ELECTRIC VEHICLE CHARGING IN COMMUNITIES

Equity Workgroup Report

November 2022

Prepared for**:**

Electric Vehicle Charging Infrastructure Strike Force (ET Community)

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ACKNOWLEDGEMENTS

The Equity Workgroup (EWG) co-facilitators, Larry Rillera and Samantha Houston, expresses appreciation and gratitude to the varied and diverse EWG members. We also deeply appreciate the support of the EV Charging Infrastructure Strike Force (Strike Force) and the California Transportation Electrification Coalition (CalETC) for their support to community-based organizations and individuals that allowed them to participate in EWG meetings, to illuminate issues and subject areas that should be addressed, and to contribute to the development of the Equity Workgroup Report.

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Acknowledgment also goes to the organizations and affiliations that participated in this process. The strategies and recommendations in the Equity Workgroup Report are a synthesis of participant input and may not fully represent the position of individual participants or their affiliated organizations.

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EXECUTIVE SUMMARY

The California Electric Vehicle Charging Infrastructure Strike Force (Strike Force) is a collaboration of public and private stakeholders working together to accelerate the buildout of electric vehicle (EV) charging infrastructure that is equitable, accessible, and affordable. The Strike Force is comprised of leaders from industry, academia, labor, and equity groups in coordination with public sector stakeholders[1]. The Strike Force established the Equity Workgroup (EWG) to:

- Develop strategies and recommendations and identify areas of cooperation and collaboration among Strike Force members to promote equity in infrastructure build-out and ensure that charging infrastructure is accessible to all Californians.
- Explore definitions of "equity" that the Strike Force and workgroups can use and incorporate into their work and if possible, achieve consensus on an overarching definition.
- Explore how to quantify benefits to priority communities (under-resourced and over-burdened communities) beyond just dollars invested in those communities.

Samantha Houston (Union of Concerned Scientists) and Larry Rillera (California Energy Commission) co-facilitated the EWG, whose membership included community-based organizations, environmental and social justice experts, public health advocates, EV charger companies, equity non-profits, high school and college students, labor, and private businesses. Over the last 18 months, the EWG held a series of meetings to cultivate a rich dialogue that reflect the composition of the group within the Strike Force's specified scope of work. Additionally, EWG also engaged their respective communities to solicit input and feedback on the EWG content as well.

The Report presents an overarching discussion of equity and definitions of equity in EV charging, then describes how the definitions of equity in EV charging intersect with nine focus areas: (1) Light-duty vehicle (LDV) charging at home; (2) Light-duty vehicle charging away from home; (3) Medium- and heavy-duty duty (MDHD) vehicle charging; (4) Shared mobility and micromobility charging; (5) Access to emerging and advanced technologies; (6) Investments and community wealth; (7) Workforce and jobs; (8) EVSE supply chain businesses; and, (9) Community awareness and education.

Overarching Equity Considerations

Environmental Imperative

Reducing air pollution is important to address health inequities that fall disproportionately on vulnerable communities. Transitioning fossil-fueled vehicles to zero-emission vehicles EVs is one solution to reduce air pollution burdens where those vehicles operate. EVs, and the charging infrastructure to support them, must be rapidly deployed in Environmental Justice

[1] Electric Transportation Community Development Corporation, "EV Infrastructure Strike Force," available at https://etcommunity.org/strike_force.html

(EJ) communities most burdened by transportation pollution to bring people in those communities' relief from the health-harming effects of vehicle tailpipe pollution.

Socioeconomic Imperative

In addition to pollution reduction, EVs can provide economic benefits in the form of cost savings relative to fossil fuel vehicle models across many EV segments. These economic benefits could be especially impactful for low-income consumers, truck drivers, and fleet operators. However, accessing those benefits requires an up-front investment in the vehicle and in the charging infrastructure. Those without access to the capital to invest could be cut off from accessing EVs and effectively left behind in the transition to electrified transportation. In addition, the installation, maintenance, and ownership of charging stations is an opportunity to create local jobs, revenues, and asset ownership opportunities that build local community wealth. Without intentional support, those opportunities will be difficult to access for the transitioning workers, small businesses, and others who stand to benefit most from investments in EV charging infrastructure.

Definition of Equity

The EWG has generally defined equity as the sustained prioritization of investment in and advancement of justice in communities and among people that are marginalized and have historically borne and currently bear the burdens of society's systems and structures. The EWG further noted that a shift in power structures and access to decision-making and self-determination by burdened communities must be part of the process to addressing inequities. Centering equity is necessarily a departure from business as usual because the usual or performative way of doing things is what created inequality and more importantly inequities in the first place.

Low-income communities, disadvantaged communities, pollution-burdened Environmental Justice (EJ) communities, rural, and communities of color must get first-in-line priority for program consultation and funding and receive that funding at a sufficiently high level to fully complete the project and meaningfully deliver environmental, health, and socioeconomic benefits. To equitably fund projects for many such communities, funding will need to cover the full capital and installation costs and cover all or part of ongoing costs for some period. Providing such communities funding that is equal to general applicants may result in incomplete projects or a lack of initiated projects.

Definition of EV Charging Equity

Communities that have historically suffered disproportionate burdens and inadequate benefits from the transportation system must be prioritized in the transition to EV infrastructure from planning, development, installation, access, and EV charging infrastructure supply chains. Understanding and equitably delivering this transition includes:

- **Recognitional Equity** – Communities have values, history, and mobility priorities. Communities have the capacity to express their choices, preferences, and are self-determining. External entities should recognize, respect, and weave community expressions of its needs and simultaneously create space for community driven processes in the EV infrastructure space and ensure communities are not displaced nor

divided by vehicle infrastructure, car dependency, and vehicle traffic, even by zero-emission vehicles. EV charging installation, operation, and service should build and sustain community wealth.

- **Procedural Equity** – From planning to service, procedural equity in EV charging requires inclusive, accessible, authentic engagement and representation in EV infrastructure policies, programs, projects, and use. EV infrastructure decisions must be community-driven while recognizing historical, cultural, and institutional community dynamics for long-term EV charger assets.
- **Distributional Equity** – Underserved communities have not received the complete suite of resources that ensure community success, especially those with the highest need. Resources for EV charging, including funding allocations, must be distributed to those communities with the highest need first and at a level the community requires so they do not expend scarce community resources or rely on resources the community does not have. Distributional equity creates opportunities for people and communities to participate in the EV charging infrastructure supply/value chain, operations, service, and ownership and minimizes potential negative impacts of EV charging and use.

This Report discusses how the definition of equity in EV charging intersection with a variety of issues within the EV charging space. Those issues as well as related benefits, metrics, and strategies and recommendations to address those equity issues are summarized here. Benefits may include improvements in mobility options, wellbeing, economics and wealth creation, health-harming pollution exposures, and more. Metrics may be used to assess the flow of benefits to communities. Strategies and Recommendations offer Strike Force members activities to undertake that can support the creation of benefits for communities and improve equitable outcomes in EV charging deployment. The main body of the Report provides a full discussion in each of these areas in much more detail.

Equity Focus Areas

The EWG identified nine specific areas of focus that are noted in the following sections.

Light-Duty Vehicle Charging at Home

The convenience, reliability, and low cost of LDV charging at a home or residence are among the benefits of owning an EV. Access to these benefits contributes to the increased rate of EV adoption. However, charging access at home is not widely available to underserved communities, and the lack of availability is a barrier to many low-income households and households in multi-family housing (MFH) adopting an EV. At the same time, low-income households, who typically spend one third of their take-home income on transportation,[2] could benefit greatly from the fuel cost savings that charging at home can provide.

Metrics for home charging programs should measure adoption rates and the distribution of home chargers among low-income drivers and drivers in MFH, with visibility into charger

[2] Rice, Lorien, "Transportation Spending BY Low Income Households: Lessons from the San Francisco Bay Area" (2004), Public Policy Institute of California, available at https://www.ppic.org/content/pubs/report/R_704LRR.pdf

attributes such as power level, shared or non-shared, price to driver, utilization, and uptime (for shared chargers). The implementation of anti-displacement measures should also be tracked.

Strategies to promote equitable access to home charging include conducting studies to understand how to best achieve the metrics above, and that effort should leverage existing community transportation needs assessments (where available) or conducting such an assessment. In addition, Strike Force members should advocate for co-marketing EV charging programs alongside other low-income programs for EVs and home upgrades to drivers and property owners/managers. To make programs accessible, Strike Force members should advocate for needs-based incentives that scale up for lower income brackets and other equity designations. Strike Force members should also advocate for building codes that require EV charging access to all new MFH units.

Light-Duty Vehicle Charging Away from Home

Publicly accessible, workplace, and destination charging for light-duty EVs are critical pieces of the charging ecosystem to increase charging access for drivers who need to supplement their home charging, or who do not currently have access to home charging. Public and workplace charging programs must ensure that the physical locations and configurations of charging do not negatively impact other aspects of people's safety, wellbeing, or livelihood. Access to charging for priority communities should also consider the affordability, payment options, and reliability of charging.

Metrics for LDV charging away from home should measure deployment rates and the distribution of publicly accessible chargers in low-income and pollution burdened communities and communities of color, with visibility into charger attributes such as power level, location type, price to driver, utilization, and uptime. Prices to drivers should be judged against an affordability benchmark, and the use of any pre-paid public charging cards for low-income and un- and under-banked drivers should be tracked. The implementation of anti-displacement measures and physical safety best practices should also be tracked.

Strategies to promote equitable access to charging away from home include conducting studies to understand how to best achieve the metrics above, and that effort should leverage existing community transportation needs assessments (where available) or conducting such an assessment. In addition, community feedback and geographic information system mapping (GIS) tools should be used to determine the charging locations that maximize benefits to drivers and the community. Strike Force members should advocate for payment options that are accessible to un- and under-banked drivers alongside pre-paid public charging cards for those drivers and other low-income drivers without access to charging at home. Strike Force members should also support community organizations and public-private partnerships that can install charging and offer charging at a price to drivers that is like home charging.

Medium- and Heavy-Duty Vehicle Charging

MDHD vehicles, including trucks, buses, and freight equipment, constitute a relatively small number of vehicles in operation compared to the total vehicle population, but produce a large

amount of health-harming air pollution. MDHD EVs deployed in place of internal combustion engine vehicles that run on diesel and other fossil fuels in pollution-burdened communities can reduce the health-harming vehicle pollution in those areas, which are often low-income communities or communities of color.

Metrics for the equitable deployment of MDHD charging include the dollar amount invested in pollution-burdened communities as well as the share of electric vehicle miles traveled (eVMT) by trucks, buses, and equipment within those communities. The adherence of public agencies and companies to community engagement best practices and the share of small, minority-owned, and women-owned businesses claiming incentives and doing the installation of projects should also be tracked.

Strategies to promote equitable deployment of MDHD charging include incorporating the perspectives of frontline workers and fence-line communities into decision-making and using GIS tools along with community consultation to inform charging site selection. Strike Force members should also advocate for truck traffic thresholds in communities where charging is installed so that charging stations do not increase truck traffic in impacted communities and support building codes that require new warehouses and port facilities have charging. The Strike Force should also advocate for programs to prioritize small, minority-owned, and women-owned businesses as both incentive recipients and infrastructure installers. Investments in public transit and public services should be prioritized.

Shared Mobility and Micromobility Charging

LDV electrified and shared mobility programs that intentionally serve lower-income communities are important. Shared mobility and micromobility, including ride-hailing vehicles, e-bikes, and e-scooters serve multiple transportation, access, and safety purposes, especially where individual passenger vehicle ownership is not a preferred option, or it is cost-prohibitive.

Metrics related to shared mobility and micromobility include the geographic distribution of service areas, share of ride-hailing vehicles that are electric, and bike lane coverage in low-income communities. Ride-hailing driver net income by vehicle/fuel type might also be tracked.

Strategies for equitable access to shared mobility and micromobility include the expansion of programs and requirements for expanded service/access to service low-income communities and investment in charging infrastructure to support those programs.

Access to Emerging and Advanced Technologies

As charger technologies and services advance, new emergent charger technologies deployment should be prioritized in equity-designated communities where immediate technological and economic benefits can accrue in these neighborhoods.

Metrics related to advanced technology include the number and diversity of technology research, demonstrations, and pilots done in priority communities.

Strategies for equitable deployment of emerging and advanced charging technologies and workforce opportunities including community engagement in project selection, design, and data collection and jobs.

Investments and Community Wealth

Beyond the availability of funding, how that funding is distributed and who owns charging assets is equally important to community sustainability and identity. Low-income and pollution-burdened communities and communities of color should be able to direct funding toward community-determined needs, and community members or community-based entities should have the option to own the infrastructure and to direct any revenues generated within their communities.

Metrics relevant to investments and community wealth include the fraction of programs earmarked and installed in priority communities as well as the level of funding for project expenses, including operations and maintenance. The share of chargers owned by local entities or minority-owned businesses could be tracked.

Strategies to promote investments that build community wealth include advocating for programs that support upskilling of local workers and build the capacity of local businesses as well as provide pathways to ownership of charging assets and charging site real estate for community members. Strike Force members should also advocate that charging programs cover as much of the charging project cost as necessary to make stations viable in priority communities (up to the full cost of the project), and that those communities are first in line for available funds.

Workforce and Jobs

The market related to charging infrastructure buildout is significant and growing. The EVSE technical workforce to install and maintain charging stations in the state will need to scale exponentially within the near term. The installation, maintenance, repair, and replacement of chargers offers great economic potential for employing hyper local workforces as well as reskilling of people in priority communities transitioning out of fossil fuel or other industries. It also provides certified local business to scale the growth of their products and services in the EVSE industry.

Metrics for workforce and jobs include the number of hyperlocal charging trainees, certifications, apprentices, and job hires. Demographic data of charging industry workers, job quality statistics, wages, and the presence of project/community labor agreements should also be tracked.

Strategies to promote an equitable workforce in the charging industry include promoting programs that upskill and reskill workers from priority communities in the transportation sector and adjacent industries for jobs related to charger install, maintenance, repair, and

replacement. Strike Force members should also advocate for the inclusion of labor standards for program applicants and installing contractor criteria.

Electric Vehicle Supply Equipment (EVSE) Supply Chain Businesses

The EVSE supply chain includes the innovation segment (engineering, design, universities); manufacture, production, and assembly; project work (construction, installation, commissioning); operations and service; and end-of-life disposal/recycling and replacement. That supply chain must be accessible and inclusive to people in priority communities.

Metrics for the supply chain include the number of small, women, minority, veteran, disadvantaged business, and other certified businesses[3] in priority communities as well as dollars invested in, and revenues generated from those businesses.

Strategies for an equitable supply chain include programs and partnerships to increase access for small, women, minority, veteran, disadvantaged business, and other certified businesses as well as efforts to locate workplace and/or customer charging stations at those business locations.

Community Awareness and Education

Supporting community awareness and education in EVs and the charging experience in priority communities is critical. The education to support the paradigm shift from an old, outdated transportation, mobility, and refueling experience to the EV and charging experience must be sustained over time and done in a community-centric fashion.

Metrics related to awareness and education include the number and share of educational events and other activities, with visibility into type of event/activity, languages offered, and attendance.

Strategies for education and awareness include supporting community-based outreach and engagement in appropriate languages, utilizing ethnic media channels, and co-marketing/education efforts across issues and programs.

Conclusion

The EWG submits the information, definitions, metrics, strategies, and recommendations in this Report to inform the Strike Force members and stakeholders in their respective efforts to incorporate equity in its advocacy and other work to advance charging infrastructure in California. The Report and strategies do not cover every aspect of EV charging equity, and it should be treated as a living document that should be revisited and updated over time.

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[3] Refers to Small Business Certification, Historically Underutilized Business Zone, Woman-Owned Small Business, Economically Disadvantaged Woman-Owned Small Business, Minority-Owned Business, B Corporation, Veteran-Owned Small Business, Service-Disabled Veteran-Owned Small Business, and Certified LGBT Business Enterprise.

CHAPTER 1: Introduction

Electric Vehicle Infrastructure Strike Force Terms of Reference[4]

The Strike Force was formed to advance public and private sector programs and policies that result in the build-out of the charging infrastructure necessary to support battery EVs as part of California's transition to zero-emission transportation over the next decade and beyond. As the Strike Force acts, it will do so intentionally to advance access, equity, and affordable EV infrastructure for all.

California lacks adequate EV infrastructure to support EVs on the road today[5]. Strike Force members understand that EV infrastructure will play a pivotal role in the state's economic recovery and commit to ensuring equitable and affordable access to EV infrastructure and electricity fuel for all. This includes intentionally partnering with equity groups to identify structural barriers and to develop bold solutions that not only support access to clean and reliable charging infrastructure and electricity fuel, but also spurs job creation and economic development where it is needed most.

The Strike Force and workgroups are intended to facilitate discussion and dialogue that informs policy development, recognizes points of difference among members, identifies common ground, and incorporates equity in all aspects EV charging infrastructure investments and build out. The Strike Force seeks to accomplish four goals:

1. Establish high-level charging infrastructure goals for 2030. The goals established are consistent with the CEC and other assessments of EV infrastructure needs.
2. Ensure adequate and reliable financing and funding to achieve equitable EV infrastructure goals.
3. Oversee the analysis of jobs creation potential resulting from the build-out of charging infrastructure to support the equitable transition to a zero-emission mobility future.
4. Define "equity" in the context of the Strike Force effort. Develop strategies to ensure that charging infrastructure is accessible to all Californians and that infrastructure buildout promotes equity and provides economic and jobs benefits to priority communities, e.g., those most impacted by transportation related pollution, poverty, under or unemployment, racism and/or other disproportionately adverse impacts.

Each goal required a workgroup comprised of representatives from the Strike Force member organizations and, as appropriate, other stakeholders, representatives, and experts determined to be essential to achieving the goal.

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[4] Electric Transportation Community Development Corporation, "EV Infrastructure Strike Force Terms of Reference" (Mar. 2021), available at https://etcommunity.org/assets/files/Strike-Force_TermsofReference_UpdatedMar2021Final.pdf

[5] Warheit, Vanessa, et al., "Narrowing the Divide: Addressing Inequities in California's Electric Vehicle Infrastructure" (Aug. 28, 2021), *Progressive Policy Review*, available at https://ppr.hkspublications.org/2021/08/28/narrowing-the-divide-addressing-inequities-in-californias-electric-vehicle-infrastructure/

Equity Workgroup

The Strike Force established the EWG with co-facilitators to convene the effort. The Strike Force specified that the EWG:

- Develop strategies and recommendations and identify areas of cooperation and collaboration among Strike Force members to promote equity in infrastructure build-out and ensure that charging infrastructure is accessible to all Californians.
- Explore definitions of "equity" that the Strike Force and workgroups can use and incorporate into their work and if possible, achieve consensus on an overarching definition.
- Explore how to quantify benefits to priority communities (under-resourced and over-burdened communities) beyond just dollars invested in those communities.

The EWG has met 12 times since the inception of the Strike Force. Meetings were usually held every 6 weeks on average. The structure of the meetings centered on specific reports and topics related to EV charging, current state agency reports, and included Strike Force member issues of importance.

California's Zero-Emission Vehicle and Infrastructure Goals

ZEVs and ZEV infrastructure (for battery electric vehicle [BEV] charging and fuel cell electric vehicle [FCEV] fueling) will be a key component of achieving California's climate and air quality goals.[6] California has goals specific to increasing the supply of ZEVs and infrastructure including:

By 2025:

- Having at least 1.5 million ZEVs on the road. (Executive Order B-16-12)[7]
- Installing 200 public hydrogen-fueling stations and 250,000 battery-electric vehicle chargers, including 10,000 direct current fast chargers (DCFC). (Executive Order B-48-18)[8]

By 2030:

- Having 5 million ZEVs on the road. (Executive Order B-48-18)

By 2035:

- Transitioning 100 percent of new sales of passenger vehicles and trucks to ZEVs.
- Transitioning 100 percent of operating drayage trucks to zero-emission.

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[6] This includes, Executive Order B-16-12, SB 350 (de Leon, Chapter 547, Statues of 2017), Executive Order B-48-18, Executive Order N-79-20, SB 676, and AB 841.

[7] Brown, Edmund G., Executive Order B-16-12 (Mar 23, 2012), available at https://www.ca.gov/archive/gov39/2012/03/23/news17472/index.html

[8] Brown, Edmund G., Executive Order B-48-18 (Jan. 26, 2018), available at https://www.library.ca.gov/wp-content/uploads/GovernmentPublications/executive-order-proclamation/39-B-48-18.pdf

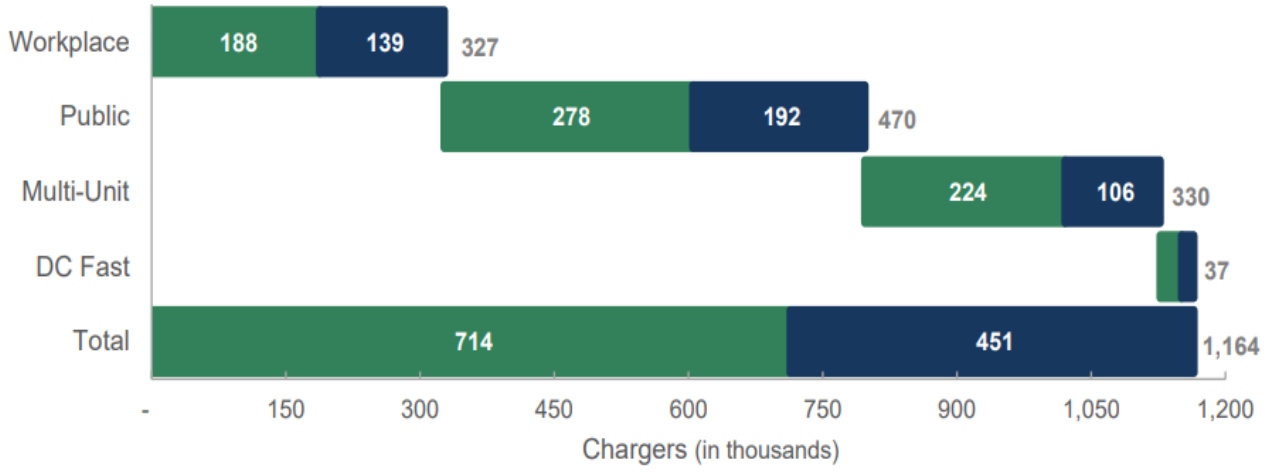
- Transitioning 100 percent of operating off-road vehicles and equipment to zero-emission everywhere feasible. (Executive Order N-79-20)[9]

By 2045:

- Transitioning 100 percent of operating medium-duty and heavy-duty (MDHD) trucks and buses to zero emission everywhere feasible. (Executive order N-79-20)

The California Energy Commission's AB 2127 charging needs assessment[10] indicates that by 2030, over 700,000 public and shared private EV chargers are needed to support 5 million light-duty ZEVs (per Executive Order B-16-12), nearly 1.2 million EV chargers are needed to support the 8 million light-duty ZEVs anticipate according to the 2020 Mobile Source Strategy[11] by the California Air Resources Board (CARB) and an additional 157,000 EV chargers are needed to support 180,000 medium-duty and heavy-duty ZEVs.[12] It should be noted that the Strike Force has adopted these findings as its goal for the deployment of charging infrastructure which was the result of Strike Force's Goal Setting Workgroup.

Figure 1: AB 2127 Projected EV Chargers for 8 Million EVs in 2030



Source: CEC's AB 2127 Report

Green bars indicate the charger need for 5 million EVs, blue bars represent the additional charger need for 8 million EVs, and text labels in gray at the rightmost end of each bar indicate the total charger need for 8 million EVs.

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[9] Newsome, Gavin, Executive order N-79-20 (Sept. 23, 2022), available at https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf

[10] California Energy Commission, "Assembly Bill 2127 Electric Vehicle Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030" (Jul. 14, 2021), available at https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127

[11] California Air Resources Board, "2020 Mobile Source Strategy" (Oct. 28, 2021), available at https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy

[12] The AB2127 report also found over 700,000 public and shared private EV chargers are needed to support 5 million light-duty ZEVs.

Report Structure

The EWG took the approach of addressing various topics that intersect with EV charging in priority communities. The topics addressed also reflect the composition of the EWG, its participants and their backgrounds, and the desire to direct attention a range of issues in charging for transportation electrification.

The Report begins with an overarching discussion of equity and definitions of equity in EV charging. That is followed by nine sections organized around specific focus areas to describe how the definitions of equity play out in those areas, with each section addressing context for the focus area, followed by, metrics, benefits, and strategies and recommendations that were identified by the EWG participants. This convention lends itself to transparency required to address specific areas regardless of market segment or community status. The Report is meant to be a tool, and the structure is designed to present opportunities where Strike Force members other stakeholders can impact decision making and change.

The focus areas for discussion include:

- Light-Duty Vehicle Charging at Home
- Light-Duty Vehicle Charging Away from Home
- Medium- and Heavy-Duty Vehicle Charging
- Shared Mobility and Micromobility Charging
- Access to Emerging and Advanced Technologies
- Investments and Community Wealth
- Workforce and Jobs
- Electric Vehicle Supply Equipment Supply Chain Businesses
- Community Awareness and Education

CHAPTER 2:
Defining Equity

Overarching Equity Considerations

Environmental Imperative

Transportation accounts for more than 50 percent of the state's greenhouse gas (GHG) emissions (when accounting for fuel extraction, production, and combustion), more than 80 percent of smog-forming nitrogen oxide pollution, and 95 percent of toxic diesel particulate matter. Reducing air pollution is important to address health inequities, given that air quality burdens fall disproportionately on vulnerable communities. EVs and charging infrastructure are a key solution to the state's air quality issues, especially in low-income communities and communities of color that suffer greater exposure to harmful air pollution. EVs, and the charging infrastructure to support them, must be rapidly deployed in those Environmental Justice (EJ) communities most burdened by transportation pollution to bring people in those communities' relief from the health-harming effects of fossil fuel, particularly diesel, tailpipe pollution.

Socioeconomic Imperative

In addition to pollution reduction, EVs may provide economic benefits in the form of fuel and maintenance cost savings for drivers and fleets, which contribute to lower total cost of ownership across many EV segments. These economic benefits could be especially impactful for low-income commuters, consumers, fleets, and truck drivers. However, accessing those benefits requires an up-front investment in the vehicle and charging infrastructure. Those without access to the capital to invest could be cut off from accessing EVs and effectively left behind in the transition to electrified transportation in the absence of policy interventions. In addition, the installation, maintenance, and ownership of charging stations is an opportunity to create local jobs and revenues, as well as build wealth. Without intentional support, those opportunities will be difficult to access for the transitioning workers, small businesses, and others who stand to benefit most from investments in charging infrastructure.

The California Air Resources Board (CARB) 2022 Scoping Plan notes that throughout the state's history of public health and environmental protection, "racist and discriminatory practices such as redlining have resulted in low-income [communities] and communities of color being disproportionately located near and exposed to health hazards and pollution burdens."[13] Accordingly, strategies to address climate change and air pollution must address the needs of affected communities. Moreover, care must be taken to ensure the transition to a

[13] California Air Resources Board, "Draft 2022 Scoping Plan Update" (May 20, 2022), available at https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf

zero-emissions economy, including zero-emission transportation sector, "is affordable and does not further disadvantage low-income communities and communities of color."[14]

Definition of Equity

In the Pacific Southwest Region University Transportation Center report, "Assessing the Impact of Equity Work in Transportation," report authors share how interviewees in the study described why it is necessary to create consensus on a definition of equity:

> *Without a clear, shared definition, [participants] noted that it was difficult for organizations to do meaningful equity work. […] Defining equity is foundational to informing goals and actions that are targeted, transparent, and measurable. A lack of clarity around equity definition and goals can lead to a phenomenon known as "performative equity work" which participants characterized to only mean "outreach" to communities or added as a last-minute consideration, something often called "retrofitting." "Authentic equity work", in contrast, was described by the participants as "demonstrably improving the living conditions of historically oppressed communities". Authentic equity work results in meaningful change to those most impacted. The practice of authentic equitable planning and policy development requires a commitment to a long process of individual, interpersonal, cultural, and organizational reframing.*[15]

The EWG identified that equity is the sustained prioritization of investment in and advancement of justice in communities and among people that are marginalized and have historically borne and currently bear the burdens of society's systems and structures. The EWG further noted that a shift in power structures and access to decision-making and self-determination by burdened communities must be part of the process to addressing inequities. Centering equity is necessarily a departure from business as usual because the usual way of doing things is what created inequities in the first place.

About Communities

At the same time, the Strike Force acknowledges that equity must be centered in the build-out of this infrastructure for priority communities[16], which means that low-income communities (LICs) as identified per Assembly Bill 1550, disadvantaged communities (DACs) per Senate Bill 535, pollution-burdened Environmental Justice (EJ) communities, and communities of color get first-in-line priority for funds and receive funding at a level to meaningfully deliver environmental, health, and socioeconomic benefits from these investments.

Definition of EV Charging Equity

Communities subjected to historic disproportionality of burdens and inadequate benefits must be prioritized and first in line for the complete transition to EV infrastructure from planning,

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[14] *Ibid.*

[15] Rebolloso McCullough, Sarah and Sequoia Erasmus, "Assessing the Impact of Equity Work in Transportation" (2021), Pacific Southwest Region Transportation Center, available at https://escholarship.org/uc/item/2sq7k9cn

[16] California Air Resources Board, "California Climate Investments Priority Populations 2022 CES 4.0" (May 2022), available at https://www.arb.ca.gov/cci-communityinvestments

development, installation, access, and EV supply chains. Understanding and equitably delivering this transition includes:

- **Recognitional Equity** – Communities have values and history. Communities have the capacity to express their choices, preferences, and are self-determining. External entities should recognize, respect, and weave community expressions of its needs and simultaneously create space for community driven processes in the EV infrastructure space and ensure communities are not displaced nor divided by vehicle infrastructure, car dependency, and vehicle traffic, even by zero-emission vehicles. EV charging installation, operation, and service should build and sustain community wealth.
- **Procedural Equity** – From planning to service, procedural equity in EV charging requires inclusive, accessible, authentic engagement and representation in EV infrastructure policies, programs, projects, and use. EV infrastructure decisions must be community-driven while recognizing historical, cultural, and institutional community dynamics for long-term EV charger assets.
- **Distributional Equity** – Underserved communities have not received the complete suite of resources that ensure community success, especially those with the highest need. Resources for EV charging, including funding allocations, must be distributed to those communities with the highest need first and at a level the community requires so they do not expend scarce community resources or rely on resources the community does not have. Distributional equity creates opportunities for people and communities to participate in the EV charging infrastructure supply/value chain, operations, service, and ownership and minimizes potential negative impacts of EV charging and use.

CHAPTER 3:
Light-Duty Vehicle Charging at Home

Context

Light-duty vehicle charging programs must provide access to charging in low-income and underserved communities for both individual and shared vehicles where people live, work, and play. Most drivers of EVs - which include battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEVs) - charge their vehicles overnight at a residence using Level 1 and Level 2 charging equipment.[17] Seventy-nine percent of EV owners reside in unattached, single-family homes (SFH), compared to 58 percent of households living in unattached, SFH statewide,[18] and unattached single-family housing is generally a logistically easier place to install home charging.

The convenience, reliability, and low cost of LDV charging at a home or residence are among the benefits of owning an EV. Access to these benefits contributes to the increased rate of EV adoption. However, charging access at home is not widely available, and the lack of availability is a barrier to many low-income households adopting an EV, hindering progress on state goals.[19]At the same time, low-income households, who typically spend one third of their take-home income on transportation,[20] could benefit greatly from the fuel cost savings that charging at home can provide.

In 2022, the California Energy Commission (CEC) published the "Home Charging Access in California" report to understand home charging through a survey of residential parking facilities. Figure 2 contains the results of the survey of over 1,300 responses. For multi-family housing (MFH), on-street (free) parking was the most widely available option followed by MFH parking lots (reserved spaces). The essential nature of charging at home underscores the need for programs to increase access to charging at homes, including those in very dense neighborhoods, while prioritizing low-income drivers and residents of multifamily housing who face higher barriers to installing home charging.

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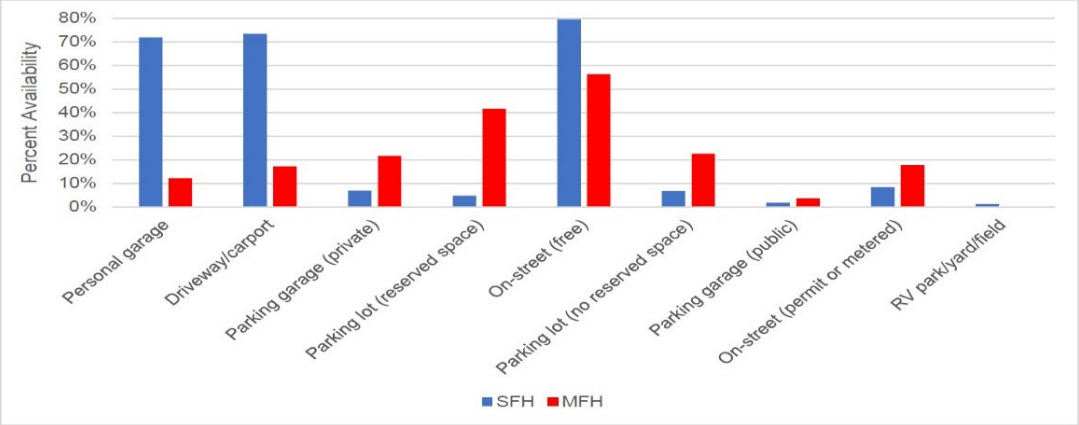
17 Alternative Fuels Data Center, "Charging Electric Vehicles at Home," U.S. Department of Energy Office of Energy Efficiency & Renewable Energy, available at https://afdc.energy.gov/fuels/electricity_charging_home.html

18 California Energy Commission, "2019 California Vehicle Survey," available at https://www.energy.ca.gov/data-reports/surveys/california-vehicle-survey

19 California Energy Commission, "Home Charging Access in California" (Jan. 2022), available at https://www.energy.ca.gov/sites/default/files/2022-01/CEC-600-2022-021.pdf

20 Rice, Lorien, "Transportation Spending BY Low Income Households: Lessons from the San Francisco Bay Area" (2004), Public Policy Institute of California, available at https://www.ppic.org/content/pubs/report/R_704LRR.pdf

Figure 2: Reported Available Parking Options by Housing Type[21]



Source: "Home Charging Access in California" (https://www.energy.ca.gov/sites/default/files/2022-01/CEC-600-2022-021.pdf)

Nearly 50 percent of Californians reside in MFH and about 20 percent of the state's LDV vehicle fleet is located at these residences.[22] Without being able to charge overnight at home, people living in MFH residences remain very unlikely to convert to EVs. Providing charging reliability at home is the most influential way to encourage consumers to purchase EVs. Deploying EV charging infrastructure across the nation, while successful in some sectors and markets, is largely behind in MFH properties especially in low- and moderate-income housing communities. Existing electrical panel capacity is a significant limiting factor in MFH. MFH properties most likely to have 60 amps of power available for EV charging were constructed after 1980 (the electrical panel is more likely to have a higher amp rating and ground circuit fault indicator (GCFI) breakers).[23] As such, providing charging at MFH could be prohibitively expensive for older buildings and creative solutions are needed to provide charging access to residents of those buildings. Solutions such as Level 2 chargers conveniently located nearby, subsidized, pre-paid charge cards for low-income families to pay for DCFC, and priority parking spots for EV car sharing are some solutions. However, additional solutions are needed to address the diversity of MFH stock and the diversity of their residents.

In addition to the access implications of housing type and charging costs, programs must address of "charging deserts"[24] that currently exist by income levels and could worsen if enhanced levels of investment do not reach underinvested areas. A recent report by the Rocky

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21 California Energy Commission, "Home Charging Access in California" (Jan. 2022), available at https://www.energy.ca.gov/sites/default/files/2022-01/CEC-600-2022-021.pdf

22 Baldwin, Sara, Amanda Myers, Michael O'Boyle, "Increasing Electric Vehicle Charging Access at Multi-Unit Dwellings: Workshop Summary Report" (Sept. 2020), Energy Innovation Policy &Technology LLC, available at https://energyinnovation.org/wp-content/uploads/2020/09/Increasing-Electric-Vehicle-Charging-at-Multi-Unit-Dwellings_FINAL3.pdf

23 Bryan, Sherry Lee and Mahlon Aldridge, "Innovation in Electric Vehicle Charging for Multi-Unit Dwellings: Community Innovation On-Ramp Grant Final Report" (Nov. 4, 2020), Ecology Action prepared for East Bay Community Energy, available as TN# 235942 on CEC docket no. 20-TRAN-04 https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=20-TRAN-04

24 Transportation Evolved, "Why EV Gentrification Is Leading To Urban Charging Deserts – And How Ride Sharing Could Help," available at https://www.transportevolved.com/articles/why-ev-gentrification-is-leading-to-urban-charging-deserts-and-how-ride-sharing-could-help

Mountain Institute identifies areas in Los Angeles to demonstrate the disparity between EV charging infrastructure and median income. [25] Entire swathes of Los Angeles have "little to no EV infrastructure, and they are areas that have traditionally been disinvested. They are also the areas with poorest health, poor health care, and the lowest median income." [26]Those finding of disparity in EV charging deployment are consistent with the findings of the CEC in the SB 1000 report discussed in the next chapter.

At the same time, simply deploying EV charging stations in underserved neighborhoods is not an optimal solution because these technological additions can lead to real gentrification, and may be seen as signs of gentrification instead of progress to benefit the community's residents.[27] Some community members may be warry of charging deployment in their area because they fear the technology will increase property values and attract more wealthy residents to the neighborhood, ultimately driving up rents and increasing the risk that longtime residents will be forced out.[28] The people in communities who have suffered historic burdens will only realize the benefits of investment if those longtime residents are able to remain in the communities.[29]

All levels of government have a role to play in enabling or directly creating policies to protect community members from displacement due to gentrification.[30] Protective measures salient to EV charging development include labor and community wealth building measures, which are discussed in later chapters. Protective measures also include neighborhood stabilization policies, such as community land trusts and renter protections.[31]

Benefits

- Increased access to charging, giving more drivers the option of adopting an EV.
- Increased equity in charging experience, affordability of charging, and access to benefits among drivers, regardless of housing type or income.
- Potential to use EVs set up for power export to bolster community resilience.

Metrics

- Percent and number of priority community households with charging at home, including MFH, and workplace[32], broken down by shared vs non-shared chargers and by charger power level.

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25 Klock-McCook, Edward J, et al., "EV Charging for All" (2021), RMI available at https://rmi.org/insight/ev-charging-for-all/

26 *Ibid.*

27 Dorazio, Justin, "Localized Anti-Displacement Policies: Ways to Combat the Effects of Gentrification and Lack of Affordable Housing" (Sept. 26 2022), Center for American Progress, available at https://www.americanprogress.org/article/localized-anti-displacement-policies/

28 "How Electric Cars Can Promote Environmental Justice, Not Gentrification" (Feb. 1 2021), Centered Technology News From the Midwest, available at https://centered.tech/students-examine-how-ev-infrastructure-can-promote-environmental-justice-not-gentrification/

29 Dorazio, Justin, "Localized Anti-Displacement Policies: Ways to Combat the Effects of Gentrification and Lack of Affordable Housing" (Sept. 26 2022), Center for American Progress, available at https://www.americanprogress.org/article/localized-anti-displacement-policies/

30 *Ibid.*

31 *Ibid.*

32 Cooke, David, "Survey Shows Preference for EVs, Barriers Faced by Different Racial Groups" (Sept. 8, 2022), Union of Concerned Scientists, available at https://blog.ucsusa.org/dave-cooke/survey-shows-preference-for-evs-barriers-faced-by-different-racial-groups/

- Distribution of charging stations provided as a community resource (e.g., at a community center or publicly accessible charging, including overnight and streetside charging) and proximity of that charging to the homes it is intended to serve.
- Percent uptime of chargers in priority communities.
- Track and analyze the implementation of anti-displacement measures, including community land trusts, right-of-first-refusal policies in project development.[33]
- Track and analyze measures of displacement and gentrification indicators including rent increases, business tenancy/vacancy, and demographic turnover.
- Benchmark charging costs of residential drivers, MFH residents in buildings on commercial rates, and public charging that serves drivers without access to charging at home.
- Benchmark utilization of shared chargers in MFH alongside demand for charging to avoid lack of access and conflicts due to too many people using too few connectors. For public chargers intended to serve MFH, track who is using the chargers to determine extent of use by drivers who are not MFH community members and impact on MFH community access to charging.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Leverage existing community needs assessments to determine the costs and benefits of installing home chargers or develop a plan to assess local needs and resources.
- Implement programs and rates that incentivize charging that benefits the electricity grid to lower charging costs for drivers.
- Outreach to property owners and managers to share information on the benefits of installing charging stations as amenities for obtaining Leadership in Energy and Environmental Design (LEED) points for their properties.
- Update relevant building codes to provide access to EV charging for all new California MFH units that have a parking space enabling significant cost savings due to lower EVSE construction/installation costs in new construction.
- Ensure EVSE incentive and rebate programs are needs-based with incentives scaling up to 100 percent for lowest-income homeowners, DACs as CalEnviroScreen (CES) scores increase, and in federally recognized tribal lands that cover 100 percent of the planning, pre-development, installation, and charger costs.
- Implement anti-displacement policies and strategies in planning documents and scoring criteria for funding opportunities.
- Expand access to charging, data sharing, and co-marketing at or near multi-family affordable housing (MFAH) in partnership and coordination with other housing programs.

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[33] Dorazio, Justin, "Localized Anti-Displacement Policies: Ways to Combat the Effects of Gentrification and Lack of Affordable Housing" (Sept. 26 2022), Center for American Progress, available at https://www.americanprogress.org/article/localized-anti-displacement-policies/

- Provide subsidized charging at MFAH through state-funded charge cards, to support charging by the lowest income residents of MFAH.
- Ensure programs serving MFAH have robust warranty, maintenance, and up-time requirements to ensure reliable, working infrastructure.
- Support programs incentivizing that MFAH parking spots have proximate electrical outlets for Level 1 charging as one option, especially where gaps persist for Level 2 charging and direct current fast charge (DCFC), or where future electrical upgrades are needed to support faster charging.
- Expand coordination with programs that enable EVSE charging, such as programs providing funding for home electrical upgrades, such as main service panel upgrades, with financial support for homeowners scaling for lowest-income homeowners
- Expand data-sharing with the utilities and state agencies related to help improve their planning efforts needed to better enable lower-income communities to install EVSE at home.

CHAPTER 4:
Light-Duty Vehicle Charging Away from Home

Context

Publicly accessible, workplace, and destination charging for light-duty EVs are critical pieces of the charging ecosystem to increase charging access for drivers who need to supplement their home charging, or who do not currently have access to home charging. Public and workplace charging programs must ensure that the physical locations and configurations of charging do not negatively impact other aspects of people's safety, wellbeing, or livelihood. Access to charging for priority communities should also consider the affordability, payment options, and reliability of charging.

The report, "California Electric Vehicle Infrastructure Deployment Assessment: Senate Bill 1000 Report: Increasing Access to Electric Vehicle Infrastructure for All" (SB 1000 Report) indicates that fewer public Level 2 chargers are deployed per capita in low-income communities statewide.[34]

The SB 1000 report further states that "…preliminary distribution analysis indicates that more public EV infrastructure investments and deployments may need to be targeted in low-income communities and high population-density neighborhoods to enable more proportionate infrastructure deployment throughout the state."

Additionally, about 27 percent of Californians live in an apartment.[35] Of that, approximately 72 percent are within low-income communities.[36]

The cost of charging is a critical equity issue and component of charging access. Pricing structures for public chargers are not uniform and are costly especially for low-income users. The state requires for the sale of electricity as a fuel to be on a price per kilowatt-hour basis. However, some are charged fees or fees after a certain period of charging for free. Generally, Level 1 or Level 2 charging is typically less expensive than DCFC. The unevenness in the ability to charge at home or at work furthers equity implications.[37]

In addition to the access implications of charging costs; programs, and policies to advance charging access must proactively protect communities against gentrification as discussed in Chapter 3.

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[34] California Energy Commission, "SB 1000 Electric Vehicle Infrastructure Deployment Assessment" (Dec. 30, 2020), available at https://www.energy.ca.gov/publications/2020/california-electric-vehicle-infrastructure-deployment-assessment-senate-bill

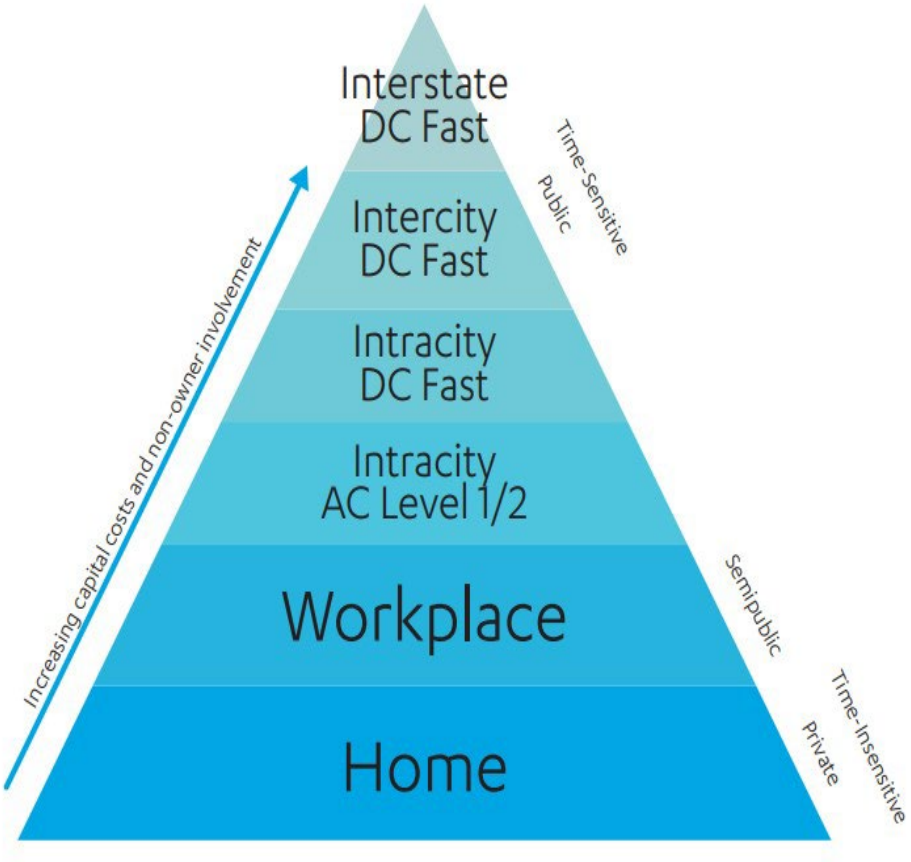
[35] U.S. Census Bureau 2014 – 2018 American Community Survey Total Population in Occupied Housing Units by Tenure by Units in Structure 5-Year Estimates.

[36] California Energy Commission staff analysis using U.S. Census Bureau 2014 – 2018 American Community Survey Estimates. Low-income communities are defined as census tracts with median household incomes at or below 80 percent of the statewide median income or with median household incomes at or below the threshold designated as low income by the Department of Housing and Community Development's list of state income limits adopted pursuant to Section 50093.

[37] California Energy Commission, "SB 1000 Electric Vehicle Infrastructure Deployment Assessment" (Dec. 30, 2020), available at https://www.energy.ca.gov/publications/2020/california-electric-vehicle-infrastructure-deployment-assessment-senate-bill

Investments in and the prioritization of safety at public charging sites is important. State incentive funding including the states' National Electric Vehicle Infrastructure Deployment Plan (NEVI)[38] also articulate how critical public safety is during charging events.

Figure 3 Charging Away from Home[39]



Source: UCLA Luskin Center

Effective January 1, 2023[40], EV charging infrastructure requirements for new parking lots will increase such that 20 percent of the total parking spaces must be EV capable. Approximately 25 percent of EV capable spaces will require the installation of Level 2 or DCFCs. Still, that will leave 75 percent of spaces at those locations' incapable of EV charging, which could leave some drivers behind.

K-12 schools are viewed as community assets and can serve multiple community functions and purposes. To address the opportunity to meet the state's electrification and climate change

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38 California Department of Transportation and California Energy Commission, "California's Deployment Plan for the National Electric Vehicle Infrastructure Programs" (Aug. 2022), available at http://rebuildingca.ca.gov/static/2022-ca-nevi-deployment-plan-a11y-8acc5dc59e4a797c873f28e1bfb74805.pdf

39 Winn, Ryan, "Electric Vehicle Charging at Work: Understanding Workplace PEV Charging Behavior to Inform Pricing Policy and Investment Decisions" (Mar. 2019), University of Los Angeles Luskin Center for Innovation, available at https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/EV_Charging_at_Work.pdf

40 Building Standards Commission, "2022 Title 24 Code Changes" California Department of General Services, available at https://www.dgs.ca.gov/BSC/Resources/2022-Title-24-California-Code-Changes

goals, EV chargers in schools was prioritized in legislation[41]. EV Charge Schools by PG&E represents one program that expands charging away-from home opportunity.[42]

Benefits

- Provides access to charging to those without home charging or who need to supplement home charging.
- Reduces and/or eliminates EV charging range anxiety.
- Visibility of public stations can build awareness of the availability of public charging, socialize the idea of owning an EV and give drivers confidence to take longer trips, unlocking the possibility of adopting an EV for more drivers especially in priority communities.
- Provides the opportunity to charge at places that drivers visit regularly to make their travel experiences better.
- Increase access to charging for a wider range of groups.

Metrics

- Number of public charging stations in priority communities, broken down by power output and by location type (e.g., community, corridor, or popular destination).
- Benchmark charging prices and enforcement of pricing transparency and affordability standards.
- Establish community-defined metrics to ensure charging infrastructure benefits in DAC/LIC communities are reaching community members.
- Public charger usage by community members using pre-pay cards and/or survey data.
- Percent uptime and downtime of chargers in priority communities.
- Implementation of anti-displacement/gentrification policies and measures.
- Implementation of physical safety best practices at public charging sites.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Learn and understand travel patterns of EV drivers from low-income/pollution-burdened communities and identify location/stops away from home. Use GIS tools, along with community consultation, to identify potential charging sites based on priority or preference.
- Award planning grants to communities and fund implementation.
- Use additional community engagement to ensure the benefits of the charging infrastructure are maximized.

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[41] Burke, Autumn, "A.B. 1082 Transportation Electrification: Electric Vehicle Charging Infrastructure: School Facilities and Other Educational Institutions" (Oct 2017), California State Assembly, available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB1082

[42] Pacific Gas & Electric, "EV Charge Schools" (2021), available at https://www.pge.com/pge_global/common/pdfs/small-medium-business/energy-alternatives/clean-vehicles/ev-charge-network/electric-vehicle-charging/EVChargeSchools_FactSheet.pdf

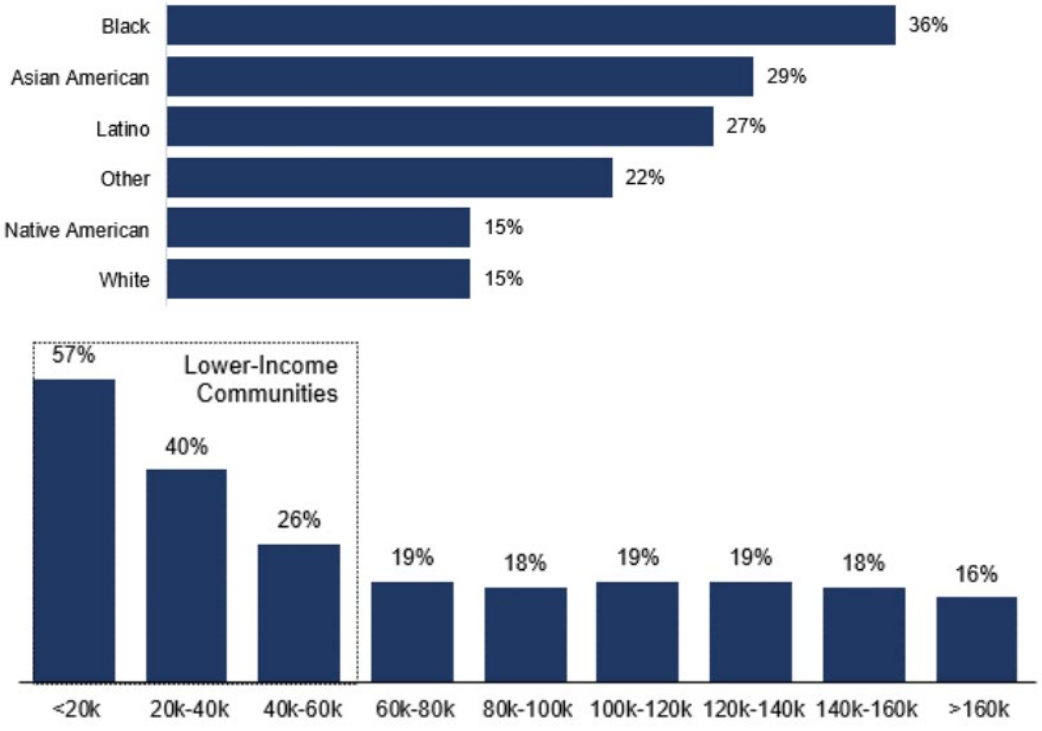
- Work with the federal Department of Energy/Department of Transportation EV charging maps to implement real time feedback on chargers that require EVSE maintenance.
- Implement payment options that are accessible to unbanked populations, including chip readers for pre-paid cash cards.
- Rapidly expand subsidized and prepaid EV charge cards, with financial support scaling for lowest-income EV owners.
- Ensure EVSE programs are paired and co-marketed with EV rebate programs that ideally scale for lowest-income residents to help prevent gentrification.
- Expand programs incentivizing charging at "community connections," such as workplaces; public schools, libraries, places of worship, and other community facilities.
- Develop public private partnership that results in similar cost as home charging (e.g., at churches, schools, hospitals, etc.)
- Use investments to build community wealth, as discussed in Chapter 8.

CHAPTER 5:
Medium- and Heavy-Duty Vehicle Charging

Context

Medium-duty and heavy-duty (MDHD) vehicles, including trucks, buses, and freight equipment, constitute a relatively small number of vehicles in operation, but produce a large amount of health-harming air pollution due to their high per-mile emissions and intense duty cycles. Thus, the potential benefits from electrifying these vehicles are great. MDHD electric vehicles deployed in place of diesel vehicles in pollution-burdened communities can help reduce the health-harming vehicle pollution in those areas, which are often low-income communities or communities of color (see Figure 4). Charging programs, policies, and investments must target the electrification of MDHD vehicles, routes, and corridors that operate in the most pollution-burdened, priority communities to provide immediate air pollution relief. It is important to note that community benefits result from diesel pollution reduction, not necessarily the charger location.

Figure 4: Transportation-Related Diesel Pollution Exposure by Race and Income



Source: CEC analysis of census and CES data.[43]

[43] California Energy Commission, "2022-2023 Investment Plan Update for Clean Transportation Program – Revised Staff Report" (Sept. 29, 2022), available at https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program/clean-transportation-program-investment-7

Figures show percent of residents living in high diesel PM exposure communities by race (top) and income (bottom). High diesel PM exposure communities are census tracts that score in the highest seventy-fifth percentile of census tracts for diesel PM. Most (90 percent of) diesel Pm emissions come from vehicles.

As with light-duty charging programs, MDHD EV and charging programs can ensure meaningful involvement from pollution-burdened communities and can benefit from discussions in this area with CARB, the air districts, and AB 617 communities.

To the extent charging sites are private locations, state-funded incentive projects must ensure that small businesses, and particularly those owned by people of color and women are included at-scale in the disbursement of funds, given that larger and enterprise-level organizations with staff capacity to compete for funds are typically the most successful participants in the application process for incentive programs. This is especially important in extending the impact of state dollars by ensuring that those with the fewest resources and/or highest barriers to participation are included given that larger and enterprise-level organizations may be more likely to make these investments even without leveraging state incentive funds.[44]

Benefits

- Pollution reduction in communities.
- Access for drivers/workers to MDHD vehicles and infrastructure.
- Workforce training and development opportunities.

Metrics

- Adherence of agencies and companies to community engagement best practices.
- Investments in Community Air Protection (AB 617) Communities.
- Number of electric vehicle miles traveled (eVMT) by all on- and off-road MDHD vehicles and equipment in priority communities.
- Share of charging infrastructure sited at behind-the-fence private facilities versus publicly accessible facilities.
- Share of incentives claimed by small-, minority-owned, and women-owned business enterprises.
- Share of projects installed by vendors who are small-, minority-owned, and women-owned business enterprises.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Award planning grants to communities and fund implementation.
- Decision makers at all levels (government, public, private sectors) ensure that policies and program decisions reflect the input and perspectives of frontline workers and fence-line communities.

[44] Personal communications with GRID Alternatives.

- Prioritize the setting of truck traffic thresholds as part of investment rubrics so charging stations do not increase truck traffic and the safety imperative is employed in frontline communities.
- Use GIS tools, along with community consultation, to narrow down potential charging sites based on community priority, pollution-burden reduction, and other benefits to low-income communities of color.
- Educate truck drivers on the changes in workflow due to the transition to EVs. Use clear messaging while educating stakeholders.
- Prioritize installation and use of electric infrastructure at all loading docks in all new warehouses/facilities or in large facilities.
- Support charge infrastructure mandates, such as building codes that require new facilities to be built ready for zero-emission trucks or equipment.
- Use incentives, regulations, and permitting decisions to accelerate the shift to a zero emissions system.
- Create funding opportunities to incubate or build capacity among small-, minority-owned, and women-owned business enterprises operating as vendors in the MDHD EV space; reduce barriers to their participation in state-funded programs.
- Ensure that MDHD EV programs target both enterprise-level end-users, as well as small and medium-sized businesses, and set minimum goals for their participation as well as for minority-, woman-, and disabled veteran-owned businesses. Set formal benchmarks for or create carveouts for projects sited at or accessible to small-, minority-owned, and women-owned business enterprises.
- Set formal benchmarks for or create carveouts for a minimum share of work to be performed by vendors who are small-, minority-owned, and women-owned business enterprises.
- Ensure programs include vendors of the same categories and encourages competitive bidding and/or allow participants to opt into receiving services from small-, minority-owned, women-owned, and service-disabled veteran-owned businesses.
- Analyze investments and impacts of EnergIIZE Commercial Vehicles' EV Jump Start Lane results.
- Require fleets to share charging data with stakeholders, including utilities who need the data for grid planning purposes.

CHAPTER 6:
Shared Mobility and Micromobility Charging

Context

Electrified and shared mobility programs that intentionally serve lower-income communities are important. They operate with EVs and serve multiple transportation and access purposes, especially where individual passenger vehicle ownership is not preferred or is prohibitively expensive an option. A recent report[45] looks at the principal costs of such programs, one of which is charging infrastructure. Electric utilities in some areas are already engaged in providing support for building-out charging infrastructure for EV car share programs, including in underserved communities.

In addition to car sharing, ride-hailing services (run by transportation network companies or TNCs) represent an important vehicle use case to electrify from the rider perspective and from the driver perspective (see Chapter 6). CARB estimates that California TNC vehicles accounted for 1.2 percent of all light-duty vehicle miles traveled in 2018. In 2018, the CPUC and the CARB began implementing the nation's first law requiring TNCs to reduce emissions. Senate Bill 1014 (Skinner, Chapter 369, Statutes of 2018), the Clean Miles Standard, requires TNCs to reduce GHG emissions on a per-passenger-mile basis and sets annual targets for electric vehicle miles traveled (eVMT), starting with 2 percent in 2023 and increasing to 90 percent by 2030,[46] and directs TNCs to provide EVs for their fleets.

With respect to TNC charging, Figure 5 illustrates the charging habits of TNC drivers compared to non-TNC drivers in Los Angeles, California. TNC drivers have a substantially higher propensity to charge between 12 a.m. and 10 a.m. There is also a noticeable dip in charging events for TNC drivers around 8 p.m., whereas this is the busiest charging time for non-TNC drivers. Charging behavior data from San Francisco and San Diego showed similar patterns.[47] A majority of TNC drivers are people of color, and many are low-income.[48] Those TNC drivers, along operators of other shared mobility services, stand to benefit greatly from the reduced fuel and maintenance costs of EVs relative to gasoline vehicles, but require support to make the transition to electric platforms. Moreover, the differences in charging behaviors between TNC and non-TNC drivers indicates that differing program designs may allow programs to serve these differing kinds of drivers.

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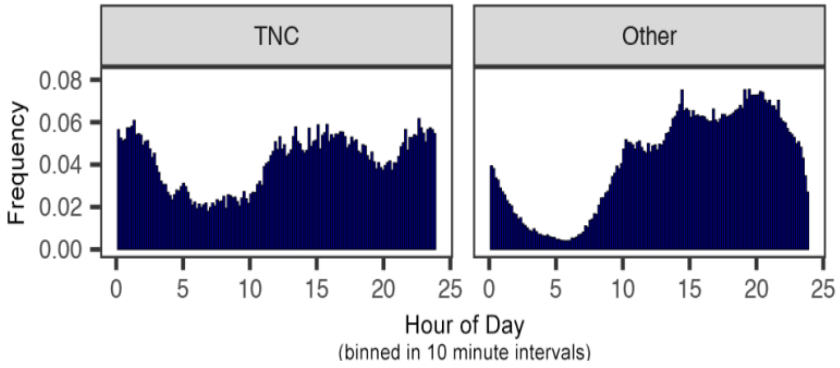
[45] Interstate Renewable Energy Council, "Paving the Way: Enabling Equitable Electric Vehicle Shared Mobility Programs" (Feb. 2. 2022), available at https://irecusa.org/resources/paving-the-way-enabling-equitable-electric-vehicle-shared-mobility-programs/

[46] California Air Resources Board, "Clean Miles Standard Workshop: Proposed Regulation Targets" (Nov. 19, 2020), available at https://ww2.arb.ca.gov/sites/default/files/2020-11/CMS%20Workshop%206_public%20%28002%29.pdf

[47] California Energy Commission, "Assembly Bill 2127 Electric Vehicle Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030" (Jul. 14, 2021), available at https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127

[48] Reich, Michael, "Pay Passengers and Profits: Effects of Employee Status for California TNC Drivers" (Oct. 2020), University of California Berkeley Institute for Research on Labor and Employment Working Paper No. 107-20, available at https://irle.berkeley.edu/files/2020/10/Pay-Passengers-and-Profits.pdf

Figure 5: Daily Charging Profile of TNC and Non-TNC Drivers in Los Angeles



There are also EV charging lessons to be learned from projects such as the Green Raiteros Program[49] (Figure 8), Miocar[50] in the San Joaquin Valley, Our Community CarShare[51] in Sacramento, and BlueLA[52] in Los Angeles.

While not covered in the scope of work for the EWG in the SF Terms of Reference, EWG participants were interested in including micromobility, including e-bikes, and charging as a zero-emission transportation option as part of this Report. Micromobility serves as critical and affordable options for access to services, jobs, schools, retail, recreation, etc. It also serves as an important connection to other EV options and is a tool in the zero-emission transportation planning toolbox, especially in lower-income communities. Reduced vehicle miles traveled, and greenhouse gas emissions are also complementary benefits of zero-emission shared and micromobility options. Additionally, CARB has held public work group meetings to discuss e-bikes as part of an incentive project under consideration.[53]

Benefits

- Provide a full/equitable suite of transportation options, access, and connectivity.
- Share in the transportation electrification economy.
- Achievement of full quality of life through enhanced electric mobility options.

Metrics

- Track charging sessions/events, costs, and reliability.
- Geographic distribution of electric car shares and charging, service areas for micromobility as a service, micromobility incentives (e.g., e-bike purchase) including at frequented locations such as local businesses, grocery stores, medical facilities, etc.

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[49] Shared-Use Mobility Center and Latino Environmental Advancement and Policy Institute, "The Story of Green Raiteros: A Shared & Electric Lifeline for California Farmworkers" (Feb. 2020), available at https://learn.sharedusemobilitycenter.org/wp-content/uploads/GreenRaiteros_0220.pdf

[50] Miocar homepage, available at https://miocar.org/

[51] Sacramento Metropolitan Air Quality Management District, "Our Community CarShare," available at https://www.airquality.org/Our-Community-CarShare/Apply-for-Our-CarShare

[52] BlueLA homepage, avaialble at https://blinkmobility.com/

[53] California Air Resources Board, "Electric Bicycle Incentives Project Workgroup 1 Public Comment Summary" (Sept, 27, 2021), available at https://ww2.arb.ca.gov/sites/default/files/2021-09/Electric%20Bicycle%20Incentives%20Project%20Workgroup%201%20Comments%20ADA.pdf

- Number and share of ride-hailing vehicles that are EVs.
- Number of rides provided, and passengers driven per ride.
- Reported net TNC income of driver by vehicle/fuel type.
- Availability and class of bike lanes in priority communities.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Expand zero-emission ride sharing programs and charging in low-income communities.
- Programs should include multiple sources of funding to support the costs of charging infrastructure.
- Incorporate equity programs within state and local policy planning.
- Public utility commissions (PUCs) and utilities must build sustainable EV charging infrastructure programs with the long run-in mind. PUCs should coordinate with both public and private funding to integrate EV infrastructure.
- Ensure that historic portfolio of electric mobility options include vehicles that can accommodate LMI residents with various levels of physical abilities
- Partner with public housing developments.[54]
- Encourage local authorities having jurisdiction, particularly planning departments and boards, to consider equity indicators for their plans to build-out bike lanes and other related infrastructure to better support the expansion of micromobility in priority communities.
- Provide further incentives and programs supporting fuel switching for shared mobility options.
- Analyze the impacts of vehicle maintenance and fuel costs on individual TNC drivers' financial wellbeing and the business case for the ride-hailing industry.

[54] See e.g., Housing Authority of the City of Los Angeles, "Electric Car Share Pilot Program Launches in Rancho San Pedro" (Mar. 11, 2020), available at https://www.hacla.org/en/news/electric-car-share-pilot-program-launches-rancho-san-pedro

CHAPTER 7:
Access to Emerging and Advanced Technologies

Context

Lower cost charging solutions and increased flexibility are essential to growing California's EV market and meeting the state's EV and charging infrastructure goals, particularly as the state invests in communities where charging infrastructure is unavailable or very limited. As charger technologies and services advance, new emergent charger technologies, such as vehicle-to-building and vehicle-to-grid charger chargers and others, should be demonstrated with early deployment in priority communities where immediate technological and economic benefits can accrue in these neighborhoods. Vehicle-grid integration solutions can help lower the cost of electricity, and therefore the cost of charging, or even create revenue streams for the EV driver.

The CPUC recently issued Resolution E-5192 that established a process and a budget for utilities to propose VGI pilot projects pursuant to Decision 20-12-029.[55] D.20-12-029 requires that large electrical corporations develop and implement strategies to prioritize environmental and social justice (ESJ) communities in siting and benefits of SB 676 pilots including working with community-based organizations. Projects approved under this resolution must have clearly identified benefits and metrics that can immediately accrue to underserved communities while the advanced technologies and markets develop and scale.

Benefits

- Access to emerging technologies and early market participation.
- Decreased cost of electricity as transportation fuel and/or creating of revenues from vehicle-grid integration.
- Increased community awareness of advanced and emerging technologies.
- Potential to use EVs set up for power export to bolster community resilience.

Metrics

- Number of emerging and advanced charger technology research, development, and demonstration (RD&D) projects and investments in priority communities.
- Priority community engagement, project/funding design, and data collection for emerging charger technology funding initiatives by state entities.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.

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[55] California Public Utilities Commission Energy Division, Resolution E-5192 (May 5, 2022), available at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M474/K369/474369017.PDF

- Priority community engagement, project/funding design, and data collection for emerging charger technology funding initiatives by state entities.
- Immediately deploy "vehicle-to-X" projects in priority communities, high fire hazard severity zones, communities experiencing high incidences of public safety power shut off events, utility disconnections, etc.
- Conduct annual technical and merit review forums like the DOE program[56] for projects located in priority communities.
- Promote freight transport over the road vehicles (including last-mile delivery, short-haul trucks, and long-haul tractors), zero emissions vehicle technology which is already commercially available.
- Promote emerging technologies, including " zero emission rail, zero emission container shipping, and some container handling equipment" which are in earlier commercial stages.
- Work with community members to implement emerging technology demonstration projects.
- Partner with community organizations.

[56] Office of Energy Efficiency & Renewable Energy, "Vehicle Technologies Annual Merit Review," Department of Energy, available at https://www.energy.gov/eere/vehicles/vehicle-technologies-annual-merit-review

CHAPTER 8:
Investments and Community Wealth

Context

The up-front cost of charging infrastructure, particularly for direct ownership of EV charging infrastructure, presents a significant barrier to electric vehicle adoption among low-income communities and small businesses. A 2019 study found the cost of a residential Level 2 charger ranges from just under $400 to almost $700, while commercial Level 2 models cost between $2,500 and $4,900.[57] The cost of DC fast chargers can range from $20,000 for a lower-powered, 50-kilowatt (kW) charger up to $150,000 for a higher-powered, 300 kW charger.[58] Trenching, wiring, and panel or transformer upgrades, project mitigations may be required, adding to the total infrastructure cost, which generally scales with the power output of the station. Labor, permitting, and taxes are also added to the project bill. Ongoing costs, including data and networking charges (if applicable), maintenance, and electricity costs, can exacerbate challenges in covering the costs of a charging station. This challenge is particularly acute in priority communities where incentive funding for charging assets alone may not be sufficient to make a project viable.

The cost for chargers decreased following a typical experience curve for the manufacturing of new technology between 2010 and 2019. However, current supply chain disruptions and inflation may disrupt this trajectory, leading to higher charging costs in the near term.

The CEC's EV Jump Start is one of four funding lanes under their EnergIIZE Commercial Vehicles Program. The application process is competitive, and applications are scored on criteria demonstrating project readiness, cost effectiveness, and community benefit. Commercial fleet users interested in EV charging infrastructure for MDHD electric vehicles may be eligible for up to $750,000 funding per project.[59]

On November 15, 2021, President Biden signed the Infrastructure Investment and Jobs Act (IIJA), which included significant funding to advance EV charging infrastructure in the form of formula program and discretionary grant funding. California's share from the National Electric Vehicle Infrastructure (NEVI) Formula Program is estimated at $384 million over five years. California agencies and communities will also be eligible to apply for additional funding as part of the $2.5 billion discretionary Charging and Fueling Infrastructure grant program.[60]

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57 Nelder, Chris and Emily Rogers, "Reducing EV Charging Infrastructure Costs" (2019), RMI, available at https://rmi.org/wp-content/uploads/2020/01/RMI-EV-Charging-Infrastructure-Costs.pdf

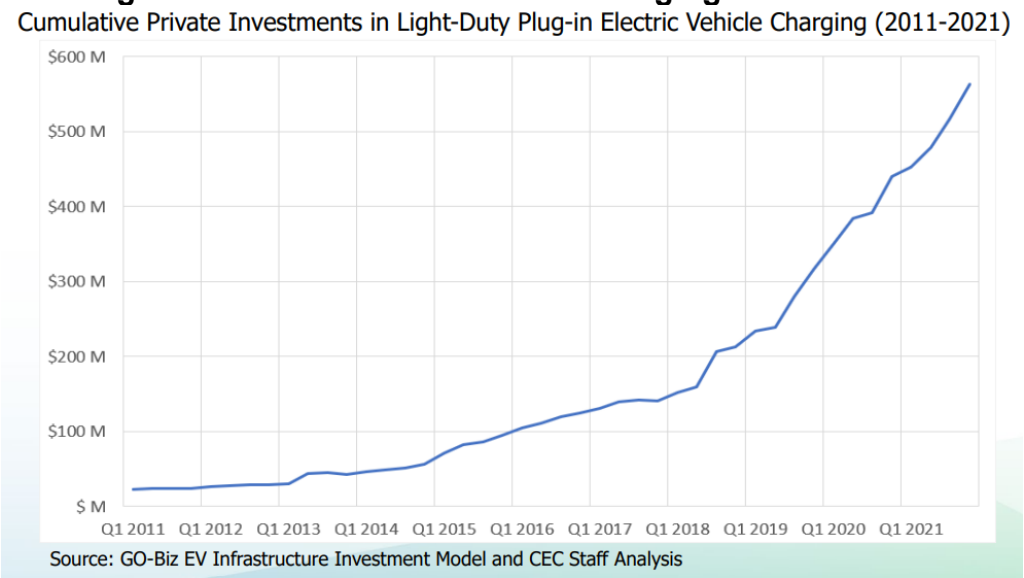
58 *Ibid.*

59 EnergIIZE, "Incentives for Commercial Zero-Emission Vehicles Infrastructure," available at https://energiize.org/

60 California State Transportation Agency, "CalSTA Infrastructure Investment and Jobs Act (IIJA) Implementation," available at https://calsta.ca.gov/subject-areas/infrastructure-investment-act

In addition to public incentive programs, private sector investments in infrastructure have steadily increased since 2011 (Figure 6) with significant private investment recently announced by a major vehicle OEM.[61]

Figure 6: Private Investments in Charging Infrastructure



To read more about other charger incentive programs in the state, see DOE's Alternative Fuel Data Center.[62]

While the availability of funding is incredibly important and necessary, how that funding is distributed is equally important. To advance equity and avoid perpetuating histories of underinvestment and harm, low-income, pollution-burdened, and communities of color must be first in line to direct how those funds can benefit their communities. In addition to directing funding toward community-determined needs, community members or small businesses should have the option to own the infrastructure, depending on the charging market segment. Communities should participate in the discussions on the use of any revenues generated at community-owned stations. Investment in communities should prioritize a hyperlocal workforce that give the opportunity for community members to create wealth through participation in prevailing-wage jobs.[63]

Benefits

- Direct investments in priority communities.
- Wealth creation through ownership of assets and participation in EV sector jobs.
- Economic sustainability, job creation, and community transition.

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61 https://insideevs-com.cdn.ampproject.org/c/s/insideevs.com/news/539127/gm-750million-investment-ev-charging/amp/

62 https://afdc.energy.gov/fuels/electricity.html

63 More on workforce development is in Chapter 9

Metrics

- Fraction of programs earmarked for investing in priority communities.
- Inclusion of operations and maintenance as eligible project costs for EV charging.
- Pathways to ownership by community members of EV infrastructure installations in priority communities including the number/percent of installations owned by the people in the communities those stations serve.
- Number and percentage of publicly funded charges that are locally owned or owned by people of color or minority-owned businesses.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Use EV Charging Financial Analysis Tools[64] for local businesses to track the financial performance of EV charging projects.
- Obtain feedback from community members to share with investors on what directly benefits low-income communities through their investments.
- Imbed workforce training and employment services in infrastructure investments so that services are directly connected to the jobs created.[65]
- Prioritize incentive spending on frontline workers conducting business in environmental justice communities.
- Direct all incentive monies to those in communities in need. Companies and individuals that are well-resourced and have the means to purchase electric vehicle charging equipment should be ineligible for incentive funding.
- Select EV charging project locations in low-income communities that will boost local economies.[66]
- Encourage project administrators to provide a directory of companies that may serve as potential vendors or vendors' subcontractors, with specific callouts for small-, minority-owned businesses, and those headquartered in DACs.
- Support capacity-building efforts for minority-owned businesses, particularly those located in DACs, that incubate new small businesses or grow the ability of existing businesses to participate in state-funded programs as vendors.
- Provide funds for upskilling minority-owned electrical contracting companies for relevant staff to become EVITP certified.
- Expand information related to gap and bridge loan finance for EV charging infrastructure to help reduce financial barriers to direct ownership for smaller vendors.

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64 Atlas Public Policy, "EV Charging Financial Analysis Tool" (Apr. 2019), available at https://atlaspolicy.com/ev-charging-financial-analysis-tool/

65 Moving Forward Network, "NESCAUM/Multi-State Advanced Clean Truck Rule Action Plan Equity and Environmental Justice Recommendations," available at https://www.nescaum.org/files/mhdzev-attachments/NESCAUM_%20Multi-State%20Advance%20Clean%20Truck%20Rule%20Equity%20and%20Environmental%20Justice%20Recommendations.pdf

66 U.S. Department of Transportation, "Community Benefits of Rural Electrification," available at https://www.transportation.gov/rural/ev/toolkit/ev-benefits-and-challenges/community-benefits

- Proactively seek out and provide technical assistance to potential vendors for EV charging incentive programs, specifically targeted minority-owned businesses, and set benchmarks for their participation.
- Needs assessments and barriers studies where necessary, leveraging interviews, focus groups, and surveys.
- Provide full cost coverage for EV charging infrastructure via incentive programs when the applicant is a part of a targeted community.
- Develop program that sets to reach metrics above as goals for program.

CHAPTER 9:
Workforce and Jobs

Context

The EV market includes "the human workforce, including supply chains, needed to design, manufacture, sell, construct and install, service, and maintain EVs, EV infrastructure, EV distribution systems, dealerships, energy systems, networks of charging and fueling stations, and other ZEV-related build."[67] The subset of the market related to charging infrastructure buildout, specifically, is significant.

The Strike Forces' Jobs Assessment Workgroup (JAW) commissioned a study on the workforce associated with EVSE installation. In June 2021, "Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation" was published. The report reflects the work, analysis, and study by the JAW as prepared by Energy and Environmental Research Associates, LLC.[68] This report assesses the high-road workforce needs associated with LDV and MDHD vehicle charging infrastructure build-out.

Workforce estimates from this report, derived from bottom-up surveys from industry professionals, show that California's statewide LDV deployment goals, and the associated charging infrastructure would generate workforce needs of up to 62,400 job-years between 2021 and 2030[69] (Table 1). The greatest workforce needs for LDV infrastructure would be for electricians (21.3 percent of job-years), general contractors (21 percent of job-years), planning and design (20 percent of job-years), and electrical contractors (15 percent of job-years).

[67] Governor's Office of Business and Economic Development, "California Zero-Emission Vehicle Market Development Strategy" (Feb. 2021), available at https://static.business.ca.gov/wp-content/uploads/2021/02/ZEV_Strategy_Feb2021.pdf

[68] Carr, Edward W, James J. Winebrake, and Samuel Winebrake, "Workforce Projections to support Battery Electric Vehicle Charging Infrastructure" (Jun. 8, 2021), Energy and Environmental Research Associates, LLC, prepared for Electric Transportation Community Development Corporation, available at https://caletc.com/assets/files/Workforce-ProjectionstoSupportBatteryElectricVehicleChargingInfrastructureInstallation-Final202106082.pdf

[69] Workforce needs are estimated based on analysis of survey responses, provided in person-days, and converted to job-years assuming a full-time equivalent (FTE) of 2080 hours and 8-hour workdays. Note that job-years cannot always be directly translated into a number of jobs created, but instead help to describe the demand for work. One job-year is equivalent to one person performing a job for one year, or two people performing the same job for half a year, and so on. The skills required are largely identical to existing trades and likely additive to existing work.

Table 1: LDV Workforce Projections between 2021 to 2030

Light-Duty High - No New Build, No renewables	Level 2 (Job-years)	DC Fast (Job-years)	Sum (Job-years)
Planning and Design	11,740	750	**12,490**
General Contracting	12,510	560	**13,080**
Utility Linework	4,080	140	**4,220**
Electrical Contracting	9,150	190	**9,340**
Electrician	12,590	730	**13,320**
Admin	4,970	200	**5,170**
Legal	910	90	**1,000**
Other	3,630	170	**3,800**
Sum	**59,580**	**2,840**	**62,420**

Source: "Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation"

Workforce estimates from this report for projected MDHD vehicle growth estimate that the associated charging infrastructure in California would generate up to 9,100 additional job-years (Table 2), in addition to the LDV charging infrastructure workforce needs.

Table 2: MDHD Workforce Projections between 2021 and 2030

CA M/HDV	Sum (Job-years)
Planning and Design	2,410
General Contracting	1,800
Utility Linework	450
Electrical Contracting	620
Electrician	2,330
Admin	630
Legal	300
Other	560
Sum	**9,090**

Source: "Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation"

Among other factors noted in the report, priority communities are identified by high unemployment rates, low levels of education, and low incomes. When discussing the necessary increase of equity in future electrification, the participation of priority communities within the EV charger installation workforce must be considered. The main expenses (around75 percent) when installing electric vehicle charging infrastructure are accounted for by either contracting or electrical work. Important jobs within these areas include electricians, journey-level line workers, and urban/regional planners. The Bureau of Labor Statistics (BLS) states that electricians and journey-level line workers typically need a high school diploma when entering the workforce, while urban/regional planners require a master's degree. A high

school diploma or equivalent was the most common "typical entry-level education requirement" in the US in 2019, demonstrating that, typically, these EV infrastructure occupations reflect the average US employment entry-level education requirements. Jobs such as electricians and journey-level line workers provide good-quality opportunities with median national hourly wages of $27.36/hour ($32.95 in California) and $36.07 ($49.50 in California), respectively, while still being available to a majority of members within priority communities due to the low entry-level education requirements. This is possible due to the pairing of low entry-level education with apprenticeships and on-the-job training provided in these occupations.

SB 589 (Hueso, Ch. 732, Stats. 2021)[70] requires the preparation of a statewide assessment of EV charging infrastructure (AB 2127 Report) and requires the following:

> "The assessment shall expand on the commission's electric vehicle infrastructure projections to consider all necessary charging infrastructure, including, but not limited to, the chargers, make-ready electrical equipment, and supporting hardware and software, all vehicle categories, road, highway, and offroad electrification, port and airport electrification, and other programs to accelerate the adoption of electric vehicles to meet the goals described in subdivision (a). The assessment shall examine existing and future infrastructure needs throughout California, including in low-income communities."

Chargers deployed in priority communities need to have high operability rates in order to have confidence in the transition to transportation electrification. In a recent assessment of the operability of a charging, ChargerHelp![71] found that 34 percent of chargers (Level 2 and DCFC) were not able to dispense any charge. Consistently broken chargers in priority communities will not support this transition. Funding for charger maintenance and the skilled workforce to provide the repairs should be included when chargers are commissioned for there to be equitable reliability throughout priority communities. The EVSE technical workforce to maintain California's threshold of inoperable charging stations will need to grow exponentially within the next couple of years. The maintenance and repairs of EVSE brings an opportunity for California to scale EVSE jobs that could be utilized for the reskilling of people in priority communities and people transitioning out of dissolving or fossil fuel industries including diagnostics and data collection for those entering the workforce.

Benefits

- Community ownership of projects and long-term charger assets.
- Local job creation, economic development, and source of household income.
- Extends charger reliability if operations/maintenance skills are retained in the community.

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[70] Hueso, Ben, "SB-589 Air Pollution: Alternative Vehicles and Vehicle Infrastructure" (Oct. 2021), available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB589

[71] Personal communications with ChargerHelp! regarding their pending study which has not been published.

Metrics

- Number of local priority community EVSE trainees, certifications, and job hires.
- Number of project labor agreements and targeted hires in non-urban areas for EVSE installations.
- Number of community owned and operated EVSE projects.
- Job quality[72] assessments from EV charger incentive programs in priority communities.
- Demographic data of trainees and fulltime jobs created or supported by EV charging infrastructure incentive programs

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Recruiting and hiring practices that target talented and diverse job applicants to fill professional (e.g., engineers, accountants, planners) and management jobs in the local community.
- Incentive recipient hires local construction workers for infrastructure projects, increasing work force development in communities in need, boosting both economic development and EV infrastructure.
- Ensure that the transition to zero emissions transportation does not displace workers from the fossil fuel sector through additional career training.
- Ensure all primary and adjacent labor, truckers, equipment operators, warehouse and logistics workers, and other displaced workers can transition into emerging technologies through career training/professional development.
- Make funds contingent upon companies agreeing to improve workplace standards, union neutrality, and non-interference policies.
- Investments in freight-sector electrification directly benefit local companies and factories investing in innovation, by training employees on zero-emission innovation.
- Resolve underlying misclassification of drivers as independent contractors, leading to increased responsibility on industry rather than individual drivers for charging installations.
- Strengthen workers' rights to organize for fair wages, benefits, and a say in automation-related decisions.
- Establish programs that require participating companies to raise industry standards on labor laws across the supply chain that improve workplace environment for all workers.
- Diversify the EV Market with workforce diversity and inclusion to widen opportunities for new technology.

We recommend that technical colleges and other community-based organizations are prioritized to ensure training, testing, and certifying is accessible and affordable.

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[72] The ideal job pays a family-sustaining wage, offers comprehensive employer-provided benefits, values worker voice, and provides security, fair scheduling, a safe and healthy work environment, and pathways for career advancement.

CHAPTER 10:
EVSE Supply Chain Businesses

Context

As noted in California's ZEV Market Development Strategy[73], the EVSE supply chain is inclusive of the innovation segment (engineering, design, universities); manufacture, production, and assembly; project work (construction, installation, commissioning); operations and service; and through end-of-life and replacement. Public and private entities identified as having a direct role in the EVSE supply chain, some of which are noted below, must each center equity in its approach:

- California Infrastructure and Economic Development Bank - Finance support for ZEV expansion, including EVSE manufacturing, and provide lending to enable women and minority owned businesses and develop lending parameters to ensure equitable access to highroad jobs.
- Governor's Office of Business and Economic Development - Business support including streamlining target economic expansion in underserved communities with a focus on minority and small owned businesses/suppliers.
- State Treasurer's Office - Finance support for ZEV projects including EV charging infrastructure and provide lending to facilitate access to capital for small businesses including supplemental support in priority communities.
- Electric Utilities/Load Serving Entities - Provide electricity to EV vehicles/chargers safely, reliably, affordably, and in a timely manner; provide customer support and education; ensure electric rates remain affordable; fill in market gaps to support infrastructure development in priority communities and contracting to encourage minority and women owned business.
- Trade Associations - Represent collective business interest to streamline policymaking input, workforce development, pursue employees from priority communities, and bring in minority owned businesses.
- Manufacturers and Supply Chain – Deliver ZE technologies and products to all in an equitable manner.
- New Market Entrants – Bring new vehicles, charging infrastructure, components, software, innovation, and human behavior solutions, introduce disruptive technologies and business models, and increase access to priority communities.
- Organized Labor - Deliver job quality essential to a high-road EVSE industry, and the skilled workforce needed to build it; promote high-quality jobs for EVSE workers; generate equity and opportunity in the EVSE labor market through industry partnerships that join business, labor, education, community, and social services.

[73] Governor's Office of Business and Economic Development, "California Zero-Emission Vehicle Market Development Strategy" (Feb. 2021), available at https://static.business.ca.gov/wp-content/uploads/2021/02/ZEV_Strategy_Feb2021.pdf

Benefits

- Economic, business, and market expansion for certified local businesses and economies.

Metrics

- Number of small, women, minority, disadvantaged certified business in priority communities.
- Dollar value of investments in certified businesses.
- Amount of project co-funding.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Place EV chargers in front of small and locally owned businesses/store fronts.
- Use GIS tools, along with community consultation, to locate priority neighborhoods to site chargers.
- Leverage "Jobs to Move America's U.S. Employment Plan" policy tool that provides technical support to increase the rate at which zero-emission vehicles and technologies are purchased and adopted by individual drivers, companies, warehouses, agencies, and corporations.
- Have public and private organizations offer grants, loans, or financial incentives to help individuals, small businesses, and low-income communities purchase both EVs and EV chargers through partnerships.

CHAPTER 11:
Community Awareness and Education

Context

Supporting community awareness, education, and consumer confidence in EVs and the charging experience in priority communities is critical. The paradigm shifts from an old, outdated refueling experience to the EV and charging experience must be sustained over time and done in a community-centric fashion. All community leaders and the EVSE industry share in the collective to learn and share the charging process and experience in a manner that communities can relate to if EV adoption is to occur.

A 2022 CEC report[74] shows that the gap in consumer awareness of home charging options could hinder EV adoption. Survey results indicate that only 11 percent of the respondents have access to a standard 120 volt plug near where they park at home *and* are aware they can use that plug to charge an EV. Simply raising awareness and educating consumers about PEV charging options could boost perceived access up to 25 percent (for all housing types together) without installing a single plug.

Even with clear benefits and increasing availability, there are consumers who are hesitant to switch to EVs. A 2022 survey conducted by Consumer Reports, Union of Concerned Scientists, EV Noire, and Green Latinos found high overall interest in EVs across racial demographics.[75] However, adoption lags in communities of color, and charging access is among the barriers preventing some EV-interested consumers from adopting an EV.[76] In addition, more Black and Latino respondents indicated maintenance and repair costs as a consideration preventing them from purchasing or leasing an EV.[77] Consumers, especially those in priority communities, must understand, that the fueling and maintenance costs of an EV is lower than a gasoline or diesel vehicle, and those savings can offset incremental up-front cost of most electric models. Over the lifetime of the vehicle, electric models for many vehicle segments, particularly LDV, have a lower total cost of ownership than a comparable internal combustion engine model. Additionally, consumers are unaware that an EV battery gets a little charge through regenerative breaking every time a driver hits the brakes.[78]

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[74] California Energy Commission, "Home Charging Access in California" (Jan. 2022), available at https://www.energy.ca.gov/sites/default/files/2022-01/CEC-600-2022-021.pdf

[75] Consumer Reports, Union of Concerned Scientist, EV Noire, and Green Latinos, "Survey Says: Considerable Interest in Electric Vehicles Across Racial, Ethnic Demographics" (Sept. 2022), available at https://www.ucsusa.org/resources/ev-survey-equity

[76] *Ibid*.

[77] *Ibid*.

[78] Toll, Micah, "Regenerative Breaking: How It Works and Is It Worth It in Small EVs?" (Apr. 24, 2018) Electrek, available at https://electrek.co/2018/04/24/regenerative-braking-how-it-works/

A comparison of research[79] about EV and EVSE perceptions shows 5 distinct areas of awareness that can be addressed in equity communities through information, tools, and community advocates: general EVSE information, cost comparisons, public charger locations, incentives, and EV/EVSE models and features.

Benefits

- Increased understanding of how EVs can fit drivers' needs and increased willingness to adopt EVs.
- Enhanced flexibility in the driving and charging experience when drivers know the variety of charging options.
- Ability of drivers to reduce fuel costs through education.

Metrics

- Community education events by type of event and attendance.
- Number and share in LICs, DACs, on tribal lands, etc.
- Count of passive educational efforts (e.g., emails, Facebook ads, bill inserts, etc.)
- Education materials available in languages relevant to priority communities.
- Number of languages translated.

Strategies and Recommendations

- Conduct comprehensive study to understand how to achieve the benefits and metrics of this chapter.
- Use a variety of ethnic media channels to spread valuable information regarding opportunities to save money in the long term with EV charging.
- Hire technicians within the local community to provide in-person training to teach customers to use the charging station.
- Coordinate outreach with individual climate and transportation programs to ensure consumer understanding, especially in neighborhoods where there is overlap with existing programs.
- Host EV truck show case and drive and ride events with supportive services available.
- Have auto and truck dealers work on addressing consumer issues such as range anxiety and charging reliability while offering incentives (guided test drives, current EV owners to serve as mentors) to welcome customers.
- Communities can award or recognize individuals, organizations, and businesses that champion EVs and EV chargers.
- Educational campaigns with youth about the health advantages EVs have compared to ICE vehicles.

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[79] Jin, Lingzhu and Peter Slowik, "Literature Review of Electric Vehicle Consumer Awareness and Outreach Activities" (Mar. 21. 2021), International Council on Clean Transportation, available at https://theicct.org/sites/default/files/publications/Consumer-EV-Awareness_ICCT_Working-Paper_23032017_vF.pdf

- Encourage efficient co-marketing and education efforts across project administrator teams; state, regional, and local government entities; utilities; and other stakeholders.
- Ensure materials are translated into enough languages to reach monolingual households.
- Provide marketing and alternative framing of the charging experience by considering/reflecting on the time it takes to recharge an EV.

CHAPTER 12: Conclusion

California cannot successfully achieve its goals to deploy 100% zero emission cars and trucks unless it undertakes an equity-centered strategy that invests first and foremost in low-income, pollution-burdened, and underserved communities and communities of color. To center equity, those communities who have been subjected to historic disproportionality of burdens and inadequate benefits must have access to decision-making and be allowed to self-determine policies and programs affecting them. Investments to accelerate the transition to a zero-emission transportation future include EV charging infrastructure. Understanding and equitably delivering this transition includes three dimensions of equity for EV charging:

- **Recognitional Equity** – Communities have values and history. Communities have the capacity to express their choices, preferences, and are self-determining. External entities should recognize, respect, and weave community expressions of its needs and simultaneously create space for community driven processes in the EV infrastructure space and ensure communities are not displaced. EV charging installation, operation, and service should build and sustain community wealth.
- **Procedural Equity** – From planning to service, procedural equity in EV charging requires inclusive, accessible, authentic engagement and representation in EV infrastructure policies, programs, projects, and use. EV infrastructure decisions must be community-driven while recognizing historical, cultural, and institutional community dynamics for long-term EV charger assets.
- **Distributional Equity** – Underserved communities have not received the complete suite of resources that ensure community success, especially those with the highest need. Resources for EV charging, including funding allocations, must be distributed to those communities with the highest need first and at a level the community requires. Distributional equity creates opportunities for people and communities to participate in the EV infrastructure supply/value chain, operations, service, and ownership and minimizes potential negative impacts of EV charging and use.

The Equity Workgroup of the Strike Force submit the information, definitions, metrics, strategies, and recommendations within this Report to inform the Strike Force and stakeholders in its effort to equity in its advocacy and other work to advance charging infrastructure in California. We recognize that the Report and strategies do not cover every aspect of EV charging equity, therefore we recommend this Report to be a living document that will be revisited and updated over time.

APPENDIX A: Resources

American Council for an Energy-Efficient Economy,	*Leading with Equity Initiative: Key Findings and Next Steps*	https://www.aceee.org/energy-equity-initiative
American Council for an Energy-Efficient Economy	*Siting Electric Vehicle Supply Equipment with Equity in Mind*	https://www.aceee.org/white-paper/2021/04/siting-electric-vehicle-supply-equipment-evse-equity-mind
Argonne National Laboratory	*Electric Vehicle Charging and the Justice40 Initiative*	https://www.anl.gov/esia/electric-vehicle-charging-equity-considerations
Avista Corp.	*Electric Vehicle Supply Equipment Pilot Final Report*	https://www.myavista.com/
Blast Point	*EV Charging Deserts: Where They Are & Why They Might Exist*	https://blastpoint.com/blog/ev-charging-deserts-where-they-are-why-they-might-exist/
California Air Resources Board	*SB 350 Education, Outreach & Engagement Strategic Roadmap: Equitable Access to Clean Transportation & Mobility Options*	https://ww2.arb.ca.gov/sites/default/files/2020-06/SB350_report_final_6.1.2020_0.pdf
California Air Resources Board	*Funding Guidelines for Agencies that Administer California Climate Investments*	Funding Guidelines for Agencies that Administer California Climate Investments
California Energy Commission	*Electric Vehicle Infrastructure Assessment (AB 2127)*	https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127
California Energy Commission	*California Electric Vehicle Infrastructure Deployment Assessment: Senate Bill 1000 Report*	https://www.energy.ca.gov/publications/2020/california-electric-vehicle-infrastructure-deployment-assessment-senate-bill
Canary Media	*How to Build an Equitable Electric Vehicle Infrastructure*	https://www.canarymedia.com/articles/how-to-build-an-equitable-electric-vehicle-infrastructure/
Center for American Progress	*Localized Anti-Displacement Policies: Ways to Combat the Effects of Gentrification and Lack of Affordable Housing*	https://www.americanprogress.org/article/localized-anti-displacement-policies/
CleanTechnica	*If We Want to See More EV Adoption, We Need to Educate the Masses*	https://cleantechnica.com/2019/03/31/if-we-want-to-see-more-ev-adoption-we-need-to-educate-the-masses/

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