The Community Energy Association (CEA) is pleased to provide the following submission for evidence in the EV charging pricing inquiry.

About CEA

CEA [http://communityenergy.bc.ca/] is an enterprising non-profit that supports local governments (municipalities and regional districts) in advancing climate action. CEA does this through develop plans, writing policy, running programs, and deploying infrastructure. CEA has managed the first community-led regional charging infrastructure deployment program (Accelerate Kootenays http://acceleratekootenays.ca/).

Introduction

This inquiry provides the opportunity to balance multiple objectives including:

1. Supporting public policy objectives (provincial and municipal) on mobility electrification by minimizing the cost of charging, particularly over the next several years as communities in BC are at the beginning of a market transformation from internal combustion to electrification
2. Ensuring utilities are able to support the above-noted public policy objectives without undue financial impacts
3. Not unnecessarily excluding entities other than utilities from owning and operating charging stations and supporting these public policy objectives
4. Not unduly harming utility rate-payers
5. Ensuring that residents of small communities in BC are not excluded from mobility electrification and that they are not put at a disadvantage because of decisions arising from this inquiry.

Utilities are valued partners of small communities across BC. Small communities need utilities to own and operate DCFC infrastructure in their jurisdictions in order to achieve community energy and emissions reduction targets and economic development. Small communities can find the capital for DCFC but need utilities for ongoing ownership and operation. The utility operation of DCFC must provide high availability and high visibility in order to achieve the community objectives leading to DCFC deployment.

Currently, DCFC deployment in small communities across BC is contingent on utility ownership and operation.

Electric mobility is an emerging market in BC and increasing the deployment of EV charging stations is critical to increasing the adoption of electric mobility in BC. Many projections for EV adoption converge around a compound annual growth rate of +/- 30% though to 2030 and gradually levelling off to form a typical new-product introduction 'S' curve. The answers to the questions before the inquiry may change as EV adoption becomes more mainstream and charge events increase over the next decade.

CEA perspective on BCUC Inquiry questions

1. Do EV charging stations operate in a competitive environment in BC or are they a natural monopoly service?

a. **Defining 'EV charging stations':** There are several types of EV charging stations and for the purposes of the Inquiry it is useful to make the distinctions between what are commonly referred to as

   i. **Level 2 stations** – which are usually between $1,000 and $10,000 to install and require an electrical connection similar to that of a dryer or stove. These stations are owned and operated by a great variety of public and private sector entities. Most of these stations are free currently, however as electric vehicle penetration increases, there may be value in a user-pay approach to these stations.

      These stations do not have monopoly characteristics. These stations are different than the natural monopoly of electricity distribution in that they are owned and operated by a great variety of actors and customers are free to drive to the next station if they do not like the pricing or service. This is conceptually similar to a gas station (though, of course, operationally different).

      These stations do operate in a competitive environment and are NOT a natural monopoly service.

      Not having a blanket exemption for charging for electricity for these stations is currently hindering adoption of EV charging in some sectors such as strata corporations.

      A category exemption for resale of electricity for Level 2 charging stations, allowing the market determine pricing as appropriate may help remove barriers to increased deployment of Level 2 stations, thus supporting public policy objectives without negatively impacting rate-payers and removing barriers to multiple private and public sector entities owning and operating Level 2 stations.

b. Level 3 / DC Fast Charge / DCFC stations – which are usually between $70,000 and $120,0000 to install and are usually between 25 kW and 100kW systems requiring special electrical connections.

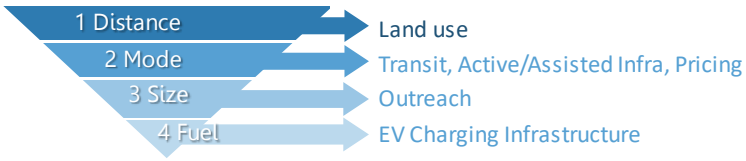
   Within this category are two distinct categories of stations – Tesla super-chargers and CHAdeMO/CCS stations.

   The CHAdeMO/CCS stations are usually provided on a use-pay system and CEA understands that these are the primary focus of the inquiry. **CEA's remaining evidence will be related solely to the** CHAdeMO/CCS **stations**.

The answer to the question **"Do EV charging stations operate in a competitive environment in BC or are they a natural monopoly service" depends on the outcomes of the inquiry**. The decisions of BCUC on pricing will either create a level playing field or create a default monopoly based on financial considerations.

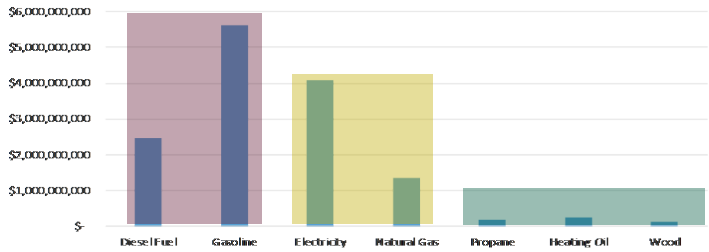
Monopoly vs Competitive discussion - Small Local governments across British Columbia

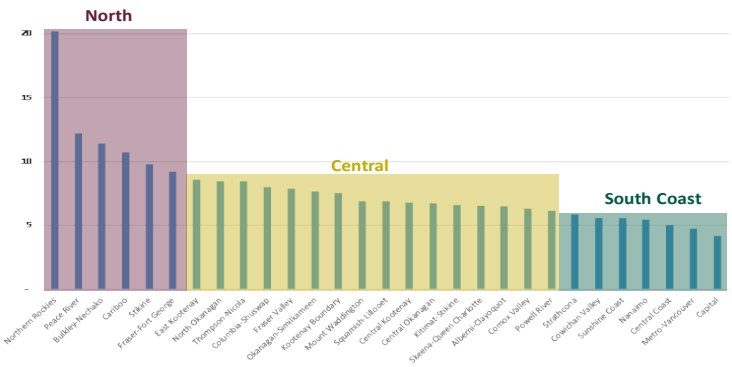
- Small communities (under 5,000 population which are the majority of local governments in BC) across British Columbia have expressed interest in establishing robust EV charging networks in their communities to promote economic development associated with EV tourism as well as providing options for their residents to comfortably and confidently adopt electric vehicles.
- Over 50% of local governments have a Community Energy and Emissions Plan (a plan to leverage local government powers to reduce community-wide energy and emissions). Transportation is often over half of the energy and emissions in small communities. Transportation is included in all Community Energy and Emissions Plans. There are four broad categories of approaches local governments can take to reduce transportation emissions as depicted below.



- Small local governments are, on average, growing at a far slower rate in BC than the major urban centers. Small local governments have fewer opportunities to reduce transportation emissions than large urban centers because of slow growth (reducing the impact of land-use decisions on transportation emissions), lower population density and distance between communities (limiting the impact of public transit and active/assisted transportation infrastructure). Electrification holds great promise for small local governments in reducing GHG emissions and building the local economy.
- British Columbians spend on the order of $8 billion annually on transportation fuels (see chart below) which are also a major contributor to greenhouse gas emissions in the province.

Annual Spend: BC Residential and Commercial





- Small communities in northern and central BC may have greater opportunities for per-capita emissions reductions as their per-capita emissions are significantly higher than the larger urban areas of the south coast.
- CEA believes that it is important that small communities are not unduly disadvantaged through pricing decisions arising from this inquiry.
- Local governments, collaborating together regionally and with partners such as Community Energy Association can access grants for the capital cost of DCFC stations (such as we did with Accelerate Kootenays). **Initial capital cost is a barrier to entry that can be addressed for local governments**.

- **Ongoing costs** are currently a significant challenge for small local governments. This is why Accelerate Kootenays has negotiated agreements with BC Hydro and FortisBC to own and operate stations in their service areas that the project has funded on behalf of local governments. Service levels / expectations were also negotiated which was also a first in BC. The table below provides an ILLUSTRATIVE EXAMPLE that is known to be incomplete regarding the differences in utility vs non-utility costs of ownership and operation.

Level 3 Charging Station Business Model			
		1 station	10 stations
Annual Non-Electricity Operating Costs			
Network & Monitoring fee	$ 150		
Maintenance (air filters, confirm toque)	$ 1,000		
Subtotal		**$ 1,150**	$ 11,500
Asset renewal fund (10 year life)	$ 3,500		
Total		**$ 4,650**	$ 46,500
Repairs (non-warranty and vandalism)	tbd		
Staff time for tier-2 support	tbd		
Monthly Electricity costs (BCH MGS)			
Basic charge/day	$ 0.243		
Monthly avg		$ 7.29	$ 72.87
Demand charge per kW over 35	$ 4.92		
Demand for 50kW service		$ 73.80	
Subtotal		$ 81.09	
Rate rider	5%		
Subtotal	$ 4.05	**$ 85.14**	**$ 851.41**
Energy charge per kWh	$ 0.088		
Per 6kWh charge event	$ 0.528		
Average resale price per kWh	$ 0.350		
Net electricity	$ 0.262		
Net electricity / charge event		**$ 1.57**	
Monthly 6kWh ($1.57 net) charge events required to break even on:			
Electricity Costs			
Utility - no demand charge		**$ 4.87**	**$ 48.67**
Non-Utility - incl demand charge		**$ 54.16**	**$ 541.61**
Annual non-electrticity operating costs			
Total		**$ 246.50**	**$ 2,465.01**
sub-total (no asset renewal)		**$ 60.96**	**$ 609.63**
Both electricy & non-electricity costs			
Utility without asset renewal		**$ 65.83**	$ 658.30
Non-utility with asset renewal		**$ 300.66**	$ 3,006.62
Daily charge events for break even			
Both electricy & non-electricity costs			
Utility without asset renewal		2	22
Non-utility with asset renewal		10	100

- Assumptions in the above chart include:
  a. BC Hydro Medium General Service Tariff
  b. Utilities not charging themselves demand charges
  c. Effective price (based on time or kWh) of $0.35 / kWh which is pricing BC Hydro has used in DCFC chargers
  d. An average charge event of 6kWh based on a recent sample of charging activity.

e. Local governments applying good asset management principles to DCFC assets as they do to their other assets requires setting aside annual funds to build up a reserve for asset renewal.

- As can be seen from this example, costs for a small local government to own and operate DCFC are currently approximately **five times** the costs of a utility to own and operate the same infrastructure.
- BCUC's decisions on pricing for utilities and non-utilities will not be the sole factor but will contribute to determining if small local governments will continue to be dependant on utilities for ownership and operation of DCFC assets, if they can own and operate DCFC themselves or have a selection of competitive providers to choose from.
- Many larger local governments are prepared to own and operate DCFC stations themselves and have the financial capacity to do so.

Conclusion: **Currently DCFC can operate in a quasi-competitive environment in larger urban centers (local governments and utilities as owner/operators). However in small communities, DCFC is currently operating as a regional monopoly for utilities given their unique cost and capability advantages**.

2. Are the customers of EV charging stations captive or do they have a choice?
   a. A distinction between two separate 'customer' classes may be useful.
      i. **Electric Vehicle Owners**: Most have accounts for multiple charging networks so they are not captive to a particular network. There is an option to charge at multiple locations (homes with regular wall outlets, level two stations and level 3 DCFC stations) providing an opportunity for EV owners to escape captivity. Currently, EV owners who have a practical or operational need for a fast charge ARE captive to the BC Hydro and FortisBC networks regionally as there are currently few other owner/operators. As more large local governments deploy their own DCFC, this captivity will diminish in larger urban centers. In large urban areas, as the density of electric vehicles and therefore of charging events increases, eventually a private sector business model will be possible. In small communities, the captivity is greater and will continue for the foreseeable future in the absence of revised pricing direction from the commission.
      ii. **Host Local Governments**: As discussed above, small local governments through collaboration and access to grants can secure the capital for DCFC however the ongoing costs of ownership and operation are beyond their capabilities. Under the current financial structure of ownership, operation, and pricing, small local governments are required to negotiate with utilities for the utilities to own and operate the stations. This process can take more than twelve months (in the case of Accelerate Kootenays negotiations with BC Hydro) and can consume significant resources that would otherwise be used to achieve the public policy objective of mobility electrification. Small local governments, as noted above, have an interest in increasing economic development through EV tourism and providing practical electric mobility choices to their residents. In order to achieve these objectives, the DCFC stations must have high availability and high

visibility to planned and unplanned outages and service restoration estimates. As the providers of capital and requiring service levels, small local governments hosting DCFC on their property and contracting with utilities to own and operate the DCFC can be viewed as customers of the utility. Currently these customers ARE captive given no other practical choices except the electric distribution provider locally. These customers, once the contracts are in place continue to be captive for the life of the infrastructure. While exemptions to electricity resale are possible for DCFC and were explored by Accelerate Kootenays, the cost advantages and distribution asset management capacity that utilities have make them the only practical owner / operator for small local governments at this time.

3. Should the Commission regulate the services provided by EV charging stations? What are benefits and detriments to such regulation?
    a. As noted above, small host local governments can obtain capital but currently require utilities to own/operate the DCFC in a professional manner which results in the high availability and high visibility required to achieve the public policy objectives that underlie the deployment of DCFC. Accelerate Kootenays negotiated the first service level expectation for DCFC in BC. This may be surprising given the number of years that BC Hydro has been operating a DCFC network in BC. Accelerate Kootenays negotiated the agreement to ensure that the service level for the network funded by the project had higher availability and visibility than the experience to-date of the BC Hydro network including examples of stations being down for months at a time and few timely and informative updates to EV drivers or outages and restoration timelines. Small local governments have limited staff capacity to provide oversight and dispute resolution if the utility does not meet its service expectations. BCUC could provide valuable assistance to small local goverments by providing an oversight or dispute resolution mechanism to ensure utilities who own and operate municipally-funded DCFC meet their expectations.
    b. Defining services: ‘services provided by EV charging stations’ can be further refined into:
        i. Equipment: which is the physical station. This, along with the network provide the functionality for EV charging.
        ii. Network: The equipment uses a network to provide visibility to EV drivers and owner/operator of its status as well as for payment processing and sometimes charge initiation or the issuing of reset or other simple commands by the network operator or owner/operator. There are two broad approaches to networks within DCFC. The first is a solution coupling the network and equipment together from one vendor providing a packaged solution. The second approach is procuring equipment from one vendor and procuring the network from a second vendor which puts the owner/operator in a systems integrator role if issues arise between the network and equipment. On the original deployment of BC Hydro DCFC, the network cards did not work with the card readers on the equipment, requiring EV drivers to initiate charging through a cell phone application. This second approach is often associated with ‘open standards’.

iii. Tier 1 support: typically provided by the network operator includes identifying that there is a problem and initial diagnostics / problem identification and attempts at remotely resolving the problem. If tier 1 cannot fix the problem it is escalated to tier 2.
iv. Tier 2 support: This is typically the owner operator who may undertake further investigation or initiate onsite repairs and maintenance either through its own staff or more often in many parts of the province, through local electrical contractors or site hosts (for simple mechanical resets or problem identification)
v. Onsite repairs & maintenance: this includes physically interacting with the physical station.

c. Regulating services:
   i. Equipment & Network: Assuming the equipment meets operational requirements (certification for performance in the weather / temperature conditions it will be deployed in etc), small local governments see little value in BCUC attempting to regulate what equipment is deployed. Note, of course, that depending on the outcome of the inquiry and tariff development, if a decision is made to charge per kWh, this will restrict the types of equipment deployed to those being measurement Canada certified as revenue meters. Similarly, with the network, local governments are most concerned with proven reliability and performance. Small local governments do not see substantial value in regulation of DCFC communications networks. If there is a public policy interest in promoting 'open standards', that may be best achieved through providing a preference for 'open' networks and not unnecessarily restricting utility or other owner / operator options in a relatively young, highly dynamic market where 'winners' have yet to be determined. A cell phone analogy may help clarify. We are concerned with the functional performance of the phone not if it is a 'closed' system such as the IPhone or an 'open' platform such as Android. The operational functionality is the primary concern of local governments. From an owner-operator perspective, having some diversity in networks in their DCFC portfolio may reduce risk / reliance on a single vendor.
   ii. Support: There may be a valuable role for BCUC to play in regulating (perhaps in a light-touch, complaint-based manner similar to small district energy systems) support services, particularly tier-2 and onsite support to ensure small local governments with limited capacity (sometimes a total of less than 10 staff work at small local governments providing all the municipal services) are able to effectively resolve service issues with large utility owner-operators. If the commission regulates pricing of DCFC EV charging, it may make sense to include the cost of providing ongoing service which is dependant on both equipment and network reliability as well as the service level expectation.

4. Should the rate design of EV charging stations be established under a public utility's traditional cost of service model or some other model? And within that context, what are the customer pricing options (e.g. energybased rate vs. time-based rate)?
   a. Pricing Options: An energy based rate would restrict the equipment to Measurement Canada Certified revenue meters which are rare if not currently non-existent in the

DCFC market. A time based rate provides for greater equipment choice as well as incenting disconnecting when sufficiently charged and liberating the station for the next EV user.

b. Model: Rate design should balance the public policy objective of accelerating electric mobility with ensuring utilities are not unduly penalized for owning and operating DCFC. To accelerate electric mobility, minimizing the cost of charging is important, particularly over the next several years while the first cost of EV's is still higher than internal combustion vehicles. A high cost for charging will erode public appetite for EV's and will risk unused DCFC assets in the utilities portfolio.

c. Non-utilities: Non-utility DCFC owner/operators currently have high demand charges for DCFC equipment (typically 50kWh systems) that utilities do not appear to account for in their internal costs for DCFC. If BCUC wishes to increase the diversity of owner/operators to ensure that customers are not captive, addressing the demand-charge costs could be a way to make DCFC ownership and operation more attractive to private and public sector owner/operators. We expect that this would be most applicable to large urban areas over the next decade where EV and charging density provides the volume of charge events required for a positive business case. We do not expect a positive business case for private sector DCFC owners in small communities in the immediate future.

5. Should the EV charging station service rate be based on a public utility's existing wholesale or commercial retail rate or some other rate?
    a. No comment
6. Should public utilities include EV charging stations in their regulated rate base or through a separate nonregulated entity?
    a. No comment
7. If public utilities provide EV charging services within their regulated business, is there a risk of cross subsidization from other rate classes to support this new service and if so, is the proposed rate design potentially unduly discriminatory?
    a. No comment