



It is cheaper to drive a mile on electricity than it is to drive a mile on gasoline. Though your electricity costs will go up if you're charging your electric vehicle (EV) at home, your gas costs will decrease more. We've done some math to demonstrate cost savings and found that, by switching from the average new gas-powered car to the average new all-electric vehicle, the average Massachusetts or Rhode Island driver will save 3.38 cents per mile, which amounts to \$402.08 per year or \$33.51 per month.

The Union of Concerned Scientists' cost savings estimate for the entire country is about \$770/year. Our estimate for New England is lower than the national average due to the high cost of electricity, low cost of gasoline, and relatively fewer miles driven in New England compared to other states. You can access their numbers [here](#).

Considered another way, a new gas-powered car would have to get more than 66 miles per gallon in order to be cheaper per mile than the average new electric vehicle (but the gas-powered car would emit about twice as much pollution). Here's how we arrived at those numbers.

Saving 3.38¢/mile

How much does it cost to drive a mile on electricity?

The average new all-electric car available through the Drive Green program requires about 0.29 kilowatt-hours (kWh) per mile driven, according to the U.S. Department of Energy's [Electric Car Comparison Tool](#). (The 2019 Chevrolet Bolt requires 0.28 kWh/mile and the 2019 Nissan LEAF requires 0.30 kWh/mile.) In Massachusetts and [Rhode Island](#), one kWh costs about \$0.20 including generation, transmission, and distribution. The cost per kWh depends on the time of year (National Grid and Eversource change their rates every six months and rates tend to be lower in the summer). However, \$0.20/kWh is a good average estimate. Multiplying the number of kWh required to drive a mile by the cost of a kWh, we arrive at a cost of **5.8¢/mile** to drive the average new all-electric car as a National Grid or Eversource electric customer in Massachusetts or Rhode Island.

$$\frac{0.29 \text{ kWh}}{\text{mile}} \times \frac{\$0.20}{\text{kWh}} = \$0.058/\text{mile} = \text{cost to drive one mile on electricity}$$

How much does it cost to drive a mile on gasoline?

The average fuel efficiency for new vehicles sold in the United States 25.2 miles per gallon, according to [a study](#) by the University of Michigan's Transportation Research Institute as of 2018. Therefore, the average new gas-powered car requires 0.04 gallons of gasoline to drive one mile (1 mile ÷ 25.2 miles/gallon = 0.04 gallons of gasoline). According to the [U.S. Energy Information Administration](#), the average retail gasoline price in New England on 2/4/19 was \$2.313/gallon. Multiplying the number of gallons required to drive a mile by the cost of a gallon of gasoline, we arrive at a cost of **9.18¢/mile** to drive the average new gas-powered car in New England.

$$\frac{1 \text{ gallon}}{25.2 \text{ miles}} \times \frac{\$2.313}{\text{gallon}} = \$0.0918/\text{mile} = \text{cost to drive one mile on gas}$$

How much do I save by switching from a gasoline-powered car to an all-electric car?

It costs 9.18¢/mile to drive a gas-powered car and 5.8¢/mile to drive an all-electric car. The difference (9.18 – 5.8) is 3.38, so switching to an all-electric car saves the average Massachusetts or Rhode Island driver **3.38¢/mile**, *not* including savings from service, which you can learn more about at www.greenenergyconsumers.org/drivegreen/costs#service.

Saving \$402/year or \$33.51/month

The average licensed driver drives 11,759 miles per year in Massachusetts and 12,781 miles per year in Rhode Island, according to the [Federal Highway Administration](#). We will use the weighted average of these numbers based on their [2018 population](#) difference – 6.89 million MA residents and 1.06 million RI residents for a total of 7.92 million people. This leads to an average of 11,896 miles driven yearly.

$$11,759 \text{ MA miles} * \frac{6.89 \text{ million}}{7.92 \text{ million}} + 12,781 \text{ RI miles} * \frac{1.06 \text{ million}}{7.92 \text{ million}} = 11,896 \text{ average miles}$$

Since switching from a gas-powered car to an all-electric saves the average Massachusetts or Rhode Island consumer 3.38¢/mile, those savings amount to **\$402.08/year** (11,896 miles/year x 3.38¢/mile). Divided over twelve months, that amounts to **\$33.51/month**. But the more you drive, the more you save!

How many miles per gallon would a new gas-powered car have to get to be cheaper per mile than the average new electric car?

When we calculated the 9.18¢/mile required by a gas-powered car above, we multiplied the number of gallons required to drive a mile by the cost of a gallon of gasoline. Assuming a gas price of \$2.313/gal (the average retail gasoline price in New England on 2/4/19, according to the [U.S. Energy Information Administration](#)), a car would need to drive a mile using just 0.015 gallons of gasoline to be cheaper than a new all-electric car.

$$\frac{\$0.0348}{\text{mile}} \times \frac{1 \text{ gal}}{\$2.313} = 0.015 \frac{\text{gal}}{\text{mile}} \rightarrow 66.6 \frac{\text{miles}}{\text{gal}}$$

(Cost of driving 1 mile on electricity ÷ cost of gallon of gas = Gallons of gasoline per mile required to be as cost effective as EVs → MPG required for gas-powered car to be more cost-effective than an EV)

One mile per 0.015 gallons is equivalent to 66.6 miles per gallon, so the average new gas-powered car would have to get nearly **67 miles/gallon** (over twice as efficient as the current average new gasoline powered car) to be cheaper than an all-electric vehicle, assuming current gas prices!