



Electric Vehicle Council

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EV Charger Deployment Optimization

An Analysis of U.S. State-level Electric Vehicle
Supply Equipment Demand Forecast and
Supporting Infrastructure Considerations

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Fuels Institute

Summary of Findings

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Overview:

The Fuels Institute commissioned S&P Global Mobility to evaluate the electric vehicle (EV) charging infrastructure deployment strategies that would best serve the needs of end users within the growing EV market. This included determining how many charging stations may be required at various stages of EV market development to satisfy demand, when and where they would be needed and what types of chargers (Level 2 and DC Fast chargers) will be required at different locations in order to optimize deployment to satisfy consumer needs while reducing overall infrastructure costs and accelerating the business case for charger installation.

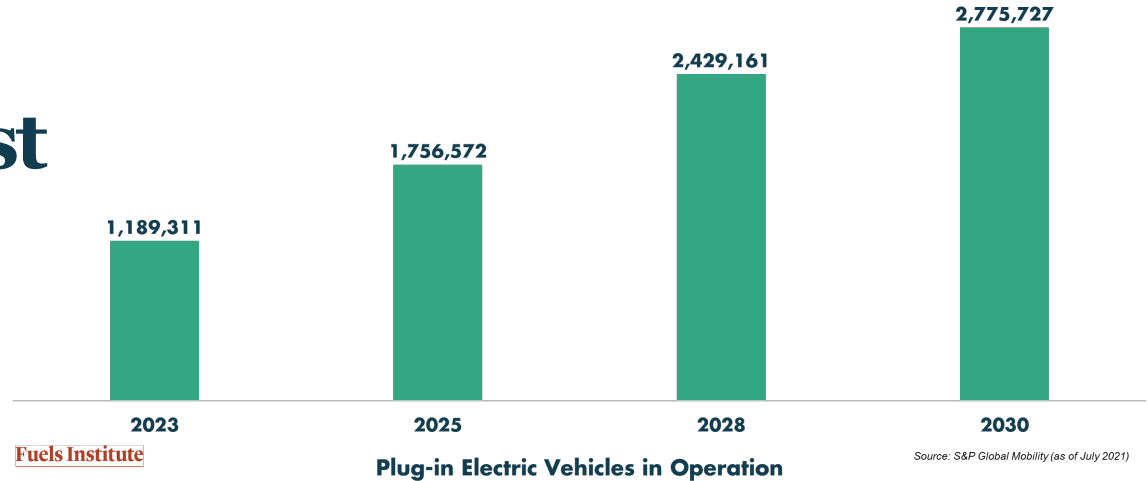
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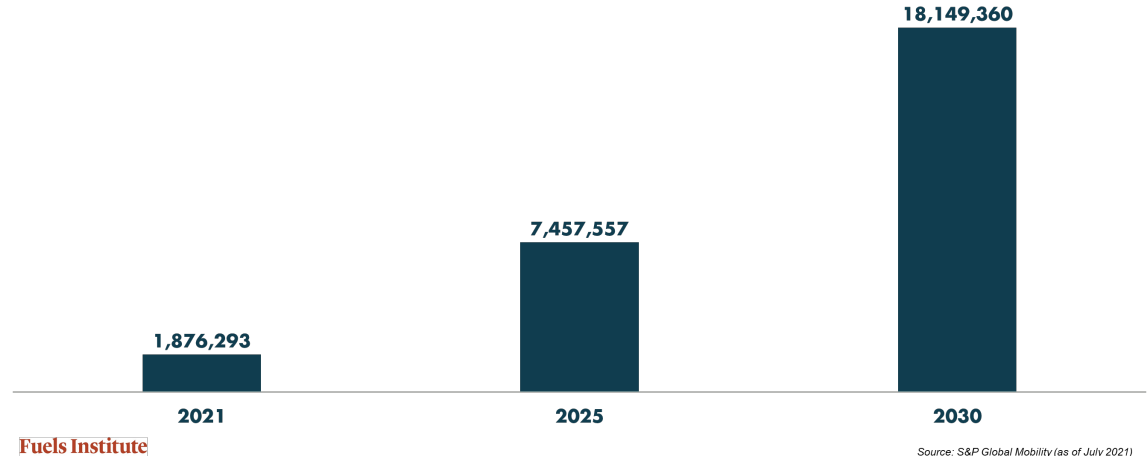
S&P Global Mobility Forecast

To determine how many chargers might be required, researchers first had to forecast the size of the EV market through 2030. S&P Global Mobility developed the forecasts for this research in July 2021. At that time, they forecast that U.S. sales of plug-in electric vehicles would reach 2.78 million units in 2030 and plug-in electric vehicles in operation would exceed 18 million.

Plug-in Electric Vehicle Sales



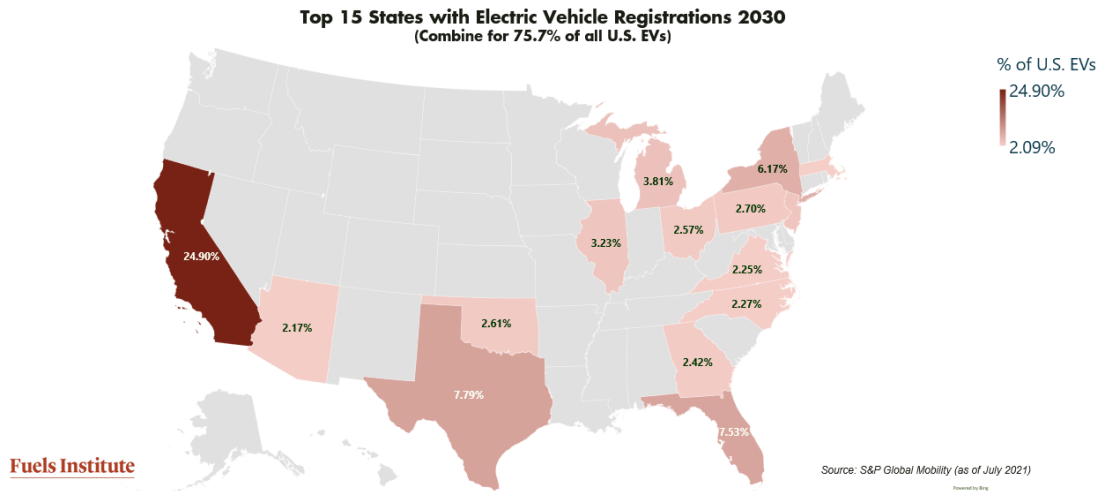
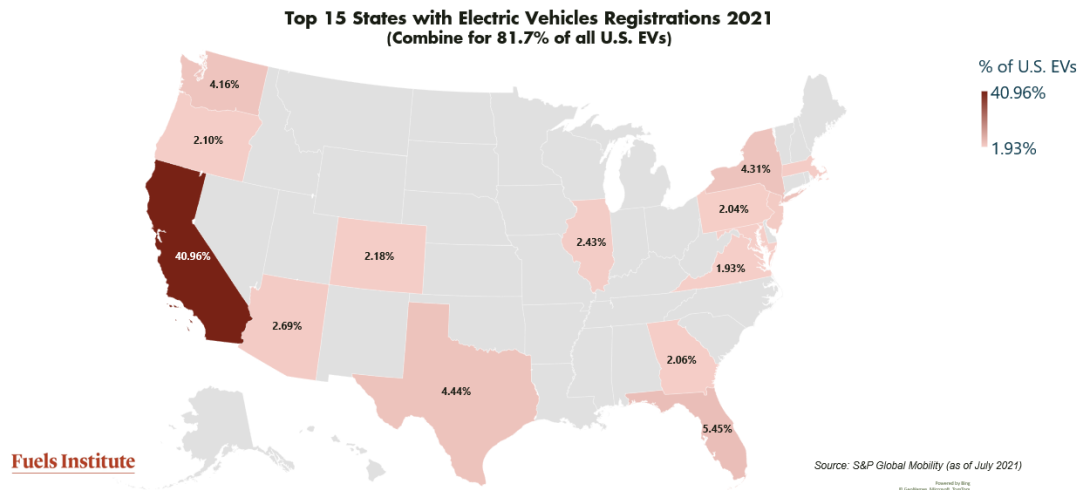
Plug-in Electric Vehicles in Operation



Geographic Distribution is Uneven

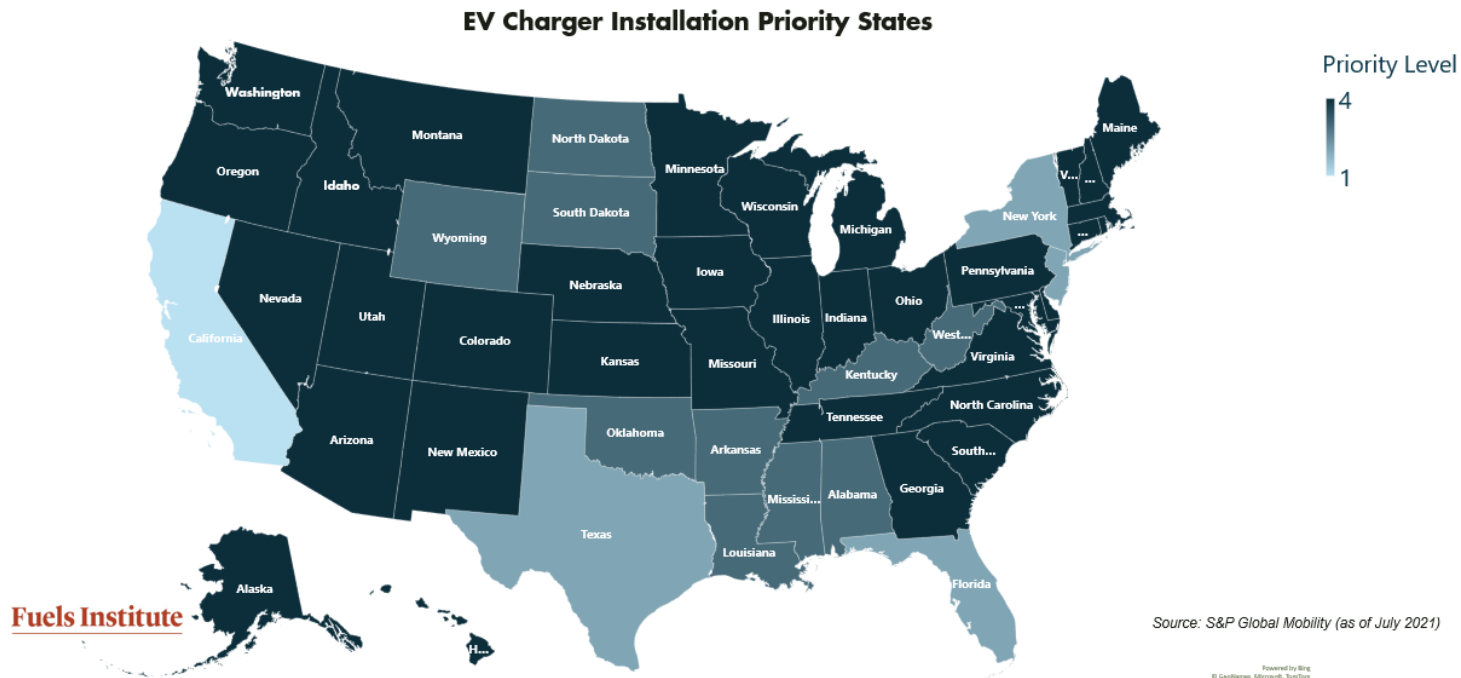
S&P Global Mobility leveraged their database of registered vehicles in the United States, combined with their July 2021 forecast, to determine that plug-in electric vehicle registrations would remain significantly concentrated among a minority of states through 2030.

This distribution of EVs influences greatly the strategic deployment of charging stations to support drivers and long-distance travel with electric vehicles.



Prioritizing EVSE Deployments

Building upon their knowledge about the vehicles and transportation market, S&P Global Mobility prioritized states based upon their need for EV charging installations. Taking into consideration the expected future plug-in EVs in operation along with factors which influence out-of-home charging requirements, including housing mix, miles traveled, and parking habits, researchers combined these inputs and used them to forecast EVSE requirements at a census tract level. This highly granular forecast was then aggregated to create a state-level prioritization to help guide industry stakeholders to strategically deploy stations to support the expanding demand of the EV driver.



U.S. may need more than 1.7 million charging stations in 2030

How did they arrive at this number?

- Applied international benchmark for ideal EV-to-charger ratio of 10.4:1
- Applied S&P Global Mobility forecast of EVs in operation in 2030 of 18 million
- Charging Stations Needed – 1.737 million
- More than 90% could be Level 2 - based upon census track analysis combined with driving patterns and observed dwell times

It is worth noting that this figure is based upon a forecast that is significantly lower than many other published forecasts. If the market for EVs develops faster than provided for in this study, the number of required charging stations to minimize market congestion will be much higher than 1.7 million.

FIGURE 26: 2030 U.S. ELECTRIC VEHICLES IN OPERATION AND ELECTRIC VEHICLE SUPPLY EQUIPMENT RATIO FORECAST, TOP 15 STATES

STATE	ELECTRIC VEHICLES IN OPERATION	AC REQUIRED	DC REQUIRED	AC RATIO	DC RATIO	OVERALL RATIO
California	4,518,839	455,915	24,216	9.9	186.6	9.4
Florida	1,413,638	120,153	6,382	11.8	221.5	11.2
Texas	1,367,370	129,196	6,862	10.6	199.3	10.0
New York	1,118,911	83,065	4,412	13.5	253.6	12.8
New Jersey	690,699	74,426	3,953	9.3	174.7	8.8
Illinois	585,425	49,072	2,606	11.9	224.6	11.3
Pennsylvania	577,492	44,072	2,341	13.1	246.7	12.4
Michigan	490,824	46,548	2,472	10.5	198.5	10.0
Ohio	474,604	42,619	2,264	11.1	209.7	10.6
Washington	465,586	33,079	1,757	14.1	265.0	13.4
Georgia	439,410	44,814	2,380	9.8	184.6	9.3
North Carolina	411,960	36,184	1,922	11.4	214.4	10.8
Massachusetts	408,620	54,115	2,874	7.6	142.2	7.2
Arizona	393,973	27,380	1,454	14.4	270.9	13.7
Virginia	378,517	34,414	1,828	11.0	207.1	10.4
Top 15	13,735,870	1,275,050	67,724	10.77	202.8	10.2
National	18,149,360	1,649,942	87,636	11.00	207.1	10.4

Metro-level EVSE Forecasting – Case Studies

It is important to view the EVSE forecasts on a micro-level of geography, because EVSE deployment is going to physically occur in the locales and municipalities where people live and work – and not on a federal or even state level. To this point, the report includes three case studies (Detroit, MI; Dallas, TX; Portland, OR) to demonstrate how infrastructure looks today and how these cities should be addressing future charging demand and equity.

FIGURE 31: DETROIT, MICHIGAN: MAP OF ELECTRIC VEHICLE SUPPLY EQUIPMENT INSTALLATION REQUIREMENTS BY 2030

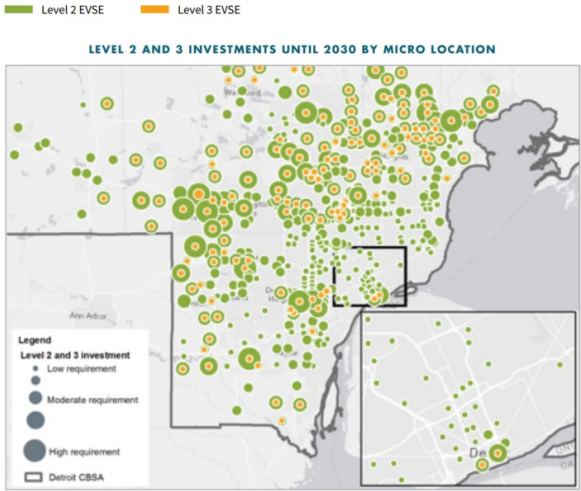


FIGURE 27: DETROIT, MICHIGAN: CHARGING DESERT IN THE CITY

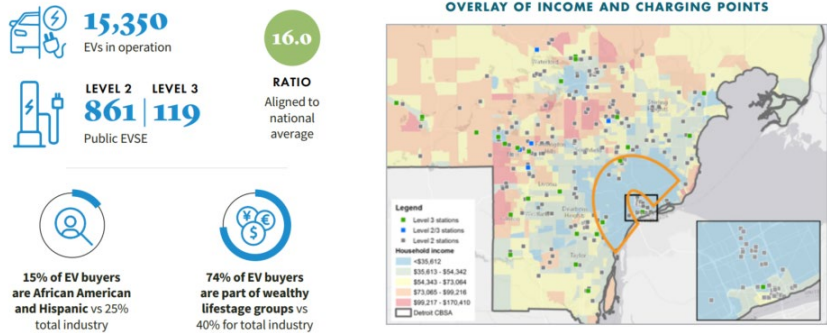
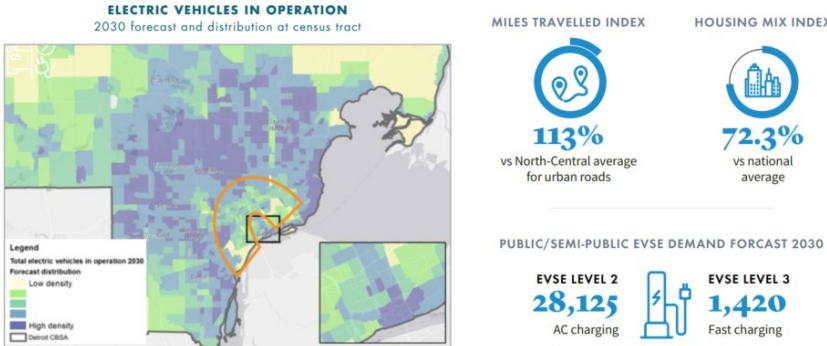


FIGURE 28: DETROIT, MICHIGAN: 2030 ELECTRIC VEHICLES IN OPERATION DISTRIBUTION BY CENSUS TRACT



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