

Electric Vehicle vs. Gas vs. Hybrid Cars: A Comparison of Maintenance, Fuel, Insurance and Other Costs

Eco-friendly vehicles have emerged as an attractive alternative to gas-powered cars. Drivers looking to leave a smaller carbon footprint will also enjoy knowing that driving a fuel-efficient car is a financially smart move.

Electric-vehicle drivers can save over 10,000 € on car ownership costs over five years, compared with those driving gas automobiles.

Let's compare:

Volkswagen Golf, a gasoline powered-vehicle

Toyota Prius, a hybrid that runs on gas and electricity

Nissan Leaf, an all-electric car



Figure 1: Volkswagen Golf

<http://www.autoblog.com/volkswagen/golf/>

Figure 2: Toyota Prius

<http://www.toyota.com/prius/>

Figure 3: Nissan Leaf

<https://www.nissanusa.com/electric-cars/leaf/>

Driving an electric car can save 36% or 10,538 € over five years. In all 27 cities they examined, the Nissan Leaf was by far the cheapest to own. Although all three car models they analyzed are similarly priced, on average, Nissan Leaf owners will spend 10,538 € less than Golf drivers and 9,609 € less than Prius owners over five years. The savings are mainly due to the 7,500 € government incentives to Leaf and all electric car owners, but even without the credit, the Leaf is cheaper to own. Prius owners don't receive a credit. The Leaf costs much less to operate. Over five years, Leaf drivers can expect to spend 4,691 € less than Golf owners and 1,707 € less than Prius drivers. Much of this difference comes from not buying gas.

Two important considerations

Incentives

Most electric cars, including the Leaf, qualify for the 7,500 € government after purchase credit. However, there are a few things to consider before making an electric-vehicle purchase:

You won't receive money before your purchase, it will rather be refunded after you apply to Eco fund for unrefundable money.

You won't qualify for the incentive if you buy a used electric vehicle or if you lease it.

Additional state incentives include utility-rate reductions, charging battery powered car on public charging station free of charge, the ability to drive in some otherwise restricted areas and free parking for electric vehicles in some areas.

Who Wins on Lifetime Global Warming Emissions?

On average, **battery electric vehicles (BEVs)** representative of those sold today produce *less than half* the global warming emissions of comparable gasoline-powered vehicles, even when the higher emissions associated with BEV manufacturing are taken into consideration. Based on modeling of the two most popular BEVs available today and the regions where they are currently being sold, excess manufacturing emissions are offset within 6 to 16 months of driving.

EVs are now driving cleaner than ever before. Driving an average EV results in lower global warming emissions than driving a gasoline car that gets 50 miles per gallon (MPG) the average EV driving on electricity produces global warming emissions equal to a gasoline vehicle with a 68 MPG fuel economy rating.

EVs will become even cleaner as more electricity is generated by renewable sources of energy. In a grid composed of 80 percent renewable electricity, manufacturing a BEV will result in an over 25 percent reduction in emissions from manufacturing and an 84 percent reduction in emissions from driving—for an overall reduction of more than 60 percent (compared with a BEV manufactured and driven today).

Although a BEV has no tailpipe emissions, the total global warming emissions from operating it are not insignificant; they depend on the sources of the electricity that charge the vehicle's batteries and on the efficiency of the vehicle.

Meanwhile, many EV owners are pairing electric vehicle purchases with home investments in solar energy. With increasing levels of renewable electricity coming onto the grid, with carbon standards for fossil-fuel power plants beginning to be implemented, and with continued improvements in vehicle technologies, the emissions-reduction benefits of EVs will continue to grow.



Figure 4: <http://www.evstores.co.uk/the-benefit-of-leaving-gas-behind-and-going-electric-on-the-road/>

Global warming emissions occur when manufacturing any vehicle, regardless of its power source, but BEV production results in higher emissions than the making of gasoline cars—mostly due to the materials and fabrication of the BEV lithium-ion battery. Producing a midsize, midrange BEV similar to a Nissan LEAF typically adds a little over 1 ton of global warming emissions to the total manufacturing emissions, resulting in 15 percent greater emissions than in manufacturing a similar gasoline vehicle.

In other words, the extra emissions associated with electric vehicle production are rapidly negated by reduced emissions from driving. Comparing an average midsize midrange BEV with an average midsize gasoline-powered car, it takes just 4,900 miles of driving to “pay back”—i.e., offset—the extra global warming emissions from producing the BEV. Similarly, it takes 19,000 miles with the full-size long-range BEV compared with a similar gasoline car.

Based on typical usages of these vehicles, this amounts to about six months' driving for the midsize midrange BEV and 16 months for the full-size long-range BEV.

Meanwhile, the global warming emissions of manufacturing BEVs are falling as automakers gain experience and improve production efficiency. With a focus on clean manufacturing, emissions could fall even more. There are many ways in which the EV industry might reduce these manufacturing-related emissions, including:

Advances in manufacturing efficiency and in the recycling or reuse of lithium-ion batteries;
The use of alternative battery chemistries that require less energy-intensive materials; and
The use of renewable energy to power manufacturers' and suppliers' facilities.