

Electric Vehicles in MN: Top Ten

Electric vehicles come in many shapes and sizes; they are not limited to small compact cars.

- There is an electric vehicle (EV) to suit most needs, including all-wheel drive.
- There are sedans, hatchbacks, minivans, and SUVs. Many more models are in production, with multiple EV pick-up trucks coming in the next few years.
- Whether your city needs an EV for driving between building inspections or needs something with a little more power for hauling equipment between job sites, there is an EV that will work for you.
- Current EV models easily tow more than 5,000 pounds. An all-electric pick-up with more than 11,000 pounds of towing capacity is coming soon.

<https://www.ford.com/police-vehicles/hybrid-utility/>
<https://www.mitsubishicars.com/outlander-phev/2018>
<https://www.consumerreports.org/cro/cars/hybrids-evs/buying-guide/index>.

Electric vehicles can and do function in cold climates.

- The most bitterly cold days might reduce the charge by 40 percent, and that is only in the rarest of circumstances. Besides, temperatures below -10 F impact the efficiency of all types of automobiles.
- Electric vehicles (EVs) often perform better in icy conditions compared to gasoline vehicles due to the more consistent acceleration and lower center of gravity.
- You can use features like heated seats and heated steering wheel to keep warm and lessen the drain on the battery caused by running the heater.
- You don't need an all-wheel drive EV to function well in cold climates. In fact, a front-wheel drive EV with winter tires has greater traction control over snow and ice than an all-wheel drive EV with all-weather tires.
- Scandinavian countries have the highest percentage of electric vehicle drivers in the world (and it's cold there)!

https://www.greencarreports.com/news/1109449_driving-electric-cars-in-winter-tips-from-experienced-owner
<https://insideevs.com/nordic-ev-report-shows-how-far-ahead-region-really-is/>

ELECTRIC VEHICLES
PROVIDE REAL
GREENHOUSE GAS
REDUCTIONS; THEY
ARE NOT COAL CARS.

- Electricity is generated from a variety of sources other than coal, like solar, wind, and nuclear, so electric vehicles (EVs) do provide significant greenhouse gas reductions.
- EVs in Minnesota provide a greenhouse gas reduction of at least 65 percent in most cases (for cars being charged using Xcel Energy's electric mix). Xcel Energy aims to achieve 100 percent carbon-free electricity by 2050, so their electricity is getting cleaner all the time.
- Residents who participate in renewable energy options with their utilities can reach greenhouse gas reductions of 95 percent.

<https://www.betterenergy.org/blog/electric-vehicles-provide-large-ghg-reduction-minnesota/>



Electric vehicles provide many benefits beyond the environment; they will save you money and time over the life of the vehicle.

- Even though the up-front cost of an electric vehicle (EV) is currently a bit higher than a gas- or diesel-powered car, the savings from fuel and maintenance add up quickly over the life of the vehicle.
- In 2016, a study published by Massachusetts Institute of Technology showed that EVs are already among the cheapest cost-per-mile available.
- For a city fleet vehicle with intermittent idling and use, an EV is perfectly suited to replace an old vehicle and save the city money.
- EVs help build energy independence for the US because they do not run on imported fuels. In 2017, the US imported 19 percent of the petroleum it consumed.

<http://news.mit.edu/2016/study-finds-low-emissions-vehicles-less-expensive-overall-0927>

<http://www.driveelectricmn.org/electric-vehicles/>

https://www.eia.gov/energyexplained/index.php?page=oil_imports

<http://carboncounter.com/>

Most charging will happen overnight and at home.

- More than 80 percent of charging of electric vehicles (EVs) happens at home, particularly when you're asleep.
- EVs can be charged with a standard 110-volt outlet. These chargers are called Level 1 chargers and charge two-to-five miles per hour of charging.
- Level 2 chargers use 240-volt outlets and can charge an EV ten to 60 miles per hour of charging.
- Installing a Level 2 charger is a relatively simple process, much like installing the wiring for a clothes dryer or other heavy appliance. Most homeowners hire an electrician for this, but it can usually be done in a few hours.
- Many utilities offer a time of use rate to incentivize consumers to use electricity during specific times, generally overnight or during low demand times. This offers significant benefit to EV drivers since most EV charging is done at those times.

<http://www.driveelectricmn.org/charging/>

<https://www.energy.gov/eere/electricvehicles/charging-home>

TODAY'S ELECTRIC
VEHICLES HAVE THE
RANGE YOU NEED
FOR YOUR PRIMARY
VEHICLE.

- Fully-electric vehicles (called battery-electric vehicles, or BEVs) with the smallest range available on the market today can easily go more than 100 miles on a full charge.
- If you are still concerned about range, plug-in hybrid electric vehicles (called PHEVs that run on electricity and gas) offer the same range as any other vehicle while still offering the option to drive fully electric when desired.
- There are charging stations all over the United States. If you are driving more than 100 miles in one day, simply find a charging station on Plugshare.com and fill up!

<https://www.plugshare.com>

<https://electrek.co/2017/12/26/average-electric-car-range/>



Drive Electric MINNESOTA

Electric vehicle charging infrastructure is already in place in Minnesota to support your driving needs, and more is being added every day.

- Unless you drive more than 80 miles a day, you usually do not need to use a public charger. For fleet vehicles, you can plug them in before you leave work for the day and let them charge overnight. If you have an EV for personal use, you can do the same at home while you sleep.
- DC fast chargers (DCFCs) give you 180-240 miles per hour, and Level 2 chargers give you 10-20 miles per hour of charging. If you need to recharge your electric vehicle during the day, the network of charging stations, including DCFC, around Minnesota is growing quickly.
- Finding a charging station is easy thanks to services like PlugShare and the Alternative Fuels Database's fueling station map. As of March 2018, PlugShare shows there are more than 350 publicly available Level 2 or higher charging stations in Minnesota.

<https://www.plugshare.com/>

<https://www.energy.gov/eere/electricvehicles/vehicle-charging>

https://afdc.energy.gov/fuels/electricity_locations.html#/analyze?fuel=ELEC

Electric vehicles are not just a trend, they are here to stay, and more people are buying them every year.

- By 2040, estimates indicate that 55 percent of all new vehicle sales will be electric.
- Electric vehicle (EV) costs continue to fall, with upfront costs expected to be competitive with other vehicles without subsidies by 2024.
- Companies like Tesla are proving just how viable EVs are in the modern marketplace, and major manufacturers are listening. For example, Ford is investing \$11 billion into developing EVs by 2022.
- In the United States, as of December 2018, the EV market has seen 39 months of consecutive growth and sales continue to increase at incredible numbers. Costs continue to decrease, and major auto manufacturers are investing more and more in the EV market.

<https://about.bnef.com/electric-vehicle-outlook/>

<https://www.reuters.com/article/us-autoshow-detroit-ford-motor/ford-plans-11-billion-investment-40-electrified-vehicles-by-2022-idUSKBN1F30YZ>

<https://insideevs.com/december-2018-u-s-plug-in-ev-sales-report-card/>

ELECTRIC VEHICLES ARE FUN!

- Electric vehicles (EVs) generate instant torque from their motors, providing faster and more seamless acceleration compared to gas-fueled vehicles.
- With a low center of gravity, an EV ride is comfortable and smooth (like butter).
- EVs come equipped with lots of luxury features and technology, so you'll feel like you're driving a space ship (probably)!

<https://driveelectricus.com/learn-the-facts/the-fun-factor/http://www.driveelectricmn.org/electric-vehicles/>



Electric vehicle batteries are long-lasting.

- Like all automotive batteries, electric vehicle (EV) batteries will deteriorate over time. However, most automakers provide an eight-year warranty in case an EV battery malfunctions and will repair or replace it for free during that time. The majority of EV batteries last beyond the warranty period.
- Surveys of EV owners found that, on average, many drivers retain over 90 percent of the original battery capacity even after the odometer surpasses 100,000 miles.
- Potential EV owners concerned about reduced battery capacity later on in the vehicle's life can lease an EV instead.
- Research is being done to examine second uses of EV batteries once they no longer provide enough capacity to fuel a vehicle. The National Renewable Energy Laboratory's initial analysis predicts EV batteries will retain 70 percent of their original capacity at the end of the vehicle's lifetime and could operate for an additional ten years through a second use. Currently, the most promising second use application is to provide services to the electric grid.
- Once EV batteries are no longer viable for a second use, they are recycled for raw materials. A Canadian-based company, Li-Cycle, can recycle up to 100 percent of lithium from EV batteries.

<https://evannex.com/blogs/news/how-long-will-my-tesla-battery-last>

<https://www.nrel.gov/transportation/battery-second-use.html>

<https://www.nrel.gov/transportation/battery-second-use-analysis.html>

<https://www.bloomberg.com/news/features/2018-06-27/where-3-million-electric-vehicle-batteries-will-go-when-they-retire>

<https://www.li-cycle.com/recycling-technology.html>