

ELECTRIC Vehicle NEWS

Why Go Electric?

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Save the Climate

- ◆ Gas and diesel vehicles release greenhouse gases into the atmosphere.



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- ◆ Electric vehicles produce no greenhouse gases when they run.
- ◆ **Over the lifetime of an electric car, the total effect on the environment is much lower than a gas or diesel vehicle.**

Save Money

- ◆ Electricity is becoming cheaper than gasoline or diesel.



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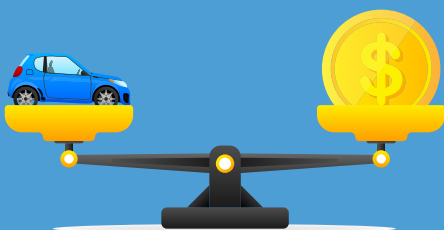
- ◆ You can produce your own electricity with solar panels.
- ◆ Electric cars are cheaper to maintain - fewer moving parts, no engine oil changes.

How Do Electric Cars Work?

Simply put, electric vehicles (EVs) use electricity to “go”, instead of using gasoline or diesel fuel.

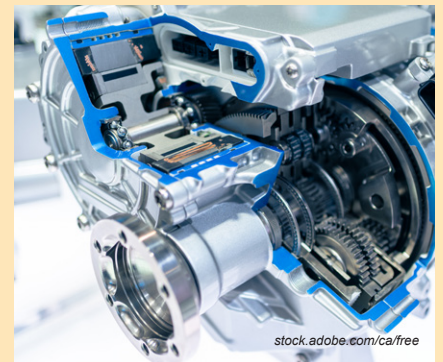
- ◆ An alternating electrical current in the motor acts as magnets with opposite poles.
- ◆ This causes a rotor inside to turn, creating mechanical energy.
- ◆ This energy is used to drive the wheels forward.
- ◆ So electric cars send power directly to the wheels - no gears, no clutch!

What's iZEV?



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Since 2019, the Canadian government has offered purchase incentives of up to \$5,000 for eligible vehicles through Transport Canada's iZEV program, which has helped Canadians purchase or lease over 136,000 new ZEVs.



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Electric motors have fewer moving parts - less to go wrong



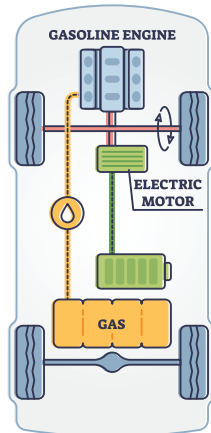
Types of Electric Vehicles

Electric vehicles (EVs) use electricity to:

- ◆ improve efficiency
- ◆ lower operating costs
- ◆ lower emissions

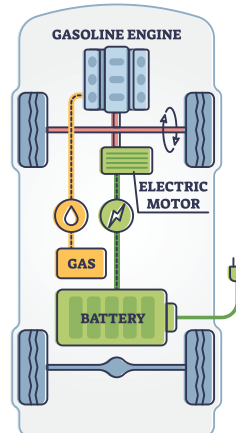
There are three basic kinds of EVs, based on how electricity is used to run them.

Hybrid



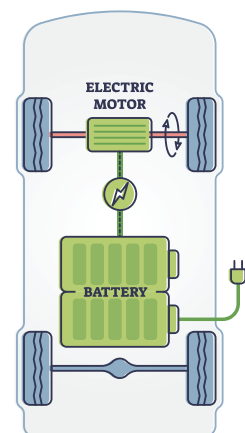
FUEL Gasoline

Plug-in Hybrid



FUEL Gasoline and/or Electricity

Battery Electric Vehicle



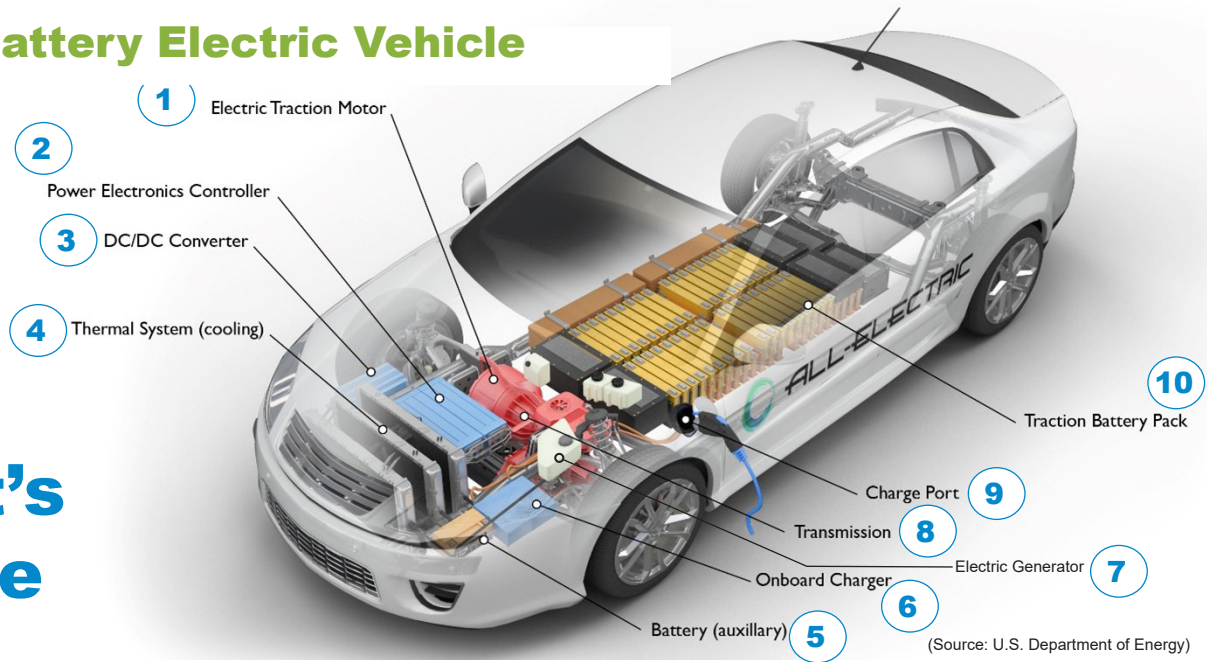
FUEL 100% Electricity

123rf.com # 168410075

	Hybrid	Plug-in Hybrid	Battery Electric Vehicle
Also called:	HEV (hybrid electric vehicle)	PHEV (plug-in hybrid electric vehicle)	BEV or just EV
Powered by:	Gas engine (ICE - internal combustion engine) <ul style="list-style-type: none"> • Has small electric motors that help provide extra power to save fuel 	Electric motor + gas engine (ICE) as backup	Electric motor only
Electric details:	<ul style="list-style-type: none"> • Relies on gas engine to charge as you drive • Smaller batteries 	<ul style="list-style-type: none"> • Similar to hybrids • Charges as you drive* • Larger battery • Can be plugged in • Runs on electric power until battery runs out 	<ul style="list-style-type: none"> • Operates using only electricity • Very large battery • Charged by plugging it in
Gas details:	Provides all the energy for the system. <ul style="list-style-type: none"> • Fuel tank is filled like traditional gas vehicle 	Only used when battery runs out <ul style="list-style-type: none"> • Fuel tank is filled like traditional gas vehicle 	None
Environmental Effect:	Highest exhaust emissions of the three	Exhaust emissions only when gas engine is running	No exhaust emissions
Purchase Costs:	More expensive than traditional gas vehicles <ul style="list-style-type: none"> • Least expensive of the 3 EVs 	More expensive than regular hybrids or gasoline cars.	Typically the most expensive type of EV (see below)
Savings:	Some savings on fuel. <ul style="list-style-type: none"> • This is the least efficient type 	Savings happen if owners recharge frequently. <ul style="list-style-type: none"> • Some are less fuel-efficient than regular hybrids when running on gas. 	Fuel savings enough to recover some (or all) of the vehicle cost

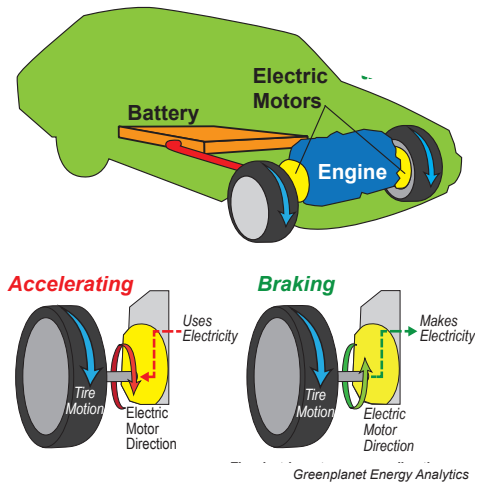
Battery Electric Vehicle

See What's Inside



(Source: U.S. Department of Energy)

- 1. Electric traction motor:** drives the vehicle's wheel, using high-voltage electricity from the main battery. AC (alternating current) motors are common.
- 2. Power electronics controller:** manages the flow of electricity from the main battery to the wheels, controlling the speed and torque produced by the motor.
- 3. DC/DC converter:** reduces the high-voltage direct-current (DC) electricity from the main battery to low-voltage DC electricity, used to run vehicle accessories and charge the auxiliary battery.
- 4. Thermal system (cooling):** prevents the electric motor and other electronics from overheating during use.
- 5. Battery (auxiliary):** provides electricity to power vehicle accessories, such as the radio, electric space heater, and fans.
- 6. Onboard charger (Inverter):** converts incoming AC electricity from the charging port to DC electricity to charge the main battery. (See AC/DC below.)
- 7. Electric generator:** uses energy from the wheels during braking, to charge the battery. (See right)*
- 8. Transmission:** transfers rotational power from the electric motor(s) to the wheels. This is a single-speed transmission - *no clutch, no gears*.
- 9. Charge port:** allows the vehicle to plug-in to charging equipment, in order to charge the battery. This can be in different locations including the back or front of the vehicle.
- 10. Traction battery pack:** the main battery of the EV, stores electricity to drive the electric motor. The larger the battery (kW), the longer the range.



Greenplanet Energy Analytics

*What is Regenerative Braking?

When braking in a traditional car (ICE), the energy created goes to waste. However, when an electric car brakes, the electric motor by the wheel reverses direction, becoming a generator. It now produces electricity which is sent back to the vehicle's battery to be stored. Pretty clever!



AC/DC - It's Not Just A Rock Band

AC (alternating current) power is what you get out of the outlets at your house, and DC (direct current) power is what goes into and out of batteries.

Most electric car motors use AC power. Many accessories in the car, like radios and fans also use AC. Since chargers/batteries are DC, an inverter is needed to convert the electric current from DC to AC. (See item 6 in diagram above.)

Find Out More

Myth Busting: EVs in Alberta 2021

Municipal Climate Change Action Centre



Through the Municipal Climate Change Action Centre's Electric Vehicles for Municipalities Program, cities and towns are replacing gas-powered fleets with electric options. For instance, the Town of Okotoks received funding for their new electric UTV.

May 7, 2021

Here are the updated busted myths and misconceptions about electric vehicles in Alberta.

<https://mccac.ca/2021/05/07/myth-busting-evs-in-alberta/>



Use your smart phone to look at these QR codes - it will take you to this place on the internet.

Videos



How Plug-In Vehicles Work

US Environmental Protection Agency

Considering an electric vehicle? Or just want to learn more about them? This short video describes how electric vehicles and different types of plug-in hybrid electric vehicles work. Learn about driving range, saving money and reducing air pollution. (US content but still very relevant.)



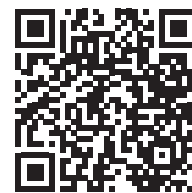
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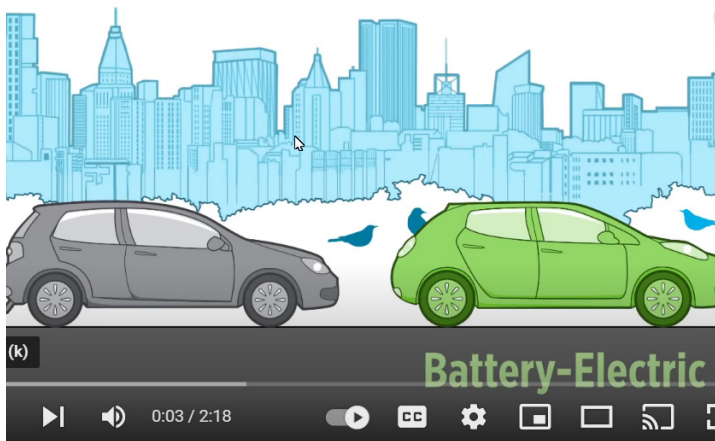
Why people don't buy electric cars...yet

Global News

The list of benefits of electric vehicles (EVs) is endless; they're quiet, cheaper over the long term and better for the environment. However, it seems that many drivers, especially in North America, are still reluctant to give up gas. So what's the hold up? Aalia Adam explains.



<https://www.youtube.com/watch?v=U-oBsJgsmD4>



Electric Cars & Global Warming

Union of Concerned Scientists

Everyone knows electric cars are cleaner than gasoline vehicles—but just how much cleaner? This video explores the global warming emissions of EVs on a lifecycle basis, from the manufacturing of their batteries to their ultimate disposal or reuse. (US content but still very relevant.)



<https://www.youtube.com/watch?v=K9m9WDxmSN8>

Designed as educational material for 3NE by:

