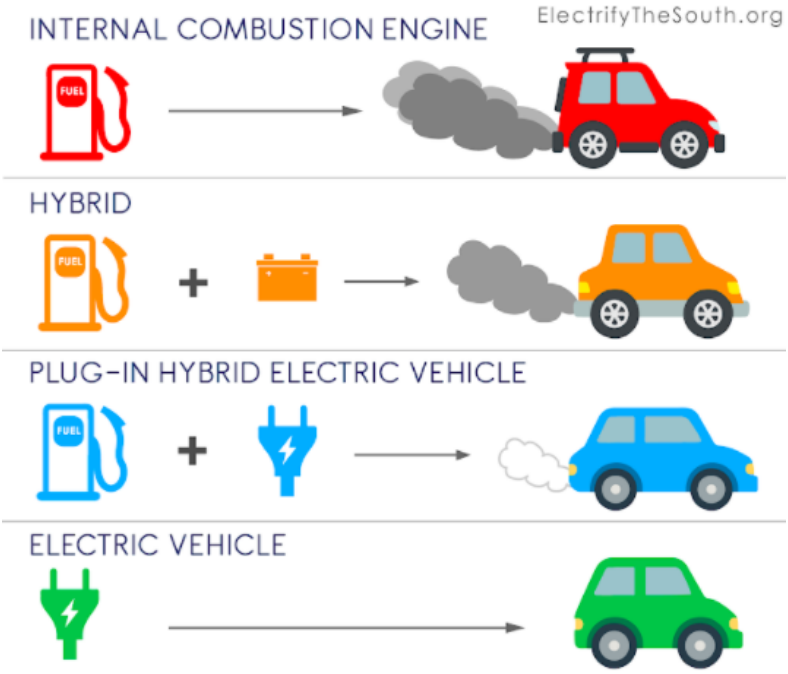
The transportation sector is now the largest source of carbon dioxide (CO_2) pollution in the United States.

What is an Electric Vehicle?



Plug-in electric vehicles are a category of vehicles that includes both plug-in hybrids (PHEVs) shown in blue and battery electric vehicles (BEVs) shown in green – basically, any vehicle that has the ability to plug-in and accept electricity as an energy source.

Benefits of Electric Transportation

- **Significant emissions reductions.** *The transportation sector is now the largest source of greenhouse gas (GHG) pollution in the United States.* Transitioning to electric transportation systems will significantly reduce these GHG emissions. There are two types of emissions associated with transportation that come from the tailpipe when burning gasoline or diesel. The first are GHG emissions that exacerbate climate change. The second are criteria pollutants like nitrogen dioxide and sulfur dioxide. They cause human health issues and environmental problems too (like smog). Battery electric vehicles have no tailpipe and emit no direct emissions.
- **Lower lifetime ownership costs.** Typical drivers save $6,000 to $10,000 over the life of the vehicle, versus owning a comparable gas-powered vehicle. This is largely due to lower fueling and maintenance costs. There are no oil

changes with an EV and there is less scheduled maintenance because of the simplicity and fewer moving parts with an electric motor.

- **Fueling costs are much lower.** It costs about $35-40 to drive 1,000 miles on electricity (which is an average month's worth of driving). Gasoline costs are much higher than that and fluctuates widely due to its economic volatility.
- **Time savings and convenience.** There are no oil changes with an all-electric vehicle so you save time and money. Additionally, because they don't use oil you never have to worry about oil marks on your driveway. With fewer moving parts, EVs require less maintenance than traditional Internal Combustible Engines (ICE vehicles). Also powering them is easy, you can schedule to charge them at night while you're sleeping. So you can skip the pump and never have to worry about dirty gas tank handles.
- **Superior efficiency.** EVs are significantly more efficient than an internal combustion engine vehicle. The average fuel efficiency in the US is 25.7 miles per gallon. The fuel efficiency for most electric cars is over 100 MPGe. MPGe is the miles per gallon equivalent. So, what that means to a consumer is that you use less energy to get from point A to point B, and **the cheapest fuel is the fuel you don't use**.
  In an electric drive system about 80% of the electrons move the car down the road whereas with a conventional vehicle only about 12%–30% of the energy from the fuel is used to move it down the road.
- **Superior technology and safety features**. The quickest mass produced car in the world is a Tesla Model S but all electric vehicles have that powerful instant torque. Propulsion from an electric motor means EVs are smooth and a quiet drive, and they have to pass the same rigorous safety standards often with flying colors.

How Do Electric Vehicles Work And How Long Does It Take To Charge Them?

A battery electric vehicle works by an electric motor that is powered by a rechargeable battery pack. The range that the vehicle can travel before being recharged depends on the size of the battery pack. An electric vehicle has a single-speed transmission so has instant acceleration and with no tailpipe and emits no direct emissions.

BEV can be charged using a traditional 110V outlet and a charging cord plugged into the car. This is called "trickle charging" or Level 1 charging and it adds about 5 miles per hour. Most drivers can replenish what was driven in a day by plugging in overnight at home. The second way to charge is called Level 2 charging and it allows you to add about 25-60 miles per hour. This method uses charging stations

that you can find around town and some folks choose to install them in their home. The third way to charge, DC Fast-Charging, is usually found along highways and allows you to quickly recharge approximately 80% of the battery in half an hour.

Existing EVSE Types and Use Cases

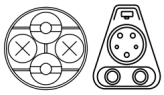
EVSE Type	Supply Voltage	Charger Examples	Power Level	Charge Rate (miles / hr)	Install Cost	Charging Use Cases	KEY POINTS
Level 1	120V (Toaster)	 J1772 Connector	1 - 1.8 kW	3 - 7	$	Home / Overnight	Obsolete for commercial purposes
Level 2	208-240V (Clothes Dryer)	 J1772 Connector	3.3 - 19.2 kW	10 - 60	$$	Home-work / Destination / Community	Currently dominant for commercial purposes
			7.7 kW typical	26			
DCFC	480V (Small office building)	 CHAdeMO / SAE Combo (CCS)	50 kW	175	$$$	Travel along State Highways	Most applicable for long-range travel and evacuations
			150 kW	**500**			
			350 kW	1,200			

Image Source: Florida Department of Transportation EV Infrastructure Master Plan

Notice the two different shapes of DC fast charger connectors. The CHAdeMO connector was used by Nissan but is being phased out to CCS. Additionally, Tesla has their own proprietary charging and the shape is the same for all levels of charging.

Currently, there are 61 models of plug-in hybrid and full battery electric passenger duty vehicles. By 2026, another 96 models will be coming to market. The average new EV gets 256 miles of range before needing to be plugged in. Additionally, automakers are decisively pivoting to EV. To date, there has been $460B in global investment in EVs.

There is an electric application for every class of trucks 4-8. Transit and school buses, delivery and garbage trucks are here today. Children today can ride to school in an emission-free bus. Right now quiet garbage trucks and emission-free deliveries are happening in towns.

One fantastic resource for finding the model that is right for you is Plug-In America's PlugStar website. They list all current makes and models, show MSRP and range and link to the manufacturer's websites.

Economic Benefits

1. Tax dollars saved operating electric public fleets can be invested in other areas.
2. Purchasing "local" electricity instead of out-of-state gas keeps transportation dollars circulating in local economies. By switching to electric, we can spend $42 billion less annually on fuel. Additionally, $5 billion annually would be recirculating through and supporting local economies if we switched to a fully electric transportation system. **If all the cars, trucks, and buses were electric today, the Southeast would have an extra $47 billion circulating through the region's economy annually.**
3. Increased spending on electricity for transportation puts downward pressure on electricity rates for all ratepayers.
4. Electric vehicle manufacturing directly creates 7,785 jobs in the southeast. That accounts for 18% of the national total EV manufacturing jobs and a 33% increase over the past 12 months.
5. Price-stability of electricity vs gasoline/diesel for fleet fuel budgeting.
6. Value of stored energy in EV batteries that can serve the grid to meet peak-demand needs and resilience during an emergency.
7. Ability to pair with solar spurring on another clean energy sector and enabling the cascading economic development benefits.
8. Public health dollars saved by reduced air pollution leading to reduced disease and ER visits and increased productivity.
9. Climate-cost avoidance achieved by reducing transportation carbon emissions and maximized by cleaning the grid in parallel