WHY BUY AN ELECTRIC CAR?

Electric vehicles (EVs) are fun to drive, safe, comfortable, and convenient to refuel. They also cost less to operate per mile and produce no tailpipe emissions.

Today’s electric cars do everything a gas car can do—and more. Most are high-performing vehicles with silent, instant torque, superb handling, and the latest technology and safety features. Most can travel 200–250 miles on a charge; many can go farther.

Most EV drivers prefer to charge at home for its convenience and savings. A growing national network of public charging sites enables more consumers—even those who can’t plug in at home—to consider purchasing an EV.

Because EVs are powered by electricity instead of gasoline, they shift our energy reliance to domestic sources while also reducing emissions. Cutting vehicle emissions is especially critical in communities adjacent to heavily trafficked roadways. As local power generation grows cleaner, every electric car charged on that grid gets cleaner too—and the broader public health and climate benefits increase. Electrifying light-duty transport would reduce overall greenhouse gas emissions by 17% relative to 2018 levels.

EV 101

This guide highlights the two types of electric vehicles that plug into the grid to recharge their batteries. They are battery-electric (or all-electric) vehicles and plug-in hybrids.

**All-electric vehicles** are powered solely by an electric motor and battery. They burn no gasoline or diesel fuel, so they have no tailpipe and no emissions. Battery technology is rapidly advancing, vehicle costs are declining, and range between charges is increasing.

**Plug-in hybrids** pair an electric motor and battery with an internal-combustion engine. Plug-in hybrids drive on electricity until the battery is mostly empty. Then the engine turns on, and the car drives like a conventional hybrid.

**Conventional hybrids**, sometimes called “electrified vehicles,” refuel only with gasoline. Because they do not plug in, they are not included in this guide.
Electric cars are available in almost all body styles, from sedans to SUVs, hatchbacks to wagons. Each year, automakers expand their offerings. Some offer gasoline, battery-electric, and plug-in hybrid options in the same model. Many now say they aspire to electrify their entire fleet in response to global climate change.

EV range is increasing, and costs are falling thanks to better batteries and components and to rising production volumes. An EPRI analysis based on automaker announcements shows the average range of all-electric vehicles will increase from 246 miles in 2021 to 270 miles by 2024. In response, US consumers are warming up to EVs, and sales have risen over all but a couple of the last 10 years.

More than 50 EV models are available new today, and more than 130 different models are expected by 2024 (Figure 1).

Many EVs are available nationwide. Some, however, are sold only in select markets. (See FAQs, page 16.) Earlier generations of EVs are now available in the used-car market and serve as affordable EV options.

Several limited-edition or ultra-luxury models priced at $150,000 or higher are also available. These models are listed in the tables but are not detailed in this guide.

Figure 1. The number and variety of EVs continue to grow. By 2024, more than 130 models are projected to be available for US consumers.
**AVAILABLE NOW**

### BATTERY-ELECTRIC VEHICLE

<table>
<thead>
<tr>
<th>MODEL NAME</th>
<th>RANGE (MILES)</th>
<th>WHERE</th>
</tr>
</thead>
<tbody>
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<td><strong>SUV/CROSSOVER</strong></td>
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<tr>
<td>Audi e-tron</td>
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<tr>
<td>Audi e-tron Sportback</td>
<td>218</td>
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<td>Ford Mustang Mach-E AWD</td>
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<td>Chevrolet Bolt EUV</td>
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<td>110</td>
<td>Nationwide</td>
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<td>Nissan Leaf and Leaf Plus</td>
<td>149 and 226</td>
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<td>Volkswagen ID.4</td>
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<td><strong>SPORTS CAR</strong></td>
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<td>Porsche Taycan Turbo and Cross Turismo</td>
<td>212 and 204</td>
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### PLUG-IN HYBRID

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<th>MODEL NAME</th>
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<td><strong>SUV/CROSSOVER</strong></td>
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<tr>
<td>Audi Q5 55 TFSI e Plug-in Hybrid</td>
<td>19/400</td>
<td>Nationwide</td>
</tr>
<tr>
<td>BMW X3 xDrive30e</td>
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<td>Ford Escape Plug-in Hybrid</td>
<td>37/530</td>
<td>Nationwide</td>
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<tr>
<td>Jeep Wrangler 4xe</td>
<td>22/370</td>
<td>Nationwide</td>
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<td>Land Rover Range Rover PHEV</td>
<td>19/480</td>
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<td>Land Rover Range Rover Sport PHEV</td>
<td>19/480</td>
<td>Nationwide</td>
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<td>Mini Cooper SE Countryman ALL4</td>
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<td>Nationwide</td>
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<td>Mitsubishi Outlander Plug-in Hybrid</td>
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<td>Nationwide</td>
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<td>Porsche Cayenne E-Hybrid and E-Hybrid Coupe</td>
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<td>Volvo XC60 T8 eAWD</td>
<td>19/520</td>
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<td>Volvo XC90 T8 eAWD</td>
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<td>Lincoln Corsair Grand Touring</td>
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<td><strong>COMPACT/HATCHBACK</strong></td>
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<td>BMW i3 REx</td>
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<td>Toyota Prius Prime</td>
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<td>26/560</td>
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<td><strong>SEDAN</strong></td>
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<td>Chrysler Pacifica Hybrid</td>
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<tr>
<td>Porsche Panamera 4 E-Hybrid Sport Turismo</td>
<td>19/480</td>
<td>Nationwide</td>
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<tr>
<td>Volvo V60 Recharge Plug-in Hybrid</td>
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<td>Nationwide</td>
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<tr>
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<td>Bentley Bentayga Hybrid</td>
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<td>Ferrari SF90 Stradale Coupe</td>
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<td>Karma GS-6</td>
<td>61/330 and 54/280</td>
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<td>Polestar 1</td>
<td>52/470</td>
<td>Nationwide</td>
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<td>Porsche Cayenne Turbo S E-Hybrid and Coupe</td>
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<td>Nationwide</td>
</tr>
<tr>
<td>Porsche Panamera Turbo S E-Hybrid and Sport Turismo</td>
<td>17/430</td>
<td>Nationwide</td>
</tr>
</tbody>
</table>

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1. Range for battery-electric vehicles is all-electric range. Range for plug-in hybrids is all-electric/combined (electric + gas) range. Sources for vehicles available now: www.fueleconomy.gov and manufacturer websites.
## COMING LATER IN 2021

### BATTERY-ELECTRIC VEHICLE

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Range (Miles)</th>
</tr>
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<tbody>
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<td><strong>SUV/CROSSOVER</strong></td>
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<tr>
<td>Audi Q4 e-tron</td>
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<tr>
<td>Audi Q4 Sportback e-tron</td>
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<tr>
<td>Hyundai Ioniq 5</td>
<td>300</td>
</tr>
<tr>
<td>Kia EV6</td>
<td>300</td>
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<tr>
<td>Rivian RT5</td>
<td>300</td>
</tr>
<tr>
<td><strong>COMPACT/HATCHBACK</strong></td>
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</tr>
<tr>
<td>Genesis G60e</td>
<td>TBA</td>
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<tr>
<td>Mazda MX-30</td>
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<tr>
<td>Mini Cooper SE</td>
<td>114</td>
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<td><strong>SEDAN</strong></td>
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<tr>
<td>Audi e-tron GT</td>
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<td>Genesis Electrified G80</td>
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<td>Mercedes-Benz EQS</td>
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<tr>
<td>Volvo C40 Recharge</td>
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<tr>
<td><strong>PICKUP TRUCK</strong></td>
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<tr>
<td>Rivian RT1</td>
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<tr>
<td>GMC Hummer EV</td>
<td>300</td>
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<tr>
<td><strong>ULTRA-LUXURY/LIMITED EDITION</strong></td>
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<tr>
<td>Karma GS6-e</td>
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<tr>
<td><strong>PLUG-IN HYBRID</strong></td>
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<tr>
<td><strong>SUV/CROSSOVER</strong></td>
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<td>Hyundai Tucson Plug-in Hybrid</td>
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<tr>
<td>Jeep Grand Cherokee L 4xe</td>
<td>TBA</td>
</tr>
<tr>
<td>Lexus NX 450h+</td>
<td>36/TBA</td>
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</tbody>
</table>
AVAILABLE NATIONWIDE

• Electric cars available nationwide as of June 2021; discontinued models or older model years may still be available.

• Range sources: www.fueleconomy.gov and automaker specifications.

• Range per hour of charging assumes home or workplace charging; see FAQs, page 15.

• Fast-charging times are provided by automakers or calculated from automaker statements. These rates vary due to many factors, including battery charge level and ambient temperature.

• Starting manufacturer suggested retail prices (MSRPs) are retrieved from automaker websites and may vary.

• Models that offer different configurations and battery sizes may show multiple numbers for driving range, charging time, and starting MSRP.

• Despite industry classifications of five-door vehicles as crossovers or compact SUVs, this guide categorizes them as hatchbacks unless they are offered with all-wheel drive.

2021 Audi A7 Sportback 55 TFSI e Plug-in Hybrid
 Plug-in hybrid    Sedan
EPA electric range: 24 miles
EPA total range (gas + electric): 440 miles
Range/hour of charging: 10 miles
Starting MSRP: $74,900

2021 Audi A8 L 60 TFSI e Plug-in Hybrid
 Plug-in hybrid    Sedan
EPA electric range: 18 miles
EPA total range (gas + electric): 420 miles
Range/hour of charging: 7 miles
Starting MSRP: $95,900

2021 Audi e-tron
 Battery-electric    SUV/Crossover
EPA electric range: 222 miles
Range/hour of charging: 22 miles
Fast charging: 160 miles in 30 minutes
Starting MSRP: $65,900

2021 Audi e-tron Sportback
 Battery-electric    SUV/Crossover
EPA electric range: 218 miles
Range/hour of charging: 22 miles
Fast charging: 160 miles in 30 minutes
Starting MSRP: $69,100
2021 Audi Q5 55 TFSI e Plug-in Hybrid
Plug-in hybrid    SUV/Crossover
EPA electric range: 19 miles
EPA total range (gas + electric): 400 miles
Range/hour of charging: 8 miles
Starting MSRP: $51,900

2021 BMW 745e xDrive iPerformance
Plug-in hybrid    Sedan
EPA electric range: 16
EPA total range (gas + electric): 290
Range/hour of charging: 4 miles
Starting MSRP: $95,900

2021 BMW 530e and 530e xDrive
Plug-in hybrid    Sedan
EPA electric range: 21 and 19
EPA total range (gas + electric): 350 and 330
Range/hour of charging: 7 miles
Starting MSRP: $57,200 and $59,500

2021 BMW i3
Battery-electric    Compact/Hatchback
EPA electric range: 153 miles
Range/hour of charging: 30 miles
Fast charging: 120 miles in 40 minutes
Starting MSRP: $44,450

2021 BMW i3 REx
Plug-in hybrid    Compact/Hatchback
EPA electric range: 126 miles
EPA total range (gas + electric): 200 miles
Range/hour of charging: 18 miles
Fast charging: 100 miles in 40 minutes
Starting MSRP: $48,300

2021 BMW 330e and 330e xDrive
Plug-in hybrid    Sedan
EPA electric range: 23 and 20
EPA total range (gas + electric): 320 and 290
Range/hour of charging: 8 miles
Starting MSRP: $44,550 and $46,550

2021 BMW 330e and 330e xDrive
Plug-in hybrid    Sedan
EPA electric range: 23 and 20
EPA total range (gas + electric): 320 and 290
Range/hour of charging: 8 miles
Starting MSRP: $44,550 and $46,550
2021 BMW X3 xDrive30e
Plug-in hybrid    SUV/Crossover
EPA electric range: 18 miles
EPA total range (gas + electric): 340 miles
Range/hour of charging: 6 miles
Starting MSRP: $49,600

2021 BMW X5 xDrive45e
Plug-in hybrid    SUV/Crossover
EPA electric range: 31 miles
EPA total range (gas + electric): 400 miles
Range/hour of charging: 6 miles
Starting MSRP: $65,400

2022 Chevrolet Bolt EV
Battery-electric    Compact/Hatchback
EPA electric range: 259 miles
Range/hour of charging: 34 miles
Fast charging: 100 miles in 30 minutes
Starting MSRP: $31,995

2021 Chrysler Pacifica Hybrid
Plug-in hybrid    Minivan/Wagon/Van
EPA electric range: 32 miles
EPA total range (gas + electric): 520 miles
Range/hour of charging: 16 miles
Starting MSRP: $39,995

2021 Ford Escape Plug-in Hybrid
Plug-in hybrid    Compact/Hatchback
EPA electric range: 37 miles
EPA total range (gas + electric): 530 miles
Range/hour of charging: 11 miles
Starting MSRP: $32,650

2022 Chevrolet Bolt EUV
Battery-electric    Compact/Hatchback
EPA electric range: 247 miles
Range/hour of charging: 34 miles
Fast charging: 95 miles in 30 minutes
Starting MSRP: $33,995
<p>| Model                                      | Type                    | EPA electric range: | Range/hour of charging: | Fast charging: | Starting MSRP: |
|-------------------------------------------|-------------------------|---------------------|-------------------------|---------------|               |
| <strong>2021 Ford Mustang Mach-E AWD</strong>          | Battery-electric        | 211–270 miles       | 25 miles               | 168–216 miles in 45 minutes | $42,895–$47,000 |
| <strong>2021 Jaguar I-Pace</strong>                    | Battery-electric        | 234 miles           | 18 miles               | 187 miles in 85 minutes | $69,850        |
| <strong>2021 Jeep Wrangler 4xe</strong>                | Plug-in hybrid          | 22 miles            | 10 miles               | 370           | $47,995        |
| <strong>2021 Land Rover Range Rover PHEV</strong>      | Plug-in hybrid          | 19                  | 6 miles                | 480           | $97,000        |
| <strong>2021 Land Rover Range Rover Sport PHEV</strong>| Plug-in hybrid          | 19                  | 6 miles                | 480           | $83,000        |
| <strong>2021 Mini Cooper SE</strong>                   | Battery-electric        | 110 miles           | 27 miles               | 88 miles in 36 minutes | $29,900        |</p>
<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Category</th>
<th>EPA Electric Range</th>
<th>EPA Total Range (Gas + Electric)</th>
<th>Range/hour of Charging</th>
<th>Fast Charging</th>
<th>Starting MSRP</th>
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<tr>
<td>2021 Mini Cooper SE Countryman All4</td>
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<td>2021 Nissan Leaf and Leaf Plus</td>
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<td>120 miles in 40 minutes</td>
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<td>$59,900</td>
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<td>2021 Porsche Cayenne E-Hybrid and E-Hybrid Coupe</td>
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<td>SUV/Crossover</td>
<td>17 miles</td>
<td>430 miles</td>
<td>8 miles</td>
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<td>$81,800 and $87,600</td>
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<td>Sedan</td>
<td>19 miles</td>
<td>480 miles</td>
<td>5 miles</td>
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<td>$103,800</td>
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</table>
2021 Porsche Panamera 4 E-Hybrid Sport Turismo

 插电式混合动力

 EPA 电能行驶里程: 19 英里
 EPA 总行驶里程（汽油 + 电能）: 480 英里
 充电时长: 5 英里/小时
 基本售价: $107,800

2021 Porsche Taycan

 锂电池

 EPA 电能行驶里程: 200–225 英里
 充电时长: 21 英里
 快速充电: 160–180 英里/93 分钟（50 kW）
 快速充电: 160–180 英里/22 分钟（270 kW）
 基本售价: $79,900–$85,680

2021 Porsche Taycan 4 Cross Turismo

 锂电池

 EPA 电能行驶里程: 215 英里
 充电时长: 21 英里
 快速充电: 160–180 英里/93 分钟（50 kW）
 快速充电: 160–180 英里/22 分钟（270 kW）
 基本售价: $90,900

Tesla Model 3

 锂电池

 EPA 电能行驶里程: 263–353 英里
 充电时长: 33 英里
 快速充电: 175 英里/15 分钟
 基本售价: $39,990–$48,990

Tesla Model S

 锂电池

 EPA 电能行驶里程: 390–412 英里
 充电时长: 27 英里
 快速充电: 200 英里/15 分钟
 基本售价: $79,990–$119,990

Tesla Model X

 锂电池

 EPA 电能行驶里程: 340–360 英里
 充电时长: 25 英里
 快速充电: 175 英里/15 分钟
 基本售价: $89,990–$119,990
Tesla Model Y
Battery-electric  SUV/Crossover
EPA electric range: 303–326 miles
Range/hour of charging: 45 miles
Fast charging: Up to 162 miles in 15 minutes
Starting MSRP: $51,990–$60,990

2021 Toyota Prius Prime
Plug-in hybrid  Compact/Hatchback
EPA electric range: 25 miles
EPA total range (gas + electric): 640 miles
Range/hour of charging: 12 miles
Starting MSRP: $28,220

2021 Toyota RAV4 Prime
Plug-in hybrid  SUV/Crossover
EPA electric range: 42 miles
EPA total range (gas + electric): 600 miles
Range/hour of charging: 9 miles
Starting MSRP: $38,100

2021 Volkswagen ID.4
Battery-electric  Compact/Hatchback
EPA electric range: 250
Range/hour of charging: 33 miles
Fast charging: 60 miles in 10 minutes
Starting MSRP: $39,995

2021 Volvo S60 Recharge Plug-in Hybrid
Plug-in hybrid  Sedan
EPA electric range: 22 miles
EPA total range (gas + electric): 510 miles
Range/hour of charging: 7 miles
Starting MSRP: $47,650

2021 Volvo S90 Recharge Plug-in Hybrid
Plug-in hybrid  Sedan
EPA electric range: 21 miles
EPA total range (gas + electric): 490 miles
Range/hour of charging: 7 miles
Starting MSRP: $60,050
2021 Volvo V60 Recharge Plug-in Hybrid
Plug-in hybrid    Minivan/Wagon/Van
EPA electric range: 22 miles
EPA total range (gas + electric): 510 miles
Range/hour of charging: 7 miles
Starting MSRP: $67,300

2021 Volvo XC90 Recharge
Battery-electric    SUV/Crossover
EPA electric range: 18 miles
EPA total range: 520 miles
Range/hour of charging: 6 miles
Fast charging: 166 miles in 40 minutes
Starting MSRP: $63,450

2021 Volvo XC40 Recharge
Battery-electric    SUV/Crossover
EPA electric range: 208 miles
Range/hour of charging: 26 miles
Fast charging: 166 miles in 40 minutes
Starting MSRP: $53,990

2021 Volvo XC60 Recharge Plug-in Hybrid
Plug-in hybrid    SUV/Crossover
EPA electric range: 19 miles
EPA total range (gas + electric): 520 miles
Range/hour of charging: 6 miles
Starting MSRP: $53,500

2021 Volvo XC90 Recharge Plug-in Hybrid
Plug-in hybrid    SUV/Crossover
EPA electric range: 18 miles
EPA total range: 520 miles
Range/hour of charging: 6 miles
Starting MSRP: $63,450
AVAILABLE IN SELECT MARKETS

- Electric cars available in select markets as of June 2021; discontinued models or older model years may still be available.
- Range per hour of charging assumes home or workplace charging; see FAQs, page 15.
- Fast-charging times are provided by automakers or calculated from automaker statements. These rates vary due to many factors, including battery charge level and ambient temperature.
- Starting MSRP's are retrieved from automaker websites and may vary.
- Models that offer different configurations and battery sizes may show multiple numbers for driving range, charging time, and starting MSRP.
- Despite industry classifications of five-door vehicles as crossovers or compact SUVs, this guide categorizes them as hatchbacks unless they are offered with all-wheel drive.

2021 Honda Clarity Plug-in Hybrid
- Plug-in hybrid
- Sedan
- EPA electric range: 48 miles
- EPA total range (gas + electric): 340 miles
- Range/hour of charging: 22 miles
- Starting MSRP: $33,400

2021 Hyundai Kona Electric
- Battery-electric
- Compact/Hatchback
- EPA electric range: 258 miles
- Range/hour of charging: 27 miles
- Fast charging: 200 miles in 54 minutes
- Starting MSRP: $37,390

2021 Hyundai Ioniq Plug-in Hybrid
- Plug-in hybrid
- Compact/Hatchback
- EPA electric range: 29 miles
- EPA total range (gas + electric): 620 miles
- Range/hour of charging: 13 miles
- Starting MSRP: $26,700

2021 Hyundai Ioniq Electric
- Battery-electric
- Compact/Hatchback
- EPA electric range: 170 miles
- Range/hour of charging: 29 miles
- Fast charging: 136 miles in 54 minutes
- Starting MSRP: $33,245
### 2020 Kia Niro EV
- **Battery-electric**  
  - Compact/Hatchback
  - EPA electric range: 239 miles
  - Range/hour of charging: 25 miles
  - Fast charging: 100 miles in 30 minutes
  - Starting MSRP: $39,090

### 2021 Kia Niro Plug-in Hybrid
- **Plug-in hybrid**  
  - Compact/Hatchback
  - EPA electric range: 26 miles
  - EPA total range: 560 miles
  - Range/hour of charging: 11 miles
  - Starting MSRP: $29,590

### 2021 Subaru Crosstrek Hybrid
- **Plug-in hybrid**  
  - SUV/Crossover
  - EPA electric range: 17 miles
  - EPA total range (gas + electric): 480 miles
  - Range/hour of charging: 8 miles
  - Starting MSRP: $35,345

### 2021 Lincoln Aviator Grand Touring
- **Plug-in hybrid**  
  - SUV/Crossover
  - EPA electric range: 21
  - EPA total range (gas + electric): 460
  - Range/hour of charging: 8 miles
  - Starting MSRP: $69,070

### 2021 Lincoln Corsair Grand Touring
- **Plug-in hybrid**  
  - SUV/Crossover
  - EPA electric range: 28
  - EPA total range (gas + electric): 430
  - Range/hour of charging: 8 miles
  - Starting MSRP: $50,390

### Mercedes-Benz GLC 350e
- **Plug-in hybrid**  
  - SUV/Crossover
  - EPA electric range: 22
  - EPA total range (gas + electric): 360
  - Range/hour of charging: 17 miles
  - Starting MSRP: $51,900
WHAT ARE KILOWATTS AND KILOWATT-HOURS, ANYWAY?

A kilowatt (kW) is a measure of power. A kilowatt-hour (kWh) is a measure of energy, or how much power is used over time. An EV battery’s size, measured in kWh, tells you how much energy it may contain and therefore how far the EV can go. The rate at which you use (and recharge) the battery is expressed in kW.

To understand their relationship, think of a hose and a bucket. Power (kW) is comparable to the rate of water flowing through the hose. Energy (kWh) is much like the amount of water that collects in the bucket over time (Figure 2a).

How do kilowatt-hours compare to gallons of gasoline?

Just as internal combustion cars have different size gas tanks, EVs have different size batteries. The amount of energy stored in a typical EV battery varies:

- Plug-in hybrid: ≤ 20 kWh
- All-electric car: 40–100+ kWh

The distance the energy takes you in your EV depends on your battery size, how you drive, and factors such as weather. Driving fast, uphill, having a “lead foot,” or running the heat or air-conditioning in your EV increase energy use. Conversely, making frequent stops or driving in stop-and-go traffic and downhill can add energy to your battery.

An EV travels roughly 2 to 4 miles on each kWh of energy, so 3 miles per kWh is a good rule of thumb for calculating how many miles your EV can go, based on the kWh in your battery.

Here’s another way to compare EV battery energy to gas cars: One gallon of gasoline contains about 33 kWh of energy. So, a 25-mpg car with a 12-gallon tank has the equivalent of 400 kWh, which is many times the size of the largest EV battery. Conventional gas cars need more energy storage because they waste two-thirds of that energy in heat and noise, whereas EVs use less energy to cover the same 300 miles.

When you refuel your gas car, the price is shown in dollars per gallon. When you refuel your electric car, prices are often shown in cents per kWh.

Explain kilowatts and EV charging.

Continuing our hose analogy, just as more water would travel through a garden hose than a drinking straw, with EV charging, the amount of energy that can be added to your battery over time depends on the charging rate or power (kW) (Figure 2b). With high charging power (high kW), the car’s battery fills faster than with low charging power (low kW). The car, not the charging station, determines the charging power.

Even if a public charging station can provide a high rate of power, such as 250 kW DC, only a few of today’s EVs can accept that rate. Most current all-electric cars accept less than 150 kW DC, and most plug-in hybrids accept much lower rates, around 3.3 kW AC. Rapid industry advances are leading to cars that can accept high power rates and chargers that can supply that power. The next two questions have more charging details.
WHERE CAN I CHARGE AND HOW LONG DOES IT TAKE?

With gas cars, you stop at a gas station to refuel on the road. With an electric car you charge at home, at work, or on the road. Simply plug it in, like your smart phone or computer; your car charges while you sleep, work, or play.

Most drivers with a driveway or garage prefer the convenience of charging at home. They can either plug into a standard 120-volt household outlet using the cord that comes with the car or install a dedicated 240-volt charging station.

The first option, called Level 1 charging, is the simplest and most economical home-charging solution because it requires no other equipment or installation provided the 120-volt outlet is up to date. Charging at Level 1 (typically 1.4 to 1.9 kW) delivers roughly 3 to 5 miles of range per hour.

A dedicated 240-volt charging station, called Level 2 charging, requires sufficient electrical capacity, and may need to be installed by a licensed electrician. (It’s similar to the outlet for a clothes dryer or other 240-volt appliance.) Charging at Level 2, (typically 3.3 kW to 19.2 kW) delivers roughly 8 to 24 miles of range per hour or more, depending on the car, the charging station, and the electrical service.

Public charging stations and some workplaces also offer Level 2—and sometimes Level 1—charging.

All electric cars can charge at Levels 1 and 2, and many are equipped to accept an even faster level of charging, called DC fast charging.

While DC fast chargers cannot be installed at home, a growing number of fast-charging stations are available in strategic locations nationwide along highway corridors and near shopping centers. The speed at which a car charges at a DC fast charging station varies, depending on the car and the power availability at the station (typically 50 kW to 350 kW) (Figure 3).
**HOW MUCH DOES IT COST TO CHARGE?**

Charging cost depends on several factors: the price of electricity, your car’s efficiency (how much electricity it uses to travel one mile), and how many miles you drive.

Home charging is the most economical. At the US national average residential price of 13 cents per kWh, fueling a car with electricity is roughly equivalent to buying gasoline at $1 per gallon. Many utilities offer discounted residential EV rates that further cut the cost.

Public charging costs vary by region and network provider. Some public stations are free and open to all, with electricity subsidized by the property owner. Fee structure and membership requirements vary by charging network. Charging on the go usually costs more than charging at home though less than the current average cost of gasoline (Table 1).

**WHERE CAN I BUY AN EV?**

You can buy a used or new EV through a conventional car dealer or online. Some carmakers invite buyers to order a new car online and pick it up at a regional retail center. Automakers that rely on traditional dealer networks (i.e., all but the startups) may also accept online orders and then deliver the EV to your local dealer.

Some carmakers choose to limit EV sales to major urban areas, or to states that have adopted regulations to promote clean cars and EVs (Figure 4). Likewise, some may offer plug-in hybrids nationwide but limit sales of their battery-electric models to certain states. Each manufacturer’s strategy differs and may change in response to market signals and regulatory pressures.

**WHAT INCENTIVES ARE AVAILABLE?**

A federal tax credit of up to $7,500 may be available for qualified EVs and buyers whose tax circumstances allow them to take advantage of it. A federal EV charging-station incentive may also be available. Additional federal incentives are under consideration.

Many states and local governments also offer vehicle purchase and charging station incentives. In some cities, electric cars may use carpool lanes with a single driver and receive parking and charging perks. Some utilities also offer EV charging incentives. The US Dept. of Energy Office of Energy Efficiency and Renewable Energy tracks currently available government incentives.

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**Table 1. Average cost to drive 30, 100, and 200 miles using electricity (with home and public charging options) compared to gasoline. Although gasoline prices vary by region and season, the cost of home charging is roughly equivalent to gasoline at $1/gallon.**

<table>
<thead>
<tr>
<th>MILES DRIVEN</th>
<th>GASOLINE COST</th>
<th>ELECTRICITY COST HOME CHARGING</th>
<th>ELECTRICITY COST PUBLIC CHARGING LEVEL 2</th>
<th>ELECTRICITY COST PUBLIC CHARGING DC FAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>$3.33</td>
<td>$1.33</td>
<td>$2.70</td>
<td>$3.10</td>
</tr>
<tr>
<td>100</td>
<td>$11.12</td>
<td>$4.44</td>
<td>$8.99</td>
<td>$10.33</td>
</tr>
<tr>
<td>200</td>
<td>$22.24</td>
<td>$8.89</td>
<td>$17.99</td>
<td>$20.66</td>
</tr>
</tbody>
</table>

1 These calculations assume: an average US light-duty vehicle efficiency of 25 mpg and a regular unleaded gasoline price of $2.78/gallon (US Energy Information Administration 2021 Summer Forecast); an average electric vehicle efficiency of 3 miles/kWh; an average US residential electricity price of $0.1334 (US Energy Information Administration, February 2021); and an average value of $0.27/kWh and $0.31/kWh for public Level 2 and DC fast charging, respectively.
WHAT SHOULD I CONSIDER IN EVALUATING AN EV?

Consider your driving needs. If your daily driving patterns are predictable, or if you like the idea of a gasoline-free driving experience, an all-electric vehicle can be a good choice. Today’s longer-range EVs together with access to workplace or public charging may alleviate range anxiety. If you often drive long distances, a plug-in hybrid with its backup internal-combustion engine can provide a worry-free transition to EVs.

Consider costs and benefits. Despite higher sticker prices, EVs can cost less to operate over their lifetime, thanks to purchase incentives, lease options, and discounted electricity rates. Like other innovations, EV costs are falling as technology improves and production volumes rise.

Consider environmental benefits. Electric cars have lower emissions than gasoline-powered vehicles, even in areas where much of the electricity is generated by power plants that burn fossil fuels. As power generation gets cleaner, the electric cars charged on those grids get cleaner, too.

ARE EVS HERE TO STAY?

In 2020, despite a decline in US vehicle sales overall, EV sales grew. Although EVs represent a small share of the US light-duty vehicle market today, the market is transforming and a global shift toward electrification is underway, fueled largely by regulations, and driven by those in Europe and China.

As more jurisdictions embrace climate change policies, as more automakers pledge to electrify their fleets, and as more consumers experience EVs, the transformation is expected to accelerate. One forecast shows global EV sales increasing from 1.7 million in 2020 to 8.5 million in 2025, 26 million in 2030, and 54 million by 2040—or more than half of all new cars built.¹

MORE INFORMATION

Explore automakers’ websites for product updates and check your local electricity provider’s website for information about EVs.

Additional EPRI Resources:

Consumer Guide to Electric Vehicles
(Online version, updated periodically throughout the year)
https://evconsumerguide.epri.com/

Consumer Guide to Electric Vehicle Charging
October 2019 (EPRI Product ID 3002016961)
https://www.epri.com/research/products/000000003002016961

Environmental Assessment of a Full Electric Transportation Portfolio
September 2015 (EPRI Product ID 3002006881)
https://www.epri.com/research/products/000000003002006881

Other Resources:

GoElectricDrive Foundation
https://www.goelectricdrive.org/

US Dept. of Energy Alternative Fuels Data Center
https://afdc.energy.gov/fuels/electricity.html

https://www.energy.gov/eere/office-energy-efficiency-renewable-energy

US Dept. of Energy and US Environmental Protection Agency fuel economy information
https://www.fueleconomy.gov/

US Environmental Protection Agency, Fast Facts on Transportation and Greenhouse Gases
https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions

Plug In America
https://pluginamerica.org/

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