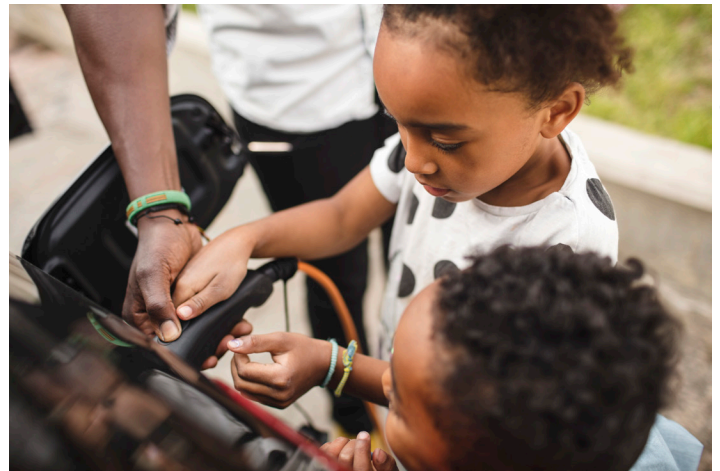


FACT SHEET

# REACHING FULL CHARGE: HOW CALIFORNIA'S CHARGING INFRASTRUCTURE INVESTMENTS CAN ENABLE 100 PERCENT LIGHT-DUTY ELECTRIC VEHICLE SALES BY 2035

Transportation remains the single largest contributor of climate change-causing carbon emissions in California and a significant driver of dangerous air pollution. Six of the 10 American cities with the dirtiest air are in California.<sup>1</sup> To protect our planet and California residents from harmful emissions, Governor Gavin Newsom issued an executive order in 2020 (N-79-20) requiring that all new passenger cars and light-duty trucks sold in California be zero-emission vehicles (ZEVs) by 2035.<sup>2</sup> Currently the governor and the State Legislature are working on a historic \$10 billion investment package to accelerate this transition to ZEVs and fight climate change.<sup>3</sup>

The California Air Resources Board's (CARB) Advanced Clean Car II program lays out a clear pathway to meeting Governor Newsom's target by increasing light-duty ZEV sales—including battery electric vehicles (EVs), plug-in hybrid EVs, and fuel cell vehicles—to approximately 35 percent by 2026, 68 percent by 2030, and 100 percent by 2035.<sup>4</sup> These proposed sales levels are consistent with those of other leadership states helping realize President Biden's executive order that at least 50 percent of vehicle sales be electric by 2030.<sup>5</sup> Rapidly increasing ZEV sales at the rate called for in the Advanced Clean Cars II program will require a similarly rapid increase in public charging infrastructure. NRDC, together with Atlas Public Policy and Dean Taylor Consulting, evaluated whether current and proposed investments in California are sufficient to support the public EV infrastructure and the shared private infrastructure (such as chargers at apartment buildings and workplaces) needed for the EV ramp-up. Unshared private EV chargers at apartments and condominiums, private chargers at homes and for fleets, and fuel-cell vehicle infrastructure were not included in this analysis.



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Our analysis found that current and expected funding levels could meet the state's public, workplace, and shared multiunit dwelling charging needs over the next five years—provided that the legislature passes the governor's ZEV investment proposal; the utilities implement their approved investments; federal funds are disbursed as expected; and the state's Public Utilities Commission (CPUC) approves filings on the Low Carbon Fuel Standard (LCFS), near-term priorities, and Pacific Gas and Electric's new EV Charge 2 proposal.<sup>6</sup> Funding levels are shown in Figure 1, below.<sup>7</sup> If California continues to accelerate its investment trends, it could also be on a path to meet its EV and EV infrastructure goals for 2030 and beyond.<sup>8</sup> Below, we recommend specific actions to accelerate California's long-term EV infrastructure build-out and estimate the associated cost. These findings are consistent with recent analysis by California agencies showing that sufficient infrastructure funding likely exists to meet the state's 2025 goal for EV infrastructure.<sup>9</sup>

Furthermore, our evaluation reveals that:

**Significant numbers of public and shared private EV chargers already exist in California.** Currently 79,000 EV public and shared private chargers exist in the state, more than in any other state. These include direct-current fast chargers (DCFC), Level 2 chargers, and Level 1 chargers.<sup>10</sup> The total does not include the estimated 700,000 unshared private chargers at homes and for fleets.<sup>11</sup>

**Over the next five years, significant increases in funding and incentives for public and shared private chargers are expected.** A mix of new federal incentives for charging infrastructure, existing and proposed state incentives, utility investments, and Low Carbon Fuel Standard (LCFS) credits are expected to provide about \$3.2 billion in support for light-duty charging infrastructure, including both monetized credits for utilizing low-carbon electricity and capacity credits for installing fast chargers (Figure 1).<sup>12</sup> Additionally, there may be other funding sources such as settlement funds, private company funding or matching funds (e.g., from Tesla and/or Electrify America), or future state funding or ballot measures, such as the Clean Cars and Clean Air measure expected to be on the ballot in November 2022.<sup>13</sup>

**Current investments include funding to increase EV charging access for frontline communities most burdened by tailpipe pollution.** To date, about 40 percent of utility investments have been designated for disadvantaged communities (see [Appendix](#)). However, more can be done by the legislature to ensure that investments in charging infrastructure prioritize build-out in frontline communities, often low-income communities and communities of color facing the largest pollution burdens in the state.<sup>14</sup>

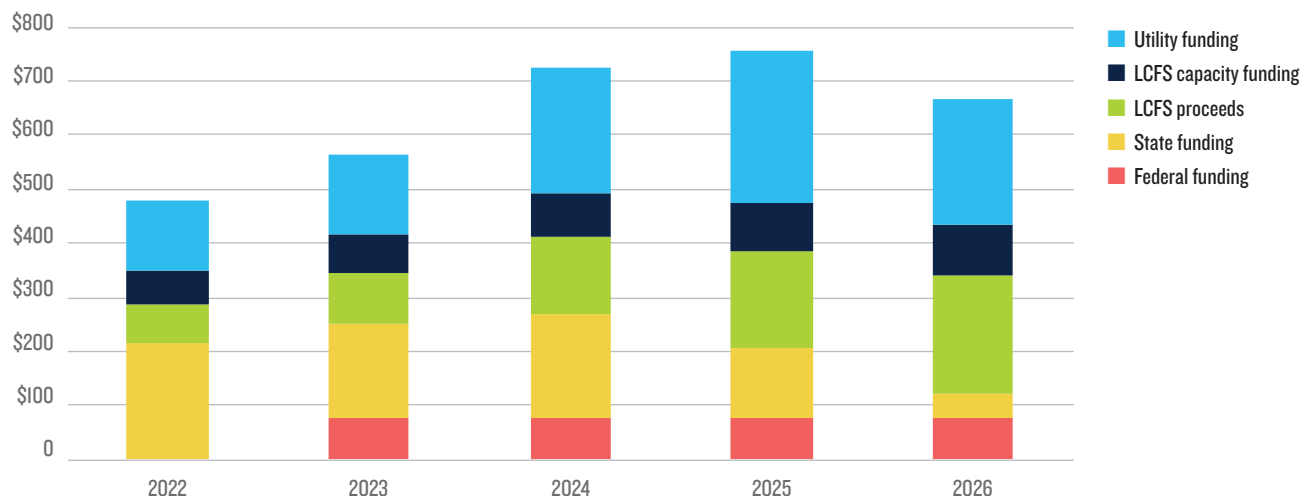
**Continuing the trends to increase funding for infrastructure will enable California to meet its EV goals.** The state, the federal government, and electric utilities are on track to invest \$3.2 billion in charging

infrastructure to support passenger vehicles in California over the next five years, which will put the state on very strong path to meet infrastructure needs through 2027.<sup>15</sup> However, continued investments will likely be necessary to meet 2030 and 2035 public and shared private light-duty charging infrastructure needs, including up to another \$1.4 billion in public investments required between now and 2030, and up to \$6.3 billion between now and 2035. We note these amounts do not include potential funding needs for charging by fleets, single-family homes, or dedicated (assigned) parking in multiunit dwellings. Increasing public and private investments over time will be required to facilitate even faster market growth in the future.

Historically, California has succeeded in large, statewide infrastructure investments. For example, the state's population doubled from 1940 to 1956, and again by 1987, requiring major upgrades to the electric grid and large increases in all types of infrastructure.<sup>16</sup> Other countries such as China, Germany, France, Portugal, the United Kingdom, and Denmark are adding EVs and EV infrastructure at faster rates than California.<sup>17</sup> If these countries can go fast, so can California.

**California's electricity grid can accommodate these ZEV goals with strategic advance planning.** The California Energy Commission (CEC) forecasts that if there are five million ZEVs on the road by 2030 and 95 percent of these are electric vehicles, EVs will account for only approximately 7 percent of California's annual electricity usage and 1 percent of system peak demand.<sup>18</sup> The CEC's *Draft Zero-Emission Vehicle Infrastructure Plan* finds that "California's electric grid can accommodate near-term infrastructure goals, and longer-term goals can be achieved with planning, which is already underway."<sup>19</sup> State agencies and policymakers are already implementing policies to encourage grid-friendly, beneficial load growth, such as time-of-use rates and programs to encourage charging during times when renewables are in excess.<sup>20</sup>

**FIGURE 1: STATE, FEDERAL, AND UTILITY FUNDING FOR PUBLIC AND SHARED PRIVATE CHARGING INFRASTRUCTURE FOR LIGHT-DUTY EVS**



## RECOMMENDATIONS

While current charging infrastructure investment trends are promising, there is little room for error. California’s agencies including the CEC, CPUC, and CARB must continue working in partnership to establish infrastructure policies and goals and to reduce all barriers to meeting California’s charging infrastructure needs.

1. The CEC and CPUC should accelerate their investments in customer-side public and shared private charging infrastructure at needed levels through 2035. Unfortunately, CPUC in its Transportation Electrification Framework proceeding is considering scaling back its funding of customer-side incentives for charging infrastructure, which could harm progress after 2025 in particular.<sup>21</sup> The recent Revised Staff Proposal in that proceeding has created significant regulatory and market uncertainty about future utility support.

2. California state agencies should fully implement:

- Recommendations from the EV Infrastructure Strike Force, a public-private partnership among the state agencies, private industry, and nonprofit organizations that have worked to identify the necessary investments to support charging infrastructure deployment over the next decade and beyond.<sup>22</sup>
- The principles of the broad-based, 38-member National EV Charging Initiative.<sup>23</sup>
- The *2022 Draft Zero-Emission Vehicle Infrastructure Plan* developed by the CEC with eight other state agencies, including recommendations on streamlining construction permits and utility interconnections, additional standardization and reliability of charging stations, and expanded minimum requirements in building codes for charging infrastructure.<sup>24</sup>



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3. The Governor’s Office of Business and Economic Development (GO-BIZ) should continue to support and cultivate opportunities to accelerate ZEV market growth, including through EV charging infrastructure deployment.<sup>25</sup>

4. CARB staff should consider additional actions to increase ZEV charging infrastructure or make it more affordable to drivers and property owners or tenants. For example, CARB might develop best practices to reduce the cost of charging, new incentive programs, or regulations such as requiring or encouraging automated managed charging or bidirectional charging by automakers or charging network providers or reducing the cost of charging for low-income EV consumers.

5. The California State Legislature should pass, and the governor should sign, AB 2700 in 2022. This would expedite the build-out of distribution infrastructure such as substations and feeder lines anticipated to be needed to implement California’s regulations for ZEVs and reach the state’s goals.<sup>26</sup> In the long term, the legislature should provide ongoing funding for EV infrastructure.

Thanks to Dean Taylor (Dean Taylor Consulting) and Lucy McKenzie (Atlas Public Policy) for their contributions to this analysis.

### ENDNOTES

- 1 American Lung Association, “Most Polluted Cities,” in *State of the Air 2022*, 2022, <https://www.lung.org/research/sota/city-rankings/most-polluted-cities>.
- 2 Executive Department, State of California, Executive Order N-79-20, September 23, 2020, <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>.
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- 4 California Air Resources Board (hereinafter CARB), “Public Hearing to Consider the Proposed Advanced Clean Cars II Regulations Staff Report: Initial Statement of Reasons,” April 12, 2022, <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/acii/isor.pdf>.
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- 7 Assumes 100 percent of the cost would be covered. However, private funds can likely pay for 20 to 50 percent of the cost. Thanh Lopez and Madison Jarvis, *Draft Zero-Emission Vehicle Infrastructure Plan (ZIP)*, California Energy Commission (hereinafter CEC), April 2022, 6, <https://www.energy.ca.gov/sites/default/files/2022-04/CEC-600-2022-054.pdf>. See this fact sheet’s Appendix for details on the analysis by Atlas Public Policy and Dean Taylor Consulting.

- 8 Patrick Brecht, *Commission Final Report: 2021–2023 Investment Plan Update for the Clean Transportation Program*, CEC, updated December 17, 2021, Table ES-1, <https://www.energy.ca.gov/publications/2021/2021-2023-investment-plan-update-clean-transportation-program>. Table ES-1 does not include the 2021 state budget, the proposed 2022 state budget, new private funds, or recent federal funds from the Infrastructure Investment and Jobs Act. Also see CEC, “CEC Approves \$1.4 Billion Plan for Zero-Emission Transportation Infrastructure and Manufacturing,” press release, November 21, 2021, <https://www.energy.ca.gov/news/2021-11/cec-approves-14-billion-plan-zero-emission-transportation-infrastructure-and>. Also see Lopez and Jarvis, *Draft Zero-Emission Vehicle Infrastructure Plan*.
- 9 Lopez and Jarvis, *Draft Zero-Emission Vehicle Infrastructure Plan* at 1, 29. For example, “The state is on track to meet its goal of 250,000 (of which 10,000 are DCFC) chargers by 2025; however, even more chargers may be needed by 2025 to meet updated PEV [plug-in electric vehicle] population projections.”
- 10 Level 2 chargers can charge at power levels of 2.5–19.2 kilowatts (kW), providing 12 to 60 miles of range per hour, while Level 1 operates at 1.4–1.9 kW, providing 3 to 5 miles of range per hour. See, for example, Kristi Brodd, “An Overview of Electric Vehicles and Charging Stations,” *Advanced Energy*, November 1, 2020, <https://www.advancedenergy.org/2020/11/01/an-overview-of-electric-vehicles-and-charging-stations/>.
- 11 CEC, “Electric Vehicle Chargers in California,” accessed March 31, 2022, <https://www.energy.ca.gov/data-reports/energy-insights/zero-emission-vehicle-and-infrastructure-statistics/electric-vehicle>. Note that this fact sheet does not consider fuel-cell EVs and hydrogen stations. The number of private charging stations is estimated by Dean Taylor Consulting for both Level 1 and Level 2 charging stations that are currently in use. More than 1,122,000 plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) have been sold in California (light-duty, as of first-quarter 2022). CEC, “New ZEV Sales in California,” accessed June 4, 2022, <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-zev-sales>. However, only 826,000 light-duty BEVs and PHEVs were on the road at the end of 2021. CEC, “Light-Duty Vehicle Population in California,” accessed June 4, 2022, <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/new-zev-sales>. Some 84 percent of BEV and PHEV drivers in California are charging primarily at homes and apartments, and likely more have home charging access, resulting in an estimate of 700,000 home charging stations (not counting the 80,000 BEVs and PHEVs sold in first-quarter 2022). Michael Nicholas, Dale Hall, and Nic Lutsey, *Quantifying the Electric Vehicle Charging Infrastructure Gap Across U.S. Markets*, International Council on Clean Transportation, January 2019, [https://theicct.org/sites/default/files/publications/US\\_charging\\_Gap\\_20190124.pdf](https://theicct.org/sites/default/files/publications/US_charging_Gap_20190124.pdf).
- 12 See Appendix for details on how Figure 1 was calculated.
- 13 Clean Cars and Clean Air Initiative, “Get the Facts,” accessed June 4, 2022, <https://cleancar.org/facts>. According to the CEC, fewer than half the public and shared private chargers installed in California have received public funding from the state, utilities, or settlement agreements. Lopez and Jarvis, *Draft Zero-Emission Vehicle Infrastructure Plan* at 6. Note that much of this comes from Tesla chargers, and the CEC notes, at 38, that its grant program is paying for only about half the cost of Level 2 chargers and two-thirds of the cost of DC fast chargers.
- 14 Bill Magavern et al., “Securing an Equitable Clean Transportation Future,” accessed April 28, 2022, <https://www.investincleanair.com/letter-to-the-governor>.
- 15 See Appendix for details on how this was estimated.
- 16 Macrotrends, “California Population 1900–2021,” Table: “California–Historical Population Data,” accessed June 5, 2022, <https://www.macrotrends.net/states/california/population>.
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- 19 Lopez and Jarvis, *Draft Zero-Emission Vehicle Infrastructure Plan* at 1.
- 20 CARB, “Governor Newsom’s Zero-Emission by 2035 Executive Order.”
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- 23 EV Charging Initiative, “Guiding Principles,” <https://www.evcharginginitiative.com/principles>, accessed June 2022; EV Charging Initiative, “Members,” accessed June 2022, <https://www.evcharginginitiative.com/members>.
- 24 Lopez and Jarvis, *Draft Zero-Emission Vehicle Infrastructure Plan*, Chapter 3.
- 25 California Governor’s Office of Business and Economic Development (GO-Biz hereafter) seeks to be a one-stop resource for most of the relevant EV resources and internal, as well as external, reports, such as 20 Agency ZEV action plans, accessed July 18, 2022, <https://business.ca.gov/industries/zero-emission-vehicles/zev-strategy/agency-zev-action-plans/>, seven reports on Plug in EV Charging Station Readiness, accessed July 18, 2022 <https://business.ca.gov/industries/zero-emission-vehicles/plug-in-readiness/>, and well as a variety of other resources, including: Go-BIZ, *ZEV Funding Resources*, accessed July 18, 2022, <https://business.ca.gov/industries/zero-emission-vehicles/zev-funding-resources/>, *California Business Comeback Guide*, January 2022, <https://static.business.ca.gov/wp-content/uploads/2021/12/GO-Biz-California-Comeback-Guide-1-13.pdf>; California Governor’s Office of Business and Economic Development, “Zero Emission Vehicles,” accessed April 13, 2014, <https://business.ca.gov/industries/zero-emission-vehicles/>. GO-Biz, *Equity Engagement & Implementation Plan: ZEV Market Development Strategy*, December 2021, [https://static.business.ca.gov/wp-content/uploads/2021/12/Equity\\_Engagement\\_Plan\\_12-15-21\\_FINAL.pdf](https://static.business.ca.gov/wp-content/uploads/2021/12/Equity_Engagement_Plan_12-15-21_FINAL.pdf).
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