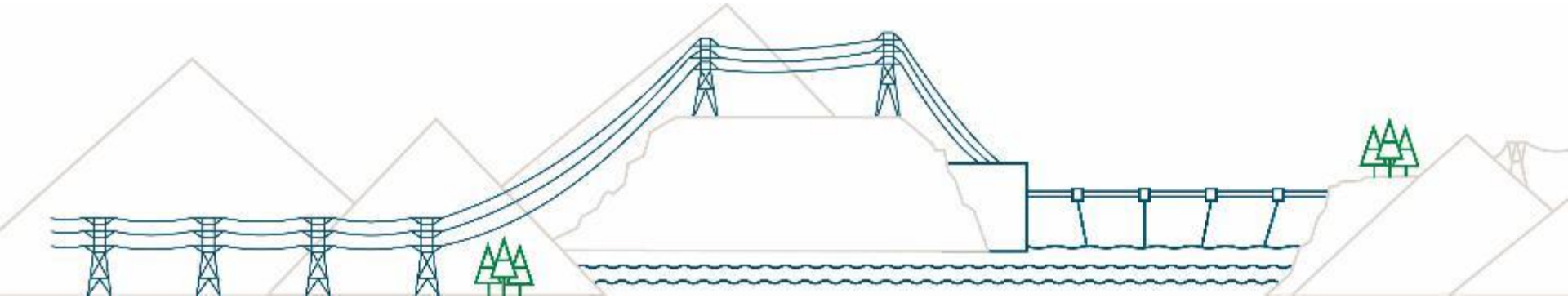


Electrification Plan Engagement

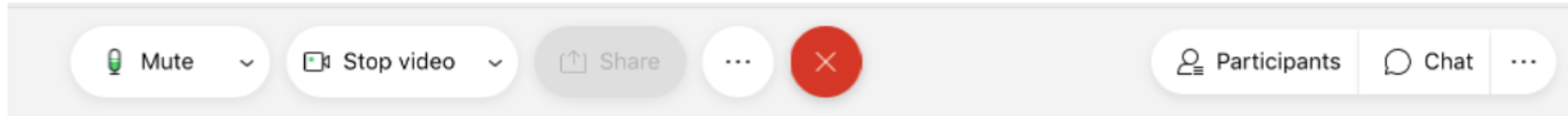


April 13, 2021

Cisco Webex reminders

We'll be using a few basic tools, which you can find if you hover your mouse over the bottom of the screen

Mute/unmute your mic
& turn your video on/off



Audio connection trouble?
See the alternative options here

View the
participant list



Open the chat panel:

- to ask questions
- to provide feedback

Virtual meeting etiquette



- Be respectful by listening to others and sharing time so that everyone gets heard
- Stay curious about new ideas
- Use the chat function to seek input and ask questions
- We are not recording these sessions, and kindly ask that others do not record

Introductions and Outline

- April 12 : Industry
- **Today: Transportation**
- April 14: Homes and buildings (the built environment)

- Each session will begin with an overview
- We've included breaks for questions and comments

Purpose

To provide an overview of our load growth strategy

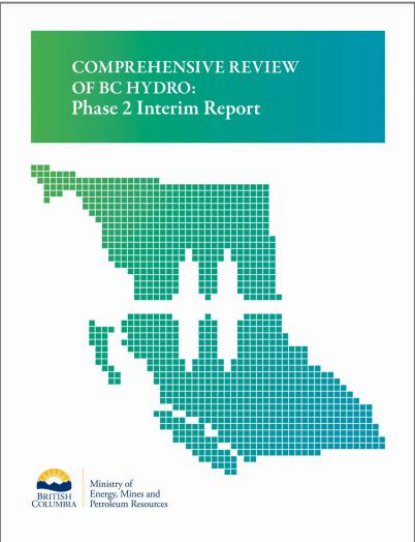
In these sessions we'll cover existing and new potential electrification initiatives in:

- Industry
- Transportation
- Homes and buildings (the built environment)

We're seeking your feedback on:

- opportunities for load growth
- barriers to electrification
- potential new BC Hydro actions to grow our load

Policy and Regulatory Context

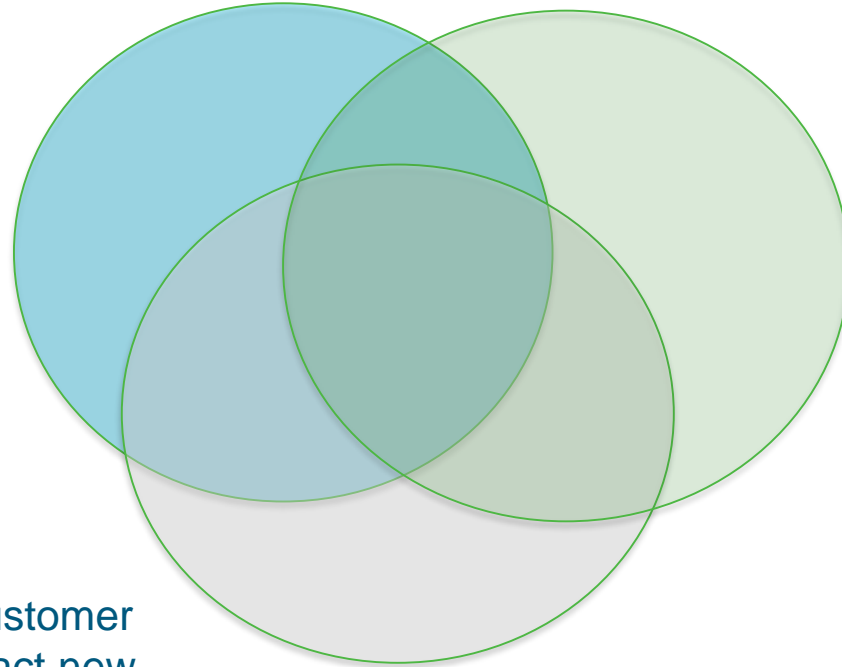


We're developing a plan to grow our load

To keep rates affordable

To reduce emissions and meet provincial GHG targets

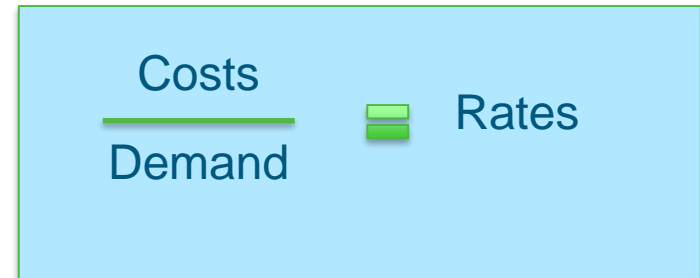
To support customer growth & attract new industries to BC



Load growth can improve affordability

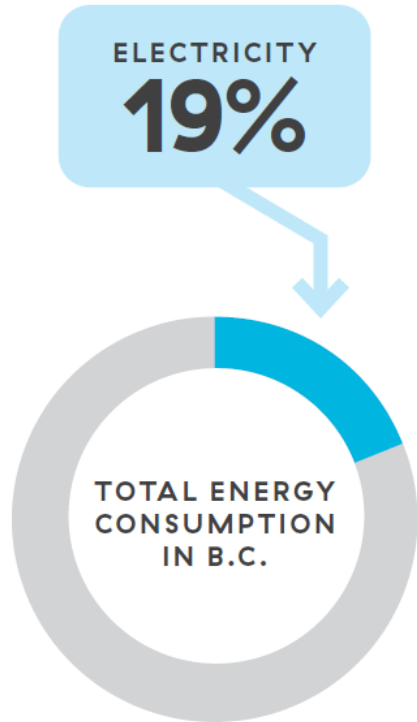
- Maintaining and growing our load is a critical part of how we keep our rates affordable and competitive for customers.
- Many of our costs are fixed, which means they stay the same whether we sell more or less electricity.
- By growing our load and our revenues, we can reduce upward pressure on rates and improve affordability.

The Affordability Equation



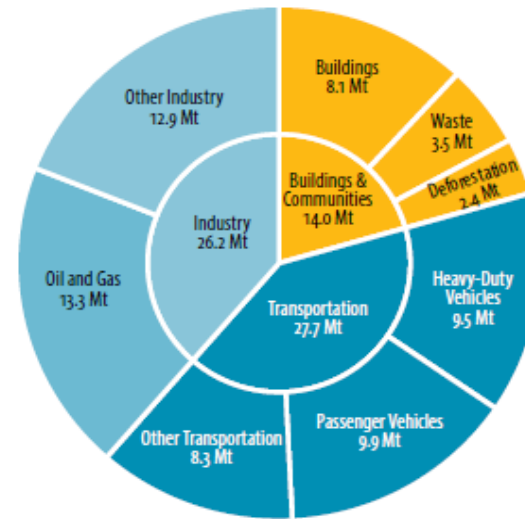
The diagram illustrates the Affordability Equation as a light blue rectangular box with a green border. Inside the box, the word "Costs" is positioned above a horizontal green line. Below this line, the word "Demand" is written. To the right of the line, there is a small green square icon. Further to the right, the word "Rates" is written. This visualizes the equation: $\text{Costs} / \text{Demand} = \text{Rates}$.

Load Growth Can Reduce Emissions

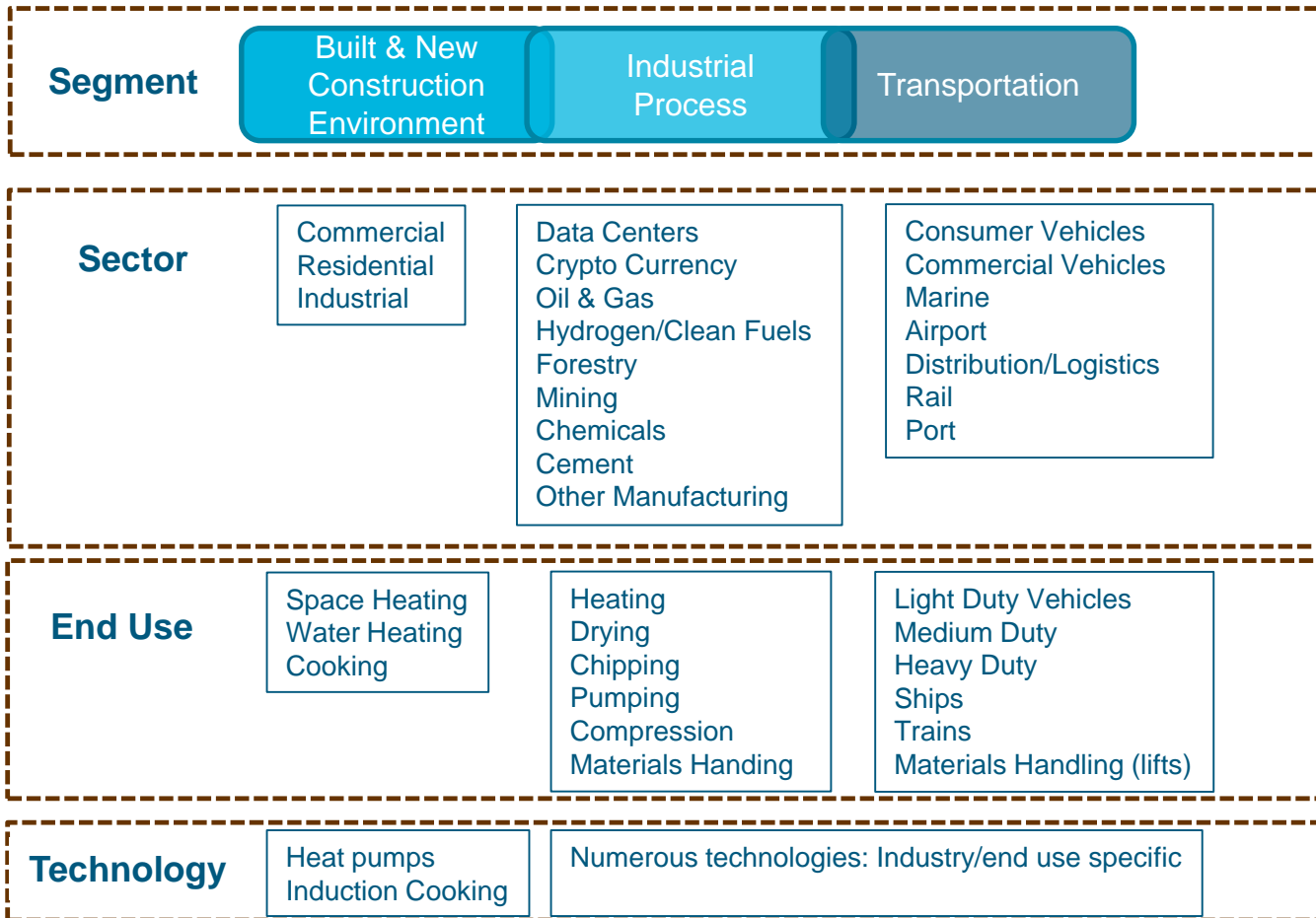


By switching from fossil fuels to clean electricity we could reduce emissions across BC

B.C.'s Gross Emissions by Sector in 2018



Emission reduction opportunities



Load growth

- BC's traditional resource-based industrial sectors will continue to play a leading role, but there is also significant interest from emerging energy-intensive sectors including clean technology, hydrogen, and data centers
- These emerging sectors can locate globally but are attracted by BC Hydro's clean, reliable, and affordable hydroelectric power

We're already taking action

BC Hydro has been supporting electrification by:

- Connecting customers and attracting new electricity consuming businesses
- Offering Low Carbon Electrification programs
- Introducing new rate designs
- Expanding the transmission system to enable gas producers to use grid electricity instead of self-supplying with natural gas
- Deploying EV charging stations

Governments are key partners



Better Homes
Better Buildings
Go Electric BC
CleanBC Industry Fund
CleanBC Industrial Incentive
Program



Investing in Canada
Infrastructure Program:
Green Infrastructure Stream

Our approach is to build on these partnerships and address barriers and gaps

Barriers to electrification

We're drawing on our DSM experience addressing barriers to energy efficiency

Barriers	Description
Awareness	Are customers aware of electrification opportunities and any relevant programs or incentives and do any myths or misconceptions need to be dispelled?
Acceptance	Do customers accept that low carbon electrification measures are attractive solutions that contribute to a better home, transportation alternatives, building or process and reduce GHG emissions?
Affordability	The costs of purchasing, installing and operating low carbon electrification measures can be more expensive than customers can justify or customers lack access to upfront capital to proceed with a project.
Availability	Are low carbon electrification technologies and professional services available in the customer's region?
Accessibility	Are the products or professional services available, but too difficult to find or access? Is BC Hydro's grid accessible? Is the time, cost and process to connect a challenge?

What will the plan cover?

- Initial five year strategy to grow existing and secure new load
- The plan will include:
 - new and expanded programs
 - new infrastructure investments
 - rate design to support electrification
- The plan will include targets for load growth and emission reductions

When will the plan be complete?

The plan:

- will be completed this summer and included in BC Hydro's next Revenue Requirements Application
- will be an evolving framework

We'd like your feedback

We're seeking input on:

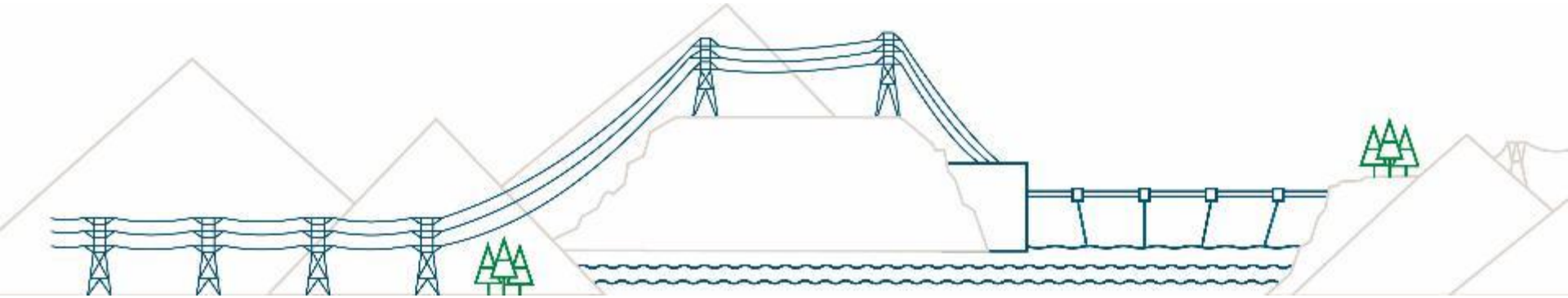
- opportunities for load growth
- barriers to electrification
- potential new BC Hydro actions to grow our load

Questions?



Electrification Plan Engagement

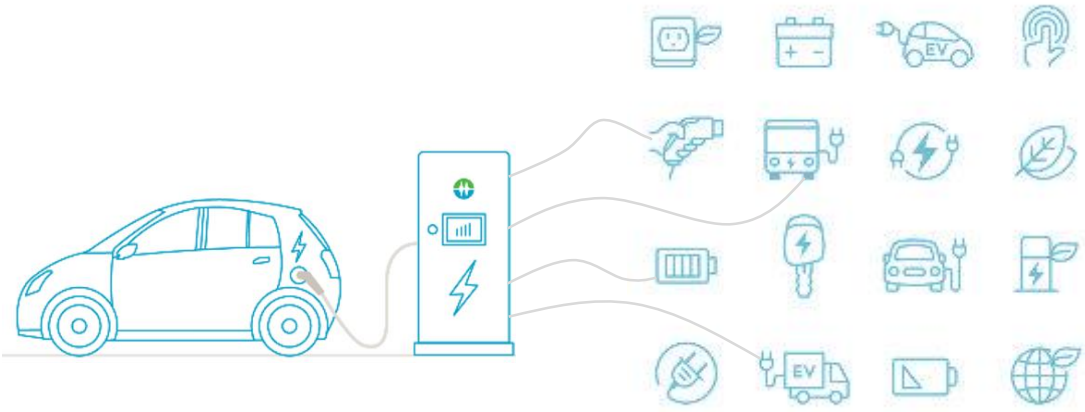
Transportation



Transportation Electrification Opportunities

Part 1: Consumer EV's

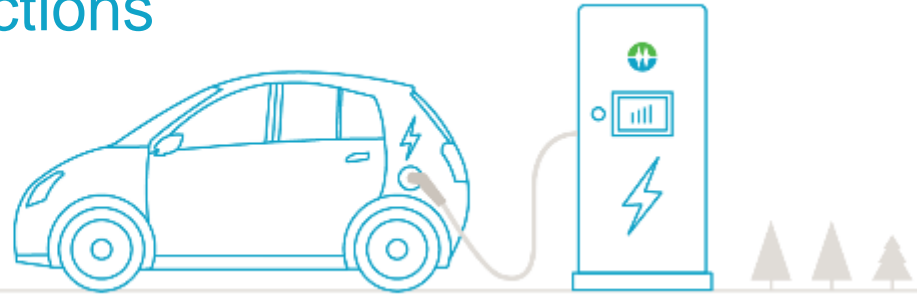
Part 2: Commercial & Fleets



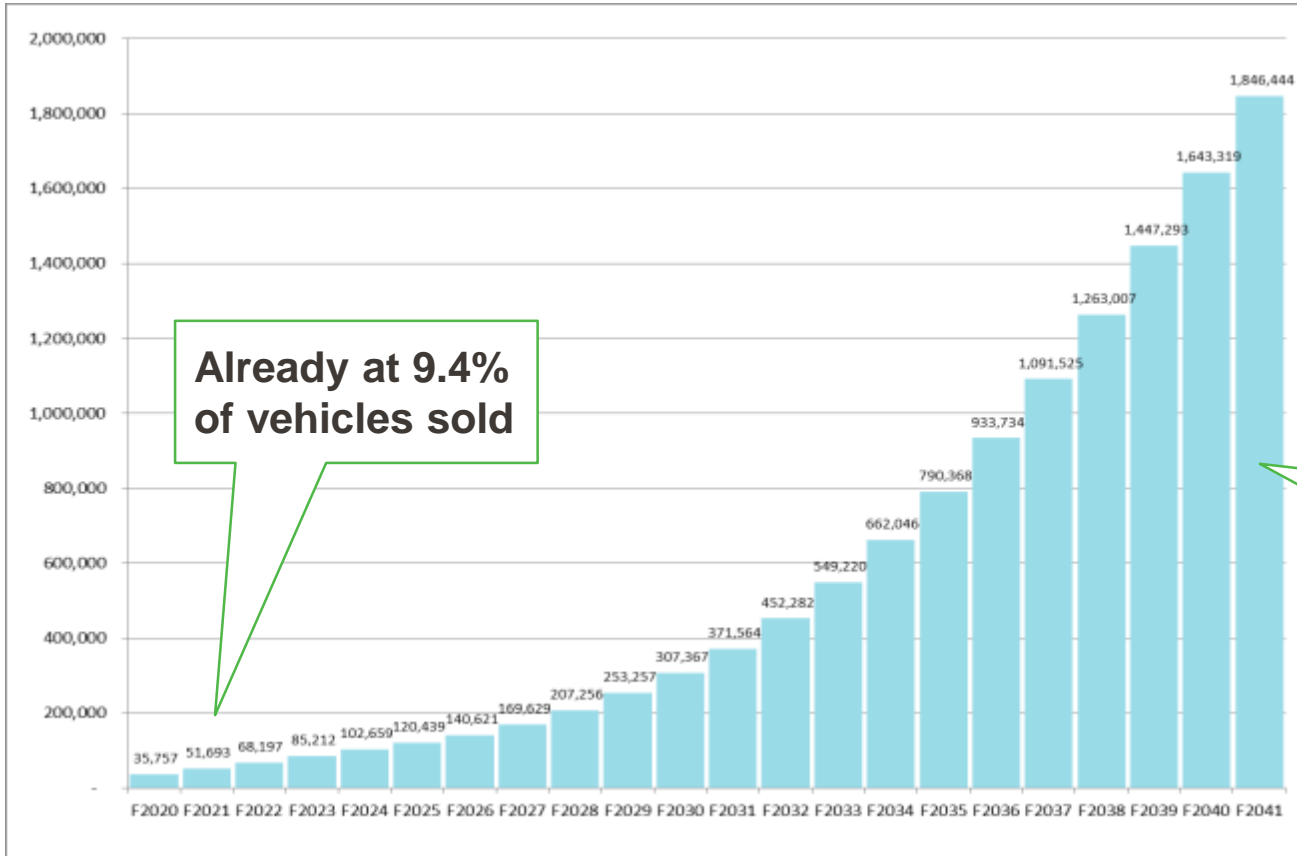
Part 1: Consumer Electric Vehicles

➤ Opportunities

- Barriers
- Current Government actions
- Current BC Hydro actions
- Potential future BC Hydro actions



100% of Sales Zero Emission by 2040

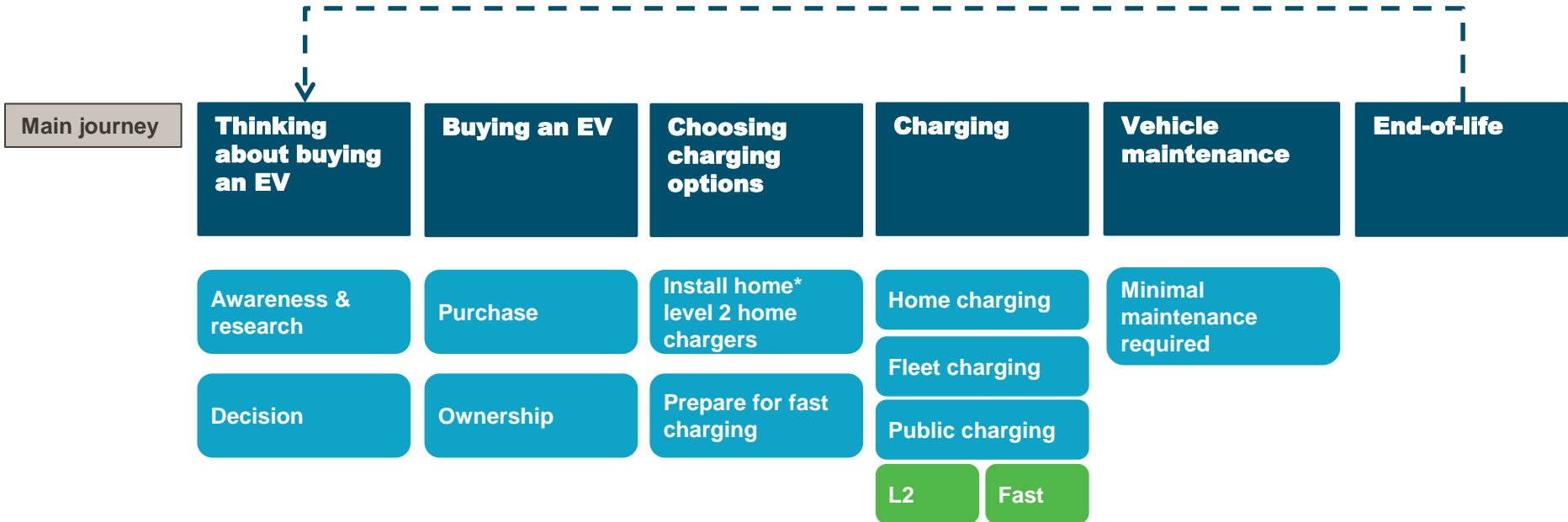


BC ZEV Mandate	
	Percent of New Vehicle Sales
2025	10%
2030	30%
2040	100%

2 million ZEVs will use about 6,000 GWh per year

If we look at the end-to-end EV journey

We can improve the entire journey

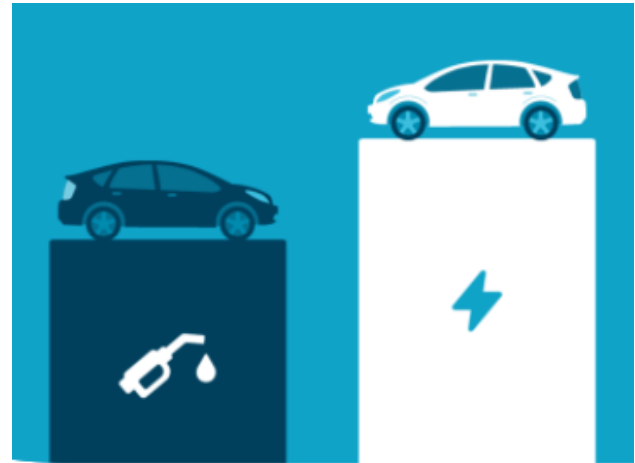


*home for an EV could be a fleet charging areas

Example: Thinking about buying an EV

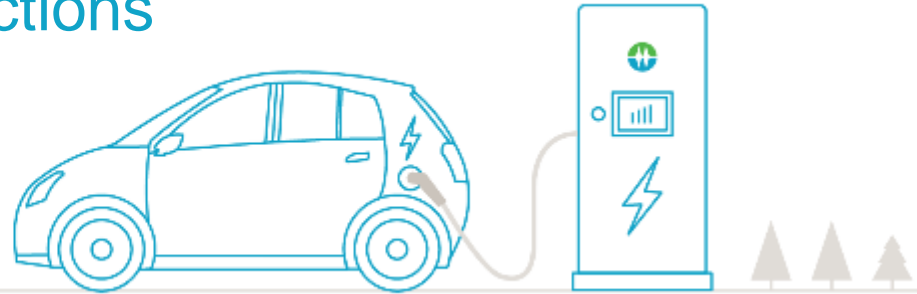
Here's some key messages: 6 great things about owning an EV

1. You're fighting climate change
2. You'll save on fuel costs
3. You'll save on maintenance
4. You'll love driving it
5. You'll enjoy some perks
6. You'll boost your green cred



Part 1: Consumer Electric Vehicles

- Opportunities
- **Barriers**
- Current Government actions
- Current BC Hydro actions
- Potential future BC Hydro actions



Purchase barriers

Why am I buying an EV?

From awareness through taking the new EV home

Is there an EV that fits my needs?

- Budget?
- Availability?
- New or used?
- Still need to wait?
Eg. pickup truck



Single family home charging barriers

Level 1 regular wall socket – our barrier is just communications

Level 2 charging requires a bit more effort in many cases...

Each of these requires some degree of electrical work. Electrical complexity and cost is a significant barrier in some cases for Level 2

1 Service size

Need sufficient electrical service to the home/building

2 Behind the meter

- Panel size, capacity for additional load, distance to parking
- MURBs add layer of complexity

3 EV supply equipment (EVSE)

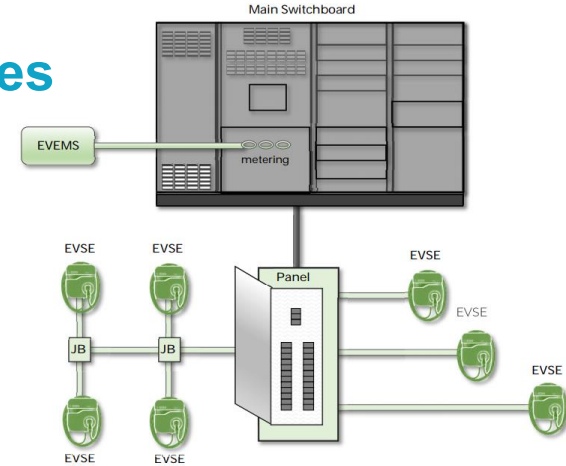
- Does it come with the vehicle?
- Is it non-networked (potentially limiting future options) or networked?
- Plug-in or hard-wired?
- Purchase incentive available (and easy to get?)



Multi-unit charging barriers

More challenging than single-family in many cases

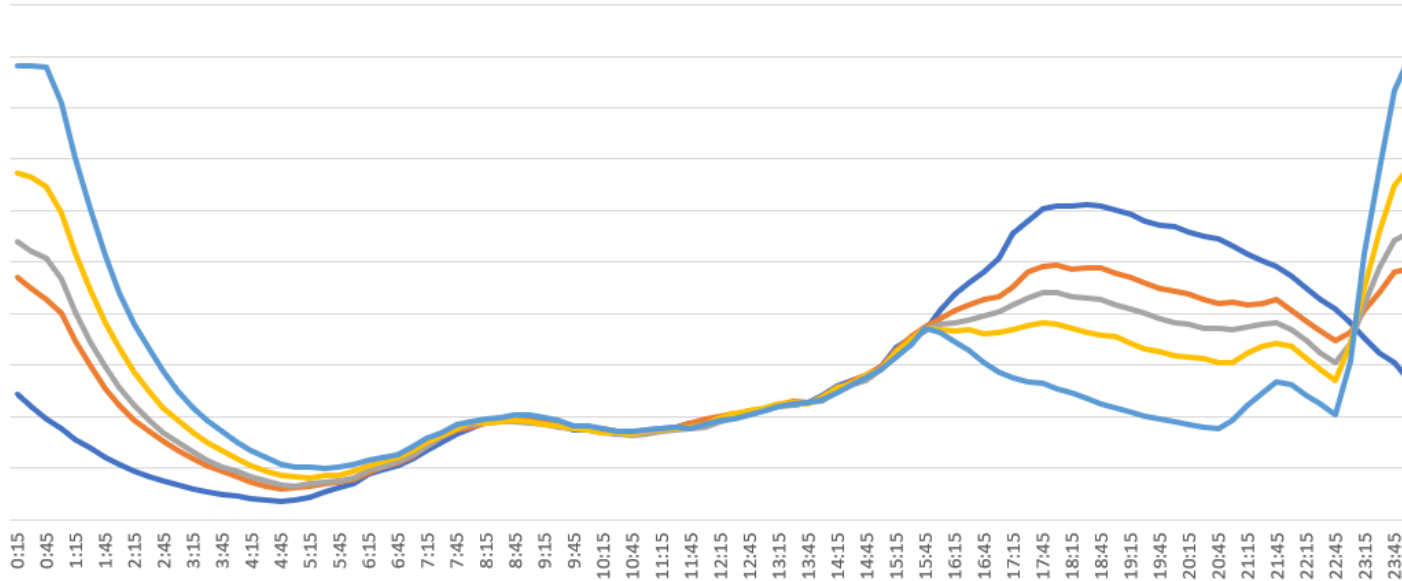
- **Strata rules**
- **Cost allocation (EV vs. non-EV residents)**
- **Many different building electrical configurations**
- **Install complexity**
- **Metering complexity**
- **Distance to panel**
- **Own vs. rent**
- **Municipal requirements**



Time of charging barrier

The future load forecast shows a need for EV charging to shift to off-peak

Modelled Charging Profile



Public charging barriers

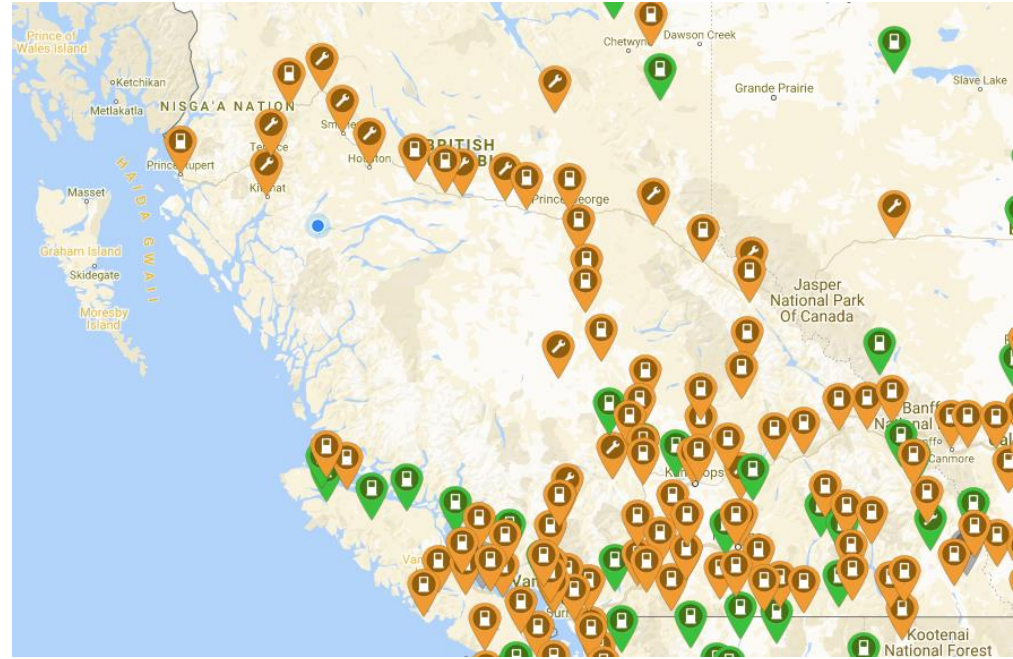
Public charging will take a province-wide effort to build and maintain at a high level of reliability and availability

EV drivers need:

- Right power level, at the
- Right time, in the
- Right place, at the
- Right price, that's
- Available, and
- Working!

Charging site host/owner needs:

- A solid plan in order to
- 30 successfully build AND operate reliably

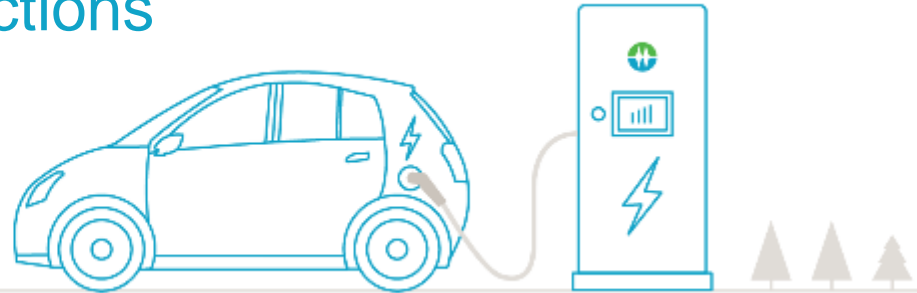


Questions: Opportunities and Barriers



Part 1: Consumer Electric Vehicles

- Opportunities
- Barriers
- **Current Government actions**
- Current BC Hydro actions
- Potential future BC Hydro actions



Current Government Actions

Provincial / CleanBC

- **Policy & Regulation**
 - Zero Emission Vehicles Act
 - Low Carbon Fuel Credits
- **Incentives & Rebates**
 - Vehicle purchase rebates
 - Residential charging incentives
 - Other incentives such as HOV lane

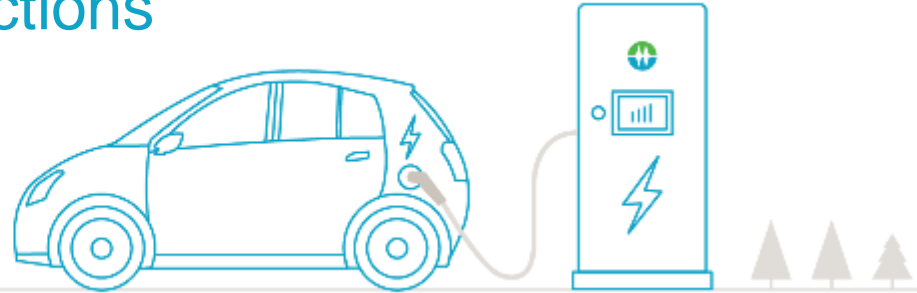


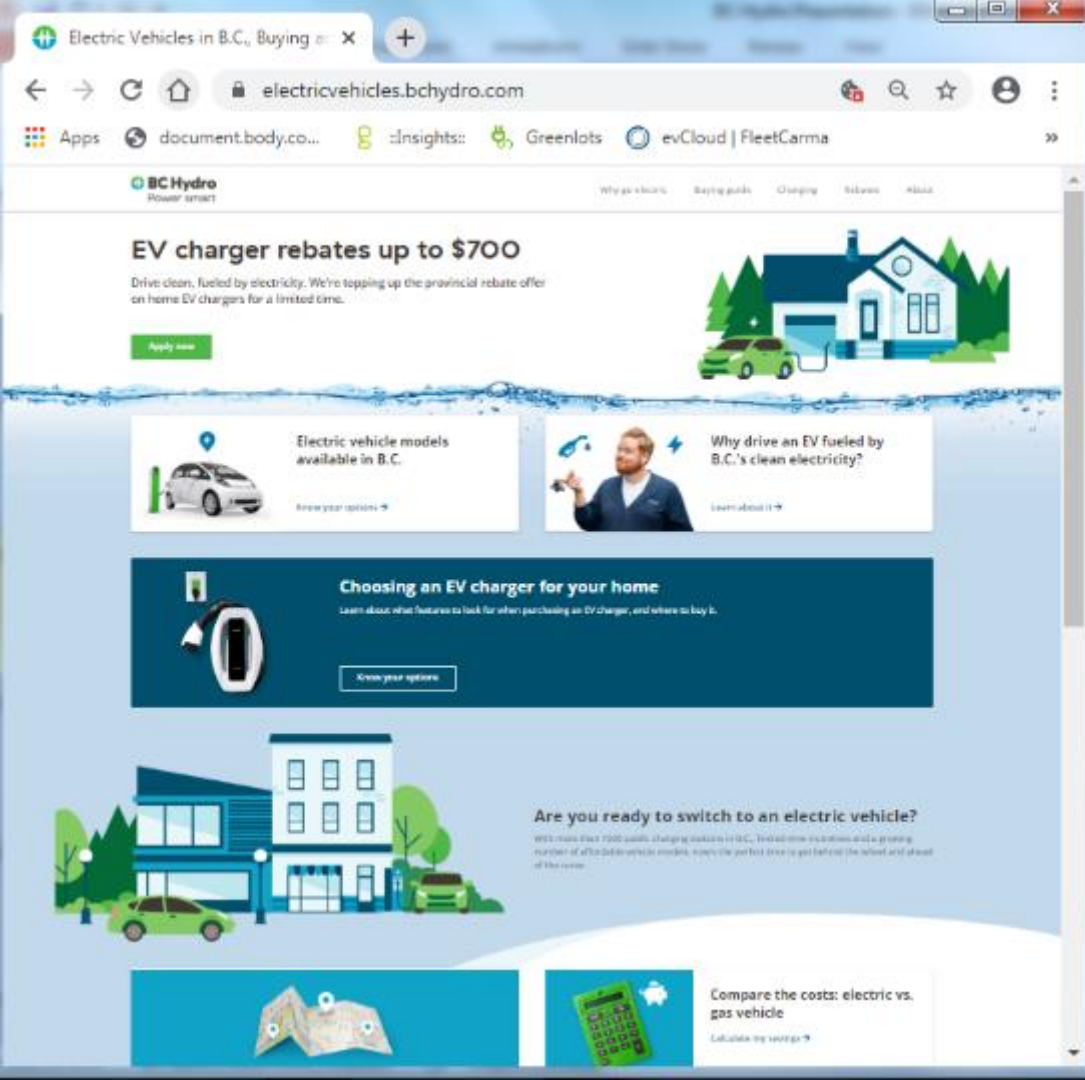
Federal / Natural Resources Canada

- Zero Emission Vehicle Infrastructure Programs

Part 1: Consumer Electric Vehicles

- Opportunities
- Barriers
- Current Government actions
- **Current BC Hydro actions**
- Potential future BC Hydro actions





Awareness & Incentives

- Coordinated websites (BC Hydro, CleanBC, Plug In BC)
- Coordinated marketing campaigns & offerings
- Coordinated Incentives (CleanBC, BC Hydro, Plug In BC, Fortis)
- Local government coordination (EV peer group, UBCM)

Enabling EV travel across B.C. ...

McBride



Valemount



70 Mile House



Cache Creek



Surrey



Cloverdale



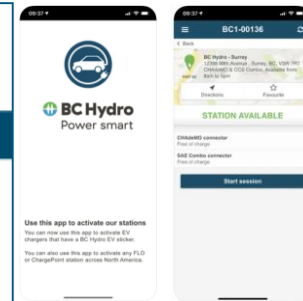
Saanich



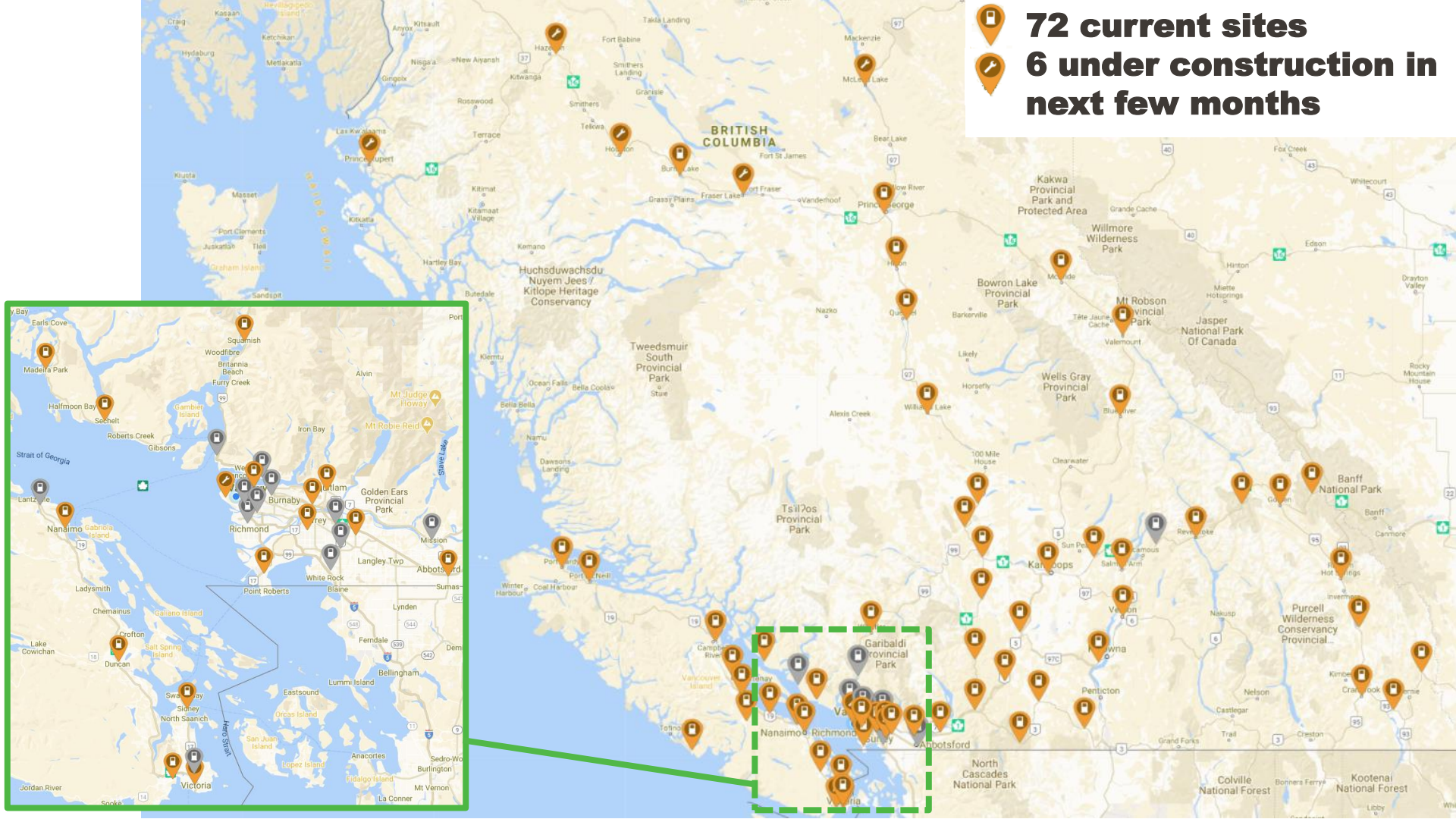
BC Hydro EV network

22,000 network members and growing

- 70+ sites and 90+ DC fast chargers – growing every month
- 25kW, 50kW power levels plus 100kW in the near future
- BC Hydro EV app and RFID cards for improved privacy and security compliance, plus local customer support from British Columbians who know B.C. roads and towns
- Free for 7 years as network developed and improved
- Rate starts May 1, 2021 (21 cents/min for 50kW)
- Roaming with FLO and ChargePoint for additional options
- Installing two or more chargers, improved lighting and accessibility at all new sites going forward

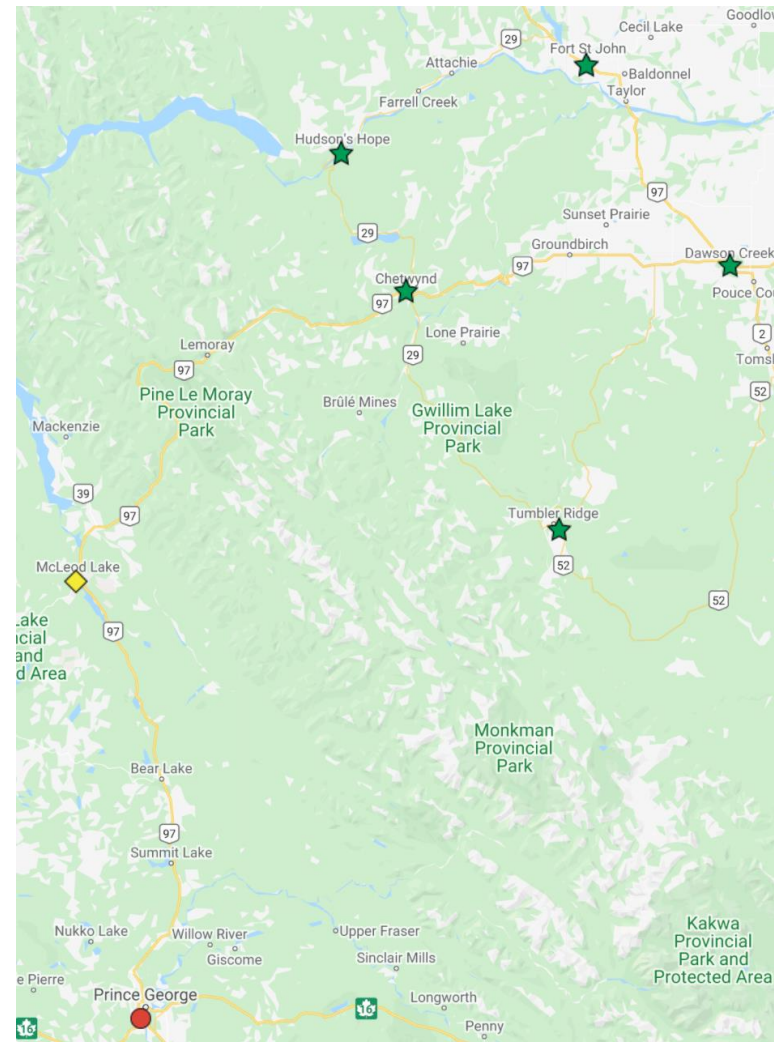
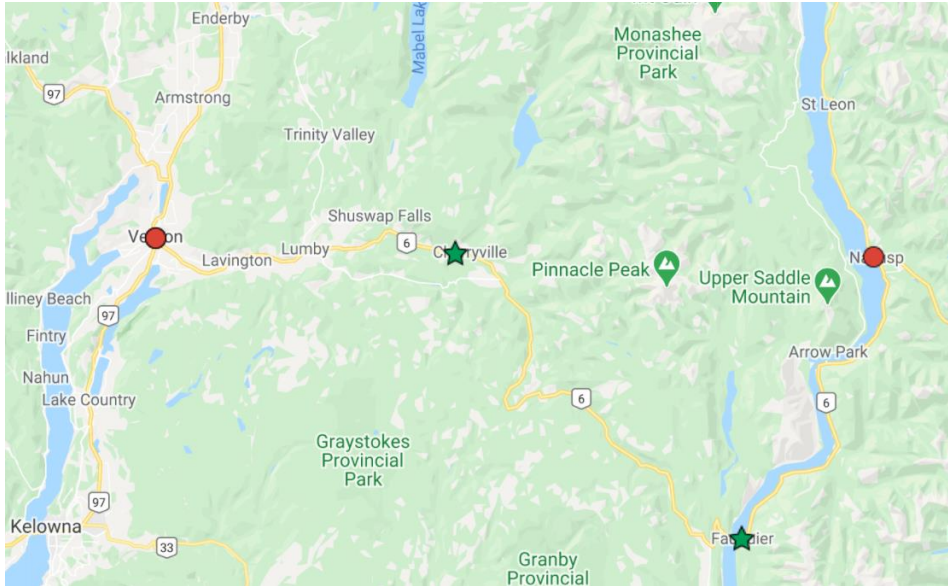


72 current sites
6 under construction in
next few months



Mid 2021 through 2022

- 7 new stations – dual fast charger ★
- 28 upgraded stations – twin remaining single charger sites plus other upgrades
- Very large Lower Mainland demonstration station in the works

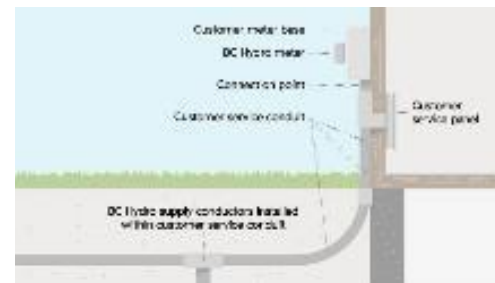
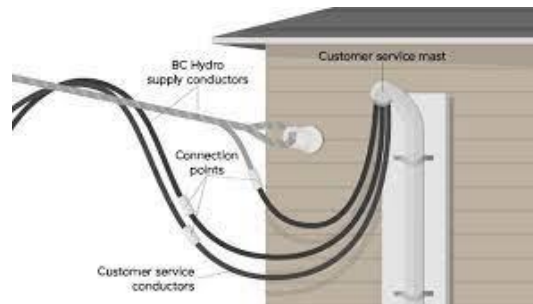


Connecting and supporting EV charging across the BC Hydro service area

Public charging – private and municipal



Home & Business – Connections & Upgrades



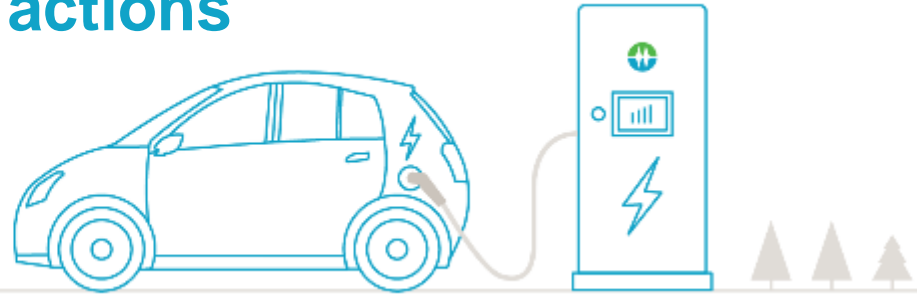
R&D, Pilots, Standards Development

There's a lot going on 'behind the scenes'

- EV demand response pilot
- EV TOU measurement trial
- Growing and leveraging the BC Hydro EV fleet
- Working with Technical Safety B.C. to reduce barriers to electrification
- New equipment testing at Powertech Labs
- Supporting government and municipal policy
- Improving building and electrical codes
- Publishing guidelines on bchydro.com for deploying various types of EV charging
- Web content and communications to keep the public and stakeholders informed with the latest industry information

Part 1: Consumer Electric Vehicles

- Opportunities
- Barriers
- Current Government actions
- Current BC Hydro actions
- **Potential future BC Hydro actions**



Potential future actions

High level categories

- **Awareness & education** – Expand activities to promote EV adoption and coordinate those activities with other B.C. entities.
- **Charging infrastructure** – Grow the BC Hydro EV public fast charging network to “fill the gaps” while at the same time supporting private and municipal EV charging expansion.
- **Connections** – Remove barriers to make it easier to upgrade existing service or install new electrical service. Support customers to find the most cost effective sites/locations to service.
- **Rates & pricing** – Start developing optional time-of-use rates to encourage charging EV’s during off-peak periods.
- **Demand management** – Develop demand-response and utility managed charging solutions to make charging management effortless for customers.
- **Codes, standards & policies** – Continue to work with stakeholders to “hard-wire” EV adoption while at the same time removing barriers.

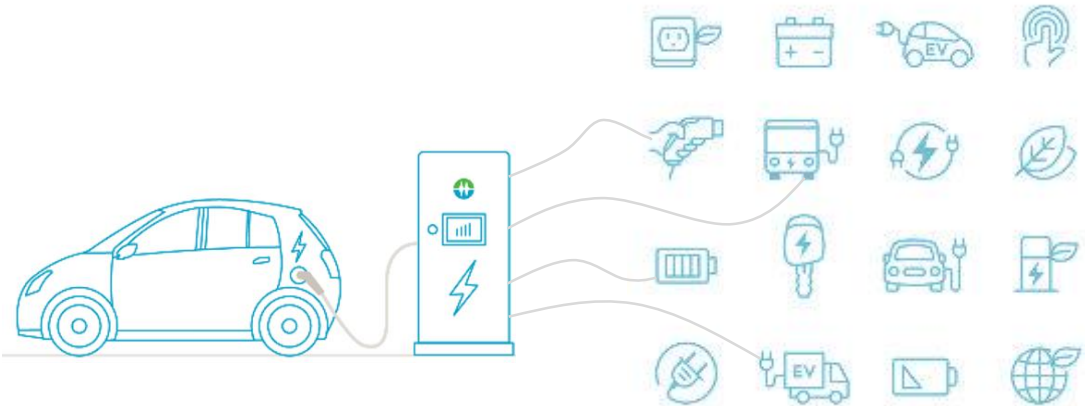
Questions: Existing and Potential Actions



Transportation Electrification Opportunities

Part 1:
Consumer EV's

Part 2:
Commercial & Fleets



Part 2: Commercial & Fleets

➤ Opportunities

- Barriers
- Current Government actions
- Current BC Hydro actions
- Potential future BC Hydro actions



Commercial / Fleet EV's

Fleets are going electric across B.C.

- Translink & BC Transit



- Municipal fleets



- Commercial fleets



- School Buses



- Trucking



- BC Ferries



Customer Examples – BC Transit

- 10 Battery Electric in Victoria's Regional Transit System in 2022
- Goals:
 - Buy only zero-emissions buses in all vehicle classes after 2028
 - Zero-emissions fleet by 2040



Customer Example - TransLink

- Currently 4 Battery Electric Buses operating with another 15 being added to Route 100
- Low Carbon Fleet Strategy:
 - reducing GHG emissions by 45% by 2030
 - Replacing all retiring conventional diesel buses with battery electric
 - Fleet operating on entirely renewable energy by 2050



Customer Example – BC Ferries

BC Ferries electrification plans:

- Electrify new builds of Island Class ferries
- Investigate feasibility of electrification of new Major Vessels
- Potential Conversion of Existing Vessels



Fleet Electrification Study

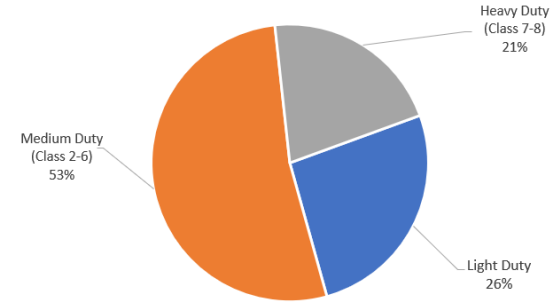
Study Objectives:

- Obtain fleet inventories to understand scale and opportunity
- Focus on customer studies, targets, and challenges
- Ask how BC Hydro can best support them

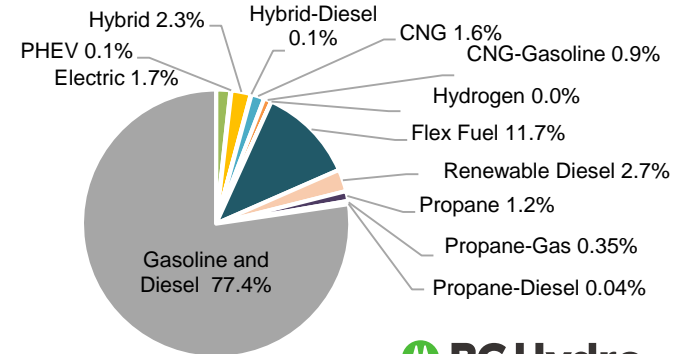
Findings:

- All Customers have taken steps
- 66% of organizations have at least one EV in their fleets
- Over 50% have a strategy or roadmap and targets

Existing Fleet Vehicle Classes

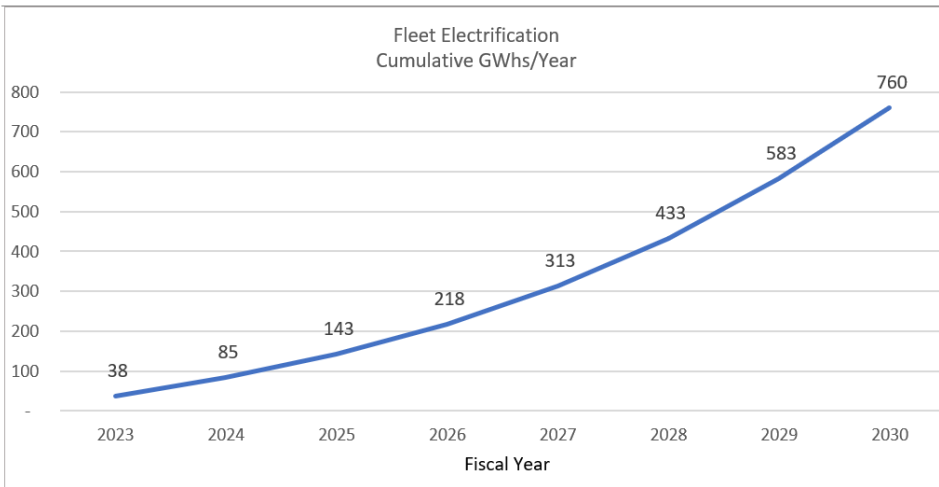
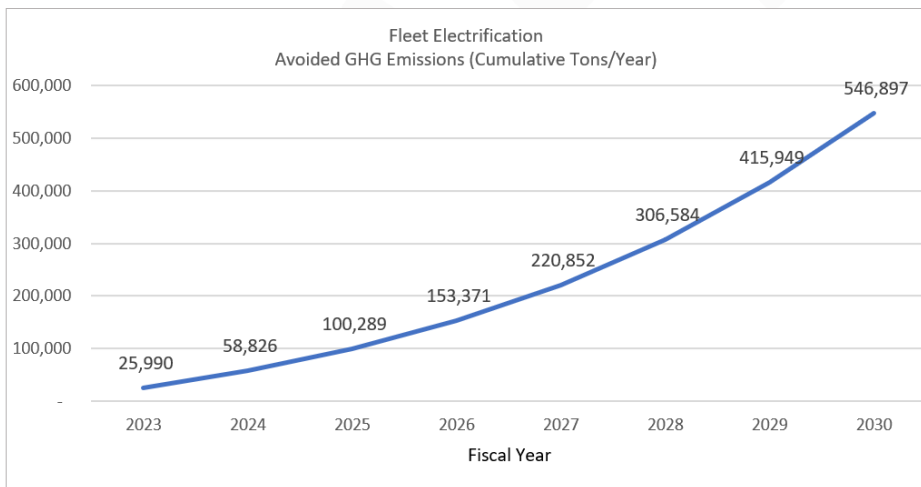


Existing Fleet Fuel Types



Fleet Electrification Study Modeling - BC

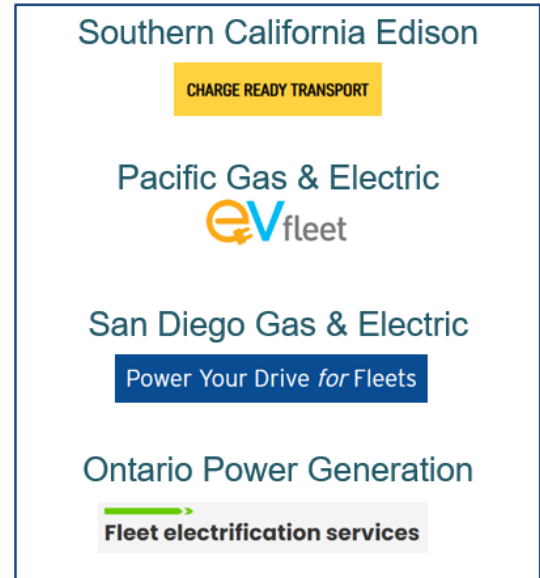
- Fleet modeling developed based on study findings
- Growth projections based customer forecasts, ICBC fleet data, and external research insights (Bloomberg, McKinsey)
- MD/HD vehicle introductions can accelerate growth



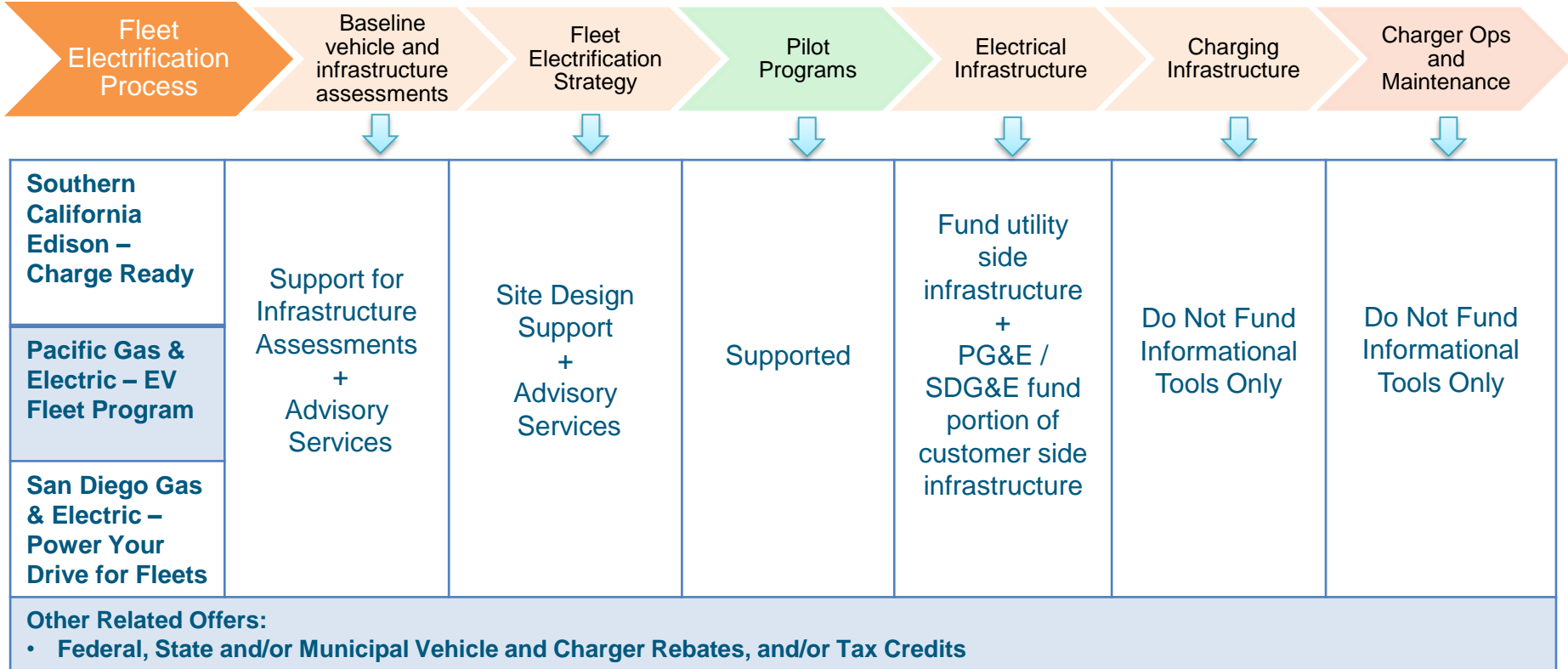
Utility Benchmarking Study

Study Objectives:

- Assess peer utilities' business drivers
- Capture and map relevant approaches to BC Hydro's context, customers and business drivers;
- Inform next steps to accelerate fleet electrification across BC



Utility Benchmarking Study



Part 2: Commercial & Fleets

- Opportunities
- **Barriers**
- Current Government actions
- Current BC Hydro actions
- Potential future BC Hydro actions

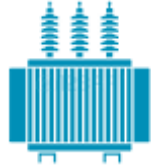
Customer Barriers to Transportation Electrification

There are multiple considerations and costs for a positive, fuel switching business case



Capacity for required load

Capacity required / capacity availability



Infrastructure beyond traditional customer drop

Interconnection cost and requirements on both sides of the meter



Charging Infrastructure & Management

Operational requirements and load management decisions

Charging infrastructure choices



End Use

Rates & Billing analysis

Positive business case

Part 2: Commercial & Fleets

- Opportunities
- Barriers
- **Current Government actions**
- Current BC Hydro actions
- Potential future BC Hydro actions

Existing Actions & Funding Programs



Plug In BC Go Electric Fleets	Yes	Yes	Yes	Yes	Yes	Advisory
Commercial Vehicle Pilots Program	No	No	Yes	Yes	Yes	No
Other related offers	<ul style="list-style-type: none"> ▪ Vehicle Rebates: SUVI (MD/HD Vehicles), GO Electric BC (point-of-sale LD) ▪ Chargers: (workplace / MURBS), NRCAN ZEVIP (public charging only), Plug In BC (public charging only) 					

Regulation	<ul style="list-style-type: none"> • Zero-Emission Vehicles Act (ZEVA) • Low Carbon Fuel Standard
------------	---

Part 2: Commercial & Fleets

- Opportunities
- Barriers
- Current Government actions
- **Current BC Hydro actions**
- Potential future BC Hydro actions

Transportation Electrification – Existing Actions

- BC Hydro website
- Fleet Electrification Guidelines
- Fast Charging and L2 Guidelines
- New Fleet Electrification Rates
- Key Account Management Customer Engagement – Energy Manager forums, EV Working Groups, Association Meetings, Fleet Symposiums, Conferences, Consultation & Support

EV resources for industry

It's not just commuters and road trippers who are going electric. Commercial and transportation industries in B.C. are evolving too, and municipalities are electrifying their roadways. Find our resources for commercial, municipal and industrial interests here.



Electric fleets

Thinking about electrifying your business's vehicle fleet? Follow our fleet electrification guidelines and when you're ready, request a site pre-assessment.



Electric forklifts

If you're still running gas-powered forklifts, here are a few reasons to consider going electric. Plus, try the cost calculator to see how much you could save.



Fast charging stations

Industry best practices for designing and operating Level 3 EV fast charging stations and other resources.

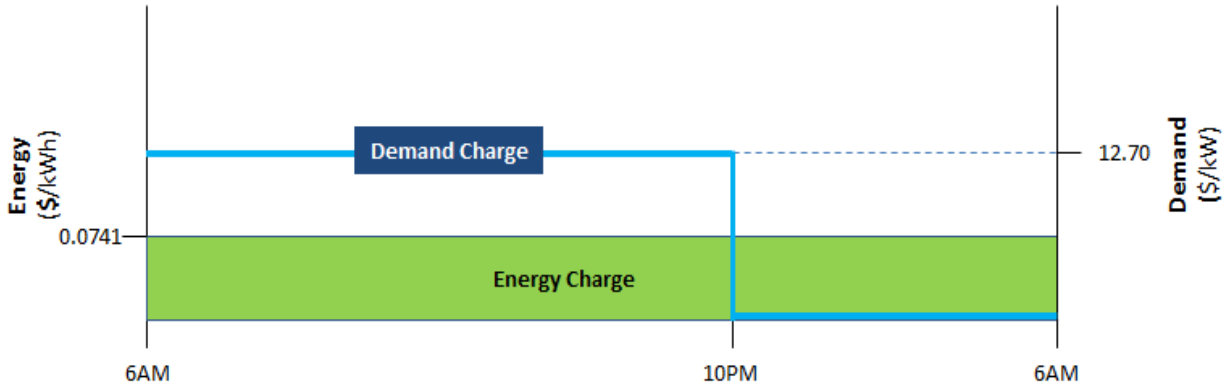


Level 2 charging stations

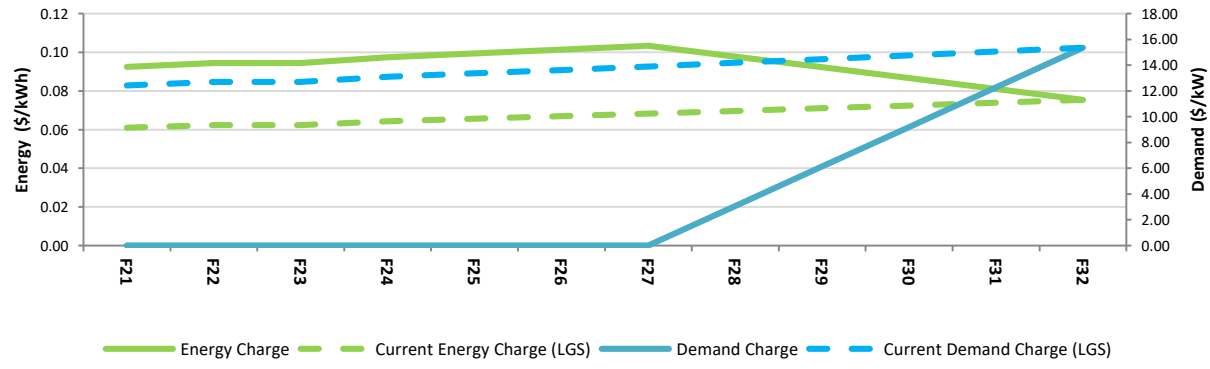
Industry best practices for designing and operating Level 2 EV charging stations, and other resources.

Transportation Fleet Electrification Rates

Overnight rate

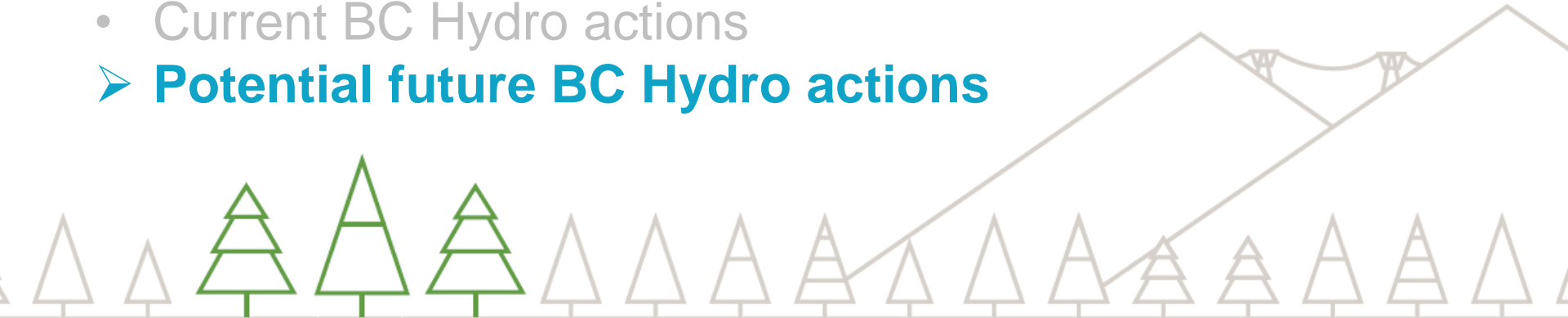


Demand Transition Rate

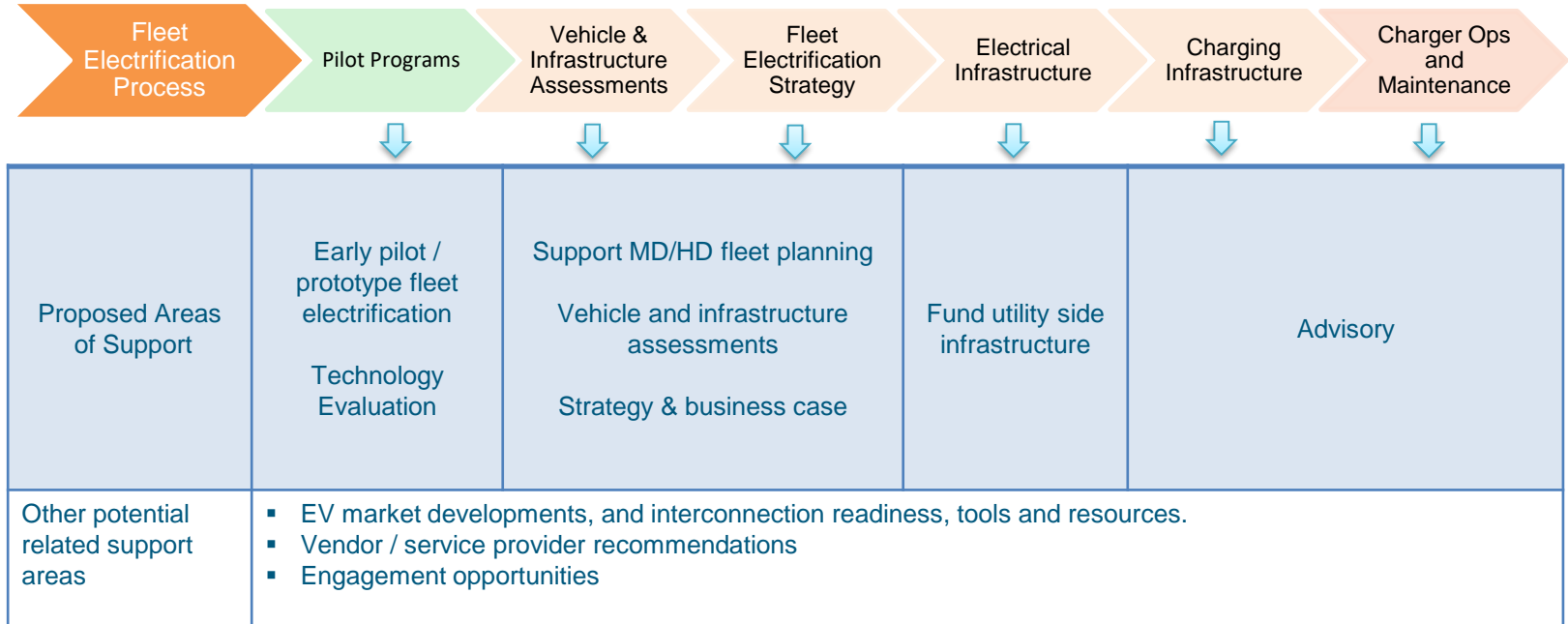


Part 2: Commercial & Fleets

- Opportunities
- Barriers
- Current Government actions
- Current BC Hydro actions
- **Potential future BC Hydro actions**



Proposed Transportation Electrification Program Support



Proposed Transportation Electrification Areas of Opportunity

- 1. Increased support for codes, standards and policy:** expanded ZEV mandate, vehicle/technology certification, codes/standards for shared infrastructure.
- 2. Update distribution tariff and extension policy.**
- 3. Financial and regulatory support for pilots.**
- 4. Shared in route charging facilities.**

Questions

- Existing and Potential Actions



Next Steps

We want your input!

- Online feedback open until April 26
- BC Hydro will include the electrification plan and funding requirements in the Fiscal 2023+ Revenue Requirements Application

