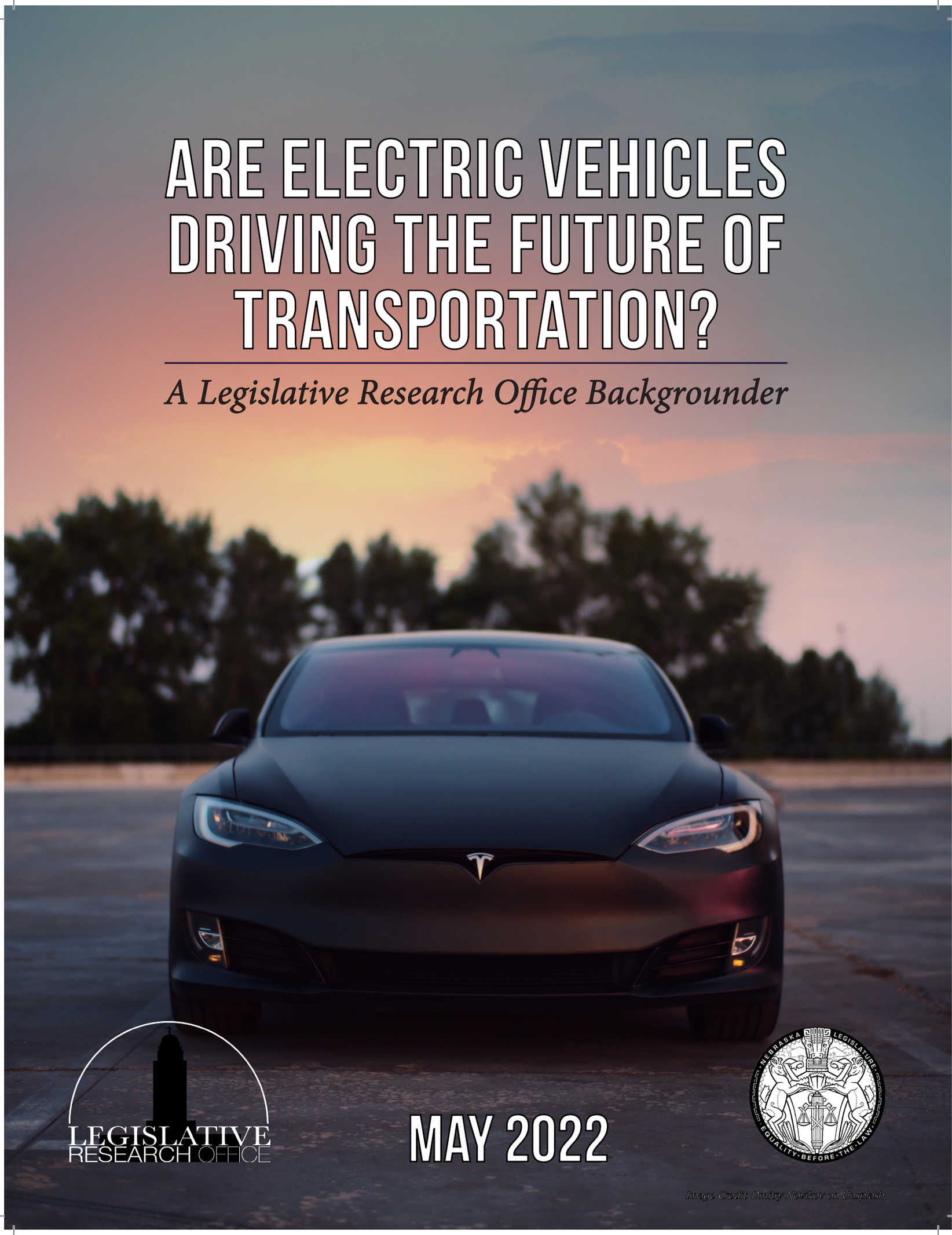
ARE ELECTRIC VEHICLES DRIVING THE FUTURE OF TRANSPORTATION?

A Legislative Research Office Backgrounder



LEGISLATIVE RESEARCH OFFICE

MAY 2022

NEBRASKA LEGISLATURE · EQUALITY · BEFORE · THE · LAW

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May 2022

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Introduction

Driven by emission standards, automakers are ramping up production of all-electric and plug-in hybrid electric vehicles (EVs). Consumer demand for electrified vehicles has steadily grown with the help of tax incentives, and popularity of these new vehicles continues to increase among enthusiasts. In 2021, MotorTrend, the world's largest automotive media company, selected EVs for both of their 2022 Awards: Truck of the Year (Rivian R1T) and Car of the Year (Lucid Air).

In 2021, automakers around the world pledged enormous investments intended to increase EV production. GM announced a $35 billion investment in EVs by 2025 and that it hopes to discontinue sales of smaller combustion engine vehicles by 2035. Ford declared that it aspires to make at least 40 percent of their portfolio all-electric by 2030. The automaker Stellantis (parent company to the brands Chrysler, Dodge, and Jeep) will invest over $33 billion euros to electrify its lineup, and the Chrysler brand itself will shift to all-electric by 2028. In Japan, Toyota Motor Corporation committed $70 billion to electrify its portfolio by 2030. Executives at Mercedes have released plans for half of their sales to be EVs by 2025. Manufacturers have also recently announced plans to open more than a dozen EV and battery factories in U.S. states like Tennessee (Ford), Georgia (Rivian), and North Carolina (Toyota).

With EVs featured in nearly every new car commercial on TV, the message is loud and clear that the auto industry is moving toward electrification. What are the factors driving this massive and historic industry transformation? How quickly will the public adopt this new technology? What are frequently asked questions about hybrids and electrified cars? These questions and more will be answered in this backgrounder from the Legislative Research Office.

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Vehicle Emissions

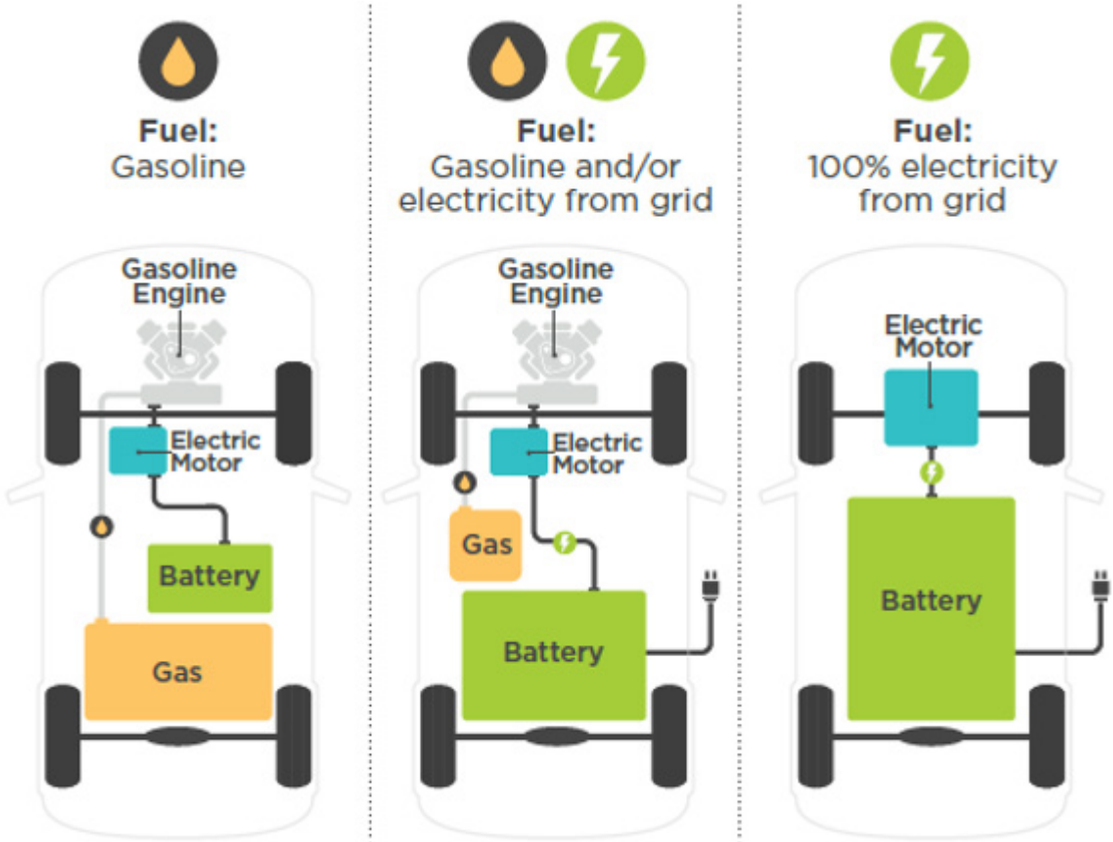
Limits to the amount of pollution a car can produce are referred to as emission standards. When powered solely by electricity, EVs produce no tailpipe emissions; however, the electricity powering EVs can be produced from several sources, each with varying levels of indirect emissions: coal, hydropower, natural gas, nuclear, solar, and wind.[1]

National and regional emission standards like in China, the European Union, and several U.S. states have accelerated manufacturers' retooling of their production lines and have increased EV supply in those areas. In terms of results, the recent proliferation of EVs in southern California has led to a small (4 percent) reduction in nitrogen oxide emissions from passenger cars.[2]

What are zero-emission vehicles?

A zero-emission motor vehicle emits no exhaust pollution or greenhouse gas emissions. Vehicles that qualify as zero-emission include all-electric vehicles (also called battery electric) and plug-in hybrid electric vehicles (EVs). Although they are electrified, gas-electric hybrid vehicles are not considered zero-emission vehicles. These gas-electric hybrid vehicles are not plugged into the electric grid and require gasoline as the only source of energy. Hydrogen fuel cell electric vehicles are another type of vehicle with no emissions, but their current availability is limited.[3]

Types of Electric Vehicles



Gas-electric hybrid

Plug-in hybrid (EV)

All-electric or Battery electric (EV)

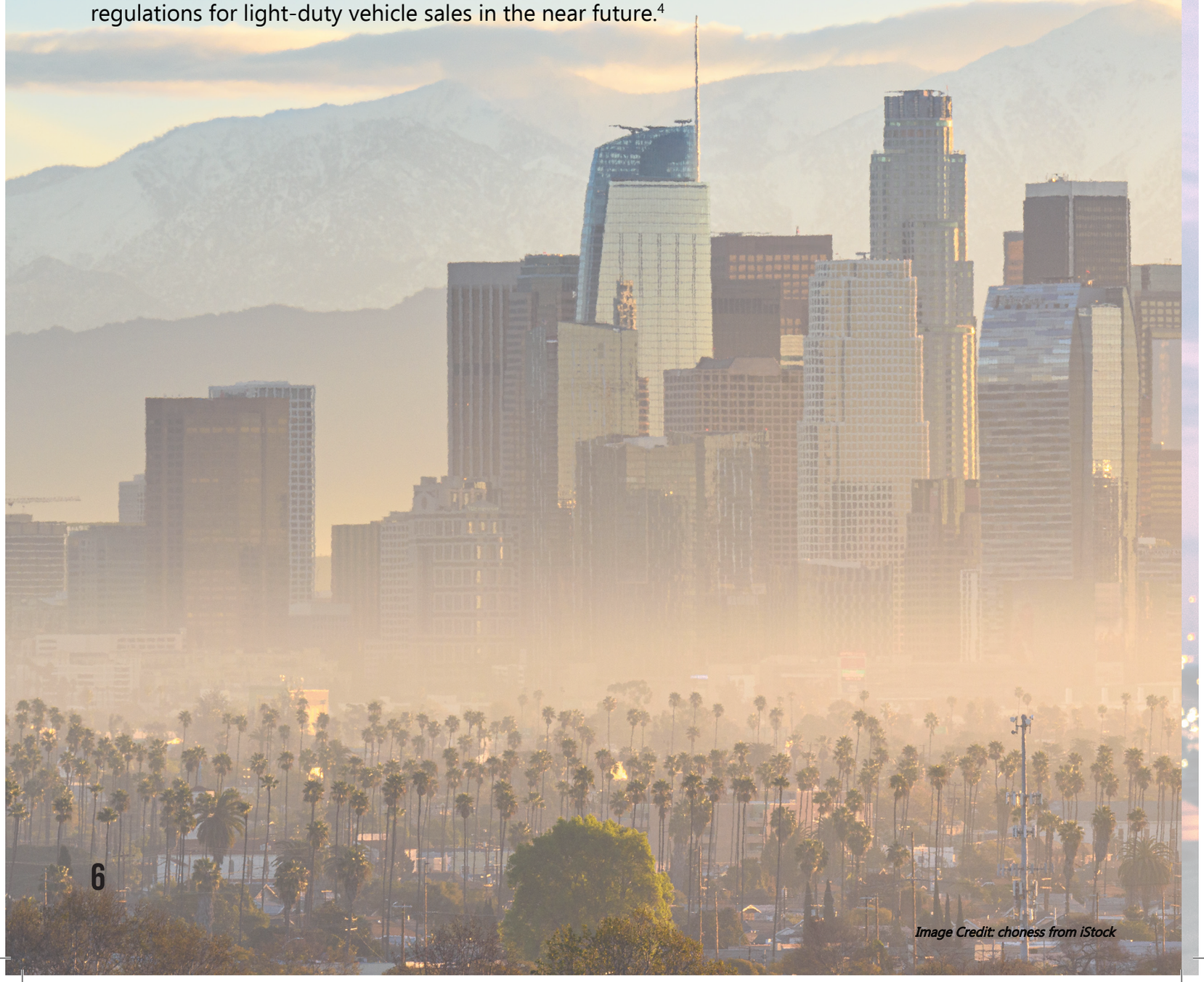
Image Credit: EPRI

Vehicle Emissions

What are the emission standards in the U.S.?

In December 2021, the U.S. Environmental Protection Agency issued new emission and fuel economy rules for cars and light trucks for model years 2023 through 2026. Administrative rules, executive orders, and legislation that create emission and fuel-type standards are motivating factors for automakers to provide EVs to that marketplace. Leading the race among states, California has taken executive action to call for the replacement of five million combustion engine vehicles with zero-emission vehicles by 2030. In addition, California has asked that both private and public entities work in unison to install 250,000 charging stations in the state by 2025.[3]

Other states have adopted similar standards, sometimes called clean car programs, which require that a share of new vehicle sales be zero-emission vehicles. Fifteen states (Colorado, Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, and Washington) and the District of Columbia have adopted California's zero-emission standards. Two states (Minnesota and Nevada) intend to adopt regulations for light-duty vehicle sales in the near future.[4]



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Comparing Vehicles

How is EV mileage measured?

Driving-age adults today clearly understand concepts like miles per gallon and gas tank capacity. Electric vehicles, however, are powered by a fuel that is measured in terms of an energy unit called kilowatts (kW), which defines how much power an electric device consumes. EV mileage is measured by how many kilowatts of energy per hour (kWh) are needed to run a vehicle for 100 miles.

What is the best way to compare the energy consumption of EVs and internal combustion engine vehicles?

Miles per gallon equivalent (MPGe) is the best measure to compare the relative energy consumption of EVs and gas-powered vehicles. For example, the potential energy contained in one gallon of gas is equal to 33.7 kWh of electricity. If an EV can travel 90 miles on 33.7kWh, it receives a 90 MPGe rating. A gas-powered vehicle would have to travel 90 miles per gallon to receive the same rating.[5]

While some diesel-powered cars reach up to 40 or 50 miles per gallon, the Tesla Model 3, the most affordable option from that automaker, has a 134 MPGe rating.[5]

How can the efficiency of different EVs be compared?

The rating kilowatt-hours per 100 miles (kWh/100mi) describes the efficiency of an electric vehicle much like a miles per gallon rating. It tells the consumer how well the motor converts the electrical energy in the battery into 100 miles traveled in the vehicle. A lower kWh/100mi rating indicates the electric motor requires less energy to travel 100 miles of distance.[5]

The 2021 Tesla Model 3 has a rating of 24 kWh/100mi and is more efficient compared to the Ford Mustang Mach-E with a 34 kWh/100mi rating.

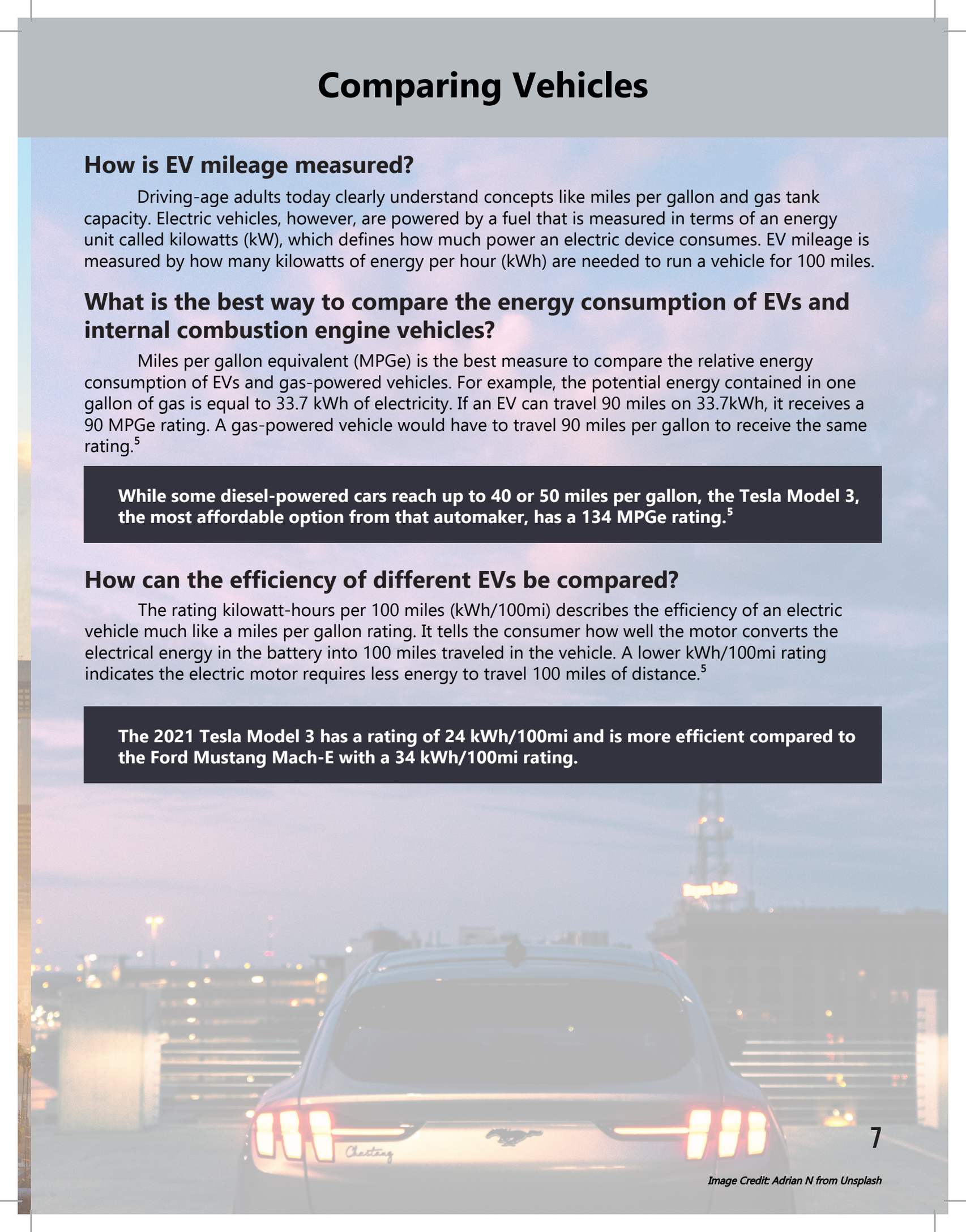


Image Credit: Adrian N from Unsplash

EV Charging

What equipment is needed to charge an EV?

The term electric vehicle supply equipment (EVSE) encompasses all the cables, connectors, and attachments needed to supply power to an EV at home or in public. Focusing on public EVSE, a "station location" is described as a public site with EV charging infrastructure. A "charging post", which resembles a gas pump, may house one or more EVSE ports. These ports provide power to a vehicle through connectors that operate like any common electrical plug. At a single station location there may be one charging post that has multiple EVSE ports and connectors, but that charging post will only supply power to one EV at a time.[6]

One Station Location with Two Charging Posts

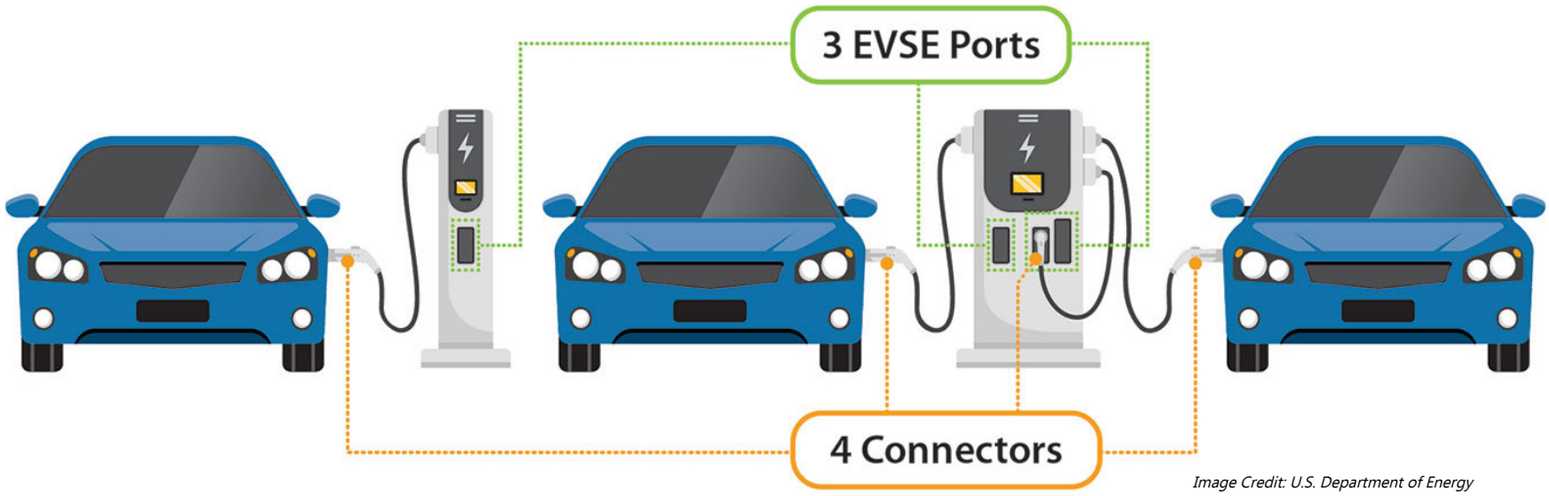


Image Credit: U.S. Department of Energy

How much time does it take to charge an EV?

The time required to charge an EV depends on multiple factors like the amount of charge already in the battery, the battery capacity, and the level of power output from the charging equipment. Because of these variables, the time required to completely charge an electric vehicle could range from 20 minutes to 20 hours or more in a worst-case scenario.

EVs are charged via either alternating current (AC) or direct current (DC), which provides double the power output of AC equipment. AC Level 1 charging equipment supplies an EV with two to five miles of range per hour and AC Level 2 provides 10 to 20 miles of range per hour of charging. DC charging technology is currently delivering 60 to 80 miles of range per 20 minutes of charging. Marketing itself as the fastest charging EV, the Lucid Air charges at rates of up to 20 miles per minute at DC stations.

The time required to fuel an EV is rapidly reaching equivalency with the duration of a gas-station fill-up. Charging time is a major factor for industry growth as faster charging technology enables the expanded use of larger EVs and commercial fleets like school buses and trailer-trucks.[7,8]

Tesla's proprietary "supercharger" units are even faster than normal DC chargers – they can fuel Tesla batteries to 80 percent capacity in 30 minutes - quickly providing hundreds of miles of range.

EV Charging

Where are EV chargers located?

Slower AC charging is most often utilized at home when the vehicle can be plugged-in overnight. An AC Level 1 charger is often provided along with the purchase of an EV and is usually installed without additional cost as they only require a standard home electrical outlet.

Faster DC chargers are better suited for public settings like parking garages, shopping malls, and workplaces. The U.S. Department of Energy Alternative Fuels Data Center provides a tool to locate one of the more than 46,000 publicly available alternative fueling stations across the nation.[9]

Currently, there are a total of 182 public charging stations in Nebraska with over 360 EVSE ports. Most of these public charging stations deliver power though AC Level 2 chargers (149 station locations with 291 EVSE ports) followed by DC fast chargers (33 station locations with 83 ports).[9]

Wireless EV charging technology is beginning to emerge for powering up at-home or in public. Michigan has a plan to construct a 1-mile stretch of electrified road which allows an EV to charge as it is being driven. Indiana is also developing a wireless-charging segment of highway and is testing the feasibility of charging heavy-duty electric trucks as they travel. The Kansas City International Airport has invested in wireless EV charging which will help extend the range of its electric buses without taking them out of service.

What is the range of new EVs?

The average range of EVs – how far they can travel on a single charge - has increased greatly in the last decade, and average EV range is expected to reach 270 miles in 2022. Range is best described in terms of how much energy can be stored in the EV battery. The Mini Cooper SE carries a 28.9 kWh battery, giving it a 110-mile range compared to the Tesla Model S which holds a 100kWh battery providing over 400 miles of range. Larger-size EVs like the 2022 GMC Hummer EV (350 mile range) and the upcoming Ram 1500 Electric (500 mile range) are expected to carry even larger batteries providing more range compared to smaller vehicles.[8]

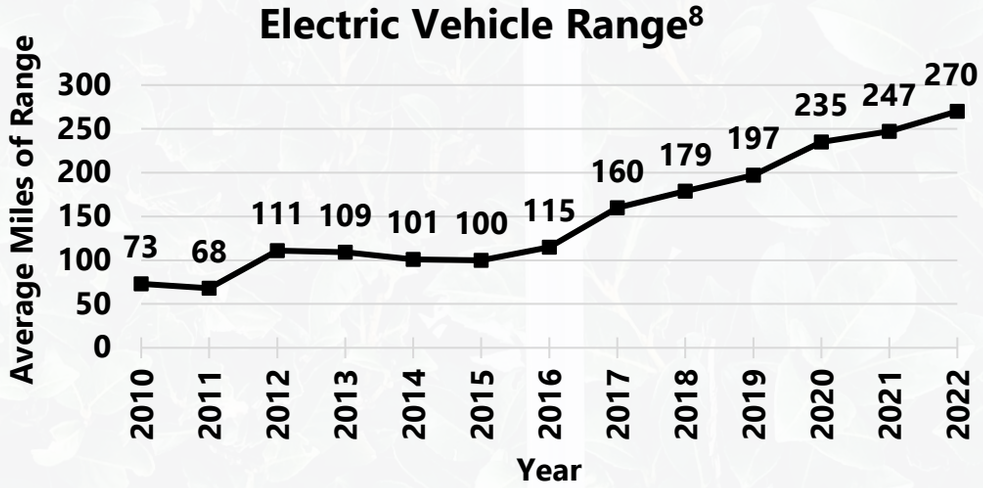


Image Credit: John Cameron on Unsplash

EV Production and Sales

What types of EVs are being built?

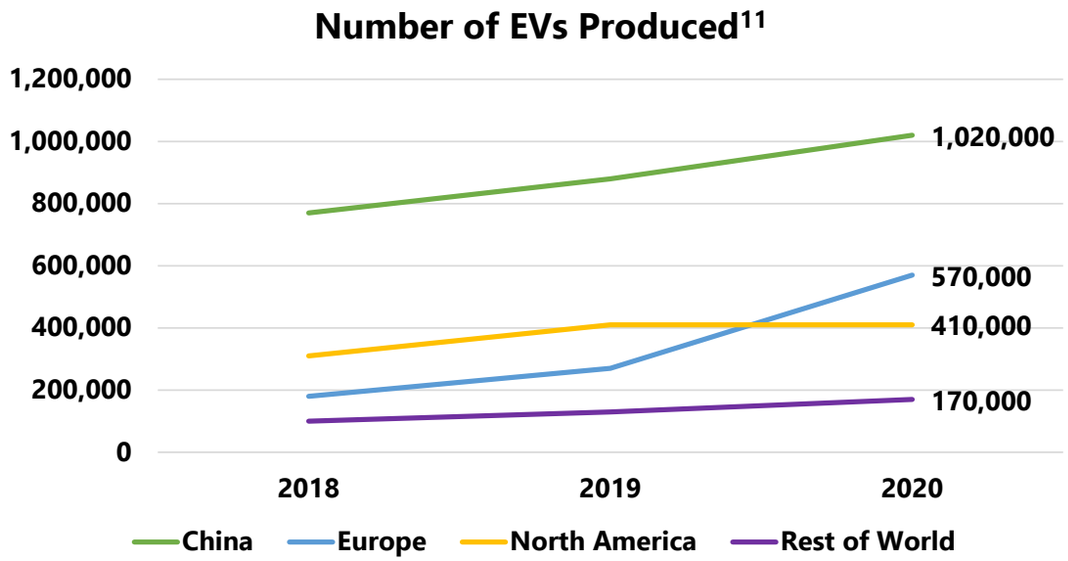
By 2024, there will be over 130 different EV models of varied shapes and sizes available on the market. Early EV models were most often compacts or sedans, but with the advancement of battery technology, larger and more heavy-duty EVs like pickup trucks and sport utility vehicles are becoming more available.

The announcement of Ford's electric F-150 Lightning created much excitement and generated nearly 200,000 purchase reservations which drove Ford to increase annual production by 275 percent.[10] The F-150 Lightning features a 300-mile range battery and a "frunk" – a front trunk doubling as a cooler – located where the gas engine would have been housed. The new EV truck is also advertised as an energy supply that can even power a home during an outage. Other makers of electric trucks either have models available now (GM and Rivian) or have announced they will be available in 2023 or 2024 (Tesla, Chevrolet, and Ram).[8] Automakers like Ford, Nissan, and Winnebago are also producing concepts for electric camper vans and recreational vehicles, but none have yet announced mass production of an electric RV.

How many EVs are being built around the world?

The International Organization of Motor Vehicle Manufacturers (OICA) tracks the production of vehicles for each country and region. According to OICA, total global vehicle production fell in 2020 (77.6 million) from the observed totals in 2019 (92.1 million) and 2018 (96.8 million). Despite the recent slowdown of vehicle manufacturing overall, the number of EVs built and their market share has increased.

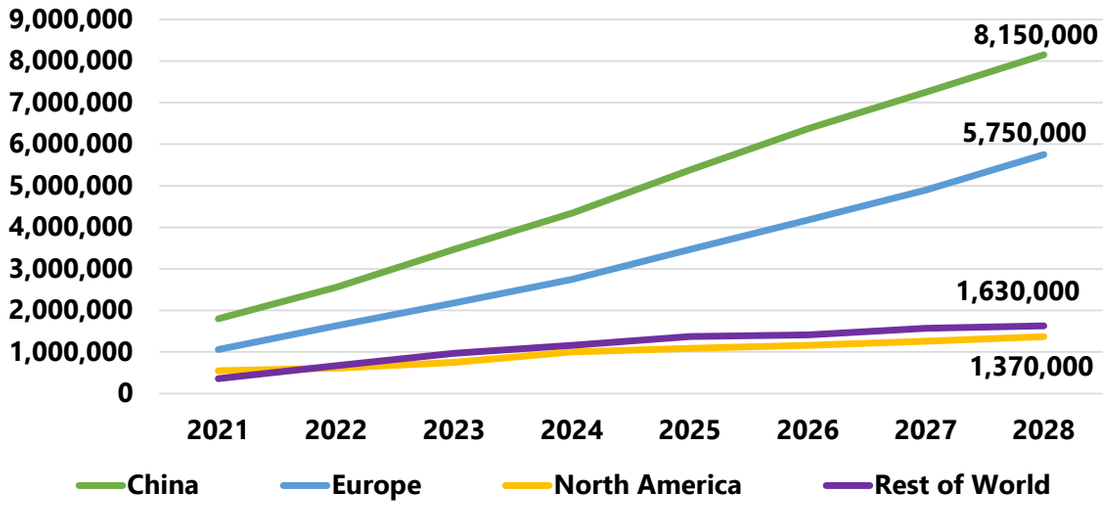
In 2018, an estimated 1.36 million EVs were produced – 1.4 percent of total vehicle production. In 2019, EV production sped up to a 1.8 percent share (1.69 million) and in 2020, production accelerated to a 2.8 percent share (2.17 million). In 2020, regional EV production in China (1.02 million) and the EU (570,000) outpaced North America (410,000) and the rest of the world (170,000).[11]



EV Production and Sales

LMC Automotive, a global data firm, estimates that China will have the capacity to produce over eight million EVs a year by 2028. Europe is on schedule to make 5.75 million EVs a year by 2028 and North American automakers are estimated to build only 1.37 million EVs a year by 2028.[12]

Forecasted Number of EVs to be Produced[12]



What percentage of cars being sold are EVs?

Internationally, 8.5 percent of new cars sold in 2021 were EVs (6.6 million vehicles), up from 4.1 percent (3 million) in 2020 and 2.5 percent in 2019 (2.2 million). Annual EV sales in the U.S. market more than doubled in 2021 with over half a million sold – a 4.5 percent share of all vehicles sold in the U.S.

The emissions standards recently enacted in Europe and China have driven up EV sales in those regions. For example, in 2019 just 5 percent of vehicles sold in Europe were EVs. After new regulations were enacted, the 2020 share of EVs sold in Europe jumped to 12 percent (1.4 million vehicles). In 2021, EVs made up 17 percent (2.3 million) of vehicles sold in Europe. Diesel vehicle sales have now fallen behind EVs in Europe, and in Norway, the international leader, 72 percent of all new cars sold in 2021 were all-electric vehicles.

In China, 3.4 million EVs (a 9 percent market share) were sold in 2021, a 158 percent increase from 2020. By 2025, EVs are expected to reach a 20 percent market share in China.[13] Despite the relatively small percentage of EV sales in the U.S., global market changes are beginning to influence buying habits here at home.

From 2012 to 2021, more than 1.8 million EVs were sold in the U.S. with Tesla greatly outpacing all other automakers. As of May 2021, Tesla had sold more EVs to U.S. consumers (750,000) than all other automakers, followed by Chevrolet (250,000).[8] Of all EVs in the U.S. as of 2022, more than 60 percent were manufactured by Tesla.[14] Worldwide, Tesla sold nearly 1 million EVs in 2021, only a third of which were shipped to customers in the U.S.[15]

EV Production and Sales

How many EVs are registered in Nebraska?

According to data from the Nebraska Department of Environment and Energy, more than 1.9 million total vehicles were registered in Nebraska in 2021. Of those registrations, 23,540 were for electric-gasoline hybrid and plug-in hybrid vehicles (1.2 percent), but only 2,527 registrations were for all-electric vehicles (0.1 percent). Nearly 80 percent of all 2021 registered vehicles in Nebraska are powered by a gasoline/ethanol blend whereas EVs and gas-electric hybrids currently represent less than 2 percent of registered vehicles. Other fuel types such as diesel/biodiesel and flex fuel account for the remaining 18 percent of Nebraska vehicle registrations.[16]

As of June 2021, 1.02 million all-electric vehicles were registered in the U.S. with most being registered in California (41.7 percent) followed by Florida (5.7 percent) and Texas (5.1 percent). Of all EVs in the U.S., the percentage registered in Nebraska ranks 42nd among all states at 0.18 percent.[17]

Registered Vehicles in Nebraska[17]

Year	Diesel/Biodiesel	Electric	Electric/Gasoline Hybrid	Flex Fuel (FFV)	Gasoline/Ethanol–Blend	Other	Total
2021	148,748	2,527	23,540	208,094	1,516,658	1,168	1,900,735
2020	139,868	1,373	18,381	202,998	1,477,114	1,135	1,840,869
2017	144,574	507	16,473	209,397	1,688,692	1,539	2,061,182
2016	133,691	320	14,430	193,520	1,535,821	1,492	1,879,274
2015	133,918	253	13,762	188,665	1,617,357	1,668	1,955,623
2014	121,965	190	12,101	169,401	1,482,127	1,597	1,787,381

Image Credit: solarseven from iStock

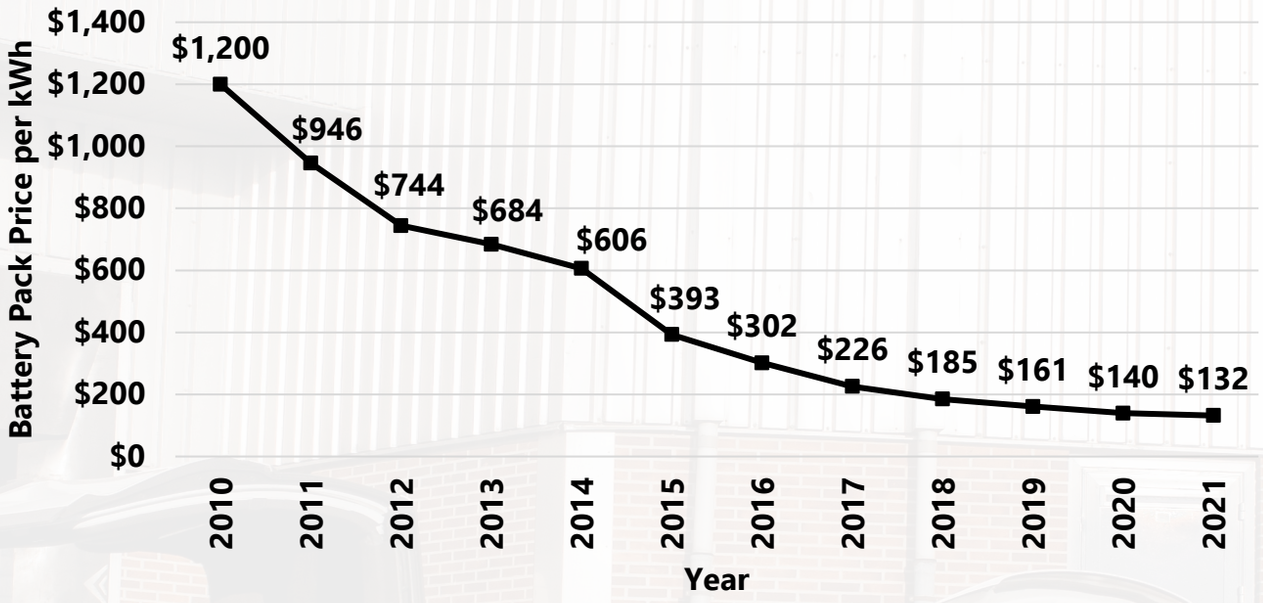
Costs Associated with EVs

How much does it cost to buy and own an EV?

In 2021, the average cost of buying an EV was $56,437, which was more than $10,000 higher than the overall industry average ($46,329), which includes all vehicle types.[18] Currently, all-electric vehicle prices vary from less expensive options like the Nissan Leaf S ($30,000) and Tesla Model 3 ($40,000) to larger or luxury options like the Rivian R1T truck ($67,500) and the Lucid Air Grand Touring ($139,000).[19] Price parity between electric and gas-powered cars is expected in 2024 for small vehicles like sedans and is expected in 2026 for large vehicles like pickup trucks.

Exceeding expectations, the price of EV batteries has decreased dramatically by 80 percent since 2010. These cheaper battery systems are driving the trend of decreasing EV purchase prices. Battery pack price reduction is expected to continue, albeit more slowly than in the past due to a recent rise in the costs of raw materials needed for battery manufacturing.[20]

Electric Vehicle Battery Price[20]



Despite the higher initial costs, EVs can save buyers thousands of dollars on maintenance and fuel over the life of the vehicle. Combustion engine vehicles require oil changes, unlike an EV, contain many more moving parts, and require about 30 percent more labor to assemble compared to EVs. The Tesla Model 3 and Jaguar XF P250 sedans have similar purchase costs, but after five years, the Tesla costs $16,000 less to maintain and operate.[2]

Image Credit: Jorgen Hendriksen on Unsplash

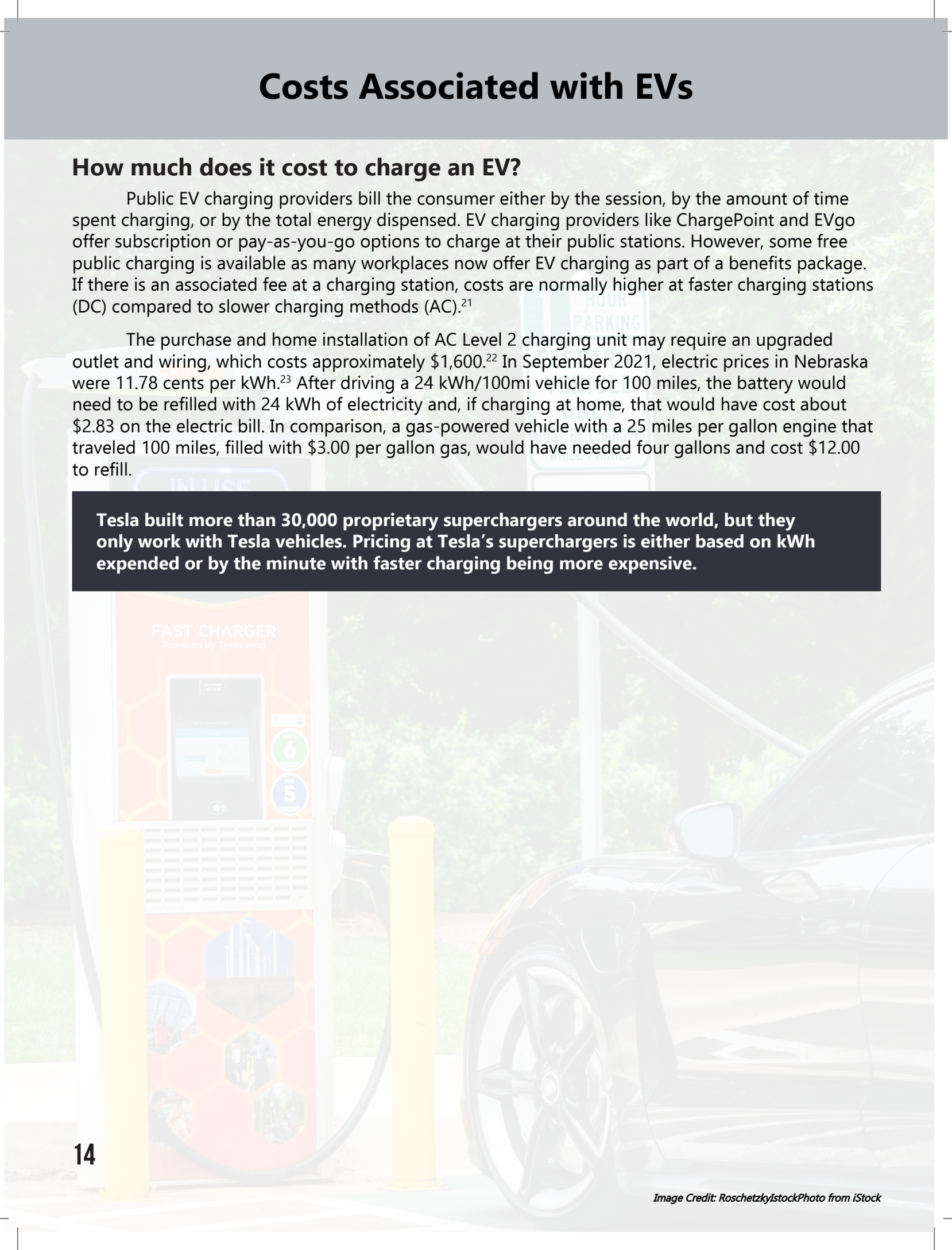
Costs Associated with EVs

How much does it cost to charge an EV?

Public EV charging providers bill the consumer either by the session, by the amount of time spent charging, or by the total energy dispensed. EV charging providers like ChargePoint and EVgo offer subscription or pay-as-you-go options to charge at their public stations. However, some free public charging is available as many workplaces now offer EV charging as part of a benefits package. If there is an associated fee at a charging station, costs are normally higher at faster charging stations (DC) compared to slower charging methods (AC).[21]

The purchase and home installation of AC Level 2 charging unit may require an upgraded outlet and wiring, which costs approximately $1,600.[22] In September 2021, electric prices in Nebraska were 11.78 cents per kWh.[23] After driving a 24 kWh/100mi vehicle for 100 miles, the battery would need to be refilled with 24 kWh of electricity and, if charging at home, that would have cost about $2.83 on the electric bill. In comparison, a gas-powered vehicle with a 25 miles per gallon engine that traveled 100 miles, filled with $3.00 per gallon gas, would have needed four gallons and cost $12.00 to refill.

Tesla built more than 30,000 proprietary superchargers around the world, but they only work with Tesla vehicles. Pricing at Tesla's superchargers is either based on kWh expended or by the minute with faster charging being more expensive.



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Transportation Infrastructure Funding

A massive industry shift like vehicle electrification will affect the available funding for roads, bridges, and other transportation infrastructure. An increased demand for alternative fuel will also affect the type of required transportation infrastructure (EV charging stations). These changes in the market present an opportunity to re-think transportation taxes and infrastructure funding.

What is the trend of existing fuel taxes?

With the increased adoption of EVs, and with more fuel-efficient gas-powered vehicles on the road than ever, fewer tax dollars will be generated by traditional motor fuel taxes than in the past. Any decrease in total revenue will likely have an impact on both the quality of existing roads and the construction of new roads and highways. The National Association of State Budget Officers noted in 2019 that the largest national revenue source for transportation funds was motor fuel taxes (40 percent).[24]

According to the Nebraska Department of Transportation (NDOT) in fiscal year 2021, a total $1.1 billion was received from all sources; approximately half was received from state sources ($500.5 million). Of those state receipts, 57 percent ($284.7 million) was collected from motor fuel taxes. During the same period, NDOT spent $745 million for highway construction and related expenses.[25] Several options exist that can help make up the potential revenue shortfall from decreasing motor fuel tax collections.

Motor fuel taxes in Nebraska are set to decrease in 2022. Effective January 1, 2022, until June 30, 2022, the gas tax in Nebraska will decrease from 2020 levels (27.7 cents per gallon) by nearly three cents per each gallon of gas to 24.8 cents per gallon.[26]

How much are state registration fees for EVs?

More than half of states (30) require an additional registration fee for EVs. A portion of these states require a slightly lower fee for plug-in hybrids compared to all-electric vehicles. The fees for EVs range from $50 per year in Colorado, Hawaii, and South Dakota to $200 or more in Alabama, Arkansas, Georgia, Ohio, Washington, and Wyoming.

In Arkansas, military personnel and veterans are exempted from additional EV and hybrid vehicle fees. In addition, fees for gas-electric hybrid vehicles in the state were lowered from $100 (which is the fee for EVs) to $50.

Oklahoma imposed new tiered EV fees in 2021 that are based on the vehicle weight. Legislation was introduced in Idaho that would have increased the annual EV fee from $140 to $300. The bill, which failed to pass, would have provided the option to pay 2.5 cents per mile in lieu of the $300 fee. Some states have scheduled the additional EV fees to increase over time by tying them to inflation-related metrics like the consumer price index. This approach intends to offset the decline in total gas taxes that has resulted from years of fixed-rate frameworks.[27]

In Nebraska statute, motor vehicle (§60-3,190) and registration (§60-3,143) fees also apply to EVs. Additionally, an annual $75 fee is applied to alternative fuel vehicles (§60-3,191) when first registered and at each renewal. The revenues from vehicle registrations and EV special fees are deposited into the Highway Trust Fund.

Transportation Infrastructure Funding

Can electricity be taxed like motor fuels?

A common idea to replace traditional motor fuel taxes is to impose a similar fee on the electricity drawn by consumers from public charging stations. In fact, legislation was introduced in Kansas in 2022 that would assess a fee on the energy drawn from a public charging post to power an EV. However, a complication with applying a motor fuel tax to electricity is whether the state allows for the resale of that electricity. Because there is no industry standard, some states prevent persons or businesses from selling electricity at a higher price than the purchase cost from a utility. Electricity prices are set by public or private utilities based on the demand being placed on the electric grid.[28] Naturally, both public and private electric utility companies are most concerned with vehicles that will be connected to the grid.

Does Nebraska allow non-utilities to resell electricity through EV charging stations?

In Nebraska, the Power Review Board has jurisdiction over the sale of electricity by a non-utility to a third party. The Power Review Board has determined that any person or business selling electricity through a charging station that meters the energy consumed and bills the consumer based on the kWh expended, is in potential violation of Nebraska law. It is not a violation of law, however, if the electricity is provided as part of another service or package, and when the consumer is not charged based on actual usage. Legislation will be required to allow for the collection of taxes at public EV charging stations in Nebraska.[29]

Are there other options to replace existing fuel taxes?

Road funding does not necessarily have to come from fuel taxes, and alternative methods to fund transportation infrastructure construction and maintenance are being explored. Other than additional registration fees or a tax on public charging, another option to replace declining motor vehicle tax revenue is a road user charge or mileage-based user fee (MBUF). In contrast to a blanket gas tax, proponents for the implementation of the MBUF argue that drivers will be funding the infrastructure that they are actually using. Based on passenger vehicle research, the increase or decrease in cost would be minimal for most households if this system were adopted (about $1.50 month). Those with more fuel-efficient vehicles may pay more in this system compared to the traditional model of motor fuel taxes, however.[29]

Oregon, Virginia, and Utah have adopted variations of the MBUF and the Kansas Department of Transportation is studying their own MBUF model. Kansas officials are expected to release an MBUF implementation plan in 2024.[31]

Image Credit: Stasys Kudarauskas from iStock

Federal and State EV Policy

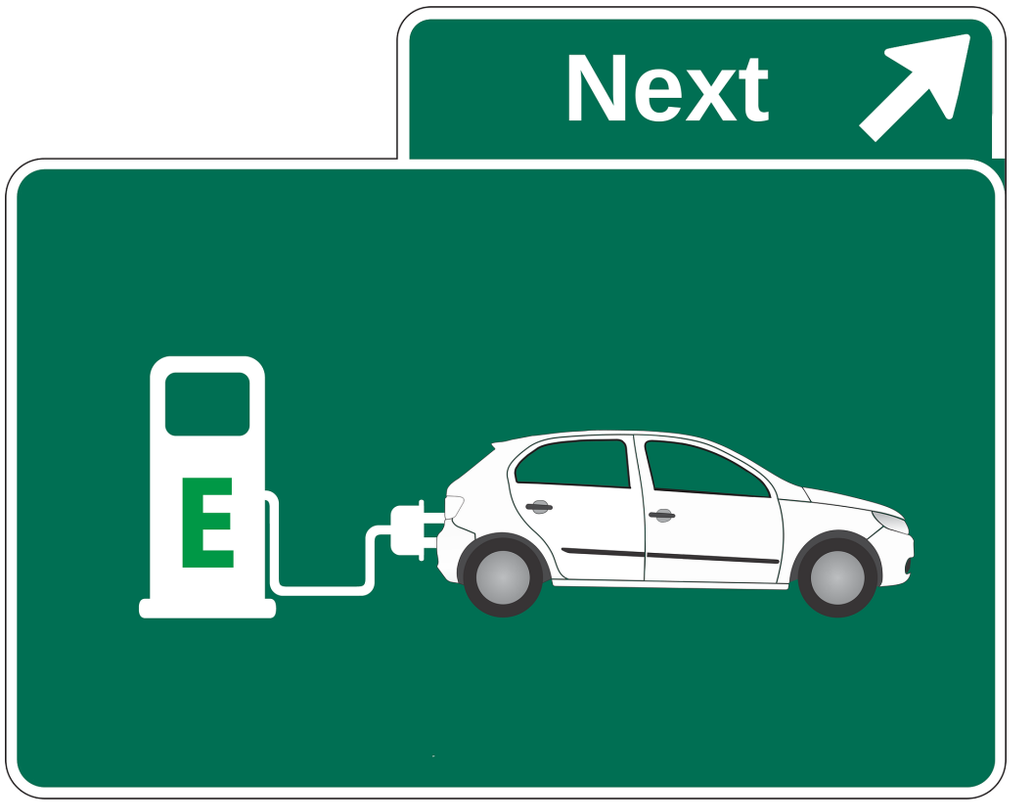
What is happening at the federal level regarding EVs?

The Infrastructure Investment and Jobs Act, signed by President Biden in 2021, provides several appropriations of federal funds for EVs. Approximately $7.5 billion dollars are earmarked for EV chargers, but approximately $50 billion would be needed to reach the President's goal of installing 500,000 chargers by 2030. U.S. Department of Transportation officials have declined to estimate the number of EV chargers they plan to install with the $7.5 billion in funding, but fast charging stations can cost $100,000 dollars to buy and install.[32]

A new joint office between the U.S. Department of Energy and U.S. Department of Transportation was created to accelerate the implementation of a national EV charging station network. The joint office will also offer technical support to states to bolster their strategic deployment of charging infrastructure. Of the $7.5 billion allocated for EV charging, $5 billion has been sent to states through a formula (Nebraska was allocated $30.2 million) and $2.5 billion will be used for discretionary awards by the joint office.[33]

The infrastructure bill also invests more than $7 billion into battery supply chain programs. These programs include producing and sourcing the necessary minerals and materials for battery manufacturing and battery recycling. The EPA will also administer a new $5 billion dollar effort to replace diesel school buses with electric versions. Additionally, grants totaling $11 billion are being provided to states, tribes, and utilities for the enhancement of the electric grid infrastructure to be more resilient against extreme weather or cyberattack.

Current federal incentives for consumers to buy an EV include the Qualified Plug-In Electric Vehicle Tax Credit. The $7,500 incentive is only available for the purchase of a new EV and is capped to the first 200,000 vehicles sold by a manufacturer. The only automakers that have reached that cap are Tesla and GM, but legislation has been proposed in Congress that would remove the cap and increase the incentive amount.[34]



Federal and State EV Policy

What is happening at the state level regarding EVs?

Many states have implemented policies to expand electrification of their transportation sectors. These actions include financial incentives for adoption, electrifying fleets, and building charging infrastructure. Around the world, EV sales tend to increase as the cost of adoption decreases.

EV adoption incentives range from tax credits for buying a vehicle and building charging stations to reductions in utility prices for charging during off-peak hours. Nearly all states (45) - Nebraska included - and the District of Colombia offer incentives, either through a utility or legislation, to support EVs and related infrastructure deployment. In Colorado, tax credits have been offered since 2019 depending on the income tax year and the type of vehicle. For example, from 2020 to 2021 the buyer of a light-duty EV car (or any EV truck) in Colorado was able to receive a $4,000 tax credit. Oklahoma recently enacted a tax credit that covers up to 45 percent of the cost for a business to install charging stations.[35]

EV incentives in Nebraska include low-cost loans administered by the Nebraska Energy Office called the Dollar and Energy Saving Loan Program. The loans are capped at a maximum of $500,000 per borrower with an interest rate at five percent or less. Loans are available for a variety of projects including alternative fuel vehicle replacement and conversion, and the construction or acquisition of charging stations and associated equipment. The public power agencies in Nebraska also offer rebates of varying amounts to their residential customers for the purchase of an EV and associated home charging equipment.[35]

Medium and heavy-duty EV purchases are increasingly being incentivized by states. Hawaii now requires that state agencies buying or leasing medium- and heavy-duty vehicles prioritize EVs. In Utah, recently signed legislation created a tax credit for alternative fuel heavy-duty vehicles, including EVs.[31] Metro Transit in Omaha launched their first three all-electric buses in March 2022. The purchase of the new buses was supported by a competitive federal grant and by the Nebraska Environmental Trust. The buses require three to five hours to fully charge, and Metro Transit staff plan to evaluate their battery life and performance in inclement weather as they consider replacements for aging buses.

Revenue from vehicle fees is often appropriated to a state transportation fund, but in some cases the revenue is used to bolster EV infrastructure. Alabama, Colorado, and Washington all allocate either a portion or the entire fee towards new EV infrastructure and charging stations.

States are also attempting to standardize EV charging infrastructure through rules tied to the funding provided for installation. For example, California is requiring that charging infrastructure allow a consumer to pay for the electricity with a credit card. Additionally, a recently enacted law in Virginia requires that certain newly built state and local government buildings feature EV charging stations.[35]

Image Credit: Mario Sessions from Unsplash

Federal and State EV Policy

What EV legislation has been considered in the Nebraska Legislature?

Passed in 2011, LB289 (Mello) provided for the $75 registration fee for vehicles using alternative fuels. Since then, several topics related to EVs have been discussed in the Legislature. LB830 (Vargas) was introduced in 2018, which would have allowed automakers like Tesla to sell cars directly to consumers in Nebraska. The topic of direct vehicle sales to consumers was again discussed the next year with the introduction of LB51 (Vargas). Also in 2019, LB366 (Bostelman) proposed to incrementally increase the alternative fuel vehicle fee to $125 over five years. That same year, the Volkswagen settlement was discussed in LB678 (Vargas), which proposed that 15 percent of the funds received would be used to build, fund, and maintain EV charging stations. LB678 was amended into another bill, which passed, and the Nebraska Department of Environment and Energy (NDEE) ultimately funded EV charging infrastructure with $1.8 million, or 15 percent of Nebraska's initial allocation from the settlement. NDEE reports that funded projects were expected to result in 35 charging stations across 18 counties in Nebraska.

In 2020, LB1162 (Wishart) proposed to provide a tax credit for businesses and individuals installing public EV charging stations. The following year, LB346 (Wishart) again proposed the Fueling Station Tax Credit Act. The bill would have provided for a nontransferable and non-refundable income tax credit to the taxpayer in charge of a qualified alternative-fuel station that is placed in service during calendar years 2021 or 2022. The tax credit would have been equal to 75 percent of the cost incurred to place the station in service.

In 2022, LB1149 as amended (Friesen) would have required the Nebraska Department of Transportation and the Nebraska Department of Revenue to develop and submit recommendations to the Legislature by October 1, 2025, for administering an excise tax on the electricity used to charge EVs. The legislation would have required entities engaged in the retail sale of electric power, solely for the purpose of charging EVs, to collect a per-kilowatt-hour excise tax and remit the funds to the Department of Revenue for credit to the Highway Trust Fund. Further, beginning in 2027, the bill would have exempted vehicles powered exclusively by electric energy from the $75 registration fee currently charged to those who own vehicles powered by an alternative fuel.

Finally, another bill introduced in 2022, LB1257 (Bostar), proposed to appropriate $10 million in federal funds from the American Rescue Plan Act to the Nebraska Department of Transportation to create a competitive grant program to provide matching funds to entities for the installation of a comprehensive statewide network of fast charging stations.

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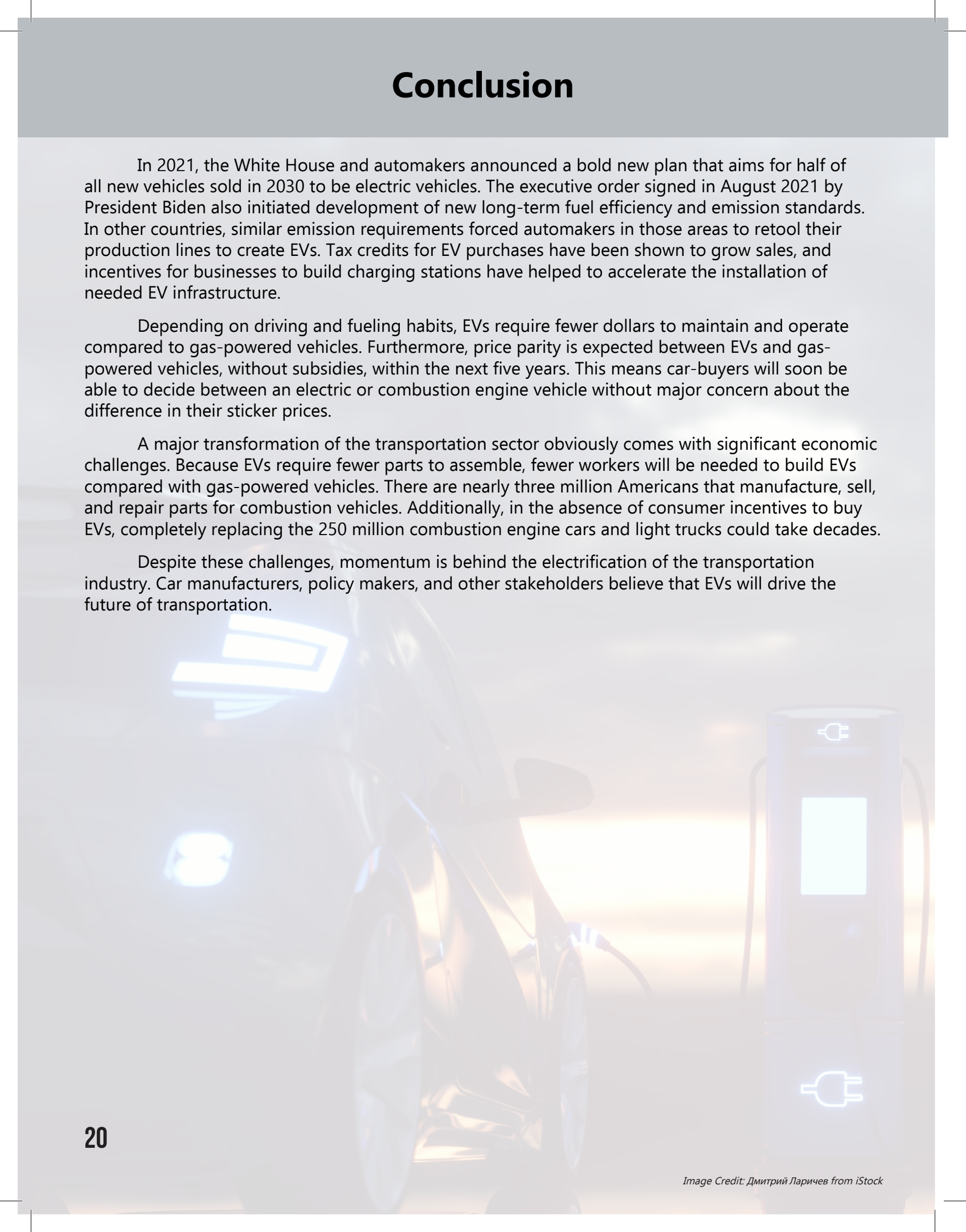
Conclusion

In 2021, the White House and automakers announced a bold new plan that aims for half of all new vehicles sold in 2030 to be electric vehicles. The executive order signed in August 2021 by President Biden also initiated development of new long-term fuel efficiency and emission standards. In other countries, similar emission requirements forced automakers in those areas to retool their production lines to create EVs. Tax credits for EV purchases have been shown to grow sales, and incentives for businesses to build charging stations have helped to accelerate the installation of needed EV infrastructure.

Depending on driving and fueling habits, EVs require fewer dollars to maintain and operate compared to gas-powered vehicles. Furthermore, price parity is expected between EVs and gas-powered vehicles, without subsidies, within the next five years. This means car-buyers will soon be able to decide between an electric or combustion engine vehicle without major concern about the difference in their sticker prices.

A major transformation of the transportation sector obviously comes with significant economic challenges. Because EVs require fewer parts to assemble, fewer workers will be needed to build EVs compared with gas-powered vehicles. There are nearly three million Americans that manufacture, sell, and repair parts for combustion vehicles. Additionally, in the absence of consumer incentives to buy EVs, completely replacing the 250 million combustion engine cars and light trucks could take decades.

Despite these challenges, momentum is behind the electrification of the transportation industry. Car manufacturers, policy makers, and other stakeholders believe that EVs will drive the future of transportation.



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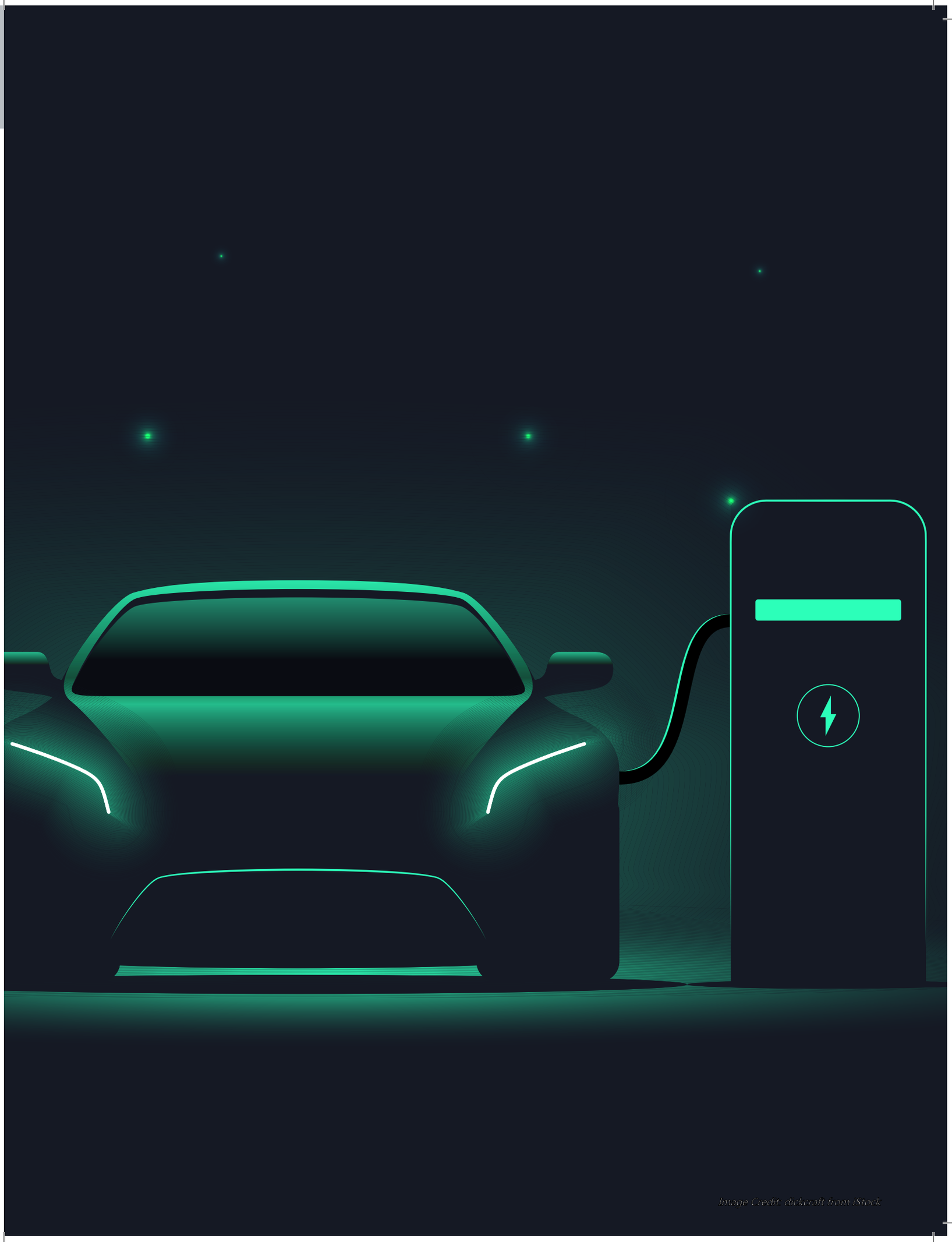

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