



Leading the Charge

PEV Charging Infrastructure Roadmap

The EV Charging Infrastructure Roadmap report uses the experience gained from initial deployment and use of charging infrastructure, including the U.S. Department of Energy's investment in infrastructure development and data collection. As requested by DOE, the Roadmap report focuses on what charging infrastructure should be installed, where it should be installed and when it should be installed. It also prioritizes the type, location and uses of charging infrastructure to promote plug-in electric vehicle (PEV) adoption and increase electric miles driven.

The Roadmap assumes that the technical challenges and vehicle performance improvements set forth in the EV Everywhere Grand Challenge will be met. To support this objective, the Roadmap leverages electric vehicle industry experts and data analysis to identify priorities for deploying PEV charging infrastructure.




The Roadmap matrix highlights the following:

- Home charging is the most important PEV charging location for all vehicle types and during all phases of maturity.
- Workplace charging is the next most important charging location and is an effective way to maximize electric miles driven.
- During the early stage and transitional phases of charging infrastructure development, DC fast chargers (DCFC) provide a means for extending intra-urban AEV-100 (all-electric vehicles with a 100-mile range) travel.
- During the mature stage of charging infrastructure development, DCFCs enable inter-urban travel for AEV-300 PEVs.

These initiatives have demonstrated effectiveness in overcoming infrastructure deployment obstacles:

WORKPLACE CHARGING COMPLEMENTS RESIDENTIAL CHARGING.



| Use | Deployment |
|--|---|
|  <p>Residential charging</p> <ul style="list-style-type: none"> • Fully implement time-of-use or electric vehicle charging rates that encourage off-peak charging by providing cost savings for energy used off peak | <p>Residential charging</p> <ul style="list-style-type: none"> • Residential building code requirements for prewired charging circuit in the garage of single family homes • Streamline permitting process |
|  <p>Away-from-home charging</p> <ul style="list-style-type: none"> • Promote use with "no charge to charge" programs • Support EV industry charger location apps such as Plugshare • Implement/enforce penalties for ICE-ing of charging stations | <p>Away-from-home charging</p> <ul style="list-style-type: none"> • Commercial building code requirements for dedicated circuits for charging stations • Clarify ADA requirements for PEV charging • Continuation of investment tax credits for PEV charging stations |
|  <p>DCFC</p> <ul style="list-style-type: none"> • Aggregate demand for billing purposes | <p>DCFC</p> <ul style="list-style-type: none"> • Clarify ADA requirements for DCFC |

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PEV Charging Infrastructure Roadmap Matrix

As the PEV market matures, the charging infrastructure expansion includes the continuous build out of the previous stage(s) and expansion of the next stage of infrastructure deployment

| | Early Stage | Transitional | Mature |
|---------------------|---------------------|-----------------------|------------------------|
| PEV-40 (i.e. Volt) | Residential (AC L1) | Workplace (AC L2) | Public (AC L2) |
| AEV-100 (i.e. Leaf) | Residential (AC L2) | Workplace (AC L2) | Within cities (DC FC) |
| AEV-300 (next-gen) | Residential (AC L2) | Within cities (DC FC) | Between cities (DC FC) |

As charging expands beyond homes and workplaces, the next most frequently used infrastructure locations are DC fast chargers found along highways within urban areas. These chargers are used to extend daily urban miles traveled, and support inter-urban travel and drivers living in multi-dwelling units.



Findings from the Plug-in Electric Vehicle and Infrastructure Analysis and the U.S. Department of Transportation's National Household Travel Survey

39.5

Average daily miles traveled on days a vehicle is driven

93

Percent of vehicles that travel less than 100 miles per day driven

22

Average number of hours per day that a vehicle is parked at home and work

98

Percent of time those with access to workplace charging charge at home or work

As the EV Everywhere targets for battery energy density, driveline efficiency and weight reduction are achieved, the PEV market will mature and include more AEV-300s (all-electric vehicles with a 300-mile range) and even more affordable PEV-40s and AEV-100s. The widespread presence of publicly accessible charging stations promotes PEV adoption and increases electric miles driven.