Service under the Demand Transition Rate stays for at least ten years. If the Demand Transition Rate is successful in encouraging electrification of Fleet Vehicles and Vessels in BC Hydro's service territory, BC Hydro expects this new load to last well beyond ten years. This is a reasonable expectation given the long lead times and intensive capital investment required to convert fleets to electricity, as noted by BC Transit in their comment letter (see Appendix C), and the expected make up of Demand Transition Rate Customers which includes Governmental organizations such as public transit providers.

5.4 Demand Transition Rate Bonbright Assessment

Shown below is BC Hydro's assessment of how the Demand Transition Rate performs against the Bonbright Rate Design Criteria.

[19] The ratepayer benefit cost ratio is the ratio of the net present value of revenue divided by the net present value of marginal cost over each time period.

Bonbright Criteria	2015 RDA Grouping	Performance	Remarks
• Price signals to encourage efficient use and discourage inefficient use	Economic Efficiency	Fair	The transition to the LGS rate encourages improvements to utilization and load factor, which should result in more efficient utilization of the electrical system.
• Fair apportionment of costs among customers	Fairness	Good/Fair	During the period of demand charge relief, revenues are not sufficient to recover embedded costs. However, in the later periods, all ratepayers benefit as incremental revenues exceed marginal costs.
• Avoid undue discrimination	Fairness	Good	The rate is available to all fleet charging loads.
• Customer understanding and acceptance; practical and cost effective to implement	Practicality	Good	The rate is simple for customers to understand. The rate will also use existing metering and billing systems.
• Freedom from controversies as to proper interpretation	Practicality	Good	The rate is simple for customers to understand and for BC Hydro to explain.
• Recovery of the revenue requirement	Stability	Good	Fleet electrification is expected to result in a new source of stable long term revenue for BC Hydro. .
• Revenue stability	Stability	Fair	Pricing changes year to year and revenues are sensitive to load factor and timing of fleet conversion

5.5 Demand Transition Rate Implementation Consideration

The implementation of the Demand Transition Rate is relatively simple and BC Hydro expects minimal cost due to implementation. No new metering or billing changes are required to implement this rate except for configuring new rate schedules in the SAP billing system. It will take approximately two months to implement the billing system change and complete the required testing.

5.6 Demand Transition Rate Response to Stakeholder and Customer Feedback

As described in section 2.3.1, BC Hydro solicited feedback from its stakeholders through a May 28, 2019 workshop and received some feedback specific to the design of the Demand Transition Rate. Below is a discussion of the feedback that was specific to the design of the Demand Transition Rate.

1. Provide customer specific start dates for the Demand Transition Rate.

   Some participants requested that BC Hydro consider providing each account in the Demand Transition Rate a specific start date, such that customers would benefit from the same period of demand relief regardless of when they first commenced service under the rate. This feedback was in consideration that for some customers, it may take several years before they are in a position to take service under the Demand Transition Rate; and

   BC Hydro analyzed the impact of implementing this suggestion, and concluded that the resulting complexity limits it practicality. In particular, BC Hydro estimates that providing custom start dates would result in 40 different individual rates schedules which over the ten years that the Demand Transition Rate is proposed to be made available. While BC Hydro is unable to implement the suggested request by some participants in the May workshop, we are proposing to extend the demand relief period from five years, as described in the May 28 workshop, to six years. This extension will allow customers to benefit from demand relief even if they do not commence service for several years.

2. Include Time of Day Energy Rates for the Demand Transition Rate

   Some workshop participants suggested that BC Hydro consider including time of day differentiated pricing as part of the Demand Transition Rate design rather than the proposed flat energy charge. BC Hydro has considered this suggestion and believes there are potential benefits to time differentiated

periods. In particular, including time of day price signals in the Demand Transition Rate would send an economically efficient price signal to encourage fleet customers to shift their charging load from higher cost peak periods to lower cost non-peak periods. However, BC Hydro's customer engagement indicates that in route bus charging load has limited ability to respond to time of day energy charges.[20] Further, there would be incremental costs and time required to implement the metering and billing solutions required to enable time of day energy use charging. Therefore BC Hydro's view is that the increased complexity associated with introducing time of day pricing is not warranted at this time; and

BC Hydro is of the view that rate simplicity is an important consideration for the proposed rates, particularly during the early years of customers adopting electric vehicles and understanding their charging needs and patterns.

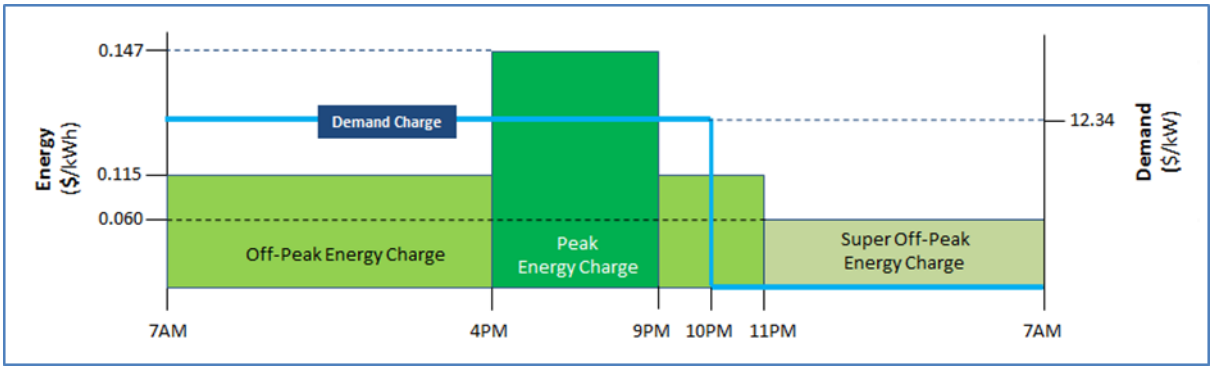
6 Other Rate Design Options Considered

6.1 Overnight Rate with Time-of-Use Energy

As an alternative to the proposed Overnight Rate with time varying demand charge, BC Hydro refined that rate design to incorporate a TOU energy charge. The resulting rate was presented as Option 2 in the May 28, 2019 stakeholder engagement workshop. The following figure shows the rate design:

[20] BC Transit Feedback from May 28 Workshop. Appendix C

Figure 9 Overnight Rate with Energy and Demand Time of Use



Rather than a flat energy rate, BC Hydro developed a year round TOU energy rate with TOU prices applicable to peak, off-peak and super off-peak periods. A year round TOU energy rate was developed given that the charging load would be similar in each month and that a TOU energy rate with seasonal pricing would be more complicated for the customer to understand and remember. The peak period from 4:00 pm to 9:00 pm is based on when BC Hydro's system peaks which occurs during the winter months. The super off-peak period is from 11:00 p.m. to 7:00 a.m. and the off-peak period is the remaining hours of the day.

This rate is revenue neutral to the Overnight Rate with time varying demand charge and uses the depot charging load profile. The peak price is based on allocating the marginal capacity costs to the peak period in each month. The super off-peak price is based on the standard LGS energy rate. The off-peak price is determined assuming revenue neutrality.

The demand charge is the same as the Overnight Rate with time varying demand charge i.e., LGS demand charge from 6:00 a.m. to 10:00 p.m. and no demand charge during overnight.

Regarding practicality, this rate requires more complex metering and billing solutions. It is also more complicated for customers to understand.

The economic assessment results for this rate showed that there are greater bill savings to participants, and fewer benefits to all ratepayers than the Overnight Rate with time varying demand charge.

The feedback from the stakeholder engagement was to align the demand and energy periods e.g., the super off-peak price could start at 10:00 p.m. when the demand charge ends, and it could end at 6:00 a.m. when the demand charge begins. Tesla also indicated that this rate option would not benefit public charging, as most consumers have inflexible charging schedules that would require them to charge during the day and evening hours.

BC Hydro did not advance this TOU energy and demand rate design since it believes that the rate objectives can be met by the simpler Overnight Rate as proposed..

7 Proposed Monitoring and Reporting

BC Hydro proposes to monitor and evaluate the two new optional rates to verify whether they are obtaining the expected benefits. The scope of the analysis will focus on the new services billed under the Overnight and Demand Transition Rate only[21].

For each of the Overnight Rate and Demand Transition Rate, BC Hydro intends to monitor the following on an annual basis:

- Number and nature of fleet charging operations;
- New load (energy, demand, load shape and load factor);
- New Revenues;

[21] BC Hydro's annual Fully Allocated Cost of Service Studies will include the Overnight Rate and Demand Transition Rate within the LGS Rate Class, and will not show Fleet Charging as a separate rate class. This is similar to how various Residential Service Rate Schedules, e.g. E-Plus (RS1105) are included in the Residential Rate Class.

- Incremental costs (e.g., metering, billing); and
- Customer feedback.

BC Hydro intends to evaluate each of the Overnight Rate and Demand Transition Rate. Based on the implementation schedule proposed in this Application, the three year evaluation of the Demand Transition Rate would be completed by December 30, 2023, and the three year evaluation of the Overnight Rate would be completed by December 30, 2024. The scope of the three year evaluations is expected to include:

- Cost recovery;
- Economic impact on ratepayers;
- Greenhouse gas emission reductions and air pollutants to the extent practical ; Customer feedback; and
- Participant electricity costs and bill savings relative to the LGS rate

BC Hydro proposes to file these evaluation reports with the BCUC and may recommend changes to pricing, terms and conditions of the Overnight Rate and/or the Demand Transition Rate based on the outcomes of these evaluations.

8 Conclusion

BC Hydro's proposed Overnight Rate and Demand Transition Rate are responsive to customer feedback, they support BC Hydro's fleet electrification objectives and the B.C Government's CleanBC goals, while they protect the interests of existing ratepayers and they provide economic benefits to all ratepayers over time. BC Hydro respectfully requests the Overnight Rate and Demand Transition Rate be approved as filed.

BC Hydro Fleet Electrification Rate Application

Appendix A

Draft Order

bcuc
British Columbia
Utilities Commission

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

ORDER NUMBER
G-xx-xx

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

British Columbia Hydro and Power Authority (BC Hydro)
Fleet Electrification Rate Application (the Application)

BEFORE:
Commissioner
Commissioner
Commissioner

on Date

ORDER

WHEREAS:

A. On August 7, 2019, BC Hydro filed an Application which seeks an order approving Rate Schedules 164x -Overnight Rate (150 kW and over) and Rate Schedules 165x – Demand Transition Rate (150 kW and over) as shown in the rate schedules contained in Appendix B of the Application;

B. Both rates are proposed to be optional and available for charging of Electric Fleet Vehicle and Vessels. BC Hydro has had requests from potential electric fleet customers for Large General Service rate options that would help mitigate the impact of demand charges to support the electrification of bus fleets;

C. The Overnight Rate does not have a demand charge during the overnight period. This rate is intended for depot and overnight charging of fleet vehicles and vessels. The Demand Transition Rate provides demand charge relief for a fixed period of years after which it transitions to the Large General Service rate. The Demand Transition Rate is intended for in route and daytime charging of fleet vehicles and vessels;

D. BC Hydro states that the Overnight Rate is modelled to fully recover BC Hydro's embedded cost of service and that the Overnight Rate, as proposed, may also provide economic benefits to all ratepayers. BC Hydro also states that the Demand Transition Rate, as proposed, is justified on an economic basis and will provide benefits to all ratepayers over time;

E. BC Hydro has consulted with customers who could potentially be eligible for the proposed rate options. Additionally BC Hydro held a workshop on May 28, 2019 with customers and stakeholder groups to review rate design options for fleet electrification in order to gather feedback to inform its proposals. BC Hydro has indicated that there is strong customer support for its proposed rate options.

.../2

NOW THEREFORE the Commission, pursuant to sections 58 to 61 of the *Utilities Commission Act*, orders as follows:

1. The RS 164x - Overnight Rate (150 kW and Over), as shown in Appendix B of the Application, is approved effective April 1, 2021.

2. The RS 165x – Demand Transition Rate (150 kW and Over), as shown in Appendix B of the Application, is approved effective April 1, 2020 and will terminate effective March 31, 2032.

3. BC Hydro shall submit a three year evaluation report for the Demand Transition Rate by December 30, 2023 and a three year evaluation report for the Overnight Rate by December 30, 2024.

DATED at the City of Vancouver, in the Province of British Columbia, this (XX) day of (Month Year).

BY ORDER

(X. X. last name)
Commissioner

Attachment Options

BC Hydro Fleet Electrification

Rate Application

Appendix B

Rate Schedules

2. GENERAL SERVICE

RATE SCHEDULES 1640, 1641, 1642, 1643 – OVERNIGHT RATE (150 KW AND OVER)

Availability	For Customers who qualify for General Service where the Customer is a business, government agency or other organization. For use only for separately metered charging of Electric Fleet Vehicles or Vessels owned or leased by, and operated by, the Customer, at Maximum Demand equal to or greater than 150 kW. Supply is 60 hertz, single or three phase at Secondary or Primary Voltage. BC Hydro reserves the right to determine the voltage of the Service Connection.
Applicable in	Rate Zone 1.
Rate	**Basic Charge:** 27.52 ¢ per day plus **Demand Charge:** $12.70 per kW of Billing Demand per Billing Period plus **Energy Charge:** 7.41 ¢ per kWh
Discounts	1. A discount of 1½% will be applied to the above charges if a Customer's supply of Electricity is metered at a Primary Voltage. 2. A discount of 25 ¢ per Billing Period per kW of Billing Demand will be applied to the above charges if a Customer supplies Transformation. 3. If a Customer is entitled to both of the above discounts, the discount for metering at a Primary Voltage will be applied first.

Monthly Minimum Charge	50% of the highest Demand Charge billed in any Billing Period wholly within an on-peak period during the immediately preceding 11 Billing Periods. For the purpose of this provision an on-peak period commences on November 1 in any year and terminates on March 31 of the following year.
Rate Schedules	1. Rate Schedule 1640: Applies if a Customer's supply of Electricity is metered at a Secondary Voltage and BC Hydro supplies Transformation. 2. Rate Schedule 1641: Applies if a Customer's supply of Electricity is metered at a Primary Voltage and BC Hydro supplies Transformation. 3. Rate Schedule 1642: Applies if a Customer's supply of Electricity is metered at a Secondary Voltage and the Customer supplies Transformation. 4. Rate Schedule 1643: Applies if a Customer's supply of Electricity is metered at a Primary Voltage and the Customer supplies Transformation.
Definitions	1. Billing Demand The Billing Demand will be the highest kW Demand between the hours 06:00 and 21:59 daily in the Billing Period. 2. Billing Period A month between regular meter readings, provided that where meter readings are not available or are delayed for any reason BC Hydro may vary the number of days in the Billing Period.

	3. Electric Fleet Vehicle or Vessel A Vehicle or Vessel that: (a) Is powered entirely or partially by electricity; and (b) Is part of a group of similar Vehicles or Vessels that are used for similar purposes. 4. Vehicle A vehicle used for transportation, not run on rails, and includes, without limitation, buses, medium duty trucks and heavy duty trucks. 5. Vessel A watercraft used for transportation and includes, without limitation, passenger and vehicle ferries, tugs and barge transportation.
Special Conditions	1. Metering Metering Equipment with both Demand and Energy measurement capability will be installed. Only charging of Electric Fleet Vehicles or Vessels and related equipment will be served under these Rate Schedules. 2. Migration Customers taking service under these Rate Schedules will not be migrated to Rate Schedules 1300, 1301, 1310, or 1311 (Small General Service) or Rate Schedules 1500, 1501, 1510 or 1511 (Medium General Service) due to changes in load size. BC Hydro will review this Special Condition in its evaluation report planned for the third year after which the rate commences. 3. Concurrent Service under other Rate Schedules BC Hydro will not provide service to equipment installed for service under these Rate Schedules under any other rate schedule except Rate Schedule 1901.

Rate Rider	The Deferral Account Rate Rider as set out in Rate Schedule 1901 applies to all charges payable under these Rate Schedules, before taxes and levies.
Rate Increase	Effective April 1, 2021 the rates under these Rate Schedules include an interim rate increase of XX% before rounding, approved by BCUC Order No. G-45-19.

2. GENERAL SERVICE

RATE SCHEDULES 1650, 1651, 1652, 1653 – DEMAND TRANSITION RATE (150 KW AND OVER)

Availability	For Customers who qualify for General Service where the Customer is a business, government agency or other organization. For use only for separately metered charging of Electric Fleet Vehicles or Vessels owned or leased by, and operated by, the Customer, at Maximum Demand equal to or greater than 150 kW. Supply is 60 hertz, single or three phase at Secondary or Primary Voltage. BC Hydro reserves the right to determine the voltage of the Service Connection.
Applicable in	Rate Zone 1.
Termination Date	These Rate Schedules will terminate effective March 31, 2032. As of April 1, 2032 customers will be migrated to Rate Schedules 16xx or the otherwise applicable rate.
Rate	**Basic Charge:** 26.92 ¢ per day plus **Demand Charge:** $0 per kW of Billing Demand until March 31, 2026 plus **Energy Charge:** 9.24 ¢ per kWh
Discounts	1. A discount of 1½% will be applied to the above charges if a Customer's supply of Electricity is metered at a Primary Voltage. 2. A discount of 25 ¢ per Billing Period per kW of Billing Demand will be applied to the above charges if a Customer supplies Transformation. 3. If a Customer is entitled to both of the above discounts, the discount for metering at a Primary Voltage will be applied first.

Monthly Minimum Charge	50% of the highest Demand Charge billed in any Billing Period wholly within an on-peak period during the immediately preceding 11 Billing Periods. For the purpose of this provision an on-peak period commences on November 1 in any year and terminates on March 31 of the following year.
Rate Schedules	1. Rate Schedule 1650: Applies if a Customer's supply of Electricity is metered at a Secondary Voltage and BC Hydro supplies Transformation. 2. Rate Schedule 1651: Applies if a Customer's supply of Electricity is metered at a Primary Voltage and BC Hydro supplies Transformation. 3. Rate Schedule 1652: Applies if a Customer's supply of Electricity is metered at a Secondary Voltage and the Customer supplies Transformation. 4. Rate Schedule 1653: Applies if a Customer's supply of Electricity is metered at a Primary Voltage and the Customer supplies Transformation.
Definitions	1. Billing Demand The Billing Demand will be the highest kW Demand in the Billing Period. 2. Billing Period A month between regular meter readings, provided that where meter readings are not available or are delayed for any reason BC Hydro may vary the number of days in the Billing Period.

	3. Electric Fleet Vehicle or Vessel A Vehicle or Vessel that: (a) Is powered entirely or partially by electricity; and (b) Is part of a group of similar vehicles or Vessels that are used for similar purposes. 4. Vehicle A vehicle used for transportation, not run on rails, and includes, without limitation, buses, medium duty trucks and heavy duty trucks. 5. Vessel A watercraft used for transportation and includes, without limitation, passenger and vehicle ferries, tugs and barge transportation.
Special Conditions	1. Demand and Energy Charge Pricing The Demand and Energy Charge Pricing over the period that these Rate Schedules are in effect is provided in the following table. No Demand Charge shall apply to Customers receiving service under these Rate Schedules for the first six years of the rate, from April 1, 2020 to March 31, 2026. As of April 1, 2026 the Demand Charge will be transitioned to the Rate Schedules 1600, 1601, 1610 and 1611 (Large General Service) Demand Charge over six years and completed by March 31, 2032, unless otherwise authorized by the Commission. The Energy Charge will be subject to general rate increases during the period of April 1, 2020 to March 31, 2026. As of April 1, 2026 the Energy Charge will be transitioned to the Rate Schedules 1600, 1601, 1610 and 1611 (Large General Service) Energy Charge over six years, to March 31, 2032, unless otherwise authorized by the Commission.

		Effective Date	Fiscal Year	Demand Charge	Energy Charge
		April 1, 2020	F2021	$0	9.24 ¢ per kWh
		April 1, 2021	F2022	$0	F2021 Energy Charge x RRA increase
		April 1, 2022	F2023	$0	F2022 Energy Charge x RRA increase
		April 1, 2023	F2024	$0	F2023 Energy Charge x RRA increase
		April 1, 2024	F2025	$0	F2024 Energy Charge x RRA increase
		April 1, 2025	F2026	$0	F2025 Energy Charge x RRA increase
		April 1, 2026	F2027	F2026 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge] ÷ 6	F2026 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge] ÷ 6
		April 1, 2027	F2028	F2027 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge] ÷ 6	F2027 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge] ÷ 6
		April 1, 2028	F2029	F2028 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge] ÷ 6	F2028 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge] ÷ 6
		April 1, 2029	F2030	F2029 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge] ÷ 6	F2029 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge] ÷ 6
		April 1, 2030	F2031	F2030 Demand Charge + [F2032 LGS Demand Charge-F2026 Demand Charge] ÷ 6	F2030 Energy Charge + [F2032 LGS Energy Charge-F2026 Energy Charge] ÷ 6
		April 1, 2031	F2032	F2032 LGS Demand Charge	F2032 LGS Energy Charge

	2. Metering Metering Equipment with both Demand and Energy measurement capability will be installed. Only charging of Electric Fleet Vehicles or Vessels and related equipment will be served under this rate schedule. 3. Migration Customers taking service under these Rate Schedules will not be migrated to Rate Schedules 1300, 1301, 1310, or 1311 (Small General Service) or Rate Schedules 1500, 1501, 1510 or 1511 (Medium General Service) due to changes in load size. BC Hydro will review this Special Condition in its evaluation report planned for the third year after which the rate commences. 4. Concurrent Service under other Rate Schedules BC Hydro will not provide service to equipment installed for service under these Rate Schedules under any other rate schedule except Rate Schedule 1901.
Rate Rider	The Deferral Account Rate Rider as set out in Rate Schedule 1901 applies to all charges payable under these Rate Schedules, before taxes and levies.
Rate Increase	Effective April 1, 2020 the rates under these Rate Schedules include an interim rate increase of 0.72% before rounding, approved by BCUC Order No. G-XX-XX.

BC Hydro Fleet Electrification Rate Application

Appendix C

Customer Letters of Support

July 23, 2019

Keith Anderson
Vice-President Customer Service
BC Hydro
333 Dunsmuir Street
VANCOUVER, BC V7B 5E6

Dear Keith Anderson

Re: Support for Transportation Rate Design

This letter serves to confirm BC Transit's support for the establishment of an electricity rate for the transportation sector to support the electrification of fleets in British Columbia.

BC Transit is the provincial crown agency charged with coordinating the delivery of public transportation across British Columbia with the exception of those areas serviced by TransLink (Metro Vancouver). More than 1.8 million British Columbians in over 130 communities across the province have access to BC Transit local and regional services.

As with all provincial public sector organizations, and as part of the *Greenhouse Gas Reduction Targets Act*, BC Transit is required to provide an annual Carbon Neutral Action Report (CNAR). BC Transit reports its annual greenhouse gas (GHG) emissions, associated required GHG offsets and initiatives which have been undertaken to lower GHGs. In 2017, BC Transit's reported 64,323 tonnes of GHG emissions, of which 92 per cent are attributed to buses, were the second most of any reporting provincial entity.

A number of recent fleet investment initiatives have ensured BC Transit continues to reduce reliance on diesel fuel. For example, compressed natural gas (CNG) investments in Whistler, Nanaimo and Kamloops have enabled the deployment of 100 per cent CNG fleets in those communities. Efforts to replace heavy duty buses with medium duty buses equipped with smaller engines and fewer emissions have contributed to GHG reductions on a service-hour basis. While these investments have helped to preserve incremental increases in GHG emissions, they do not possess the necessary attributes to significantly lower BC Transit's GHG emissions from its fleet operations. The only way to do so is to actively pursue new and emerging low carbon technologies.

In May 2018, the provincial government introduced new legislation to update the Province's GHG reduction targets. The new legislation set GHG reduction targets of 40 per cent by 2030, 60 per cent by 2040 and 80 per cent by 2050. The Province also announced its Clean BC plan, which aims to reduce pollution by using more clean and renewable energy.

520 Gorge Road East, PO Box 9861 Victoria, BC Canada V8W 9T5 · T: 250 385 2551 · F: 250 995 5639 · www.bctransit.com

In November 2018, BC Transit's Board of Directors approved a transition of the fleet to electric and we are excited to work with the Province of B.C. and local government partners to achieve these climate action goals. Core to this program is a 10-year fleet replacement strategy to replace over 1,200 existing buses and expand the fleet by an additional 350 buses by using advanced GHG reducing technology. With BC Hydro's hydro-generated electricity, from power generation through to bus operations, battery electric buses are foreseen to be the technology with the potential to have zero emission fleets scalable enough to implement across the province.

In the January 29, 2019 Mandate Letter from the Ministry of Transportation and Infrastructure, the Minister directed BC Transit to meet or exceed the Province's legislated targets for GHG emissions by aligning our organization's operations with the government's new climate plan.

Across the Province of B.C., there is a growing expectation from all partners that BC Transit endeavor to find prudent ways to support its emission reduction goals. We are committed to doing our part as corporate citizens by prioritizing actions that contribute to the reduction of GHG emissions.

BC Transit is planning implementation of a small deployment of electric buses in 2020/21, followed by conversion of our heavy duty fleet to battery electric buses starting as soon as 2022/23. The pathway to electrification will require significant upfront capital investment. The capital cost of a battery electric bus, for example, is almost double that of a diesel equivalent. BC Transit will be pursuing in-depot charging which requires hydro "fueling" infrastructure to be situated at each operating and maintenance depot to support overnight charging capabilities. This will include primary service upgrades, depot electric service distribution, structural/mechanical works and charging equipment. BC Transit will work with the local and provincial government partners to identify incremental funding options to support the capital investment required to support the low carbon fleet program.

BC Transit is excited to partner with BC Hydro to achieve the goals and GHG reduction targets before us. We have appreciated the support BC Hydro provided with the electric bus trial conducted in Victoria in July 2018. We also value the engagement and consultation you have demonstrated in understanding our business needs and exploring rate design options that are fair, stable, practical and easy to understand. BC Transit believes an electric rate designed for the transportation sector is integral to the successful adoption and growth of battery electric technology.

As indicated in BC Transit's feedback form provided following the BC Hydro Fleet Electrification Rate Design Workshop held May 28, 2019, BC Transit supports separately metered new charging load over 150kW and the overnight rate with demand time of use, as well as annual monitoring and a three-year evaluation. Low operating costs are one of the major benefits to battery electric technology and a customized rate structure for the transportation sector is one way to ensure affordability over the long term given the capital investment required to transition. The overnight rate with demand time of use will help BC Transit minimize the impacts of demand charges that are a barrier to its electrification objectives. The proposed rate provides an incentive for BC Transit to shift its depot charging load to the overnight period when demand charges would not apply. BC Hydro's peak period is also outside the overnight period and therefore the load shift to the overnight period will benefit grid management.

We thank you for your consideration of this matter, and look forward to exploring how we can further assist in advancing this important initiative. Please do not hesitate to contact me should you have further questions or concerns.

Aaron Lamb
Vice President, Asset Management

TransLink
400 - 287 Nelson's Court
New Westminster, BC V3L 0E7
Canada
Tel 778-375-7500
www.translink.ca

South Coast British Columbia
Transportation Authority

July 26, 2019

Mr. Keith Anderson
VP Customer Service
BC Hydro
333 Dunsmuir Street
Vancouver BC, V6B 5E3

Dear Mr. Anderson

Re: Support for BC Hydro Proposed Rate Design Options to Support Fleet Electrification

This letter serves to confirm TransLink's support for the proposed BC Hydro rate design options with the intent to support fleet electrification and reduce greenhouse gas emissions, remove barriers to fleet conversion such as the Large General Service demand charge and help shift loads to off-peak when possible.

In 2018, with support of the Board of Directors and Mayors' Council (composed of representatives from each of the 21 municipalities, Electoral Area 'A' and the Tsawwassen First Nation, and collectively represent the viewpoints and interests of the citizens of the region), TransLink adopted two significant enterprise-wide environmental sustainability targets:

- 80% reduction of greenhouse gas emissions by 2050;
- 100% renewable energy in all operations by 2050.

In 2017, TransLink began evaluating options for significant reductions in GHG emissions from the bus fleet. During this Low Carbon Fleet Strategy – Phase 1 analysis, it was determined that only significant fleet electrification could reduce net GHG emissions from the bus operations by 80 percent or more from current levels, consistent with national and provincial goals. Based on the Phase 1 analysis TransLink took the decision to pursue fleet electrification with battery buses as a long-term Low Carbon Fleet Strategy. We are now currently developing a Low Carbon Fleet Implementation Plan, which will identify specific investments in vehicles and charging infrastructure, and necessary funding and policy support, such as the BC Hydro rate design option, to transition the majority TransLink's buses (approx. 1,500 buses) to electric operation between 2023 and 2050.

One of the most significant issues addressed by the implementation plan will be the choice of charging strategies for battery buses; whether buses will be solely or primarily charged at bus

depots overnight (depot charging) or will be charged solely or primarily via periodic charging while in service (in-route charging). While development of the implementation plan is on-going, preliminary results point toward the use of a mixed strategy, with some routes or depots employing depot-charging and others employing in-route charging, with the choice based on route characteristics. In-route charging will likely be employed on routes with high average daily energy use per bus, where range restrictions of current electric buses will significantly increase peak bus requirements and cost if depot charging is used. Depot charging may be used on routes with lower daily energy use per bus (where range restrictions have less impact), and/or where development of in-route charging infrastructure will be particularly difficult or costly – for example on routes that serve the downtown Vancouver center.

TransLink has been working in cooperation with BC Hydro for the past 2 years on mechanisms that would enable electrification and support a low carbon future. Our team was present at the recent BC Hydro Fleet Electrification Rate Design Workshop held on May 28th, 2019, in support of the review of the rate options presented by BC Hydro as a means to support fleet electrification in British Columbia.

Due to the likelihood of a mixed charging strategy for TransLink's bus fleet, we support all 3 Rate Options that BC Hydro presented to address specific customer charging needs, with either Rate Option 1 (Overnight Rate with Demand Time of Use) or Rate Option 2 (Overnight Rate with Energy and Demand Time of Use) to support our depot charge scenario in the near term . Option 3 (the Demand Transition Rate) supports TransLink's in-route charging strategy, as it mitigates the impact of the demand charge during the 5-year grace period for fleets, thereby helping the economics of fleet electrification. The demand charge impacts are most prevalent during the initial stages of the fleet roll out as the demand is set by the charger but the utilization is relatively low until more electric busses are added and make use of the charger.

We thank your team for the continued support in the development of TransLink's low carbon fleet strategy and we look forward to working on this important initiative together.

Please do not hesitate to contact us should you have any further questions or concerns.

Sincerely,

Kevin Desmond
Chief Executive Officer

PORT of vancouver

Kymm Girgulis
Senior Key Account Manager, Transportation
BC Hydro
333 Dunsmuir St, 4th floor
Vancouver, BC V6B 5R3

July 03, 2019

Dear Kymm Girgulis,

Re: Competitive Rate Structure for Commercial Freight

Vancouver Fraser Port Authority (VFPA) is responsible for Canada's largest port, handling a diverse range of cargos including; containers, bulk products (liquid and dry), break bulk, vehicles and passengers. VFPA's corporate vision is to be *the world's most sustainable port.*

Climate action is an important element of VFPA's vision, and electrification of port activities presents a significant opportunity to reduce the Port of Vancouver's contribution to climate change.

Demand charges have been identified as significant barrier to electrification of port fleets. Port business is extremely competitive and so a competitive rate structure will be needed to promote electrification. The Overnight Rate with Demand Time of Use proposed by BC Hydro would benefit terminals and drayage truck fleet operators that can charge their equipment overnight. The 'Demand transition' rate option, that allows a period of demand charge relief to help during the initial years when EV charging has low utilization and poor load factor, could be used by terminals operating 24/7 that require fast opportunity charging at various times throughout the day.

A competitive rate structure is essential to promoting electrification in the freight transport industry and to reducing emissions in this sector. We look forward to discussing rate structure options as we continue our work with BC Hydro to promote electrification and GHG emissions reductions across the port.

Sincerely,

Ronan Chester
Manager, Strategic Environmental Initiatives

BC Hydro
Power smart

BC Hydro Fleet Electrification
Rate Application

Appendix D

Ministry of Energy, Mines and Petroleum Resources Letter of Support

Ministry of Energy, Mines and Petroleum Resources

Re: 107302

August 2, 2019

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

Email: Commission.Secretary@bcuc.com

Re: BC Hydro Fleet Electrification Rate Application

Dear Mr. Wruck:

This letter is to express the support of the BC Ministry of Energy, Mines and Petroleum Resources (EMPR) for BC Hydro's Fleet Electrification Rate Application.

One of BC Hydro's priorities for 2019/2020, as outlined in its mandate letter from the Minister of Energy, Mines and Petroleum Resources, is to provide leadership in advancing the Government's energy and climate strategies, including through electrification, fuel switching, and energy efficiency initiatives in the built environment, transportation, oil and gas, and other sectors. EMPR believes that all British Columbians will benefit from reductions in greenhouse gas (GHG) emissions that result from BC Hydro efforts to advance Government's energy and climate strategies.

CleanBC is Government's overarching strategy for clean economic development, sustainable energy production and use, and reducing GHG emissions. Currently, the transportation sector accounts for 39% of B.C.'s GHG emissions. Through the CleanBC Plan, the Province has committed to significant actions to reduce transportation GHG emissions, including promoting the uptake of zero-emission vehicles.

To promote consumer sales of light-duty zero-emission vehicles, on May 29, 2019, the Province passed the Zero-Emission Vehicles Act (ZEVA), delivering on a key commitment from the CleanBC plan. ZEVA requires that automakers ensure an increasing percentage of light-duty vehicle sales in B.C. be zero-emission models, offering British Columbians more choice of ZEVs.

Electrification of fleets is another focus of the Province's energy and climate strategies. The CleanBC plan states that "ensuring an ever-greater portion of our personal and commercial vehicle fleet is powered by clean B.C. electricity, hydrogen and renewable fuels is one of the most important steps we can take to reduce our carbon footprint."

Ministry of Energy, Mines and Petroleum Resources

Assistant Deputy Minister
Electricity and Alternative Energy Division

Mailing Address:
PO Box 9314, Stn Prov Govt
Victoria, BC V8W 9N1

Location:
4th Floor
1810 Blanshard Street
Victoria

For organizations that are considering conversion of their heavy-duty vehicle and vessel fleets to electricity, BC Hydro's Large General Service Rate can be an economic barrier. EMPR believes that the two new rates proposed by BC Hydro in their Fleet Rate Application will be effective in encouraging these organizations to electrify their fleets and reduce their GHG emissions. The two new rates proposed by BC Hydro also protect the economic interests of non-participating ratepayers, as they will result in new revenues which will reduce upwards pressure on rates for all BC Hydro customers.

EMPR recognizes that fleet operators have unique vehicle charging needs that are different from the needs of private vehicle owners. Because of these differences, EMPR supports BC Hydro's proposal to limit availability of these new services to fleet operators.

Sincerely,

Les MacLaren
Assistant Deputy Minister
Electricity and Alternative Energy Division
Ministry of Energy, Mines and Petroleum Resources

cc: Fred James
Chief Regulatory Officer
BC Hydro
Email: Fred.James@bchydro.com

BC Hydro Fleet Electrification Rate Application

Appendix E

Ratepayer Economic Analysis

Ratepayer Economic Assessment

BC Hydro used an economic assessment framework to estimate the impact on electricity rates for all ratepayers due to marginal changes in utility revenues and costs. For each proposed rate, the following net present value of benefits and costs were estimated based on forecast consumption over five, 10 and 15 year periods:

Table 1 Economic Assessment Benefit and Cost

Benefit	Cost
Increase in utility revenue	Marginal cost of energy
	Marginal cost of generation capacity
	Marginal cost of transmission and distribution capacity
	Incremental BC Hydro cost e.g., billing and metering

A positive result where benefits exceed costs indicates that there are incremental benefits to all ratepayers.

BC Hydro's Marginal Costs

Energy Marginal Cost

BC Hydro's energy load resource balance shows we will not need to acquire new energy resources for many years to come. When our power system is in a state of energy surplus (energy supply is greater than demand), energy marginal cost is market price. Given potential policy changes that may affect BC Hydro arising from ongoing government review initiatives and other energy related policies, on top of technology cost uncertainty in the long term, BC Hydro recently adopted the use of Mid-C market price of energy as the energy marginal cost. Therefore the Mid-C market price is used in the ratepayer economic assessment throughout the evaluation period.

Generation Capacity Marginal Cost

When the system is in a state of capacity surplus (capacity supply is greater than peak demand), BC Hydro continues to set generation capacity marginal costs based on market values, whereas when the system is in a state of capacity deficit, the generation capacity marginal cost is set based upon the next lowest cost new generation in B.C. The marginal (lowest cost new generation) resources are assumed to be Revelstoke Unit 6, followed by a Simple Cycle Gas Turbine (**SCGT**). The generation capacity marginal cost also includes the marginal cost of bulk transmission, if a need of bulk transmission is necessary.

Non-bulk Transmission Marginal Cost

Marginal costs related to non-bulk transmission can be broadly categorized into costs related to area (or regional) transmission wires and area substations. The incremental capacity to meet requirements of overnight charging is expected to have negligible impact on area transmission wires, whereas distribution substations and distribution wires are expect to be the assets being impacted by the added load.

Distribution Capacity Marginal Cost

Distribution capacity marginal costs are asset specific, therefore will vary based on the specific location and size of the new load in addition to how the new load interconnects to the existing distribution system. Given this specificity, BC Hydro analyzed several distribution capacity marginal cost scenarios.

For the base case reported in section 4.3. BC Hydro used BC Hydro's Contribution as a proxy for the distribution capacity marginal cost. The Contribution is provided by BC Hydro under the distribution extension policy (section 8.3 of the Electric Tariff). Under this policy the Customer pays a distribution Extension Fee which is the Estimated Construction Cost of the Extension less BC Hydro's Contribution which is a maximum of $200 per KW. For large projects, (i.e., greater than 500 kVA) the customers Extension Fee may also include System Improvement Costs to address

upstream distribution improvements that are required to serve the proposed incremental load, and for very large projects (i.e., greater than 10 MW) it may also include System Reinforcement Costs. For the purpose of the economic assessment base cases for the Overnight Rate and Demand Transition Rate reported in sections 4.3 and 5.3, and shown in the tables below for ease of reference, distribution capacity marginal costs were estimated to be $15 kW-year escalated by inflation which is the annualized value of $200 /kW over 20 years.

Another estimate of distribution capacity marginal costs is obtained by analyzing the system wide distribution capital investments and distribution load forecast to produce a system wide average distribution capacity marginal cost, which are provided in the summary table below.

The following table summarizes the four categories of BC Hydro's marginal costs. The distribution capacity marginal costs reports both the average system wide estimated cost as well as the BC Hydro Maximum Contribution which is used as a proxy for distribution capacity marginal cost. The last column of the table shows the marginal cost assumption used in each of the BC Hydro analysis scenarios which are discussed below.

Table 2 Summary of BC Hydro's Marginal Costs

Marginal Costs	Value	Source	Analysis Marginal Cost Assumption Used
Non-Bulk Transmission Capacity	$50/kW-year ($2019) (Area substations cost which includes switching substation and distribution substation costs) assumes $35/kW-year for distribution substation	BC Hydro current transmission capital plan and load forecast, inflated by CPI	• Demand Transition Rate Base Case and Scenario 1 used $50 /kW year • Overnight Rate Scenario 1 assumed 30% share of $35 /kW year distribution substation cost
Distribution Capacity	• System Wide Average: $25/kW-year ($2019) (includes distribution wire system cost) Or • BC Hydro's Maximum Distribution Extension Contribution: $15/kW-yr ($2019)	BC Hydro current distribution capital plan and load forecast, Inflated by CPI. Or • Electric Tariff Section 8	• $25 /kW-year was used in: – Overnight Rate Scenario 1 (+ $10 /kW-yr for the distribution substation cost above=$25+$10=) $35/kW-yr) – Overnight Rate Scenario 2 – Demand Transition Rate Scenario 1 • BC Hydro's estimated Maximum Contribution of $15 /kW-year was used in Overnight Rate and Demand Transition Rate Base Cases
Energy	Ranges from $23/MWh in F20 to $23-34/MWh in F2034	Mid-C Market	• Used in all Base Cases and Scenarios
Generation Capacity	F20-F22: $38 /kW-year F23-F31 $60 /kW-year F32–F34 $123 /kW-year	As cited in BC Hydro F20-F21 Revenue Requirements. Inflated by CPI.	• Demand Transition Rate Base Case and Scenario 1

Additional Assumptions

- Rate serves new incremental load only.
- For the Demand Transition Rate generation capacity, non-bulk transmission capacity and distribution capacity marginal cost are applied to the amount of demand that is expected to occur at B.C. system peak. For simplicity BC Hydro has approximated this by multiplying demand by the share of daytime consumption to total daily consumption.
- For the Overnight Rate, a conservative assumption was made that all depot charging load takes place during the overnight period. Generation and non-bulk transmission capacity marginal costs were not applied for the overnight period as there is sufficient generation and transmission capacity during the overnight period. Distribution marginal capacity costs were applied as outlined in the summary table and provided below.
- For the Overnight Rate, proxy costs for incremental billing and metering were estimated and included in the economic assessment of the overnight rate. These costs are assumed to be $350,000 as described for the metering option in section 4.5.
- Energy consumption forecast is illustrative and based on preliminary estimate of prospective usage provided by BC Transit and Translink.
- Rates are inflated by 2 per cent per year in the forecast period
- Six per cent discount rate.
- Seven per cent energy loss factor to the Lower Mainland for intra-regional transmission (3 per cent) and distribution (4 per cent) applied to both energy and capacity marginal cost.
- Load is expected to stay for at least 15 years.

Distribution Capacity Marginal Cost Analysis

The following analyses were undertaken to assess the sensitivity with respect to distribution capacity marginal costs.

Base Case for Overnight Rate

The following table shows the Base Case Overnight Rate economic assessment results as reported in section 4.3 of the Application and which assumes BC Hydro Contribution as a proxy for distribution capacity marginal cost.

Table 3 Results for Base Case for Overnight Rate

Time Period (Years)	Ratepayer Benefit Cost Ratio
5	1.13
10	1.43
15	1.42

Scenario 1 for Overnight Rate

In Scenario 1 Distribution capacity marginal cost of $35 /kW-year, based on 100 per cent of the distribution capacity average system wide marginal cost ($25 /kW-year) and 30 per cent of the distribution capacity substation upgrade marginal cost (30% x $35 /kW-year = $10 /kW-year) is applied. This is based on analysis of spare distribution system and substation capacity in the overnight period and expected size of loads. All other costs and revenues were unchanged from the Base Case.

Table 4 Results for Scenario 1 for Overnight Rate

Time Period (Years)	Participant Bill Saving (Percent %)	Ratepayer Benefit Cost Ratio
5	67	0.8
10	62	1.0
15	61	1.0

Scenario 2 for Overnight Rate

Distribution capacity average system wide marginal cost ($25/kW-year) is applied to overnight load. All other costs and revenues were unchanged from the Base Case

Table 5 Results for Scenario 2 for Overnight Rate

Time Period (Years)	Participant Bill Saving (Percent %)	Ratepayer Benefit Cost Ratio
5	67	0.9
10	62	1.2
15	61	1.2

Base Case for Demand Transition Rate

The following table shows the Demand Transition Rate economic assessment results as reported in section 5.3 of the Application and which assumes BC Hydro Contribution as a proxy for distribution capacity marginal cost.

Table 6 Results for Base Case for Demand Transition Rate

Time Period for Load Factor	F2021 - F2025	F2026 - F2029	F2030 - F2034
Load Factor	15%	30%	52%
Time Period used for Ratepayer Benefit Cost Analysis	5 Years F2020-F2024	10 Years F2020-F2029	15 Years F2020-F2034
Ratepayer Benefit Cost Ratio	0.74	1.04	1.16

Scenario 1 for Demand Transition Rate

Distribution capacity average system wide marginal cost ($25/kW-year) is applied.

Table 7 Results for Scenario 1 for Demand Transition Rate

Time Period (Years)	Participant Bill Saving (Percent %)	Ratepayer Benefit Cost Ratio
5	47	0.7
10	26	1.0
15	13	1.1

BC Hydro did not undertake additional scenario analysis for distribution capacity marginal cost for the Demand Transition rate as it did for the Overnight Rate because (1) the full generation, non-bulk transmission capacity and distribution capacity marginal costs were applied for daytime load and (2) detailed site specific analysis of capacity during the daytime and impact of expected in route loads is not yet feasible to undertake at this early stage of fleet conversion.

BC Hydro Fleet Electrification Rate Application

Appendix F

Cost of Service Analysis

Cost of service analysis for the Overnight Rate and the Demand Transition Rate were undertaken using BC Hydro's standard fully allocated cost of service methodology. This methodology uses the industry standard and Commission approved embedded cost methodology to allocate accounting costs to rate classes and exam the revenue to cost ratios of rates classes. Revenue to cost ratio provide estimates of the extent to which revenues from electricity sales offset BC Hydro's embedded costs. Embedded costs include all cost associated with delivering electricity services, such as operating and capital related expenses. Individual Revenue Requirement Application cost items are allocate to rate classes in the widely-adopted three-step process summarized as in Figure 1 below: costs are first functionalized into four functions: Generation, Transmission, Distribution and Customer Care; then costs in each Function are classified as customer, energy, or demand related; finally the classified costs are allocated to rate classes based on the various allocation factors (e.g., proportion of energy, Coincident Peak, non-coincident peak, or customer number).

Figure 1 Methodology of Cost of Service Study

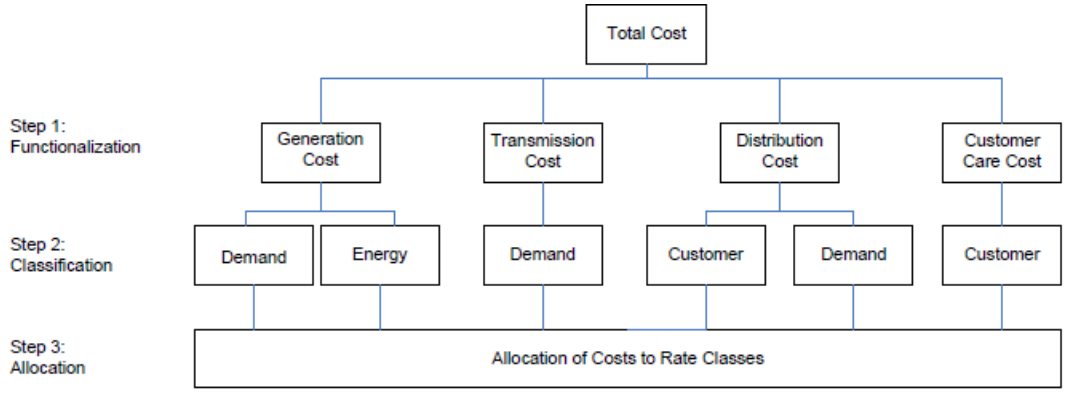


Table 1 shows the allocation factors that BC Hydro uses to allocate energy, generation demand related, transmission demand related, distribution demand related, and customer related costs to individual customer rate classes.

Table 1 Cost Allocators of Classified Costs

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

In February 14, 2019, BC Hydro filed its F2017 Fully Allocated Cost of Service (**FACOS**) Study with the BCUC.[1] The schedule 4.1 of F2017 FACOS is shown as in Figure 2.

Figure 2 Summary of Costs by Classification (schedule 4.1 of F2017 FACOS)

Rate Class	Energy Related Costs	Generation Demand Related Costs	Transmission Demand Related Costs	Distribution Demand Related Costs	Total Demand Related Costs	Customer Related Costs	Total
Residential	645.5	308.7	474.8	416.3	1,199.8	209.8	2,055.0
GS Under 35 kW	146.3	50.3	77.3	77.1	204.7	30.9	381.9
MGS < 150 kW	123.4	41.5	63.8	60.3	165.6	11.8	300.8
LGS > 150 kW	401.0	124.1	190.8	139.7	454.6	7.5	863.1
Irrigation	2.9	0.1	0.1	3.1	3.2	0.6	6.7
Street Lighting BCH	1.7	1.0	1.5	1.5	4.0	4.9	10.6
Street Lighting Cust	6.5	3.0	4.5	3.8	11.3	1.3	19.1
Transmission	479.6	139.4	214.4	0.0	353.8	2.0	835.4
Total	1,807.0	668.0	1,027.3	701.6	2,396.9	268.8	4,472.6

Cost of service analysis for the Overnight Rate is shown in Table 2 below. The analysis is based on nominal dollar values with fiscal 2029 rates and the prospective depot charging load provided in section 3.1. As shown in the Revenue to Cost ratio is estimated to be 104 per cent. As the load shape and pricing of service under the Overnight Rate is expected to be stable year over year, the revenue to cost ratio should also be stable year over year.

[1] Available at the following link: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/reports/2019-02-14-facos-f2017-ff.pdf.

Table 2 Illustrative Estimate of the Revenue to Cost Ratio of the Overnight Rate using 2029 Charges[2]

Cost			
Classified Cost Item	**Total BCH Cost ($M)**	**Allocator of Depot Charging (%)**	**Depot Charging Cost ($M)**
Energy Related	2,350	0.25	5.9
Generation Demand Related	866	0.12	1.0
Transmission Demand Related	1,300	0.12	1.6
Distribution Demand Related	910	0.57	5.2
Customer Care	349	0.01	0.03
Total Cost			13.8
Revenue			
Charge	**Nominal Charges in 2029**	**Billed Amount**	**Total Charge ($M)**
Basic Charge ($/day)	0.313	365 Days * 26 accounts (Days per year * # of Accounts)	0.003
Energy Charge ($/kWh)	0.087	130,000 MWh (Total annual energy use across all accounts)	11
Demand Charge ($/kW)	14.78	210 MW (12 months * monthly peak Billing Demand across all accounts)	3
Total Revenue			14
R/C Ratio (%)			104

Note: Number of accounts is assumed to be 26.

In 2029 after the overnight rates has been fully implemented 10 years, the Revenue to Cost ratio (**R/C**) of this rates is estimated to be 104 per cent, which is very close to the 103.9 per cent R/C ratio of LGS class in F2017 FACOS study.

In contrast to the Overnight Rate, the revenue to cost ratio for the Demand Transition Rate is expected to vary over time, as both the load shape and the pricing will change year over year. Therefore, three cost of service analysis were

[2] Number may not add up due to rounding.

undertaken for the Demand Transition Rate, using three different sets of assumptions for load factor and pricing.

The first cost of service analysis for the Demand Transition Rate is shown in Table 3 below, with fiscal 2024 rates (nominal) and an assumed load factor of 15 per cent. As shown in the Revenue to Cost ratio in this scenario is estimated to be 43 per cent.

Table 3 Illustrative Estimate of the Revenue to Cost Ratio of the Demand Transition Rate with 15 Per Cent Load Factor and Fiscal 2024 Rates[3]

Cost			
Classified Cost Item	**Total BCH Cost ($M)**	**Allocator of In Route Charging (%)**	**In Route Charging Cost ($M)**
Energy Related	2,123	0.002	0.04
Generation Demand Related	785	0.005	0.04
Transmission Demand Related	1,207	0.005	0.06
Distribution Demand Related	824	0.008	0.07
Customer Care	316	0.002	0.01
Total Cost			0.21
Revenue			
Charge	**Nominal Charges in 2024**	**Billed Amount**	**Total Charges ($M)**
Basic Charge ($/day)	0.284	365 Days * 5 accounts (Days per year * # of Accounts)	0.001
Energy Charge ($/kWh)	0.097	920 MWh (Total annual energy use across all accounts)	0.09
Demand Charge ($/kW)	0	8.4 MW (12 months * monthly peak Billing Demand across all accounts)	0
Total Revenue			0.09
R/C Ratio (%)			43

Note: Number of accounts is assumed to be five.

The second cost of service analysis for the Demand Transition Rate is shown in Table 4 below, with fiscal 2029 rates (nominal) and an assumed load factor of 30 per cent. As shown in the Revenue to Cost ratio in this scenario is estimated to be 84 per cent.

[3] Number may not add up due to rounding.

Table 4 Illustrative Estimate of the Revenue to Cost Ratio of the Demand Transition Rate with 30% Load Factor and Fiscal 2029 Rates[4]

Cost			
Classified Cost Item	**Total BCH Cost ($M)**	**Allocator of In-Route Charging (%)**	**In-Route Charging Cost ($M)**
Energy Related	2,350	0.062	1.4
Generation Demand Related	866	0.081	0.7
Transmission Demand Related	1,300	0.081	1.1
Distribution Demand Related	910	0.144	1.3
Customer Care	349	0.039	0.1
Total Cost			4.7
Revenue			
Charge	**Nominal Charges in 2029**	**Billed Amount**	**Total Charge ($M)**
Basic Charge ($/day)	0.313	365 Days * 100 accounts (Days per year * # of Accounts)	0.01
Energy Charge ($/kWh)	0.088	32,000 MWh (Total annual energy use across all accounts)	2.8
Demand Charge ($/kW)	7.68	146 MW (12 months * monthly peak Billing Demand across all accounts)	1.1
Total Revenue			3.9
R/C Ratio (%)			84

Note: Number of accounts is assumed to be 100.

The third cost of service analysis for the Demand Transition Rate is shown in Table 5 below, with fiscal 2034 rates (nominal) and an assumed load factor of 50 per cent. As shown in the Revenue to Cost ratio in this scenario is estimated to be 105 per cent.

[4] Number may not add up due to rounding.

Table 5 Illustrative Estimate of the Revenue to Cost Ratio of the Demand Transition Rate with 52% Load Factor and Fiscal 2034 Rates[5]

Cost			
Classified Cost Item	**Total BCH Cost ($M)**	**Allocator of In-Route Charging (%)**	**In-Route Charging Cost ($M)**
Energy Related	2,590	0.107	2.8
Generation Demand Related	960	0.081	0.8
Transmission Demand Related	1,470	0.081	1.2
Distribution Demand Related	1,000	0.144	1.4
Customer Care	385	0.039	0.15
Total Cost			6.3
Revenue			
Charge	**Nominal Charges in 2034**	**Billed Amount**	**Total Charge ($M)**
Basic Charge ($/day)	0.346	365 Days* 100 accounts (Days per year * # of Accounts)	0.01
Energy Charge ($/kWh)	0.0784	55,000MWh (Total annual energy use across all accounts)	4.3
Demand Charge ($/kW)	15.973	12.1 MW (12 months * monthly peak Billing Demand across all accounts)	2.3
Total Revenue			6.6
R/C Ratio (%)			105

Note: Number of accounts is assumed to be 100.

[5] Number may not add up due to rounding.

BC Hydro Fleet Electrification Rate Application

Appendix G

Stakeholder Engagement

Fleet Electrification Rate Design Workshop

REVISON - Slides 8, 19, 24 and 36 Updated

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Workshop Agenda

Approximate Time	Topic	Presenter
9:00 – 9:05	Welcome	Fred James Regulatory and Rates
9:05 – 9:30	Objective and Key Rate Drivers	Gord Doyle Customer Service
9:30 – 10:00	Jurisdictional Review	Allan Chung Regulatory and Rates
10:00 – 10:20	Break	
10:20 - 10:45	Rate Design Criteria and Economic Assessment	Anthea Jubb Regulatory and Rates
10:45 – 11:30	Rate Options and Discussion	Allan Chung Anthea Jubb Regulatory and Rates
11:30 – 11:45	Closing	Anthea Jubb Regulatory and Rates

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Objective and Key Rate Drivers

BC Hydro
Power smart

Objective

Develop optional rates to support fleet electrification while benefiting all ratepayers

Photo Source: TransLink

BC Hydro
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Key Drivers

- Support fleet electrification in achieving greenhouse gas (GHG) emission reduction targets
- Shift charging loads to off-peak where possible
- Customers have indicated that Large General Service (LGS) demand charges are a barrier to converting to electric fleets

The Province set new targets for GHG emissions:

- 40% by 2030
- 60% by 2040
- 80% by 2050

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Charging Scenarios

Two charging scenarios with distinct characteristics have been identified:

- **In Route Charging**
- **Depot Charging**

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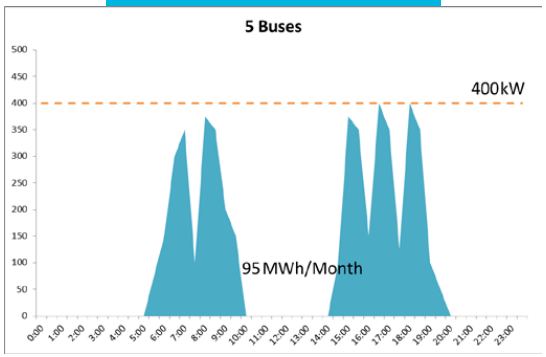
Charging Scenarios | In Route Charging

In Route Charging Characteristics

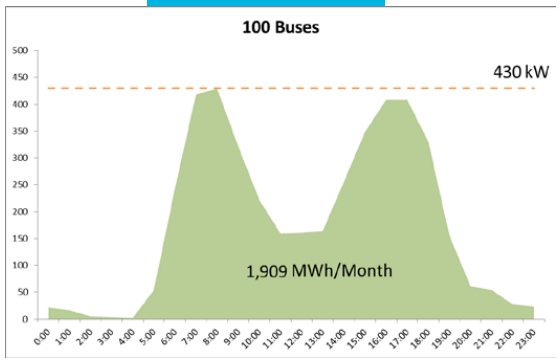
- Buses will charge at bus stops located along their route
- Most charging will occur during the daytime
- Chargers will be approximately 450 kilowatts (kW) each

Illustrative In Route Charging Load Shape Scenarios

Early Deployment Stage



Full Deployment



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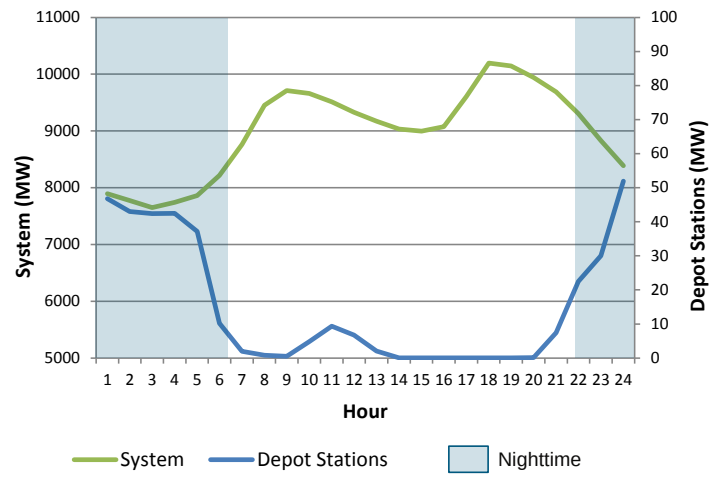
Charging Scenarios | Depot Charging

Depot Charging Characteristics

- Majority of charging will occur overnight between 10pm and 6am
- Some daytime charging may be needed to meet operational / battery range requirements
- Chargers will be in the 100 kW-150 kW range each

Illustrative Depot Charging and BC Hydro System Load Shape



REVISON – Slides 8, 19, 24 and 36 Updated

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Proposed Rate Availability:

- Separately metered new charging load over 150 kW
- Fleet charging (e.g. public transportation, commercial fleets)

Question: Are there other availability criteria that should be considered?

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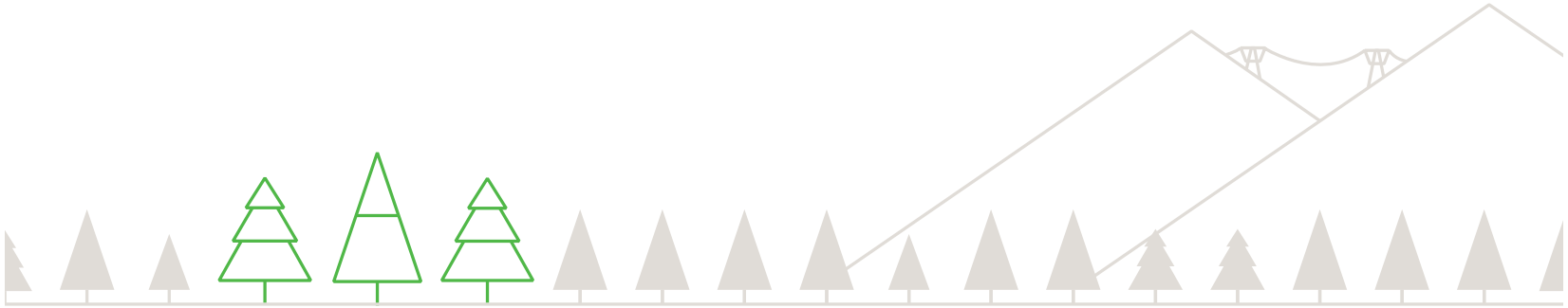
Jurisdictional Review

- The following section includes rates for commercial EV charging in other jurisdictions.



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Jurisdictional Review

Electric Vehicle (EV) rates seek to encourage EV adoption and other objectives e.g., encouraging load to shift to periods that are less costly to serve

1. Time of use (TOU) energy charges and in some cases TOU demand charges.
2. Lower energy charges and no demand charges during overnight period.
3. In some cases, no demand charge or phase-in no demand charge back over transition period (e.g., over 10 years).
4. EV rate may provide significant bill saving over standard rate.

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Commercial EV Rate Jurisdictional Review

Utility	Rate	Season	Peak Price	Mid-Peak Price	Off-Peak Price	Customer Charge	Availability
Hawaiian Electric Company	E-Bus-P TOU Energy TOU Demand	All year	Energy 27.0655 c/kWh (5pm-10pm) Demand $26.50 $/kW/ month	Energy 14.3541 c/kWh (9am-5pm) Demand $0 $/kW/ month	Energy 15.6688 c/kWh (10pm-9am) Demand $0 $/kW/month	$5 ($/month)	For electric on-road bus charging facilities with existing host commercial account on LGS rate
Liberty Utilities (serves communities in California Including Lake Tahoe)	A-3 TOU Energy TOU Demand TOU Energy TOU Demand	Summer Winter	Energy 7.306 c/kWh (10am-10pm) Demand $13.12 $/kW/month Energy 6.907 c/kWh (5pm-10pm) Demand $7.95 $/kW/month	Energy 6.813 c/kWh (7am-5pm) Demand $2.99 $/kW/month	Energy 5.523 c/kWh (10pm-10am) Energy 5.445 c/kWh (10pm-7am) Demand $0 $/kW/month	$455.59 ($/month)	Customers with demand greater than 200 kW. Includes Buses/Stations, Bus Fleet Charging Stations

Commercial EV Rate Jurisdictional Review

Utility	Rate	Season	Peak Price	Mid-Peak Price	Off-Peak Price	Customer Charge	Availability
Pacific Gas and Electric	Proposed CEV-L-S TOU Energy No Demand Charge	All year	Energy 30.267 c/kWh (4pm-10pm)		Energy 11.079 c/kWh (2pm-4pm, 10pm-9am) Super Off-Peak 8.882 c/kWh (9am-2pm)	Monthly subscription charge $183.86 per 50 kW of connected load	For fleet and public charging with charging capacities >100 kW
Southern California Edison (SCE)	TOU EV-8 TOU Energy No demand charge first 5 years Year 6 – Year 10 Phase-in Demand Charges Year 11+ Return to energy and demand charges	Summer Winter	Energy 46.20 c/kWh (4pm-9pm weekdays)	Energy 25.58 c/kWh (4pm-9pm weekends) Energy 29.11 c/kWh (4pm-9pm all days)	Energy 11.77 c/kWh (All except 4pm-9pm all days) Energy 12.58 c/kWh (9pm-8am) Energy Super-off Peak 6.73 c/kWh (8am-4pm)	$125.25 ($/month)	For customers with demand between 21-500 kW solely for fleet and public charging

Jurisdictional Review Summary

1. TOU energy rates provide an opportunity for EV charging loads to be shifted to periods with cheaper prices.
2. TOU demand rates apply during peak periods or during the day, which allow for demand charge free EV charging overnight.
3. Demand transition rates allow a period of demand charge relief to help during the initial years when EV charging has low utilization and poor load factor.

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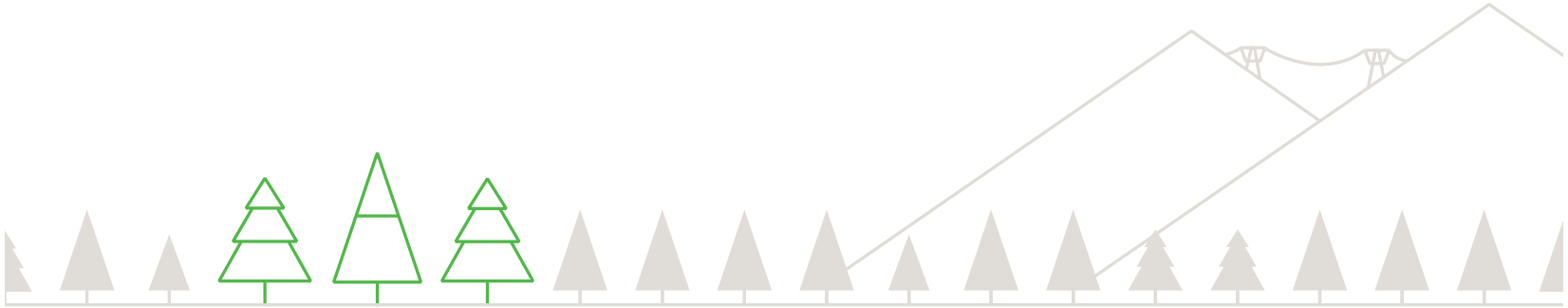
Break



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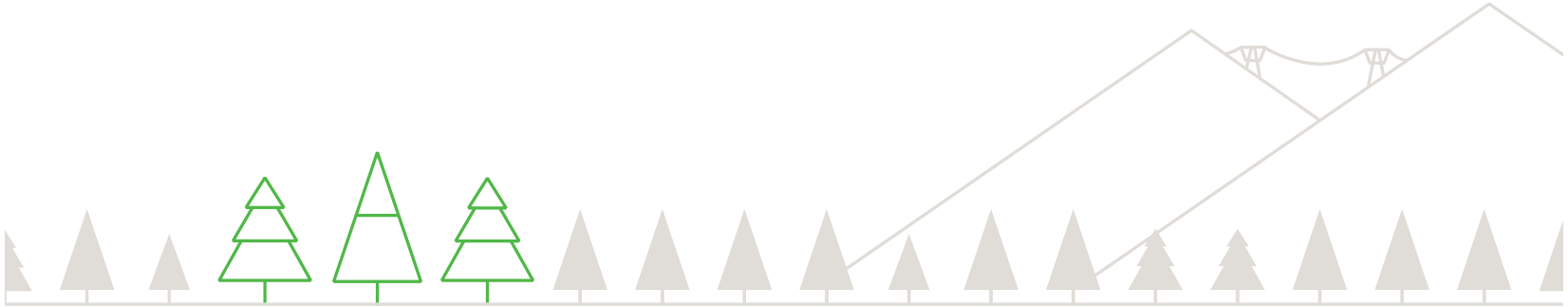
Rate Design Criteria and Economic Assessment



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Otherwise Applicable Rate - LGS

Rate Schedule 1600, 1601, 1610, 1611 (LGS 150 kW and over)

Basic Charge:

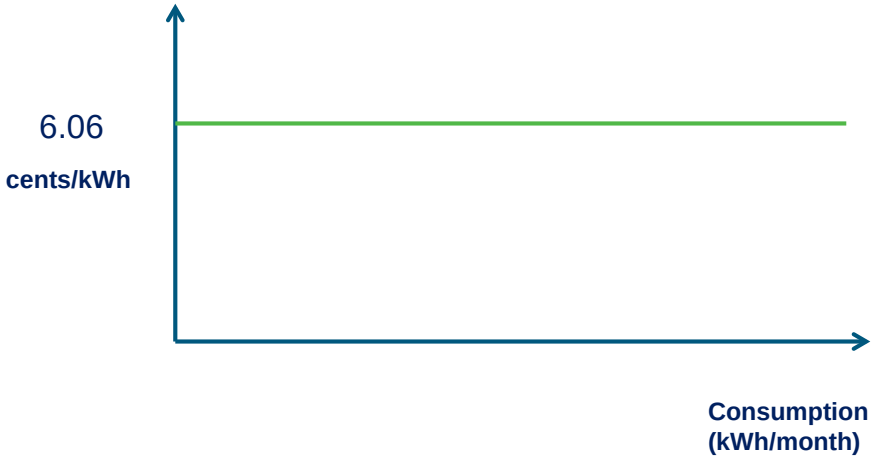
26.73 cents/day

Demand Charge:

$12.34 per kW of Billing Demand

Billing Demand is defined as the highest kW demand in the billing period

Energy Charge:



BC Hydro Electric Tariff April 2019

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Key Rate Design Criteria

- **Economic Efficiency** – price signals that encourage efficient use and discourage inefficient use
- **Fairness** – fair apportionment of costs among customers, no undue discrimination
- **Practicality** - customer understanding and acceptance, practical and cost effective to implement
- **Stability** – revenue and rate stability

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Economic Assessment Framework

Estimates the impact on electricity rates for all ratepayers due to marginal changes in utility revenues and costs

Benefit	Cost
Increase in utility revenue	Marginal cost of energy
	Marginal cost of generation capacity
	Marginal cost of transmission and distribution
	Incremental BC Hydro administrative cost

REVISON – Slides 8, 19, 24 and 36 Updated

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Monitoring and Evaluation

Annual Monitoring

- New load (energy, demand, load shape and load factor)
- Revenues
- Incremental costs (e.g., metering, billing)

Three Year Evaluation

- Impact on electricity rates for all ratepayers
- Pricing principles, fair allocation of costs
- GHG reduction
- Availability and eligibility
- Customer feedback

Question: Are there additional metrics and outcomes we should monitor and evaluate?

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Rate Design Context

BC Hydro developed rate options to address specific customer charging needs

1. Overnight Rate with Demand Time of Use (TOU) was developed for overnight depot charging load.
2. Overnight Rate with Energy and Demand TOU was developed for overnight depot charging load.
3. Demand Transition Rate was developed for in route charging load.

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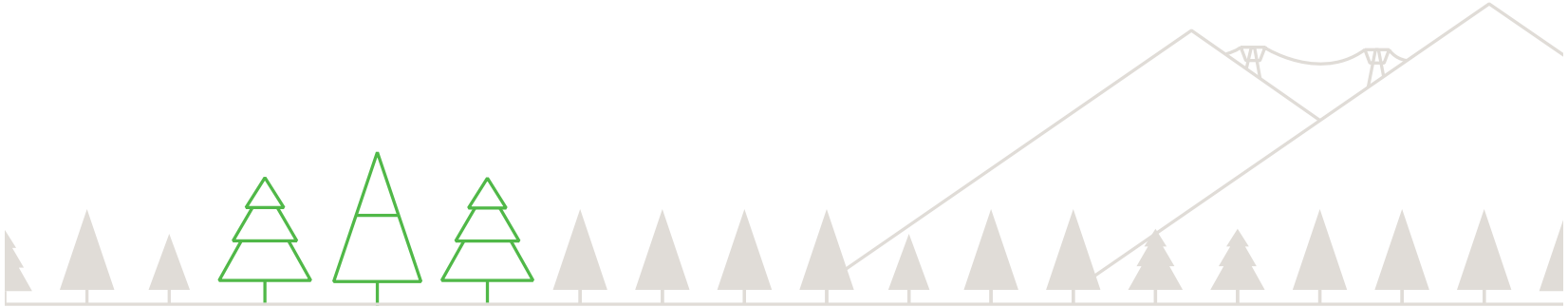
Overnight Rate with Demand Time of Use



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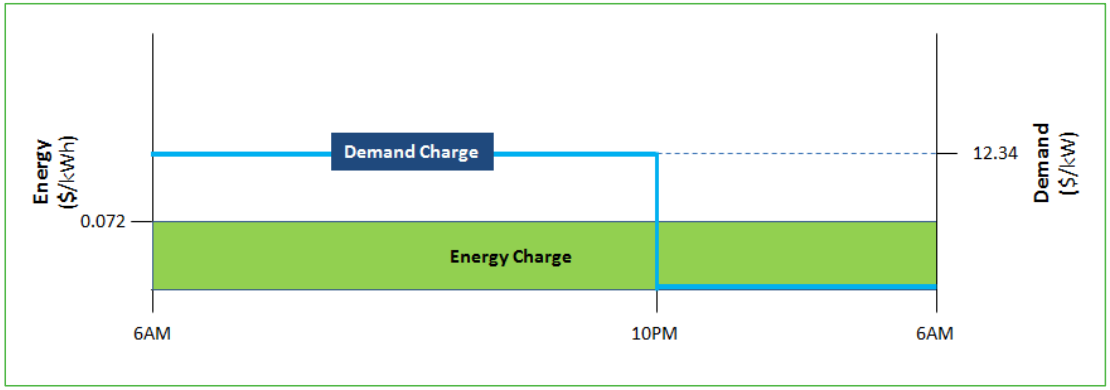
Option 1 Overnight Rate with Demand Time of Use



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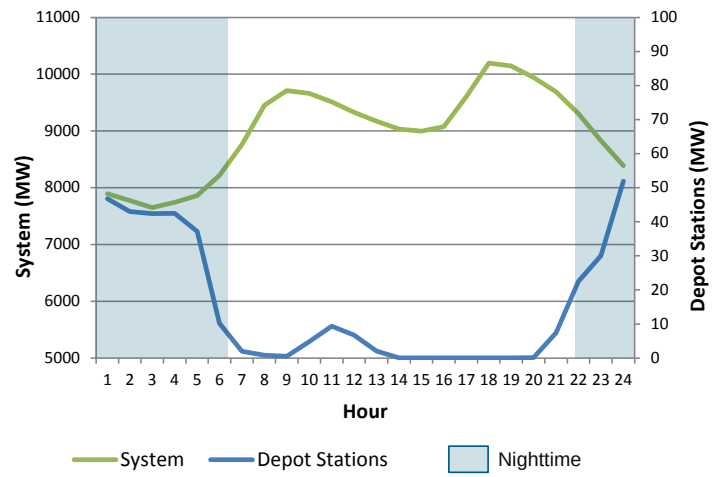
Charging Scenarios | Depot Charging

Depot Charging Characteristics

- Majority of charging will occur overnight between 10pm and 6am
- Some daytime charging may be needed to meet operational / battery range requirements
- Chargers will be in the 100 kW-150 kW range each

Illustrative Depot Charging and BC Hydro System Load Shape



24 **REVISON – Slides 8, 19, 24 and 36 Updated**

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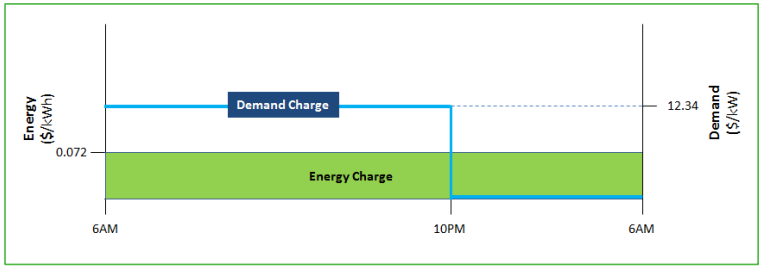
Fleet Electrification Rate Options

Option 1: Overnight Rate with Demand TOU (Depot Charging)

Description:

- Energy Charge: calculated to capture costs not recovered through the demand charge, assumes depot charging load profile
- Demand Charge:
  - **Daytime**: standard LGS Demand Charge
  - **Nighttime**: no Demand Charge



Objective:

- To encourage fleet electrification while prioritizing: economic efficiency, fairness, stability, customer understanding

Pros:

- Economic Efficiency – price signal encourages usage overnight when BC Hydro's system has spare capacity
- Fairness – fair apportionment of costs with revenues sufficient to recover both fixed and variable costs
- Fairness – incremental revenues exceed marginal costs resulting in benefits to all ratepayers
- Stability – optional rate can be offered on an ongoing basis
- Practicality – simple, easy to understand pricing

Cons:

- Practicality – time of use demand charges requires more complex metering and billing solutions

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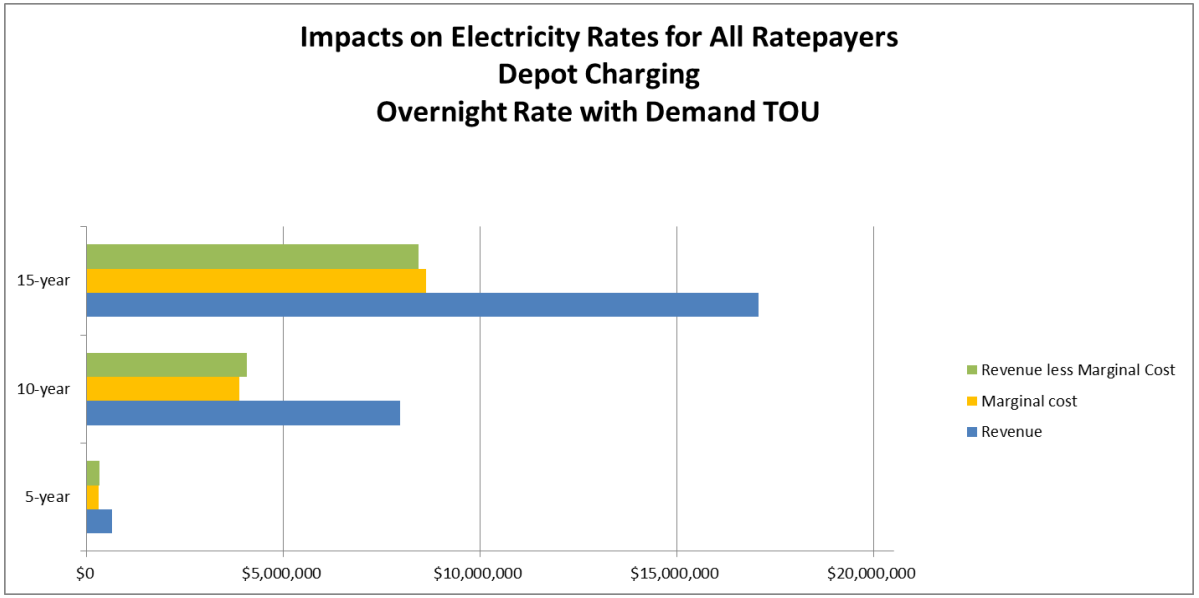
Preliminary Economic Assessment Results

Option 1 Overnight Rate with Demand TOU



✓ Customer

✓ Ratepayer

Period	Bill Saving (Percent)	Ratepayer Benefit Cost Ratio
5-year	66.9%	2.14
10-year	62.1%	2.04
15-year	61.5%	1.98

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Overnight Rate with Energy and Demand Time of Use

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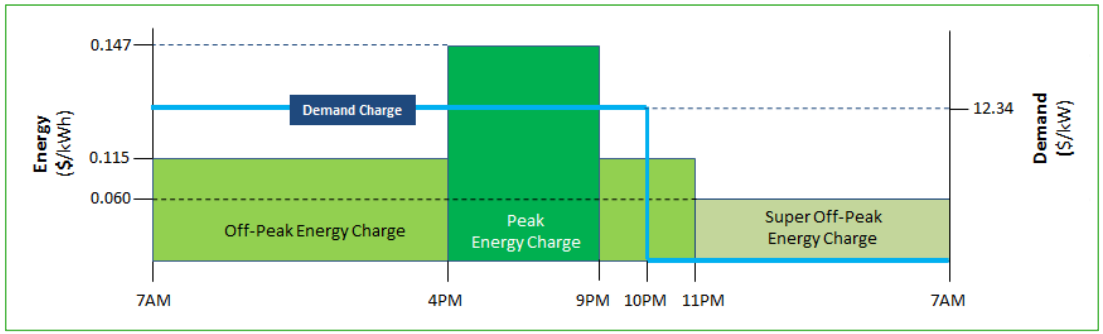
Option 2 Overnight Rate with Energy and Demand Time of Use



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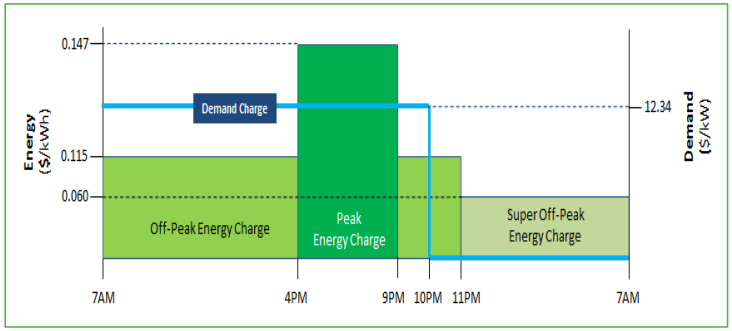
Fleet Electrification Rate Options

Option 2: Overnight Rate with Energy and Demand TOU (Depot Charging)

Description:

- Revenue neutral to Overnight Rate based on depot charging load shape
- Energy Charge:
  - **Peak** price based on a portion of marginal capacity costs
  - **Off-Peak** price based on revenue neutrality
  - **Super Off-Peak** price based on default LGS energy rate
- Demand Charge:
  - **Daytime** standard LGS Demand Charge
  - **Nighttime** No demand charge



Objective:

To encourage fleet electrification while prioritizing: economic efficiency, fairness, and rate stability

Pros:

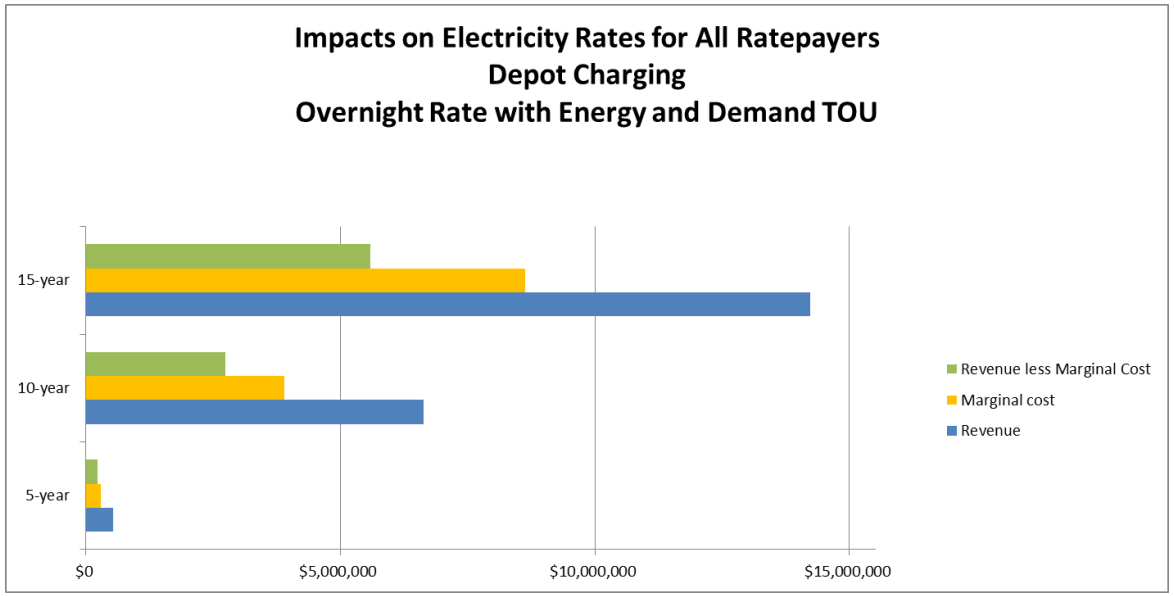
- Economically efficient – price signal encourages usage away from daytime, particularly from peak periods, and to overnight when BC Hydro's system has spare capacity
- Fairness – fair apportionment of costs with revenues sufficient to recover both fixed and variable costs
- Fairness – incremental revenues exceed marginal costs resulting in benefits to all ratepayers
- Stability – optional rate can be offered on an ongoing basis

Cons:

- Practicality – time of use energy and demand charges requires more complex metering and billing solutions
- Practicality – more complex for customer to understand
- Fairness – provides greater bill savings to participants, and less benefits to all ratepayers than Option 1 Overnight Rate with Demand TOU

Preliminary Economic Assessment Results

Option 2 Overnight Rate with Energy and Demand TOU



✓ Customer

✓ Ratepayer

Period	Bill Saving (Percent)	Ratepayer Benefit Cost Ratio
5-year	72.4%	1.78
10-year	68.4%	1.70
15-year	67.9%	1.65

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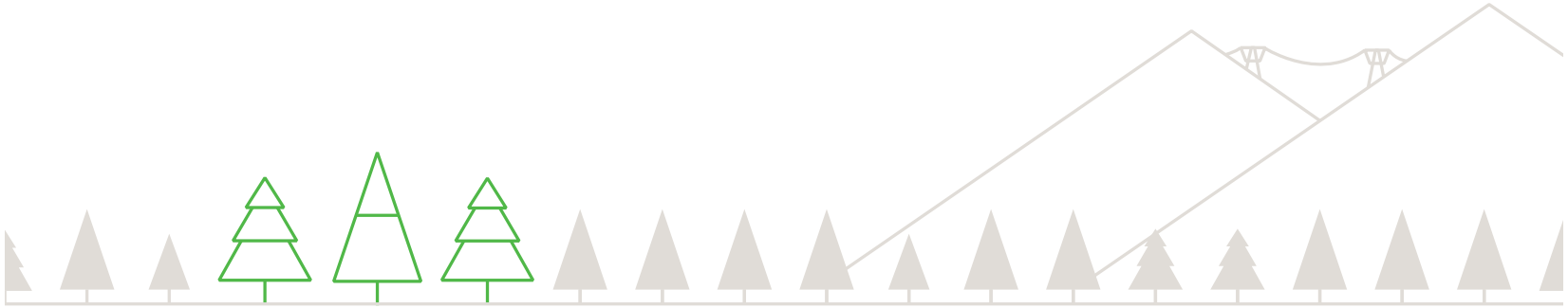
Demand Transition Rate



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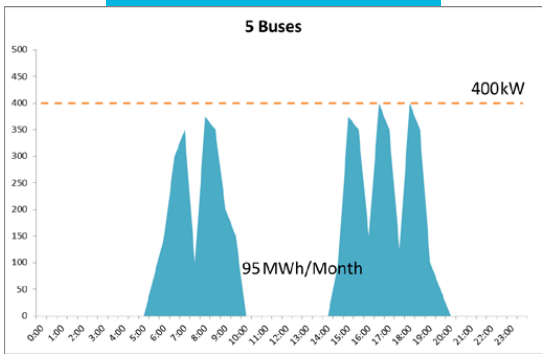
Charging Scenarios | In Route Charging

In Route Charging Characteristics

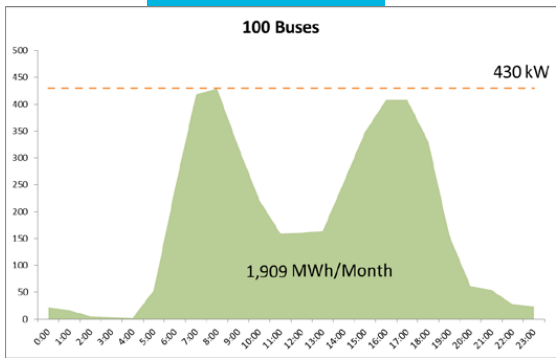
- Buses will charge at bus stops located along their route
- Most charging will occur during the daytime
- Chargers will be approximately 450 kW each

Illustrative In Route Charging Load Shape Scenarios

Early Deployment Stage



Full Deployment



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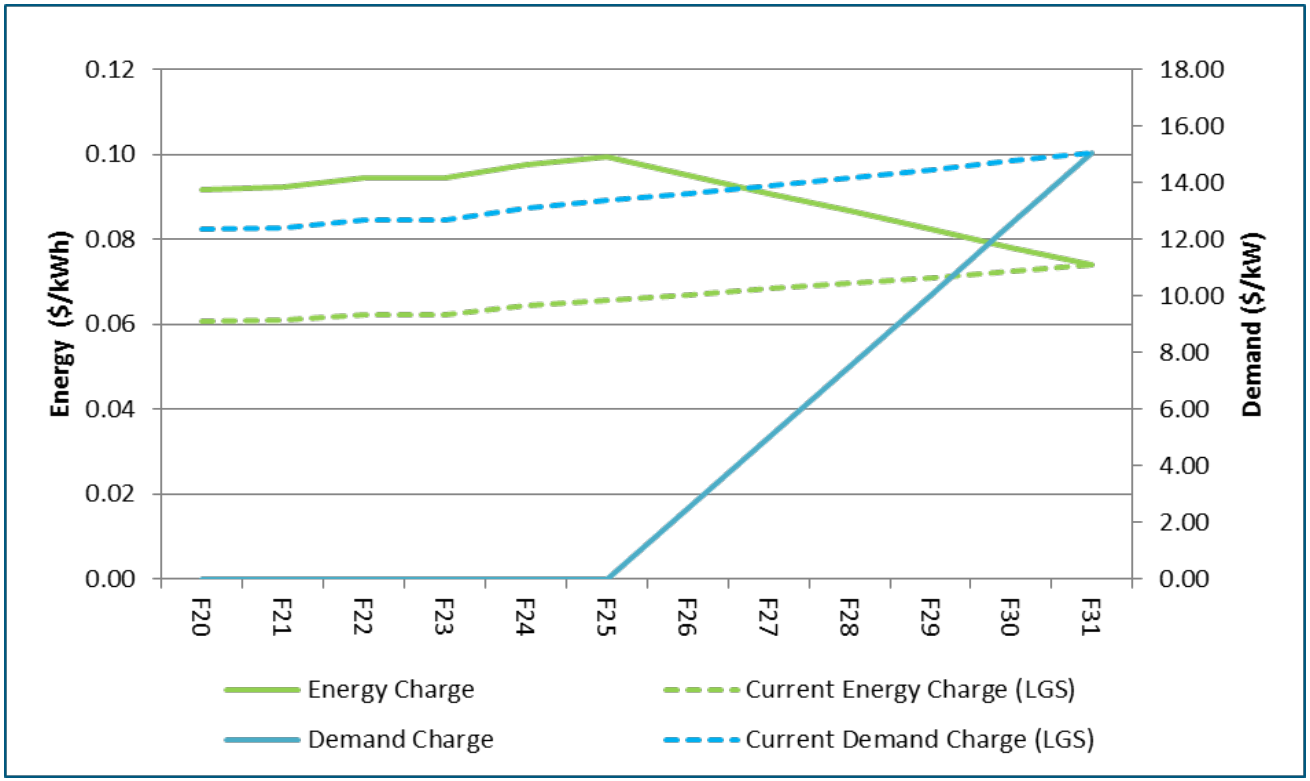
Option 3 Demand Transition Rate



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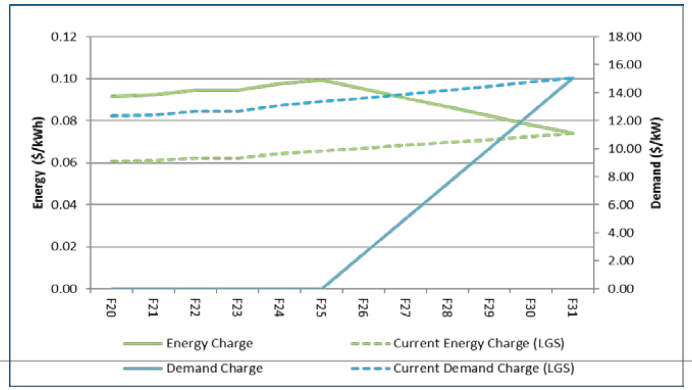
Fleet Electrification Rate Options

Option 3: LGS Demand Transition Rate

Description:

- Energy Charge:
  - Flat Energy Charge during F20-F25 based on class average load factor (55%)
  - Decreasing during F26-F30 to phase in to the standard LGS Energy charge
- Demand Charge:
  - No Demand Charge during F20-F25
  - Increasing during F26-F30 to phase in to the standard LGS Demand Charge
- Following the 11 year Transition Period, customers will be moved back to the standard LGS rate



Objective:

To encourage fleet electrification while prioritizing: customer understanding and acceptance, ease of implementation

Pros:

- Practical – practical and cost effective to implement with existing billing and metering systems
- Practical – customer understanding should be high as rate design is based on existing LGS rate
- Fairness – recovers marginal costs and therefore provides benefits to all ratepayers
- Fairness – customers transitioned to LGS after 11 years

Cons:

- Economic efficiency - price signal does not encourage shifting usage to times with lower costs to serve
- Fairness – revenues may not be sufficient to recover fixed costs, may not result in fair apportionment of costs
- Customer Acceptance – customer bill savings highly dependent on the timing and load factor of their new load
- Stability – the rate changes year to year

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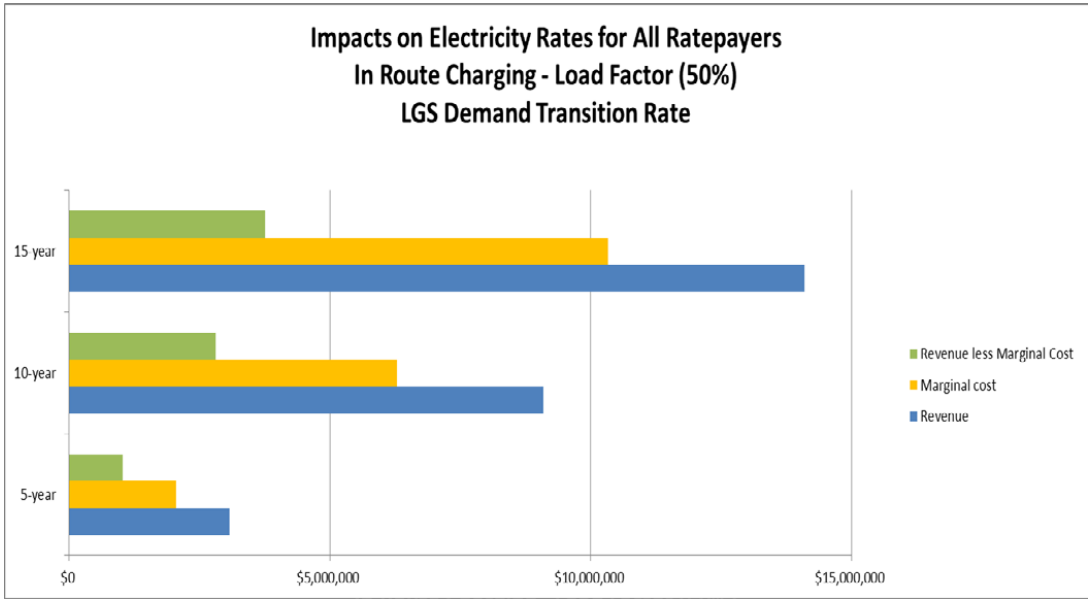
Preliminary economic assessment results

Option 3 LGS Demand Transition Rate



X Customer

✓ Ratepayer

Period	Bill Saving (Percent)	Ratepayer Benefit Cost Ratio
5-year	1.6%	1.50
10-year	0.9%	1.45
15-year	0.6%	1.36

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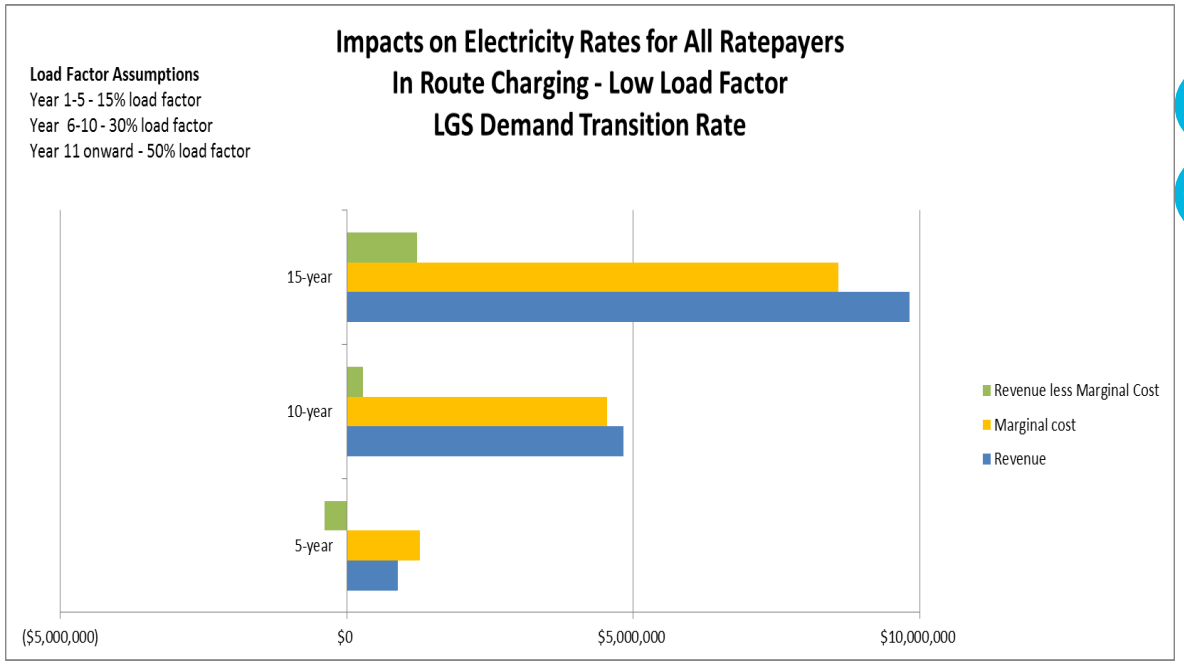
Preliminary economic assessment results

Option 3 LGS Demand Transition Rate



✓ Customer

? Ratepayer

Period	Bill Saving (Percent)	Ratepayer Benefit Cost Ratio
5-year	47.0%	0.70
10-year	20.6%	1.06
15-year	11.3%	1.14

REVISON – Slides 8, 19, 24 and 36 Updated

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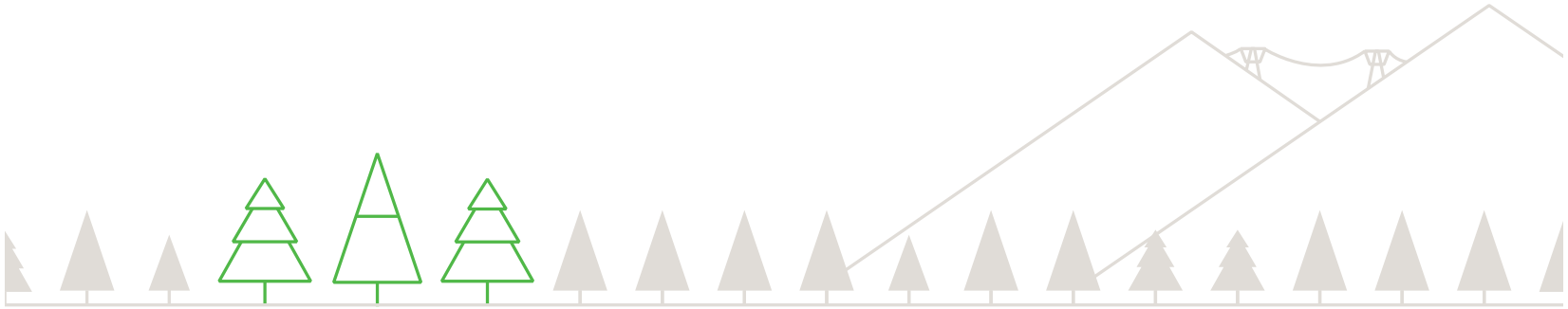
Discussion



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Discussion

Based on current forecast public transit battery electric bus charging load

1. Option 1 Overnight Rate with Demand TOU - Best supports overnight depot charging; stable rate design could be available on an ongoing basis, provides both participant and all ratepayer benefits.
2. Option 2 Overnight Rate with Energy and Demand TOU – Similar to Option 1 but with greater complexity, greater participant bill savings and lower all ratepayer benefits
3. Option 3 Demand Transition Rate – May support in route charging, participant bill savings are highly dependent on customer load factor and timing of fleet roll-out.

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Closing and Next Steps

Please send your feedback forms to bchydroregulatorygroup@bchydro.com or leave them at your table.

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Summary Notes

BC Hydro Fleet Electrification Rate Design Workshop

May 28, 2019

Vancouver – BCUC Hearing Room

Type of Meeting	Fleet Electrification Rate Design Workshop – Customers and Interveners
Agenda	Welcome – Fred James, Chief Regulatory Officer 1. Objective and Key Rate Drivers – Gord Doyle, Customer Service Operations 2. Jurisdictional Review – Allan Chung, Regulatory and Rates Group 3. Rate Design Criteria and Economic Assessment – Anthea Jubb, Regulatory and Rates Group 4. Rate Options and Discussion – Allan Chung and Anthea Jubb, Regulatory and Rates Group Closing – Anthea Jubb, Regulatory and Rates Group

Abbreviations

BCH	BC Hydro	LLH	Low Load Hours
BCIT	BC Institute of Technology	Mid-C	Mid-Columbia
BCUC	BC Utilities Commission	NRCan	Natural Resources Canada
DCFC	DC Fast Charger/Charging	NPV	Net Present Value
FACOS	Fully Allocated Cost of Service	R/C	Revenue to Cost
GHG	Greenhouse Gas	RDA	Rate Design Application
GWh	Gigawatt Hour	RRA	Revenue Requirements Application
kW	Kilowatt	T&D	Transmission & Distribution
kWh	Kilowatt Hour	TOU	Time of Use
LGS	Large General Service		

Welcome – Fred James
Fred provided a welcome to participants, both those attending in-person and via the webcast, and introduced the agenda and objectives for the workshop.

1. Objective and Key Rate Drivers – Gord Doyle
Gord provided an overview of the objective of the rate design and outlined the key drivers. He clarified that the rate options being considered are for fleet vehicles and not for public charging. Feedback is being requested on the proposed rate availability.

	Feedback	BC Hydro Response
	David Austin, Clean Energy Association of BC	
1.	**Question –** Slide 9 - Have you looked at substations where the charging will be in metro areas to see what they can accommodate?	They'll be considered as the customers interconnect.
2.	**Question** – Slide 9 - Is the existing trolley system DC? Can you piggyback on the existing infrastructure?	Not sure. Will take away and talk to TransLink. **Updated Response:** • The trolley overhead is 600 VDC • The wires and infrastructure cannot be "piggy backed" to a new system such as in route. .

2. Jurisdictional Review – Allan Chung
Allan provided an overview of rates for commercial EV charging in other jurisdictions. The review determined that other utilities have rates that are designed to encourage EV adoption and meet other objectives such as load shifting.

	Feedback	BC Hydro Response
	David Austin, Clean Energy Association of BC	
3.	**Question –** Slide 14 -Please explain how BC Hydro sets its demand charge?	For BC Hydro's LGS customers the demand charge is set to recover a portion of BC Hydro's transmission, generation and distribution demand related costs. **Note:** Slides 8 and 24 of the presentation have been revised to show the actual system peak rather than the average system load for the year. A revised presentation is attached.

	Feedback	BC Hydro Response
	David Austin, Clean Energy Association of BC	
4.	**Question –** Slide 7 - Here it shows there is little energy required for charging during the peak. Has consideration been given to using battery storage at or near charging stations? If you could charge batteries in the evening for demand in the day, it might work. What is not considered are T&D losses during the day and the need to expand substations.	BC Hydro will continue to examine battery storage as this emerging technology develops.
5.	**Question -** For years you had a study with BCIT regarding a micro-grid. Presumably you were studying cost of batteries and battery performance. Is this still ongoing? What are the results?	**Updated Response:** BC Hydro partnered with BCIT in 2012 on the Energy OASIS (Open Access to Sustainable Intermittent Sources) demonstration project that was funded by NRCan's Clean Energy Fund. This project studied the use of a solar photovoltaic system and battery energy storage as parts of BCIT's smart microgrid system to mitigate the impact of a DCFC station on BC Hydro's grid. The study was concluded and a final report was submitted to NRCan in March 2015; which can be found here: BCIT Energy OASIS Final Project Report. BC Hydro has not been engaged in further energy storage studies with BCIT since the completion of the Energy OASIS project but has provided letters of support to BCIT for their applications for further NRCan funding in 2016 and 2017 on their other microgrid studies.
	David Craig, Commercial Energy Consumers	
6.	**Comment –** It would be interesting to see the information about studies of the cost of batteries to serve this load.	Please see the response to question 5 above.
	Yolanda Domingo, BCUC Staff	
7.	**Question -** Slide 7 – 450 kW is a big draw on the system. Do you have concerns about the reliability and how that may impact the grid?	When a customer interconnects we do a study to consider impacts and what upgrades are required in accordance with our extension policy.

	Feedback	BC Hydro Response
8.	**David Austin, Clean Energy Association of BC** **Question -** You said there are applications before California regulators. Can you see if they are considering battery storage at point of use to determine demand charges?	BC Hydro is not aware of any utilities that determine demand charges based on utility scale, utility owned batteries at the point of use or elsewhere. In US states such as California and Arizona, some utility customers are purchasing and installing battery storage on their premises in conjunction with customer owned behind the meter solar photovoltaic generation. Utilities in these states are examining rate designs to address cost recovery and fairness as this new technology develops. In some cases this examination includes an assessment of demand charges.
9.	**Penny Cochrane, Cochrane Energy Consulting** **Comment -** I want to note that California has a capacity market which affords things like battery storage.	Acknowledged.

3. Rate Design Criteria and Economic Assessment – Anthea Jubb
Anthea provided a review of the rate design criteria and the economic assessment framework being considered. Feedback is being requested on the metrics and outcomes to be monitored and evaluated.

	Feedback	BC Hydro Response
10.	**Penny Cochrane, Cochrane Energy Consulting** **Question –** Slide 18 - In considering an existing LGS customer, such as large retail outlets, which, based on retail hours and land space, there would be a good opportunity for after-hours charging. Is this not the entry point for service?	This type of arrangement would be an agreement between a fleet operator and the third party such as the retail outlet.
11.	**David Craig, Commercial Energy Consumers** **Question –** Slide 19 - The BCUC will be looking at all of the benefits, beyond economic benefits, correct?	Slide 20 speaks to the metrics and outcomes we plan to monitor and evaluate. We are seeking feedback on whether there are other benefits that we are missing.

	Feedback	BC Hydro Response
	David Craig, Commercial Energy Consumers	
12.	**Comment –.**No other benefits; just want to make sure they were being covered. The primary assessment will be related to economic impacts though	Acknowledged.
	David Austin, Clean Energy Association of BC	
13.	**Question –** Slide 19 - Is the marginal cost of energy, the marginal cost of a yet-to-be built greenfield project?	The marginal cost of energy is estimated based on the mid-C market pricing. **Note:** Due to an error, Slide 19 of the presentation omitted marginal distribution costs, although these costs were included in the analysis that is presented in the slides on the preliminary economic assessment results. These costs have been added. A revised presentation was distributed to participants on June 4, 2019.
14.	**Question -** How can you use mid-C when the Clean Energy Act requires BC Hydro to be self-sufficient?	As BC Hydro is in an energy surplus on a planning basis, the mid-C market price provides a reasonable estimate of our marginal cost of energy.
15.	**Comment –** It's hard to believe you are in surplus when you imported 2500 GWh of energy – save it for RRA.	We acknowledge that there is uncertainty with regards to our marginal costs. Therefore we are analyzing a range of scenarios and conducting sensitivity analysis to test whether or not ratepayer economics remain positive, given the range of potential outcomes.
	Yolanda Domingo, BCUC Staff	
16.	**Question –** Slide 20 - This is monitoring and evaluation for this rate design. How would you measure GHG reduction as part of your rate design analysis?	We would work with our customers to estimate the GHG reductions based on the fuel type from which the customer was converting (e.g., diesel, gasoline).
	Linda Dong, Zone II Ratepayers Group	
17.	**Question –** If you are doing a three year evaluation, is this permanent rate or a pilot?	Two rate design options could be offered on an ongoing basis and one option would be time bound.

4. Rate Options and Discussion – Anthea Jubb and Allan Chung
Anthea provided an overview of Option 1 – the Overnight Rate with Demand TOU. Allan provided an overview of Option 2 – the Overnight Rate with Energy and Demand TOU and Option 3 – the Demand Transition Rate.

	Feedback	BC Hydro Response
	Penny Cochrane, Cochrane Energy Consulting	
18.	**Comment -** Slide 25 - There is a benefit to the shareholder because we are increasing rate base.	For the next two years our net income is set so this will increase revenues, but not net income. BC Hydro does not earn our net income off of rate base, so an increase in the rate base is not relevant.
	David Austin, Clean Energy Association of BC	
19.	**Question –** Why would anyone invest in the interconnection costs if it was a three year rate?	We are not contemplating terminating any of the potential rates in three years. Rather, we are contemplating an evaluation and review of outcomes, pricing and availability in three years.
	Aaron Lamb, BC Transit	
20.	**Question –** Slide 29 - Why does the off peak energy charge not commence until 11 – why is demand starting at 10?	It's the same as Option 1 – the energy charge is a little later based on the system load curve.
21.	**Comment –** This would make billing more complex.	The implication of aligning the off peak charge with the demand charge is that the unit price may go up. We will examine aligning the timing.
	Sarah Khan, BCUC Staff	
22.	**Question –** Slide 30 - How did you come up with the numbers at the bottom of the chart?	Values are illustrative. For the bill saving we compared the NPV of the customer bill under this option versus the LGS rate, over a 5 year period. So a comparison of what a customer paid under LGS versus this proposed rate expressed as a percentage of bill savings for the customer. For the ratepayer benefit cost ratio, we estimated the NPV of the incremental revenue from the proposed rate divided by the NPV of the marginal cost to serve the incremental load.

	Feedback	BC Hydro Response
	Thomas Hackney, BC Sustainable Energy Association	
23.	**Webcast Question –** Could the proposed overnight rate Options 1 and 2 be seen as a subsidy of customers on that rate class to other ratepayers?	Option 1 and Option 2 do not result in a subsidy to participants under that rate. We analyzed the apportionment of costs and Options 1 and 2 result in a similar recovery of costs as is currently the case for LGS customers. The rate designs reflect costs of service and customers pay their share of costs – i.e., there is no shifting of costs.
	Shannon Craig, Ministry of Energy, Mines and Petroleum Resources	
24.	**Webcast Question –** Are any revenues to BCH from the sale of credits under the Low Carbon Fuel Standard included in the "revenues" for the various rate options?	No.
	Penny Cochrane, Cochrane Energy Consulting	
25.	**Question –** Slide 36 **-** Can you run us through a bill calculation for demand for one month? I am not clear how you would do the calculation.	For LGS, we have a billing determinant for example for a depot load that has a demand and energy component. We apply the demand charge to the monthly peak kW and energy charge to the monthly energy kWh usage.
26.	**Question –** What if the peak is in a LLH? How do you determine the peak?	For the Demand Transition Rate, there would be no demand charge during the first 5 year period. After that you would pay for demand based on your monthly peak demand.
27.	**Question –** So one reading per month, peak regardless of when it happened?	The maximum demand for that month, multiplied by the demand charge.
	Janet Rhodes, Commercial Energy Consumers	
28.	**Question –** Have you considered seasonal rates?	We did consider seasonal rates but we wanted to have a consistent charging message year round. The rate gets complex if it is seasonal.
	Yolanda Domingo, BCUC Staff	
29.	**Question –** This is an optional rate and it has linkages to the LGS rate. Is this an optional rate to the LGS rate class or is it completely separate?	BC Hydro is contemplating that these would be optional general service rates, available to fleet charging customers within the LGS rate class. Option 1 and 2 are estimated to have the same revenue to cost ratio as does the LGS rate class overall. We have an estimated load profile and considered costs based on that profile and the revenue is based on the rates.

	Feedback	BC Hydro Response
	Yolanda Domingo, BCUC Staff	
30.	**Question –** So because the rates are optional, are you making an assumption on uptake?	We do make load assumptions (magnitude and shape). We have modelled this and found that costs and revenues are sensitive to this load. This is why we are contemplating evaluating and potentially re-pricing the rates after three years.
31.	**Question –** Would you include the revenue and cost in the evaluation?	Yes we would include revenues and costs, because this is one way to assess fairness.
	Thomas Hackney, BC Sustainable Energy Association	
32.	**Webcast Question –** Does Option 3 represent costing that better reflects FACOS for BCH's modeling of fleet charging than Options 1 and 2?	Option 1 and 2 are better reflective of BCH's cost of service; Option 3 is a little further from that. Please see Slide 24 – many of our costs are driven by our peak times. Overnight rates allow for lower rates because an overnight profile is not driving our costs. While Option 3 is less reflective of BC Hydro's costs of service our modelling indicates that it will still provide benefits to all ratepayers.
	Dorota Kwasnik, Vancouver Fraser Port Authority	
33.	**Question –** Is it possible to have more than one option available? We may have different needs for our fleets.	We may apply for more than one rate. We want to encourage overnight use but there may be customers that this does not work for.
34.	**Question –** Option 3 – Is this identical to the shore power rate? If yes, is the energy cost the Transmission rate?	No. Shore power is interruptible and was priced on that basis. The fleet electrification rate designs are not interruptible. The pricing was based on the average LGS customer at a 55% load factor.
35.	**Question –** Wouldn't it make sense to match it to shore power?	Please see the responses to question 34 above and question 37 below.
36.	**Comment -** No, interruptible does not work.	
37.	**Comment -** This rate is higher than shore power so it almost looks like a penalty	We could consider the impacts of aligning the energy price between the shore power rate and the illustrative demand transition rate.
38.	**Comment -** This would apply to port customers – so a few rates could be helpful and if they can be aligned.	

	Feedback	BC Hydro Response
	Penny Cochrane, Cochrane Energy Consulting	
39.	**Question –** You mentioned two rates. Does a customer need two services to take advantage of both rates?	Yes, each would be its own interconnection.
40.	**Comment -** This may be too ambitious in light of billing changes.	Implementing the Overnight Rate design concepts would result in some changes to how we use meter information.
	Dorota Kwasnik, Vancouver Fraser Port Authority	
41.	**Question –** These would be separate meters for fleet?	Yes.
	Bill Andrews, BC Sustainable Energy Association	
42.	**Webcast Question –** Option 3. Does the five year transition begin when each new meter is introduced? Or does the five year transition begin in 2020 regardless of when the customer and/or meter first receives service under the rate?	The starting time is proposed to be fixed, starting in 2020 but it would be upon approval and implementation. We are not contemplating that that the start date would be customer specific – it starts in year 1. Customer bill savings are based on when you sign up.
	Dorota Kwasnik, Vancouver Fraser Port Authority	
43.	**Comment -** Electrification is expensive and takes time. One vehicle costs $500k and we need many. So we need full five year period to bring on load. We will not be ready in 2020. It would only benefit those customers who accidently align with the 2020 date.	We understand that for customers, a custom start date per account may be preferable. We can examine this recognizing that there may be practical barriers to introducing it, such as metering and billing system complexity and increasing risk to all ratepayers resulting for future uncertainty regarding marginal costs.
	James Weimer, Clean Energy Association of BC	
44.	**Question –** Slide 36 - Referring to Allan's benefit cost analysis, I am looking at the chart for Option 3 and the ratios in the coloured lines look different than the chart. Why? Is there an error?	**Note:** the graph on Slide 36 of the presentation has been corrected. A revised presentation was distributed to participants on June 4, 2019.
	David Austin, Clean Energy Association of BC	
45.	**Comment -** In relation to a comment from the Port – you need to consider how long the interconnection process takes.	Fair comment. It was an illustrative date but we will consider the interconnection process and whether we should make changes the Demand Transition Rate to provide more flexibility.

	Feedback	BC Hydro Response
46.	**Mike Grist, Seaspan Ferries** **Webcast Comment -** Re the comment that BC Hydro indicated that they have not considered that there may be interest in an interruptible rate for fleets because they did not anticipate that this would be of interest to customers. Given that some customers will have hybrid energy systems, there may be some interest in an interruptible design depending on how it is priced opposite the firm service options. Can BC Hydro include such an alternative for customers that have this flexibility?	We can consider the option but we would need to get a better idea of what the customer needs may be so we could model and design this.

5. Closing – Anthea Jubb
Anthea thanked everyone for their participation and requested that feedback forms be provided back to BCH by June 5, 2019.

BC Hydro
Power smart

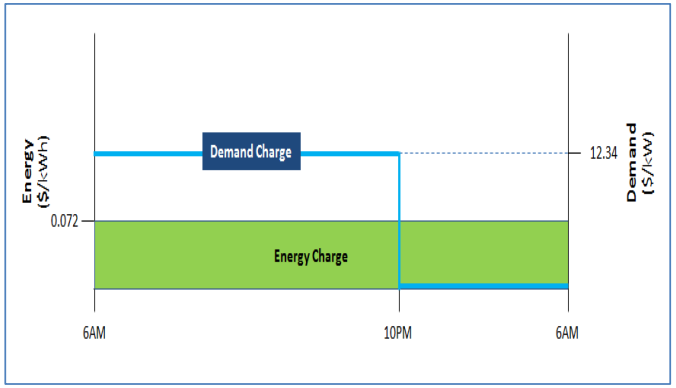
Rate Design – May 28, 2019

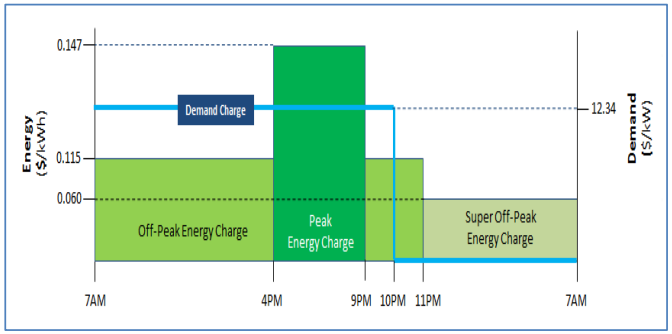
Fleet Electrification Rate Design Workshop - Feedback Form

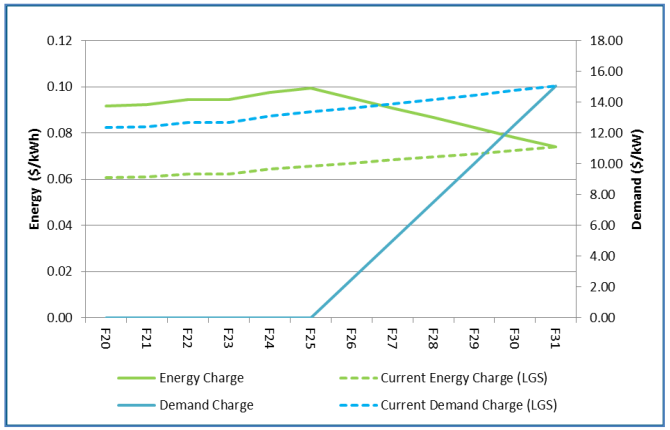
Name/Organization:

Please provide your feedback by June 5, 2019	
Proposed Rate Availability	**Comments (Please do not identify third-party individuals in your comments. Comments bearing references to identifiable individuals will be discarded due to privacy concerns)**
• Separately metered new charging load over 150 kW • Fleet charging (e.g., public transportation, commercial fleets) **Are there other availability criteria that should be considered?**	

Please provide your feedback by June 5, 2019	
Monitoring and Evaluation	**Comments (Please do not identify third-party individuals in your comments. Comments bearing references to identifiable individuals will be discarded due to privacy concerns)**
Annual Monitoring: (new load, revenues, incremental costs) Three Year Evaluation: (impact on all ratepayers, pricing principles, allocation of costs, GHG reduction, availability and eligibility, customer feedback) **Are there additional metrics and outcomes we should monitor and evaluate?**	

Please provide your feedback by June 5, 2019	
1. Overnight Rate with Demand TOU	**Comments (Please do not identify third-party individuals in your comments. Comments bearing references to identifiable individuals will be discarded due to privacy concerns)**
Please provide your feedback on the Overnight Rate with Demand TOU.  	

Please provide your feedback by June 5, 2019	
2. Overnight Rate with Demand and Energy TOU	**Comments (Please do not identify third-party individuals in your comments. Comments bearing references to identifiable individuals will be discarded due to privacy concerns)**
Please provide your feedback on the Overnight Rate with Energy and Demand TOU.  	

Please provide your feedback by June 5, 2019	
3. Demand Transition Rate	**Comments (Please do not identify third-party individuals in your comments. Comments bearing references to identifiable individuals will be discarded due to privacy concerns)**
Please provide your feedback on the Demand Transition Rate.  	

Additional Comments:

Please do not identify third-party individuals in your comments. Comments bearing references to identifiable individuals will be discarded due to privacy concerns.

CONSENT TO USE PERSONAL INFORMATION

I consent to the use of my personal information by BC Hydro as provided in this feedback form. Personal information includes my comments and contact details. This information is collected and protected by BC Hydro in accordance with the ***Freedom of Information and Protection of Privacy Act***. Personal information is not considered, in any way, to reflect the express or implied views of the company you represent. Comments submitted will be used to inform BC Hydro's customer service and rate design efforts for fleet electrification rates.

Signature:_____ Date: _____

Thank you for your comments.

You can return completed feedback forms to BC Hydro Regulatory Group – "Attention Fleet Electrification Rate Design"

Email: bchydroregulatorygroup@bchydro.com

Form available on Web: https://www.bchydro.com/toolbar/about/planning_regulatory/regulatory.html

Any personal information you provide to BC Hydro on this form is collected and protected in accordance with the ***Freedom of Information and Protection of Privacy Act***. BC Hydro is collecting information with this for the purpose of rate design in accordance with BC Hydro's mandate under the ***Hydro and Power Authority Act***, the BC Hydro Electric Tariff, the ***Utilities Commission Act*** and related Regulations and Directions. If you have any questions about the collection or use of the personal information collected on this form please contact the BC Hydro Regulatory Group via email at: bchydroregulatorygroup@bchydro.com.

BC Hydro Fleet Electrification Rate Application

Appendix H

Jurisdictional Review – Additional Information

Jurisdictional Review – Additional Information

August 7, 2019

Common Rate Features

BC Hydro reviewed several jurisdictions where rates for fleet charging are being offered or are being reviewed for approval. These rates seek to encourage electric vehicle adoption by reducing or removing economic barriers. These rates may also have other objectives such as encouraging electric vehicle charging loads to shift to periods that are less costly for the utility to serve. The following are common features of these rates:

- Time of use (**TOU**) energy charges and in some cases TOU demand charges;
- Lower energy charges and no demand charges during the overnight period which provide opportunity for lower cost electric vehicle charging during the overnight period; and
- Examples of either no demand charge or demand charge relief on a temporary basis (e.g., for a five-year period). In the latter case, demand charges may be phased back in over a transition period (e.g., for the following five-year period).

Time of Use Pricing Rationale

Time of use rates reflect the different cost of providing electricity during the day. Higher peak energy rates reflect the cost of providing electricity when electricity demand is high. During these times, energy cost may be higher and the utility may also need to invest in additional capacity in the system to meet these peak requirements over time. Lower off-peak energy rates (e.g., during the overnight period) may reflect lower energy costs. The utility may also have available spare

capacity during this time and any additional load during the off-peak time would benefit the utility and ratepayers by improving the utility's load factor and the utilization of existing assets.

Demand charges may be applied on a TOU basis e.g., during the peak period. In this case, billing demand may be defined as maximum demand during the peak period. This provides an additional price signal to reduce demand during the peak period, since system demand is highest during this time and drives the need for additional demand-related investments. The demand charge may not apply during lower cost periods because of the availability of spare capacity during these times. Therefore, load during this time will not drive the need for additional demand-related investments.

TOU rates provide the opportunity for electric vehicle charging customers to charge their vehicles during less costly periods and to save money on their electricity bills. By providing TOU price signals, the utility minimizes the cost of serving incremental electric vehicle charging load if customers respond by charging during the off-peak periods. Therefore, TOU rates may be mutually beneficial to both the customer and the utility.

Case Studies

Hawaii

Hawaii has strong policy goals regarding emissions reductions which are aligned with the 2016 Paris Climate Agreement.[1] The state has also set a 100 per cent renewable portfolio standard by 2045. Electrification of transportation is a key element of Hawaii's clean energy policy goals. Hawaii Electric supports this initiative by a variety of ways including fleet procurement, rate design, customer education, charging infrastructure and innovative pilot projects.

[1] Please refer to Act 32 _https://climateadaptation.hawaii.gov/initiative/.

California

California is considered a leader in North America regarding electric vehicle support and adoption. The Government of California has established goals regarding the number of zero emission vehicles (**ZEVs**) in California. In 2018, the goal is five million ZEVs by 2030. California's Senate Bill 350 establishes GHG reduction goals for 2030 and beyond, and was signed into law in October 2015. The target is a GHG emission reduction of 40 per cent below 1990 levels. The Legislature directed California's three major utilities to each develop plans to promote transportation electrification and help achieve reductions targets, and outlined that the programs must also seek to maximize benefits and minimize costs to the ratepayers.

Liberty Utilities

Liberty Utilities provides retail electric service to 49,000 customers who reside mainly in the Lake Tahoe area of California and it is a winter peaking utility. It is supplied with electricity through a purchase power agreement with Nevada Energy and also by a new 50 MW solar energy project that serves 25 per cent of Liberty Utilities' customers' energy needs.

Pacific Gas and Electric (PG&E)

PG&E is an investor-owned utility which provides both electricity and natural gas service and has 5.4 million electric customers. On November 5, 2018, PG&E filed a commercial EV rate Application which proposed two new rate classes and rates CEV-S and CEV-L for commercial EV customers. The regulatory proceeding is still on-going with an expected decision by the summer. The proposed CEV-S rate is available for charging capacities less than 100 kW, and the CEV-L rate is available for charging capacities greater than 100 kW. Table 2 in section 2.2 shows CEV-L-S which is applicable for customers at secondary voltage. The proposed rates are available for fleets, fast charging, workplaces and multifamily dwellings.

PG&E's proposed commercial EV rate schedule eliminates demand charges and instead uses a monthly subscription pricing model which may offer more affordable charging, simpler pricing structure and improved certainty and budgeting. For Rate Schedule CEV-L-S, the monthly subscription rate is billed at $183.86 per 50 kW of connected load. Customers choose their subscription level, based on charging needs. Those that want to manage their charging loads can opt for a lower subscription level. If site charging exceeds subscription, the customer pays an overage for that month equal to 200 percent of the equivalent monthly kW subscription rate for all additional units. For example, if a customer selected a 550 kW level, but exceeded demand by 20 kW they would be charged for 13 units (11x1, plus 1x2).

Southern California Edison (SCE)

SCE is an electric utility which supplies 15 million customers in Southern California. As part of SCE's 2017 Transportation Electrification Proposals, SCE proposed three voluntary commercial EV TOU rate schedules (TOU-EV-7 (demand less than 20 kW), TOU-EV-8 (demand between 21 and 500 kW) and TOU-EV-9 (demand greater than 500 kW). The Application was approved with modifications recommended by some stakeholders.