

# 100% EV Ready Multifamily Building Retrofit - Case Study

*A multifamily condominium implemented an electrical renovation to make all parking “EV Ready”, enabling easy access to “at home” EV charging for all residents, now and in the future.*

## PROJECT OVERVIEW

<b>Building Type</b>	Multi-unit residential
<b>Parking Spaces</b>	46 (2 per residential unit)
<b>EV Ready Parking Spaces</b>	100% of parking
<b>Charging Stations</b>	10
<b>Parking Type</b>	Underground
<b>EV Energy Management</b>	2-way load share
<b>Electrical Service Upgrade</b>	None

## PROJECT TEAM

<b>Electrical Engineer</b>	AES Engineering
<b>Electrical Contractor</b>	Power Pros Electrical
<b>Charging Station Provider</b>	ChargePoint
<b>EV Charging Service Provider</b>	ChargePoint



## PROJECT CONTEXT

This EV Ready retrofit was performed in 2020, in a 23-unit residential condominium in West Vancouver. Each residential unit in the building is assigned two parking spaces in a common underground parking area.

This project was spearheaded by both current and prospective EV owners, who desired convenient access to EV charging. Other key motivating factors for the retrofit were to improve the real estate market value of the condo residences, and to reduce greenhouse gas emissions.

## PROCESS

A group of owners engaged AES Engineering to perform an assessment of possible solutions to provide EV charging access to for residences. This assessment included a capacity assessment, electrical design, and cost estimates.

Based on this assessment, the owners held a Special General Meeting to review options and select their preferred approach. The owners opted to implement a design in which each residence’s two parking spaces are provided with one adjacent wired “EV Ready” electrical junction box, at which the unit owner can install an EV charging station (i.e. EV supply equipment - EVSE) in the future. Residences share a 40A branch circuit with one



neighbouring unit (i.e. 4 parking space share one 40A circuit).

A competitive bid process was used to select an electrical contractor. AES engineering assisted the building in choosing the appropriate EV charging service provider.

In addition to EV Ready infrastructure, owners had the option of installing an EVSE in their garage. 10 owners proceeded with this option at the time of the retrofit, while the remaining 13 deferred this cost until they, or future owners, purchase an EV.

## CAPACITY ASSESSMENT

The capacity of the electrical system for the building was 1,600 amps at 208 volts, three-phase, 80%-rated, equating to 461 kVA. Based on BC Hydro metering data and load calculations from the original electrical drawings, 234 kVA of spare capacity at continuous load was available for EV charging.

80 kVA capacity was required to provide a Level 2 charging station in each of the 23 garages plus one visitor parking spot with 2-way load sharing. Therefore, no electrical utility service upgrade was needed.

## EQUIPMENT

The following new equipment was installed:

- BC Hydro meter.
- 400A Panelboard.
- Communications gateway and repeater.
- Wiring, conduit, junction boxes for EVSE.
- EVSE (10 out of 23 units).

The EVSE and EV Energy Management System (EVEMS) were provided by ChargePoint. Owners/residents who install EVSE in the future will be required to purchase their

EVSE from ChargePoint, to ensure compatibility with the EVEMS.

## COSTS

The costs for the project included:

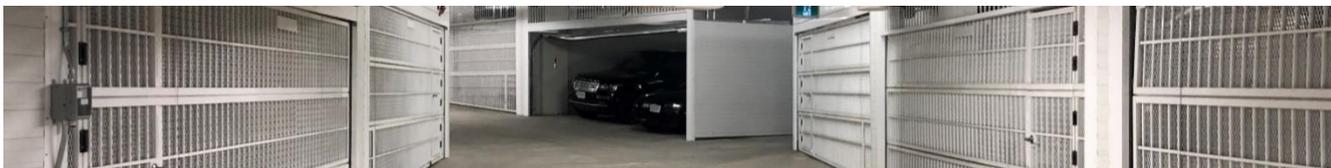
- Electrical engineering feasibility assessment: \$6,000.
- Detailed electrical design: \$8,000.
- Electrical contractor materials and labor (excluding EVSE): \$57,200.
- BC Hydro and other misc. costs: \$2,600.
- Materials and labor to install 10 EVSE: \$23,000 (paid by individual unit owners).

An application to BC Hydro's CleanBC EV Charger Rebate program was approved, providing the maximum \$14,000 rebate for project costs. This project was completed before the Go Electric EV Ready Rebate Programs was available; had the EV Ready Rebate program been available, the project would have received \$27,800 in total incentives.

Additionally, AES Engineering notes that lower project costs could have been achieved through greater EV sharing (e.g. 3-share on 40A circuits); however, this condo's owners prioritized faster charging.

## OUTCOMES

10 owners (43 percent) installed a charging station during the EV Ready retrofit. Six months after the project was completed, the number of residents with EVs had increased from three (before the project started) to seven. All other owners now have EV Ready parking and the option to install a charging station easily and affordably as they adopt EVs.



## Glossary

- **Electric Vehicle Supply Equipment (EVSE):** “A complete assembly consisting of cables, connectors, devices, apparatus, and fittings installed for the purpose of power transfer and information exchange between the branch circuit and the electric vehicle.” (Canadian Standards Association, 2018) Commonly referred to as an EV charging station or EV charger.
- **EV Ready Parking Space:** A parking space which features a complete electrical circuit terminating in a junction box capable of providing Level 2 EV charging.
- **Level 2 (L2) EVSE:** An EVSE which supplies AC power, with nominal supply voltage of 208V to 240V single-phase power with maximum current of 80A (19.2kW). At 6.7kW (a common power output), a Level 2 charger can provide approximately 30km to 35km of range per hour, depending on the vehicle.
- **EV Energy Management System (EVEMS):** A system to “monitor electrical loads and to control [EVSE] loads”, often by remote means. This includes systems that allow for load sharing (one circuit shared between multiple EVSE) and service monitoring (monitoring the service and controlling EVSE to avoid overloading the service).