

# Thank you for joining the EV Ready Webinar

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  - If you cannot access the Q&A feature, you can email questions to [evcharging@cnv.org](mailto:evcharging@cnv.org)
- After the webinar ends, you will be prompted to complete an optional survey. We would appreciate your feedback!

# Implementing “EV Ready” Upgrades in Multifamily Condominiums

City of North Vancouver

February 2023



# CleanBC Go Electric EV Charger Rebates

- **CleanBC Go Electric** offers multiple rebate offers for purchasing and installing EV chargers in single family homes, multi-unit residential buildings, and workplaces
  - Funded by the Province of BC & administered by BC Hydro
  - The City of North Vancouver offers funding “top ups” for the **EV Ready Rebate Program** for **multifamily condos and apartments**





### EXPERTISE



**Buildings + Industry**



**Energy**



**Mobility**

### SERVICES



**Quantify Opportunities**



**Design Strategies**



**Evaluate Performance**



**GOVERNMENTS**

**UTILITIES**

**CORPORATE + NON-PROFIT**

# Outline

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BC’s EV Ready Rebate Program & City Top Up Incentives

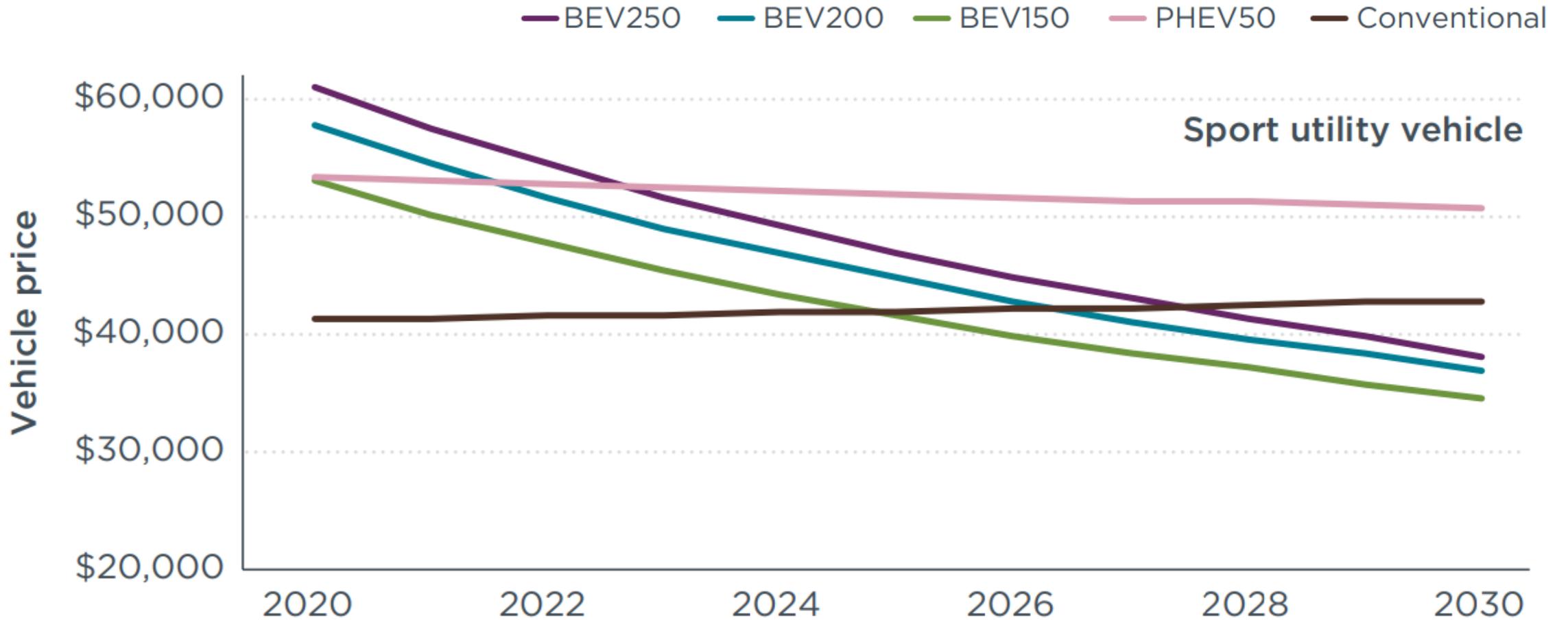
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Implementing an EV Ready Upgrade in Your Multifamily Building

# EV Overview

Technology advancements, improving economics & strong policies will drive the transition to EVs in the next decade

# EV Prices are Declining



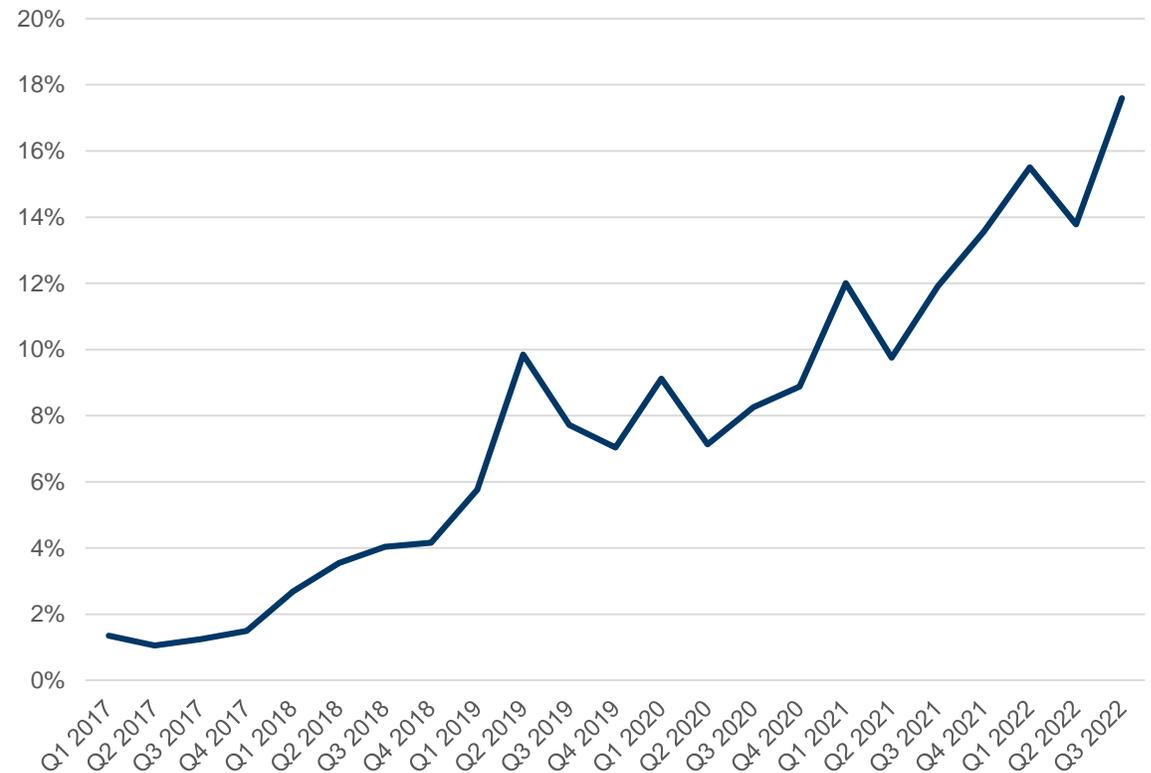
**Source:** International Council on Clean Transportation. 2019. *Update on electric vehicle costs in the United States through 2030*. [https://theicct.org/wp-content/uploads/2021/06/EV\\_cost\\_2020\\_2030\\_20190401.pdf](https://theicct.org/wp-content/uploads/2021/06/EV_cost_2020_2030_20190401.pdf)

# Policy is Driving EV Adoption

In October 2021, the Province of BC announced it would update the Zero Emissions Vehicles Act & Regulation to require:

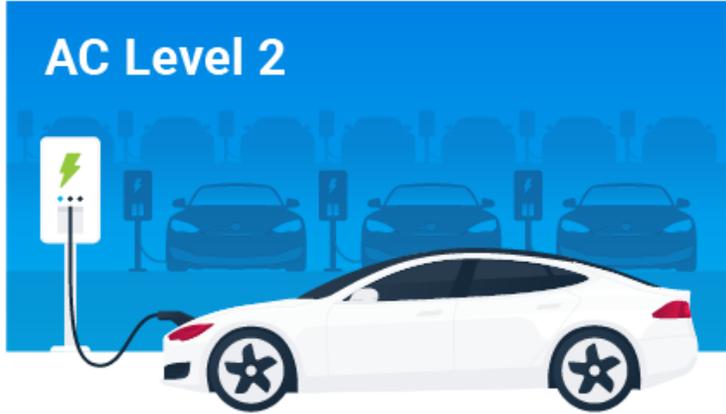
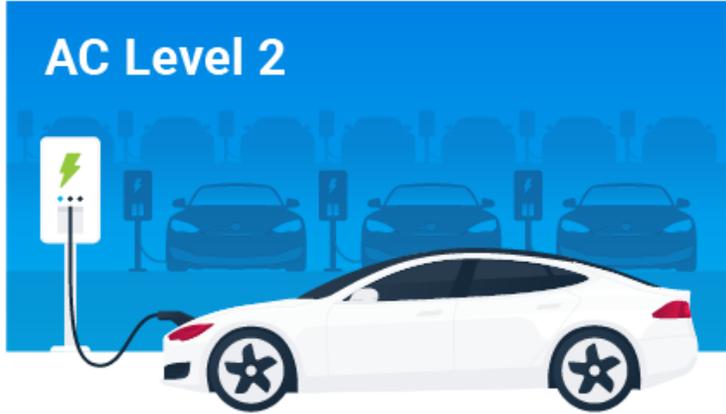
- 26% of vehicles sold in 2026 be ZEVs
- 90% by 2030
- 100% by 2035

The Market Share of EVs in BC is Rising Fast



# About EV Charging & EV Ready Parking

## Know your EV Charging Stations

 <h3>AC Level 1</h3> <th><h3>AC Level 2</h3><th><h3>DC Fast Charge</h3></th></th>	 <h3>AC Level 2</h3> <th><h3>DC Fast Charge</h3></th>	 <h3>DC Fast Charge</h3>
<b>Voltage</b> 120V 1-Phase AC	<b>Voltage</b> 208V or 240V 1-Phase AC	<b>Voltage</b> 208V or 480V 3-Phase AC
<b>Amps</b> 12 – 16 Amps	<b>Amps</b> 12 – 80 Amps (Typ. 32 Amps)	<b>Amps</b> <125 Amps (Typ. 60 Amps)
<b>Charging Loads</b> 1.4 to 1.9 kW	<b>Charging Loads</b> 2.5 to 19.2 kW (Typ. 7kW)	<b>Charging Loads</b> <90 kW (Typ. 50kW)
<b>Charge time for vehicle</b> 3 – 5 miles of range per hour	<b>Charge time for vehicle</b> 10 – 20 miles of Range per hour	<b>Charge time for vehicle</b> 80% Charge in 20 – 30 minutes

# Access to “Home Charging” is Critical to EV Adoption

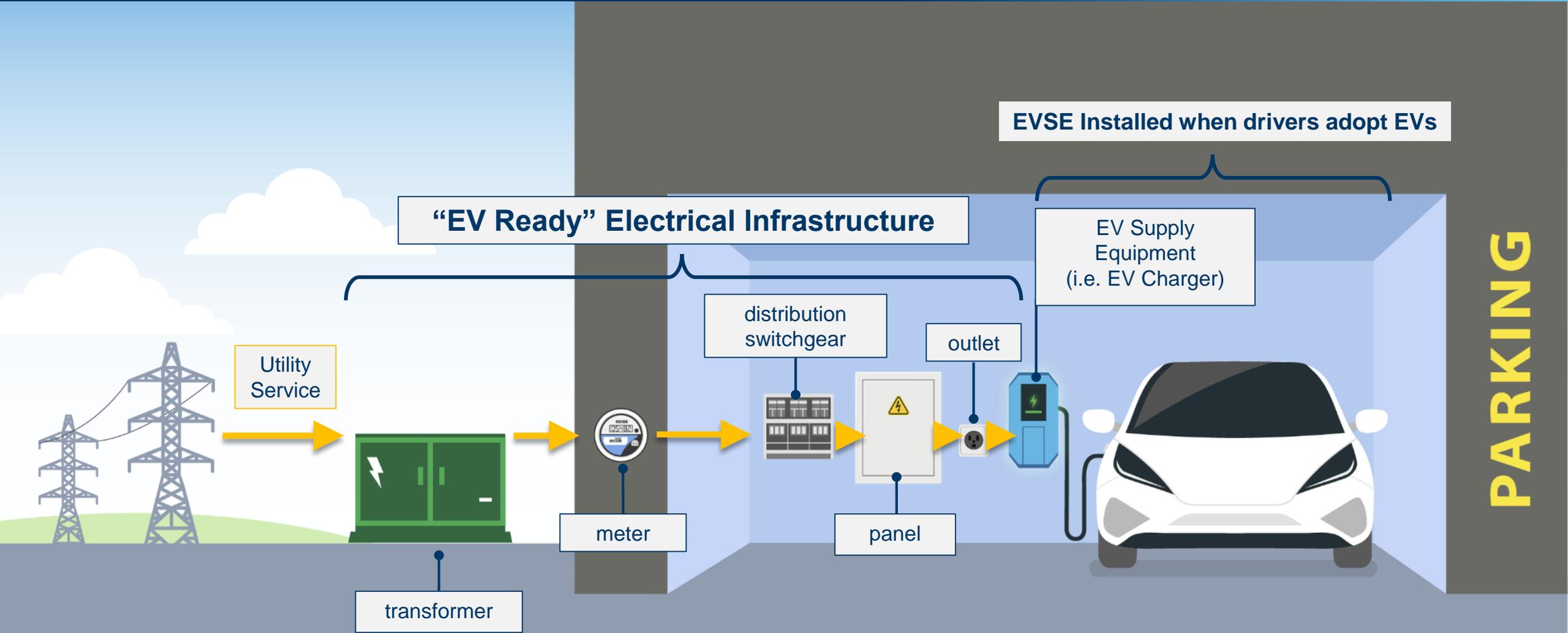


# EV Charging in Multifamily Buildings

- **Incremental additions of EV charging cost ~\$5-\$15k+ per EVSE**
- **Complicated approvals process for condominiums, rental apartments**
- **Electrical capacity is limited**
  - Risk of stranded assets & significant costs as EV charging infrastructure grows, if initial designs are properly future-proofed



# “EV Ready” Infrastructure



# What is an electrical outlet?



**Junction Box**



**Receptacle**

A person is seen from behind, sitting at a desk and using a laptop. The image is heavily overlaid with a semi-transparent blue filter. The person's hands are on the keyboard, and the laptop screen is visible. The overall scene is dimly lit, with the blue overlay being the most prominent color.

# About EV Energy Management & EV Charging Service Providers

# EV Energy Management Systems

- **EVEMS monitor and control EV loads.**
  - Enabled in Canadian Electrical Code.
- **Advantages include:**
  - Reduction in electrical capacity and associated electrical infrastructure costs to provide EV charging.
  - Managing EV loads to maximize value – e.g. avoid demand charges; respond to dynamic rates; respond to utility demand response events; use variable renewable energy; etc.
- **EVEMS are important to enabling high levels of EV charging in multifamily buildings, workplaces, and fleet depots.**

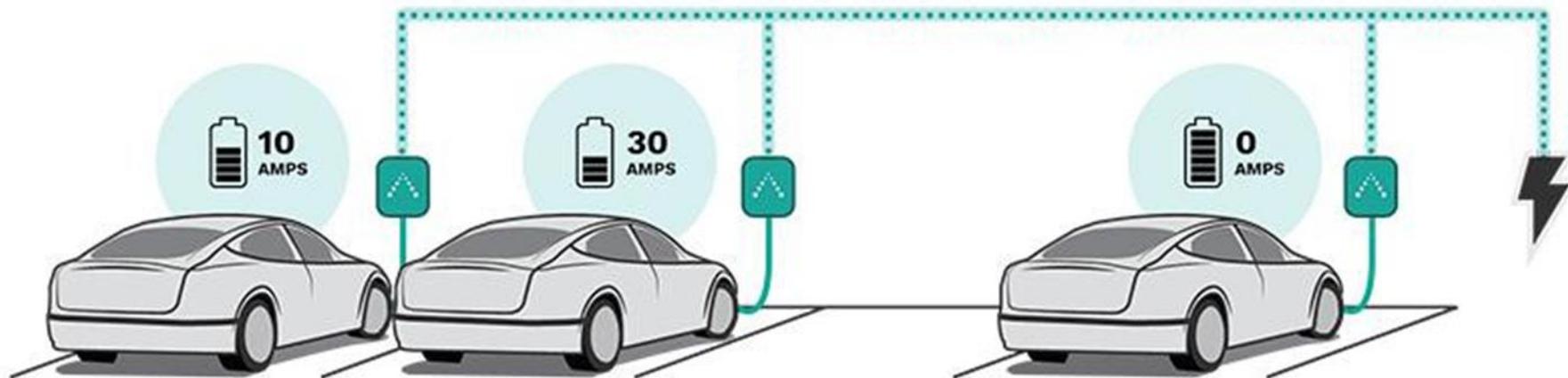
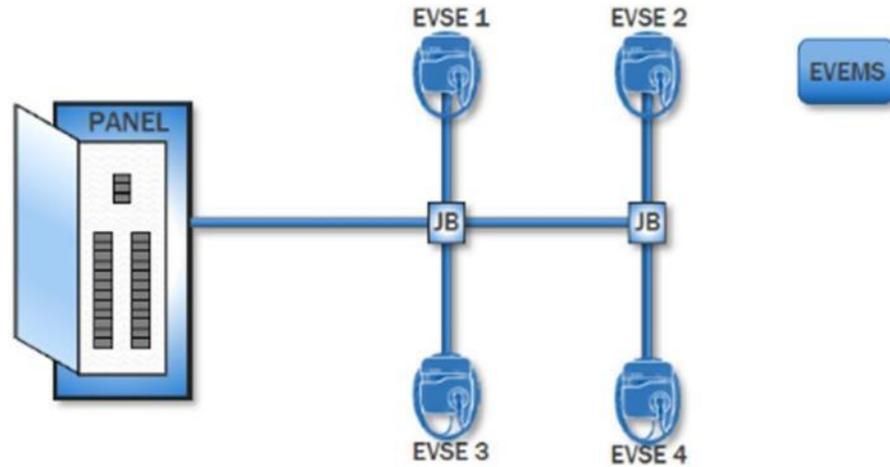


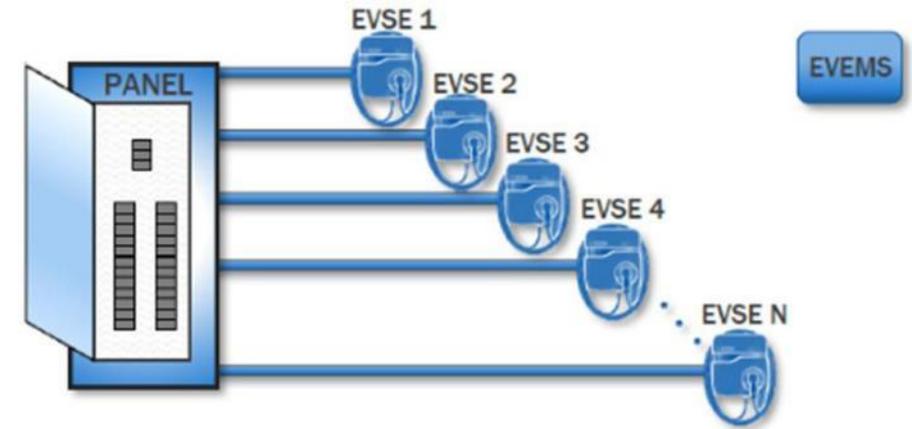
Image Source: Evercharge.

# Some Electrical Infrastructure Configurations

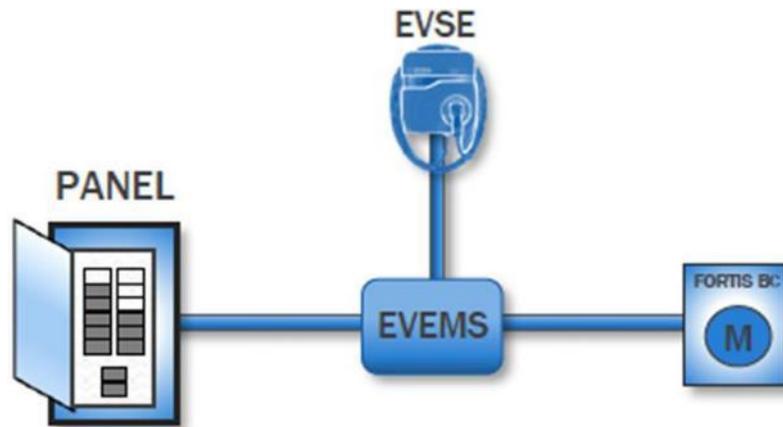
Source: AES Engineering. 2019.



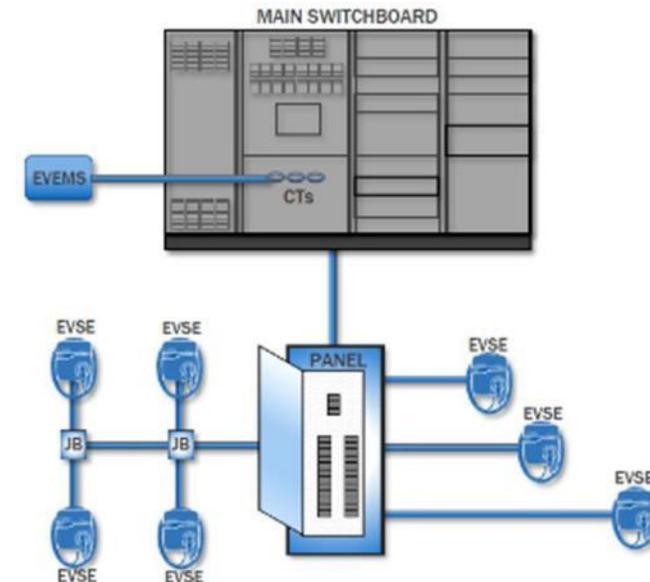
Circuit sharing: Multiple EVSE on a circuit, with control to ensure capacity is not exceeded.



Panel sharing: EVSE loads in excess of panel, with control to ensure capacity is not exceeded.



Feeder sharing: on/off control of EVSE based on available capacity on the supply to an electrical panel.



Service monitoring: Monitoring of spare capacity on building's main electrical board; and control of EV loads accordingly.

# About EV Charging Service Providers

## Services provided for “site hosts” (e.g. multifamily buildings)

- Provide EVSE
- Access control
- User apps & admin dashboards
- Reconcile electricity costs - Apply user fees, bill EV drivers, repay condo / owner
- Data
- EV energy management
- Warranties
- O&M
- Customers assistance & support
- Help buildings access revenue for EV charging, e.g.:
  - Utility demand response
  - Clean Fuel Standard



And other charging service providers...

# Designing for load sharing using EVEMS reduces costs

- The table below illustrates recent cost estimates for a 100% EV Ready retrofit to a multifamily building in Vancouver with 153 parking spaces.
- Costing is from late 2020.
- Different electrical configuration options represent different designs for load sharing.

Configuration Option	Total Project Cost (Paid by strata; one time retrofit)	Cost per Stall*	EVSE Cost (Paid by drivers when they adopt EV; one time cost)	Energy Cost ** (Monthly; paid by drivers)	Network Cost *** (Monthly; paid by drivers)
Dedicate 40A Circuit ("dumb charger")	\$643,000	\$4,200	~\$500 - \$1,500	~\$71/month	\$0 (if not networked) ~\$15-\$25/month if networked
4-way sharing per 40A circuit (EVEMS)	\$144,000	\$940	~\$1,000 - \$3,000	~\$36/month	~\$15-25/month

\* Cost per parking stall is total project cost divided by number of stalls. Differences to due to rounding.

\*\* Different energy costs are due to increased utility demand charges for peak consumption. Driving distances same in all scenarios.

\*\*\* EVEMS systems frequently require drivers to pay monthly network fees. Dedicated circuits may require network fees for utility billing, etc.

# Designing for load sharing using EVEMS reduces costs

- There can be ways to reduce costs even further, through aggressive use of load sharing.
- The 7-share on 40A and 12-share on 60A configurations are uncommon, and will provide a very low amount of power per vehicle once all vehicles are EVs
  - Many EV charging service providers are not comfortable with such high levels of sharing
  - However, modeling and early pilots suggest such high levels of load sharing are viable in many urban areas where households have relatively short driving distances

Configuration Option	Total Project Cost (Paid by strata; one time retrofit)	Cost per Stall**	EVSE Cost (Paid by drivers when they adopt EV; one time cost)	Energy Cost *** (Monthly; paid by drivers)	Network Cost**** (Monthly; paid by drivers)
Dedicate 40A Circuit ("dumb charger")	\$643,000	\$4,200	~\$500 - \$1,500	~\$71/month	\$0 (if not networked) ~\$15-\$25/month if networked
4-way sharing per 40A circuit (EVEMS)	\$144,000	\$940	~\$1000 - \$3,000	~\$36/month	~\$15-25/month
7-way sharing per 40A circuit (EVEMS)	\$101,000	\$662	~\$1000 - \$3,000	\$30/month	~\$15-25/month
12-way sharing per 60A circuit (EVEMS)	\$96,000	\$628	~\$1000 - \$3,000	\$30/month	~\$15-25/month

Data derived from costing study from: AES Engineering.



# **EV Ready New Construction Requirements**

# EV Ready New Construction Requirements



Jurisdiction	Residential	Commercial
City of Toronto, ON	100% EV Ready	25% EV Ready
City of Vancouver, BC	100% EV Ready	45% EV Ready
City of Richmond, BC	100% EV Ready	TBD
City of P. Coquitlam, BC	1 EV Cap. / dwelling	TBD
City of Burnaby, BC	100% EV Ready	TBD
City of Coquitlam, BC	1 EV Ready / dwelling	TBD
City of New West., BC	100% EV Ready	TBD
City of N. Vancouver, BC	100% EV Ready	45% EV Ready
City of P. Moody, BC	100% EV Ready	TBD
District of Squamish, BC	100% EV Ready	TBD
City of Surrey, BC	100% EV Ready	20% EV Ready
Township of Langley, BC	1 EV Ready / dwelling	TBD
District of Saanich, BC	100% EV Ready	Varies
City of Nelson, BC	1 EV Ready / dwelling	10% EV Ready
District of West Van., BC	100% EV Ready	TBD
City of Victoria, BC	100% EV Ready	5% EV Ready
Ville de Laval, QC	50% EV Ready	
Previous Ontario Building Code (rescinded)	20% EVSE	20% EVSE



# About EV Ready Upgrades in Existing Multifamily Condos & Rental Apartments

# EV Charging Infrastructure in Existing Multifamily Buildings

	1. Comprehensive EV Ready Retrofits	2. Incremental Additions of EVSE
<b>Process</b>	One large electrical renovation to make all residential parking spaces “EV Ready”	Series of electrical renovations over time, adding a few EVSE at a time
<b>Cost</b>	<ul style="list-style-type: none"> <li>• Lower life-cycle cost</li> <li>• Larger one-time upfront cost</li> </ul>	<ul style="list-style-type: none"> <li>• Higher life-cycle cost</li> <li>• Series of smaller projects</li> </ul>
<b>Location of EV chargers</b>	In drivers’ assigned parking space	Often, initially in commonly accessible parking (e.g. visitors parking); sometimes in assigned parking
<b>Process for Drivers to Install EV Chargers</b>	Simple (after initial comprehensive renovation)	Typically lengthy, complicated & uncertain
<b>Convenience</b>	<ul style="list-style-type: none"> <li>• Highly convenient</li> <li>• EV charging in regular assigned parking space</li> </ul>	<ul style="list-style-type: none"> <li>• Depends on location of chargers.</li> <li>• Less convenient if located in common parking (e.g. visitors parking)</li> </ul>
<b>Futureproofing</b>	Typically, ensures all drivers will have access to adequate EV charging.	<ul style="list-style-type: none"> <li>• Potential for stranded assets.</li> <li>• Typically not designed for future expansion.</li> <li>• Potential to exhaust limited electrical capacity, if design for EVEMS not considered.</li> </ul>

# CleanBC EV charging rebates for apartments & condos

## EV Ready Rebate Program

- Supports buildings to implement comprehensive EV Ready<sup>1</sup> upgrades (minimum 1 EV Ready space per residential unit; can make all parking EV Ready). Includes rebates for:
  - EV Ready Plan
  - EV Ready Infrastructure
  - Charger rebates

## Standalone EV Charger Rebate

- Up to \$2,000 per charging station, to maximum of \$14,000 per multifamily complex

1. An “EV Ready” parking stall is defined as having an adjacent energized electrical outlet capable of supporting Level 2 charging

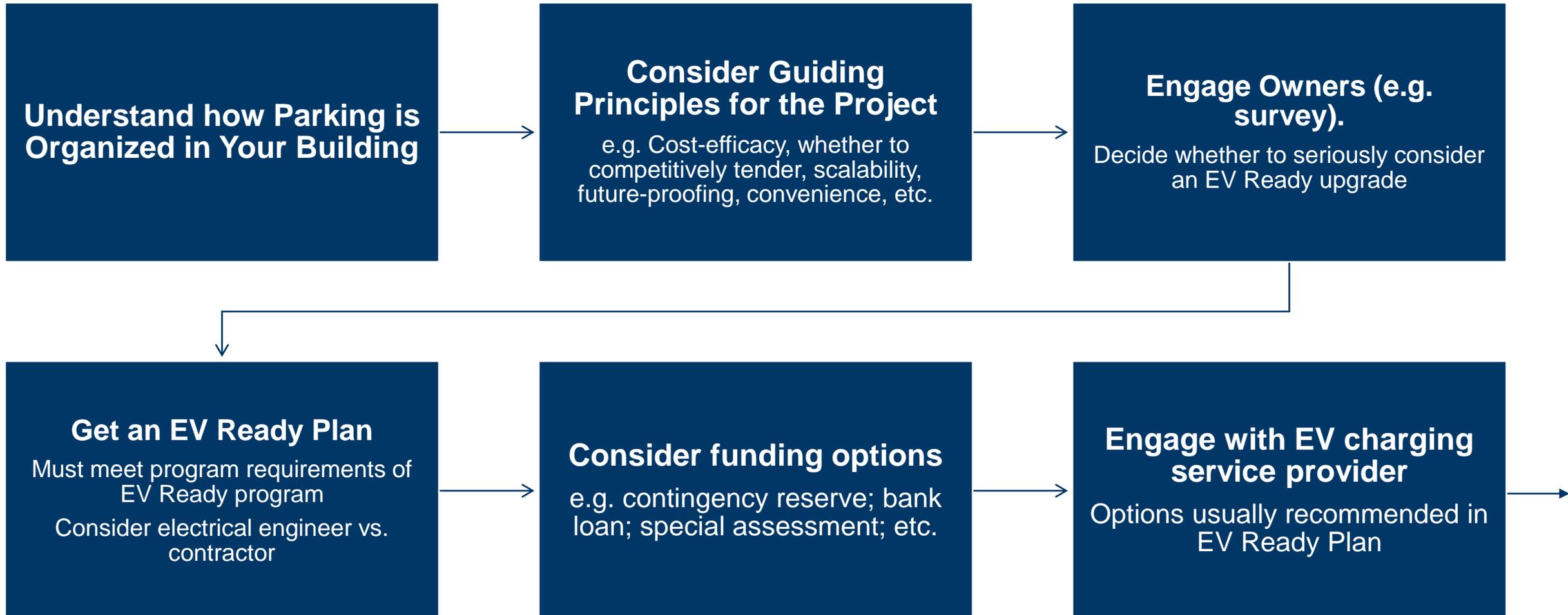
# The CleanBC EV Ready Rebate Program

## Available for multifamily condos & rental apartments

- **EV Ready Plan (i.e. Feasibility Study):** 75% (up to \$4k with City of North Vancouver “top up” incentive) of the cost of an EV Ready Plan – a professional strategy to make at least one parking space per residential unit EV Ready.
- **EV Ready infrastructure rebate:** Up to \$700 per parking space (with City top up) to install the electrical infrastructure required to make parking EV Ready for Level 2 charging. Project maximum of \$140k.
- **EV charger rebate:** \$1400 per EV charger (Up to \$14,000 for Level 2 EVSE).



# How to Implement an EV Ready Upgrade in Your Multifamily Condo or Rental Apartment



# How to Implement an EV Ready Upgrade in Your Multifamily Condo or Rental Apartment (cont.)



## Decide whether to pursue the EV Ready Upgrade

Share EV Ready Plan with owners; prepare resolutions; schedule AGM/SGM

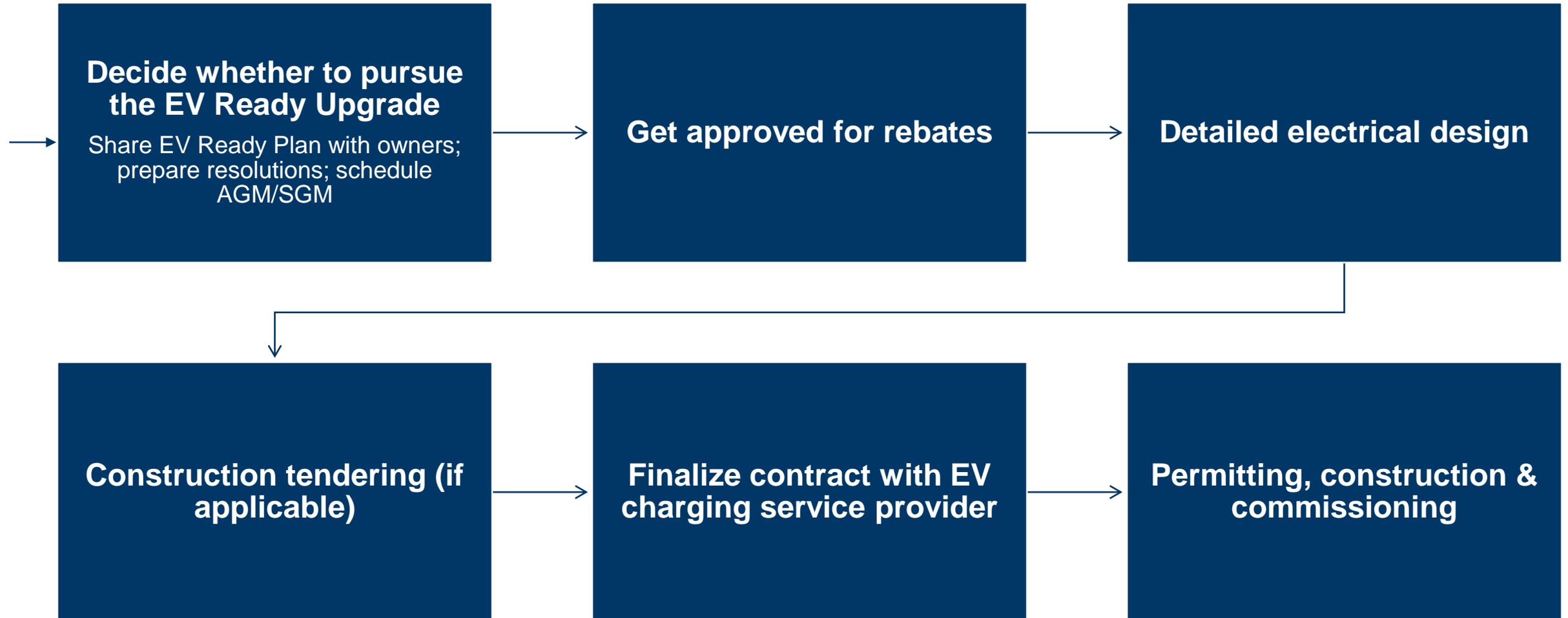
## Get approved for rebates

## Detailed electrical design

## Construction tendering (if applicable)

## Finalize contract with EV charging service provider

## Permitting, construction & commissioning



# An EV Ready Retrofit in a West Vancouver Condo

## About the Property

- 46 parking spaces
- Underground parking

## Overview

- Project Team
  - **Electrical Engineer:** AES Engineering
  - **Electrical Contractor:** Power Pros Electrical
  - **EVSE Provider:** ChargePoint
  - **EV Charging Service Provider:** ChargePoint
- 4-share on 40A branch circuits
- No electrical upgrade
- Costs
  - Electrical engineering feasibility assessment: \$6,000.
  - Detailed electrical design: \$8,000.
  - Materials & labour (excluding EVSE): \$57,200.
  - BC Hydro and other misc. costs: \$2,600.
  - Materials and labor to install 10 EVSE: \$23,000 (paid by individual unit owners).



Image credit: AES Engineering.

# Resources

- **Plug In BC Resources**

- [Evadvisor@pluginbc.ca](mailto:Evadvisor@pluginbc.ca) or go to: [www.pluginbc.ca/ev-advisor-service](http://www.pluginbc.ca/ev-advisor-service)
  - Up to five free hours of advice or presentations on charging incentives, charging installations processes, and the benefits of acquiring chargers
- <https://pluginbc.ca/charging/murb-and-workplace-charging/>
  - **Guide** for install electric vehicle charging stations in multi-unit residential buildings;
  - **A template Request for Proposals (RFP)** – strata corporations can use to solicit quotes for EV Ready Plans;
  - **A template survey** – to explore level of support for EV infrastructure from fellow residents in your building;
  - **EV Ready Plan Vetting Questions** – to help strata corporations choose the right contractor for their EV Ready Plan

- **Clean BC Go Electric Charger Rebate Program**

- <https://electricvehicles.bchydro.com/incentives/charger-rebates/apartment>
- City of North Vancouver top-up is automatically applied

# Federal Rebates

## Zero Emission Vehicle Infrastructure Program (ZEVIP) for Multi-Unit Residential Buildings

- May be combined with CleanBC rebates to a maximum of 75% of total projects costs if an applicant applies for directly to NRCan for ZEVIP funding. Stacking is not permitted if an applicant receives ZEVIP funding from another NRCan approved delivery organization
- 20 charging station minimum
- Request for proposals launching in Spring 2023, 2024 and 2025

Type of Infrastructure	Maximum Funding
Level 2 (208 / 240 V) connector	Up to 50% of total project costs, to a maximum of \$5,000 per connector

<https://www.nrcan.gc.ca/energy-efficiency/transportation-alternative-fuels/zero-emission-vehicle-infrastructure-program/21876>

# Resources

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A blue-tinted background image showing a hand holding a power drill. The drill is positioned vertically, and the hand is gripping the handle. The image is semi-transparent, allowing the text to be clearly visible over it.

**Thanks!**