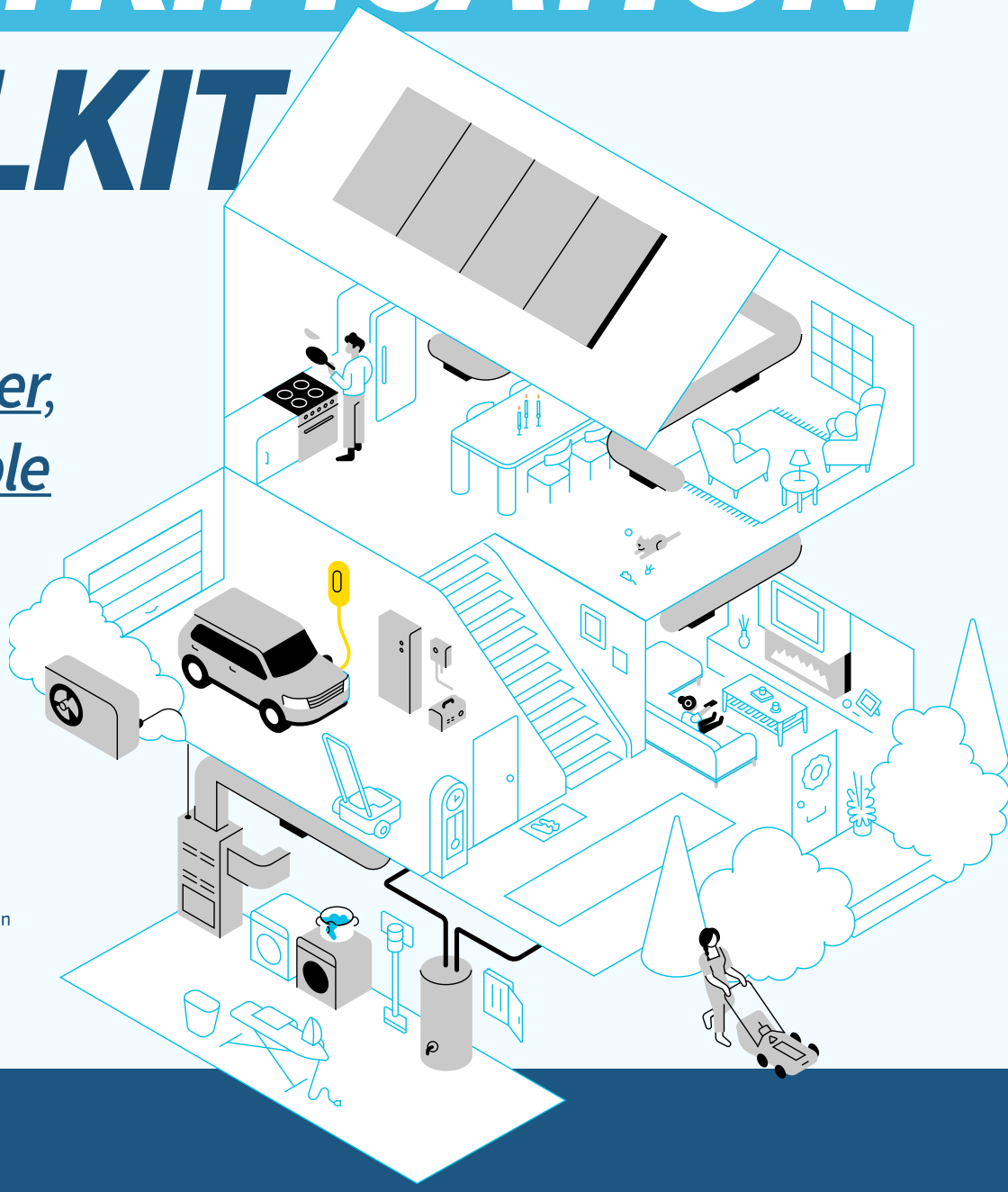
CANADA'S HOME ELECTRIFICATION TOOLKIT

Your guide to a ***cleaner, smarter, more affordable*** home



Building Decarbonization Alliance
pour la décarbonation des bâtiments

ELECTRIFY YOUR:

EV CHARGERS

EV Chargers at a glance

COST

Upfront costs:
$-$$$$

CHARGING SPEED

10-13 years

ELECTRICAL NEEDS

120V 15 amp to 240V 100 amp

IMPLEMENTATION

Easy to difficult

EMISSIONS REDUCTION IMPACT

Very high

RENTERS

Talk to your property owner about EV charging

CHECK

The connector type and charging power

BONUS

Power appliances or your home during a power outage with EVs capable of V2L, V2H or V2G

Links to further resources

- Guide to home EV charging
- Vehicle-to-load Explained

EV Chargers

“

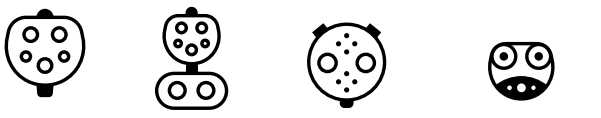
You have to have a better car. It’s not just the ideological decision of buying an EV. It’s about buying a better car.

–
author unknown

The easiest way to keep an electric vehicle (EV) charged up and ready to go is by using a home charging station. This is also the lowest cost option, especially when owners can take advantage of low time-of-use rates available in some provinces.

North American EVs can have a variety of connectors for charging. Most new vehicles come with a NACS (North America Charging Standard, also known as SAE J3400) connector that is used for level 1, 2 or 3 charging.

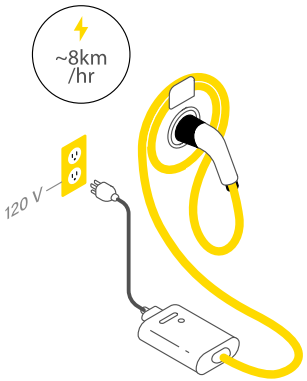
Some vehicles will have an SAE J1772 connector for level 1 or 2 charging and a second connector for level 3 fast charging. The second connector will be either CCS or CHAdeMO.



J1772 CCS Chademo Tesla/NACS

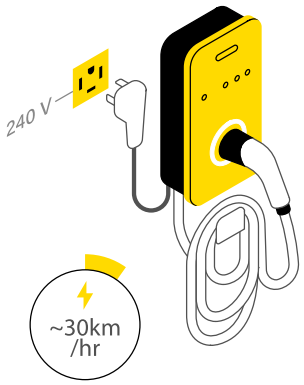
OPTIONS

Level 1:



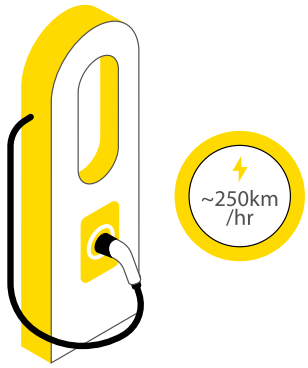
You absolutely can charge your EV or plug-in hybrid using your portable EV charging cord plugged into a standard household outlet. You can charge your car just about anywhere with an electrical outlet. This is the slowest speed of charging, achieving approximately 8 km of driving range for every hour of charging, but it is also ridiculously cheap relative to gasoline or public charging. With overnight charging letting you drive more than 60 km, this may be all you need.

Level 2:



For speed and convenience, you may want to invest in a level 2 home charger. These chargers can be hard-wired into your home or use a 240V outlet. Once it is there, you can get an average of 30 km of driving range for every hour of charging at very low cost. Level 2 chargers come with different power outputs (in amp ratings), and some allow you to set the power output. In general, the higher the power output, the faster the charge, but not all EVs can benefit from higher power outputs, and lower power systems leave electrical panel space for other electrification projects.

Level 3:



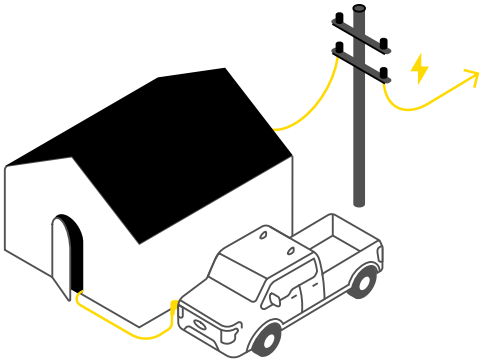
For fast charging while on the go, look for public level 3 chargers. These are not suitable for home installs because they require very high amperage to supply the power needed.

EV CHARGER FEATURES

Equipment	Purpose	Charging speed	Outlet	Upfront cost	Operating cost	Emissions
Level 1 charging cable	Charging EV	~8 km/hr	120V 15 amp	Up to $$	▼	▼
Level 2 charger	Charging EV	~30 km/hr	240V 20-60 amp	$$	▼	▼
Bidirectional charger	Charging EV/ vehicle to grid	~30 km/hr	240V 20-100 amp	$$$-$$$$	▼	▼
Vehicle to load	Powering appliances	N/A	none		N/A	▼
Vehicle to home (vehicle to load)	Powering a home	N/A	Manual transfer switch	$$-$$$	N/A	▼

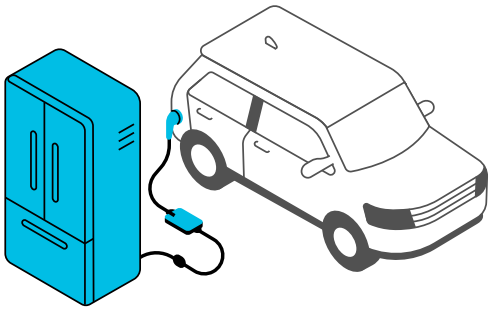
**Updated April 2025, see appendix for breakdown of cost and emissions outcomes by province and territory*

Bidirectional charger for vehicle-to-grid (V2G):



Bidirectional chargers combined with a home energy management system allow electricity to flow from the grid to charge the car's battery, or from the car's battery to your home or grid. Currently very few EVs are capable of V2G, but the number is expected to grow. Bidirectional chargers can save you money on your utility bills when you take advantage of time-of-use rates, and they also replace power generation from some of the dirtiest power plants. During a power outage, bidirectional chargers with a manual transfer switch can be configured to power your home.

Vehicle-to-load (V2L):



Some EVs allow appliances to be plugged into an outlet on the EV or plug into the charging port via an adapter. The appliances then run independently of the electrical grid, which is convenient during a power outage or when camping. See 'Home Batteries and Backup Generators' section for more details.

Vehicle-to-home (V2H) and V2L:

With a manual transfer switch, your V2L- or V2H-capable EV can replace a stand-alone generator when the power goes out. See 'Home Batteries and Backup Generators' section for more details.

OTHER CONSIDERATIONS

- When charging, consider using your EV or charger's timer to program when to charge to take advantage of low time-of-use electricity prices where available.
- Most chargers are designed to charge in a garage or outdoors. While it is fine to charge a vehicle in the elements, it is better to store the charger in a sheltered location.
- Check that the charging cord length is suitable for your charging configuration. If using an extension cord with a Level 1 charger, make sure it is rated for the charging current the car needs.
- Your battery will have a longer life if you maintain the charge between 20% to 80% and if you minimize high speed charging (level 3 and even high-power level 2).
- If electrical work is required, you will generally require an electrical permit. Be sure to always use CSA-certified electrical equipment and hire a licensed electrician when needed. For safety and durability, ask for commercial-rated 240V outlets, which reduce the risk of poor plug connections.
- Consider installing a lower amp level 2 charger or sticking to a level 1 charger to maximize available capacity on the electrical panel for other electrification upgrades.
- If your electrical panel does not have the capacity to add a 240V level 2 charger, consider adding a circuit-pausing or load-sharing device to share the circuit with another appliance such as your dryer or water heater. See '**Energy Management Systems**' section for details.

This section is part of the Canada's Home Electrification Toolkit. The Toolkit provides clear, concise, and up-to-date information on space heating, cooking, fireplaces, home batteries and backup options, and other household equipment. It also includes tips for renters, strategies for avoiding potentially costly electrical panel upgrades, and case studies from satisfied homeowners.

ADDITIONAL SECTIONS ARE AVAILABLE FOR DOWNLOAD BELOW:

- Space Heating
- Electric Thermal Storage
- Water Heaters
- Cooking
- Dryers
- Fireplaces
- Outdoor Equipment
- Home Batteries and Backup Generators
- Solar Power
- Avoiding an Electrical Panel Upgrade
- Energy Management Systems
- Options for Renters
- Electrification Incentives
- Amplifying the Impact Through Conversations
- Ways Community Groups Can Help
- Appendices

Symbols and terms in this publication:

Upfront or operating cost (no incentives applied)

Symbol	Description
$	Up to $99
$$	$100-$999
$$$	$1,000-$9,999
$$$$	$10,000 and above

Implementation

Term	Description
Easy	Can be implemented by yourself if no electrical upgrade is required
Medium	Can be implemented by someone with DIY skills
Difficult	Generally requires a qualified electrician or other contractor

Emissions reduction potential (onsite emissions reductions using Canadian averages)

Term	Description
Low	1-9 kg CO2 per year
Medium	10-99 kg CO2 per year
High	100-999 kg CO2 per year
Very high	> 1,000 kg CO2 per year

When comparing electric to gas equipment on upfront costs, operating costs and emissions

Symbol	Description
=	Values differ by 10% or less
▽	Electric version is 10-50% lower
▼	Electric version is more than 50% lower
△	Electric version is 10-100% higher
▲	Electric version is more than 100% higher

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Visit buildingdecarbonization.ca/canadas-home-electrification-toolkit for digital downloads, updates, and other information about home electrification.

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