



U.S. Public Electric Vehicle (EV) Charging Infrastructure Deployment

July 2023

Industry Investment
Briefing



Environmental
Defense Fund



Key Takeaways

- ▶ An extensive survey found a **dramatic expansion and acceleration of investments in public electric vehicle (EV) charger deployments across the U.S.**
- ▶ Since 2021, based on a conservative estimate considering only the most concrete announcements, **more than \$21.5 billion** in investments have been announced, which will result in the deployment of **over 800,000 new charger ports** by 2030. Announcements made since the passage of the Inflation Reduction Act will implement **4.5 times** the number of current public chargers, underscoring the impact of recent federal policy in spurring expansion.
- ▶ Based on concrete announcements, existing and already announced public EV charger deployments will provide at **least 70% of the public chargers needed in the U.S. by 2030** under EPA's current proposed light-duty (LD) vehicle rule. For direct current fast chargers (DCFCs), existing and announced chargers account for **more than 100% of the needed DCFC chargers past 2032.**
- ▶ When 25% of soft announcements and 50% of unawarded grants are also included, these investments would result in the deployment of more than 100% of the required public chargers in 2030.



Key Takeaways (cont.)

- ▶ Market forces together with incentives from recent federal policy have attracted **a wide array of players to invest in public charger deployments**. The analysis identified investments by 18 charge network providers, 10 retailers, 7 vehicle manufacturers, 6 toll road operators, along with public utilities, truck and service station operators, and fleet owners
- ▶ EV owners across the U.S. will have increased access to public charging. The NEVI program along with 3 additional federal programs, and 21 nationwide announcements by companies will result in **nationwide expansion of the existing charging network and deployment of new infrastructure in all states**, including in rural communities



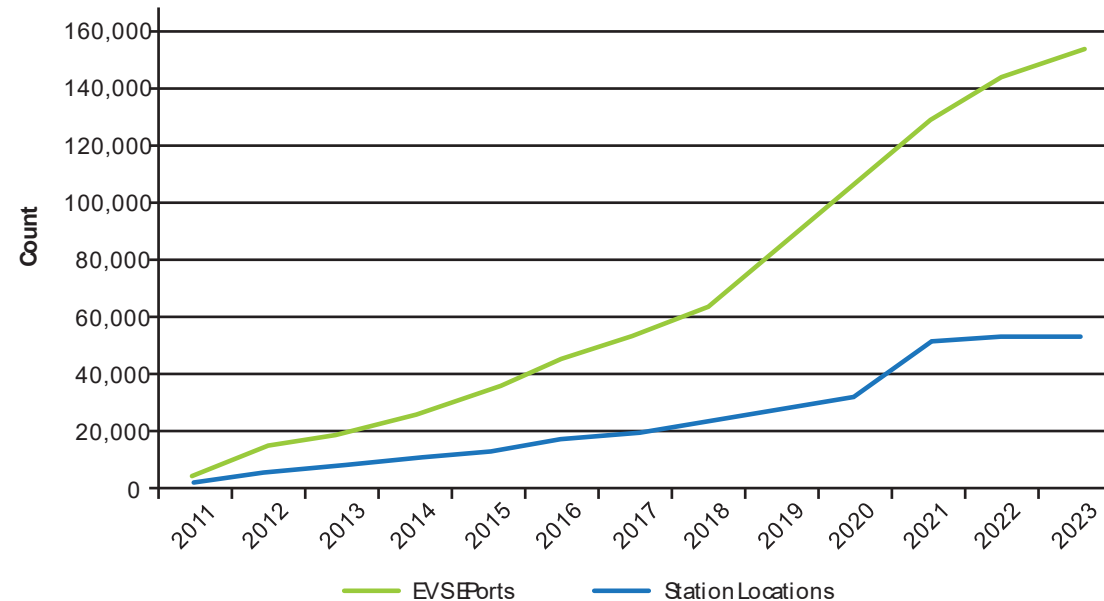
Existing Public Charging Infrastructure

June 2023

- ▶ 58,000 Stations – *Physical Location where charging occurs*
- ▶ 155,700 Ports – *Providing electricity to vehicles*
 - ▶ Level 1: 2,900 2%
 - ▶ Level 2: 121,500 78%
 - ▶ DCFC: 31,300 20%

Charging infrastructure is available today, but much more will be needed by 2030

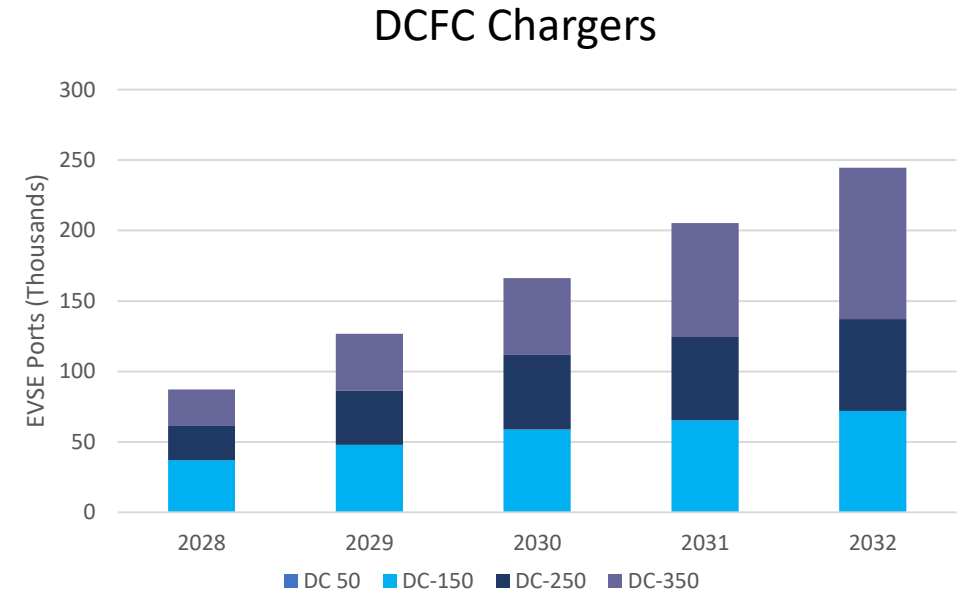
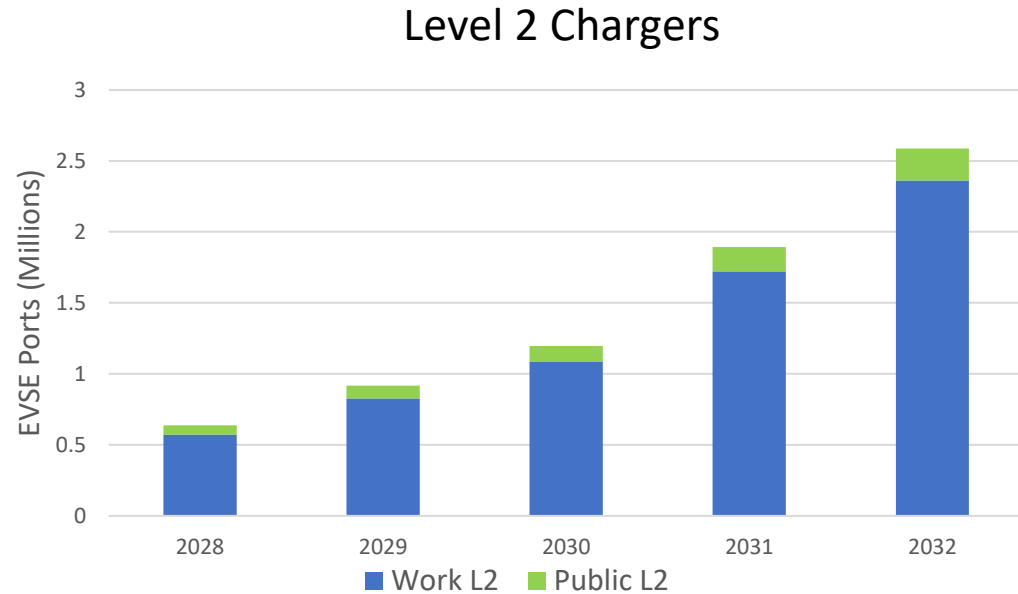
U.S. Public and Private EV Charging Infrastructure



Source: U.S. Department of Energy, Alternative Fuel Database, June 19, 2023



Future U.S. Public Charging Infrastructure Needs



EPA projects that approximately 1,075,000 new Level 2 chargers and 135,000 new DCFC chargers will be needed by 2030 to accommodate increasing numbers of EVs on the road with its proposed emission standards

Source: U.S. Environmental Protection Agency (EPA) *Multi-Pollutant Emissions Standards for Model Year 2027 and Later Light-Duty and Medium-Duty Vehicles Draft Regulatory Impact Analysis*, April 2023, Figure 5-15



Announced EV Charger Deployment

WSP estimated the number of public chargers that will be added to the current network by 2030 based on extensive desktop research identifying 86 public announcements and commitments to invest in new public chargers that have already been by the following types of organizations:

- ▶ U.S.DOT National Electric Vehicle Infrastructure(NEVI) Program **7**
- ▶ State Governments **29**
- ▶ Charge Network Providers **18**
- ▶ Retailers **10**
- ▶ Vehicle Manufacturers **7**
- ▶ Toll Road Operators **6**
- ▶ Utilities **4**
- ▶ Truck Stop Developer/Operators **4**
- ▶ Service Station Operators **2**
- ▶ Fleet Owners **2**

Walmart and General Motors have announced they will install publicly available DCFC chargers at all of their retail locations in the U.S. – 90% of Americans live within 10 miles of a Walmart or GM dealership.



Announced Public EVSE Deployment as of June 2023

- ▶ 806,300 new charging ports
 - ▶ 552,900 Level 2 ports (68.6%)
 - ▶ 253,400 DCFC ports (31.4%)
- ▶ Over \$21.5 billion in investment

Charger Type	Ports	Investment (\$ billions)
Level 2	552,900	\$2.1
DCFC	171,200	\$6.7
DCFC 150	16,500*	\$8.4
Supercharger 250	4,800	\$1.7
Supercharger 350	60,900	\$2.1

*Includes a conservative estimate of 6,000 NEVI Ports
75,000-mile network / 50-mile intervals = 1,500 stations with 4 ports / station = 6,000 ports

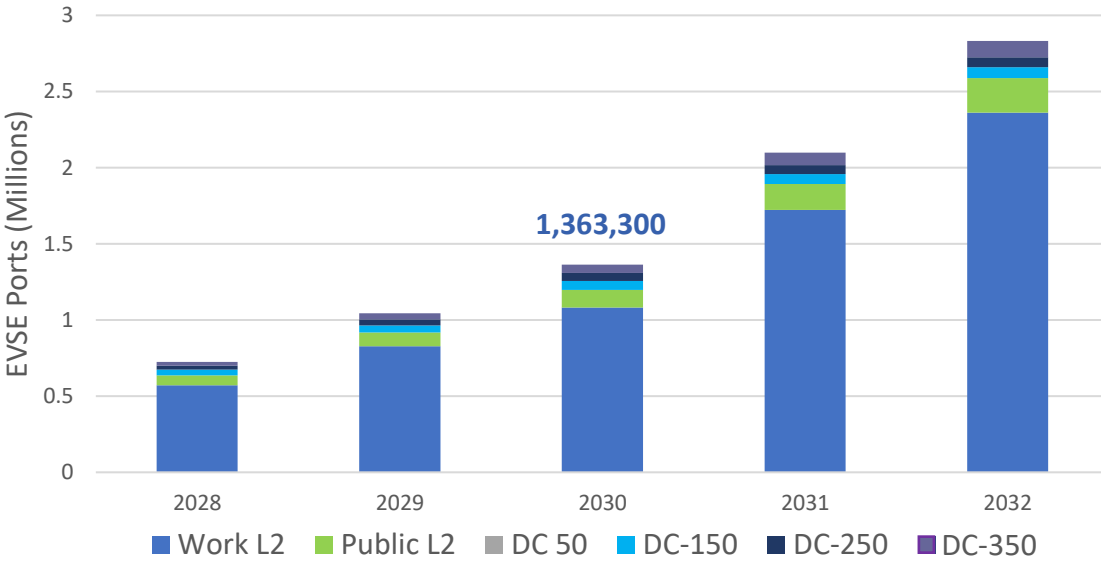
Based on specific, concrete projects already announced, our conservative estimate is that there will be at least a 4.5-time increase in Level 2 ports and an 8-time increase in DCFC ports by 2030



Existing and Announced Public Charger Deployment

▶ Existing Public Ports	152,700
▶ Announced Public Ports	<u>806,300</u>
Total Ports	959,000

Existing and already announced public EV charger deployments as of June 2023 will provide at least 70% of the public chargers needed in the U.S. by 2030, even though announcements do not seem to capture most workplace charging

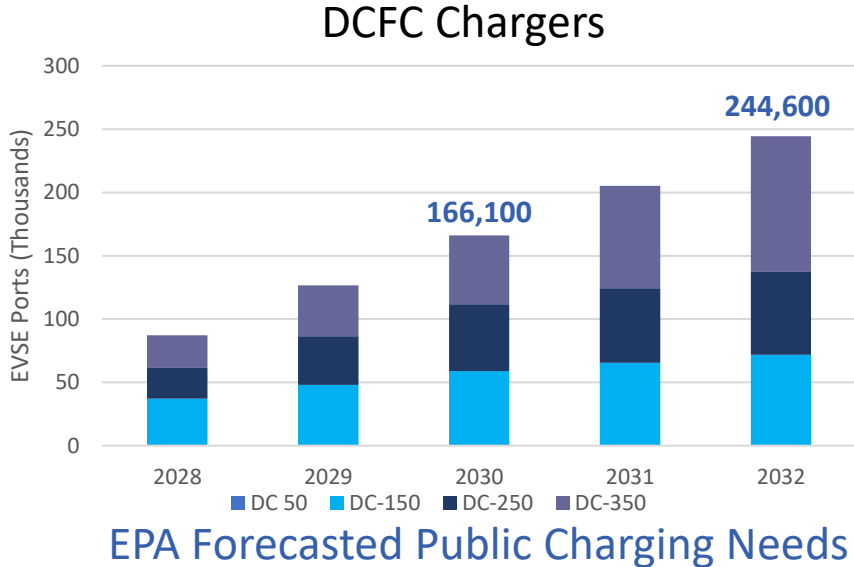


EPA Forecasted Public Charging Needs



Existing and Announced DCFC Charger Deployment

	Number of Ports	Charging Capacity (Gigawatts)
Existing DCFC Ports	31,300	3.1
Announced DCFD Ports	253,400	35.3
TOTALS	284,700	38.4



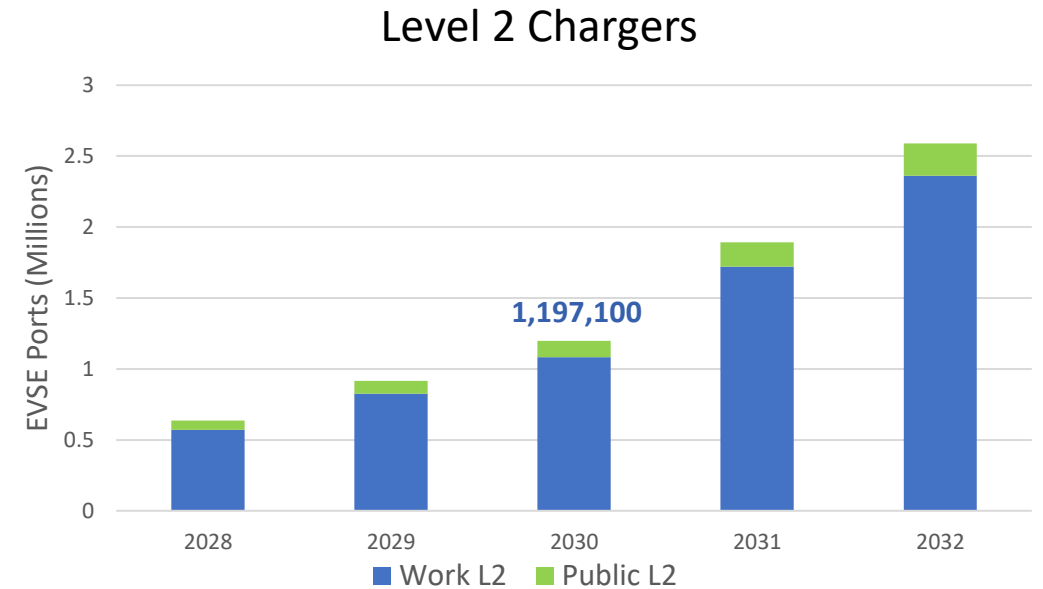
Existing and already announced DCFC charger deployments as of June 2023 will provide over 170% of the DCFC ports needed in the U.S. by 2030 and 116% of the ports needed by 2032. It will also deliver 93% of the DCFC charging capacity needed by 2030 and 59% of the DCFC charging capacity needed by 2032



Existing and Announced Workplace and Public Level 2 Charger Deployment

▶ Existing Level 2 Ports	121,500
▶ Announced Level 2 Ports	<u>552,900</u>
Total Level 2 Ports	674,400

Existing and already announced public Level 2 EV charger deployments as of June 2023 will provide 56% of the workplace and public DCFC chargers needed in the U.S. by 2030. However, the analysis does not fully capture workplace charger deployments because employers do not normally make this information available to the public.



EPA Forecasted Public Charging Needs



Additional Announcements

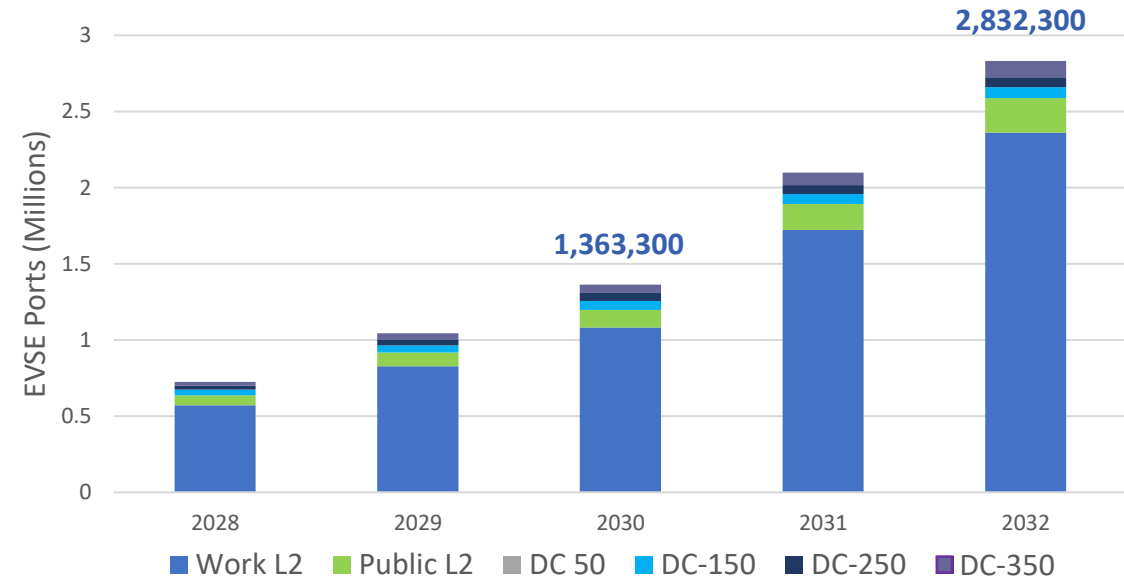
WSP's estimate of new charging ports is conservative and is based on public announcements with enough specific detail to estimate the number and type of ports that will be installed and total estimated investment. In addition, it does not capture all workplace charging, it does not account for the fact that announcements will continue to occur, and it does not include the following less specific information:

- ▶ 2,750,000 additional ports announced by 21 firms
Companies including Cumberland Farms, Enel X Way, Francis Energy, Kohl's Kroger, Prologis, Siemens, Shell, Subway, Target and Wawa have announced major EV charger deployments, but these softer announcements have not provided enough detail to determine their type, location, the precise number of ports, or the level of investment
- ▶ \$4.9 billion in EVSE grants announced but not yet awarded
The federal government and 10 states have announced grants that will fund approximately 100,000 ports, some of which may already be included in WSP's deployment forecasts



Possible Public Charger Deployment

▶ Existing Public Ports	152,700
▶ Announced Public Ports	806,300
▶ Other Possible Ports <i>(discounted)</i>	687,500
▶ Awarded Grant Ports <i>(discounted)</i>	<u>50,000</u>
Total Possible Ports	1,696,500



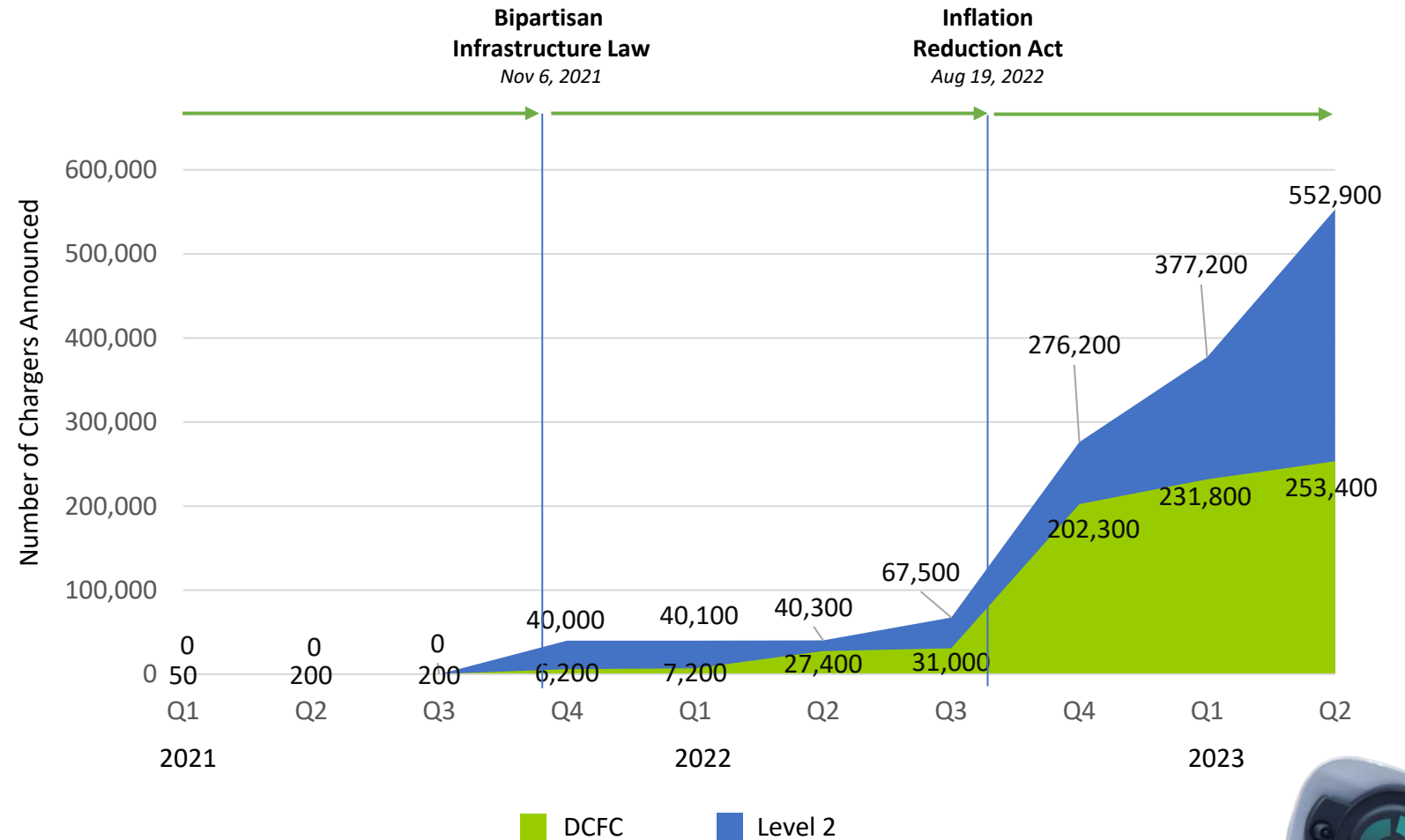
EPA Forecasted Public Charging Needs

Assuming 25% of these softer announcements and 50% of announced grant ports are built in addition to concrete announcements, possible deployments as of June 2023 will provide at least 124% of the public chargers needed in the U.S. by 2030



Charger Announcement Timing

The pace of charger announcements increased markedly following the Passage of the Inflation Reduction Act



Geographic Expansion Is Nationwide

- ▶ The NEVI Formula Program will install DCFC chargers at 50-mile intervals across a national network of 75,000 miles of highway
- ▶ The NEVI Discretionary Grant Program will incentivize charger deployment in rural and low- and moderate-income neighborhoods
- ▶ The review also identified 21 nationwide announcements by companies including General Motors, Ford, Tesla, Rivian, Mercedes Benz, Walmart, Walgreens, Hertz, Ikea, Whole Foods, Macy's, Blink, EVgo, and Electrify America
- ▶ The analysis also identified 63 additional confirmed investments in 24 states



Methodology

The research team conducted desktop research to identify current announcement of charger deployments. The team identified three Whitehouse Briefing Room FACT SHEETS on electric vehicles (EV) and related infrastructure released on [February 15](#), [April 17](#), and [June 27](#) 2023. We investigated each of the public EV charging infrastructure announcements contained in the FACT SHEETS and created an Excel spreadsheet to track their attributes including:

- ▶ Charger Type
- ▶ Charging Stations
- ▶ Ports
- ▶ Charging Rate (kW)
- ▶ Cost
- ▶ Date of Announcement
- ▶ Project Completion
- ▶ Data Sources (URLs)

We augmented this information by conducting additional searches on EV charger announcements made by all 50 states, electric vehicle supply equipment (EVSE) manufacturers, charging network providers, vehicle manufacturers, retailers, fleet owners, major employers, toll road and travel plaza operators, service station operators, and electric utilities. The research team incorporated all information obtained in the Excel spreadsheet.



Methodology

These searches revealed a total of 86 announcements with enough detailed information for the research team to identify or estimate the number and type of chargers to be deployed and the implementation cost. For certain projects, the information that was available was incomplete. When this was the case, the research team used the following attributes derived from The analysis utilized the projections of future charger needs prepared by the U.S. Environmental Protection Agency (EPA) for its *Draft Regulatory Impact Analysis (DRIA)* for the proposed Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles, together with the research team's experience to calculate the cost, number of chargers, or charging rates. The following costs and charging rates were used:

Charger Type	Power	Average Cost
Work Level 2	8 kW	\$ 5,900
Public Level 2	8 kW	\$ 5,900
DCFC	60 kW	\$112,000
NEVI /DCFC-150	150 kW	\$242,000
Super Charger-250	250 kW	\$306,000
Super Charger-350	350 kW	\$370,000

In instances where the number of DCFC charging stations was available, but the number of ports was not specified it was assumed that one to four ports would be provided per charging location.



Methodology

In several cases, charger announcements simply discuss the deployment of DCFC chargers, but do not specify their charging rate. To keep the analysis conservative, the research team assumed that they would be 60 kW chargers. In other cases, chargers with other charging rates were referred to, 175 kW for example. When this occurred, the research team tabulated these chargers with those in the next lowest charging rate category, in this case 150 kW.

The research team employed two methodologies to calculate the number of chargers that will be provided by the NEVI formula program. The first assumed that charging stations would be located at 50-mile intervals along a 75-000mile highway network. This would provide 1,500 charging stations with a minimum of four ports each, creating 6,000 ports. The second methodology was based on cost and assumed that a four-port charging station, the NEVI standard, would cost \$1.6 million. Dividing the total amount of NEVI funding – \$5.0 billion in federal funding and a required \$1.25 billion in local matching funds – by the per-station cost would provide 3,900 four-port stations, or a total of 15,600 ports. The research team used the lower 6,000 port figure to keep the analysis conservative.



Methodology

The analysis identified concrete announcements to deploy the following EVSE infrastructure by 2030:

Charger Type	Stations	Ports	Investment (\$ millions)
Level 2	15,963	552,949	2,101
DCFC	15,089	171,178	6,713
DCFC-150	3,300	16,454	8,357
Super Charger-250	69	4,834	1,663
Super Charger-350	737	60,900	2,064
Totals	35,131	806,315	21,538

Of these figures, the following percentages were calculated using the factors provide above:

Charger Type	Stations	Ports	Investment (\$ millions)
Level 2	1%	30%	60%
DCFC	0%	10%	53%
DCFC-150	10%	36%	11%
Super Charger-250	13%	7%	76%
Super Charger-350	0%	2%	76%
Totals	35,131	806,315	21,538



Methodology

In addition to these specific charger announcements, the research revealed 20 other announcements that provided less information such that it was not possible for the research team to determine the full complement of information: charger type, stations, ports and investment. The research team compiled information on these soft announcements separately. They include announcements identifying the deployment or intent to sell 2.1 million level 2 chargers, 610,000 DCFC chargers, and over 50,000 charger whose type could not be identified. Investment information was only available for six of the 20 other announcements, which together represent an investment of over \$13 billion. To include these announcements in the main analysis, the conservative assumption that 25 percent of these projects would be built by 2030, resulting in nearly 690,000 additional ports.

The research also identified 24 national and state specific grant programs providing funding for the provision of charging infrastructure. These programs – including the NEVI Discretionary Grant Program – have been announced, but not yet awarded. For instance, grant applications for the first cycle of the \$2.5 billion NEVI Discretionary Grant Program were due to USDOT on May 30, 2023 and are still being reviewed at the time of this writing. The research identified a total of nearly \$4.9 billion in pending EVSE grants that are estimated to fund approximately 100,000 charging ports. Recognizing that some of these ports may duplicate other charger announcements already captured in the analysis, the research team assumed conservatively that half of these chargers, or 50,000 additional ports would be installed by 2030.



Methodology

The analysis utilized the projections of future charger needs provided in the EPA *DRIA* for the proposed Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles. The analysis also utilized a June 2023 search of the U.S. Department of Energy Alternative Fuels Data Center EVSE database to identify current charger deployments in the U.S. The analysis then quantified the number of current and announced chargers and compared this figure to the estimated charger needs identified in the *DRIA* for the years 2030 and 2032. This comparison is made for the concrete charger deployment announcements, as well as the concrete announcements together with 25% of the less specific charger announcements and 50% of the announced but not yet awarded grants.

