EV Charging
Strategies and Best Practices

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By 2020 there will be over 120 different models of EVs. They will make the internal combustion equivalent look old fashioned.

Michael Liebreich, Founder, Bloomberg New Energy Finance
Electric for Dog Lovers.

Electric for Cat Lovers.

Brought to you by VELOZ
Plug-in car sales were up 66% in the first half of 2018 vs. to first half of 2017.
### Top 15 Cars in USA – September Sales

1. Toyota Camry
2. Honda Accord
3. Honda Civic
4. Tesla Model 3 (est.)
5. Toyota Corolla
6. Hyundai Elantra
7. Nissan Sentra
8. Ford Fusion
9. Nissan Altima
10. Kia Optima
11. Volkswagen Jetta
12. Kia Soul
13. Hyundai Sonata
14. Toyota Prius
15. Ford Focus

*Non-Tesla sales = September sales. Tesla Model 3 sales = delivery estimate for September.*

Chart: CleanTechnica • Source: CleanTechnica • Created with Datawrapper
<table>
<thead>
<tr>
<th>Automaker</th>
<th>Number of Electrified Vehicles*</th>
<th>Number of BEVs</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audi</td>
<td>20</td>
<td>10</td>
<td>2025</td>
</tr>
<tr>
<td>BMW</td>
<td>25</td>
<td>12</td>
<td>2025</td>
</tr>
<tr>
<td>Fiat Chrysler</td>
<td>One-half of entire vehicle lineup</td>
<td></td>
<td>2022</td>
</tr>
<tr>
<td>Ford</td>
<td>40</td>
<td>16</td>
<td>2022</td>
</tr>
<tr>
<td>General Motors</td>
<td>20</td>
<td></td>
<td>2023</td>
</tr>
<tr>
<td>Honda</td>
<td>Two-thirds of entire vehicle lineup</td>
<td></td>
<td>2030</td>
</tr>
<tr>
<td>Jaguar Land Rover</td>
<td>One-half of entire vehicle lineup</td>
<td></td>
<td>2020</td>
</tr>
<tr>
<td>Mercedes-Benz</td>
<td>Electrified equivalent of all new vehicles</td>
<td></td>
<td>2022</td>
</tr>
<tr>
<td>Nissan/Mitsubishi/Renault</td>
<td>Electrified equivalent of all new vehicles</td>
<td></td>
<td>2022</td>
</tr>
<tr>
<td>Porsche</td>
<td>One-half of global sales will be plug-in vehicles</td>
<td></td>
<td>2025</td>
</tr>
<tr>
<td>Toyota/Lexus</td>
<td>Electrified equivalent of all new vehicles</td>
<td></td>
<td>2025</td>
</tr>
<tr>
<td>Volkswagen Group</td>
<td>All models</td>
<td>15</td>
<td>2025</td>
</tr>
<tr>
<td>Volvo</td>
<td>Electrified equivalent of all new vehicles</td>
<td></td>
<td>2019</td>
</tr>
</tbody>
</table>

*The term, "electrified" may mean conventional hybrid, not plug-in electric. Expanded use of electric drive systems help reduce costs and build the broader market for electric vehicles. Source: EPRI, 2018 EV Consumer Guide
Public EV charging is not a barrier to early market acceptance. It is an enabler of mainstream acceptance.
Charging Locations

- 80-90% of charging happens at **home**.
- **Workplace** charging is a great benefit for employees & usually inspires faster EV adoption among employees.
- **Public** charging allows people to drive EVs on longer distance trips.
## EV Charging: One size does not fit all locations

<table>
<thead>
<tr>
<th></th>
<th>Voltage</th>
<th>Charging Time</th>
<th>Equipment Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1</strong></td>
<td>120V</td>
<td>2 to 5 miles of range per hour</td>
<td>$0 - $1,500</td>
</tr>
<tr>
<td>(slow)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td>240V</td>
<td>10 to 20 miles of range/hour</td>
<td>$400 - $12,000</td>
</tr>
<tr>
<td>(medium)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC Fast</strong></td>
<td>480V</td>
<td>60 to 80 miles of range 20 minutes</td>
<td>$25,000 - $150,000</td>
</tr>
<tr>
<td>(fast)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Key Factors in Siting EV Charging

- Cars are parked 95% of the time. Put charging where cars are parked.
- Match the charger to the natural dwell time of a location.
- Prioritize destination locations with regional draws.
- Place chargers near electrical panels or transformers to reduce installation cost.
- Maximize accessibility - make sure it cannot be easily blocked.
Key Factors in Siting DC Fast Charging

- Locate within ONE mile of highway corridor.
- Adequate power supply - talk to your utility **early** in the planning process.
- Access to bathrooms, lighting, shopping, restaurants, amenities. Make sure to provide a good user experience.
Train your employees & Mark the spaces
Pay the bills and maintain the station.
Helpful Maps & Resources for EV Project Planning
Federal Highway Administration Designated EV Corridors
Current DC Fast Charging in OK
Planned Electrify America Stations in OK

Bristow
Vinita
Moore
Ardmore
Weatherford
Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite

This tool provides a simple way to estimate how much electric vehicle charging you might need at a city- and state-level.

How Much Electric Vehicle Charging Do I Need in My Area?

Estimate for a State

Estimate for a City/Urban Area
Resources

INCOG and ACOG
Oklahoma EV Coalition
EVs and Chargers on State Purchasing Contract
Some utilities developing EV and charging incentives - call yours and ask
State tax credit through 2019 - 75% of costs of EV charging installations may be eligible for state tax credits
Do you choose to visit local dining, shopping, or other destinations with EV chargers over locations that do not offer EV charging?

46 responses
Results of Oklahoma EV Driver Survey 2018

If you do purchase goods or services while you are charging, how much do you spend, on average, per charging session?

42 responses

- 33.3% Less than $10
- 16.7% $10-$20
- 11.9% $20-$30
- 11.9% $30-$40
- 9.5% $40-$50
- 9.5% $50-$60
- 7.1% More than $60
- 1.2% I typically do not purchase anything while I am charging in my town.
When traveling with your EV, do you choose accommodations, dining, shopping, or other destinations with EV...cations that do not offer EV charging?

38 responses

- Always: 50%
- Frequently: 31.6%
- Occasionally: 7.9%
- Never:
If you do purchase goods or services while you are charging out of town, how much do you spend, on average, per charging session?

37 responses

- I typically do not purchase anything from the charging station host when traveling.
- Less than $10 (16.2%)
- $10-$20 (35.1%)
- $20-$30 (27%)
- $30-$40 (0.9%)
- $40-$50 (0.9%)
- $50-$60 (3.7%)
- More than $60 (16.2%)
Oklahoma EV Drivers Comments on Charging in 2018

- I always look for hotels and restaurants with chargers and give preference to them.
- Chargers should be near restrooms and dining
- Small Town, no public charging available.
- Would love to frequent more businesses and other locations who add public charging.
- Destination charging is a great boost to the local economy.
- More level 3 chargers will increase tourism. Especially needed on interstate highways.
- It's common for ICE vehicles to block EV charging spots. Sometimes because they're closer or out of spite. The EV spots should be clearly marked and enforced.
- Convenient, accessible, safe and attractive locations
- Choose places where time is spent already; shopping, dining.
- As drivers charge their vehicle they will shop and get meals. EV drivers are loyal to the businesses that provide this service.
- Prompt station repairs and communication are vital for EV drivers. We count on having a place to charge when we make our plans. It’s not like when a car wash is out of service. We rely on your best service. When a charger needs repair it must be reported so we can utilize other options for our charge.
Thank you.

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