

A U.S. CONSUMER'S GUIDE TO ELECTRIC VEHICLES

FEBRUARY 2018



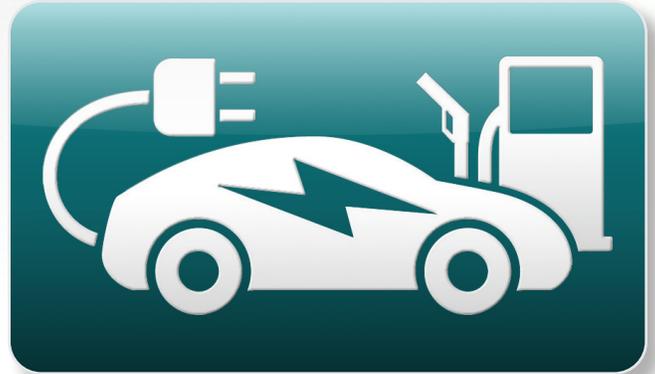
Today's Choices in Cars

Electric cars offer consumers affordable, efficient, and high-tech transportation. More models, including crossovers, minivans, hatchbacks, and sedans, become available every year. Today, new-car buyers can choose from about 40 models. By 2022, about 90 electric vehicles are projected.

An expanding nationwide charging network enables more consumers to consider electric cars, although most drivers still prefer to charge at home due to convenience and savings over time. At the U.S. national average price of 12.5 cents per kilowatt-hour (kWh), electricity is roughly equivalent to gasoline at \$1 a gallon. Plus, many electricity providers offer special electric vehicle rates.

Displacing gasoline with domestic electricity cuts petroleum use and emissions, which benefits public health. Electrifying the transportation sector can reduce greenhouse gas emissions in 2050 by 57% relative to 2015 levels.

Take a look at your driving needs. An electric vehicle might work for you.



ELECTRIC VEHICLES

Plug-in electric vehicles have batteries that recharge by plugging into the electricity grid. There are two main types. Plug-in hybrids are powered by an electric motor(s) and battery, paired with an internal combustion engine. Battery electric vehicles, also called all-electric vehicles, are powered by an electric motor and battery alone, and never use gasoline.

Plug-in hybrid designs differ. Most drive on electricity alone using battery energy, and after the battery is discharged, continue driving using gasoline much like conventional hybrids. (Conventional hybrids have a smaller battery and do not plug in.) On average, plug-in hybrids can travel 10 to 50 miles on electricity before they switch to gasoline. Their gas tanks extend total range to between 300 and 600 miles. Some designs allow the driver to choose when to use electricity or gasoline.

All-electric vehicles can travel farther on electricity than plug-in hybrids, but their total range is limited by the battery size. As battery technology advances and costs come down, vehicle range is increasing. Most battery electric vehicles available today promise 100 to 240 miles on a charge, and some can travel even farther. Most future models promise even more range, 200 to 300 miles.

ELECTRIC VEHICLE AVAILABILITY

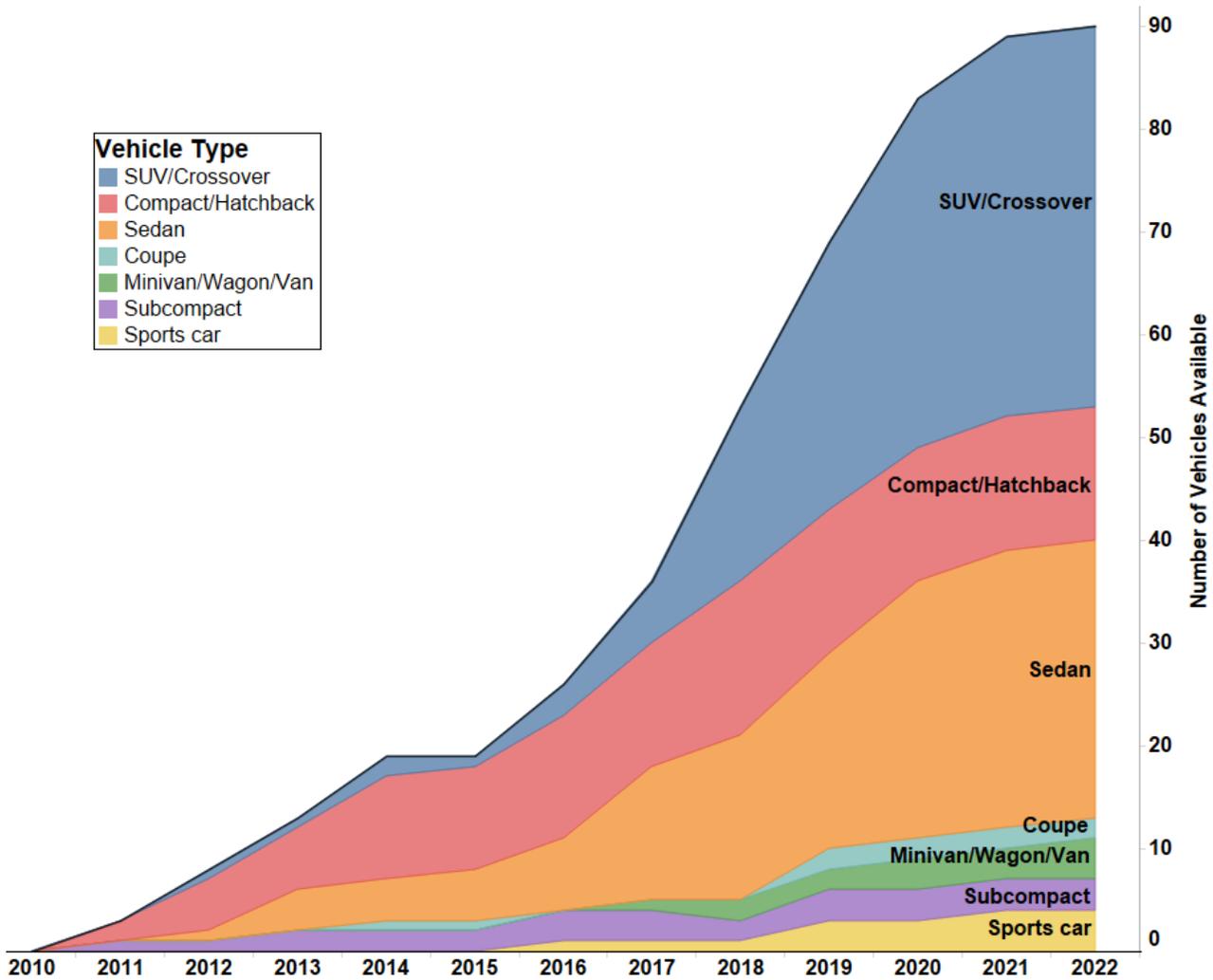
The modern electric vehicle market is evolving quickly. Today, you can buy an electric car in almost every vehicle class, as shown in Figure 1. Although electric cars account for roughly 1% of global new-car sales, they are a growing and increasingly competitive segment. Automakers are offering more choices in trim levels and body styles. Some even offer different powertrains—gasoline, battery electric, plug-in hybrid, or hydrogen fuel cell—for the same car.

Some electric vehicle models are available nationwide. Others are available only in California, the Pacific Northwest, and some Northeast states. Still others can be ordered through a dealer, even if that dealer does not have electric vehicles in stock.

Used electric cars are now available, as well. As people who bought the first generation of electric vehicles trade up to the newest models, their old cars are now for sale in the used-car market as affordable electric vehicle options.

In addition, several ultra-luxury models priced over \$150,000 are available. (They are listed in Table 1 on page 12 but not detailed in this guide.)

The following pages highlight new model-year electric cars that are available as of February 1, 2018.



The number and variety of electric vehicle models continues to grow. By the end of 2018, about 53 different models are expected to be available. By 2022, at least 90 models are projected.

Available Nationwide

2018 BMW 330e iPerformance



Photo courtesy of BMW

Type: Plug-in hybrid; Sedan
EPA electric range: 14 miles
EPA total range (gas + electric): 350 miles
Charging time: 2.2 hours @ 240V; 7 hours @120V

2018 BMW 530e iPerformance



Photo courtesy of BMW

Type: Plug-in hybrid; Sedan
EPA electric range: 16 miles
EPA total range (gas + electric): 370 miles
Charging time: <3 hours @ 240V; 7 hours @120V

2018 BMW 740e xDrive iPerformance



Photo courtesy of BMW

Type: Plug-in hybrid; Sedan
EPA electric range: 14 miles
EPA total range (gas + electric): 340 miles
Charging time: 3 hours @ 240V; 7 hours @120V

2018 BMW i3 REx and i3



Photo courtesy of BMW

Type: Plug-in hybrid (i3 REx); Battery electric vehicle (i3); Compact/Hatchback
EPA electric range: 97 miles (i3 REx); 114 miles (i3)
EPA total range (gas + electric): 180 miles (i3 REx)
Charging time: 5 hours @ 240V; Fast-charging capable

2018 BMW X5 xDrive40e iPerformance



Photo courtesy of BMW

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 14 miles
EPA total range (gas + electric): 540 miles
Charging time: 3 hours @ 240V; 6 hours @ 120V

2018 Chevrolet Bolt EV



Photo courtesy of GM

Type: Battery electric vehicle; Compact/Hatchback
EPA electric range: 238 miles
Charging time: 9.3 hours @ 240V; Fast-charging capable

2018 Chevrolet Volt



Photo courtesy of GM

Type: Plug-in hybrid; Compact/Hatchback
EPA electric range: 53 miles
EPA total range (gas + electric): 420 miles
Charging time: 4.5 hours @ 240V; 13 hours @ 120V

2018 Chrysler Pacifica Hybrid



Photo courtesy of Chrysler

Type: Plug-in hybrid; Minivan/Wagon/Van
EPA electric range: 33 miles
EPA total range (gas + electric): 570 miles
Charging time: 2 hours @ 240V; 14 hours @ 120V

2018 Ford Focus Electric



Photo courtesy of Ford

Type: Battery electric vehicle; Compact/Hatchback
EPA electric range: 115 miles
Charging time: 5.5 hours @ 240V; Fast-charging capable

2018 Ford Fusion Energi



Photo courtesy of Ford

Type: Plug-in hybrid; Sedan
EPA electric range: 21 miles
EPA total range (gas + electric): 610 miles
Charging time: 2.5 hours @ 240V; 7 hours @ 120V

2018 Honda Clarity Plug-in Hybrid



Photo courtesy of Honda

Type: Plug-in hybrid; Sedan
EPA electric range: 48 miles
EPA total range (gas + electric): 340 miles
Charging time: 2.2 hours @ 240V; 16 to 24 hours @ 120V

2018 Hyundai Ioniq Electric



Photo courtesy of Hyundai

Type: Battery electric vehicle; Compact/Hatchback
EPA electric range: 124 miles
Charging time: 4 hours @ 240V; Fast-charging capable

2018 Hyundai Ioniq Plug-in Hybrid



Photo courtesy of Hyundai

Type: Plug-in hybrid; Compact/Hatchback
EPA electric range: 29 miles
EPA total range (gas + electric): 630 miles
Charging time: 2.3 hours @ 240V; 10 to 14 hours @ 120V

2017 Hyundai Sonata Plug-in Hybrid



Photo courtesy of Hyundai

Type: Plug-in hybrid; Sedan
EPA electric range: 27 miles
EPA total range (gas + electric): 590 miles
Charging time: 2.7 hours @ 240V; 9 hours @ 120V

2018 Kia Niro Plug-in Hybrid



Photo courtesy of Kia

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 26 miles
EPA total range (gas + electric): 560 miles
Charging time: 2.5 hours @ 240V; <9 hours @ 120V

2018 Kia Optima Plug-in Hybrid



Photo courtesy of Kia

Type: Plug-in hybrid; Sedan
EPA electric range: 29 miles
EPA total range (gas + electric): 610 miles
Charging time: 2.7 hours @ 240V; 9 hours @ 120V

2018 MINI Cooper SL Countryman All4



Photo courtesy of BMW

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 12 miles
EPA total range (gas + electric): 270 miles
Charging time: 2 hours @ 240V; 4 to 6 hours @ 120V

2018 Mitsubishi Outlander PHEV



Photo courtesy of Mitsubishi

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 22 miles
EPA total range (gas + electric): 310 miles
Charging time: 3.5 hours @ 240V; 8 hours @ 120V;
Fast-charging capable

2018 Nissan LEAF



Photo courtesy of Nissan

Type: Battery electric vehicle; Compact/Hatchback
EPA electric range: 151 miles
Charging time: 7.5 hours @ 240V; Fast-charging capable

2017 Porsche Cayenne S E-Hybrid



Photo courtesy of Porsche

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 14 miles
EPA total range (gas + electric): 480 miles
Charging time: 3 hours @ 240V; up to 11 hours @ 120V

2018 smart fortwo Electric Drive



Photo courtesy of Mercedes-Benz

Type: Battery electric vehicle; Subcompact
EPA electric range: 58 miles
Charging time: 3 hours @ 240V; 16.5 @ 120V

Tesla Model 3



Photo courtesy of Tesla

Type: Battery electric vehicle; Sedan
EPA electric range: 220 to 310 miles
Charging time: 8.5 to 12 hours @ 240V; Fast-charging capable

Tesla Model S



Photo courtesy of Tesla

Type: Battery electric vehicle; Sedan
EPA electric range: 335 miles
Charging time: 4.75 to 8.75 hours @ 240V; Fast-charging capable

Tesla Model X



Photo courtesy of Tesla

Type: Battery electric vehicle; SUV/Crossover
EPA electric range: 295 miles
Charging time: 6.5 to 9.5 hours @ 240V; Fast-charging capable

2018 Toyota Prius Prime



Photo courtesy of Toyota

Type: Plug-in hybrid; Compact/Hatchback
EPA electric range: 25 miles
EPA total range (gas + electric): 640 miles
Charging time: 2 hours @ 240V; 5.5 hours @ 120V

2018 Volvo S90



Photo courtesy of Volvo

Type: Plug-in hybrid; Sedan
EPA electric range: 21 miles
EPA total range (gas + electric): 410 miles
Charging time: 3 hours @ 240V; 7 to 10 hours @ 120V

2018 Volvo XC60



Photo courtesy of Volvo

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 18 miles
EPA total range (gas + electric): 370 miles
Charging time: 3 hours @ 240V; 6 to 9 hours @ 120V

2018 Volvo XC90



Photo courtesy of Volvo

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 19 miles
EPA total range (gas + electric): 380 miles
Charging time: 3 hours @ 240V; 6 to 9 hours @ 120V

Available in Select Markets

2018 Audi A3 Sportback e-tron



Photo courtesy of Audi

Type: Plug-in hybrid; Compact/Hatchback
EPA electric range: 16 miles
EPA total range (gas + electric): 400 miles
Charging time: 2.25 hours @ 240V;
8 hours @ 120V

2018 Cadillac CT6 Plug-in



Photo courtesy of GM

Type: Plug-in hybrid; Sedan
EPA electric range: 31 miles
EPA total range (gas + electric): 430 miles
Charging time: 4.5 hours @ 240V;
10 to 15 hours @ 120V

2017 Fiat 500e



Photo courtesy of Fiat

Type: Battery electric vehicle; Subcompact
EPA electric range: 84 miles
Charging time: 4 hours @ 240V

2018 Honda Clarity Electric



Photo courtesy of Honda

Type: Battery electric vehicle; Sedan
EPA electric range: 89 miles
Charging time: 3 hours @ 240V;
Fast-charging capable

2018 Kia Soul Electric



Photo courtesy of Kia

Type: Battery electric vehicle;
Compact/Hatchback
EPA electric range: 111 miles
Charging time: 5 hours @ 240V;
Fast-charging capable

2018 Mercedes-Benz C350e



Photo courtesy of Mercedes-Benz

Type: Plug-in hybrid; Sedan
EPA electric range: 9 miles
EPA total range (gas + electric): 410 miles
Charging time: 1.5 hours @ 240V;
7.3 hours @ 120V

2018 Mercedes-Benz GLE550e



Photo courtesy of Mercedes-Benz

Type: Plug-in hybrid; SUV/Crossover
EPA electric range: 10 miles
EPA total range (gas + electric): 460 miles
Charging time: 2 hours @ 240V;
7.5 hours @ 120V

2018 Volkswagen e-Golf



Photo courtesy of Volkswagen

Type: Battery electric vehicle;
Compact/Hatchback
EPA electric range: 125 miles
Charging time: 5.3 hours @ 240V;
Fast-charging capable

Availability at a Glance

Table 1 – U.S. Electric Vehicle Availability

	AVAILABLE NOW			EXPECTED IN 2018		
	MODEL NAME	RANGE (MI) ¹	WHERE	MODEL NAME	RANGE (MI) ¹	WHEN
BATTERY ELECTRIC VEHICLE	SUV/CROSSOVER			SUV/CROSSOVER		
	Tesla Model X	295	Nationwide	2019 Audi e-tron Quattro	275	2018
	COMPACT/HATCHBACK			BMW X7 iPerformance	TBA	2018
	BMW i3	114	Nationwide	2019 Hyundai Kona Electric	200	Late 2018
	Chevrolet Bolt EV	238	Nationwide	2019 Jaguar I-PACE	220	Mid 2018
	Ford Focus Electric	115	Nationwide	2019 Kia Niro Electric	200+	Late 2018
	Hyundai Ioniq Electric	124	Nationwide	COMPACT/HATCHBACK		
	Nissan LEAF	151	Nationwide	2019 Nissan LEAF (Gen. 2+)	225	Late 2018
	Kia Soul Electric	111	Select Markets	Hyundai Ioniq Electric (Gen 1+)	200	2018
	Volkswagen e-Golf	125	Select Markets			
	SEDAN					
	Tesla Model 3	220-310	Nationwide			
	Tesla Model S	335	Nationwide			
	Honda Clarity Electric	89	Select Markets			
	SUBCOMPACT					
	smart fortwo Electric Drive	58	Nationwide			
Fiat 500e	84	Select Markets				
PLUG-IN HYBRID	SUV/CROSSOVER			SUV/CROSSOVER		
	BMW X5 xDrive40e iPerformance	14/540	Nationwide	Audi Q8 e-tron	37/620	2018
	Kia Niro Plug-in Hybrid	26/560	Nationwide	Bentley Bentayga	14/TBA	2018
	MINI Cooper SL Countryman	12/270	Nationwide	Mercedes-Benz GLC350e	TBA/TBA	Summer 2018
	Mitsubishi Outlander PHEV	22/310	Nationwide	Subaru	TBA/TBA	2018
	Porsche Cayenne S E-Hybrid	14/480	Nationwide	SEDAN		
	Volvo XC60	18/370	Nationwide	Porsche Panamera E-Hybrid	22/TBA	Spring 2018
	Volvo XC90	19/380	Nationwide	MINIVAN/WAGON/VAN		
	Mercedes-Benz GLE550e	10/460	Select Markets	Porsche Panamera E-Hybrid Sport Turismo	22/TBA	Spring 2018
	COMPACT/HATCHBACK			SPORTS CAR		
	BMW i3 REx	97/180	Nationwide	BMW i8 Roadster	18/330	2018
	Chevrolet Volt	53/420	Nationwide			
	Hyundai Ioniq Plug-in Hybrid	29/630	Nationwide			
	Toyota Prius Prime	25/640	Nationwide			
	Audi A3 Sportback e-tron	16/400	Select Markets			
	SEDAN					
	BMW 330e iPerformance	14/350	Nationwide			
	BMW 530e iPerformance	16/370	Nationwide			
	BMW 740e xDrive iPerformance	14/340	Nationwide			
	Ford Fusion Energi	21/610	Nationwide			
	Honda Clarity Plug-in Hybrid	48/340	Nationwide			
	Hyundai Sonata Plug-in Hybrid	27/590	Nationwide			
	Karma Revero	37/240	Nationwide			
	Kia Optima Plug-in Hybrid	29/610	Nationwide			
	Volvo S90	21/410	Nationwide			
	Cadillac CT6 Plug-in	31/430	Select Markets			
Mercedes-Benz C350e	9/410	Select Markets				
MINIVAN/WAGON/VAN						
Chrysler Pacifica Hybrid	33/570	Nationwide				
SPORTS CAR						
BMW i8	15/330	Nationwide				

¹ Range: For battery electric vehicles is all-electric range. For plug-in hybrids is all-electric/combined (electric + gas) range. Sources for vehicles available now: www.fueleconomy.gov and manufacturer websites. Sources for vehicles expected in 2018: manufacturer and industry news websites, data subject to change.

Future Electric Vehicles

In 2017 and early 2018, carmakers made international headlines with strong, forward-looking statements about their electric vehicle development and deployment plans. Consultants and market analysts also made wide-ranging and sometimes very optimistic predictions about the electric vehicle market in 10 to 20 years.

Clearly, the automotive industry is going through a major transformation, and it appears electrification will play a significant role. Table 2 provides a summary of the major automakers' recent statements on electrification.

Table 2 – Automaker Statements on Future Vehicles and Electrification

Automaker	Number of Electrified ¹ Vehicles	Number of All-Electric Vehicles	Year Promised
Audi	20	10	2025
BMW	25	12	2025
Fiat Chrysler	One-half of vehicle lineup	Not specified	2022
Ford	40	16	2022
General Motors	20	Not specified	2023
Honda	Two-thirds of vehicle lineup	Not specified	2030
Jaguar Land Rover	One-half of vehicle lineup	Not specified	2020
Mercedes-Benz	Electrified equivalent of all new vehicles	Not specified	2022
Nissan/Mitsubishi/Renault	Electrified equivalent of all new vehicles	Not specified	2022
Porsche	One-half of global sales volume is plug-in vehicles	Not specified	2025
Toyota (and Lexus)	Electrified equivalent of all new vehicles	Not specified	2025
Volkswagen Group	All models electrified	15	2025
Volvo	Electrified equivalent of all new vehicles	Not specified	2019

¹ The term, "electrified" may mean conventional hybrid, not plug-in electric. Expanded use of electric drive systems helps reduce costs and build the broader market for electric vehicles.

Answers to Important Questions

How far do electric vehicles go on a charge?

Plug-in hybrids typically drive from about 10 to 50 miles on electricity alone, before the gasoline engine takes over. On electricity and gas combined, total range is 300 to 600 miles. If you charge every day, you may be able to drive 1,000 to 2,000 miles between gasoline fill-ups.

Battery electric vehicle range is increasing each year, with many current models traveling 100 to 240 miles on a charge, and a few capable of going much farther.

As with gasoline fuel economy, your driving behavior affects electric vehicle range. Many people find their electric car's range exceeds their daily driving needs and they need not charge every day.

How much does it cost to charge?

At the U.S. national average residential price of 12.5 cents per kilowatt-hour (kWh), fueling a car with electricity is roughly equivalent to buying gasoline at \$1 a gallon.

How do I charge my car?

Most drivers find it convenient and cost-effective to charge at home. Every electric car comes with a 120V charging cord that plugs into a standard household outlet. Charging at 120V delivers roughly two to three miles of range for every hour of charging, which is usually sufficient for plug-in hybrids. Charging at 120V may also be sufficient for some all-electric cars, depending on the car's range and the driver's daily needs.

For faster charging, you can install a 240V charging station at home. Many electricity providers offer discounted electric vehicle rates that encourage charging overnight when electricity is plentiful.

Public and workplace charging availability is increasing nationwide, and fast-charging station networks are also expanding. A fast charger can charge a properly equipped battery electric vehicle to 80% full in about 30 to 40 minutes.

For more information, see EPRI publication, "A U.S. Consumer's Guide to Electric Vehicle Charging" (Product ID [3002009442](#)).

Can weather affect my car's performance?

Electric vehicles may draw energy from the traction battery for interior air-conditioning, heating, and window defrosting or defogging. This energy use can reduce driving range. To minimize the effects, you can program the car to pre-condition the interior and battery while it is plugged in. Pre-conditioning also makes a car more immediately comfortable for passengers. Windshield wipers, headlights, and similar accessories do not affect range.

Where can I get an electric vehicle?

Some electric vehicle models are available nationwide. Others are available only in California, the Pacific Northwest, and some Northeast states. Still others can be ordered through a local dealer, even if that dealer does not stock electric vehicles on the lot.

Used electric cars are now available, as well. As people who bought the first generation of electric vehicles trade up to the newest models, the used-car market offers affordable electric options for consumers.

What incentives are available?

A federal tax credit of up to \$7,500 may be available for qualified electric vehicles. Some state and local governments offer vehicle and charging station incentives. In some metros, electric vehicles can use carpool lanes with a single driver. Parking and charging perks are available in some cities. Some electricity providers offer rebates and incentives for electric vehicle charging. Incentives are subject to limitations and may change over time. More information is available at the [U.S. Dept. of Energy Office of Energy Efficiency and Renewable Energy](#).

What should I consider in making a purchase?

Consider your driving needs and lifestyle. If you have only one car, or often drive long distances, a plug-in hybrid with its back-up internal combustion engine can provide a worry-free transition to electric vehicles. If you can charge at work you can effectively double your range.

If you have a predictable commute and a second car for long trips, or if you like the idea of a gasoline-free driving experience, a battery electric vehicle could be a good choice. Access to workplace or public charging may alleviate any range concerns.

Consider costs and benefits. With manufacturer lease options, discounted electricity rates, and government purchase incentives, electric vehicles can be less expensive to operate over their lifetime despite costing more to purchase.

Consider environmental benefits. Electric vehicles have lower emissions than gasoline-powered vehicles, even in areas where much of the electricity is generated by power plants that use fossil fuels. For more information, read EPRI publication, "Environmental Assessment of a Full Electric Transportation Portfolio" (Product ID [3002006881](#)).

FOR MORE INFORMATION

Explore automakers' websites for product updates and check your local electric utility website for information about electric vehicles. Other sources:

Electric Drive Transportation Association

www.electricdrive.org and

www.goelectricdrive.org

U.S. Dept. of Energy Alternative Fuels Data Center

www.afdc.energy.gov/fuels/electricity.html

U.S. Dept. of Energy Fuel Economy Information

<http://www.fueleconomy.gov/>

Plug In America

www.pluginamerica.org

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