



# Electrify Everything

## Transportation

Transportation is the largest source of greenhouse gas emissions in Massachusetts ([42% of emissions as of 2016](#)), with motor vehicles accounting for most of those emissions. According to the [Carbon Free Boston 2019 report](#), the electric motors propelling electric vehicles (EVs) are three times more efficient than internal-combustion engines at converting their energy sources into motion.

As a report from the World Economic Forum, [Electric Vehicles for Smarter Cities: The Future of Energy and Mobility](#), makes clear, we are at the start of a mobility revolution. By 2040, more than half of new cars sold in the world will be EVs, though the U.S. remains far behind Europe and China.

Our grandchildren will look back at the gas-guzzler the way we associate horse-drawn carriages as something we see only in movies. In the future, virtually all of us will refuel not at gas stations but at EV battery-charging stations, and more and more in the convenience of our homes and workplaces without the need to drive to a charging station.

Electric pickup trucks and buses are becoming more and more [popular](#). Reducing GHG emissions from heavy-duty [trucks](#) is a bigger challenge, but these vehicles are just over the horizon in a big way. As gas and diesel vehicles in car and truck fleets reach their end of life, they should be replaced by electric vehicles.

In 2019, air travel produced about 1 billion tons of CO<sub>2</sub> – 2% of global emissions. Electric air travel presents many technical, economic, and regulatory hurdles, but pioneering innovators, including major plane builders like Boeing and AirBus, are working to get e-planes off the ground.

Cargo ships belch almost as much carbon into the air each year as the entire continent of South America. According to one [study](#), a midsize cruise ship can emit as much particulate as one million cars. [Modern sails](#) could have a surprising impact.

Electrifying the transportation system will foster national security, energy independence, and a healthier environment. The same cannot yet be said of combustion fuels. No matter how efficient a gasoline-powered car gets, it can't eliminate carbon emissions.

## ***EVs as Grid Assets***

Due to its intermittent nature, wind- and solar-generated electricity requires fast-responding backup generators, which are fueled most often by natural gas. EVs represent a significant opportunity to bring more renewable energy onto the grid by managing and leveling those periods of intermittency.

In effect, EVs can be grid assets – batteries on wheels. One EV can store as much as three days' worth of a typical home's energy usage. EVs can charge up on cheap energy from the grid when the wind blows and the sun shines. They can discharge that energy back to the grid during periods of peak, high-priced demand. When aggregated and connected to the electricity grid, EVs collectively mimic a fast-responding backup generator – a very clean and quiet one.

## ***We Need a Shared Vision of Mobility***

Simply electrifying transportation will still leave us with congestion and a system that does not meet the needs of a large portion of the population. To address the transportation question adequately, investments not just in electrification, but also in public transit, pedestrian, and bicycling amenities must be considered.

Beyond that, we can look at advancing ways to reduce the need for travel at all, such as telecommuting and redesigning our urban environments to be more conducive to non-powered transit. We must view these systems holistically and aim to address some of the problems that won't be solved by electrification alone.

Learn more at [How to drive fossil fuels out of the US economy, quickly.](#)