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CHARGING UP THE *Central Coast*

Policy solutions to improve electric vehicle
charging access in Watsonville

JANUARY 2024
Policy Report



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16. Abstract California's goal to eliminate internal combustion engine sales by 2035 poses challenges for lower- and moderate-income residents, hindering their access to electric vehicles (EVs). Barriers include limited EV charging stations, exacerbated by lower home ownership and inadequate grid infrastructure in lower-income communities. To address this, UC Berkeley School of Law's Center for Law, Energy & the Environment (CLEE) partnered with the City of Watsonville. Due to its location, demographics, and ambitious policy goals, Watsonville represents a potential model and case study for other cities around the state grappling with how to boost EV charging infrastructure. CLEE conducted stakeholder interviews and a convening in Watsonville in May 2023, and developed a set of policy recommendations for both state and local entities to accelerate investment in EV charging infrastructure in Watsonville, which could inform other cities facing similar challenges and seeking to meet state targets and residents' needs.			
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CHARGING UP THE CENTRAL COAST

Policy solutions to improve electric vehicle charging access in Watsonville

ABOUT THIS REPORT

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	8
INTRODUCTION	12
Project Method	13
Watsonville's EV Infrastructure Deployment Could Further Federal and State Electric Vehicle Charging Policies and Programs	14
EV Charging Infrastructure Is Inequitably Distributed	16
EV CHARGING AND SUSTAINABILITY GOALS IN WATSONVILLE	19
EV CHARGING VISION FOR WATSONVILLE	22
BARRIERS AND PRIORITY POLICY SOLUTIONS	25
Barrier 1: Insufficient Planning and Mapping to Identify and Deploy EV Chargers	25
Barrier 2: High Cost of Installing, Operating and Using Chargers	30
Barrier 3: Limited Public Awareness, Education, and Outreach	33
CONCLUSION	37
APPENDIX I	40
APPENDIX II	41
State Electric Vehicle Policies and Programs	41
Federal and State Electric Vehicle Charging Policies and Programs	42
ENDNOTES	43



EXECUTIVE SUMMARY

As California seeks to achieve a statewide goal of ending the sale of internal combustion engine passenger vehicles by 2035, lower- and moderate-income residents will face acute barriers to accessing zero-emission vehicles, particularly battery-powered electric vehicles (EVs). Among these challenges is lack of access to EV charging stations. Many lower-income communities feature lower home ownership rates and higher rates of tenancy in apartment buildings, which means these residents lack a dedicated parking space with an electric outlet to charge. Those who do own garages and dedicated parking spaces may have less capital to invest in private charging and electrical upgrades. And lower-income areas often have inadequate grid infrastructure to support the electrical loads required for vehicle charging.

To address these challenges and ensure more and equitably distributed chargers across California, state and local policymakers can learn lessons from representative communities and the practical challenges they face to EV charger installation. To further this objective, UC Berkeley School of Law's Center for Law, Energy & the Environment (CLEE) partnered with Watsonville, a diverse city of 50,000 in Santa Cruz County. Due to its location, demographics, and ambitious policy goals, Watsonville represents a potential model and case study for other cities around the state grappling with how to boost zero-emission vehicle charging infrastructure.

Based on stakeholder interviews and a convening in Watsonville in May 2023, CLEE developed a set of policy recommendations for both state and local entities to accelerate investment in EV charging infrastructure in Watsonville, which could inform other cities facing similar challenges and seeking to meet state targets and residents' needs. Additionally, based on these interviews and convening, CLEE developed the following elements for a vision of ideal charging infrastructure deployment in Watsonville:

- Chargers co-located with other essential services and community hubs, such as schools and libraries and as part of microgrids that can help sustain electricity supply during grid outages and support bidirectional charging, promoting resilience in the process.
- Improved access and outreach around the stations, such as through instructions in multiple languages and with verbal guidance as well for those unable to read or unfamiliar with the technology.
- Granular data collected by public charging transactions, collated in a simple manner to encourage better siting decisions.

- Chargers available at the locations and times necessary for users in priority communities.
- Respect for the privacy of those charging, to allow people of all backgrounds to charge without fear of discrimination.

Participants identified the following three key barriers to achieving this vision, along with targeted solutions to address them:

BARRIER 1: INSUFFICIENT PLANNING AND MAPPING TO IDENTIFY AND DEPLOY EV CHARGERS

- Watsonville's City Planning Department and Public Works & Utilities Department could initiate a comprehensive mapping assessment to determine optimal and equitable charger locations based on local needs and transportation patterns.
- Local utility and city staff could explore curbside charging options, including streetlight or utility pole charging.
- City of Watsonville leaders could promote investment in mobile charging infrastructure to better serve agricultural workers or those whose work locations may change frequently.
- Watsonville's City Planning Department could revise zoning and permitting policies to require EV charger installation or EV-ready electrical infrastructure at certain priority locations.
- Watsonville's City Planning staff could encourage charger installers to include physical components that enhance equity, safety, and accessibility.

BARRIER 2: HIGH COST OF INSTALLING, OPERATING AND USING CHARGERS

- The California Public Utilities Commission (CPUC) and utility companies could implement electricity rates that reduce the cost of charging during off-peak hours and improve transparency for consumers about these rates.
- The CPUC could encourage utility companies to offer incentives for home charger installations targeted at priority communities.
- Local organizations and regional governments could continue to coordinate on grant applications to secure state and federal funding for charging infrastructure.

BARRIER 3: LIMITED PUBLIC AWARENESS, EDUCATION, AND OUTREACH

- The state transportation agencies could expand support for community-based organizations in Watsonville that conduct targeted, multi-lingual public awareness campaigns about the potential cost savings and benefits from switching to EVs

- The City of Watsonville could work with community-based organizations to support schools, car dealerships, or other community entities, to expand the distribution of information about how to use EV chargers and what options are available.
- Charging companies and utilities could provide more detailed data on charger use patterns and demographics so that the City of Watsonville can target awareness and education efforts while also informing siting for new infrastructure.



Photo Courtesy of the
City of Watsonville

INTRODUCTION

California has established concrete plans for a transition to electric vehicles (EVs). Following an executive order from Governor Newsom, in 2022 the California Air Resources Board (CARB) introduced regulations to phase out sales of new internal combustion engine vehicles by 2035.¹ Although internal combustion engine vehicles will still be on the roads after 2035, California cities will need to plan for and in some cases invest in charging infrastructure to support the substantial influx of EVs expected in the coming years.

As more Californians of all demographic and socioeconomic backgrounds adopt EVs throughout the next decade, vehicle use might outpace charging infrastructure, the related transition away from gasoline fueling infrastructure, and the complex physical, technical, and political considerations that will go into an effective and equitable infrastructure buildout.

Lower- and moderate-income Californians face particular barriers to electric vehicle and charging access, including higher initial costs; lack of convenient home, workplace and public charging; reduced range compared to gas vehicles; and fewer models available that can carry multiple passengers and equipment.² Deliberate local government-led efforts will be crucial to ensuring that these residents and communities are not left behind. Because cities and counties are more likely to have a deep understanding of local transportation needs and infrastructure, permitting and planning capacities, and challenges such as the state of local electric grids, they are often best positioned to develop and implement the solutions that are tailored to their specific circumstances. As electric vehicles become the dominant technology, available, convenient, and affordable charging will become a necessity for Californians who rely on automobiles for their travel needs. Cities across California will need both more and equitably distributed chargers so that all Californians can participate in the EV transition.

This report focuses on the challenge of inadequate charging infrastructure, which is especially pronounced for low-income individuals and families residing in apartment complexes. About 27 percent of Californians live in an apartment,³ and of that number, approximately 72 percent are within low-income communities.⁴ These multi-unit dwellings may not have a dedicated parking space to charge or ability to install a charger. As a result, residents cannot conveniently take advantage of

the opportunity to reduce air pollution in their communities⁵ and achieve lower fuel and maintenance costs from relying on electricity over gasoline, among other EV benefits.

Given these policy needs, this report focuses on the City of Watsonville for an in-depth assessment of charging infrastructure priorities, based on an evaluation of where, how many, and what types of chargers are needed, given community demographics and input. Watsonville is a diverse mid-size city with limited public transit but ambitious sustainability goals. It is the third-largest city in the Monterey Bay area, south of the San Francisco Bay Area, with a population of 51,525. Of this total, 84.3% identify as Hispanic, making it one of the most significant Hispanic-majority cities in California. The median income in the city is \$67,007, 20% lower than the state median and 30% lower than the county median.⁶ Watsonville also straddles two disadvantaged communities (DACs) as defined under Senate Bill 535 (De León, 2012), covering the majority of the southern part of the city and including the downtown area.⁷ Watsonville's largest employers are the agriculture and construction industries, employing almost 20% and 15% of the workforce respectively.⁸

CLEE partnered with the city after determining it would serve as an example for the rest of the state and had staff capacity and interest in engaging, following a series of initial conversations to align priorities and approaches. City staff agreed that this process could help them advance implementation of their climate and transportation goals.

While this report aims to provide immediate benefit to the residents of Watsonville and its EV planning process, CLEE envisions that these policy recommendations can inform approaches for other California cities facing similar challenges and sharing some of the general attributes of Watsonville, such as demographics and built environment. The outcomes of this project are to enable city government leaders and local community groups across the state to determine funding priorities, more effectively obtain federal and state grant funding, and build public support for EV charging that meets a range of community needs.

PROJECT METHOD

CLEE combined a literature review, stakeholder interviews, and a half-day workshop with city leaders and advocates to inform the policy recommendations presented in this analysis.

Stakeholder Interviews

After CLEE and Watsonville agreed to work together, CLEE conducted approximately 30 informational interviews with key local experts and stakeholders, ranging from local government officials to regional non-profit organizations. Through these interviews, CLEE assessed local EV charging needs, including general locations of charging stations and the types of chargers that might be most appropriate for the needs of different populations in Watsonville (e.g., mobile charging stations for workers who do not have a single location of employment, like agricultural

workers). Additionally, the interviews revealed an initial set of barriers and potential policy and funding solutions for Watsonville.

In-Person Workshop

On May 16, 2023, CLEE and Watsonville staff organized approximately 18 participants for a 4-hour workshop at the Watsonville Civic Plaza Community Room. The goal of the workshop was to discuss key barriers and solutions to charging infrastructure in Watsonville. Prior to the workshop, CLEE had surveyed participants for input on priority EV charging station locations and top barriers to charger installation in Watsonville. CLEE then incorporated the survey results into the meeting agenda and pre-meeting materials. CLEE had also interviewed many of the participants prior to the workshop and given them the opportunity to elaborate on their ideas and engage in conversation with others in the space.

WATSONVILLE'S EV INFRASTRUCTURE DEPLOYMENT COULD FURTHER FEDERAL AND STATE ELECTRIC VEHICLE CHARGING POLICIES AND PROGRAMS

Watsonville's need for equitable electric vehicle charging infrastructure deployment comes in the context of ambitious state and federal support. To help achieve the state's goal of phasing out sales of new internal combustion engine vehicles by 2035, the California Air Resources Board (CARB) has adopted a wide array of complementary policies and programs to stimulate demand and production of EVs and associated infrastructure. As of 2023, the most significant of these policies include:

- **Zero-emission Vehicle Regulation:** Requires light-duty automakers to sell an increasing proportion of zero-emission vehicles, from 4.5% in 2018 to 22% in 2025. In 2022, the agency set requirements for 2026 onwards, increasing from 35% in 2026 to 100% from 2035 onwards.
- **Clean Vehicle Rebate Project:** A rebate of up to \$7,500 for income-eligible customers to buy or lease a new or used zero- or low-emission light-duty vehicle. This program will transition in late 2023 into a new program that helps low- and middle-income Californians access zero-emission vehicles.⁹
- **Clean Cars 4 All:** Grants of up to \$9,500 for income-eligible residents to replace their old vehicle with a new or used zero- or low-emission light-duty vehicle.¹⁰
- **Low Carbon Fuels Standard:** A credit trading scheme that awards credits for the production of low carbon fuels and infrastructure, including the sale of electricity as a transportation fuel.¹¹

At the federal level, the key policy for promoting light-duty EV deployment is the Clean Vehicle Tax Credit, a federal tax credit of up to \$7,500 for income-eligible customers to buy or lease a new or light-duty vehicle.¹² The Inflation Reduction Act of 2022 removed individual manufacturer eligibility caps, expanded the tax credit to cover used vehicles (up to \$4,000) and commercial vehicles (up to \$40,000), while adding a manufacturer’s suggested retail price (MSRP) cap, income cap (\$150,000 for single person households and \$300,000 for families),¹³ local assembly/sourcing requirement, and the option to transfer the credit to a rebate.¹⁴

State and federal agencies have also implemented policies to spur the implementation of public and shared chargers. California’s goal of 100% zero-emission light-duty sales by 2035 may require nearly 1.2 million public and shared chargers to be deployed in-state,¹⁵ while only 93,855 were active as of December 2023.¹⁶ These federal and state policies include:

- **National Electric Vehicle Infrastructure (NEVI) Grant Program:** The Department of Transportation’s (DOT) Federal Highway Administration (FHWA) offers funding to deploy an interconnected network of public or shared electric vehicle charging stations, primarily along Alternative Fuel Corridors (AFCs). Created through the Bipartisan Infrastructure Bill of 2021, metropolitan planning organizations, public authorities, and governments are eligible.¹⁷
- **Charging and Fueling Infrastructure (CFI) Discretionary Grant Program:** The DOT’s FHWA offers funding to deploy publicly-accessible EV charging infrastructure in urban and rural communities, as well as along Alternative Fuel Corridors. The Bipartisan Infrastructure Bill of 2021 created the program and made metropolitan planning organizations, public authorities, and governments eligible to receive the funding.¹⁸
- **Clean Transportation Program:** The CEC offers \$100 million annually, primarily to electric vehicle charging infrastructure, and “will seek to provide more than 50 percent” of funds “towards projects that benefit low-income and disadvantaged communities.” As of April 2022, the agency had awarded 49% of funding to projects in low-income and/or disadvantaged communities.¹⁹ AB 2061 (Ting, 2022) required the CEC to create an assessment of the equitability of access to reliable charging stations by 2025.²⁰ Businesses, vehicle and technology manufacturers, fleet owners, consumers, and academic institutions are eligible.²¹

MEDIUM- AND HEAVY-DUTY POLICIES

Though this report focuses on policy for light-duty vehicle charging infrastructure, medium- and heavy-duty vehicle electrification will also be critical to reducing emissions and achieving EV deployment targets. Many of the policy solutions discussed in this report are applicable to the medium- and heavy-duty context, in particular for agricultural medium- or heavy-duty work vehicles that may do double duty as work transportation. Some critical state heavy-duty EV policies include:

- **Advanced Clean Truck Regulation:** Requires heavy-duty automakers to sell an increasing proportion of zero-emission vehicles, with deficits differing by vehicle class and weight.
- **Heavy-duty Vehicle Incentive Program:** Funding up to \$120,000 for the purchase of a zero- or low-emission heavy-duty vehicle.
- **Phase 2 GHG Emissions Standards:** Requires heavy-duty automakers to adhere to increasing vehicle and engine emissions performance standards until Model Year 2027.

- **Utility-funded Charger Installations:** The California Public Utilities Commission (CPUC) has also authorized the use of ratepayer funding for EV charging infrastructure investments. The three large Investor-Owned Utilities (IOUs) have policies to fund the installation of light-duty EV charging stations at workplaces, multi-unit dwellings, and some destination centers, mostly at level 2. Southern California Edison's (SCE) Charge Ready, and San Diego Gas & Electric's (SDG&E) Power Your Drive program are undergoing their second round while Pacific Gas & Electric's (PG&E) Charge Program 2 has been authorized to install approximately 2,822 chargers to add to their first round total of 4,749.²²

The federal government's Justice40 initiative set a goal to ensure that 40 percent of the overall benefits from specific federal investments benefit disadvantaged communities burdened by pollution.²³ Additionally, California's legislative measures SB 535 and AB 1550 (Gomez, 2016) require that at least 25% of the funds allocated from the Greenhouse Gas Reduction Fund be invested in projects or programs that provide benefits to low-income households and disadvantaged communities. This scope includes initiatives related to sustainable transportation, clean energy, energy efficiency, and other climate-related projects.

The state has also recognised the need to promote the equitable uptake of EVs, given the disproportionate burden of vehicle exhaust on lower-income areas and the financial challenges individuals face in transitioning to EVs. California has taken a number of steps towards promoting EV uptake in these communities, including:

- **2022 CARB Scoping Plan:** CARB stated that it has ensured equity and affordability in its scoping plan, "prioritiz[ing] working with the communities most impacted [by air pollution] to ensure that these strategies address their needs." CARB also highlighted that "the state has an important role to play in providing financial incentives, especially to low-income consumers, to allow for uptake of clean technologies."²⁴
- **2022 CARB ZEV Regulation Update:** The update to CARB's ZEV regulation highlighted the need for a "coordinated, collaborative, and cross-cutting approach" to ensure an equitable transition, including a focus on charging and grid infrastructure.²⁵
- **Executive Order B-44-18:** In 2018, then-governor Jerry Brown declared that electric vehicle charging must be made "affordable and more accessible to all drivers."²⁶
- **Executive Order N-79-20:** In 2020, Governor Gavin Newsom directed state agencies "to accelerate deployment of affordable fueling and charging options for zero-emission vehicles, in ways that serve all communities and in particular low-income and disadvantaged communities."²⁷
- **SB 350 Study, Part B:** CARB's low-income barriers study as mandated by SB 350 (de León, 2015) acknowledged that for clean transportation, "barriers low-income residents and disadvantaged communities face are magnified."²⁸

EV CHARGING INFRASTRUCTURE IS INEQUITABLY DISTRIBUTED

Access to public chargers is increasingly important for low-income consumers, who are more likely to purchase used vehicles if they were to adopt EVs and consequently rely heavily on public chargers due to the typically more limited range of used vehicles. These consumers also often reside in rented housing and multi-unit dwellings where public charger availability is even more lacking.²⁹ For example, state initiatives such as the California Energy Commission's SB 1000 assessment report have found that public chargers are unevenly distributed across state air districts and counties and are co-located with populations and plug-in electric vehicles.³⁰ This uneven deployment of charging stations has perpetuated existing inequities as low-income communities – with fewer current EV drivers – generally attract less infrastructure investment, which discourages these residents from adopting EVs.³¹ Additionally, while about half of all public Level 2 and Direct Current Fast Chargers (DCFCs) in the state are deployed in low-income communities, low-income communities have fewer Level 2 chargers per capita, as represented in figure 1.

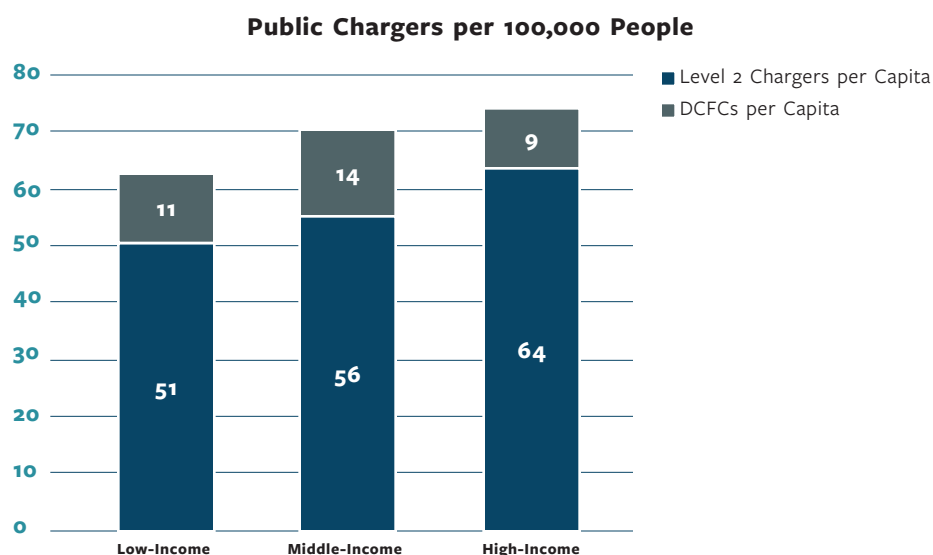


Figure 1: Public Level 2 and DCFC Per Capita by Community Income Level.³² Source: California Energy Commission Staff Analysis using U.S. Census Bureau 2014 – 2018 American Community Survey Median Household Income 5-Year Estimates and U.S. Department of Energy's Alternative Fuels Data Center Station Locator charger data as of July 23, 2020.

Many lower-income communities feature lower home ownership rates and higher rates of tenancy in apartment buildings. Even those residents who do own homes in these communities often face financial constraints that impede their ability to invest in charging infrastructure. Consequently, developers will need to place more charging stations in multifamily building parking lots and public parking areas, presenting barriers related to financing, permitting, and split incentives between landlords and tenants regarding building electrification upgrades. Finally, in lower-income areas, grid infrastructure is sometimes inadequate to support the electrical loads required for vehicle charging. Recent studies have documented

that public charger access disparities are more pronounced in communities with below-median household incomes, as well as those with predominantly Black and Hispanic populations. These disparities are particularly significant in areas with a higher prevalence of multi-unit housing, where residential charging is less common.³³



EV CHARGING AND SUSTAINABILITY GOALS IN WATSONVILLE

Watsonville city leaders have ambitious goals to expand the number and distribution of chargers to encompass residential neighborhoods and business districts, building on the city's sustainability goals. These broader goals include a 2021 action by the Watsonville City Council to achieve net-negative emissions by 2030 as part of the Climate-Safe California Campaign.³⁴ To reach this target, the city developed the 2030 Climate Action and Adaptation Plan (CAAP), which includes a three-pronged approach to the initiatives of climate action, climate adaptation, and climate restoration.

Watsonville will need action to reduce transportation emissions, specifically from gas-powered cars and trucks, which represent the largest source of greenhouse gas emissions at 53% of the city's total (the other main sources include natural gas, electricity use, and food waste disposal).³⁵ As a result, the city set up two CAAP strategies and programs to target carbon emissions from transportation: 'Facilitating EV Infrastructure' and 'Getting People into EVs - Equitably'.³⁶ Planned actions to increase the scale and equitability of EV infrastructure include strengthening public-private partnerships, creating charging station-friendly codes, and working with nonprofits and Central Coast Community Energy (3CE). The immediate actions of 2022 involved installing 13 new EV charging stations. Ultimately, the CAAP had a target of creating at least 20 EV charging facilities in public parking areas, defined as city-owned lots and parking spaces, by 2030.³⁷

As of November 2023, the City of Watsonville has 82 EV charging ports, including 56 Level 2 and 26 DCFCs, out of which 18 DCFCs are Tesla superchargers, and 6 level 2 chargers are at a Cadillac car dealership.³⁸ All of this existing charging infrastructure is either private or concentrated in downtown Watsonville and Watsonville airport, resulting in limited accessibility for residents to charge overnight, the most common and convenient time of day to charge for most EV drivers. To address this gap, participants at the May convening noted aspirational plans to expand the number and locations of chargers across the city to both residential areas and office locations. City staff are also in discussions with the local utility, Pacific Gas & Electric (PG&E), to pilot streetlight and utility pole charging stations to better serve disadvantaged communities, including renters and multi-unit dwelling residents.

To accommodate the transition to EVs, upgrades to the existing city power grid capacity will be necessary – in particular for Level 2 and DCFCs. Meanwhile, Santa Cruz County in general has a total of 476 Level 2 chargers at workplace and public sites and 47 DCFCs. The installers of this charging infrastructure intend to serve roughly 260,000 residents in the county (as of July 2022). The state, through its AB 2127 assessment,³⁹ forecasted a need in the county of 4,230 and 260 publicly accessible chargers for Level 2 and DC Fast respectively by 2030. The city and county will therefore need swift action to establish a robust EV charging infrastructure network in order to successfully meet AB 2127's 2030 and 2035 projections.

This infrastructure build-out will require significant new sources of funding and financing. Current efforts to increase EV charging stations have relied primarily on various grants and rebate programs for the installation. But they do not fund the operational and maintenance costs that agencies incur to sustain the EV charging. For example, the Central Coast Incentive Project, under CALeVIP and in partnership with Central Coast Community Energy (3CE), provided \$700,000 total in rebates for the purchase and installation of EV chargers in the Monterey, San Benito, and Santa Cruz counties.⁴⁰ Rebates were up to \$6,500 per connector and \$80,000 per charger for Level 2 and DC Fast Chargers respectively. Additionally, 41% of the project's total funding was reserved or issued to disadvantaged communities. Another incentive offered by 3CE is the *Electrify Your Ride Program*, which provides transportation electrification rebates and support for EVs (both new and used), Level 2 EV chargers, and EV readiness projects (electrical work associated with charger installation).⁴¹ 3CE customers can qualify to receive up to \$4,700 for equipment and the installation of EV chargers.⁴² More recently, the California Energy Commission established a \$30M incentive project dedicated to building EV charging stations in disadvantaged, low-income, and tribal communities across Eastern California, the Central Valley, and the Central Coast – including Watsonville.⁴³



EV CHARGING VISION FOR WATSONVILLE

Based on the expert interviews and input from the stakeholder convening, CLEE developed the following vision for electric vehicle charging infrastructure in Watsonville. At a larger scale, the California Energy Commission estimated that the Monterey region will need well over 8,000 publicly accessible chargers by 2030, including level 1 and 2 chargers at multi-unit dwellings, workplace and public level 2 chargers, and public fast chargers.⁴⁴ For Watsonville's share of this infrastructure, participants described a roll out that would anticipate future driving trends, where shared vehicles could lead to a reduced number of private vehicles. Policy makers and industry would also seek to identify and anticipate future technologies to avoid the plans becoming outdated as soon charging and vehicle technology advances.

Participants also expressed planning and usage transparency and improved outreach. For example, participants wanted the granular data collected by public charging transactions to be collated in a simple manner to encourage better siting decisions and easier-to-understand pricing. At the same time, they wanted the government to respect the privacy of those charging, to allow people of all backgrounds to charge without fear of discrimination or compromised identity. They also described improving access and outreach around the stations, such as through instructions in multiple languages and with verbal guidance as well for those unable to read. This guidance could also help people otherwise unfamiliar with the technology. Ultimately, they wanted chargers to be available at the locations and times necessary for users of all backgrounds.

In terms of specific locations for chargers, participants described co-locating them with other essential services and community hubs, such as schools and libraries and as part of microgrids that can help sustain electricity supply during grid outages, promoting resilience in the process (though several participants noted that this deployment could require significant upgrades to the existing distribution system). A sufficient number of chargers supporting microgrids could potentially generate their own electricity through bidirectional charging. Participants and city staff also noted that mobile charging and charging in locations other than traditional urban centers or workplaces could be important for Watsonville's large agricultural workforce and other residents who would otherwise struggle to access these fixed chargers. Whereas much of the recent infrastructure deployment has been focused on downtown Watsonville, participants emphasized the importance of distributing and dispersing chargers throughout the city to meet equity goals. Streetlight charging could also be

an option to meet low-income residents where they live and align with known patterns of EV charging.

On the public sector side, any publicly funded chargers require administrative capacity, which can mean significant burden on city staff, both to apply for grants and then administer the funds and maintain the sites. An equitable vision for charging deployment would therefore include sufficient resources for public sector management.



BARRIERS AND PRIORITY POLICY SOLUTIONS

Convening participants identified a number of barriers to achieving this vision for affordable and accessible charging throughout Watsonville, ranging from infrastructure availability to funding cost to the lack of planning and cooperation. This section describes the most significant barriers and top-priority policy solutions that convening participants and expert interviewees identified to overcome them.

BARRIER 1: INSUFFICIENT PLANNING AND MAPPING TO IDENTIFY AND DEPLOY EV CHARGERS

The City of Watsonville currently lacks sufficient and well-distributed EV charging infrastructure to meet the needs of all residents, particularly lower-income ones. Part of the challenge is the lack of comprehensive information about where charging would best support low-income individuals and families to access EVs. These low-income individuals are more likely to reside in multifamily dwellings or housing units without dedicated parking and are less likely to receive employment at workplaces with EV charging infrastructure.⁴⁵ A large number of vehicles parked per housing unit or overcrowding could also make it difficult to access EV chargers. These conditions reduce low-income households' ability to charge in general, and also at preferential times when they can fully reap the cost advantages of EV adoption in their own community. Additional accessibility challenges arise for those with disabilities or limited mobility. The city currently lacks a comprehensive map and set of incentives to address the lack of investment to date in these critical areas.

Solution 1: Watsonville's City Planning Department and Public Works & Utilities Department, with financial support from outside entities, could initiate a comprehensive mapping assessment to determine optimal and equitable charger locations based on local needs and transportation patterns.

To accomplish the mapping, city leaders could form a dedicated working group to design a mapping tool for identifying charging infrastructure sites

that meet the needs of a diverse set of communities. This group could include representatives from organizations such as the Catholic Church, Second Harvest Food Bank, Downtown Watsonville Law Center, social services, and local agencies. The consensus among participants was that such a comprehensive mapping tool could hold significant value in both the planning and implementation phases of charger installations within the city. A collaborative effort among stakeholders and local organizations could:

- Inform grant and funding applications made by the city and nonprofits;
- Attract private investment to underserved communities by demonstrating where charging might be most successful;
- Identify zones where private EV charging companies might expect low near-term revenue and the city might be best positioned to offer zero-cost permitting or potential tax incentives; and
- Allow community groups and stakeholders to see for themselves where charging might be the most useful/beneficial, so they can build public support and push their representatives to make the investment.

City leaders could build on existing mapping work from Community Bridges, a local organization that strives to provide equitable access to resources for the people of Santa Cruz County. The organization is working on providing maps of charging stations in the county. These maps show where the existing chargers are located in the county. Charging companies and utilities could also provide more detailed data on charger use patterns and demographics to the city, to better inform these maps.

Participants noted that city staff could consider a multitude of variables when determining equitable and optimal EV charger sites, including:

- Disadvantaged communities: placement of EV charging infrastructure in disadvantaged communities could help residents who face economic challenges and have limited access to personal charging options. Policy makers could use CalEnviroScreen (a mapping tool) to identify these communities.⁴⁶
- Locations of multifamily residential buildings: Multifamily residential buildings are often home to a significant portion of the population, including renters who may not have home charging options. Placing charging stations near these buildings, as well as potentially public buildings and nonprofit offices, could help ensure more equitable access to EV charging for all residents.
- Grid capacity: policy makers will need to consider grid capacity to ensure that the power infrastructure can handle the increased demand from charging stations without overloading the grid. Upgrades may be necessary to accommodate the additional load.
- High-traffic areas and attractions like parks and schools and shopping malls: People can spend significant “dwell” time at these locations, making them potentially convenient for EV owners to charge their vehicles while engaged in daily activities.

To visually conceptualize charging locations in alignment with the aforementioned considerations, Watsonville's city planning department could create a comprehensive map identifying the types of sites where industry and public sector leaders could prioritize installing chargers. This map would not only identify potential charger sites but also pinpoint specific locales within the city that hold significant promise for successful deployment of chargers for heavy usage. For example, the process could build on the groundwork laid by Santa Cruz Metro Transit's circulator bus route, which connects medical clinics, shopping centers, and essential service locations, by incorporating charging infrastructure at key points to connect along this route and to avoid conflicts with stops.

Participants noted that a significant number of agricultural workers in Watsonville commute from inland areas like San Jose or Santa Cruz, relying heavily on the highway infrastructure rather than the city center. These workers access highways more than downtown city locations. Hence installing EV chargers along the highways surrounding Watsonville could attract heavy usage. Some state routes fall within the purview of the National Electric Vehicle Infrastructure Program (NEVI) grants. In the case of Watsonville, city leaders could concentrate efforts on critical highways including 1, 101, and 152, all integral to California's Deployment Plan for the NEVI grants. To tap into NEVI funding opportunities, the city, state, and other local entities could collaborate in their application efforts. Consequently, the geographical positioning of these highways in and around the city could assume a central role to guide city leaders in strategically directing investment and deployment, both in pursuing federal funding and seeking alternative funding sources.

Solution: Local utility and city staff could explore curbside charging options, including streetlight or utility pole charging

Curbside charging refers to charging on the side of a road or sidewalk. Such charging deployment could be particularly valuable for Watsonville for:

- Supporting multifamily apartment dwellers: many residents of multifamily apartments, often residing in low-income neighborhoods, face challenges in accessing convenient EV charging solutions. Curbside charging can bridge this gap by providing accessible charging points within close proximity to these housing complexes.
- Assisting low-income residents: curbside charging addresses the needs of low-income residents who may be financially unable to install home charging infrastructure due to housing constraints or insufficient power capacity.

While considering charging locations, the city could address diverse needs—workplace, home, corridor, high-traffic areas, transit hubs, workplaces, retail centers, and community gathering places to provide convenient charging options for residents and visitors. The convening participants identified locations that the city could recommend the installation of charging infrastructure to charging companies:

- Existing gas stations
- Middle and high schools
- City Hall parking lot
- Santa Cruz County Fairgrounds
- Public parking lots at restaurants
- Pajaro Church parking lot
- Westridge business park
- Watsonville plaza/downtown center

Utilizing the existing streetlight network for curbside charging represents a promising opportunity for a cost-effective and equitably dispersed charging infrastructure. This approach also has the potential to meet overnight charging needs near homes with minimal expenses by using existing infrastructure. Watsonville leaders could potentially emulate the successful implementation of curbside charging in Melrose, Massachusetts, where pole-mounted EV chargers have been strategically placed throughout the community.⁴⁷ Notably, the use of a drop-down plug design in Melrose has proven effective in minimizing damage from vandalism and flooding, addressing concerns shared by some Watsonville participants. Los Angeles (home to a municipal electric utility) has deployed hundreds of streetlight chargers, as the most ambitious example of a California city program.⁴⁸

To further enhance accessibility and promote equitable distribution, Watsonville could consider committing to a specific number of curbside chargers in each neighborhood where they are needed. The city could identify the optimal and equitable charger locations based on local needs and transportation patterns, as discussed in the mapping assessment solution above. This proactive measure would ensure that charging resources are accessible to all residents across the city. Moreover, such a commitment could stimulate investment in charging infrastructure near key commercial corridors and community facilities, fostering sustainable urban development and supporting the adoption of electric vehicles in Watsonville.

Solution: City of Watsonville leaders could promote investment in mobile charging infrastructure to better serve agricultural workers or those whose work locations may change frequently

Agriculture is one of the main industries in Watsonville. The city is host to several prominent national companies such as Driscoll's Strawberries, Martinelli's, and California Giant, all of which rely heavily on the surrounding expansive agricultural fields. Many agricultural workers commute from outside of Watsonville to work. Some participants suggested that agricultural workers would benefit from the provision of charging facilities near the fields where they work. However, farms are frequently situated in rural or remote areas where access to electrical infrastructure may be limited. However, mobile chargers (portable charging units that can be transported in a vehicle) can reach these remote locations, helping EV users at farms to charge conveniently. These mobile connectors can be deployed in remote or rural locations where installing hard-wired chargers would be impractical or costly. Participants also suggested that farm workers could use services like CalVans,⁴⁹ Miocar⁵⁰ or other vanpool or carpooling services.

Solution: Watsonville's City Planning Department could revise zoning and permitting policies to require EV charger installation or EV-ready electrical infrastructure at certain priority locations.

Lower-income communities tend to have lower home ownership rates and higher rates of tenancy in apartment buildings. To address this dynamic, developers will need to install more charging stations in multifamily buildings and public parking areas, which presents barriers related to financing and permitting.

By revising the zoning and streamlining permitting to require EV charger installations in low-income neighborhoods and other priority locations, the city planning department can take a step towards a more inclusive approach to EV accessibility. The priority locations to consider for rezoning and revising permitting policies could include new multi-family housing, parking lots, and construction of shopping or major employment centers.

Watsonville leaders could potentially look to the City of Portland as an example for updating permitting for public charging. The city updated its code and administrative rules in 2023 to facilitate EV charging in the public right-of-way (PROW). The update included amendments to the Vehicles and Traffic Code, administrative rules for encroachments and utility permits in the right-of-way, and the parking management manual.⁵¹ In March 2023, Portland also launched the ‘Electric Vehicle Ready Code Project’ to amend Portland Zoning Code (Title 33) to require all new multi-dwelling and mixed-use development with five or more units – that include onsite parking – to provide EV-ready charging infrastructure.⁵² City leaders could also look to cities like Portland, Seattle, and Washington, DC which affirmatively permit residents who lack dedicated off-street parking to run Level 1 charging cords across the sidewalk from their home to a parked vehicle, so long as they meet design and safety guidance.

The city could also build on the existing reach code to require EV charging stations or EV-ready electrical infrastructure in buildings that would increase access among low-income residents. A reach code is a local building energy code that “reaches” beyond the state minimum requirements for energy use in building design and construction, creating opportunities for local governments to lead the way on clean air, climate solutions, and the renewable energy economy.

Solution: Watsonville’s City Planning department could encourage charger installers to include physical components that enhance equity, safety, and accessibility

During the discussion, several participants underscored the importance of tailoring charging infrastructure to the specific needs of the lower income communities. By doing so, the city can promote a more inclusive and equitable adoption of electric vehicles, addressing the needs of diverse user groups, including vulnerable populations, and making charging stations safer for all. Features such as well-lit charging areas, built-in lighting and emergency buttons, and accessibility accommodations not only enhance the overall charging experience but also foster a sense of security and convenience, as isolated charging locations can be unsafe for women and other vulnerable groups of people like people with disabilities, senior citizens, children and parents, late-night or shift workers.

Diversifying payment options for EV charging emerged as a key strategy at the convening to make the service inclusive. Participants noted that a number of potential EV drivers in Watsonville are “unbanked” (lacking bank accounts), lack smartphones or credit cards, or may otherwise face difficulties with traditional US-based payment methods for residents with international banking

or phone accounts. An effort in this direction was observed with the introduction of Senate Bill 823 (Smallwood-Cuevas, 2023) which would have created a discounted EV charging payment card competitive grant program aimed to subsidize charging credit cards for low-income Californians.⁵³ Although the bill did not pass in 2023, it highlighted the need for accessible payment solutions to accommodate EV adoption in low-income communities.

In efforts to improve accessibility given the city's linguistic diversity, EV charging companies could incorporate different language options on the chargers, with a particular focus on Spanish, which is one of the most spoken languages in the area. Furthermore, they could augment charging stations with more audio and visual components to aid users in comprehending usage instructions, bridging potential literacy or language barriers. Convening participants also highlighted the complexity of pricing structures for EV charging. To address the pricing, the chargers could suggest prices in terms of dollars per miles covered or time to charge rather than solely kilowatt-hour rates. This addition would simplify public understanding of costs, thus empowering a broader audience to engage with the service. Some participants suggested that the city could focus on providing Level 2 chargers for workplaces and residential areas and DCFCs for select downtown/short-term parking areas and shopping centers.

In addition, participants noted that the city could improve access to chargers through updates to the aforementioned reach codes. When choosing where to put EV charging stations, city leaders could consider the needs of people with disabilities (Americans with Disabilities Act [ADA] requirements). This means making sure that some charging ports are located near spaces that are accessible to people with disabilities. Relatedly, participants noted that some people have safety concerns about EV batteries catching fire, and the city could consider updating the code to reflect fire safety at indoor parking spaces with EV charging stations.

BARRIER 2: HIGH COST OF INSTALLING, OPERATING AND USING CHARGERS

EV charging infrastructure can entail significant costs, including upfront expenses for hardware and installation and long-term expenses for maintenance and power supply. The high cost associated with installing and maintaining chargers can pose a barrier for private investment in charger installation. Installation and site preparation costs can range from \$600 - \$12,700 for Level 2 and \$4,000 - \$51,000 for commercial DCFC.⁵⁴ In addition, according to California Energy Commission data, for projects with one to four connectors, the average unit cost per connector was \$3,658, and the total project cost per connector was \$9,992.⁵⁵ Costs for DCFCs are significantly higher. For one installed DCFC, the average rebate per charger was \$62,516, the average unit cost per charger was \$45,293, and the average total project cost per

EV fast chargers and Level 2 chargers are two common types of charging stations used to charge electric vehicles. They differ in terms of charging speed, power, and use cases:

DCFC (Direct Current Fast Charger): DCFC, or fast chargers, provide rapid charging by delivering high-power direct current to electric vehicles. They are commonly used for long-distance travel and can charge an EV in approximately 30 minutes to an hour. DCFC are significantly more expensive to purchase and install than Level 2 chargers due to their higher power output and specialized technology.

Level 2 Charger: Level 2 chargers offer a moderate charging speed by providing alternating current at a higher rate than standard household outlets. Level 2 chargers are more affordable than DCFCs and have lower installation costs, making them suitable for home, workplace, and public charging locations.

DC fast charger was \$124,665.⁵⁶ Depending on the charging location and type, these costs may be borne or shared by local governments, charging service providers, building and property owners, and charging users. Furthermore, charging an electric vehicle at home is generally more cost-effective than utilizing public charging stations. This cost disparity may inadvertently impose a financial burden on individuals with lower incomes who rely on public chargers.⁵⁷

Solution: The California Public Utilities Commission (CPUC) and utility companies could implement electricity rates that reduce the cost of charging during off-peak hours and improve transparency for consumers about these rates

Watsonville residents who have an electric vehicle but lack access to private driveways or garages will be less likely to benefit from fuel cost savings associated with charging during overnight or daytime off-peak hours as well as from the advantage of receiving subsidized electricity rates for vehicle charging at home. Instead, they are more likely to rely on public charging, including costlier DCFC. To address these disparities, city leaders could encourage the installation of more workplace chargers, enabling individuals to capitalize on off-peak hour daytime charging rates. Furthermore, the CPUC could approve dynamic EV charging rates for drivers who use public charging that are based on the type of EV, the driver's income, and the time of charging (peak/off-peak hours). Some convening participants proposed implementing variable rates based on residents' income levels, or exploring percent income payment plans, to ensure equitable access to affordable EV charging options. This variable rate approach based on income levels could include:

- **Income assessment:** To determine the appropriate rate structure, the CPUC and/or charging companies would need to assess residents' income levels. This assessment could be based on self-reporting, documentation, or data from government assistance programs.
- **Tiered pricing:** Once the CPUC and/or charging companies determine the income levels, the utility could offer tiered pricing structures. Lower-income individuals or households would pay lower rates for EV charging, while higher-income individuals would pay standard or higher rates.

While the CPUC's dynamic rates have the potential to reduce costs, users may not understand the benefits of this reduction without clear communication through a standardized fee structure or pricing unit that facilitates a straightforward comparison of costs. To enhance consumer understanding of the pricing, charging station operators could present prices in easily digestible terms, such as dollars per mile covered or time required for charging, taking into account the tiered pricing structure for individuals.

Solution: The CPUC could encourage utility companies to offer incentives for home charger installations targeted at priority communities

The CPUC can encourage utility companies to create EV charging programs that directly benefit low-income households and underserved communities. PG&E, for instance, has already taken significant steps by introducing two progressive initiatives that offer incentives to low-income households. The utility's Empower EV Program provides one free Level 2 charger and covers up to \$2,000 per eligible single-family household for panel upgrades. The goal is to assist up to 2,000 households with a no-cost Level 2 charger and up to 800 eligible households with panel upgrades through this program.⁵⁸ PG&E has also partnered with Ecology Action on the Multifamily Housing and Small Business EV Charger Program, through which PG&E will install Level 1 and Level 2 EV chargers at multifamily housing (MFH) units, not-for-profit organizations and small businesses, at no cost for sites located in a "priority" community. The program also includes an education campaign for site residents and employees to increase awareness about the charger installation and other EV benefits and incentives.⁵⁹ Utility leaders and CPUC regulators could consider funding mechanisms to bolster and expand these programs.

Solution: Local organizations and regional governments could continue to coordinate on grant applications to secure state and federal funding for charging infrastructure

The City of Watsonville has participated in successful collaborations across different regions and organizations to secure grant funding, which could inform fundraising efforts focused on EV charging infrastructure buildout. Most prominently, Watsonville leaders collaborated with the city and county of Santa Cruz, plus with the counties of San Benito and Monterey, to participate in a multi-agency membership of the Regional Climate Project Working Group (RCPWG). In addition, local environmental community-based organizations such as Ecology Action also contributed to the working group in an advisory capacity. The RCPWG, formalized in 2022, now serves as a collective effort to develop, prioritize, secure funding and advocate for the implementation of regionally beneficial climate mitigation and adaptation projects and programs. Within this framework, the working group has completed two regional grant applications for EV charging infrastructure: "Charging and Fueling Infrastructure Discretionary Grant Program" by the Federal Highway Administration,⁶⁰ and "Advanced Technology Demonstration and Pilot Projects: Municipal Green Zones Grant Program" by the California Air Resources Board.⁶¹ Each of these proposals, if successful, would bring in \$15 million in State and Federal funding to the region, or \$30 million in total for regional EV and EV supply equipment infrastructure.

This collaborative approach, involving multiple regional governments and local organizations, enables the identification and joint application for grants, in turn pooling resources for larger, longer-term, and more cost-effective clean transportation benefits for the community. Moreover, these grants can act as leverage to secure additional funding from federal, state, local, and private sources.

City leaders could also explore dedicating a portion of their CEC grants to advance EV infrastructure installation in Watsonville. Specifically, Ecology Action, a state-wide non-profit with an active presence in Watsonville focused on advancing equitable and climate smart initiatives, received a CEC Reliable, Equitable, and Accessible Charging for multi-family Housing (REACH) grant to cover 100% of costs for EV charger installation (permitting, design, contracting, hardware, maintenance costs) for multi family EV charging in the central coast, central valley and bay area.

Ultimately, the City of Watsonville and RCPWG serve as examples for other cities and regional governments on how to collaborate with each other and local community-based organizations to jointly apply for grants. In order to have a planned and organized approach to grant applications, the cities could appoint a core team to research and identify grant opportunities applicable to and appropriate for them. This team could coordinate across jurisdictions where possible to find and access more regional opportunities. Some funding sources that the city could consider include the Inflation Reduction Act,⁶² Infrastructure Investment and Jobs Act,⁶³ and CALeVIP. Once team members identify these sources or grant opportunities, they could develop a pipeline of opportunities for funding and line up projects. Subsequent grant cycles could support infrastructure maintenance.

BARRIER 3: LIMITED PUBLIC AWARENESS, EDUCATION, AND OUTREACH

Limited access to information about various EV incentive programs offered by state and government agencies, as well as a lack of awareness of available charging options, hinder EV adoption by low-income residents. Language barriers, in particular, can create hurdles to EV purchasing and or disincentivize utilization among residents of disadvantaged communities who do not speak English as a first language. In Watsonville, 84.3% of the population identifies as Hispanic, making it one of the most significant majority Spanish-speaking cities in California. In addition, installers do not always equip charging stations with audio/visual components and different language options, which can limit accessibility for disabled and non-English speaking drivers respectively.

Participants noted that in many cases upfront costs alone do not deter EV adoption among low-income households. Instead, the combination of limited access to financing, lack of awareness of EVs, and general inconvenience of locating EV charging stations can create heightened barriers specific to low-income communities like in Watsonville. As a result, financial education programs and focused outreach that target community-specific barriers and needs can empower low-income individuals to make well-informed decisions about EV ownership.

Solution: The state transportation agencies could support community-based organizations in Watsonville to create a targeted, multi-lingual public awareness campaign about the potential cost savings and benefits from switching to EVs

In addition to financial support, local education and outreach efforts can increase EV adoption in low income and disadvantaged communities. The source of electric vehicle information influences the effectiveness of education and outreach programs. Information ideally would come from trusted sources with ties to the community whenever possible.⁶⁴ Community-based organizations that have already built trust among local residents and understand the specific circumstances of a community may be best positioned to share information about electric vehicles.

Community-based organizations are often under-resourced in terms of funding and staff capacity. These organizations could use state and other outside funding to hire additional staff, broaden their outreach efforts, strengthen organizational capacity, and extend staff positions for longer periods of time, among many other uses. Such organizations in the region could partner with the local government to create public awareness programs on EVs. For example, Ecology Action's initiative EVs for Everyone is aimed at assisting low-to-middle-income residents in the region through the entire process of buying EVs. They are also staffed by bilingual community-based organizations and professional advisors to serve English and Spanish speaking low-income communities.⁶⁵ PG&E's *Empower Electric Vehicle Charger Incentive and Education Program* offers education-based outreach, in addition to EV charger installation rebates, to low- and moderate-income customers on EV education and available incentives through utility and state programs.⁶⁶

In Watsonville, 12.9% of the population lives in poverty and cannot afford a car.⁶⁷ For such populations, the campaign could advertise EV ride share programs and the financial benefits associated with it. The campaign could also offer income-based incentives with EV advance payment grants that would help non-car owners to purchase a used EV. The city could also work with bus transportation agencies to help people who do not own cars, to provide them with reliable, convenient, and affordable access to transportation.

Participants emphasized the importance of having information available in other widely spoken languages in the region in addition to English, like having literature that shows all the charging stations in Spanish.- By conducting a thorough mapping assessment, the city could identify areas where Spanish is the primary language and actively involve Spanish-speaking communities in the development of EV charging brochures in Spanish.

Solution: The City of Watsonville could work with community-based organizations to support schools, car dealerships, or other community entities, to expand the distribution of information about how to use EV chargers and what options are available

By leveraging the knowledge, reach, and influence of schools, car dealerships, and community entities, the City of Watsonville can effectively coordinate a city-wide information network that empowers residents with the knowledge they need to make informed decisions about electric vehicle adoption, charging and usage. Collaborating with local car dealerships offers a practical platform for potential EV buyers to learn about various EV models, charging infrastructure, and available incentives. Dealerships could organize workshops, open-house events, or test drives that not only showcase EVs but also provide guidance on charging protocols and options.

Participants encouraged such engagement efforts to include educating community members about the technical use and availability of EV chargers along with the potential economic and environmental benefits and cost structure associated with EVs. Because knowledge gaps can vary across low-income communities, city leaders and advocates could conduct surveys to identify what locals currently do not understand or misconceive about EVs in order to provide more tailored and relevant educational programs to users. Partnering and collaborating with community-based organizations and local governments can also strengthen EV adoption by addressing the unique challenges faced by low-income residents.

Collaborative efforts among the city and community-based organizations can involve hands-on workshops and practical demonstrations of how to use EV chargers. These events can be held at central locations, such as community centers or popular gathering spots, and provide attendees with the chance to ride EVs and experience EV charging in a supportive and informative environment. Alongside physical outreach, the city can harness the power of online platforms and social media to share instructional videos, infographics, and step-by-step guides on EV charging. Leaders can tailor engaging content to different age groups and demographics in widely spoken languages, catering to a broader audience's learning preferences.

Solution: Charging companies and utilities could provide more detailed data on charger use patterns and demographics so that the City of Watsonville can target awareness and education efforts while also informing siting for new infrastructure

By receiving detailed data on charger use patterns and demographics from charging companies and utilities, the City of Watsonville would gain valuable insights on how the residents are engaging with EV charging infrastructure. Analyzing usage patterns, peak times, and popular locations can guide the creation of targeted awareness and education campaigns. For example, if the data reveal a surge in charging demand during specific hours or at particular charging stations, the city can tailor its educational efforts to coincide with these trends, ensuring that the information reaches those who need it most.

The charging companies and utilities could connect with Central Coast Community Energy to collect Watsonville-specific data on the demographics of the residents buying their cars, as well as what percent of their incentive dollars is used each year. They could distribute materials to educate people on the different types of chargers available, their locations, costs, capabilities and simplified explanations of which ones are best suited for each situation or driver, as well as a map of different charging locations in the city. This information could either be through an app, on a website, or displayed by the station.

In addition to obtaining data from utilities, the city could also survey residents to understand their needs and current knowledge of EVs and charging infrastructure. Accurate data on charger use patterns can inform policy decisions related to charging rates, time-of-use pricing, and infrastructure expansion. These data-driven policies could contribute to a more efficient and user-centric EV charging ecosystem.

CONCLUSION

Addressing the barriers to EV charging access for lower- and moderate-income individuals is crucial for fostering a more equitable and sustainable transportation future. This report puts forth recommendations to achieve this goal, including:

1. Watsonville's City Planning Department and Public Works & Utilities Department could initiate a comprehensive mapping assessment to determine optimal and equitable charger locations based on local needs and transportation patterns.
2. Watsonville's City Planning Department could revise zoning and permitting policies to require EV charger installation or EV-ready electrical infrastructure at certain priority locations.
3. The CPUC and utility companies could implement electricity rates that reduce the cost of charging during off-peak hours and improve transparency for consumers about these rates.
4. The state transportation agencies could expand support for community-based organizations in Watsonville that conduct targeted, multi-lingual public awareness campaigns about the potential cost savings and benefits from switching to EVs.

By removing financial, logistical, and infrastructure obstacles, Watsonville city leaders (with support from state government, the region, and the private sector) can empower the local community to benefit from cleaner and more affordable transportation options. Remedying this problem will require the

city to develop inclusive processes and implementation plans for the needed EV infrastructure. The infrastructure is too often not viable to install, due to factors such as onerous permitting, lack of a willing site host, expensive electrical upgrades, and lack of likely revenue needed to justify the investment. Local leaders will therefore need state and industry support to address these challenges, such as through improved business models, expanded industry investment, and targeted state subsidies. Ultimately, to ensure California's path toward equitable EV deployment is achievable, leaders at both state and local levels must prioritize charging access.



APPENDIX I

List of convening participants:

Alberto Rodriguez MÍOCAR	Babeeta Nagra PACIFIC GAS AND ELECTRIC	COUNCIL MEMBER AND WATSONVILLE MAYOR	Rebecca J García FORMER MAYOR OF WATSONVILLE
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Amaury Berteaud ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS	Felipe Hernandez SANTA CRUZ COUNTY SUPERVISOR; FORMER WATSONVILLE CITY	Nancy Faulstich REGENERACIÓN	Tatiana Brennan COUNTY OF SANTA CRUZ
		Raymon Cancino COMMUNITY BRIDGES	Tonje Wold-Switzer COMMUNITY BRIDGES

List of stakeholder interviews:

Alex Yasbek CITY OF WATSONVILLE	Creighton Randall MOBILITY DEVELOPMENT GROUP	Jane Barr EDEN HOUSING	Patrick Finch ELECTROTEMPO
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APPENDIX II

STATE ELECTRIC VEHICLE POLICIES AND PROGRAMS

POLICY	DESCRIPTION
Zero-emission Vehicle Regulation	Requires light-duty automakers to sell an increasing proportion of zero-emission vehicles, from 4.5% in 2018 to 22% in 2025. In 2022, the agency set requirements for 2026 onwards, increasing from 35% in 2026 to 100% from 2035 onwards.
Clean Vehicle Rebate Project	A rebate of up to \$7,500 for income-eligible customers to buy or lease a new or used zero- or low-emission light-duty vehicle. This program will transition in late 2023 into a new program that helps low- and middle-income Californians access zero-emission vehicles.
Clean Cars 4 All	Grants of up to \$9,500 for income-eligible residents to replace their old vehicle with a new or used zero- or low-emission light-duty vehicle.
Low Carbon Fuels Standard	A credit trading scheme that awards credits for the production of low carbon fuels and infrastructure, including the sale of electricity as a transportation fuel.
Advanced Clean Truck Regulation	Requires heavy-duty automakers to sell an increasing proportion of zero-emission vehicles, with deficits differing by vehicle class and weight.
Heavy-duty Vehicle Incentive Program	Funding up to \$120,000 for the purchase of a zero- or low-emission heavy-duty vehicle.
Phase 2 GHG Emissions Standards	Requires heavy-duty automakers to adhere to increasing vehicle and engine emissions performance standards until Model Year 2027.

FEDERAL AND STATE ELECTRIC VEHICLE CHARGING POLICIES AND PROGRAMS

POLICY	DESCRIPTION
National Electric Vehicle Infrastructure (NEVI) Grant Program	The Department of Transportation's (DOT) Federal Highway Administration (FHWA) offers funding to deploy an interconnected network of public or shared electric vehicle charging stations, primarily along Alternative Fuel Corridors (AFCs). Created through the Bipartisan Infrastructure Bill of 2021, metropolitan planning organizations, public authorities, and governments are eligible.
Charging and Fueling Infrastructure (CFI) Discretionary Grant Program	The DOT's FHWA offers funding to deploy publicly-accessible EV charging infrastructure in urban and rural communities, as well as along Alternative Fuel Corridors. The Bipartisan Infrastructure Bill of 2021 created the program and made metropolitan planning organizations, public authorities, and governments eligible to receive the funding.
Clean Transportation Program	The CEC offers \$100 million annually, primarily to electric vehicle charging infrastructure, and "will seek to provide more than 50 percent" of funds "towards projects that benefit low-income and disadvantaged communities." As of April 2022, the agency had awarded 49% of funding to projects in low-income and/or disadvantaged communities. AB 2061 (Ting, 2022) required the CEC to create an assessment of the equitability of access to reliable charging stations by 2025. Businesses, vehicle and technology manufacturers, fleet owners, consumers, and academic institutions are eligible.
Utility-funded Charger Installations	The California Public Utilities Commission (CPUC) has also authorized the use of ratepayer funding for EV charging infrastructure investments. The three large Investor-Owned Utilities (IOUs) have policies to fund the installation of light-duty EV charging stations at workplaces, multi-unit dwellings, and some destination centers, mostly at level 2. Southern California Edison's (SCE) Charge Ready, and San Diego Gas & Electric's (SDG&E) Power Your Drive program are undergoing their second round while Pacific Gas & Electric's (PG&E) Charge Program 2 has been authorized to install approximately 2,822 chargers to add to their first round total of 4,749.

ENDNOTES

- 1 California Air Resources Board (CARB), Advanced Clean Cars II Regulations, available at <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii>
- 2 Chih-Wei Hsu and Kevin Fingerma, “Public electric vehicle charger access disparities across race and income in California,” Transport Policy Vol. 100, 59-67 (January 2021), available at <https://www.sciencedirect.com/science/article/pii/S0967070X20309021>; CARB, Low-Income Barriers Study, Part B: Overcoming Barriers to Clean Transportation Access for Low-Income Residents, available at https://ww2.arb.ca.gov/sites/default/files/2018-08/sb350_final_guidance_document_022118.pdf
- 3 U.S. Census Bureau 2014 – 2018 American Community Survey Total Population in Occupied Housing Units by Tenure by Units in Structure 5-Year Estimates
- 4 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
- 5 Garcia et al, “California’s early transition to electric vehicles: Observed health and air quality co-benefits”, Science of The Total Environment, Volume 867, 2023 available at <https://www.sciencedirect.com/science/article/pii/S0048969723003765>
- 6 City of Watsonville census data, available at <https://www.census.gov/quickfacts/fact/table/watsonvillecitycalifornia,CA/PST04522>
- 7 DACs are defined as the top 25% of communities experiencing disproportionate amounts of pollution, environmental degradation, and socioeconomic and public health conditions according to the CalEnviroScreen tool (<https://oehha.ca.gov/calenviroscreen>). Low-income communities and households are those with incomes either at or below 80% of the Statewide median or below a threshold designated as low-income by the Department of Housing and Community Development. More information on <https://oehha.ca.gov/calenviroscreen/sb535>
- 8 Watsonville demographics data, available at <https://www.watsonville.gov/1441/Demographics>
- 9 CARB, Clean Vehicle Rebate Project, available at <https://cleanvehiclerebate.org/en>
- 10 CARB, Clean Cars 4 All, available at <https://ww2.arb.ca.gov/our-work/programs/clean-cars-4-all>
- 11 CARB, Low Carbon Fuel Standard, available at <https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>
- 12 IRS, Credits for New Clean Vehicles Purchased in 2023 or After, available at <https://www.irs.gov/credits-deductions/credits-for-new-clean-vehicles-purchased-in-2023-or-after>
- 13 Electrification Coalition, IRA EV Tax Credits Fact Sheet, available at https://electrificationcoalition.org/wp-content/uploads/2022/08/SAFE_1-sheet_Webinar.pdf
- 14 Electrification Coalition, Inflation Reduction Act Impact on Electric Vehicles, available at <https://electrificationcoalition.org/work/federal-ev-policy/inflation-reduction-act/>
- 15 CEC, Electric Vehicle Charging Infrastructure Assessment - AB 2127, available at <https://www.energy.ca.gov/data-reports/reports/electric-vehicle-charging-infrastructure-assessment-ab-2127>
- 16 CEC, Electric Vehicle Chargers in California, available at <https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics/electric-vehicle>
- 17 National Electric Vehicle Infrastructure (NEVI) Formula Program, available at <https://afdc.energy.gov/laws/12744>
- 18 Charging and Fueling Infrastructure Discretionary Grant Program, available at <https://www.fhwa.dot.gov/environment/cfi/>
- 19 CEC, 2022-2023 Investment Plan Update for the Clean Transportation Program, available at <https://www.energy.ca.gov/publications/2022/2022-2023-investment-plan-update-clean-transportation-program-o>
- 20 https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB2061
- 21 California Energy Commission, California Transportation Program, available at <https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program>
- 22 AB-2061 Transportation electrification: electric vehicle charging infrastructure, available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB2061

- 23 Justice40, available at <https://www.whitehouse.gov/environmentaljustice/justice40/>
- 24 CARB, 2022 Scoping Plan for Achieving Carbon Neutrality, available at <https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf>, p.7
- 25 Carb, Public Hearing to Consider the Proposed Advanced Clean Cars II Regulations , available at <https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/isor.pdf>, p.24-35
- 26 Governor Brown Takes Action to Increase Zero-Emission Vehicles, Fund New Climate Investments, available at <https://www.ca.gov/archive/gov39/2018/01/26/governor-brown-takes-action-to-increase-zero-emission-vehicles-fund-new-climate-investments/index.html>
- 27 State of California, Executive Order N-79-20, available at <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>,
- 28 CARB, Low-Income Barriers Study, Part B: Overcoming Barriers to Clean Transportation Access for Low-Income Residents, available at https://ww2.arb.ca.gov/sites/default/files/2018-08/sb350_final_guidance_document_022118.pdf, p.12
- 29 Hsu and Fingerman, *supra*
- 30 Electric Vehicle Infrastructure Deployment Assessment- Senate Bill 1000, available at <https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program/electric-vehicle-infrastructure>
- 31 *Ibid.*
- 32 California Energy Commission, SB 1000 Electric Vehicle Charging Infrastructure Deployment Assessment, available at <https://www.energy.ca.gov/publications/2020/california-electric-vehicle-infrastructure-deployment-assessment-senate-bill>
- 33 Hsu, Fingerman, “Public electric vehicle charger access disparities across race and income in California”, available at <https://www.sciencedirect.com/science/article/pii/S0967070X20309021>
- 34 Watsonville Public Works & Utilities, “Watsonville Climate Action & Adaptation Plan”, available at <https://www.watsonville.gov/1764/Learn-About-Climate-Action-Plan>
- 35 *Ibid.*
- 36 *Ibid.*
- 37 *Ibid.*
- 38 US Department of Energy, “Alternative Fueling Station Locator”, available at <https://afdc.energy.gov/stations/#/find/nearest>
- 39 California Energy Commission, “Electric Vehicle Charging Infrastructure Assessment - AB2127”, available at <https://www.energy.ca.gov/data-reports/reports/electric-vehicle-charging-infrastructure-assessment-ab-2127>
- 40 The California Electrical Vehicle Infrastructure Project (CALeVIP), “Central Coast Incentive Project”, available at <https://calevip.org/incentive-project/central-coast>
- 41 Central Coast Community Energy, “Electrify Your Ride – Residential”, available at <https://3cenergy.org/rebates/electrify-your-ride-residential/>
- 42 Central Coast Community Energy, “On Earth Day, Central Coast Community Energy Celebrates Distributing Over 1,000 EV Rebates and Supporting 1,000 New EV Chargers for Region”, available at <https://3cenergy.org/on-earth-day-central-coast-community-energy-celebrates-distributing-over-1000-ev-rebates-and-supporting-1000-new-ev-chargers-for-region/>
- 43 California Energy Commission, “\$30 Million in Incentives Now Available for Shovel-Ready EV Charging Projects Across California”, available at <https://www.energy.ca.gov/news/2023-02/30-million-incentives-now-available-shovel-ready-ev-charging-projects-across>
- 44 The state estimated 8,434 such chargers will be needed in Monterey County by 2028. See Matt Alexander, Noel Crisostomo, Wendell Krell, Jeffrey Lu and Raja Ramesh, “Implementation of AB 2127 Electric Vehicle Charging Infrastructure Assessments,” California Energy Commission, May 2021, at C-14, available at: <https://www.energy.ca.gov/news/2021-06/report-shows-california-needs-12-million-electric-vehicle-chargers-2030> (accessed September 1, 2023).
- 45 Ona Egbue and Suzanna Long, “Barriers To Widespread Adoption of Electric Vehicles: An Analysis of Consumer Attitudes and Perceptions”, Energy Policy Vol. 48 (September 2012), available at <https://www.sciencedirect.com/science/article/abs/pii/S0301421512005162>
- 46 CalEnviroScreen is a mapping tool that helps identify California communities that are most affected by many sources of pollution, and where people are often especially vulnerable to pollution’s effects. More information on <https://oehha.ca.gov/calenviroscreen>
- 47 City of Melrose, Massachusetts, ‘Public EV Charging, available at <https://www.cityofmelrose.org/office-planning-and-community-development/sustainable-melrose/pages/public-ev-charging>

- 48 LA Lights, EV Charging Stations, available at https://lalights.lacity.org/connected-infrastructure/ev_stations.html
- 49 CalVans, available at <https://calvans.org/>
- 50 MioCar, available at <https://miocar.org/>
- 51 Portland Bureau of Transportation, Electric Vehicle Charging In The Public Right-Of-Way Code Project, available at <https://www.portland.gov/transportation/electric-vehicles/documents/electric-vehicle-charging-public-right-way-code-project>
- 52 City of Portland, Electric Vehicle (EV) Ready Code Project, available at <https://www.portland.gov/bps/planning/ev-ready>
- 53 SB-823 Discounted electric vehicle charging payment card competitive grant program, available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB823
- 54 Henry Lee and Alex Clark, “Charging the Future: Challenges and Opportunities for Electric Vehicle Adoption”, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3251551
- 55 CALeVIP Level 2, Average Rebate, Unit Cost, and Total Project Cost Per Connector Installed, available at <https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program/california-electric-vehicle/calevip-level>
- 56 CALeVIP DC Fast Chargers, Average Rebate, Unit Cost, and Total Project Cost per Charger, available at <https://www.energy.ca.gov/programs-and-topics/programs/clean-transportation-program/california-electric-vehicle/calevip-dc>
- 57 Hardman et al, “A Perspective On Equity in the Transition to Electric Vehicles, MIT Science Policy Review Vol. 2 (August 30, 2021), available at <https://sciencepolicyreview.org/2021/08/equity-transition-electric-vehicles/>
- 58 Empower EV Program available at https://www.pge.com/en_US/residential/solar-and-vehicles/options/clean-vehicles/electric/empower-ev-program.page
- 59 PG&E Multifamily Housing and Small Business EV Charger Program, available at https://www.pge.com/en_US/small-medium-business/energy-alternatives/clean-vehicles/ev-charge-network/program-participants/multifamily-housing-smb-ev-charger-program.page?
- 60 Federal Highway Administration, Charging and Fueling Infrastructure Discretionary Grant Program, available at <https://www.fhwa.dot.gov/environment/cfi/>
- 61 CARB, Advanced Technology Demonstration and Pilot Projects (2023), available at https://ww2.arb.ca.gov/sites/default/files/2023-07/fy21-23demoandpilot_solicitation.pdf
- 62 Inflation Reduction Act Guidebook, available at <https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/>
- 63 The Bipartisan Infrastructure Deal, available at <https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/06/fact-sheet-the-bipartisan-infrastructure-deal/>
- 64 Anders Fjendbo Jensen et al., “On the stability of preferences and attitudes before and after experiencing an electric vehicle,” Transportation Research Part D: Transport and Environment, Volume 25, (December 2013), available at <https://www.sciencedirect.com/science/article/pii/S1361920913001077>
- 65 EVs for Everyone, available at <https://evsforeveryone.org/>
- 66 Natural Resources Defense Council, “California Approves Novel Low-Income EV Charger Program”, available at <https://www.nrdc.org/bio/miles-muller/california-approves-novel-low-income-ev-charger-program>
- 67 City of Watsonville census data, available at <https://www.census.gov/quickfacts/fact/table/watsonvillecitycalifornia,CA/PST045222>

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