



## Green Vehicles

Cars that are more efficient and less polluting than conventional fossil-fueled vehicles are often termed 'green vehicles'. A hybrid electric vehicle (HEV), a plug-in hybrid electric vehicle (PHEV), and an all-electric vehicle (EV) are all examples of green vehicles that lead to cleaner air.<sup>1</sup>

### What is the difference between a HEV, a PHEV, and an EV?

A HEV combines a gas- or diesel-powered engine, a small rechargeable battery and an electric motor. PHEVs have a larger battery, an electric drive motor and a gas- or diesel-powered engine. PHEVs can either run on electricity alone at speed up to >50 miles before switching to fuel, or can use fuel and electricity at the same time as the engine charges the battery.<sup>2</sup> EVs operate using only a large battery and an electric motor.

### What are the health benefits associated with driving green vehicles?

Air pollution can cause both immediate and long-term health problems. Short-term symptoms related to air pollution exposure include shortness of breath, coughing, wheezing, and chest pain. Exposure may trigger asthma episodes as well. Long-term exposure to air pollution puts people at risk for lung disease, stroke, heart attacks, and premature death.<sup>3</sup> Green vehicles reduce or eliminate the dangers of particulate matter, nitrogen oxides and greenhouse gas pollution that cause immediate and long-term health problems.<sup>4</sup> While green vehicles improve air quality and reduce global warming emissions, EVs offer the greatest health benefits because they emit no tailpipe emissions.

<sup>1</sup> "Learn About Green Vehicles." EPA. February 23, 2017. Accessed July 19, 2017.

<https://www.epa.gov/greenvehicles/learn-about-green-vehicles>.

<sup>2</sup> "How Do Plug-in Hybrid Electric Cars Work?" Union of Concerned Scientists. Accessed July 26, 2017. <http://www.ucsusa.org/clean-vehicles/electric-vehicles/how-do-plug-in-hybrid-electric-cars-work#.WXjEiRXYvcs>.

<sup>3</sup> "Ambient (outdoor) air quality and health." World Health Organization. September 2016.

Accessed July 24, 2017. <http://www.who.int/mediacentre/factsheets/fs313/en/>.

<sup>4</sup> Sovacool, Benjamin K. "A Transition to Plug-in Electric Hybrid Vehicles (PHEVs): why public health professionals must care ." *Journal of Epidemiology and Community Health*, 2010: 185-187.

### How far can a green vehicle travel?

HEVs and PHEVs have the same power and range as conventional vehicles. Newer EVs have a range of >100 miles, sufficient for 90% of all household vehicle trips in the U.S.<sup>5</sup> Battery technology is advancing quickly and some EVs already boast a range of 200-300+ miles. EVs and PHEVs can be charged at home in a parking space or garage. Publicly available charging stations can also be found at <https://www.plugshare.com>.

### How much does an electric vehicle (EV) cost?

While EVs now have a higher upfront cost, the total cost of owning an EV is reduced by both lower fuel costs and maintenance costs. The cost of electricity is cheaper than gas and diesel in most states.<sup>6</sup> Having fewer moving parts than gas or diesel engines leads to lower electric vehicle maintenance costs. At present, a federal tax credit can also significantly reduce the price of a new electric car. EV prices will continue to fall further due to the declining cost of batteries. Experts predict the cost of owning electric cars will be cost competitive with gas- or diesel-powered vehicles by 2020.<sup>7</sup>

The cost of an EV can be offset using federal and state tax credits and incentives. Find tax credits and incentives at

<https://www.afdc.energy.gov/laws/>.

Search for available Green Vehicles at

[https://www.afdc.energy.gov/vehicles/electric\\_availability.html](https://www.afdc.energy.gov/vehicles/electric_availability.html)

<sup>5</sup> "All-Electric Vehicles." Alternative Fuels Data Center: All-Electric Vehicles. April 3, 2017. Accessed July 19, 2017. [https://www.afdc.energy.gov/vehicles/electric\\_basics\\_ev.html](https://www.afdc.energy.gov/vehicles/electric_basics_ev.html).

<sup>6</sup> Yamauchi, Mia. "Driving on Electricity Is Cheaper Than Gas in All 50 States." Plugless Power. Accessed July 19, 2017. <https://www.pluglesspower.com/learn/driving-electricity-cheaper-gas-50-states/>.

<sup>7</sup> Hanley, Steve. "Electric Vehicle Battery Prices Are Falling Faster Than Expected." CleanTechnica. February 13, 2017. Accessed July 19, 2017.

<https://cleantechnica.com/2017/02/13/electric-vehicle-battery-prices-falling-faster-expected/>.