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# The Next 20 in Mobility

## Preparing for Mass Market Transportation Electrification

January 30, 2025

# Housekeeping

## Webinar Participation

- Due to the great turnout, **the chat has been disabled.**
- **Submit questions using the Q/A function** (*les questions en français sont les bienvenues!*)
- Turn on **closed captioning** by clicking the icon that says “cc” then more > show sub-titles

# Agenda

1. **Opening Remarks**
   *Philippe Dunsky*
2. **The Next 20 Years in Mobility**
   *Jeff Turner & Lindsay Wiginton*
3. **Discussion**
   *BC Hydro, City of Vancouver and Metro Vancouver*
4. **Audience Q&A**

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# Opening remarks

**Philippe Dunsky**

**PRESIDENT & FOUNDER**

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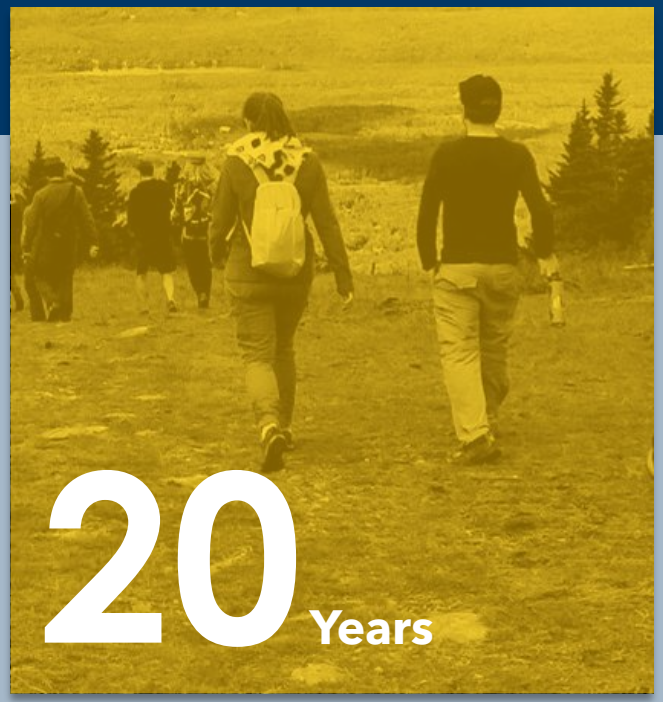
*ACCELERATING THE CLEAN ENERGY TRANSITION*

**ANALYSIS + STRATEGY**

**BUILDINGS** **MOBILITY** **INDUSTRY** **ENERGY**





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*ACCELERATING THE CLEAN ENERGY TRANSITION*

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**BUILDINGS** | **MOBILITY** | **INDUSTRY** | **ENERGY**


GOVERNMENTS | UTILITIES | CORPORATE + NON-PROFIT

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*ACCELERATING THE CLEAN ENERGY TRANSITION*

**ANALYSIS + STRATEGY**

BUILDINGS | **MOBILITY** | INDUSTRY | ENERGY

Demand forecasts

Business cases & plans

Charging strategies

Fleet strategies

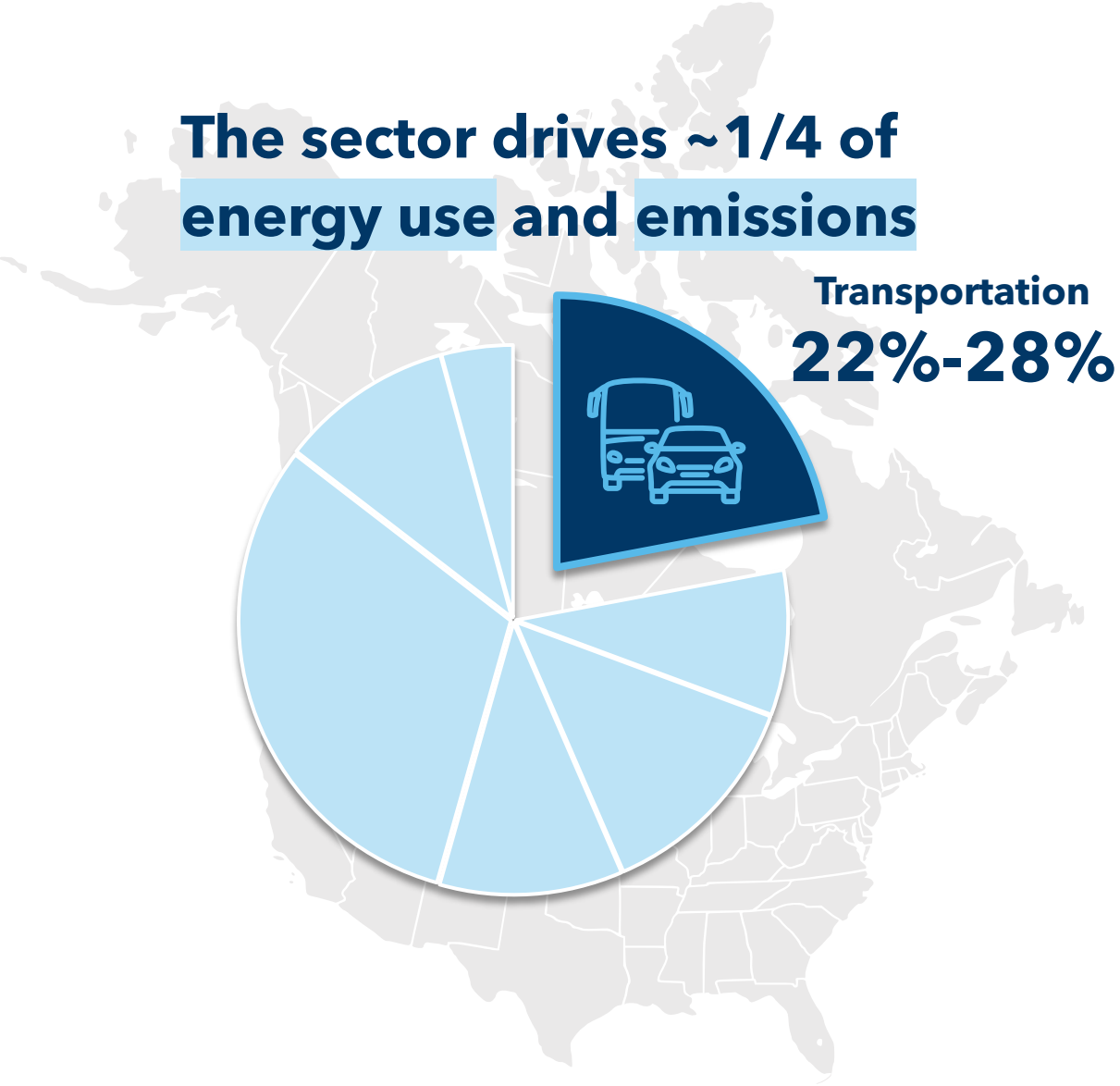
Policy / Market strategies

Due diligence

GOVERNMENTS | UTILITIES | CORPORATE + NON-PROFIT

# MOBILITY IS KEY

**The sector drives ~1/4 of energy use and emissions**




**Key Question:** Not whether, but HOW do we do this in a way that is

- Reliable
- Affordable
- Predictable

# Speakers

**Jeff Turner**
DIRECTOR, MOBILITY

**Lindsay Wiginton, RPP**
MANAGING CONSULTANT

***Question for today's webinar:***

*What will the **next 20 years** of the EV transition look like, and what should decision makers be preparing for?*

What's driving this transition?

# Technology is improving and costs are coming down


2011 Nissan Leaf
~$49,000 (2025 USD)
**117** km
10-80% in **30** minutes

2025 Hyundai Ioniq 5
$46,550 (2025 USD)
**500** km
10-80% in **18** minutes

What's driving this transition?

# Fewer "hard to electrify" segments




CLEAN ENERGY CANADA

CALSTART

Drive to Zero: Zero-Emission Technology Inventory
Zero-Emission MHDV Canadian Model Availability Catalogue

What's driving this transition?

# Supportive policies and investment

## Charging Infrastructure

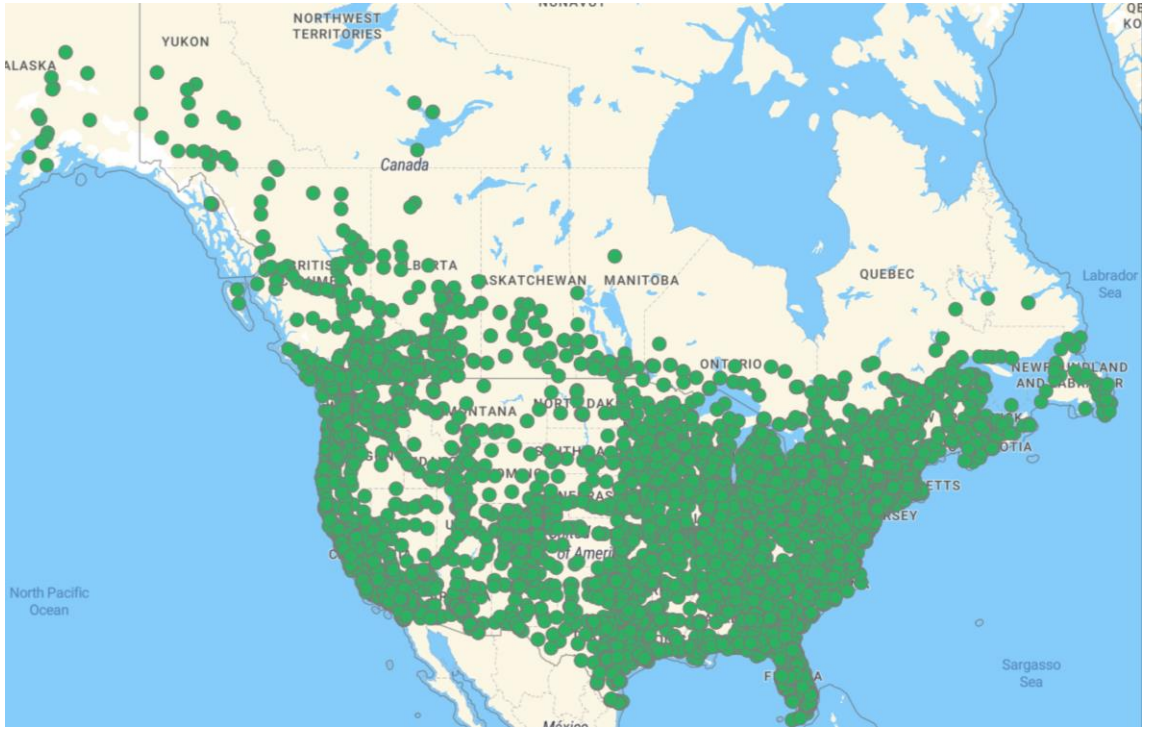
- Public + private sector investment
- Building codes for multi-family buildings

## Financial incentives

- Many are phasing out (gradually or otherwise)
- More targeted (MSRP caps, income qualified)

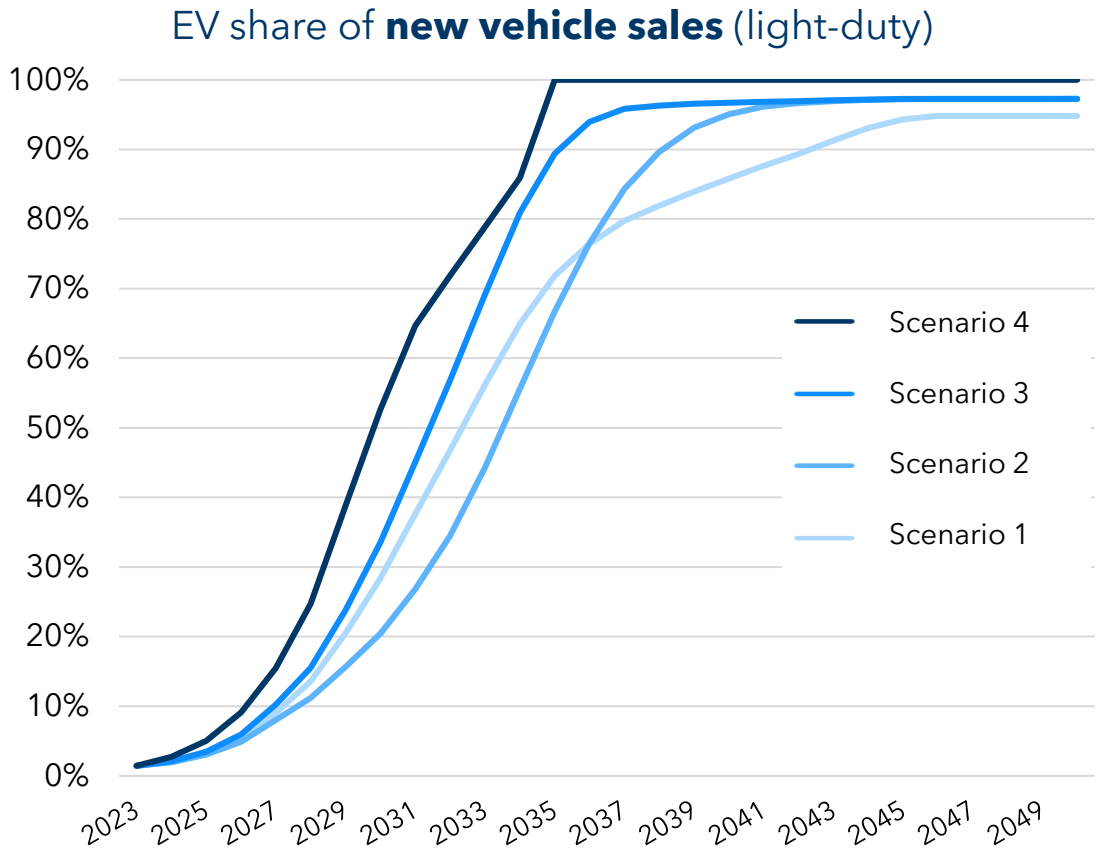
## ZEV mandates and fuel economy regulations

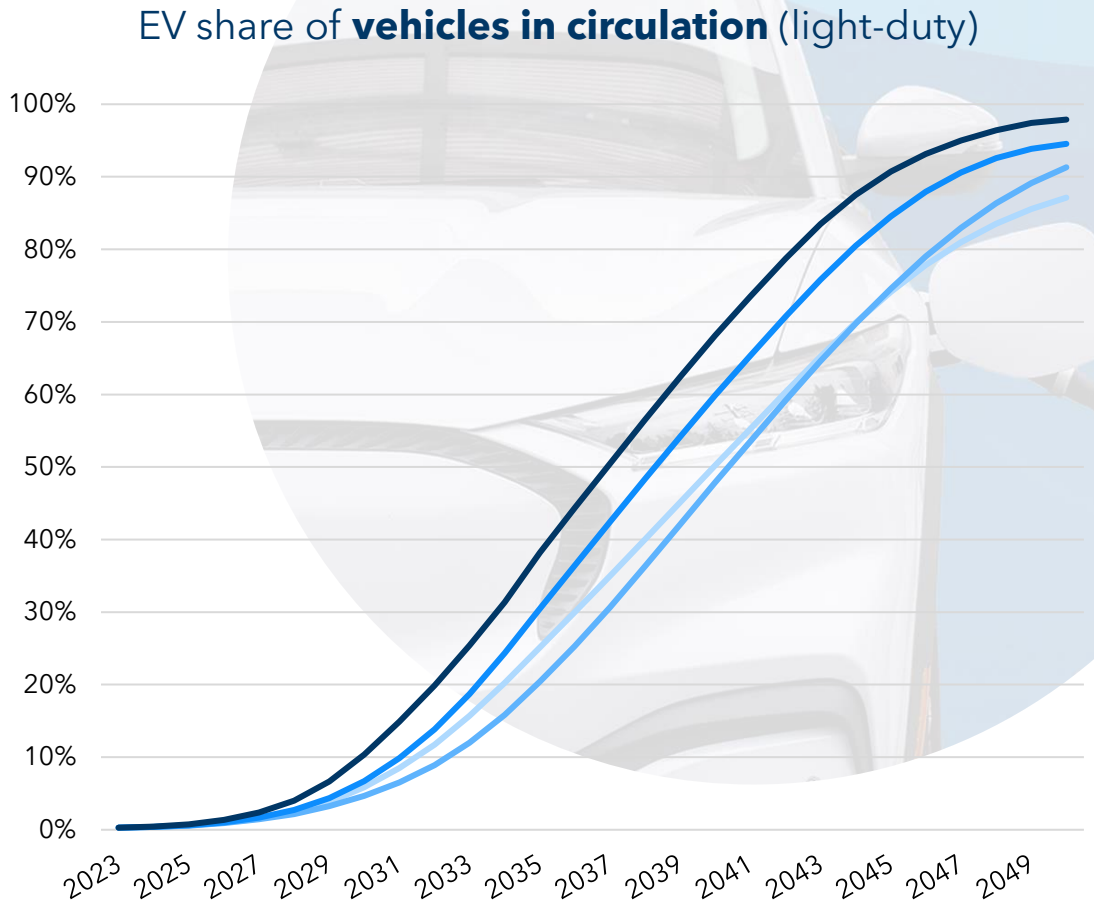
**Canada + US: 57,000 DC fast charge ports across 14,000 sites**




DOE/NRCan: https://afdc.energy.gov/fuels/electricity-locations#/find/nearest?fuel=ELEC

# 20 years from now, the vast majority (if not all) of new vehicle sales will be electric




# *Is the grid ready for transportation electrification?*

# EV load growth will be gradual but significant

## Load growth from EVs is significant

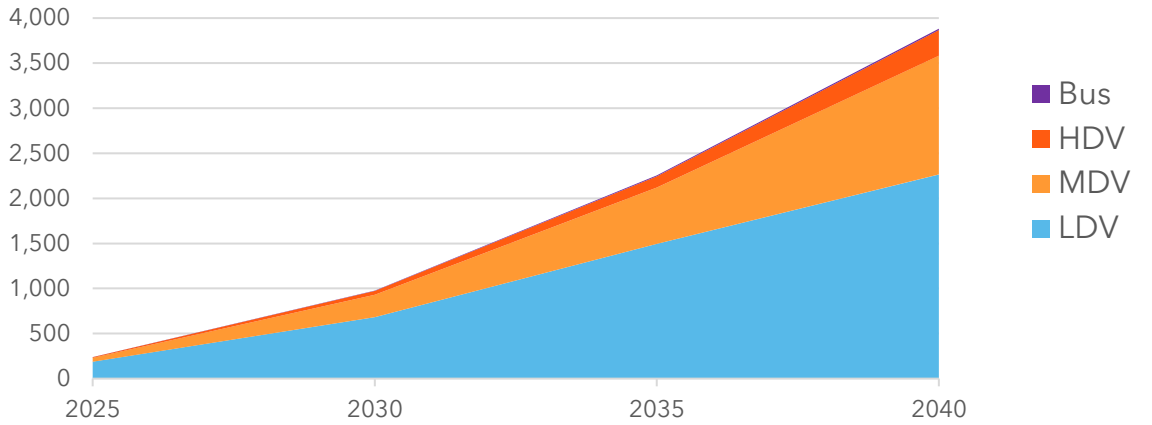
- Can potentially double peak demand
- Most load is from homes and fleet depots

## Three things working in utilities' favour:

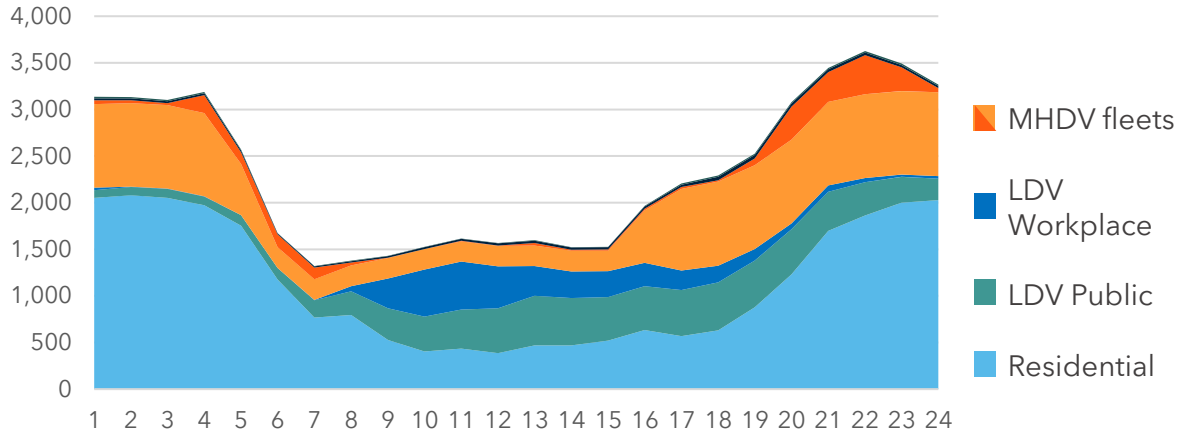
- Gradual fleet turnover gives them some breathing room
- Many EV charging loads are potentially flexible
- Parallel efforts to reduce driving benefit the grid

## Utilities: the grid can handle this, but there's work to do

**Sample Annual Max Load (MW)**



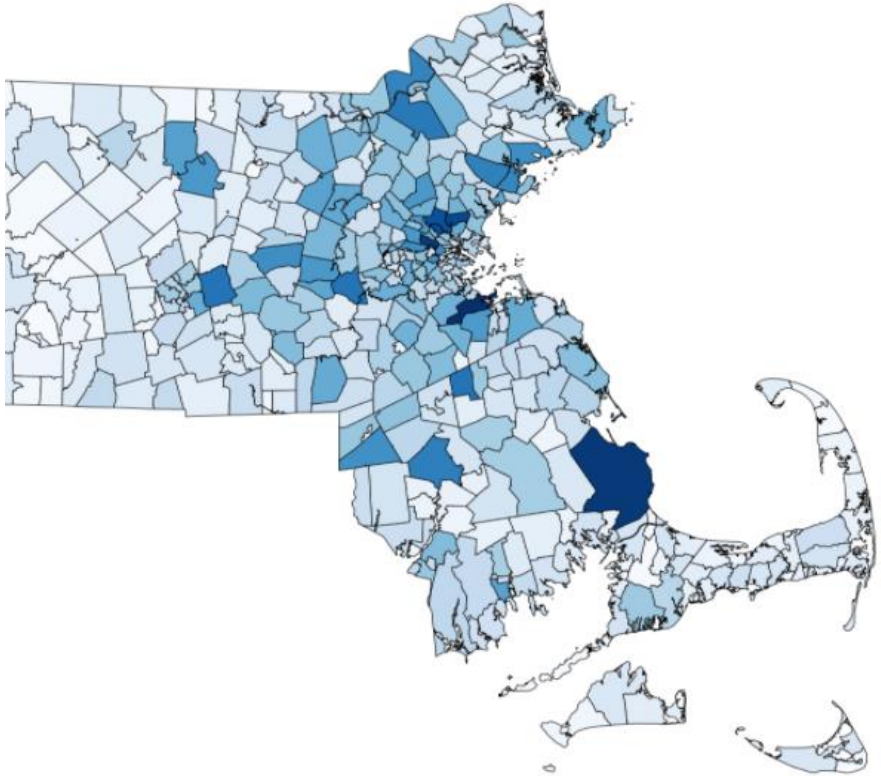

**Sample 2040 Hourly Load Impact (MW)**



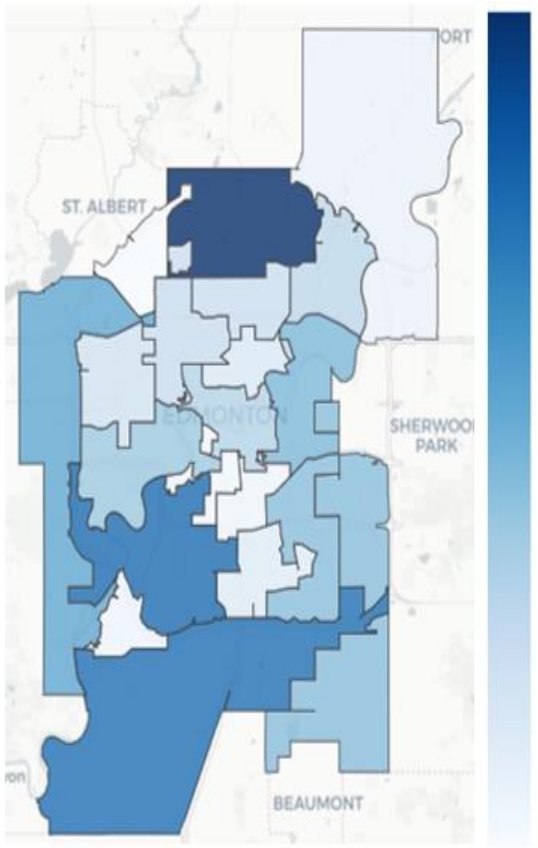
# Near term challenge: distribution system impacts

Determining the geographic distribution of impacts, at varying levels of granularity, can **highlight pockets of the distribution system where impacts are more significant.**

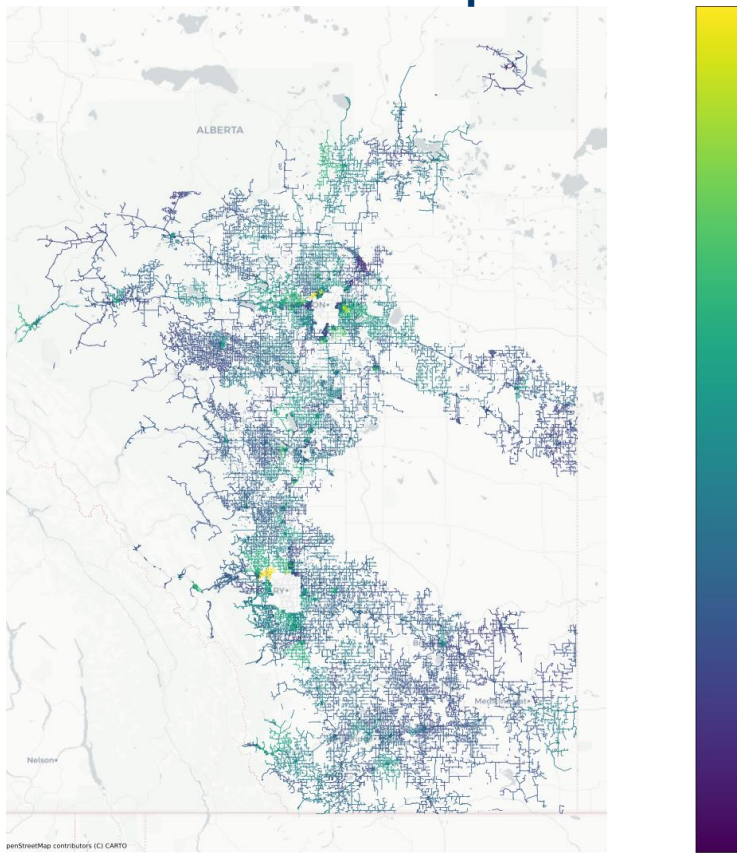
### Regional Load Impacts



### Substation-level Load Impacts




### Feeder-Level Load Impacts



# EV grid impacts vary with climate

## Energy demand from EVs increases in colder climates

- Up to 2x EV load on coldest days (higher energy consumption, more frequent charging)

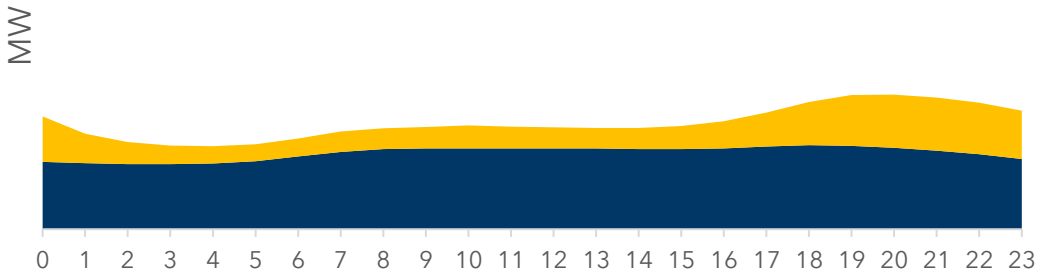
## Grids built for winter heating are already robust, others have more work to do

- Load growth from EVs is less significant relative to existing demand from electric heating

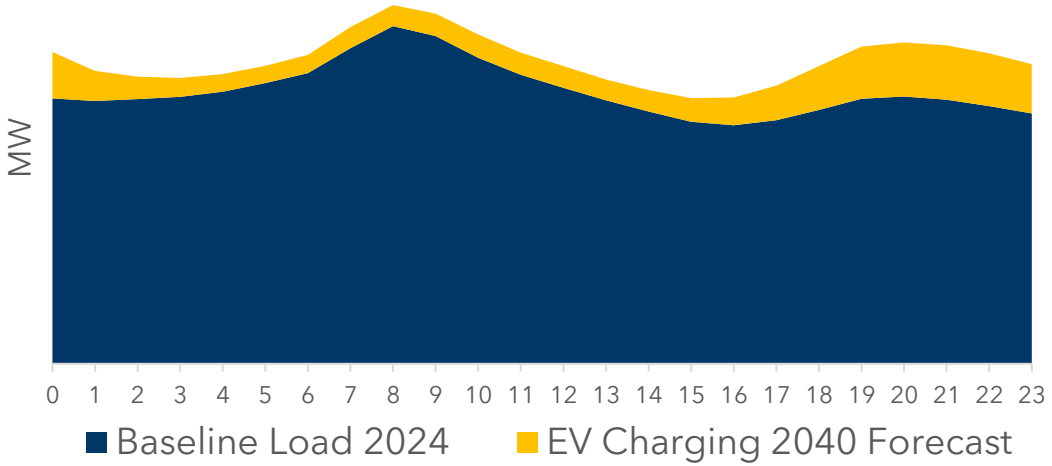
## Can’t look at EVs in isolation

- EVs, heat pumps and other load growth drivers will shift many utilities from summer-peaking to winter-peaking regimes
- Solar and storage are reshaping load profiles

### 24h load – Region with Gas Heating




### 24h load – Region with Electric Heating



# EVs can offer enormous flexibility to utilities

## Fundamental opportunity: *EVs are overdesigned for daily needs*

- *500 km range vs 50 km commute, 12 hour charging window*

## Managed charging or "V1G"

- Several tech options (telematics, smart EVSE)
- Ready for scaling

## Vehicle-to-grid or "V2G"

- Needs cost reduction and standardization
- Needs alignment of consumer benefits ($ and resiliency) and grid benefits

# Fleet electrification may run into grid bottlenecks

## Fleets can concentrate load on a single point on the grid

- Some fleet depots and MW-scale fast charging hubs are running into significant delays on connection requests
- Utilities can help streamline processes and provide information on available capacity

## Potentially less flexible

- Fleets are already motivated to minimize peak demand (demand charges, infra costs)
- Vehicle + infra are more likely to be right-sized for the application -> less flexibility

*What other challenges will we be grappling with in the 2040s?*

# Supplying & integrating charging in dense urban environments

## State, province and cities are leading with deployment strategies

- Leveraging public lands, regulatory powers
- Movement toward streamlined approvals
- Challenge of aligning with local electricity distributors

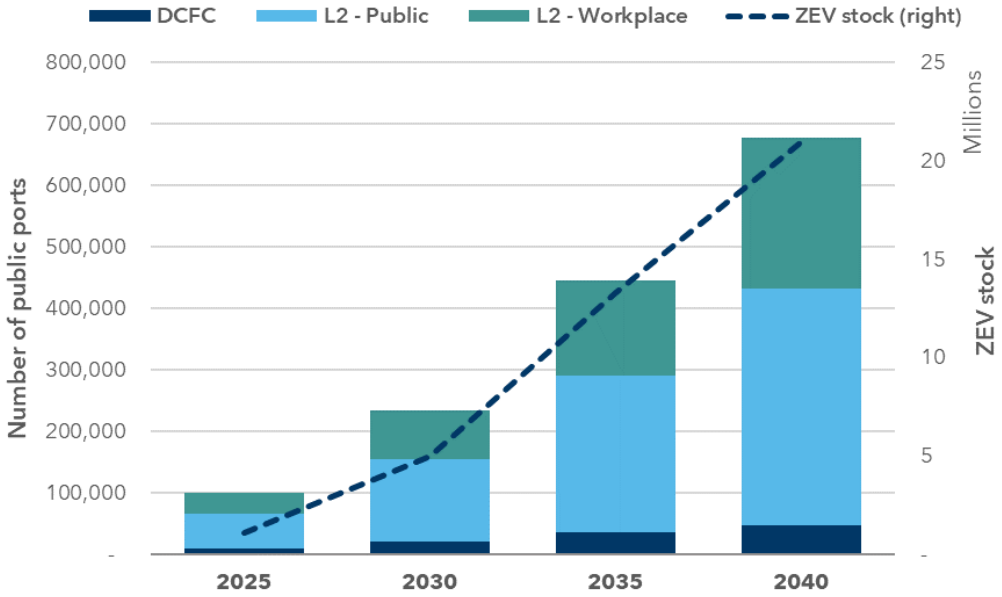
## Major private sector contributions

- De-risked investment

## *Yes, there's enough space!*

- Especially if we prioritize EV ready residential buildings

**Public light-duty EV charging infrastructure demand and EV stock growth**



# Navigating the "mid-transition"

- Even once all new sales are EVs, it will take another 15-20 years for all vehicles to be replaced
- As fewer people need fuel and conventional vehicle maintenance, gas vehicle owners will be at a disadvantage
- Identity disruptions and distress
- Decision makers will consider coordinated planning:
  - Scrappage programs?
  - Fuel and charging access measures?

*See: Grubert, E., & Hastings-Simon, S. (2022). Designing the mid-transition: A review of medium-term challenges for coordinated decarbonization in the United States. Wiley Interdisciplinary Reviews: Climate Change, e768. https://doi.org/10.1002/wcc.768*

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# Guest Speakers

## Leslie Ng

**Senior Sustainability Specialist**

CITY OF VANCOUVER

## Molly Brewis

**Team Lead – Public EV Infrastructure Planning**

BC Hydro
Power smart

## Morgan Braglewicz

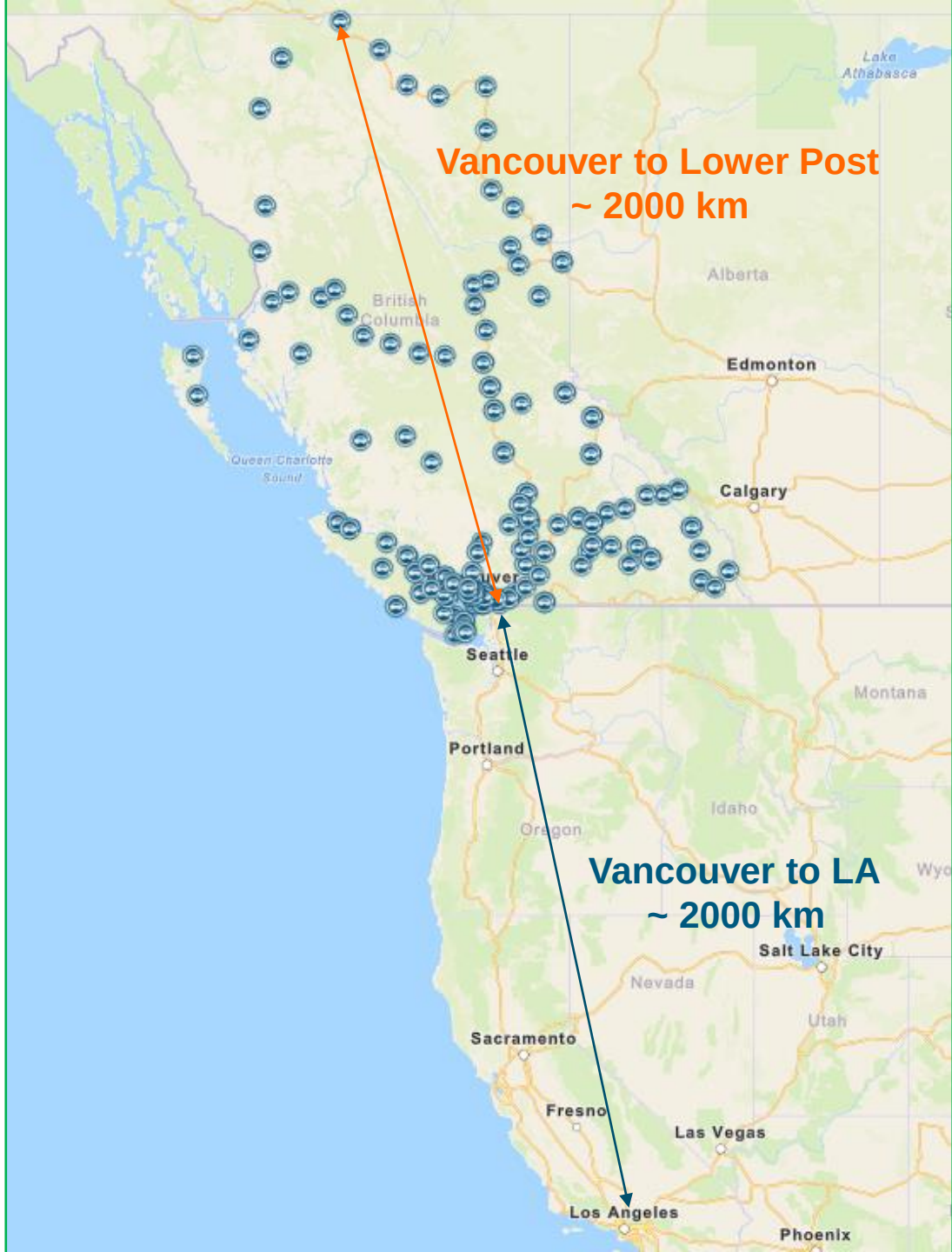
**Air Quality Planner**

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

# Geographic Connectivity

British Columbia's *ELECTRIC HIGHWAY* was completed in Sept 2024

BC Hydro
Power smart



# Metro Vancouver

**2.8 Million** Residents

**53%** of BC population

**23** Member Jurisdictions

Closing remarks

# Upcoming Webinars

## The Next 20 in
## Buildings

February 13, 2025 - 12 pm ET

## The Next 20 in
## Energy

February 27, 2025 - 12 pm ET

## The Next 20 in
## Québec

March 18, 2025 - 12 pm ET

*This webinar will be presented in French*

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