

NEW CHARGING TECHNOLOGIES FOR ELECTRIC VEHICLES

New Charging Options for Electric Vehicles

The numbers of electric vehicles in the U.S. are growing. The International Energy Agency reported some 1.8 million EVs in the U.S. as of 2020, up from less than 300,000 in 2016. While those numbers still greatly lag gasoline- or diesel-powered vehicles, it won't last for long. EVAdoption projects sales of battery-powered EVs and plug-in hybrids to account for just shy of 30 percent of new car sales in the U.S. in 2013, compared to about 3.4 percent in 2021. Sales numbers would jump from about 500,000 in 2021 to 4.7 million in 2030, according to those projections.

For that to happen, the number of charging stations throughout the country must grow. There now are more than 42,000 public charging stations across the U.S., according to Pew Research Center's analysis of Dept. of Energy data, compared to about 150,000 gas stations. But a buildout is occurring throughout the U.S. Volkswagen's Electrify America announced plans to double the number of its EV fast-charging stations in the U.S. and Canada by 2025, bringing the number to 1,800. Tesla, ChargePoint, and EVgo are three other companies building out charging infrastructure.

Charging stations commonly offer rapid and fast charging options. Slow charging commonly takes place at home with a draw of 2.3 kW that can fully charge a car in 10 to 14 hours. Fast chargers can charge a car from two to six hours, depending on use of a 7-kW charger or more powerful 22-kW unit. Rapid chargers offer a boost to 43 kW and can bring an EV battery to 80 percent capacity in 20 minutes, with another 20 minutes to top it off. As EVs become more popular, other charging technologies will be introduced. Here are a few.

Electric Vehicles in US



2016
300K



2020
1.8M



Wireless Charging

Not unlike wireless phone chargers, EVs can be charged using inductive technology. A magnetic coil placed on the vehicle's underside captures electricity transferred from an air gap from a magnetic coil in a charger beneath or on top of a road surface. Coils must be aligned and the vehicle could accept a charge even if it is positioned several inches away.



Lamp Post Charging

Lamp posts are becoming a basic building block of smart cities. Sensors placed on them can monitor vehicle and pedestrian traffic, air quality, along with other activity. They also can be used to host EV chargers, a convenient point for urban EV owners lacking space to charge their vehicles. Chargy is already installing plug-in stations in London. The company estimates a standard lamp post connected to a 25-amp supply would have 24 amps of excess supply that can be used for charging at a rate of 20 miles per hour of charging.



Electrified Roads

Charging on the go is being investigated in Sweden where a 2-kilometer stretch of road has been converted to a pilot charging project, part of the country's effort to be carbon neutral by 2030. Called eRoadArlanda, a rail embedded in the roadway transfers electricity to an adjustable arm attached to a vehicle. The arm automatically moves into a lowered position to make contact as long as the vehicle remains above it. Individual sections of rail only draw power from the grid when a vehicle is above it.



Pop-Up Pavement Chargers

In the U.K., Urban Electric Networks developed a charging device that retracts into the pavement when not in use. It can be activated and raised from its resting position through a smartphone app. A pilot project provided fast charging of up to 7 kW was installed in 2019 and a next-generation device earlier this year in Dundee.

