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ELECTRIC VEHICLE QUARTERLY REPORT

ALLIANCE FOR AUTOMOTIVE INNOVATION

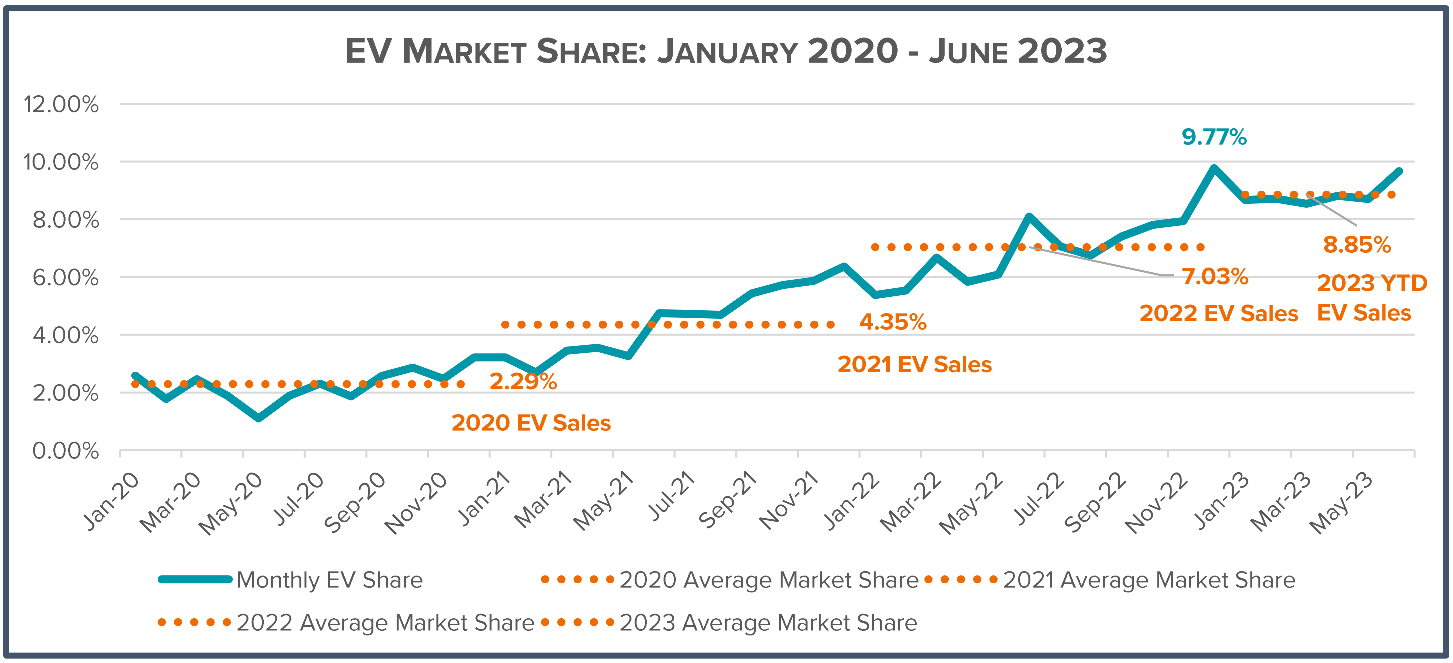
SECOND QUARTER, 2023

Contents

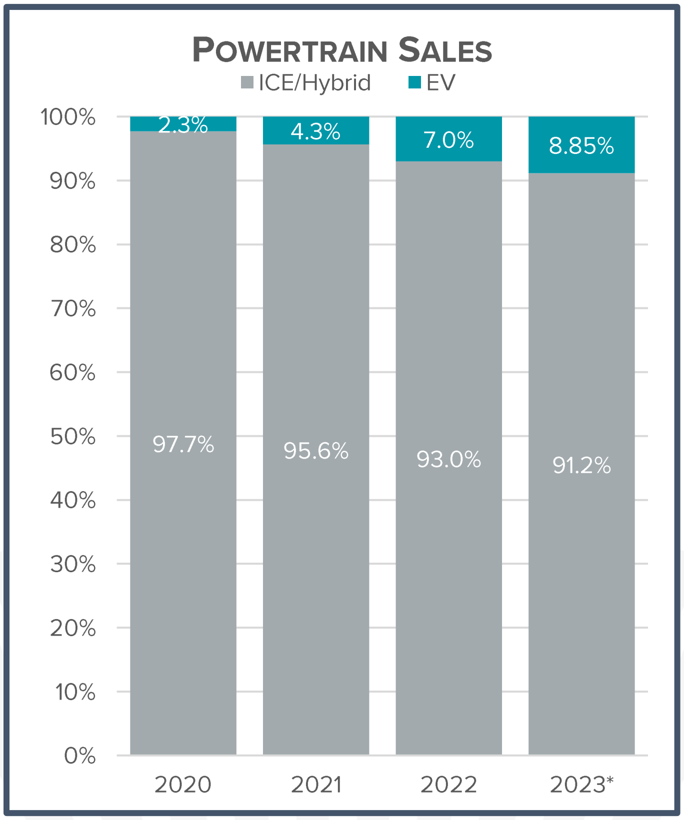
ELECTRIC VEHICLE SALES OVERVIEW (2023)

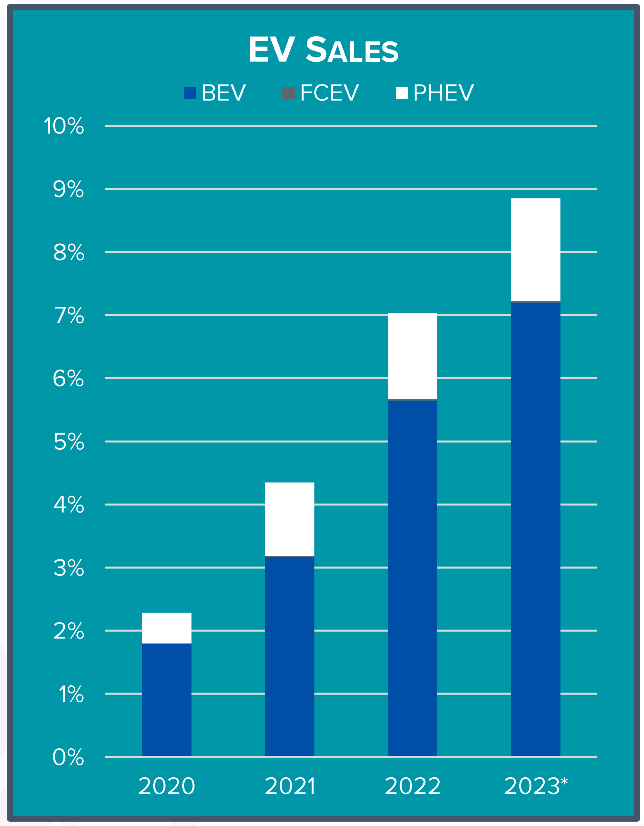
In the second quarter of 2023, automakers sold about 355,000 electric vehicles (EVs, including battery, plug-in hybrid, and fuel cell electric vehicles) in the United States, representing 9.1 percent of overall light-duty vehicle sales. Year-over-year (YoY), market share increased 2.4 percentage points (pp) from the second quarter of 2022. Over 129,000 more EV units were sold than the same period in 2022, a 58 percent increase.

More than 660,000 EVs were sold in the first half of 2023, 8.85 percent of all light vehicle sales and an increased market share of 2.6 pp over the first half of 2022. The total volume of all light-duty sales for the first half of the year is up 11 percent from the same period a year ago, while the volume for EVs increased 57 percent (an increase of 239,525 vehicles). For comparison, internal combustion engine (ICE) vehicle market share decreased by 4.1 pp during the first half of 2023 compared to the first half of 2023. [1]



[1] Hybrid vehicles comprised the remainder of the gains in vehicle share.





*2023 through first half

SEE ADDITIONAL HISTORIC DATA ON EV SALES HERE

ELECTRIC VEHICLE SALES BY SEGMENT

While passenger cars once dominated the EV market, manufacturers continue to introduce new models to satisfy a variety of consumer needs. Utility vehicle (UV) offerings continue to grow, and while electric pickup trucks are a relatively new entry to the market (making their commercial debut in September 2021), more models are expected soon. As a result, non-car segments are continuing to make gains, and in the second quarter of 2023, light truck (UVs, minivans, and pickups) sales comprised 74 percent of the EV market – a 7 pp increase over the second quarter of 2022.

Quarterly sales of BEV and PHEV UVs have grown from about 19 percent of EVs at the start of 2020 to 69 percent in the second quarter of 2023. More than 128,000 UVs were sold in the second quarter of 2023 than the second quarter of 2022.

EV MODEL AVAILABILITY

103 Vehicle Models Sold in Q2 2023:

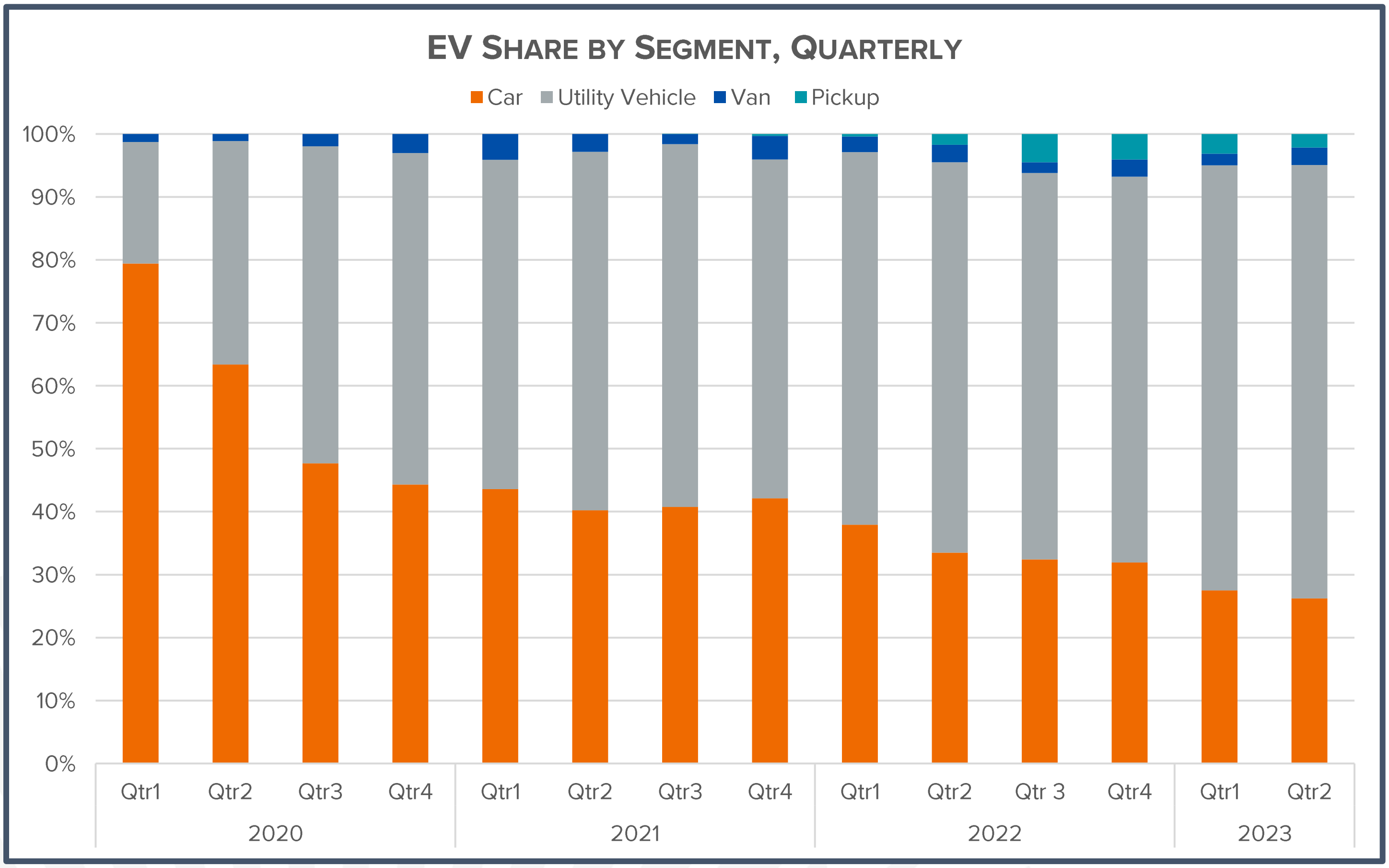
58 Battery Electric Vehicles
- 20 Cars
- 31 Utility Vehicles
- 4 Pickups
- 3 Vans

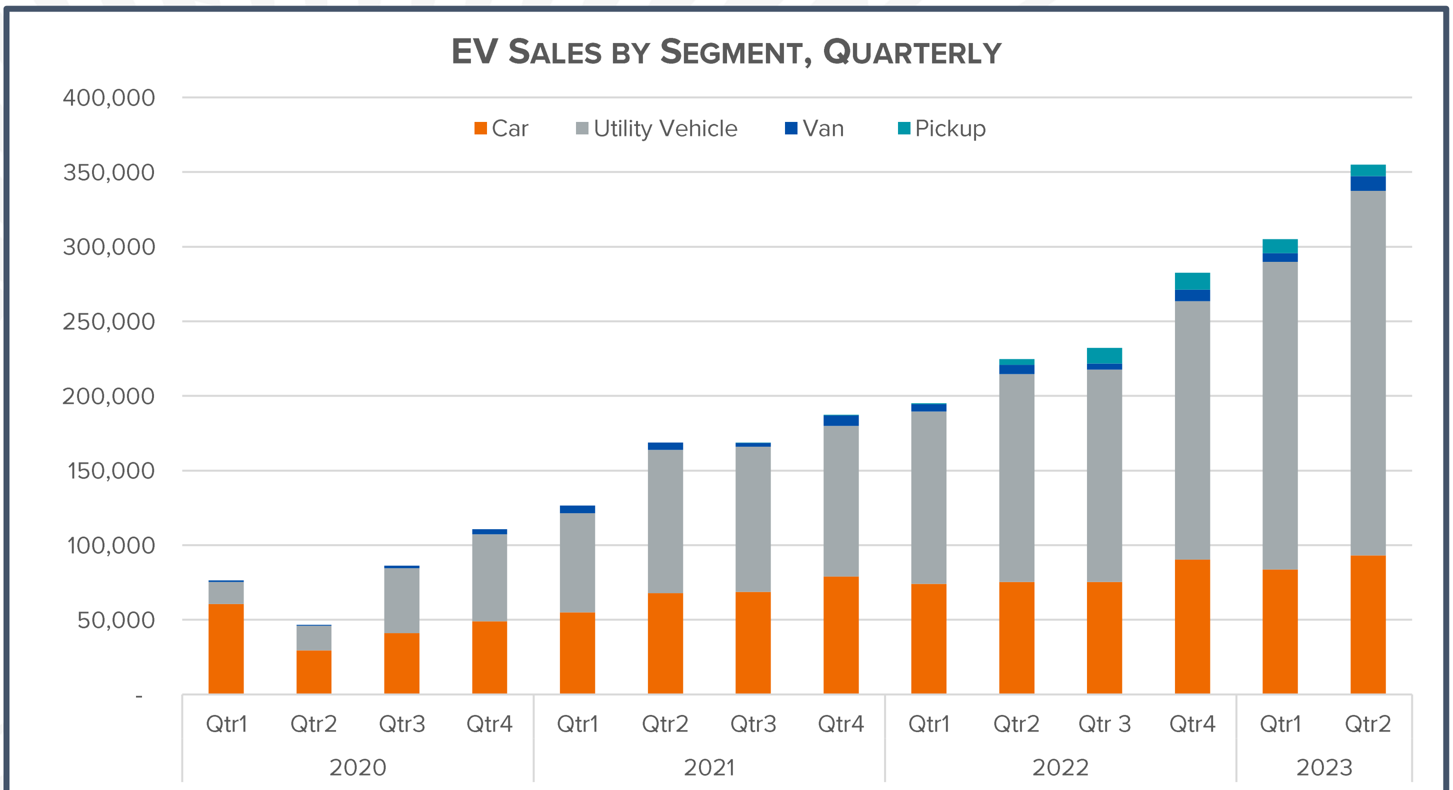
43 Plug-in Hybrid Vehicles
- 15 Cars
- 27 Utility Vehicles
- 1 Van

2 Fuel Cell Electric Vehicles
- 1 Car
- 1 Utility Vehicle

See more information about ***EV CHOICE HERE***

For a list of EVs that qualify for the federal government's new clean vehicle tax credit of up to $7,500 click here.

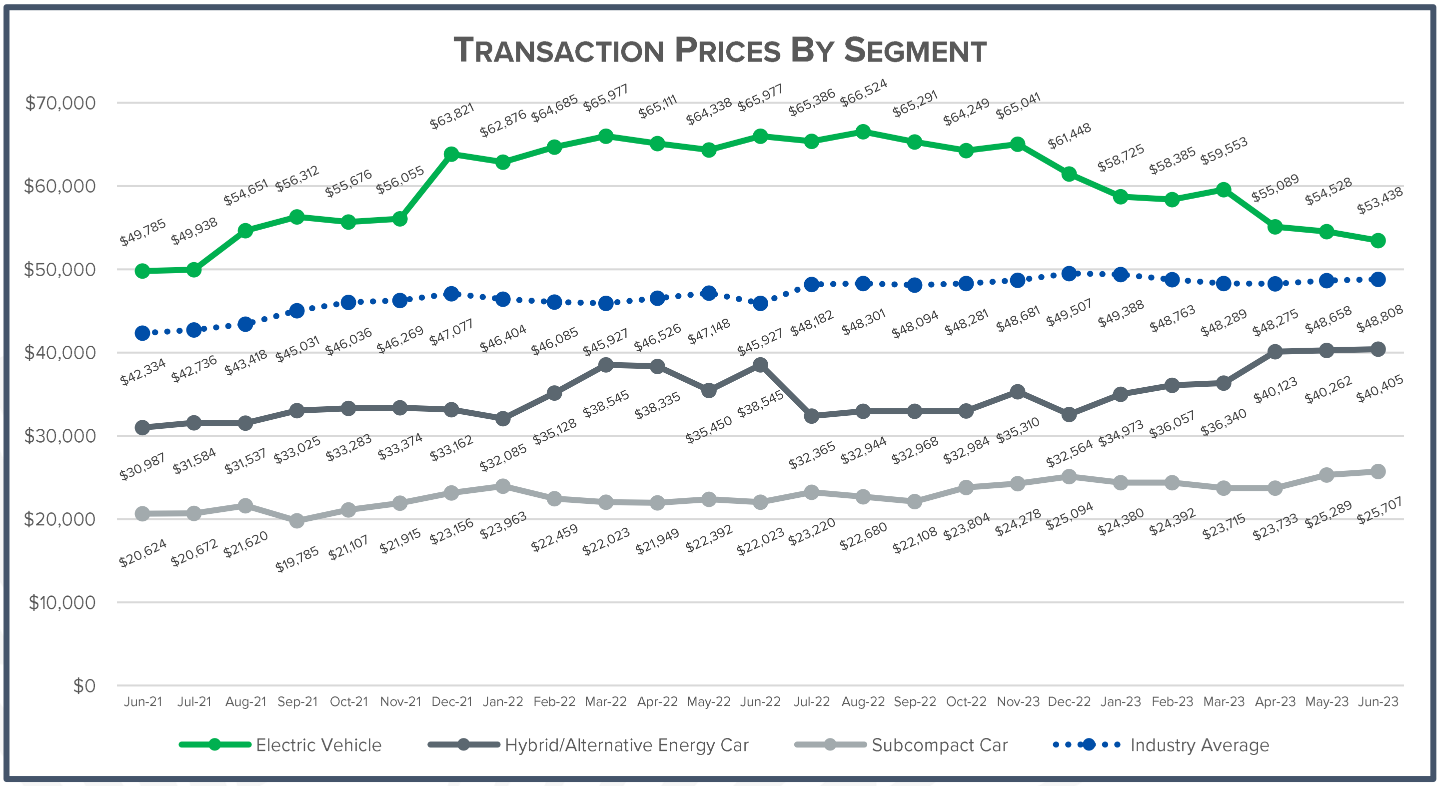




Source: Figures compiled by Alliance for Automotive Innovation with new registrations for retail and fleet data provided by S&P Global Mobility covering January 1, 2020 –June 30, 2023

Electric Vehicle Transaction Prices

The cost of the average EV in the second quarter of 2023 was about $54,300 while the average cost of all new light-duty vehicles in that time period was about $48,500. Year-over-year, EV prices declined more than $10,700 from the second quarter of 2022 while the average cost of all new light vehicles rose just over $2,000.[2]



Electric Vehicle Sales by State

For the Second Quarter of 2023:

California continued to lead the nation in EV sales, with BEVs, PHEVs and FCEVs making up nearly 26 percent of new light-duty vehicle registrations in the second quarter of 2023. There are currently seven additional states[3] and the District of Columbia with new vehicle EV registrations above 10 percent.

The market share of new EVs registered increased in all but six states[4], year-over-year, in the second quarter of 2023. Eighteen states and the District of Columbia witnessed an increased market share of EVs by 2 pp or more. Making the largest increases were California (7.2 pp), District of Columbia (6.7 pp), Washington (6.2 pp), New Jersey (4.8 pp), and Delaware (3.9pp).

For the First Half of 2023:

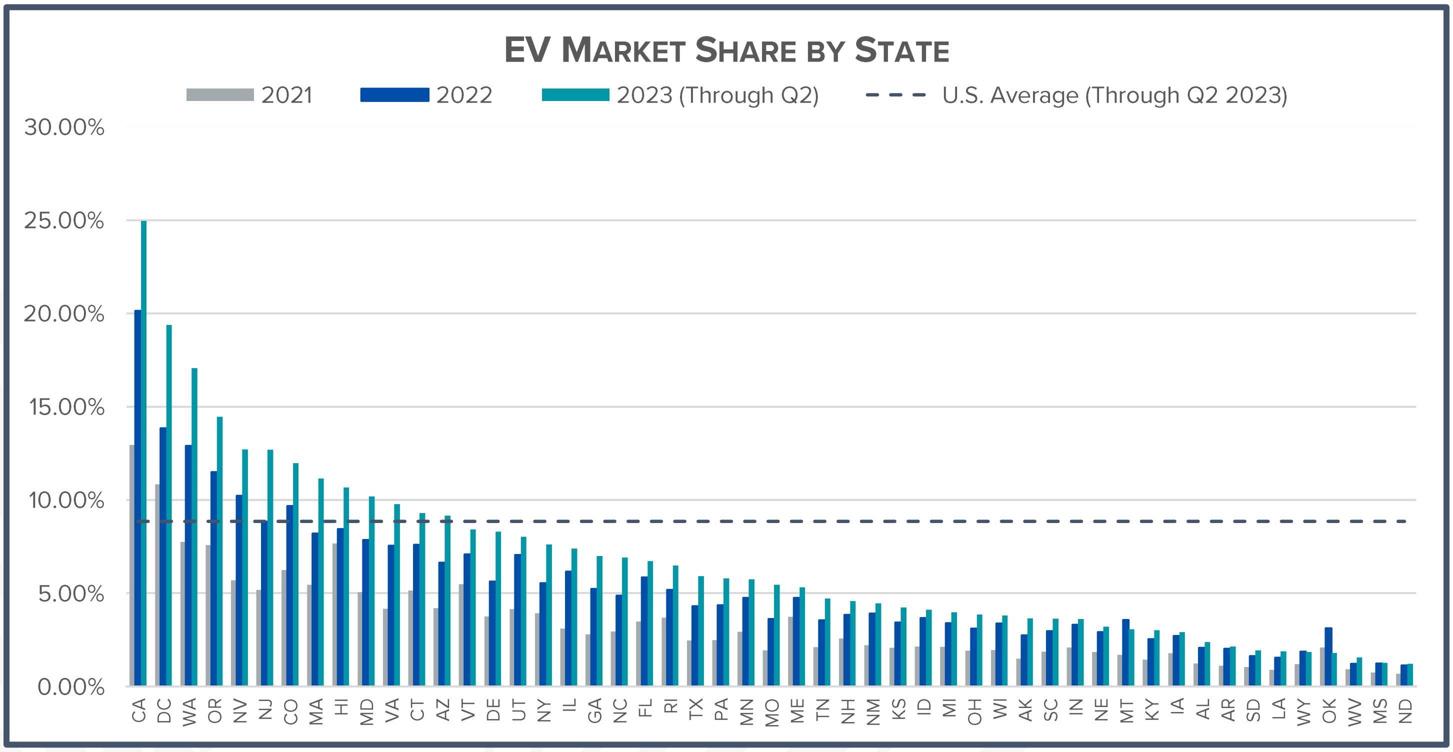
Through the first half of the year, EV sales represented 8.85 percent of the market – a 2.9 pp increase over the same period of 2022. Nearly 25 percent of sales in California were EVs, but the District of Columbia realized the greatest increase in market share, year-over-year with a 6.75 pp increase. Following D.C., the states with the largest market

[2] Average transaction prices from Kelley Blue Book, monthly press releases
[3] States with more than a 10 percent market share of EVs: California, District of Columbia, Washington, New Jersey, Oregon, Massachusetts, Colorado, Nevada, Maryland.
[4] The six states are: Arkansas, Mississippi, West Virginia, Louisiana, Montana, and Oklahoma. Note, Oklahoma is often an outlier due to rental fleet registrations.

share gains were Washington (6.7 pp), California (6.7 pp), Oregon (5.0 pp), New Jersey (4.8 pp), and Nevada (4.1 pp). Twenty states and DC increased their year-over-year EV market share by 2 pp or more. Sixteen states increased by less than 1 pp. One state decreased.[5]

While some states continue to have strong EV sales, 20 states had new EV registrations of less than 3 percent; 8 of those states were under 2 percent. All states had a market share above 0.5 percent for new EV sales.

Nine states and the District of Columbia had an EV market share above 10 percent while six states had an EV market share under 2 percent; California was the only state above 20 percent.[6]



Year to Date (2023 Through Q2) EV Market Share by State[7]

1	CA*	25.0%	**11**	VA*	9.8%	**21**	FL	6.7%	**31**	KS	4.2%	**41**	KY	3.0%
2	DC	19.4%	**12**	CT*	9.3%	**22**	RI*	6.5%	**32**	ID	4.1%	**42**	IA	2.9%
3	WA*	17.1%	**13**	AZ	9.2%	**23**	TX	5.9%	**33**	MI	4.0%	**43**	AL	2.4%
4	OR*	14.5%	**14**	VT*	8.4%	**24**	PA	5.8%	**34**	OH	3.9%	**44**	AR	2.1%
5	NV*	12.7%	**15**	DE	8.3%	**25**	MN*	5.7%	**35**	WI	3.8%	**45**	SD	1.9%
6	NJ*	12.7%	**16**	UT	8.0%	**26**	MO	5.5%	**36**	AK	3.7%	**46**	LA	1.9%
7	CO*	12.0%	**17**	NY*	7.6%	**27**	ME*	5.3%	**37**	SC	3.6%	**47**	WY	1.8%
8	MA*	11.2%	**18**	IL	7.4%	**28**	TN	4.7%	**38**	IN	3.6%	**48**	OK	1.8%
9	HI	10.7%	**19**	GA	7.0%	**29**	NH	4.6%	**39**	NE	3.2%	**49**	WV	1.6%
10	MD*	10.2%	**20**	NC	6.9%	**30**	NM	4.5%	**40**	MT	3.1%	**50**	MS	1.3%
												51	ND	1.2%

[5] Oklahoma's market share decreased, year-over-year for the first half of 2023, but is often an outlier due to fleet registrations.
[6] Figures compiled by Alliance for Automotive Innovation with new registrations for retail and fleet data provided by S&P Global Mobility covering January 1, 2021 – June 3,, 2023
[7] Figures compiled by Alliance for Automotive Innovation with new registrations for retail and fleet data provided by S&P Global Mobility covering January 1, 2023 – June 30, 2023
*Denotes states that have adopted California's ZEV program

State	Second Quarter 2023, New Light-Duty Vehicle Registrations By Powertrain — Advanced Powertrain Market Share				Change In Market Share (2023 Q2 vs 2022 Q2), New Light-Duty Vehicle Registrations Powertrain — Advanced Powertrain Market Share (Percentage Point Change)			
	PHEV	BEV	FCEV	EV Total	PHEV	BEV	FCEV	EV Total
AK	0.85%	2.56%	0.00%	**3.41%**	0.41	1.04	0.00	**1.45**
AL	0.57%	1.79%	0.00%	**2.36%**	0.10	0.79	0.00	**0.40**
AR	0.54%	1.59%	0.00%	**2.14%**	0.06	0.58	0.00	**-0.08**
AZ	1.33%	8.34%	0.00%	**9.67%**	0.09	3.21	0.00	**3.34**
CA*	3.12%	22.57%	0.23%	**25.92%**	1.00	5.03	-0.07	**7.25**
CO*	4.26%	7.45%	0.00%	**11.71%**	1.56	2.41	0.00	**2.23**
CT*	3.22%	6.10%	0.00%	**9.32%**	0.65	2.45	0.00	**1.85**
DC	3.81%	14.84%	0.00%	**18.66%**	0.47	6.15	0.00	**6.69**
DE	1.93%	7.37%	0.00%	**9.30%**	0.50	2.75	0.00	**3.90**
FL	0.85%	6.02%	0.00%	**6.86%**	0.15	1.91	0.00	**0.96**
GA	0.65%	6.49%	0.00%	**7.14%**	0.03	2.54	0.00	**2.24**
HI	0.97%	8.50%	0.01%	**9.48%**	-0.71	4.95	-0.02	**2.50**
IA	0.89%	1.98%	0.00%	**2.87%**	-0.03	0.24	0.00	**0.47**
ID	1.29%	2.80%	0.00%	**4.09%**	0.33	0.63	0.00	**0.75**
IL	1.07%	6.40%	0.00%	**7.47%**	-0.02	2.37	0.00	**1.67**
IN	0.87%	2.60%	0.00%	**3.46%**	0.01	1.26	0.00	**0.25**
KS	0.86%	3.60%	0.00%	**4.46%**	0.02	1.31	0.00	**1.01**
KY	0.81%	2.06%	0.00%	**2.87%**	-0.05	1.04	0.00	**0.65**
LA	0.39%	1.26%	0.00%	**1.66%**	0.10	0.95	0.00	**-0.27**
MA*	4.09%	7.80%	0.00%	**11.89%**	0.49	3.04	0.00	**3.83**
MD*	2.47%	7.94%	0.00%	**10.41%**	0.43	2.65	0.00	**2.97**
ME*	2.29%	2.89%	0.00%	**5.18%**	-0.01	1.22	0.00	**0.88**
MI	1.10%	2.96%	0.00%	**4.06%**	0.04	1.33	0.00	**0.73**
MN*	1.27%	4.45%	0.00%	**5.72%**	0.22	2.14	0.00	**0.91**
MO	2.90%	3.53%	0.00%	**6.42%**	0.17	1.72	0.00	**3.73**
MS	0.42%	0.80%	0.00%	**1.21%**	-0.01	0.63	0.00	**-0.11**
MT	1.00%	1.80%	0.00%	**2.80%**	0.22	0.44	0.00	**-0.32**
NC	0.94%	5.97%	0.00%	**6.91%**	0.26	3.06	0.00	**2.18**
ND	0.57%	0.49%	0.00%	**1.07%**	0.31	0.15	0.00	**0.16**
NE	1.07%	2.17%	0.00%	**3.24%**	0.15	0.70	0.00	**0.44**
NH	1.55%	2.94%	0.00%	**4.50%**	0.38	1.09	0.00	**1.12**
NJ*	2.53%	10.97%	0.00%	**13.51%**	0.37	4.26	0.00	**4.78**
NM	1.13%	3.09%	0.00%	**4.22%**	0.32	0.73	0.00	**0.76**
NV*	1.68%	9.02%	0.00%	**10.70%**	0.51	6.67	0.00	**1.09**
NY*	3.33%	4.98%	0.00%	**8.31%**	0.99	1.25	0.00	**2.58**
OH	0.97%	3.08%	0.00%	**4.05%**	0.15	0.78	0.00	**1.08**
OK	0.63%	1.24%	0.00%	**1.88%**	-1.10	-0.17	0.00	**-0.85**
OR*	3.09%	10.29%	0.00%	**13.39%**	0.45	6.15	0.00	**3.78**
PA	2.13%	4.28%	0.00%	**6.41%**	0.56	1.21	0.00	**2.06**
RI*	2.94%	3.88%	0.00%	**6.81%**	0.50	1.54	0.00	**1.54**
SC	0.76%	2.89%	0.00%	**3.65%**	0.12	1.15	0.00	**0.73**
SD	0.78%	0.95%	0.00%	**1.73%**	0.42	0.34	0.00	**0.32**
TN	0.62%	3.22%	0.00%	**3.83%**	0.00	2.97	0.00	**0.10**
TX	0.62%	5.16%	0.00%	**5.77%**	0.15	2.51	0.00	**1.85**
UT	1.44%	5.70%	0.00%	**7.14%**	0.22	2.90	0.00	**0.39**
VA*	1.30%	8.57%	0.00%	**9.86%**	-0.28	3.94	0.00	**2.49**
VT*	3.38%	5.11%	0.00%	**8.49%**	-0.06	2.10	0.00	**2.62**
WA*	3.11%	14.07%	0.00%	**17.19%**	1.31	5.91	0.00	**6.21**
WI	0.91%	2.99%	0.00%	**3.90%**	0.10	0.97	0.00	**0.66**
WV	0.57%	0.98%	0.00%	**1.55%**	0.17	0.34	0.00	**-0.12**
WY	0.75%	1.16%	0.00%	**1.91%**	0.35	-0.11	0.00	**0.31**
U.S.	**1.69%**	**7.34%**	**0.03%**	**9.05%**	**0.31**	**2.44**	**-0.01**	**2.40**

*Denotes states that have adopted California's ZEV program

Source: Figures compiled by Alliance for Automotive Innovation with new registrations for retail and fleet data provided by S&P Global Mobility covering April 1 – June 30, 2022, and April 1 – June 30, 2023

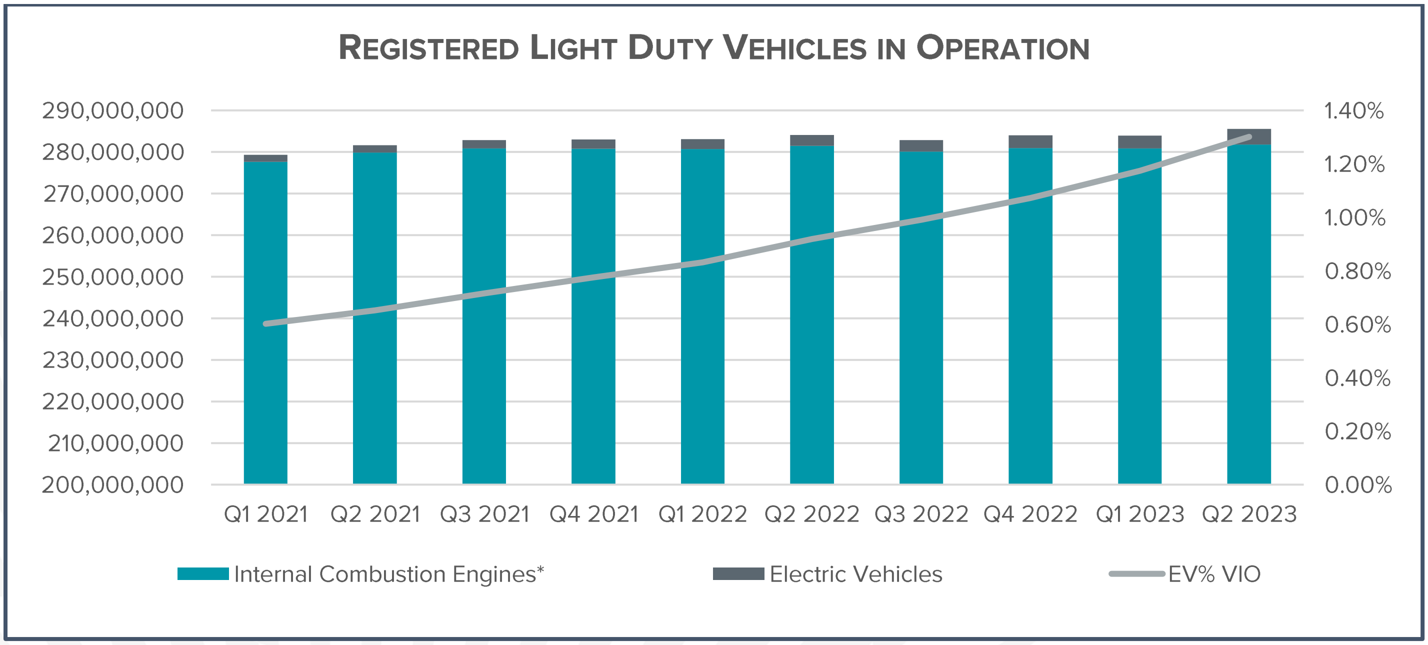
2023 New Light-Duty Vehicle Registrations By Powertrain (YTD)					Change In Market Share (2023 vs 2022 YTD), New Light-Duty Vehicle Registrations Powertrain			
State	Advanced Powertrain Market Share				Advanced Powertrain Market Share (Percentage Point Change)			
	PHEV	BEV	FCEV	EV Total	PHEV	BEV	FCEV	EV Total
AK	0.89%	2.77%	0.00%	**3.65%**	0.34	1.06	0.00	**1.40**
AL	0.53%	1.86%	0.00%	**2.39%**	-0.10	-0.54	0.00	**0.64**
AR	0.53%	1.61%	0.00%	**2.14%**	-0.03	-0.23	0.00	**0.27**
AZ	1.20%	7.97%	0.00%	**9.17%**	-0.20	-3.13	0.00	**3.33**
CA*	3.29%	21.46%	0.21%	**24.96%**	-0.59	-6.08	0.02	**6.65**
CO*	3.93%	8.06%	0.00%	**11.98%**	-1.81	-1.26	0.00	**3.07**
CT*	2.98%	6.32%	0.00%	**9.30%**	-0.70	-1.78	0.00	**2.48**
DC	4.05%	15.34%	0.00%	**19.39%**	-0.59	-6.16	0.00	**6.75**
DE	1.85%	6.44%	0.00%	**8.30%**	-0.51	-3.06	0.00	**3.57**
FL	0.88%	5.85%	0.00%	**6.72%**	0.02	-1.54	0.00	**1.52**
GA	0.68%	6.31%	0.00%	**7.00%**	0.12	-2.53	0.00	**2.41**
HI	0.99%	9.67%	0.00%	**10.66%**	0.85	-4.21	0.01	**3.35**
IA	0.85%	2.06%	0.00%	**2.91%**	0.02	-0.37	0.00	**0.35**
ID	1.24%	2.87%	0.00%	**4.11%**	-0.39	-0.47	0.00	**0.86**
IL	1.10%	6.30%	0.00%	**7.39%**	0.10	-2.09	0.00	**1.99**
IN	0.86%	2.76%	0.00%	**3.62%**	-0.03	-0.71	0.00	**0.74**
KS	0.81%	3.43%	0.00%	**4.24%**	0.01	-1.17	0.00	**1.16**
KY	0.76%	2.25%	0.00%	**3.02%**	-0.06	-0.76	0.00	**0.82**
LA	0.43%	1.47%	0.00%	**1.89%**	0.00	-0.39	0.00	**0.39**
MA*	3.62%	7.54%	0.00%	**11.16%**	-0.97	-2.76	0.00	**3.73**
MD*	2.30%	7.88%	0.00%	**10.18%**	-0.53	-2.49	0.00	**3.02**
ME*	2.28%	3.04%	0.00%	**5.32%**	-0.12	-0.99	0.00	**1.11**
MI	1.10%	2.87%	0.00%	**3.97%**	0.04	-1.09	0.00	**1.05**
MN*	1.26%	4.48%	0.00%	**5.74%**	-0.20	-1.43	0.00	**1.63**
MO	2.01%	3.45%	0.00%	**5.45%**	-1.16	-1.69	0.00	**2.85**
MS	0.36%	0.90%	0.00%	**1.26%**	0.00	-0.10	0.00	**0.09**
MT	1.02%	2.05%	0.00%	**3.07%**	-0.21	0.05	0.00	**0.16**
NC	1.00%	5.91%	0.00%	**6.92%**	-0.06	-2.68	0.00	**2.74**
ND	0.62%	0.60%	0.00%	**1.22%**	-0.35	0.05	0.00	**0.30**
NE	1.04%	2.17%	0.00%	**3.21%**	-0.13	-0.51	0.00	**0.64**
NH	1.54%	3.04%	0.00%	**4.58%**	-0.32	-0.96	0.00	**1.28**
NJ*	2.30%	10.39%	0.00%	**12.69%**	-0.66	-4.11	0.00	**4.77**
NM	1.14%	3.32%	0.00%	**4.46%**	-0.27	-0.63	0.00	**0.90**
NV*	1.64%	11.07%	0.00%	**12.71%**	-0.23	-3.85	0.00	**4.08**
NY*	3.05%	4.56%	0.00%	**7.61%**	-1.22	-1.23	0.00	**2.45**
OH	0.93%	2.92%	0.00%	**3.85%**	-0.17	-0.85	0.00	**1.02**
OK	0.59%	1.22%	0.00%	**1.80%**	0.77	0.29	0.00	**-1.06**
OR*	3.27%	11.20%	0.00%	**14.47%**	-0.25	-4.71	0.00	**4.96**
PA	1.80%	3.99%	0.00%	**5.80%**	-0.77	-1.18	0.00	**1.95**
RI*	2.65%	3.84%	0.00%	**6.48%**	-0.73	-1.08	0.00	**1.81**
SC	0.78%	2.86%	0.00%	**3.64%**	0.04	-1.06	0.00	**1.02**
SD	0.82%	1.13%	0.00%	**1.94%**	-0.29	-0.24	0.00	**0.53**
TN	0.64%	4.07%	0.00%	**4.71%**	0.14	-1.49	0.00	**1.35**
TX	0.66%	5.26%	0.00%	**5.91%**	-0.03	-2.21	0.00	**2.25**
UT	1.44%	6.58%	0.00%	**8.02%**	-0.21	-1.47	0.00	**1.68**
VA*	1.26%	8.52%	0.00%	**9.78%**	0.28	-3.36	0.00	**3.07**
VT*	3.05%	5.37%	0.00%	**8.43%**	-0.42	-1.91	0.00	**2.33**
WA*	3.01%	14.06%	0.00%	**17.07%**	-1.30	-5.41	0.00	**6.71**
WI	0.89%	2.92%	0.00%	**3.81%**	-0.07	-0.81	0.00	**0.88**
WV	0.56%	1.01%	0.00%	**1.56%**	-0.18	-0.29	0.00	**0.47**
WY	0.77%	1.08%	0.00%	**1.85%**	-0.31	0.03	0.00	**0.28**
U.S.	**1.63%**	**7.20%**	**0.02%**	**8.85%**	**-0.29**	**-2.30**	**0.00**	**2.59**

*Denotes states that have adopted California's ZEV program

Source: Figures compiled by Alliance for Automotive Innovation with new registrations for retail and fleet data provided by S&P Global Mobility covering January 1 – June 30, 2022, and January – June 30, 2023

REGISTRATIONS AND INFRASTRUCTURE

Share of Registered EVs In U.S. Light-Duty Fleet Continues to Increase Incrementally. As sales of EVs increase, so does the total number of EVs operating on U.S. roads. While there are more than 285 million light-duty vehicles in operation (VIO) in the United States, EVs represent just 1.3 percent of all light vehicles in the country (just over 3.7 million EVs). EVs represented more than 1 percent of total VIO for the first time at the end of 2022. The EV VIO of 1.3 percent is an increase of 0.4 pp since the second quarter of 2022 and double the EV VIO from the second quarter in 2021 (0.65 percent).[8]



U.S. Public Charging Infrastructure: Overview

While the U.S. Department of Energy notes that roughly 80 percent of all EV charging occurs at home, reliable and convenient access to workplace and public charging and refueling stations help to support customers that purchase EVs. Workplace and public charging infrastructure not only eases perceived "range anxiety" concerns but also increases consumer awareness of the technology. The bipartisan Infrastructure Investment and Jobs Act (IIJA) that was signed into law in November 2021, includes $5 billion in funding for states to establish a nationwide EV charging network and $2.5 billion in competitive grants to deploy publicly available EV charging, hydrogen fueling, propane fueling, and natural gas fueling stations through 2026. Here is a snapshot of publicly available EV charging and refueling infrastructure available across the United States at the end of the second quarter of 2023[9]:

Level 2: 47,772 Locations, 108,251 EVSE Ports
DC Fast: 7,472 Locations, 31,920 EVSE Ports
Hydrogen Refueling: 58 Stations (57 are in California)
U.S. Total: *54,159 Locations, 140,229 EVSE Ports*

See Recommended Attributes for EV Charging Stations

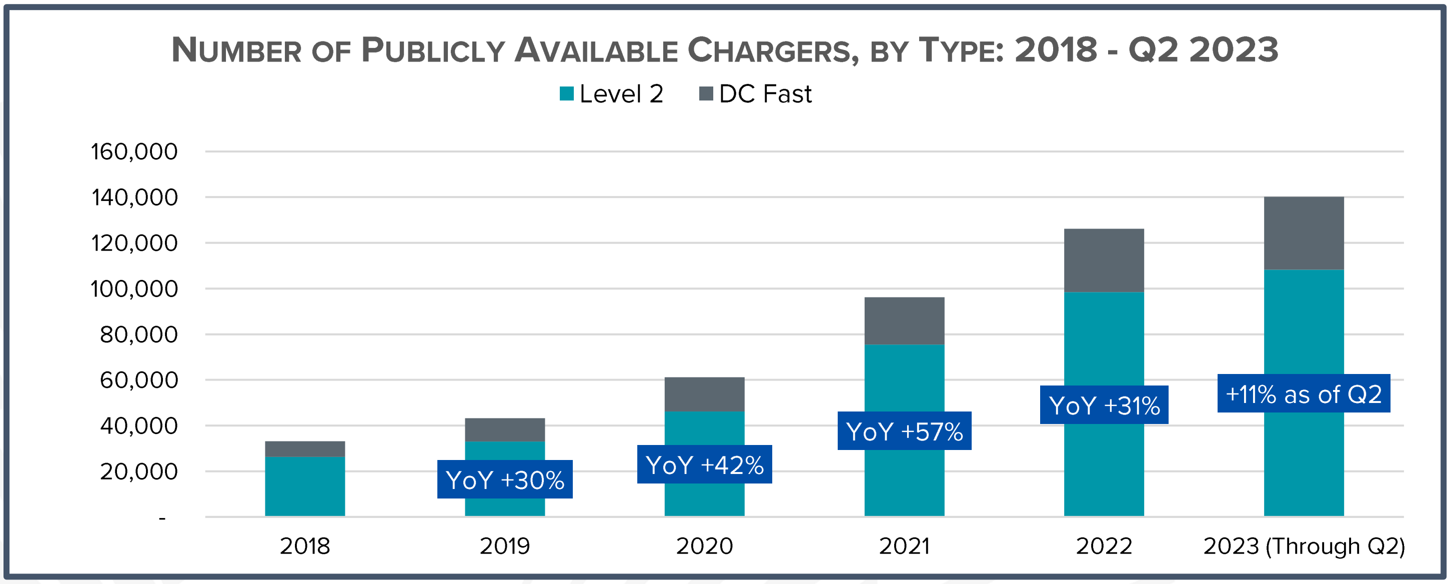
Level 2 Chargers and DC Fast Chargers. Both Level 2 and DC fast charging play important roles in electrifying the light-duty vehicle fleet. However, the key difference between Level 2 and DC Fast is how fast each will charge an EV's battery. Level 2 equipment is common for home, workplace, and public charging with longer dwell times. Level 2

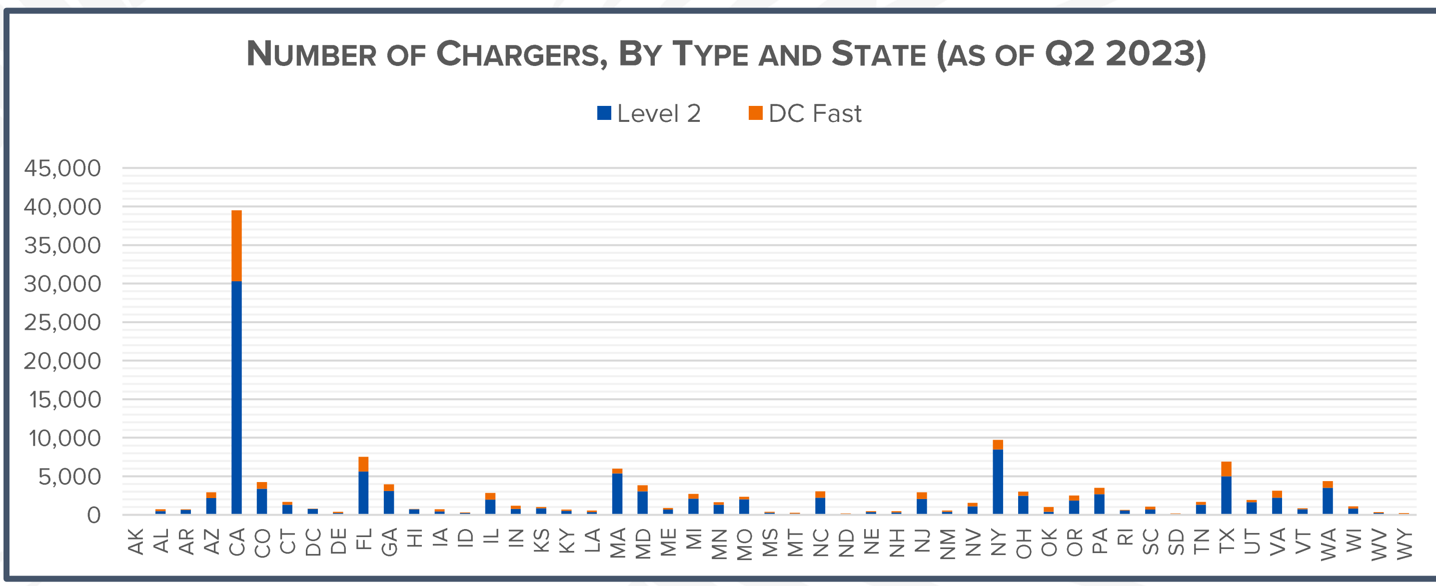
[8] Registered vehicles in operation compiled by Alliance for Automotive Innovation with data provided by S&P Global Mobility as of June 30, 2023
[9] Charging information from U.S. Department of Energy Alternative Fuels Data Center, stations in operation as of 6/30/2023
Note: prior editions of this report excluded proprietary chargers

chargers can charge a BEV from empty in 4-10 hours and a PHEV from empty in 1-2 hours. DC Fast charging equipment enables rapid charging of BEVs in 20 minutes to 1 hour along heavy-traffic corridors, in city centers, at transportation hubs, and fleet depots. Wider installation of both Level 2 chargers, DC Fast chargers, and hydrogen fueling will be necessary to support wider-scale adoption of EVs. The number of public Level 2 charging increased 10 percent in the first half of 2023 over 2022's year-end. DC Fast chargers increased 15 percent. Total charging increased 11 percent (for context, EV sales increased 57 percent).[10]

Through August 2023, Nearly Two-Thirds of Installed DC Fast Chargers Were Tesla[11]:

DC Fast Chargers Installed		
Type	**Ports**	**%Total**
Tesla	20,893	64%
CCS Combo	11,715	36%
Total	32,608	100%

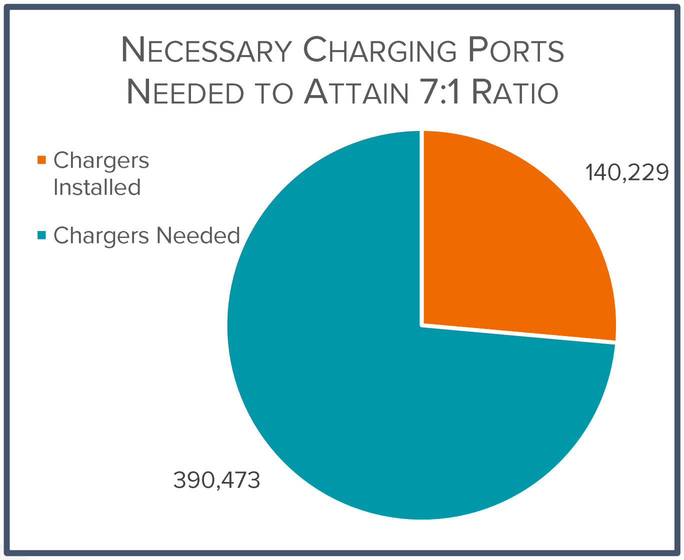




[10] Charging information from U.S. Department of Energy Alternative Fuels Data Center, stations in operation as of 6/30/2023
[11] Charging information from U.S. Department of Energy Alternative Fuels Data Center, 8/31/2023; does not include J1772 or CHAdeMO connectors

Infrastructure Falling Behind

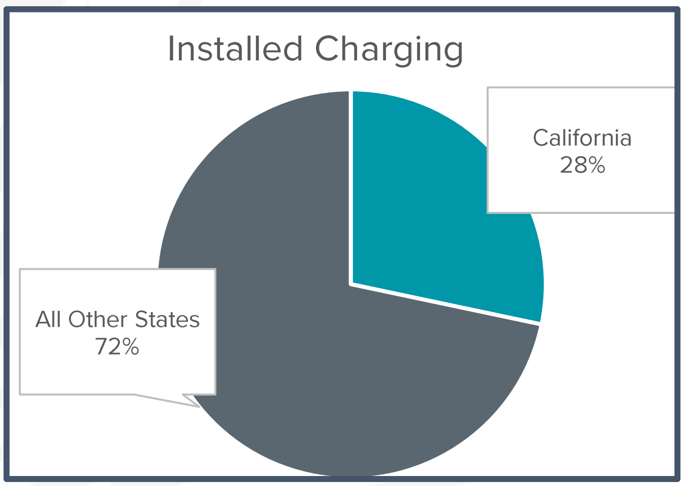
Infrastructure Still Well Below Needed Ratio of 7:1 – And Losing Ground. An assessment by the California Energy Commission concluded that 700,000 public and shared private chargers are needed to support 5 million EVs on the road (a ratio of 7 EVs per public charger). At the end of the second quarter of 2023, there were about 140,000 public charging outlets across the country and 3.7 million EVs on the road, a ratio of 26 EVs per charger. To meet the 7:1 ratio, more than 390,000 additional chargers are needed *today*, nearly three times the currently available chargers across the U.S. as of June 2023.



49 EVs Added For Each New Port In The Second Quarter of 2023: More than 354,000 new EVs were added to the roads in the second quarter of 2023, but only 7,271 new chargers were added – a ratio of 49 new EVs for every new public port – nearly seven times higher than the recommended ratio of 7:1. Contrary to recent narratives, the U.S. is falling further behind in installing publicly available chargers for the number of EVs sold, and that government regulations (both state and federal) require in the coming years.

Infrastructure Disparities by Geography

Geographic disparities in charging infrastructure are pervasive. At the end of the second quarter of 2023, nearly 30 percent of all public charging infrastructure was located in California, which had 36 percent of all registered EVs.



Vehicles in Operation and Charging by State

Public Charging Outlets And Registerd EVs (as of 6/30/2023)

	EV Level 2	EV DC Fast	H2** Fueling	Total	Percent EVs of Total VIO***	Share of Registered EVs****	EVs Per Charger	Additional Chargers Needed to Support 25% EV VIO*****	EVs Per 10K Residents
AK	75	26	-	101	0.50%	0.08%	28	20,317	38.62
AL	467	268	-	735	0.27%	0.37%	19	182,800	28.39
AR	652	88	-	740	0.26%	0.19%	10	98,248	23.81
AZ	2,173	761	-	2,934	1.40%	2.61%	33	244,349	135.37
CA*	30,314	9,195	57	39,566	4.28%	35.94%	34	1,074,756	337.56
CO*	3,387	851	-	4,238	1.64%	2.40%	21	190,825	156.82
CT*	1,305	377	-	1,682	1.23%	1.00%	22	106,078	103.61
DC	764	48	-	812	2.72%	0.25%	12	11,452	133.20
DE	236	150	-	386	1.00%	0.25%	24	32,364	94.54
FL	5,603	1,934	-	7,537	1.23%	6.24%	31	665,068	108.89
GA	3,074	891	-	3,965	0.89%	2.25%	21	333,415	79.56
HI	731	50	1	782	2.38%	0.73%	35	40,006	191.36
IA	442	266	-	708	0.37%	0.32%	17	113,521	37.33
ID	217	92	-	309	0.53%	0.28%	34	69,660	59.68
IL	1,959	872	-	2,831	0.98%	2.68%	35	358,313	78.05
IN	780	390	-	1,170	0.48%	0.79%	25	219,367	43.98
KS	837	183	-	1,020	0.44%	0.35%	13	102,638	44.22
KY	525	147	-	672	0.31%	0.34%	19	145,270	28.46
LA	352	192	-	544	0.25%	0.25%	17	134,697	20.08
MA*	5,357	644	-	6,001	1.58%	2.33%	14	189,568	125.61
MD*	3,056	794	-	3,850	1.46%	2.01%	19	178,671	123.84
ME*	672	218	-	890	0.87%	0.31%	13	46,716	87.14
MI	2,108	594	-	2,702	0.81%	1.87%	26	302,357	69.35
MN*	1,307	336	-	1,643	0.75%	1.05%	24	183,739	69.77
MO	2,028	334	-	2,362	0.51%	0.79%	12	201,772	47.94
MS	273	104	-	377	0.14%	0.12%	11	106,939	14.36
MT	143	123	-	266	0.37%	0.16%	22	55,879	54.44
NC	2,240	804	-	3,044	0.76%	1.96%	24	340,496	69.94
ND	115	68	-	183	0.17%	0.04%	7	28,550	17.60
NE	366	118	-	484	0.39%	0.22%	17	74,498	42.36
NH	310	153	-	463	0.93%	0.34%	27	47,375	92.19
NJ*	2,056	861	-	2,917	1.73%	3.38%	43	256,414	140.87
NM	409	148	-	557	0.59%	0.32%	21	70,945	56.04
NV*	1,115	437	-	1,552	1.79%	1.20%	29	87,106	146.46
NY*	8,465	1,262	-	9,727	1.37%	4.25%	16	402,030	80.76
OH	2,462	558	-	3,020	0.54%	1.55%	19	378,031	49.35
OK	401	607	-	1,008	0.70%	0.87%	32	164,862	82.26
OR*	1,861	651	-	2,512	1.90%	1.96%	29	134,401	174.04
PA	2,678	820	-	3,498	0.75%	2.23%	24	389,224	64.69
RI*	578	69	-	647	0.95%	0.22%	13	29,894	77.02
SC	699	346	-	1,045	0.41%	0.59%	21	190,513	43.37
SD	109	95	-	204	0.23%	0.06%	11	35,553	26.47
TN	1,308	362	-	1,670	0.51%	0.94%	21	243,502	51.77
TX	5,007	1,911	-	6,918	0.84%	5.54%	30	867,483	71.65
UT	1,622	287	-	1,909	1.35%	1.08%	21	104,597	127.40
VA*	2,208	922	-	3,130	1.09%	2.24%	27	270,195	97.89
VT*	734	111	-	845	1.76%	0.26%	12	18,915	155.23
WA*	3,487	895	-	4,382	2.07%	3.90%	33	245,248	192.08
WI	819	297	-	1,116	0.51%	0.74%	25	189,833	47.13
WV	248	114	-	362	0.22%	0.09%	10	55,350	19.38
WY	117	96	-	213	0.23%	0.04%	7	23,286	26.33
U.S.	**108,251**	**31,920**	**58**	**140,229**	**1.30%**	**100.00%**	**26**	**10,057,085**	**113.55**

*Denotes states that have adopted California's ZEV program; **Hydrogen count denotes stations
*** VIO is vehicles in operation; **** State share of U.S. Total; *****Calculated at 1:7 ratio at 25 percent of the existing state fleet. Ratio derived from CEC AB 2127 Report of July 14, 2021; VIO at the end of the 1st quarter was about 285 million vehicles (25% = 71 million)
Source: Figures compiled by Alliance for Automotive Innovation with registered vehicle data provided by S&P Global Mobility as of June 30, 2023; Charging information from U.S. Department of Energy Alternative Fuels Data Center, as of 6/30/2023

REGISTRATIONS

EV registrations as a share of all registered light-duty vehicles are 1.3 percent (as of June 30, 2023). There are about 285 million registered light-duty vehicles in the U.S.

At the end of Q2 2023, California accounted for 36 percent of all registered light-duty EVs in the U.S.

States with highest portion of total EVs registered:

1. CA* (133,5295, 4.3%)
2. DC (9,357, 2.7%)
3. HI (27,182, 2.4%)
4. WA* (144,741, 2.1%)
5. OR* (72,934, 1.9%)
6. NV* (44,442, 1.8%)
7. VT* (9,722, 1.8%)
8. NJ* (125,490, 1.7%)
9. CO* (89,317, 1.6%)
10. MA* (86,695, 1.6%)

States with worst ratio of registered EVs per non-proprietary public charger:

1. NJ*
2. IL
3. HI
4. ID
5. CA*
6. AZ
7. WA*
8. OK
9. FL
10. TX

Read more about automakers plans for an ***ELECTRIC FUTURE HERE***

Spotlight On: The Power Grid

Modernizing the electric grid to support the electrification of millions of vehicles will require addressing several challenges with power generation, transmission, and distribution. Analysts have projected that the total cost of upgrading the power grid could range from hundreds of billions to over a trillion dollars over several decades. Addressing these issues will require collaboration between government agencies, utilities, automakers, and technology partners to ensure the power grid can reliably and efficiently support an increasing number of EVs as required by government regulations (both state and federal) in the near future. Planning and investment in grid modernization will be required to support a successful transition to widescale electrification in the transportation system.

Power Generation and Renewable Integration

As more consumers switch to EVs, there will be a significant increase in electricity demand. The grid must be able to handle this additional load without causing disruptions or overloading. A recent report by Argonne National Laboratory found EVs used less than 0.2 percent of power consumed in 2021 (for 2.1 million EVs).[12] According to the Electric Power Research Institute (EPRI), by 2030, EVs (including buses and commercial trucks) are projected to increase U.S. electricity use between 8 – 13 percent over 2021 levels. These vehicles will consume 7 percent to 11 percent of all U.S. electricity generation by that year, the group estimates.[13]

- "EPRI projects utility companies overall will spend $1.5 trillion to $1.8 trillion on infrastructure and operations by 2030. Of that, about 22 – 30 percent will go toward adding generating and electrical-storage capacity, the group says."[14]

In conjunction with the required ramp-up of EVs, the Biden administration has set a target of 80 percent renewable energy generation by 2030[15]. Integrating renewable energy generation into the grid faces several challenges as well.

First, renewable energy sources (like solar and wind farms) are often located in rural areas far from urban population centers. Transmission and distribution infrastructure will need to be expanded and upgraded to move the power from where it is generated to where it can be used. This can be costly and often faces permitting challenges as well as lengthy wait times to be connected.

- "There are major regulatory hurdles when it comes to building new transmission lines, which often cross through multiple counties, states and utility service areas, all of which need to approve of the line and agree on how to finance it... Permitting is a major holdup as well. All new energy projects must undergo a series of impact studies to evaluate what new transmission equipment is required, how much it will cost and who will pay. But the list of projects stuck in this process is massive."[16]

- "The amount of new electric capacity in [interconnection] queues is growing dramatically, with over 2,000 gigawatts (GW) of total generation and storage capacity now seeking connection to the grid (over 95 percent of which is for zero-carbon resources like solar, wind, and battery storage). However, most projects that apply for interconnection are ultimately withdrawn, and those that are built are taking longer on average to complete the required studies and become operational."[17] "Based on past completion rates, less than a quarter of proposed projects and 14 percent of capacity are likely to come online. Even so, this volume of proposed plants indicates an ongoing and substantial shift in electricity generation toward renewable sources."[18]

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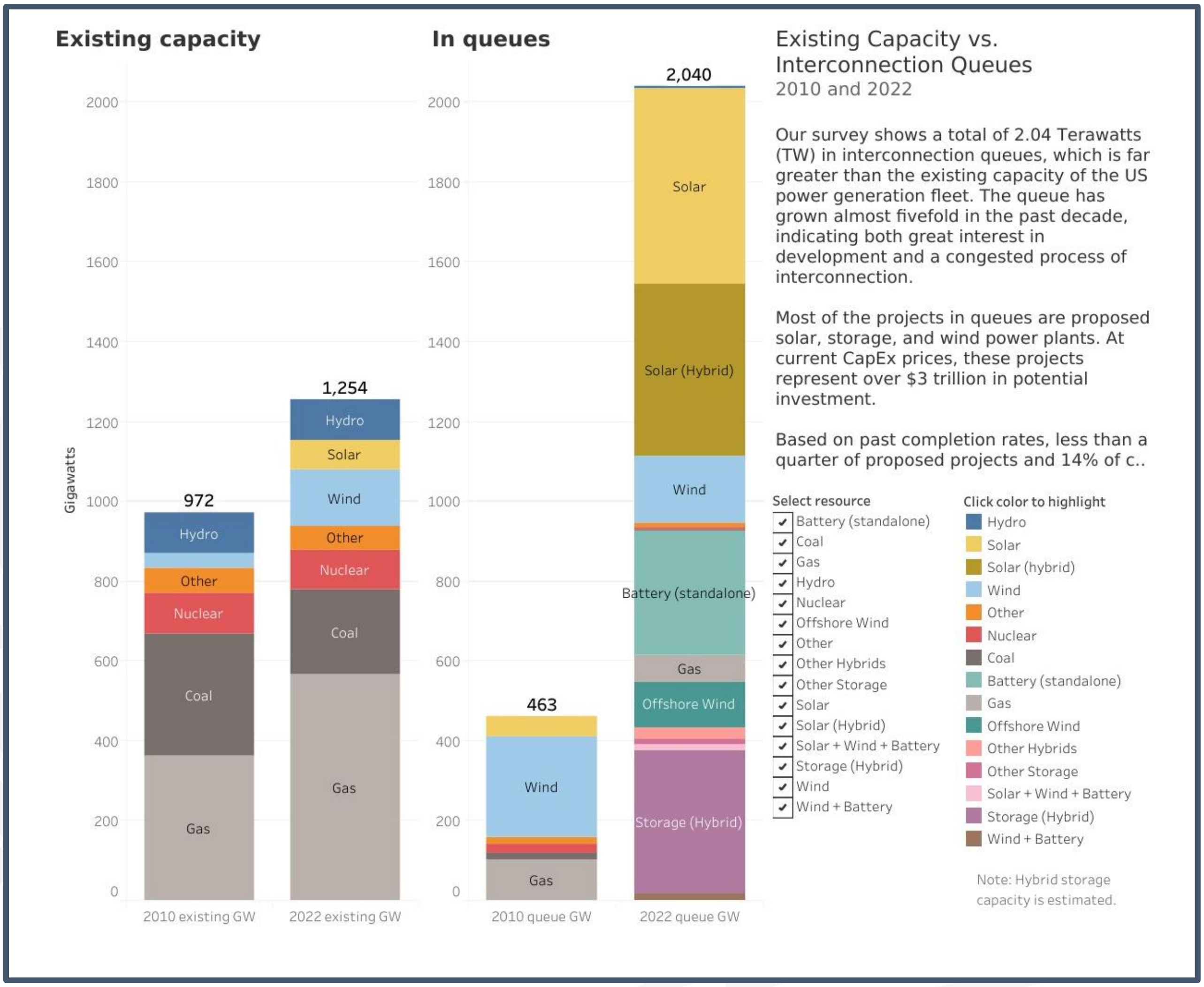
[12] Bart Ziegler, "Can the Power Grid Handle a Wave of New Electric Vehicles," *Wall Street Journal*, 2/5/2023
[13] Bart Ziegler, "Can the Power Grid Handle a Wave of New Electric Vehicles," *Wall Street Journal*, 2/5/2023
[14] Bart Ziegler, "Can the Power Grid Handle a Wave of New Electric Vehicles," *Wall Street Journal*, 2/5/2023
[15] H.J. Mai, "Energy experts share how the U.S. can reach Biden's renewable energy goals," *NPR*, 2/2/2023
[16] Katie Brigham, "Why The Electric Vehicle Boom Could Put A Major Strain On The U.S. Power Grid," *CNBC*, 7/1/2023
[17] Electricity Markets & Policy, "Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection," Accessed 9/18/2023
[18] Electricity Markets & Policy, "Generation, Storage, and Hybrid Capacity in Interconnection Queues," Accessed 9/18/2023

- "Interconnection wait times are also on the rise: The typical duration from connection request to commercial operation increased from <2 years for projects built in 2000-2007 to nearly 4 years for those built in 2018-2022 (with a median of 5 years for projects built in 2022)."[19]

Generation, Storage, and Hybrid Capacity in Interconnection Queues[20]



Second, renewable energy sources like wind and solar are intermittent and variable, depending on weather conditions and time of day. This variability can lead to fluctuations in power generation, making it challenging to consistently match supply with demand. Maintaining grid stability and balance between electricity supply and demand is crucial or blackouts will ensue – which underscores the importance of grid modernization and upgrades – as well as incorporating new technology solutions.

Battery storage, or battery energy storage systems (BESS), will play a critical role in enabling renewable energy generation. A BESS can be charged by electricity generated from renewable energy, like wind and solar, and then released when the power is needed most. Batteries will be essential to managing the hourly and seasonal variations in renewable electricity output while keeping grids stable as demand grows.[21]

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[19] Electricity Markets & Policy, "Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection," Accessed 9/18/2023
[20] Electricity Markets & Policy, "Generation, Storage, and Hybrid Capacity in Interconnection Queues," Accessed 9/18/2023
[21] International Energy Association, https://www.iea.org/energy-system/electricity/grid-scale-storage, Accessed 9/18/2023

EVs and BESSs both utilize lithium-ion batteries and thus compete for the same critical minerals and components and face the same supply chain challenges. See Get Connected, Electric Vehicle Quarterly Report for Q1 for an in depth look at critical mineral challenges. Scarcity, price volatility, and procurement challenges aside, battery systems also face interconnection challenges as well. Grid operators must manage the interaction between renewable sources, traditional power plant generation, and energy storage systems effectively to maintain grid stability.

- "Solar and battery storage are – by far – the fastest growing resources in the [interconnection] queues. Combined, they account for over 80 percent of new capacity entering the queues in 2022."[22]

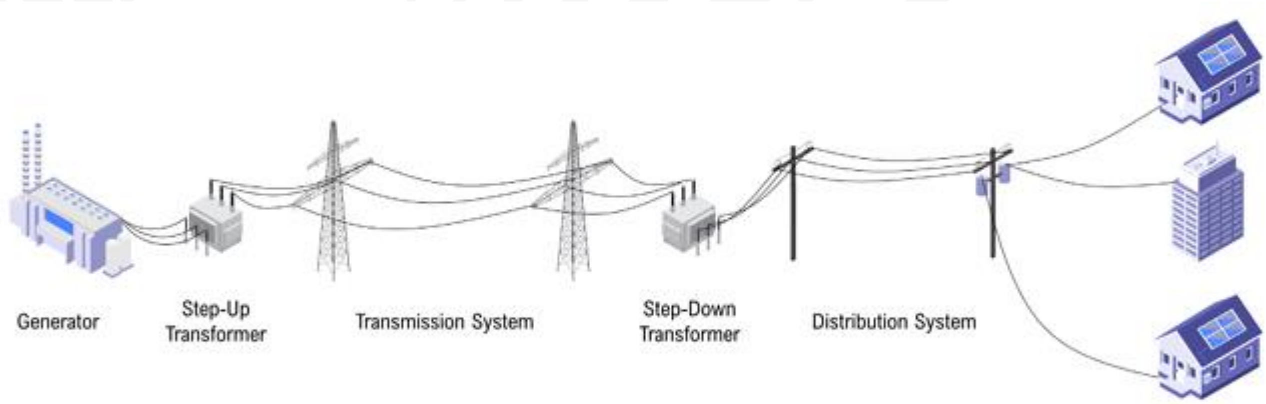
Long-distance Transmission

Once electricity leaves its generating site, it is stepped up in voltage to enable it to travel long-distances on high-power transmission lines. As electricity is transmitted over long distances, there are inherent energy losses along the way. High voltage transmission minimizes the amount of power lost as electricity flows from one location to the next.[23]

"EPRI projects the need for a 10 percent expansion in high-voltage transmission capacity by 2030, in part to connect new solar and wind-power installations to the grid but to a lesser extent contend with the power needs of EV charging."[24]

- It is estimated these upgrades will cost $30 – $40 billion, though forecasts are subject to variables such as inflation and labor costs.[25]

Upgrading and expanding high voltage transmission lines is essential for modernizing the grid and accommodating the changing energy landscape with greater renewable energy integration and increased electricity demand. However, "building new transmission lines requires countless stakeholders to come together and hash out a compromise about where a line will run and who will pay for it. There are 3,150 utility companies in the country…. and for transmission lines to be constructed, each of the affected utilities, their respective regulators, and the landowners who will host a line have to agree where the line will go and how to pay for it, according to their own respective rules."



[26]

[22] Electricity Markets & Policy, "Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection," Accessed 9/18/2023
[23] "Transmitting Electricity at High Voltages," *Beta*, 1/26/2017
[24] Bart Ziegler, "Can the Power Grid Handle a Wave of New Electric Vehicles," *Wall Street Journal*, 2/5/2023
[25] Bart Ziegler, "Can the Power Grid Handle a Wave of New Electric Vehicles," *Wall Street Journal*, 2/5/2023
[26] EPRI, "EVs2Scale2030™ Grid Primer: An Initial Look at the Impacts of Electric Vehicle Deployment on the Nation's Grid," 8/28/2023

Local Power Distribution

Once electricity arrives at the local level for distribution, the voltage must be reduced at substations to be safely delivered through the local grid. From there, wires deliver the electricity to transformers where the voltage is further reduced to a usable voltage by houses and businesses.

Absent planning and infrastructure, the concentrated demand for EV charging, especially during peak hours, could strain local distribution grids. Many neighborhoods and local distribution systems may require upgrades to accommodate multiple higher voltage EV chargers. This could involve increasing transformer capacity and distribution lines. Boston Consulting Group projects that utility companies may need to invest between $1,700 and $5,800 in grid improvements for each light-duty EV sold through 2030.[27]

- "Charging an EV can require a major boost to the electricity-transmitting capacity of the wires and transformers serving an EV-owning household—a 70 percent to 130 percent increase, depending on the power of the charger—according to an analysis by Boston Consulting Group.[28]"

However, transformers are in short supply with wait times of more than a year. Additionally, the cost of the equipment has increased as much as 400 percent since 2020, putting commercial and residential electrification projects in jeopardy of delay or cancellation.[29]

Additional concerns include power distribution along travel corridors. Providing power to fast charging locations along highways to allow long-distance drivers to charge quickly will not only be imperative but could also put a strain on the system unless upgrades are made. In some instances, a highway fast-charging site could require the same amount of electricity as a sports stadium, or even a small town. This demand will come from not only passenger vehicles, but electric trucks and heavy-duty vehicles from public and private fleets. By 2030, some sites will exceed delivery limits for the low-voltage distribution grid.[30]

Near-term EV and Grid Opportunities

To help address these challenges, it's clear that wholesale electrification of the transportation sector requires a systematic and proactive approach to grid modernization. Utilities and policymakers should assess the ability of their current distribution system planning and financing practices to accommodate the scale of grid upgrades that will be driven by widespread adoption of EVs; and they should consider adopting reforms that smooth the way for cost-effective transportation electrification. Those reforms need to be contemplated or set in motion now versus waiting years which will only further delay the needed improvements at the state and local level. One such opportunity is rate structures that incentivize EV drivers to charge during off-peak periods that can benefit the grid. Easy to understand and follow, time-of-use rates introduce EV owners to the concept of saving money by shifting charging, and they deliver a threshold level of benefits to the grid.

[27] Bart Ziegler, "Can the Power Grid Handle a Wave of New Electric Vehicles," *Wall Street Journal*, 2/5/2023
[28] Bart Ziegler, "Can the Power Grid Handle a Wave of New Electric Vehicles," *Wall Street Journal*, 2/5/2023
[29] Erin McLaughlin, The Conference Board, "An Electric Transformer Shortage Is Impeding Grid Expansion, Transformation," 6/22/2023
[30] National Grid, "Electric Highways Study: Summary Sheet," Accessed 9/12/2023