Appendix A

Monterey Bay EV CAR Framework: Existing and Expected EV Charging Infrastructure Conditions and Future Needs Analysis Technical Report, March, 2025

Monterey Bay EV CAR Framework

Existing and Expected EV Charging Infrastructure Conditions and Future Needs Analysis Technical Report

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1 Introduction

1.1 Approach

This report summarizes the technical analysis conducted to better understand the existing electric vehicle (EV) charging infrastructure and the current EV landscape within the Association of Monterey Bay Area Governments (AMBAG) region. The data and analysis results outlined in this report will be used as the baseline conditions in the Monterey Bay Electric Vehicle CAR Framework. This assessment included a review of relevant technical documents, studies, and existing reports, including the Central Coast Zero Emission Vehicles (CCZEV) study, a baseline assessment of existing EV ownership leveraging the Replica Model, and the completion of the Forecasting Anywhere Model which provides both baseline and forecasted EV charging numbers across the entire AMBAG region.

Specifically, the existing conditions study integrated data on charger locations provided by the U.S. Department of Energy's Alternative Fuels Data Center, along with anticipated future charger installations funded through initiatives such as the Santa Cruz County Monterey Bay Charging and Fueling Infrastructure Discretionary Grant Program (CFI).

The analysis also examined current EV ownership patterns based on the latest available 2023 DMV ownership data, establishing a baseline for current infrastructure availability and vehicle ownership scenarios within the region. This baseline analysis was further expanded by assessing the driving behavior trends of EV owners compared to general internal combustion engine (ICE) vehicle users, utilizing the Replica platform. Replica employs activity-based scenario modeling to depict the ratio of electric to ICE private vehicles and to highlight differences in driving patterns between these vehicle categories.

Finally, current and future EV charging infrastructure locations (both residential and public) were modeled using E3's Forecasting Anywhere Model. This model allows for projections of anticipated EV growth and provides insights into the required charging infrastructure to effectively support and sustain the EV growth trajectory through 2050.

Each of these data points will help to identify current and future EV charging locations based on projected demand and ownership rates. These locations, EV charging types (Level 2 vs. DC Fast), and overall charger counts will subsequently inform the vulnerability assessment by providing location-based information which can be mapped against future climate hazards (such as fire and landslides) as well as inform the feeder level electricity grid impact analysis to be completed in future phases of the project. All applicable data points will be incorporated into a GIS web map tool to analyze the spatial overlap of various layers.

2 Document Review

The first step in reviewing the existing EV charging infrastructure within the AMBAG region involved a review of relevant technical documents, existing studies, and reports relevant to the Monterey Bay EV CAR Framework. As seen in Table 1 below, the review involved analyzing 21 documents, assessing their relevance to this project, summarizing key points, and providing a link to each document. To highlight the aspects relevant to this project, the following points were drafted as key considerations during the review.

Other key documents that were identified to review, but not yet available were the Cal State Monterey Bay EV Infrastructure Master Plan, North Monterey County Climate Adaptation study, and the Salinas Climate Action Plan.

2.1 Relevance to the Monterey Bay EV CAR Framework

- **Existing electric vehicle charging infrastructure**
  - Level 2 chargers
  - DCFC fast chargers
  - Locations of both
  - Forecasts or expected growth
- **Climate vulnerability to the region**
  - Extreme weather events or other hazards
  - Impacts to EV charging infrastructure, grid reliability, roads
- **Road infrastructure and travel patterns**
  - For cars and trucks
- **Energy demand forecasts**
- **Population growth projections**
- **Underserved communities in the region (DACs)**
  - How are they defined
  - Where they are
- **Equity issues**
  - What are main equity considerations for EV infrastructure
- **Community outreach and engagement in the region**
  - Results from that engagement
  - Community concerns regarding EV adoption
- **Public process in the region**
- **EV ownership projections**

Table 1 Monterey Bay EV CAR Framework Document Review

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
Central Coast ZEV Strategy (DKS)	The Santa Barbara County Association of Governments (SBCAG), San Luis Obispo Council of Governments (SLOCOG), and Association of Monterey Bay Area Governments (AMBAG) partnered to develop the Central Coast Zero-Emission Vehicle Strategy (CCZEVS) in 2022. The document is a comprehensive strategy for deploying zero-emission vehicle (ZEV) charging infrastructure along California's Central Coast including the three county AMBAG area. It assesses existing infrastructure, identifies gaps and barriers to ZEV adoption (including grid capacity and equity concerns), and proposes recommendations for equitable infrastructure deployment and public education. Extensive community engagement, including surveys and focus groups, shaped the strategy's recommendations. The plan also examines relevant state and federal regulations and funding opportunities to support implementation.	CCZEV Purpose and Objectives (p.29): ▪ Assess existing EV infrastructure in the Central Coast region ▪ Identify challenges and barriers to EV adoption ▪ Ensure equitable access to charging infrastructure ▪ Recommend infrastructure improvements and implementation strategies Current Infrastructure Status (p.13): ▪ 2,095 total public EV chargers in the six-county study area ▪ Most chargers concentrated in cities ▪ Limited charging along many key interregional travel routes Future Infrastructure Needs (p.16): ▪ By 2030, six county regions need approximately: ▫ 25,481 additional public Level 2 charging stations ▫ 1,223 additional public DC Fast Charging stations ▫ 2,031 stations in unincorporated areas along highways ▪ By 2030, the three county AMBAG area needs approximately: ▫ 8,605 Public Level 2 charging stations ▫ 537 additional public DCFC charging stations Key Recommendations (p.20): ▪ Create a cooperative regional ZEV planning committee (p.20) ▪ Prioritize charging infrastructure deployment at identified high-priority locations (p.20) ▪ Provide education and outreach about ZEV technologies (p.24) ▪ Address grid capacity and transformer constraints (p.25) ▪ Ensure equitable access for disadvantaged communities (p.25) ▪ Improve charging access at multi-family housing (p.25) ▪ Streamline permitting processes (p.26) ▪ Simplify payment systems for charging (p.24) Implementation (p.27): ▪ Leverage federal, state and local funding opportunities (p.28) ▪ Partner with utilities on infrastructure planning (p.25) ▪ Work with local jurisdictions on building codes and permits (p.27) ▪ Focus on both urban and rural charging needs (p.25) ▪ Consider climate resilience in infrastructure deployment (p.26)	Central Coast ZEV Strategy
Central Coast Community Energy Blueprint	▪ Existing EV charging infrastructure ▪ Public process ▪ Climate vulnerability ▪ Road infrastructure and travel patterns ▪ Energy demand and population growth ▪ Underserved communities (DACs) ▪ Equity considerations ▪ Community outreach ▪ EV ownership projections	Existing EV charging infrastructure: ▪ The Central Coast region currently has 118 public DC fast chargers, mainly along major routes like U.S. 101. However, these chargers are largely inaccessible for heavy-duty trucks, but fine for a variety of medium-duty trucks. There is a map showing the locations of Level 2 and DCFCs in the region (p. 41). ▪ Recommendations for installing EV chargers focus on agricultural hubs (particularly for wine), population centers, and critical transportation corridors like U.S. 101 (p. 47). ▪ The Central Coast region's growing population is reliant on trucks and buses moving along the US 101 corridor and within its major population centers (p. 4). ▪ The use of MHD fleets to transport people is concentrated among municipal fleets and school districts (p.45). Climate vulnerability ▪ Recognizes the importance of establishing charging hubs for emergency events and enhancing hardware resilience to support climate adaptation efforts (p. 29). ▪ Key areas of concern identified by the TAC were grid capacity for MHD vehicle charging (p. 26).	Central Coast Community Energy Blueprint

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
		Road infrastructure and travel patterns ▪ U.S. 101 is a critical freight route with 75% of shipments transported by trucks in the region. Other major routes include SR 46, SR 152, SR 156, and SR 129 (p. 42). Energy demand and population growth ▪ The Central Coast's population is projected to grow to 1.7 million by 2030 (p. 13). ▪ Increased demand for clean energy to meet charging needs, with strategies like energy storage and grid integration outlined (p. 83). Underserved communities (DACs) ▪ Maps and demographic analyses identify disadvantaged communities in areas like Salinas and Marina Region, parts of Watsonville and the surrounding area, Guadalupe and Mussel point region. Priority is given to EV programs in these areas to address equity (p. 36). ▪ Funding programs for DACs (p. 74). Equity considerations ▪ Barriers to EV adoption in disadvantaged communities include high upfront costs (p. 89-91). ▪ Recommendations include partnering with community organizations to identify suitable locations for EV infrastructure and offering targeted rebates (p. 88). Community outreach ▪ Need for continued community outreach and a central web location for regulatory and funding resources (p. 81). ▪ Concerns include insufficient planning for medium- and heavy-duty vehicle electrification and more communication between public agencies, stakeholders, governments and regional industry (p. 91). EV ownership projections ▪ Ownership and adoption rates for MHD vehicles lag due to supply chain delays and high costs. Recommendations focus on phased deployment and incentives (p. 63).	
Assembly Bill 2127 Second EV Charging Infrastructure Report	▪ Existing EV charging infrastructure ▪ Climate vulnerability ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Underserved communities (DACs) ▪ Equity considerations ▪ EV ownership projections	Existing EV charging Infrastructure ▪ California currently has nearly 94,000 public and shared private chargers, with plans to meet the target of 250,000 chargers (including 10,000 DC fast chargers) by 2025. However, access remains uneven, particularly in rural and disadvantaged communities (p. 35, 57). ▪ By 2035, California will require about 2.1 million chargers (including 83,000 DC fast chargers) for light-duty vehicles and 264,500 chargers for medium- and heavy-duty vehicles (p. 3, 7, 39). ▪ DC charging is widely used in charging situations with short dwell times such as at highway-adjacent stations serving road trippers, grocery stores, or urban stations serving residents without at-home charging (p. 33). Climate vulnerability ▪ Anticipated load from EV charging on the grid, especially for medium- and heavy-duty vehicles (p. 10). Road infrastructure and travel patterns ▪ As DCFC charging speeds increase, more drivers might opt to fit DCFC charging events as brief stops during their regular travel patterns rather than relying on lower-speed charging at longer dwell-time destinations. (p. 86). Energy demand forecasts ▪ A systemwide load analysis as part of the 2022 IEPR Planning Scenario, which incorporates the AATE 3 scenario used in this report, anticipates vehicle charging to account for less than 10 percent of daily average load and less than 5 percent of load peak in 2030. This systemwide load analysis anticipates that vehicle charging will account for less than 20 percent of daily average load and less than 10 percent of load at peak in 2035 (p. 56). ▪ Localized and circuit-specific impacts will require significant upgrades (p. 78). ▪ Managed charging models to shift peak demand (p. 56, 75). Underserved communities (DACs) ▪ About 88 percent of urban communities are within 10 minutes of a public DC fast charger; in ▪ contrast, about 40 percent of rural communities are within 10 minutes of one (p.39). ▪ Lack of access to charging infrastructure is a significant barrier to EV adoption and use. Despite investments within low-income and disadvantaged communities, charging coverage gaps persist. Solutions to improve charging access will vary and depend on the intersecting characteristics of a community (p.41). ▪ Deployment programs under SB 1000 aim to prioritize disadvantaged areas for infrastructure development (p. 38). Equity considerations ▪ Legislation such as AB 2061 introduces standards for charger reliability and equitable distribution (p. 36).	Assembly Bill 2127 Second EV Charging Infrastructure Report

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
		EV ownership projections ▪ By 2030, California is projected to have 7.1 million light-duty plug-in electric vehicles (PEVs) (p. 4). ▪ By 2035, this figure is expected to rise to 15.2 million light-duty PEVs, including battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) (p. 4, 49). ▪ By 2030, the projection is 155,000 medium- and heavy-duty PEVs (p. 4, 70). ▪ By 2035, this will grow to 377,000 medium- and heavy-duty PEVs (p. 4, 70).	
Monterey-Salinas Transit (MST) Unveils ZWB Plan	▪ Existing EV charging infrastructure ▪ Climate vulnerability ▪ Public process	Existing EV charging infrastructure ▪ The Plan recognizes a significant and unfunded financial investment of between $71M to $107M over 19 years to fully implement. This unfunded investment includes Zero Emissions Buses (ZEBs), equipment, and charging/fueling infrastructure (paragraph 2). ▪ MST has already invested in 5 ZEBs, representing 6% of its existing fleet of 86 heavy-duty diesel-powered buses (paragraph 2) Climate vulnerability ▪ The goal of the ZEB rollout is to reduce GHG emissions and improve air quality (paragraph 1). Public process ▪ In 2018, the California Air Resources Board (CARB) adopted the Innovative Clean Transit (ICT) regulation, which requires all bus fleets to be converted to zero-emissions by 2040. As part of this mandate, small transit operators must submit a zero-emission bus rollout plan to CARB by July 2023 (paragraph 3).	Monterey-Salinas Transit (MST) Unveils ZWB Plan
Santa Cruz ZEB Rollout Plan	▪ Energy demand forecasts ▪ Existing EV charging infrastructure ▪ Underserved communities (DACs)	Energy demand forecasts ▪ Metros's ZEB rollout plan will enable the agency to fully transition its fleet to zero-emission by 2037 (p. 4). ▪ Metro will begin purchasing fuel cell electric buses (FCEB) in 2023/2024 to achieve cycles of longer routes and blocks with larger energy demands (p. 4). Existing EV charging infrastructure ▪ Metro currently has one CNG fueling station, 4 BEB charging stations with conduit ready for an additional 6 charging stations (p.11). Underserved communities (DACs) ▪ The proposed hydrogen fueling station at JKS has an explicit goal of enabling Metro to convert 100% of its fleet serving Watsonville's Historically Disadvantaged Communities (HDCs) to ZEBs by 2027 (p.11).	Santa Cruz ZEB Rollout Plan
UCSC EV Charging	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region	Existing EV charging infrastructure ▪ UCSC offers Level 2 and Level 1 charging options in various lots throughout campus (detailed locations offered on webpage). ▪ Chargers are first-come, first-served, and users must be plugged in or actively charging while parked in a Level 2 charging space. ▪ Level 2 chargers are part of either the ChargePoint or JuiceBox (Enel) network and a fee of $0.25/kWh while charging and $1/kWh idle time will be collected for active charging and while plugged in. Climate vulnerability to the region ▪ Disclaimer that EV chargers may be affected by larger grid issues due to wind, fire, heat, and other power shortages. Resources are available to report any outages.	UCSC EV Charging
California's Deployment Plan for the National Electric Vehicle Infrastructure Program Annual Update	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Population growth projections ▪ Underserved communities in the region (DACs) ▪ EV ownership projections	Existing EV charging infrastructure ▪ Figures 10, 11, and 12 show existing public DC fast charging and Level 2 charging stations in California as of June 28, 2024 (p. 44) ▪ There are now 14,708 public and shared private DC fast chargers in California according to analysis by the CEC as of August 2024 (13,943 of the DC fast chargers are public and 765 are shared private) (p. 43) ▪ There are currently more than 15,500 public Level 2 chargers in California (p. 43). Climate vulnerability to the region ▪ Between January and March 2024, nine atmospheric river storms in California caused flooding and impacted priority populations in Monterey County (p. 35). Road infrastructure and travel patterns ▪ Maps in Figures 7 and 8 identify freight corridors with significant truck traffic (p. 38). Underserved communities (DACs) ▪ Caltrans and the CEC will continue to use the NEVI program to bring benefits to both Justice40 communities and California-designated disadvantaged and low-income communities (p. 52). ▪ Figure 14 on page 53 maps disadvantaged and priority populations across California (Alternative fuel corridors) (p. 53).	California's Deployment Plan for the National Electric Vehicle Infrastructure Program Annual Update

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
		EV ownership projections ▪ To support the 7.1 million light-duty EVs projected by 2030, the state will need 1 million chargers, including 39,000 DC fast chargers. In 2035, California's projected 15.2 million light-duty EVs will need 2.1 million chargers, including 83,000 DC fast chargers (p. 19). ▪ More than 441,283 light-duty electric vehicles were sold in 2023, or 25 percent of total sales, and a 28 percent increase over 2022 sales. Cumulative light-duty ZEV sales now total nearly 2 million vehicles, and an estimated 1 million electric vehicles are now on the road (p. 35) ▪ For medium- and heavy-duty trucks, analysis by the CEC projects that 114,500 chargers will be needed in 2030 to support 155,000 vehicles: 109,000 low power (20–150 kW) depot chargers and 5,500 high powers (350–1,500 kW) in route chargers (p. 21).	
Southern California Plug-In Electric Vehicle Readiness Plan	▪ Existing EV charging infrastructure ▪ Equity issues	Existing EV charging infrastructure ▪ Currently, there are three major levels of PEV charging: Level 1 (120 volts), Level 2 (240 volts), and DC fast charging (up to 500 volts) charging can demand differing levels of power even within a given charging level category, limited by how much current the circuit and charging equipment (on- and off-board the vehicle) supply. PEVs typically come with either 3.3- or 6.6-kilowatt (kW) chargers onboard the vehicle. (p. 14). Equity issues ▪ Multi-unit dwellings (MUDs) and workplaces are potential charging environments that would disproportionately benefit from effective PEV readiness. This is largely because these environments may potentially have an advantage of economies of scale in charge station capacity, able to charge multiple PEVs at once and at lower per-kilowatt-hour costs (p. 26). ▪ Concerns like "range anxiety" and access to charging are concerns for people in general (p.5).	Southern California Plug-In Electric Vehicle Readiness Plan
Electric Vehicle Charging Equity Considerations	▪ Equity issues	Equity issues ▪ The Justice40 Initiative... states a goal that at least 40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities (DACs). ▪ Clean transportation is identified as a Justice40 covered program and identifies access to electric vehicle charging stations as an example benefit of a covered program. ▪ The joint interim definition of DACs for the NEVI program includes three components: combined census tracts from DOT's and DOE's working definitions of DACs, tribal lands, and U.S. territories.	Electric Vehicle Charging Equity Considerations
AMBAG 2045 Metropolitan Transportation Plan and SCS	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Population growth projections ▪ Underserved communities in the region (DACs) ▪ Equity issues	Climate vulnerability to the region ▪ The Monterey Bay region is expected to change due to climate, even under the most optimistic scenarios. Potential impacts include more frequent and intense heat waves and wildfires, rising sea levels and higher storm surges, the loss of native plant and animal species, and a higher demand for electricity, particularly during peak periods (p. 103). ▪ Page 67 outlines recent wildfire events in the region under FEMA funding. ▪ The SCS outlines the region's plan for integrating the transportation network within an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands while reducing GHG emissions (p. 19). Road infrastructure and travel patterns ▪ The Monterey Bay Area includes many highways that connect people between the three counties as well as outside the region... Projects for these roadways are included within the 2045 MTP/SCS (p. 36): ▪ Improvements to U.S. 101, SR 1, SR 68, SR 156 West, SR 25, SR 152 widening, and SR 1 bus on shoulder lane improvements (Santa Cruz). Population growth projections ▪ By 2045, the population is expected to reach 869,776... The region is expected to add more than 42,000 housing units by 2045 and more than 65,000 new jobs (p. 15). Underserved communities in the region (DACs) ▪ Major goal and policy objective is social Equity – Provide an equitable level of transportation services to all segments of the population (p. 30). ▪ Social equity areas are defined on page 133 and figures 5-1 and 5-2 display them geographically in the AMBAG region. Equity issues ▪ By 2045, the region is envisioned to have more travel choices and a safer, more efficient transportation system that provides improved access to jobs and education. In addition, the Plan will support job creation, expand the region's economic competitiveness through investments in freight, and improve environmental quality for the region's nearly one million residents by 2045 (p. 24).	AMBAG 2045 Metropolitan Transportation Plan and SCS

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
Monterey Regional Transportation Plan	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Population growth projections ▪ Underserved communities in the region (DACs) ▪ Equity issues	Climate vulnerability to the region ▪ Extreme weather events along the Central Coast have included temperature impacts, precipitation resulting in landslides and flooding, wildfires, and sea level rise. These climate impacts have resulted in millions of dollars in damage to the state highway system (p. 19). Road infrastructure and travel patterns ▪ Key goods movement routes in Monterey County include the U.S. 101 and State Route 156. Freight routes in Monterey County are identified as significantly important for the movement of freight, particularly agricultural products, as Salinas Valley is home to the top vegetable producing land in the nation. The U.S. 101 serves as the main north-south corridor for goods movement between Los Angeles and San Francisco and is the primary corridor for goods movement into and out of the Central Coast Counties (p. 31). ▪ State Route 1 between Castroville and Carmel serves as a commute corridor for work trips between Salinas and Marina during weekdays and is the primary route between Santa Cruz and Monterey. State Route 1 provides interregional access to the Monterey Peninsula and coast from the San Francisco Bay Area and Northern California on weekends, holidays and peak travel periods (p. 41). Population growth projections ▪ The population of Monterey County will grow 14% during the 20-year planning period. Sand City and the Salinas Valley cities are expected to have the largest percentage increase in population and housing units (p. 11). Underserved communities in the region (DACs) ▪ The Plan aims to promote equity through proactively reducing the risk of disproportionate impacts from transportation construction or operations; engaging low-income, minority, and low-mobility groups in the transportation planning process; and reducing barriers to safe transportation options for youth and seniors (p. 5). Equity issues ▪ Advancing equity in Monterey County is a core goal of the Regional Transportation Plan, touching on equity across race, income, and geography (p. 5).	Monterey Regional Transportation Plan
Santa Cruz Regional Transportation Plan	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Population growth projections ▪ Underserved communities in the region (DACs)	Climate vulnerability to the region ▪ Santa Cruz County is susceptible to a wide range of climate change effects including increased temperatures, changing precipitation patterns, increased number and severity of wildfires, sea-level rise, extreme weather events, and numerous effects on biodiversity and habitats. The transportation sector has been identified as a major contributor of climate impacting greenhouse gas emissions, and in return the transportation system is impacted by increased flooding, landslides or mudslides, sea level rise, coastal and other erosion, and more frequent and intense heat waves or fires that cause roadways to buckle (p. 147). Road infrastructure and travel patterns ▪ Highway 1 is the key thoroughfare running through the most heavily populated areas of the county. Between Watsonville and the City of Santa Cruz, it is a separated freeway with at least two lanes in each direction, with a few auxiliary lanes that connect on-ramps with the next off-ramps. Highway 1 has the highest average daily traffic volumes (number of vehicles) of all local streets and highways, connects the region with other coastal areas to the north and south, and is roughly parallel to Highway 101 for the middle stretch of the state. Highway 1 is also the county's premier access route to the coast. The rural sections of State Route Highway 1 in the coastal zone are scenic two-lane roads pursuant to California Coastal Act Section 30254 (p. 31). Population growth projections ▪ The population in Santa Cruz County is projected to grow by 9% between 2020 and 2045 (p. 65). Underserved communities in the region (DACs) ▪ Nearly one-third of Santa Cruz County residents—notably children, the elderly and disabled, and low-income individuals and families who cannot afford a car—do not drive a personal vehicle (p. 84). ▪ Figure 3.21 highlights minority and low-income areas in Santa Cruz County identified as disadvantaged communities (p. 82).	Santa Cruz Regional Transportation Plan
San Benito Regional Transportation Plan	▪ Existing electric vehicle charging infrastructure ▪ Road infrastructure and travel patterns ▪ Underserved communities in the region (DACs) ▪ Population growth projections ▪ Community outreach and engagement in the region	Existing electric vehicle charging infrastructure ▪ The success of long-term transportation electrification will depend in part on the near-term deployment of charging infrastructure. In the San Benito region, there are several public electric vehicle charging stations and residential chargers (see Figure 6) (p. 17). Road infrastructure and travel patterns ▪ Within the San Benito region, there are several key goods movement highways, including U.S. 101, SR 156, and SR 129 (p. 60). Population growth projections ▪ San Benito County is projected to grow from 56,445 in 2015 to 74,668 by 2040, representing a 32% increase (p. 46). Underserved communities in the region (DACs) ▪ In San Benito County, 10.8 percent of the population lives below the poverty line (p. 35).	San Benito Regional Transportation Plan

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
		Community outreach and engagement in the region ▪ Interested parties expressed support for local roadway maintenance and improvements to State Route 25, as well as a desire for healthier, more walkable, and bike-friendly communities (p. 16).	
Electric Vehicle Infrastructure for the Monterey Bay Area	▪ Existing electric vehicle charging infrastructure ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Public process in the region	Existing electric vehicle charging infrastructure ▪ Level II and Level III charging are most appropriate for public use, where people are parked for shorter periods of time, because of their ability to deliver a charge quickly (p. 18). ▪ Map of existing and planned stations in AMBAG 2013 – only levels 1 and 2 (p. 48). ▪ An electric vehicle charging with a Level II EVSE at 220 V on a 15-amp circuit can draw 3.3 kilowatts of power, the equivalent of a typical household (p.22). Road infrastructure and travel patterns ▪ In 2005 the AMBAG region drove 16,075,936 miles a day (p. 11). Energy demand forecasts ▪ New charging stations put an increased demand on the grid and therefore on local transformers. Coordinating with PG&E is the only way to ensure that the demand and grid infrastructure improvements can be managed in such a way that the chance of overloading the grid is minimized or eliminated (p. 61). Public process in the region ▪ Ensure local governments adopt supportive policies, including streamlined EV charging station permit processing and increased number of EVs in their fleets (p. 64).	Electric Vehicle Infrastructure for the Monterey Bay Area
Charging up the Central Coast: Policy Solutions to Improve EV Charging Access in Watsonville	▪ Existing EV charging infrastructure ▪ Energy demand forecasts ▪ Underserved communities (DACs) ▪ Equity issues ▪ Community outreach and engagement in the region	Equity issues ▪ Low and medium-income residents will face barriers to the 2035 statewide goal of ending the sale of internal combustion engine passenger vehicles. This is due to lower home ownership rates and higher rates of tenancy in apartment buildings, those who don't own garages, and inadequate grid infrastructure to support electrical loads required for vehicle chargers in lower-income areas (p. 8). ▪ Barriers include insufficient planning and mapping to identify and deploy EV chargers, high cost of installing; high cost of installing, operating and using chargers; and limited public awareness, education, and outreach (p. 10). ▪ While about half of all public Level 2 and Direct Current Fast Chargers (DCFCs) in California are deployed in low-income communities, low-income communities have fewer Level 2 chargers per capita (p. 17). Underserved communities (DACs) • The study focused on Watsonville due to its diversity (p. 8). Watsonville also straddles two disadvantaged communities (DACs) as defined under Senate Bill 535 (De León, 2012), covering most of the southern part of the city and including the downtown area (p. 13). • Chargers are available at the locations and times necessary for users in priority communities (p. 8). • Respect for the privacy of those charging, to allow people of all backgrounds to charge without fear of discrimination (p. 9). Energy demand forecasts • 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 (p. 8). • Granular data collected by public charging transactions, collated in a simple manner to encourage better siting decisions (p. 8). Community outreach and engagement in the region • 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 (p. 8). Existing EV charging in the region • Existing policies include Zero-emission Vehicle Regulation, Clean Cars 4 All, Low Carbon Fuels Standard (p. 14). 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 (p. 15).	Charging up the Central Coast - Watsonville.pdf
PG&E Climate Vulnerability and Adaptation Plan (Executive Summary)	▪ Climate vulnerability to the region	Climate Vulnerability in the Region • How rising average and extreme temperatures, extreme storms and flowing, sea level rise, and wildfire, may impact PG&E's ability to provide safe and reliable energy to the communities it is serving (p. 2). • Electrical assets such as transmission and distribution are at high risk of high heat and wildfire (p. 5). • Gas assets such as compression and processing storage are at high risk of heavy rain and flooding as well as sea level rise (p. 5). • Power generation assets such as hydropower are at high risk of heavy rain and wildfire (p. 5).	CAVA-executive-summary.pdf

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
		Recommendations from the communities PG&E is serving are (p. 7): ▫ Center equity ▫ Expand weatherization programs, ▫ Provide distribution of free safety resources. ▫ Provide direct reimbursements. ▫ Maximize enrollment and longevity. ▫ Improve energy notifications. ▫ Enable the expansion of distributed energy resources. ▫ Expand urban greening. ▫ Improve emergency evacuations. ▫ Invest in and expand existing workforce.	
AMBAG Central Coast Highway 1 Climate Resiliency Study (Executive Study)	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns	Climate vulnerability in the region ▪ The eight-mile stretch of Highway 1 through Elkhorn Slough is a critical transportation asset for the region and beyond and is vulnerable to sea level rise. It is essential to freight movement and the economy and is a major community route connecting two regionally important cities (Monterey and Santa Cruz) (p. 11). ▪ With two feet of sea level rise, major disruptions to Highway 1 transportation function are anticipated (p. 11). ▪ The refined flood hazard mapping indicates Highway 1 will be impacted by a 100-year flood by 2030 (less than one foot of sea level rise), and by monthly high water by 2050 (about 2 ft of sea level rise) (p. 14). ▪ Choosing not to adapt to sea level rise will result in widespread loss of coastal habitat, significant transportation impacts and economic losses (p. 18). ▪ Adaptation needs to be in place by 2050 to ensure benefits to transportation and habitats (p. 18). Road infrastructure and travel patterns ▪ Allowing the roadway to flood would limit access to transportation for DACs (p. 13). ▪ Widening Highway 1 to four lanes would provide the greatest relief to congestion and delay, leading to less time spent on the roadway and greater ease of travel (p. 13).	Central Coast Highway 1 Climate Resiliency Study.pdf
Capitola Climate Action Plan (CAP)	▪ Public process in the region	Public process in the region ▪ Measures related to EVs include supporting the local uptake of EVs by providing incentives and considering free parking spaces for EVs in the Village and Beach parking lots (p. 69). Also requiring new major non-residential development to include designated or preferred parking for vanpools, carpools, and EVs (p. 72).	Capitola Climate Action Plan.pdf
Monterey Climate Action Plan (CAP)	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region ▪ Public process in the region	Existing EV charging infrastructure ▪ Major GHG reductions in Monterey are projected to come from EV charging installations (p. 24). ▪ The City currently has four EV parking spaces (p. 43). Public process in the region ▪ Actions relating to EVs include replacing the City fleet with EVs and hybrids as cars age out. Climate vulnerability to the region ▪ In April 2009, Monterey adopted an updated report and map detailing fire hazard zones within and surrounding Monterey. City staff also participate in regional efforts to evaluate and address sea level rise and the loss of shoreline (p. 29).	Monterey Climate Action Plan.pdf
Santa Cruz County Climate Action and Adaptation Plan (CAAP)	▪ Climate vulnerability to the region ▪ Public process in the region	Public process in the region ▪ Actions related to EVs include to prioritize the transition to EVs using a standardized vehicle replacement schedule, providing an evaluation of the cost difference between different types of EVs and available charging stations, installing new EV charging infrastructure at select County-owned properties for use by public, and supporting a cost recovery system of EV charging stations on County facilities during the normal work week – moving to market rate charge facilities only during evenings and weekends (p. 40). Climate vulnerability to the region ▪ Climate hazards related to Santa Cruz County include extreme heat, wildfire, landslides, riverine and stormwater flooding, sea level rise, and sea water intrusion. Other notable hazards include air quality and drought. These hazards pose a threat to vulnerable populations, natural resources, and buildings, services, and infrastructure (p. 25).	Santa Cruz County Climate Action and Adaptation Plan.pdf

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
Watsonville Climate Action and Adaptation Plan (CAAP) Executive Summary	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region	Existing EV charging infrastructure ▪ The largest contributor to Watsonville's GHG emissions is gas-powered cars and trucks. 22% of the solution to lowering the GHG emissions are to facilitate EV infrastructure through the EV master plan, public-private partnerships, and getting people into EVs equitably through state and federal grants and partnerships with nonprofits and Central Coast Community Energy (p. 4). Another major goal is to electrify the City fleet as 4% of the solution (p. 5). Climate vulnerability to the region ▪ Climate adaptation focuses on strategies for energy and agricultural resilience to address issues such as the strain on the electrical grid because of increasing temperatures and reduced agricultural productivity and food security due to droughts (p. 6). ▪ Climate adaptation measures include (p. 6): ▫ Preparing for flooding, wildfires, extreme heat, and sea level rise. ▪ Improving grid resilience and having power backups and critical City facilities (p. 6).	Watsonville Climate Action and Adaptation Plan.pdf

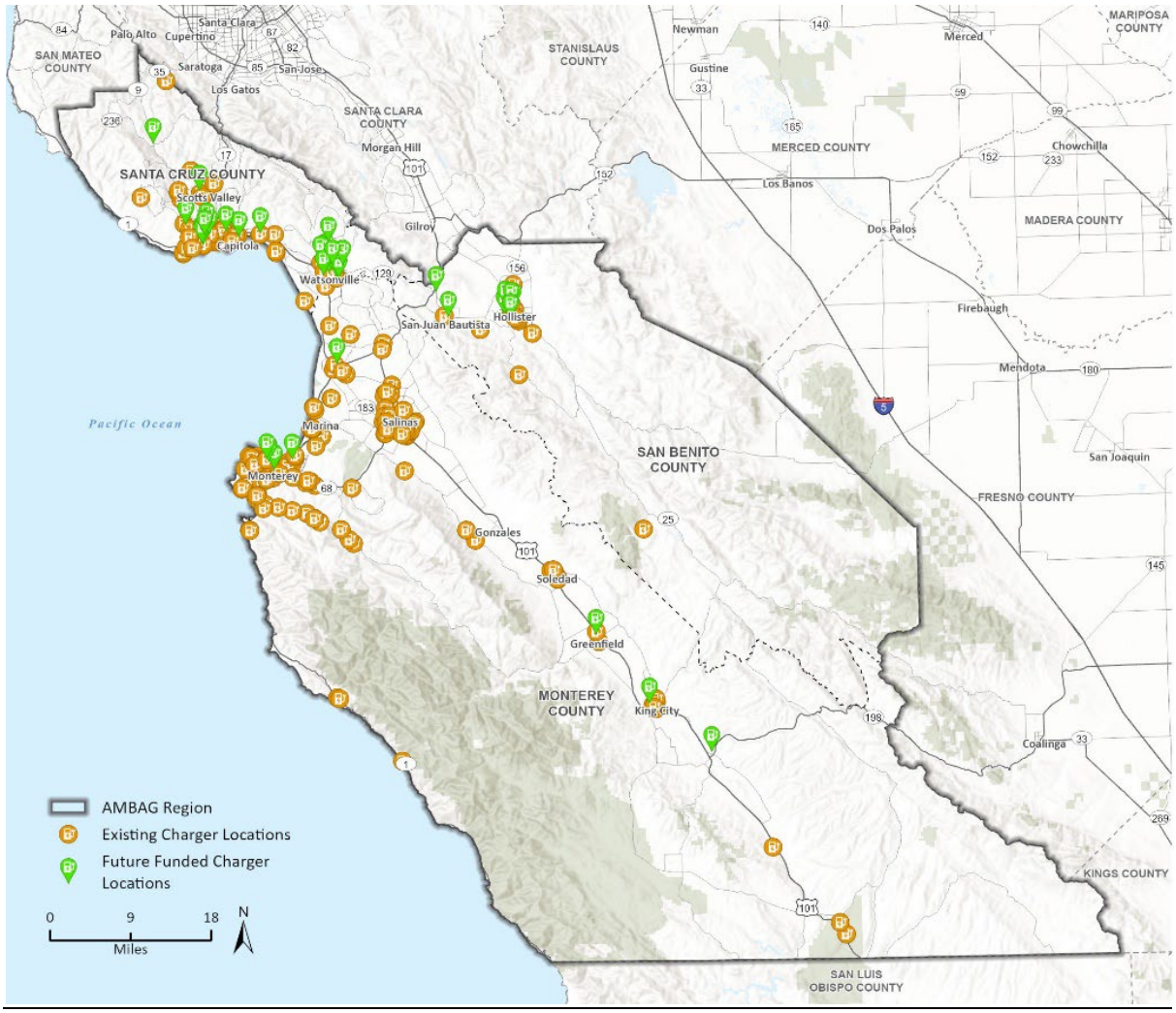
3 Baseline Conditions

3.1 Existing Charging Locations

Figure 1 displays a map of the existing and planned, future funded publicly available Level 2 and DC Fast EV charging locations in the AMBAG region. The orange dots are current EV chargers based on the US Department of Energy's Alternative Fuels Data Center as of December 9th, 2024. The green dots represent planned, future funded charger locations based on the Santa Cruz County CFI application award.

As seen on the map, most of the current public charging landscape in the region is centralized around urban-dense cities such as Santa Cruz, Monterey, and Salinas, and along the major highways such as the US-101 and coastal routes along Highway 1. The future funded charging locations follow similar patterns to the existing charging landscape but with more placement along inland routes leading to southern parts of Monterey County.

Figure 1 Existing EV Charger Locations from the US Department of Energy's Alternative Fules Data Center



3.2 Existing Travel Patterns

The travel pattern analysis consisted of two primary components: To assess the regional travel behavior for all vehicle types and to assess how EV specific travel behavior differs from the baseline. The goal of this analysis was to gain insights into potential shifts in travel behavior as EV adoption accelerates and ICE vehicles transition to EVs. Additionally, the analysis aimed to highlight differences in travel patterns between EVs and ICE vehicles to assess how EV mobility may evolve over time. This evaluation provides insight into where people are currently driving EVs, where they may travel in the future, and how those patterns could align more closely with existing ICE travel behaviors, supporting a broader resilience analysis of EV charging.

The existing travel patterns analysis was done using Replica, a location-based scenario model looking at trips within the AMBAG region on an average Thursday in 2024. The analysis comprised four primary components, beginning with a comparison of the existing road networks, to identify the most frequently traveled routes by EVs compared to ICE vehicles. Additionally, the analysis included examining major trip destinations and highlighting key locations frequently visited by EVs compared to ICE vehicles. It also involved evaluating major trip origins to identify differences in the typical origin points for trips by EVs versus ICE vehicles. Finally, average trip lengths were assessed and compared between ICE and EV's to identify travel distance variation between the two groups.

Network Link Volumes

Figure 2 and Figure 3 illustrate the differences in road usage by EVs compared to ICE vehicles. It's important to note that the scales used in these figures are not directly proportional due to the relatively lower volume of EVs. However, the figures effectively highlight the distinct travel patterns of each vehicle type. Key observations from this analysis reveal that EV travel is primarily concentrated along connecting routes between and within cities, utilizing smaller roads adjacent to major highways. In contrast, ICE vehicle trips predominantly utilize major highways, such as the US 101. Additionally, the EV patterns align with areas where charging infrastructure is already established, including Santa Cruz, Monterey, and Salinas, underscoring infrastructure availability as a factor influencing current EV travel behaviors. It is unclear whether the presence of chargers reflects the higher demand from EV's in those areas, or if EV's frequent those areas due to the presence of EV charging infrastructure.

Figure 2 EV Network Link Volumes

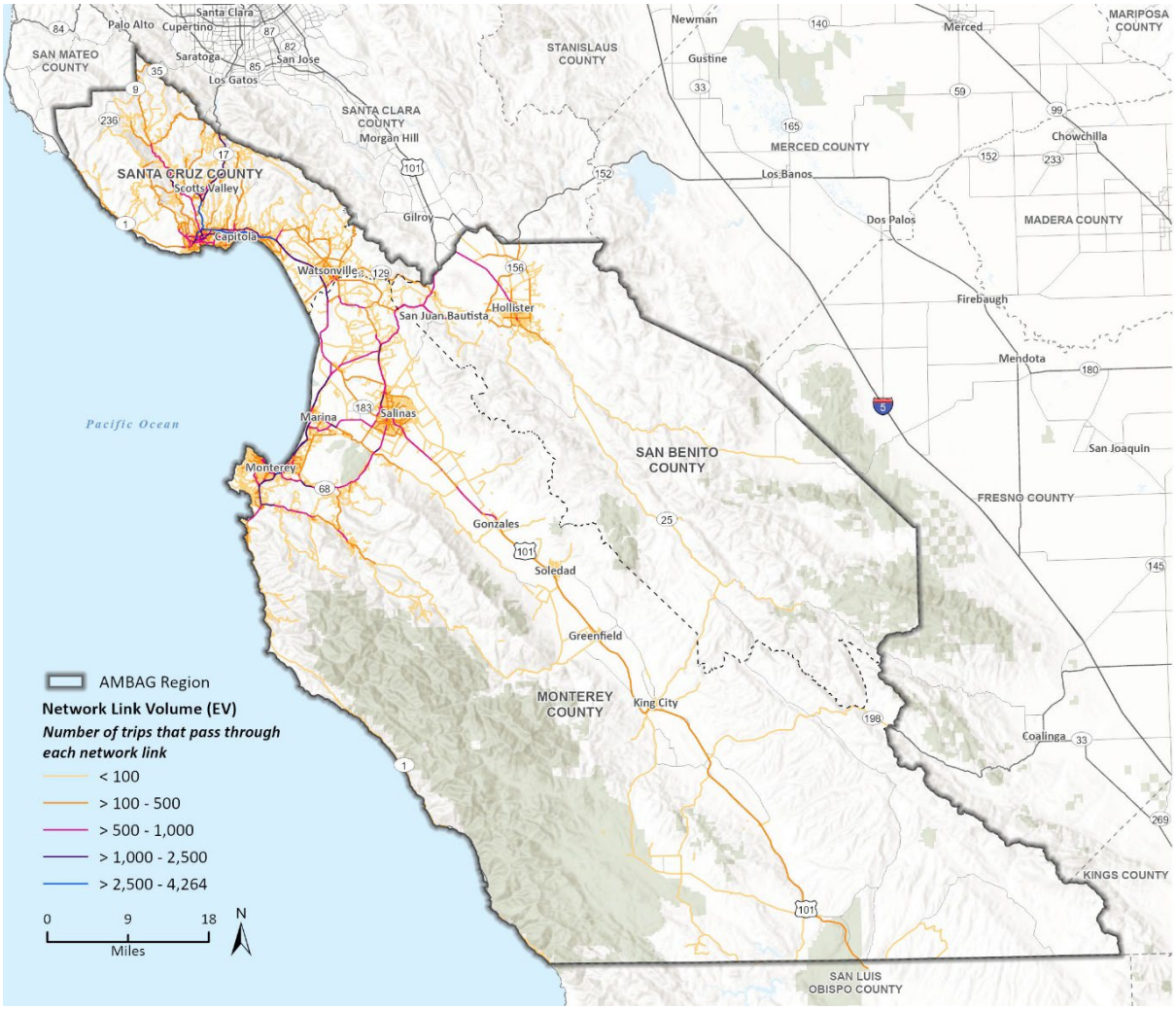
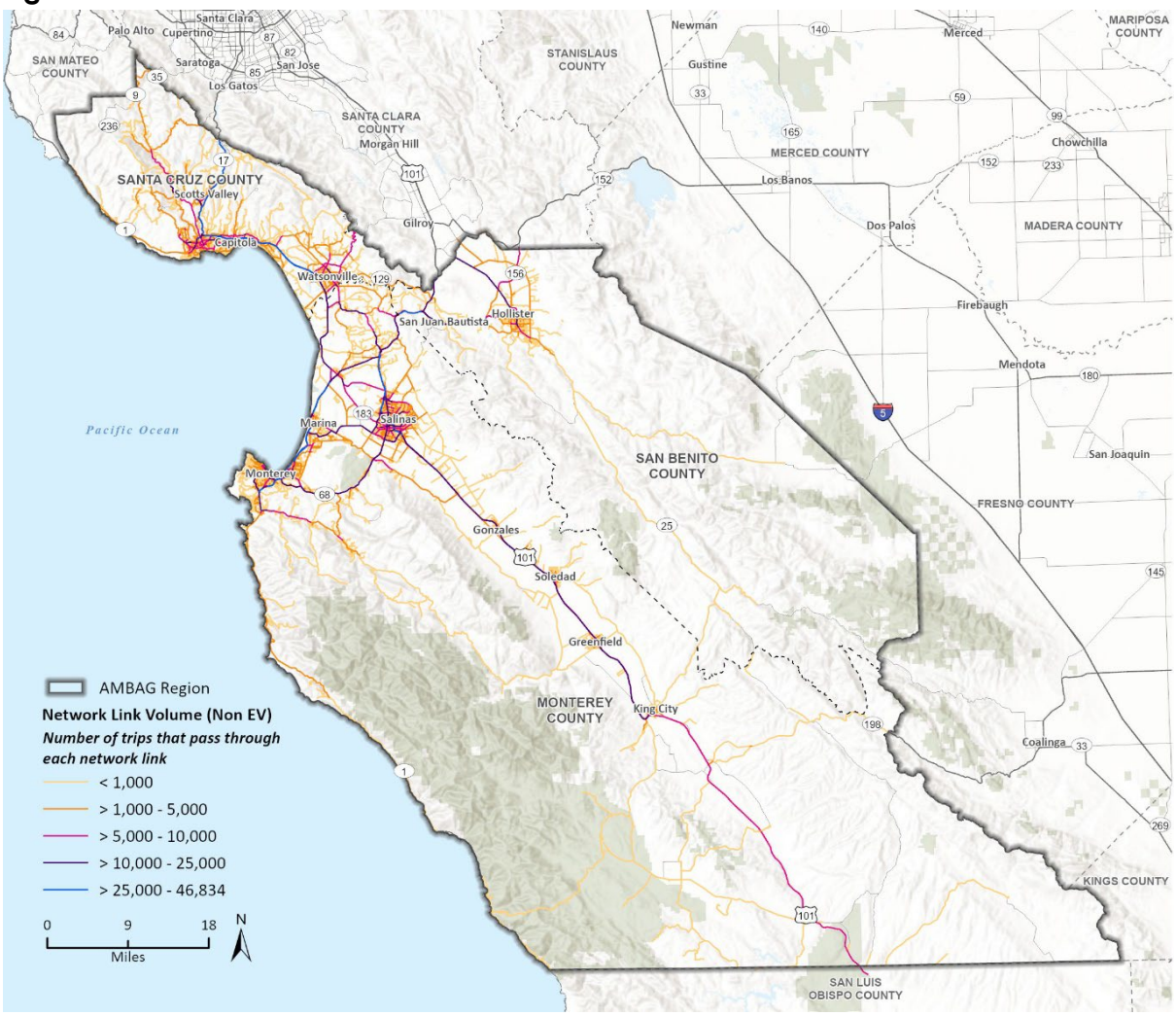


Figure 3 ICE Vehicle Network Link Volumes



Trips by Destination

Figure 4 and Figure 5 compare destination patterns for EVs and ICE vehicles, showing trends similar to those shown previously in Figure 2 and Figure 3. Again, it is important to note that the scales differ due to the comparatively low volume of EV trips represented. ICE vehicle trips end across a significantly broader area, evident by the wider presence of high-density urban zones represented by orange and yellow shading. In contrast, EV trips demonstrate a more concentrated pattern, confined to fewer specific zones. Additionally, many rural regions such as Gonzales, King City, and the Big Sur region exhibit minimal to no EV trip activity, a discrepancy likely influenced by limited charging infrastructure availability, lower overall EV adoption rates in those areas, or lack of trip data available through the Replica platform (due to small sample sizes). Range anxiety may also play a factor as more rural areas must travel greater distances on average.

Figure 4 EV Trips by Destination

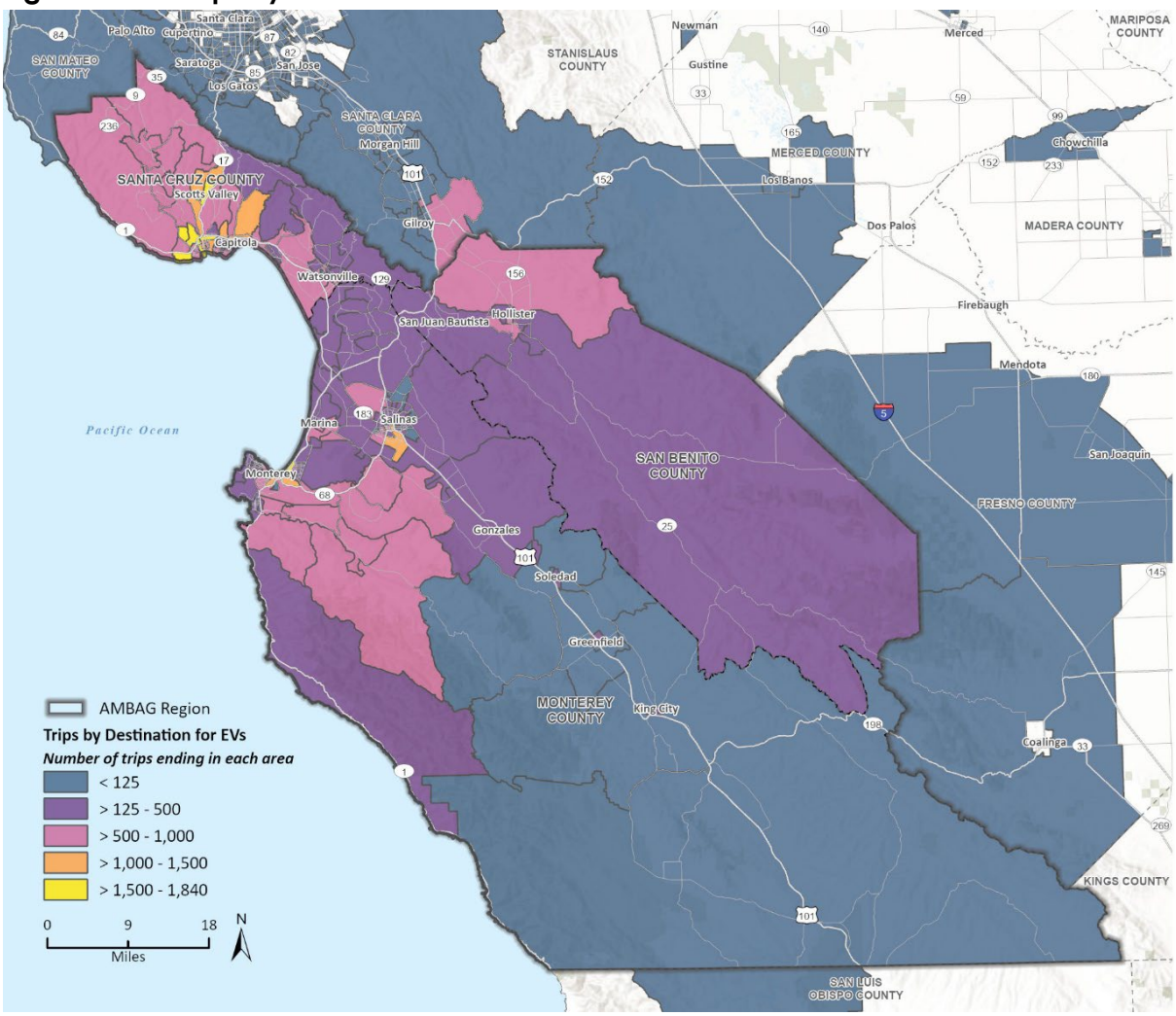
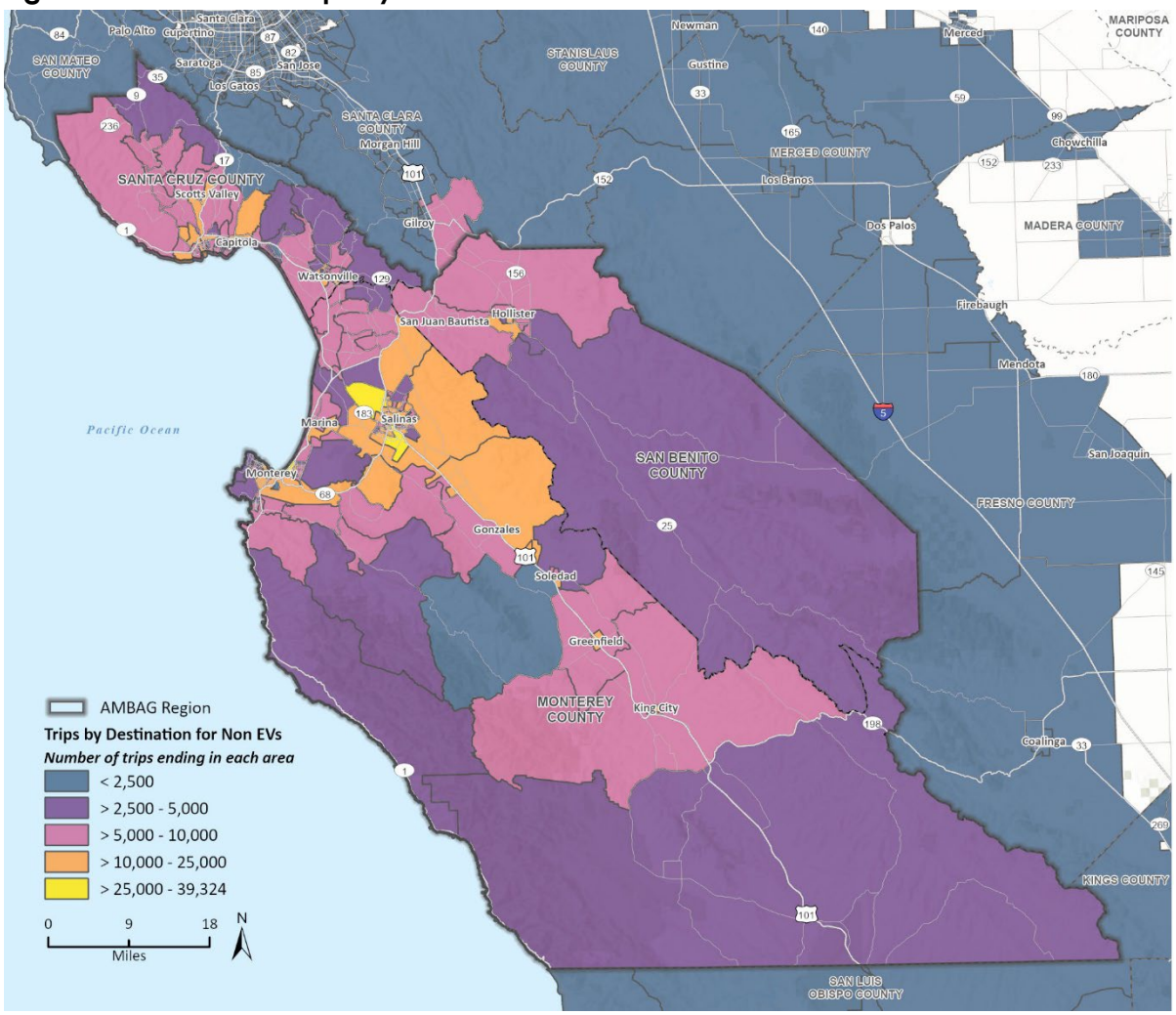


Figure 5 ICE Vehicle Tips by Destination



Trips by Origin

Figure 6 and Figure 7 compare the origins of EV trips with those of ICE vehicle trips, again noting differences in the scale due to lower volumes of EV trips recorded. ICE vehicle trips show significantly higher origin densities spread broadly across the region, with numerous locations exceeding 10,000 trips. Higher density of trips is indicated by yellow and orange zones. In contrast, EV trip origins remain concentrated primarily within urban and suburban areas. This concentration suggests lower EV adoption rates in rural areas, potentially due to fewer residential charging opportunities, limitations in the vehicle data captured by Replica for these regions, or concerns regarding vehicle range caused by limited public charging infrastructure. Overall, ICE trips originate from a diverse and expansive set of locations, whereas EV trips are predominantly initiated within fewer, more densely populated areas.

Figure 6 EV Trips by Origin

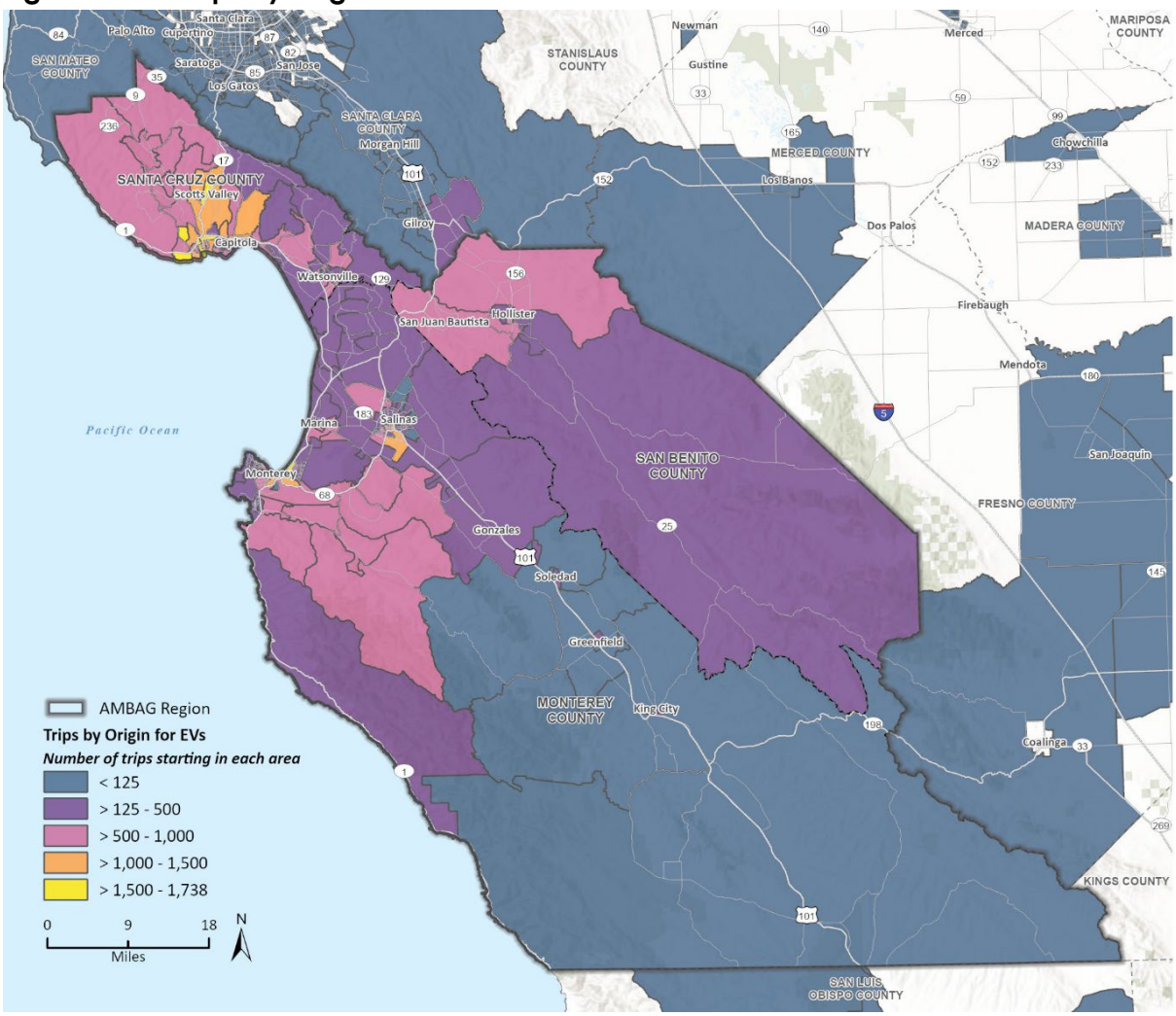
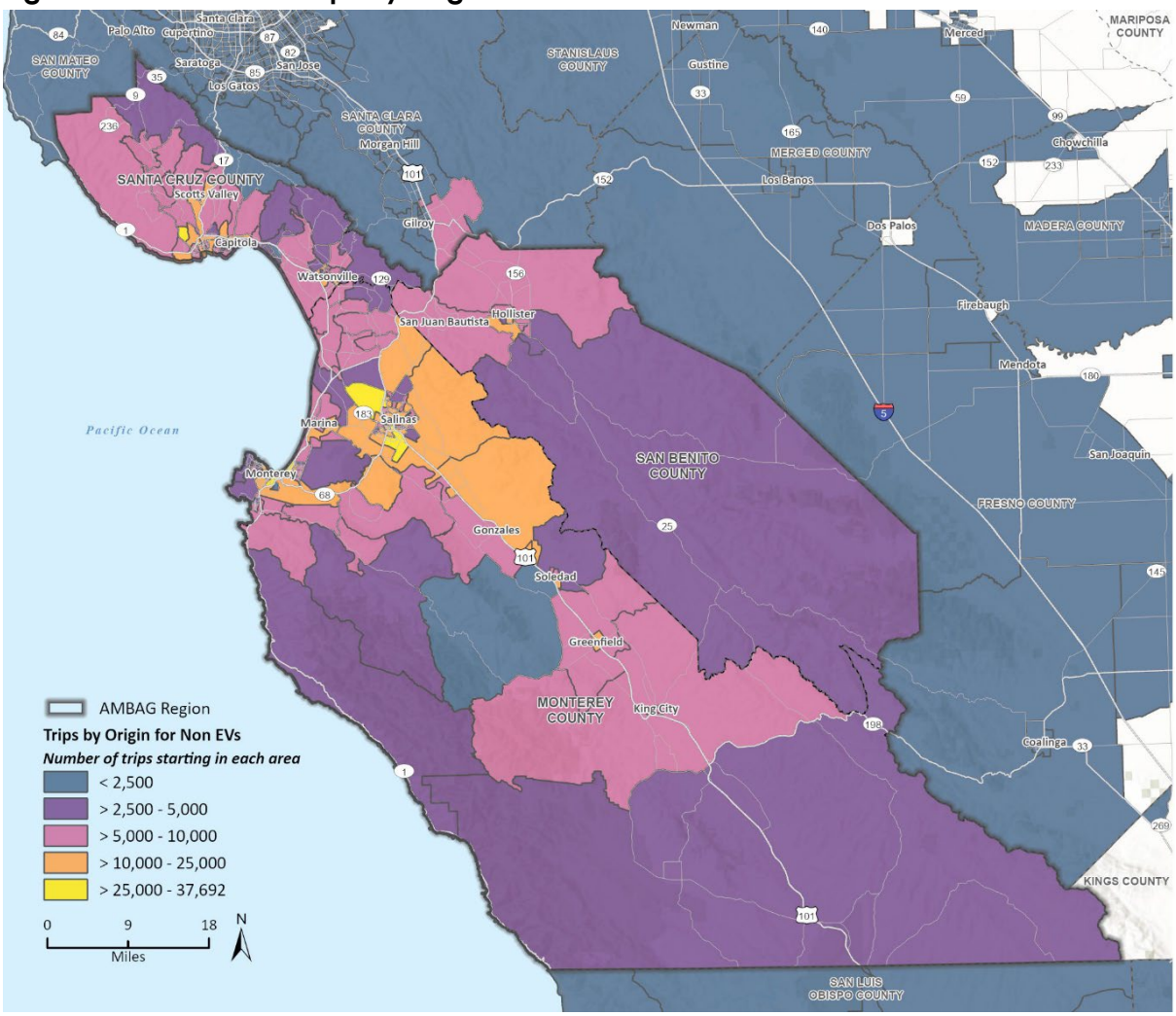


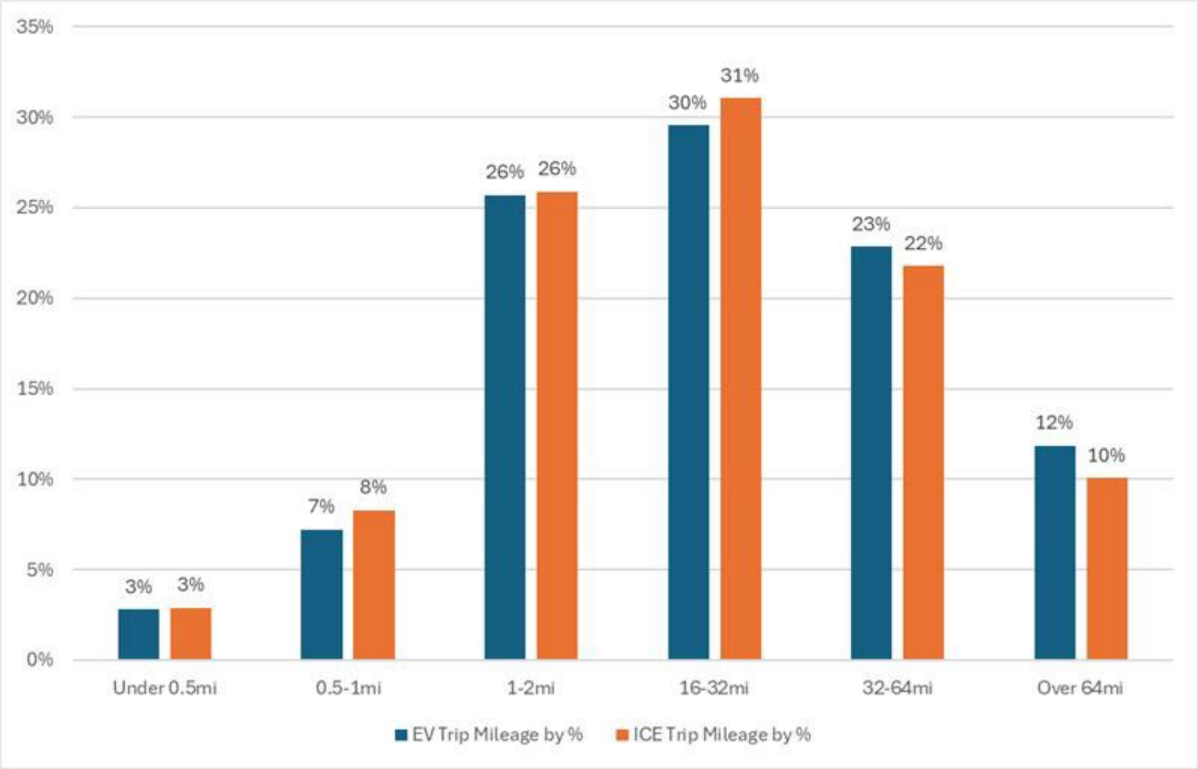
Figure 7 ICE Vehicle Trips by Origin



Average Trip Lengths

Lastly, Figure 8 presents a comparison of EVs versus ICE vehicle trips based on trip distance. Notably, mid-range trips spanning 32 to 64 miles and beyond exhibit a higher percentage of EV trips versus ICE vehicle trips. Alternatively, shorter-distance trips, 0-32 miles, show a higher percentage of ICE vehicle percentage when compared to EVs. The primary insight from this analysis is that shorter distance trips have a higher propensity towards ICE vehicles and longer distance trips tend to lean more towards EV use.

Figure 8 Average Trip Length EVs vs ICE Vehicles (Normalized)



Key Findings

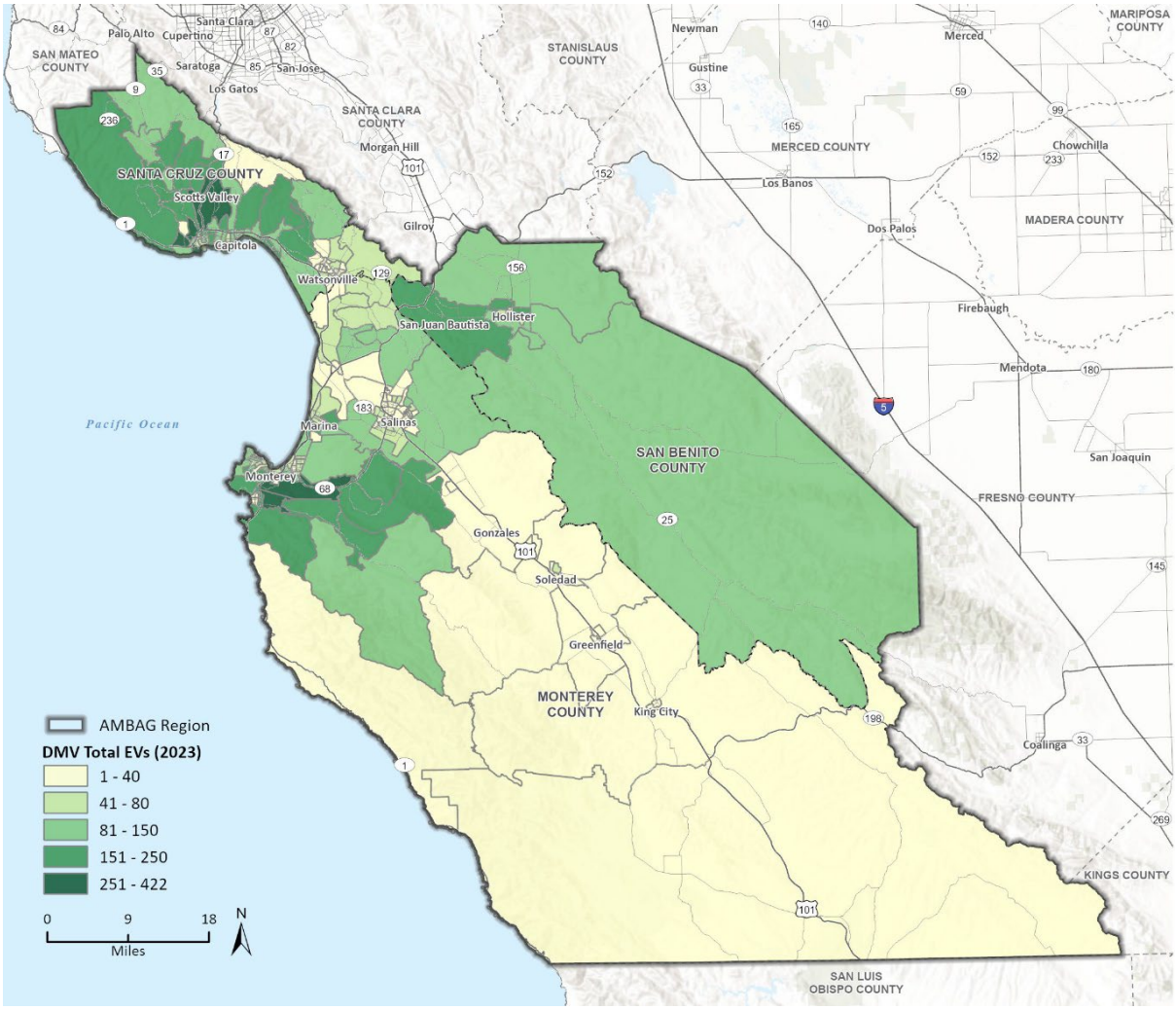
The travel pattern analysis highlights the slight differences between EVs and ICE vehicles across the region. EV travel is notably concentrated in urban and suburban areas with established charging infrastructure, suggesting infrastructure availability could influence current EV usage patterns. In contrast, ICE vehicles show broader utilization of road networks, originating from and ending in a wider variety of locations, including rural areas with limited EV activity. These differences could also be due to the overall lower vehicle data availability on Replica in more remote locations. The analysis also highlighted that longer commutes have a higher propensity towards EVs than shorter distance trips. Possible explanations include cost savings on fuel for longer-distance drivers or commuters leveraging EVs for HOV lane access, especially when commuting into the Bay Area. Overall, this indicates that current EV drivers commuting longer distances are unlikely to experience significant range anxiety.

3.3 Existing EV Ownership

The data utilized for the Existing EV Ownership analysis originates from the 2023 Department of Motor Vehicles (DMV). According to this dataset, the total number of EVs in the region in 2023 was 15,816. As illustrated in Figure 9, Carmel-by-the-Sea, Scotts Valley, and Santa Cruz exhibit the highest concentrations of EV ownership. Other areas demonstrating notable, though comparatively lower, EV ownership include San Juan Bautista, Swanton, Monterey, and Corralitos. In contrast, locations with minimal EV ownership include Salinas, the southern portion of Monterey County—from Gonzalez extending southward to Nacimiento—and Watsonville.

The EV ownership trends in Figure 9 do not fully align with the existing public charger locations depicted in Figure 1. Many current and planned public chargers are in areas such as Watsonville, Hollister, Salinas, Capitola, and southern Monterey County regions along the US 101 corridor—locations that currently exhibit relatively low EV ownership concentrations as seen in Figure 9. Since many EV drivers in the region are relying on publicly available charging for their vehicle, it is important to note that the alignment of publicly available chargers existing in 2024 does not match where many EV owners live.

Figure 9 2023 EV Ownership



4 Forecast

4.1 Methodology for EV Forecasting

This section outlines the approach to forecasting future EV charging based on adoption and electrification trends. For this analysis, E3 leveraged its "Forecasting Anywhere Model" to evaluate the expected growth of EVs and identify the charging infrastructure needed to sustain the growth effectively through 2050. This section also looks at the EV forecasting performed by DKS in the Central Coast Zero Emission Vehicle (CCZEV) Strategy.

Both the Forecasting Anywhere Model and the CCZEV Strategy employ approaches to identify optimal locations for EV charging infrastructure. However, the Forecasting Anywhere Model's methodology emphasizes granular forecasting of EV adoption tied to the 2023 Integrated Energy Policy Report.[1] The Additional Achievable Transportation Electrification (AATE Scenario 3) scenario for EV growth was used for the baseline. AATE 3 includes estimates of sales proportions of vehicle fuel type as well as impacts from Advanced Clean Cars II and Advanced Clean Trucks and is the recommended scenario for planning. Under this scenario 45% of statewide VMT is zero-emission by 2035. The Forecasting Anywhere model then specially allocates charging based on a variety of geospatial datasets including parking lots and buildings and parcel/zoning code considerations. Finally, the model looks at propensity to adopt EV and EV charging infrastructure based on demographic information which varies across charger types.

In contrast, the CCZEV Strategy looked at fewer but more specific charging station locations that were identified as priorities due to the focus on unincorporated corridors in the study area. The prioritization was based on a weighted scoring system focused on regional transportation corridors, prioritizing highway interchanges and areas of high community demand based on community engagement. This process resulted in the selection of the top 10 locations for public chargers across each of the three counties in AMBAG territory.

Because of the differences in methodology, the comparison was not meaningful as the Forecasting Anywhere Model and the CCZEV Strategy fill different roles in forecasting EV charger adoption. Therefore, this analysis combines each of these data points by identifying the CCZEV sites as planned future charging sites and leveraging the Forecasting Anywhere model to look farther out over time and across multiply charger types including residential level 2 (L2) charging which will allow for a more detailed grid impact analysis.

As seen below in Figure 10 and Figure 11, the CCZEV looks at 10 priority EV charger sites within each County whereas the Forecasting Anywhere Model looks at predicted EV charging infrastructure across all charger types and across multiple years. Despite differences in their methodologies, the results from both analyses show overlap regarding priority areas for EV charging. In Santa Cruz County, both studies highlighted the corridor between Watsonville and Scotts Valley as a significant area for expected growth and charger prioritization. Differences arise in Monterey County, with the CCZEV identifying priority sites primarily around the intersection of Highway 1 and Holman Highway, whereas the Forecasting Anywhere Model focused on areas slightly west of this location. Both analyses overlap on prioritizing San Juan Bautista, Hollister, and Salinas as key locations for EV charging infrastructure growth. However, differences emerge further south along Highway 101; the

[1] https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report-iepr/2023-integrated-energy-policy-report

CCZEV identifies the southern region of Monterey County as a high-priority area, whereas the Forecasting Anywhere Model did not forecast substantial EV adoption growth in this region.

The differences between these two results show how community priorities and baseline forecasted projections (such as who is most likely to purchase and drive an EV based on current trends) can inform decisions. While the Forecasting Anywhere Model results will inform analysis on overall grid impacts and projected adoption rates, community driven feedback on charging needs and priority locations will continue to be important.

Figure 10 CCZEV EV Charging Site Prioritization

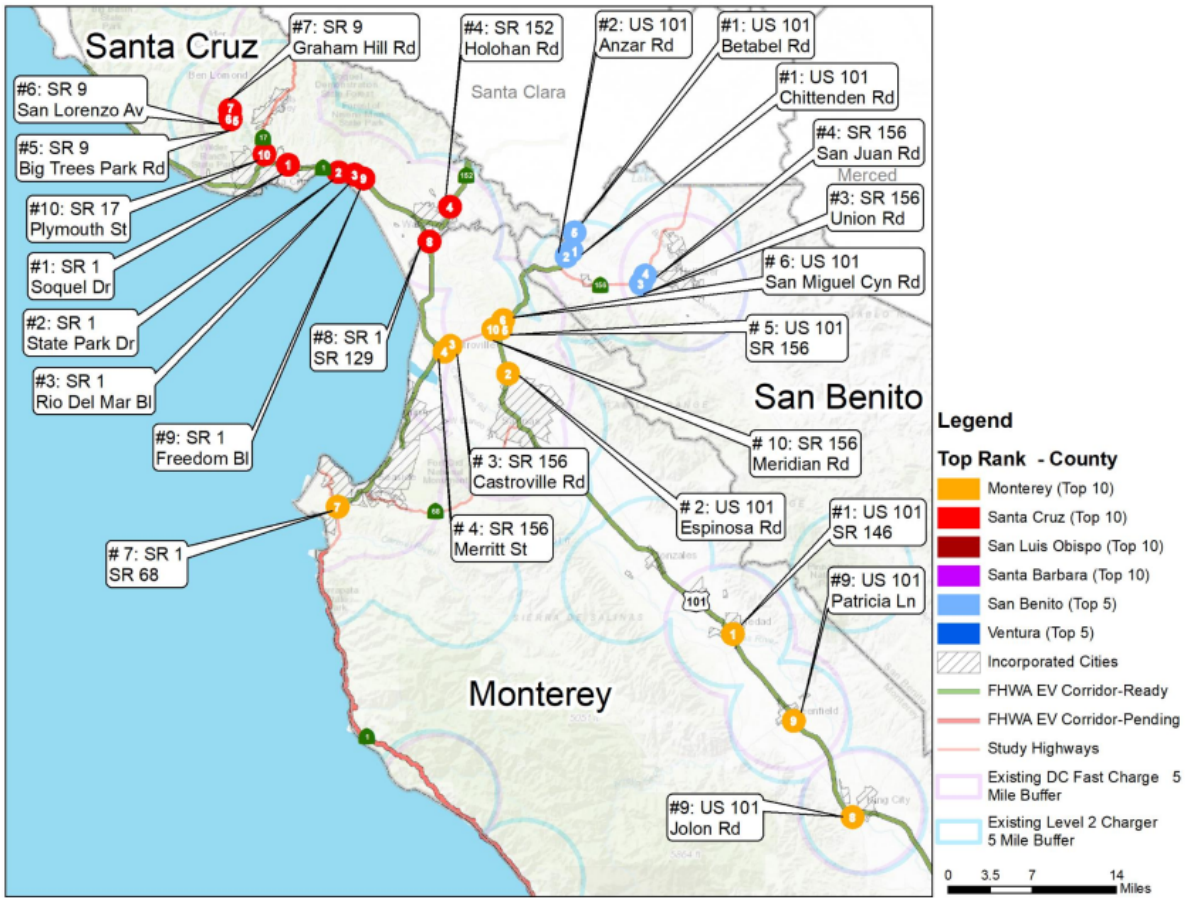
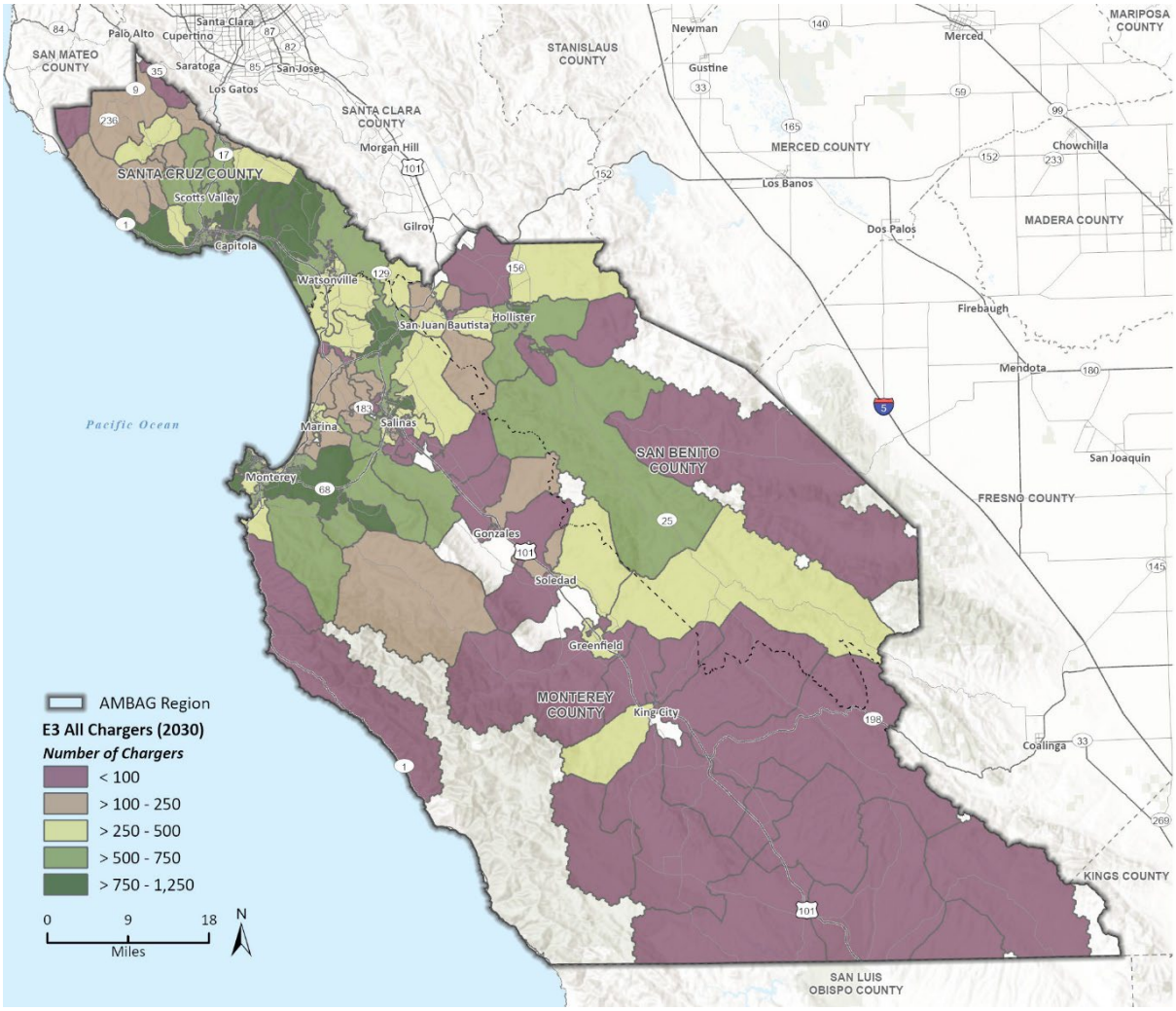


Figure 11 2030 Forecasting Anywhere Model Charging Forecast (All Charger Types)



4.2 Total Achievable % of EV Chargers

The Forecasting Anywhere model provides an estimate of both home (L2) and public (DCFC + L2) chargers that are expected to be installed between 2024 and 2050. These estimates are displayed in a percentage of technical potential below. The technical potential is defined as the total number of locations available for EV charger installations for each EV type. For home L2 chargers, this number would be essentially the number of homes/home parking spaces in AMBAG territory. For public chargers, feasible locations include locations such as public parking spaces. Table 2 summarizes EV charger installation as a percentage of the technical potential over time.

Table 2 Percentages of the total achievable percentage of EV Chargers in the region

	Forecast Year					
EV Adoption (% of Technical Potential)	**2024**	**2030**	**2035**	**2040**	**2045**	**2050**
Monterey County						
Home L2	1%	5%	10%	15%	18%	20%
Public (L2 + DCFC)	0%	3%	7%	10%	13%	14%
Total	1%	5%	10%	14%	17%	19%
San Benito County						
Home L2	1%	6%	12%	17%	20%	23%
Public (L2 + DCFC)	0%	3%	5%	7%	8%	9%
Total	1%	6%	10%	15%	18%	21%
Santa Cruz County						
Home L2	1%	7%	12%	17%	20%	23%
Public (L2 + DCFC)	0%	4%	9%	13%	15%	17%
Total	1%	6%	12%	16%	19%	22%
AMBAG Territory Total						
Home L2	1%	6%	11%	16%	19%	22%
Public (L2 + DCFC)	0%	4%	8%	11%	13%	15%
Total	1%	5%	10%	15%	18%	20%

4.3 Forecasting Anywhere Model

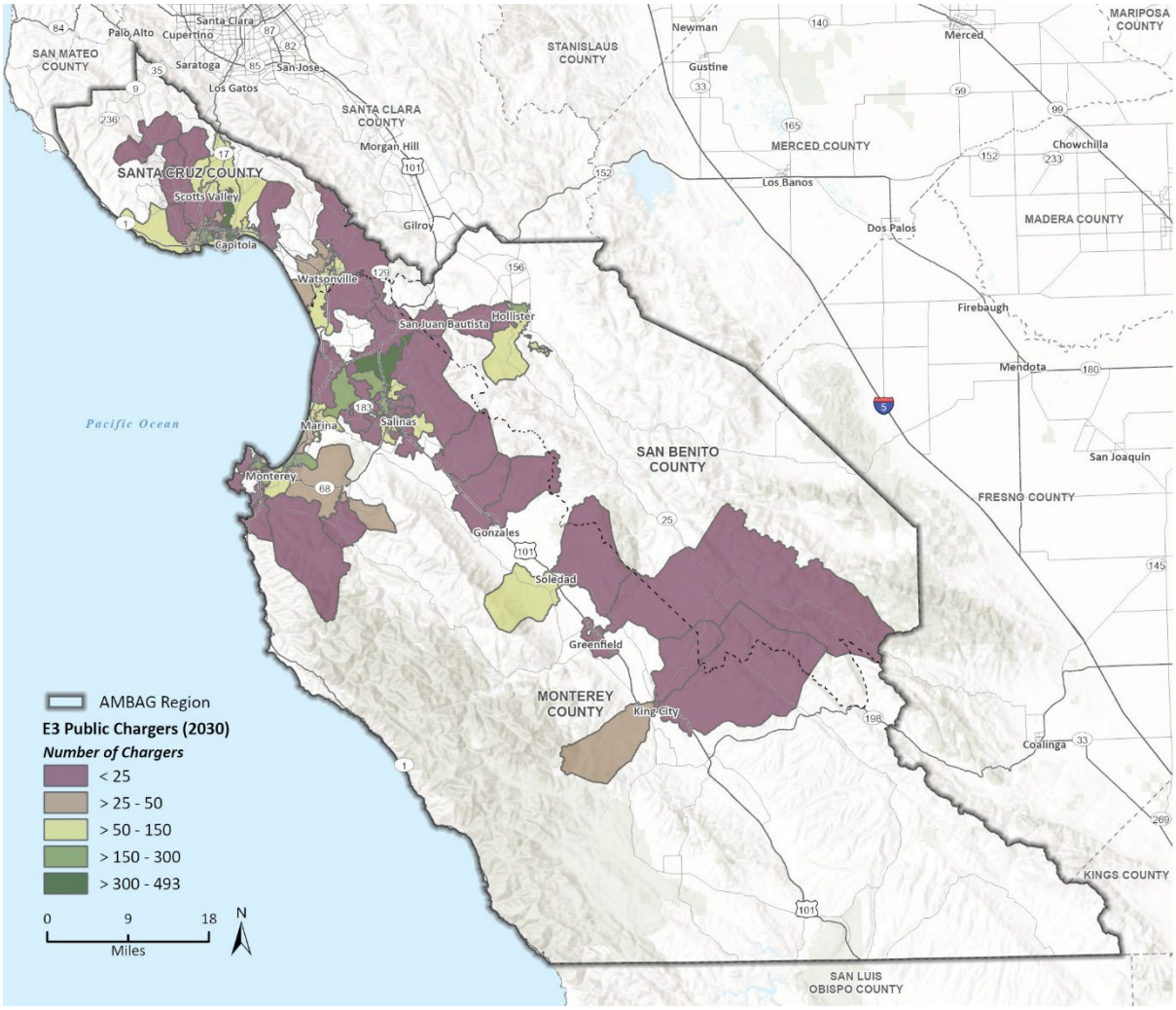
2030 Forecast

Public Charging (L2 and DCFS)

According to projections from the Forecasting Anywhere model for the year 2030, the AMBAG region is anticipated to require approximately 4,998 additional public chargers from the base year (2023), encompassing both Level 2 (L2) and Direct Current Fast Chargers (DCFC). Statewide, AB2127 establishes a goal of 700,000 shared private and public EV chargers by 2030 to support 5 Million ZEVs. The Forecasting Anywhere model projections consider EV demand alongside existing infrastructure conditions and constraints and include detailed hourly electricity demand forecasts based on expected charging load profiles. When comparing this forecast in Figure 12 with the existing public charger locations shown in Figure 1, it illustrates that the region between San Juan

Bautista and Monterey will experience increased demand for public chargers. Additionally, there is a notable anticipated demand for public charging infrastructure and gap in existing conditions near Soledad and to the south of Hollister, highlighting key areas that will require focused infrastructure development efforts in the coming years.

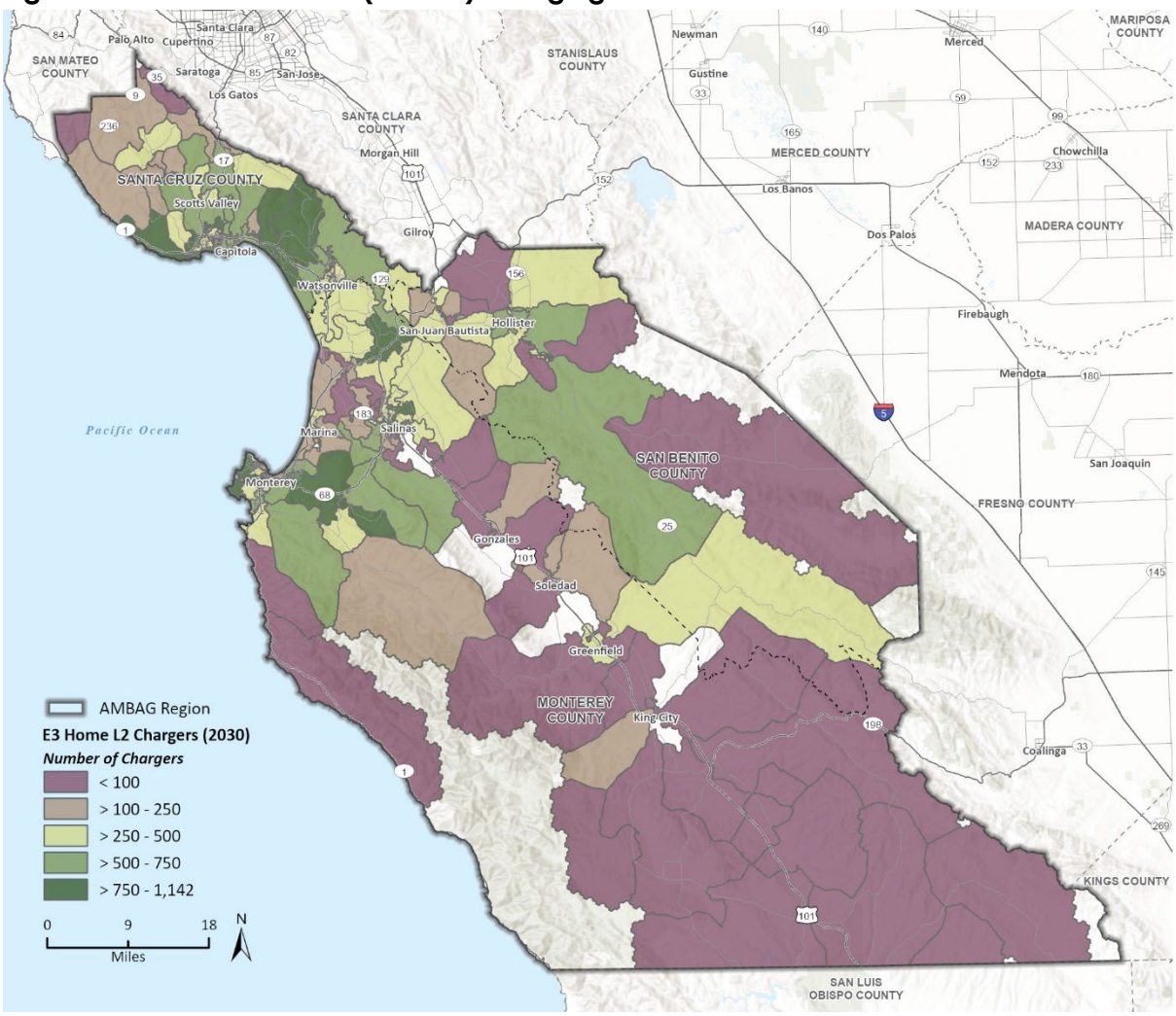
Figure 12 2030 Public Charging Demand



Level 2 Residential Charging

This analysis in Figure 13 examines projected residential L2 charging demand for the year 2030, with an additional 34,970 residential chargers expected to be installed beyond the base year estimates, which is nearly three times the number projected for 2025 based on the Forecasting Anywhere Model. As this assessment specifically addresses residential charging based directly on EV demand, the results are assumed to closely mirror anticipated EV ownership patterns. When compared to the EV ownership data from 2023, presented in Figure 9, notable growth trends emerge. Specifically, EV ownership is projected to significantly increase between Watsonville and Scotts Valley, along with substantial expansion around Monterey, particularly near Highway 68. Additionally, San Benito County is expected to experience new growth in EV ownership, notably between Hollister and the City of San Benito, with San Juan Bautista anticipated to nearly double its current EV ownership rates.

Figure 13 2030 Residential (Level 2) Charging Demand

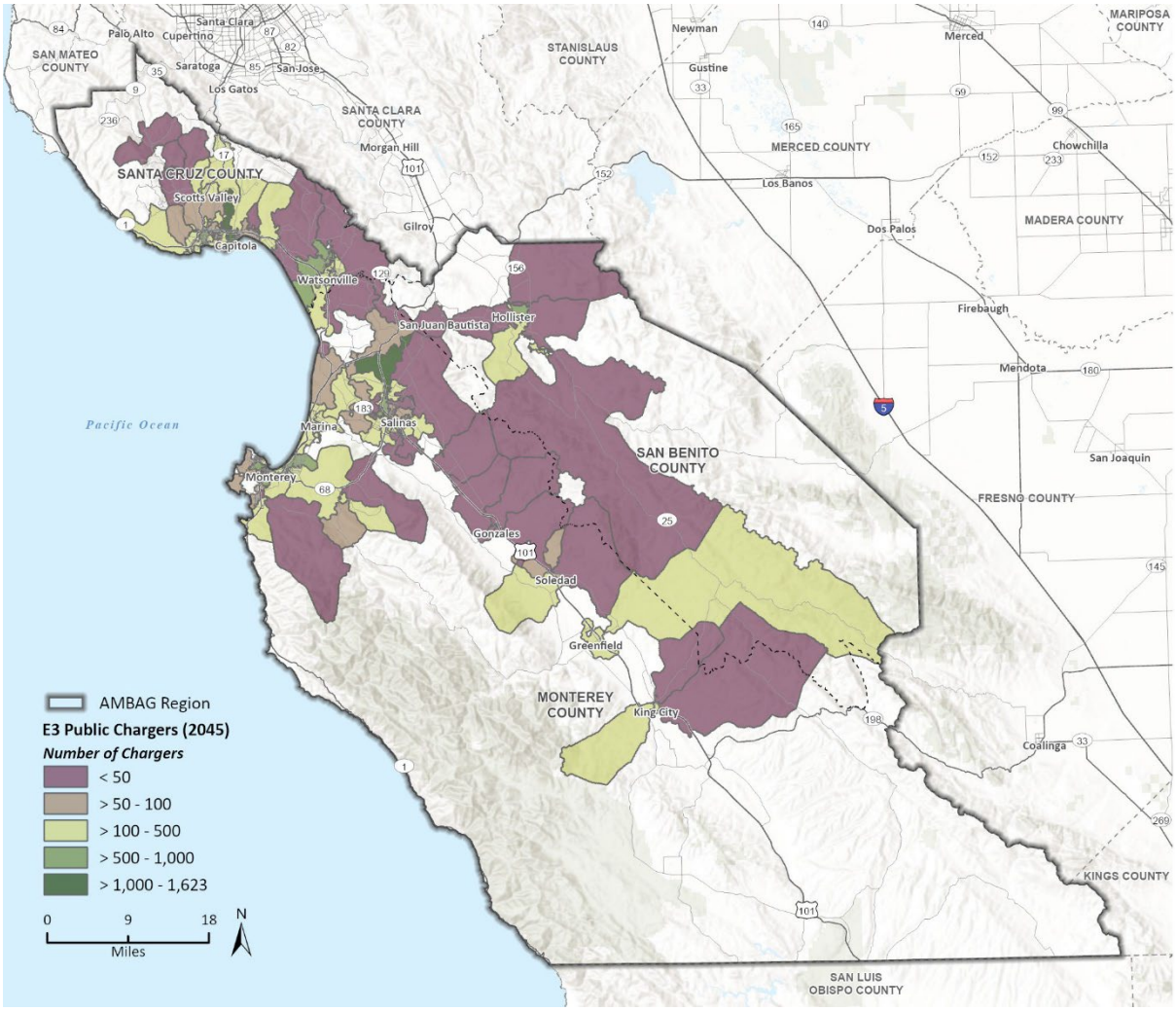


2045 Forecast

Public Charging (L2and DCFS)

When comparing the projected 2045 demand for public charging infrastructure in Figure 14, including both L2 and DCFCs, significant growth is anticipated, particularly in southern San Benito County, specifically east of the US 101 corridor, extending outward from Greenfield. The demand for public charging in 2045 jumps to 17,882 additional public chargers from the base year. This region was previously projected in 2030 to have fewer than 25 chargers in Figure 12 and is expected to expand, reaching between 150 and 300 chargers by 2045. Additionally, substantial growth is forecasted east of Monterey along Highway 68, a region demonstrating consistent and progressive increases in charging infrastructure demand from the existing conditions shown in Figure 1 in 2024 through the projections for 2045.

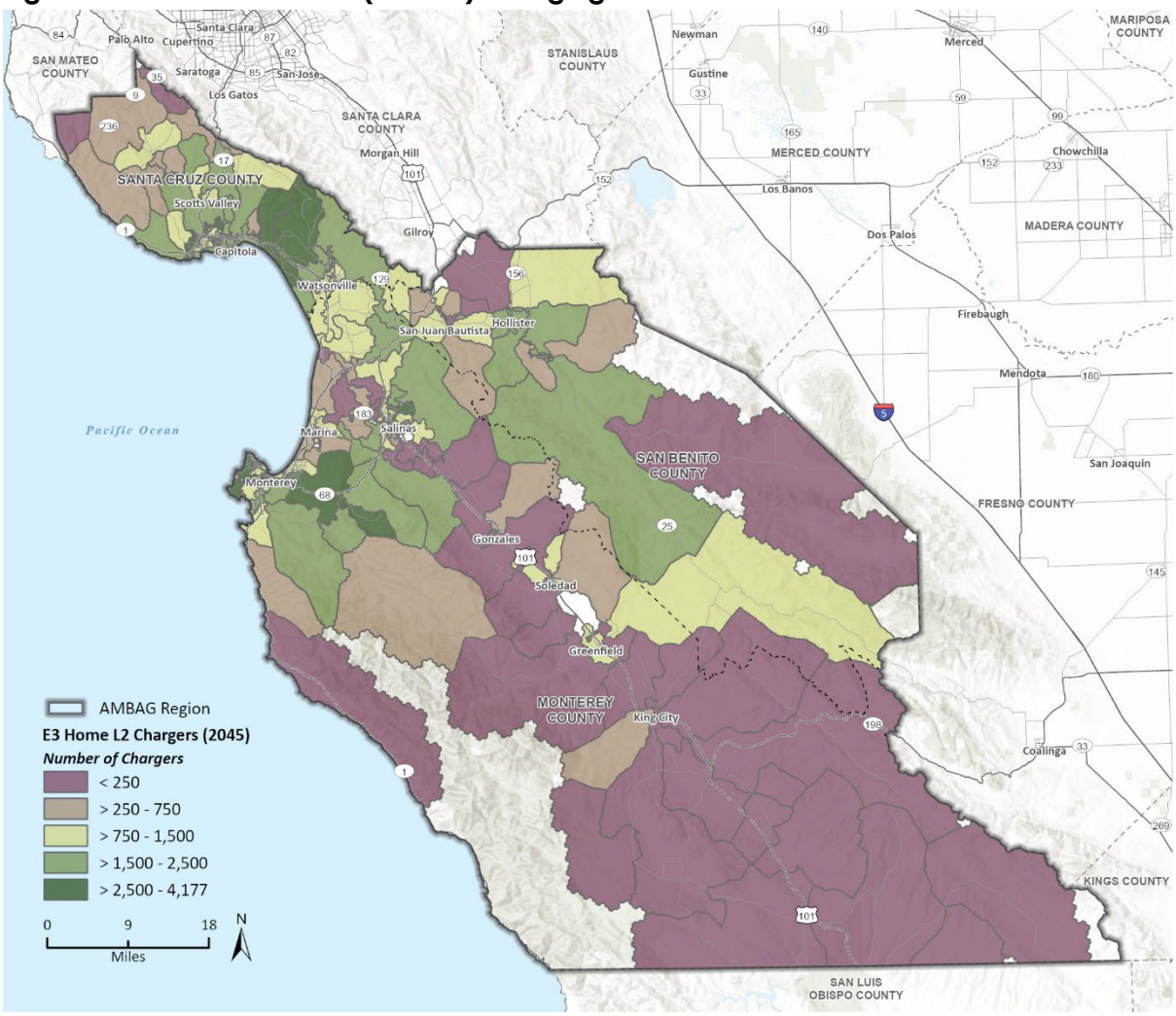
Figure 14 2045 Public Charging Demand



Level 2 Residential Charging

When comparing home charger demand projections for 2045 in Figure 15 to those of 2030 in Figure 13—again assumed reflective of EV ownership due to direct correlation with EV demand—only small changes in new locations is observed. However, there are expected to have 111,096 additional residential chargers in 2045 from the base year which means ownership since 2030 has nearly tripled. The most significant shifts in EV ownership patterns appear in and around Hollister and Salinas, where noticeable growth occurs. Additionally, King City emerges as a new area of EV ownership by 2045, representing a change from previous conditions, where EV presence was virtually absent.

Figure 15 2045 Residential (Level 2) Charging Demand



5 Conclusion and Key Takeaways

The analysis of existing and forecasted EV charging infrastructure and adoption trends in the AMBAG region reveals several important insights. Firstly, there is a current spatial mismatch between current EV charger locations and existing EV ownership patterns. However, the current EV charging infrastructure does follow the demand seen in the Forecasting Anywhere model, so it will eventually align with the forecasted trends.

The travel pattern analysis highlights significant distinctions between EV and ICE vehicle behaviors, with EV trips predominantly limited to urban corridors and zones already supported by charging infrastructure. This could mean that infrastructure availability influences EV travel behaviors and points to existing barriers like limited home and public charging accessibility as obstacles to broader adoption.

The forecast analysis demonstrates substantial anticipated growth in EV adoption, particularly evident in residential and public charging needs through 2030 and even more significantly by 2045. Public charger demand projections suggest major growth near highways, particularly along Highway 101 and areas previously underserved or minimally equipped with charging infrastructure, such as southern San Benito County and regions east of Monterey.

Residential charging demand projections which are linked to EV ownership forecasts are growing notably around Watsonville, Scotts Valley, Monterey, Hollister, and emerging markets like King City. The forecast highlights the importance of also expanding public charging infrastructure to meet future demands and facilitate wider regional adoption near these areas.

Overall, these findings emphasize the role infrastructure plays in ownership trends and travel behaviors. Planning efforts should focus on addressing existing infrastructure gaps and preparing AMBAG for the expected growth in the region.

Appendix B

EV CAR Framework: Vulnerability Assessment, February, 2026

EV Car Framework

Vulnerability Assessment

prepared by

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24580 Silver Cloud Court
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February 2026

RINCON CONSULTANTS

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Monterey Bay EV CAR Framework Vulnerability Assessment

Introduction

Electric vehicles (EVs) are a key technology for addressing climate change, providing the ability to reduce emissions from the largest source of greenhouse gas (GHG) emissions in California, the transportation sector. Electric vehicles are growing in adoption and now make up over 3% of the passenger vehicles on the road in the Association of Monterey Bay Area Governments (AMBAG) region.[1] California's Advanced Clean Cars II[2] establishes a roadmap so that by 2035, 100% of new cars and light trucks sold in the state will be zero-emission vehicles, subject to the outcome of ongoing legal and regulatory proceedings[3]. This regulation codified the light-duty vehicle goals set out by Executive Order N-79-20[4]. These policies help achieve broader climate goals for the state and region, while also playing a major role in improving air quality for the region. With the growth in EV demand by the state, AMBAG is preparing to increase charging resilience from the changing climate as global temperatures continue to rise. While EV's use the same roads as internal combustion vehicles (ICE), fueling EV's relies entirely on the electrical grid. In order for EV charging to occur successfully, electricity must be delivered to a charging station through the electrical grid or distributed energy resources, and a charging station must be available and operable.

The Monterey Bay region is experiencing growing climate-related challenges that could threaten the reliability and accessibility of EV charging infrastructure. Extreme heat, wildfire, severe winter storms, flooding, and power outages increasingly affect the electrical grid that supports EV use. As EV adoption continues to expand, these climate stressors raise concerns about charging reliability, range anxiety, and equitable access to zero-emission transportation. The AMBAG Monterey Bay EV Climate Adaptation and Resilience (CAR) Framework is intended to quantify and address these challenges by evaluating climate risks to EV charging infrastructure and identifying strategies to strengthen resilience across the region (Figure 1). This Vulnerability Assessment (assessment) has been developed to identify the key vulnerabilities and constraints associated with achieving the region's EV targets.

This assessment focuses specifically on vulnerabilities within the electrical system that supports EV charging infrastructure. While several previous reports have studied the climate vulnerabilities and risks associated with climate change in the region (*Monterey Multijurisdictional Hazard Mitigation Plan, Santa Cruz County Local Hazard Mitigation Plan, San Benito Multijurisdictional Hazard Mitigation Plan, District 5 Climate Change Vulnerability Assessments, California's Fourth Climate Change Assessment: Central Coast Region Report),* these assessments did not directly assess the ability of the electrical grid to provide the required electricity for EV charging growth in the region.

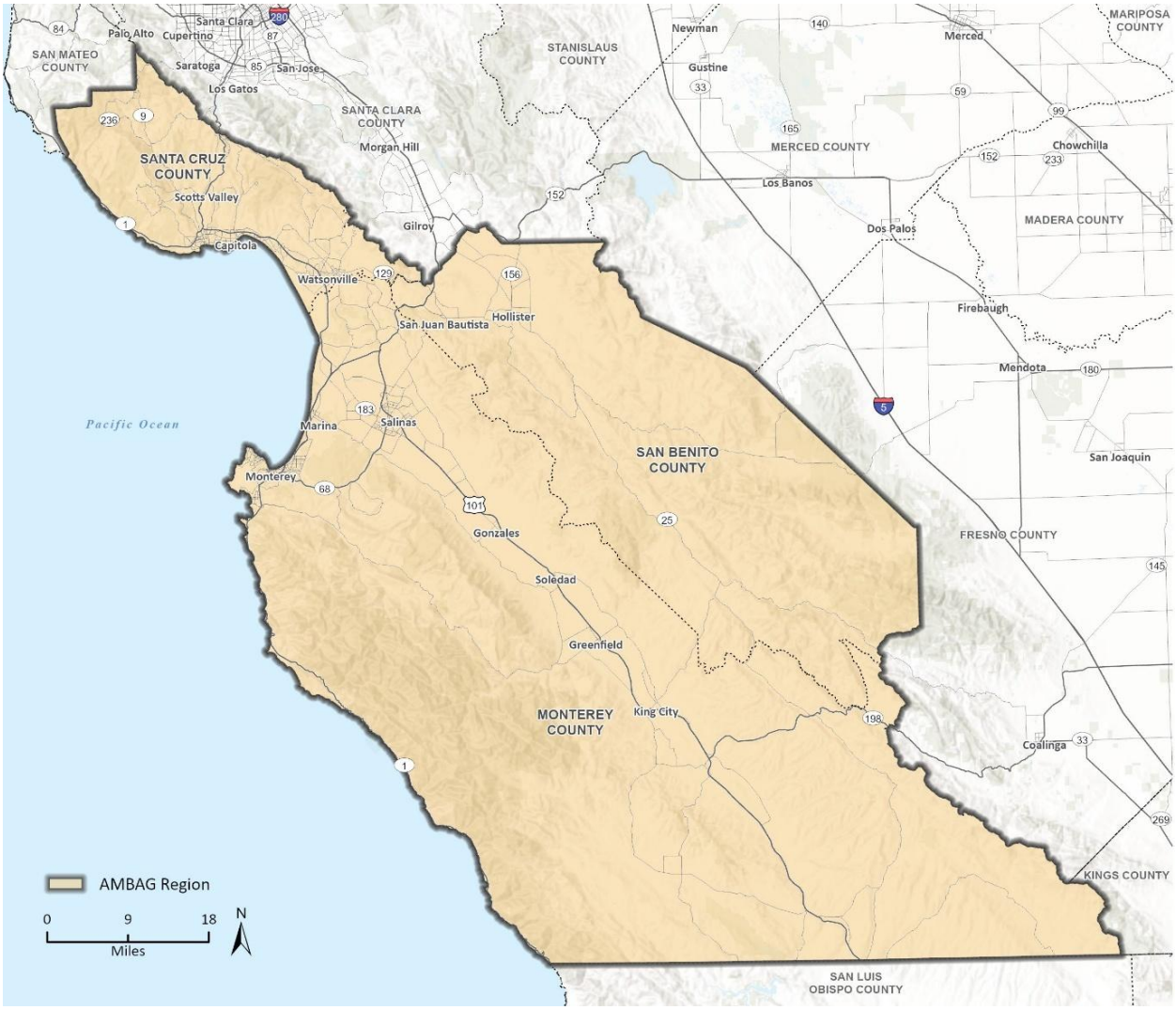
[1] California Energy Commission. "Light-Duty Vehicle Population in California." 2026. Light-Duty Vehicle Population in California

[2] California Air Resources Board. "California Moves to Accelerate to 100% New Zero-Emission Vehicle Sales by 2035." August 2022. California moves to accelerate to 100% new zero-emission vehicle sales by 2035 | California Air Resources Board

[3] CalMatters. "US Senate Blocks California's Electric Car Mandate in Historic Vote." May 2025. US Senate blocks California's electric car mandate in historic vote - CalMatters.

[4] Governor Gavin Newsom. Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change." Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change | Governor of California

Figure 1 AMBAG Region



In the AMBAG region Pacific Gas and Electric Company (PG&E) is the utility responsible for transmission and distribution of electricity and Central Coast Community Energy (3CE), a community choice aggregator, is primarily responsible for procuring electricity on behalf of customers. Therefore, PG&E is responsible for operating the power lines and other equipment that transport electricity, while 3CE is responsible for purchasing enough electricity for its customers. Consistent and reliable electricity supply is essential for EV charging to function. Climate change has the potential to directly impact both the physical infrastructure of charging sites and the electrical systems that supply them. Charging equipment, electrical components, transformers, and on-site power components can be damaged or rendered inoperable by extreme rain and wind events, wildfire, coastal flooding, and landslides. In addition, these same hazards can disrupt transmission and distribution infrastructure, leading to power outages or reduced service at charging stations. Together, these impacts can limit charging availability, disrupt travel, and reduce the resilience of the transportation system as EV cars become the dominant vehicle on the road.

This assessment focuses on the grids ability to support the EV transition in AMBAG territory through two major areas:

Grid Capacity – The ability of the grid to physically provide the growing electricity demand due to EV charging load growth and;

Grid Reliability – The grids ability to continue to provide electricity consistently throughout the year in the face of climate driven factors such as wildfires and PSPS events.

This assessment is supported by two complementary technical analysis. The first technical analysis was conducted by Energy and Environmental Economics (E3) who evaluated existing and future electrical grid constraints using PG&E feeder-level data, which Rincon then overlaid with projected EV adoption growth to identify locations where grid limitations may restrict charging deployment (Appendix B). The second technical analysis was conducted by Eagle Rock Analytics (ERA) who leveraged downscaled climate model data from California's Fifth Climate Change Assessment to assess the geographic distribution of future climate hazards and associated outage risks. These climate results were then overlaid with charger demand projects from E3's Forecasting Anywhere model results (Appendix A) to determine the number and geographical location of future charging outages within the region.

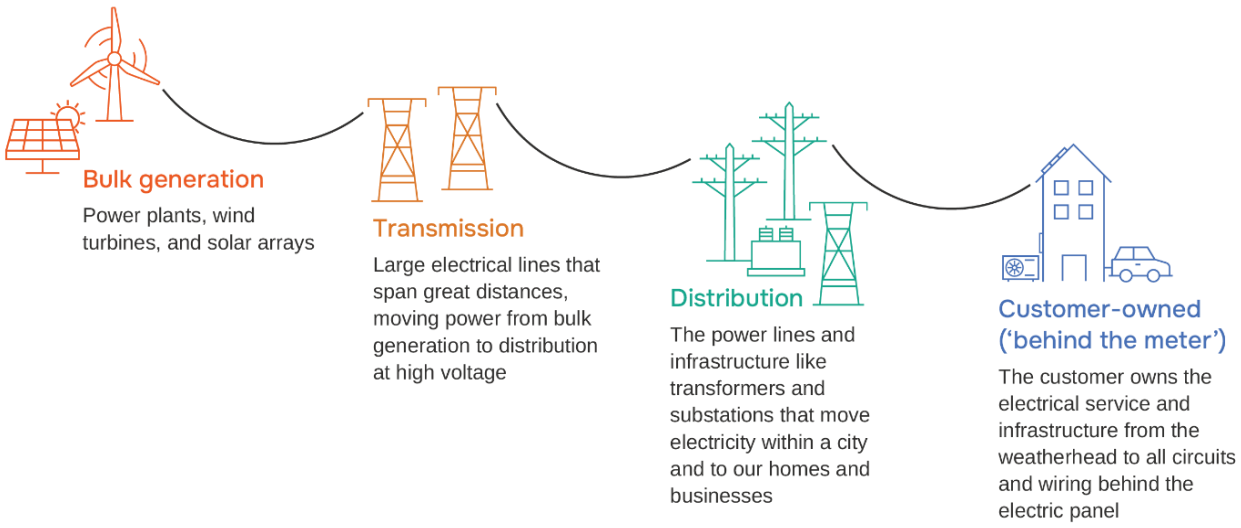
What Causes Power Outages?

Unlike internal combustion engine vehicles, EVs depend entirely on the electric grid for refueling, making power outages a risk to charging availability and transportation reliability as EV adoption continues to grow. Power outages can originate from failures at any of the three components of the electric grid: bulk generation, transmission, or distribution. Most power outages are caused by company-initiated safety shutoffs or physical disturbances to the grid, with a majority of impacts occurring at the local distribution system level due to impacts from trees, animals, and component failures. The following sections detail the types of power outages a customer may experience, what causes them, and how they relate to electric vehicle adoption and charging demand.

How Does the Electric Grid Work?

There are three parts to what is cumulatively called the "grid," or the infrastructure that brings electricity to homes and businesses.[5] These components, as seen in Figure 2 below, are the bulk generation, such as power plants, wind turbines, and solar arrays; transmission lines which serve as the long range movement of electricity from the bulk generation; and the local distribution system which are the wires present in neighborhoods.

Figure 2 Electric Grid Components



[5] Scientific American. "How California Kept the Lights on during Monster Heat Wave." September 2022. How California Kept the Lights On during Monster Heat Wave | Scientific American.

Bulk System Failures Explained

Bulk system outages almost never happen, occurring only once since 2001 (the California Energy Crisis), during the August 2020 rolling blackouts. Residents may remember in September of 2022 California sent texts to millions of people to reduce electricity use during a several hour span. This campaign to reduce consumer electric consumption was successful in avoiding a systemwide blackout and was one of the few bulk power related events in recent years. Most bulk power failures have been related to energy consumption changes in response to extreme heat events.

The root cause of these bulk system outages are failures of grid planners to match supply with demand during peak hours, which are changing rapidly as consumers react to new extreme weather events through increased electrical demand to heating and cooling buildings, rather than the physical limit of the grid itself.[6] Luckily, agencies responsible for maintaining the grid are including ambitious projections for electrification (to meet legislated state goals for carbon neutrality) in their planning. While electrification could potentially cause a bulk system failure without proper planning, multiple statewide planning initiatives are working to match forecasted demand with appropriate generation resources. The primary planning document for this work is the California Public Utilities Commission Integrated Resource Planning Process.[7] This plan includes aggressive projections for vehicle and building electrification in line with State goals.

Transmission System Failures Explained

Grid failure at the transmission level is rare but can cause widespread disturbances when it occurs, as transmission systems span large geographic areas. Core causes of failure at the transmission level include both physical issues such as vegetation contact (e.g. vegetation contact with high voltage lines) and capacity-based constraints. Each transmission line can carry a set amount of electricity at one time. As more bulk generation is required to meet demand, particularly due to the addition of new loads such as increased EV charging, new transmission systems will also be needed to move additional electricity across the State, especially if demand, such as charging EVs, occurs during peak hours. While transmission lines can have additional capacity and/or can have redundance (transmission from multiple sources to one area) a lack of sufficient transmission capacity can cause increased costs and longer power outages. If new transmission lines are built too slowly, they can also hinder the deployment of new sources of bulk renewable power.[8] Transmission lines can be affected by storms, vegetation, and other climate impacts as well as capacity constraints.

Distribution System Failures Explained

Distribution system outages are the most common type of power outages. While there has only been one bulk system outage since the CA energy crisis, there were thousands of smaller distribution-system outages during this time period. Outages are primarily driven by local factors like weather and maintenance (e.g. power safety power shutoff due to fire risk, planned maintenance projects, animal disturbance, trees falling on power lines, etc.). Furthermore, these distribution failures are also linked to climate impacts, and the frequency of these climate driven events are expected to change over time. Of the various distribution system failures, wildfire mitigation and vegetation (from winter storms) could cause increases in distribution system failures.

[6] Energy + Environmental Economics (E3). "Electric Grid Reliability." Presentation to the Regionally Integrated Climate Action Planning Support (RICAPS) webinar, April 2023. RICAPS_April_Final.pptx - Google Slides.

[7] California Public Utilities Commission. "Integrated Resource Plan and Long Term Procurement Plan (IRP-LTPP)." Integrated Resource Plan and Long Term Procurement Plan (IRP-LTPP).

[8] U.S. Department of Energy. "How Customers are Harmed by the Lack of Transmission." December 2023. How Consumers Are Harmed by the Lack of Transmission | Department of Energy.

Grid Impacts Summary

This analysis primarily focuses on the distribution system and conditions present in the AMBAG region. To some extent regional transmission infrastructure is also included as it could be impacted by local climate change impacts. However, transmission systems span a large geographic area and could be impacted by other regions impacts as well. As described above, this analysis will focus on two key areas for EV charging infrastructure and reliability: the ability of the transmission and distribution systems to provide the required electricity to support EV charging and the reliability of the distribution system to consistently provide electricity in the face of climate change and its associated impacts.

Grid Capacity Analysis

Future EV Needs Analysis

An earlier analysis evaluated projected EV adoption, charging infrastructure requirements, and associated electricity demand using E3's Forecasting Anywhere Model (Appendix B). That analysis assessed where EV and EV charger adoption would increase over time based on the demographics and growth projections of the region. The analysis looked at two scenarios, a base case and demographic scenario which accounts for increased funding allocation for disadvantaged census tracts. In 2023 the total number of EV's in the region was ~15,800. Based on EV growth projections from the Forecasting Anywhere Model, the region is expected to add 4,998 additional public chargers (Level 2(L2) and Direct Current Fast Charging (DCFC)) and 34,970 residential (L2) chargers by 2030. With continued EV adoption through 2045, an expected 17,882 public (L2 and DCFC) and 111,096 residential (L2) chargers will be needed.

Based on this previous growth analysis, E3 then assessed the increase in electricity demand and compared it to the remaining capacity of the distribution system in the AMBAG region using publicly available Integration Capacity Analysis (ICA) data from PG&E. The ICA data[9], published by PG&E, includes a simplified geospatial representation of PG&E's transmission and distribution system. This dataset reports the load capacity, defined as the amount of load (at the line level) that can be installed at that location without any thermal or voltage violations (at the time the integration capacity analysis was conducted, 2023-2024). For this analysis, the load capacity (headroom) was aggregated from the line level to the feeder level to align the geospatial granularity of the forecasted load and help AMBAG identify potentially grid-constrained areas (feeders with <10kW of headroom) without accessing confidential electric infrastructure data.

By mapping EV charging related electricity demand and feeder level capacity together, the analysis identified where EV charging infrastructure may face challenges due to existing grid constraints. This analysis does not include any current or future grid upgrade projects, which is further discussed below.

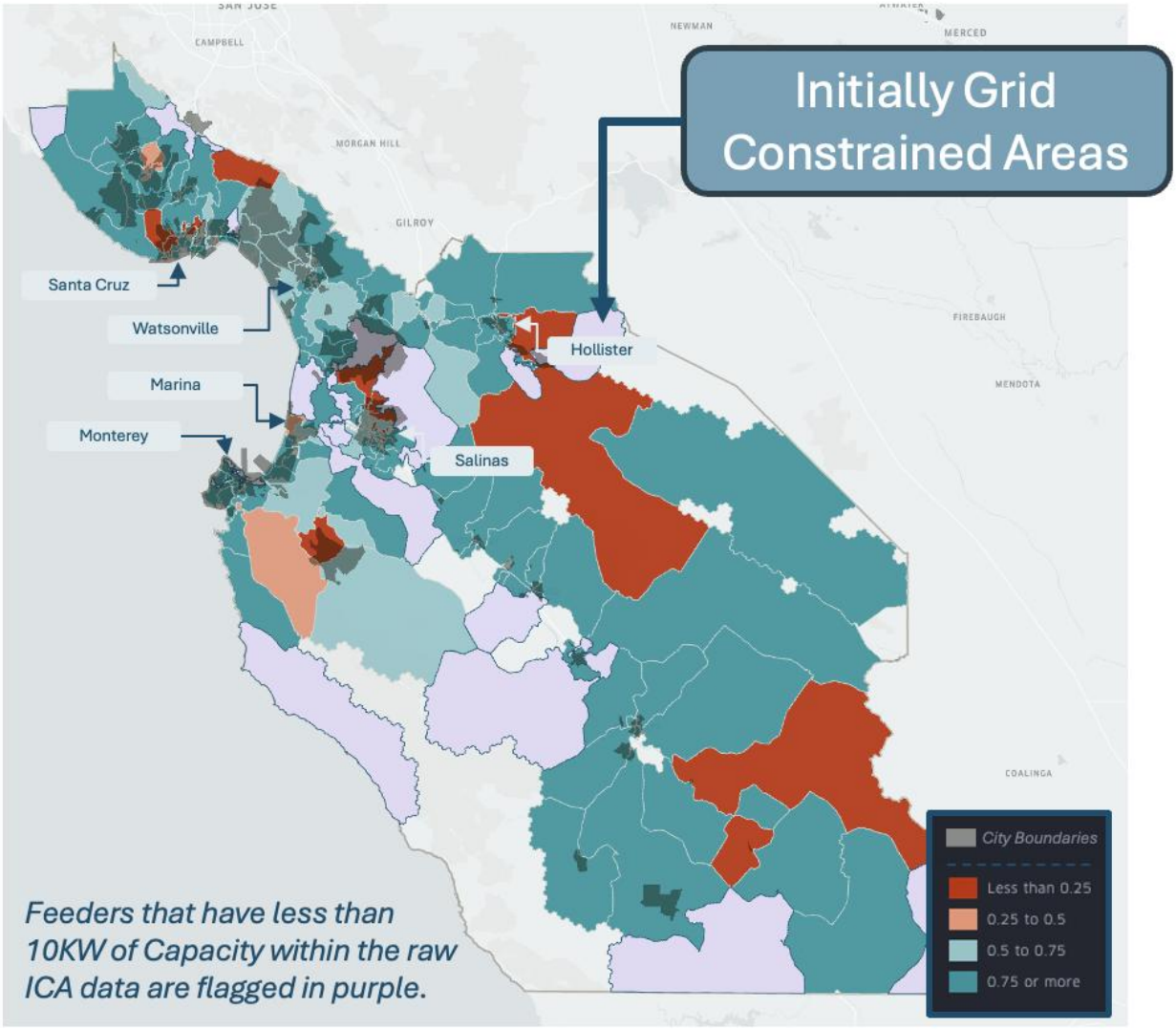
AMBAG Feeder Capacity Analysis

The results of the base case scenario indicate that the distribution system in the AMBAG region currently contains several constrained feeders and that additional areas across the region become constrained as EV adoption increases. Figure 3 below shows the remaining headroom percent available in 2030. The areas in light purple are the initially constrained areas, meaning they have less than 25% remaining capacity and any new electricity demand would need review by an engineer. Therefore, adding significant charging infrastructure in these areas will be more challenging and may require upgrades to the distribution system in the short to mid-term. The areas in red reflect locations that become grid constrained (less than 25% capacity) by 2030 and where additional engineering review would be required before new load could be accommodated. As shown in 3 below, portions of southeastern and

[9] PG&E. "Grid Resources Portal." Grid Resource Integration Portal, PG&E.

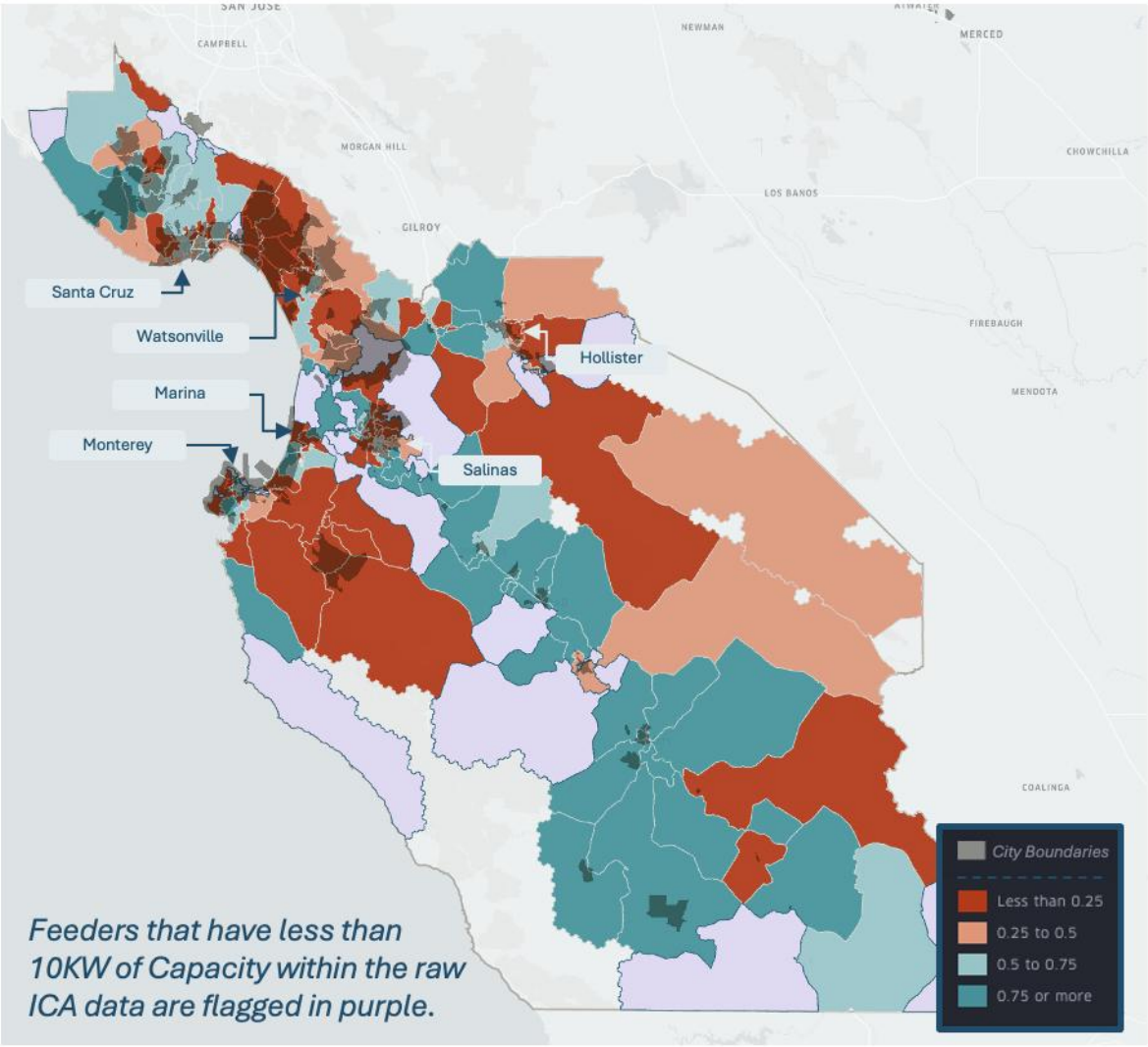
southwestern Santa Cruz County, much of central San Benito County, and southern Monterey County are projected to be grid-constrained by 2030.

Figure 3 Hosting Capacity Analysis: Remaining Headroom Percent 2030



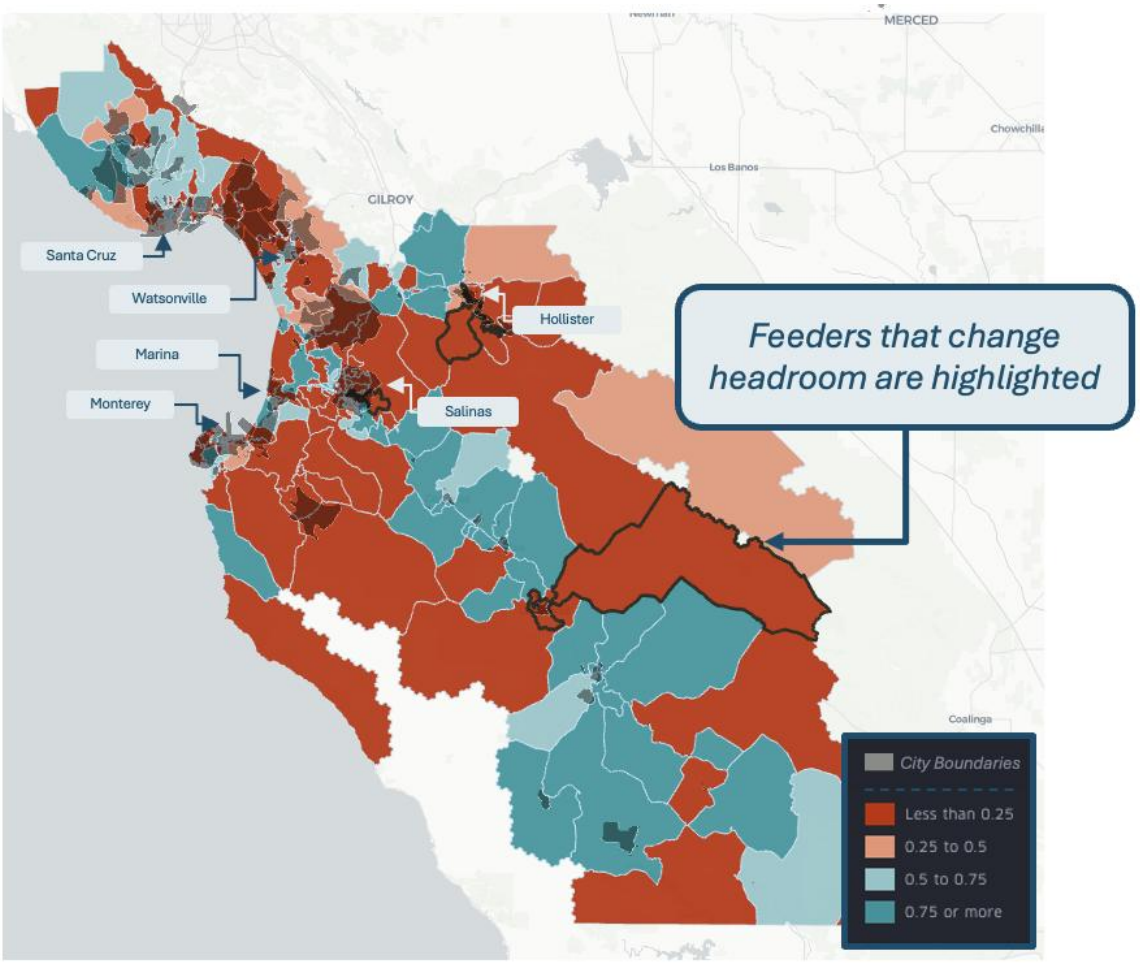
As EV adoption grows, more areas become constrained, which is seen below in the 2050 remaining headroom map (Figure 4). As seen here, more areas turn from blue to red, indicating reduced grid capacity in additional areas throughout the AMBAG region.

Figure 4 Hosting Capacity Analysis: Remaining Headroom Percent 2050



Under the demographic scenario (Figure 5), most additional charging load remains concentrated in non-disadvantaged areas, although several disadvantaged areas achieve greater adoption relative to baseline conditions. This additional adoption increases electricity demand and leads to constrained distribution systems in three additional feeder areas as shown in Figure 5 with dark outlines.

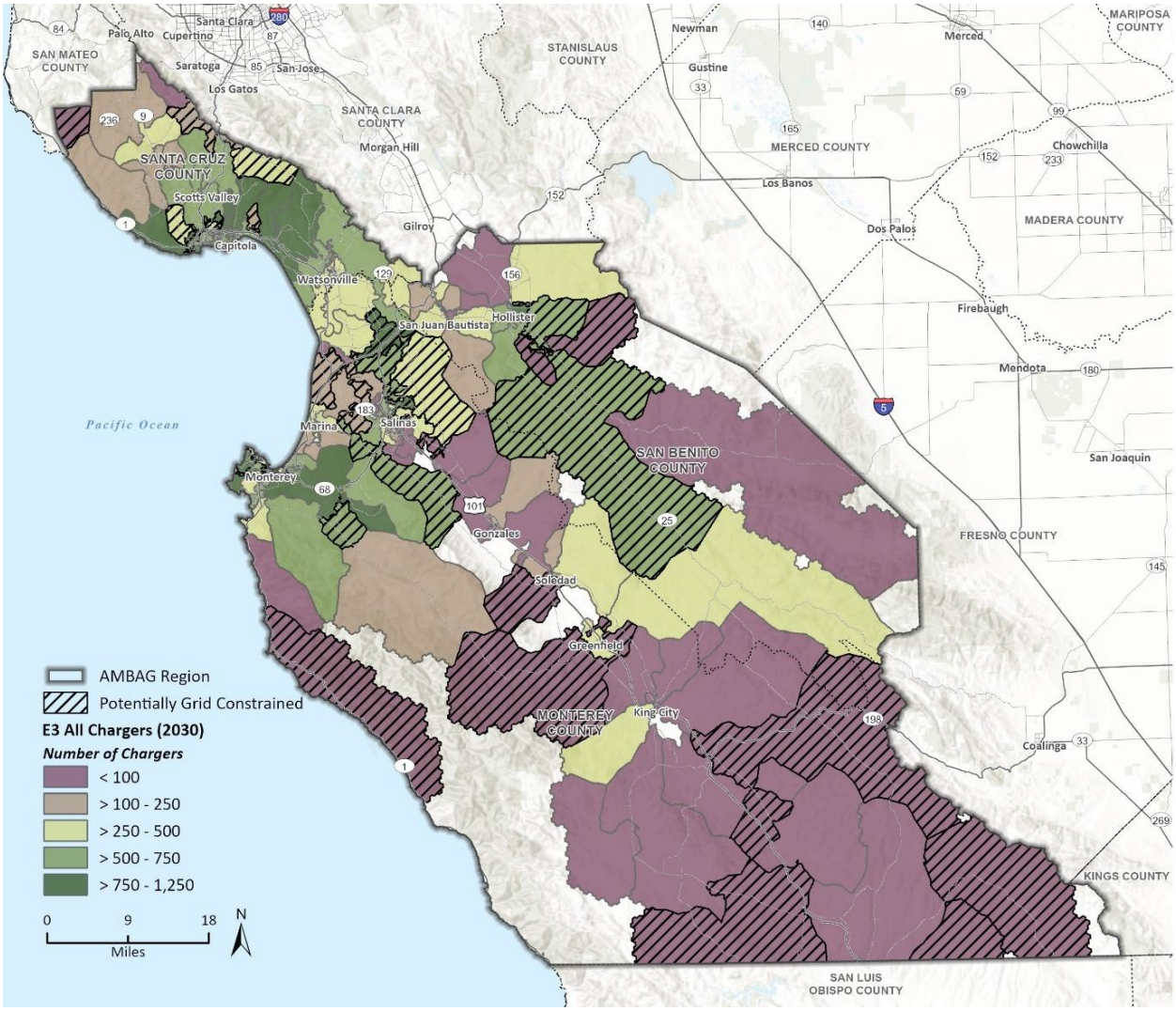
Figure 5 2050 Feeder Headroom (Demographic Scenario)



However, not all grid constrained areas will be adding a significant number of chargers, as the adoption of EV's is expected to be concentrated in more urban and developed areas. To help understand which areas of the region will see a large increase in EV charging as well as grid constraints, the EV charging installation projections (which include both residential home chargers and public chargers) were overlayed with the corresponding grid impact layers discussed in Figures 3-5. As seen in Figure 6 below, the primary areas to prioritize grid expansion and growth by 2030 are where hashmarks overlap with green zones, this shows the grid constraints with highest projected charger areas. These areas include regions of Hollister, Ridgemark, Paicines, Salinas, Felton, Forest Springs, Redwood Grove, and Monterey. It should also be noted that these areas are potentially already slated for grid upgrades by PG&E.

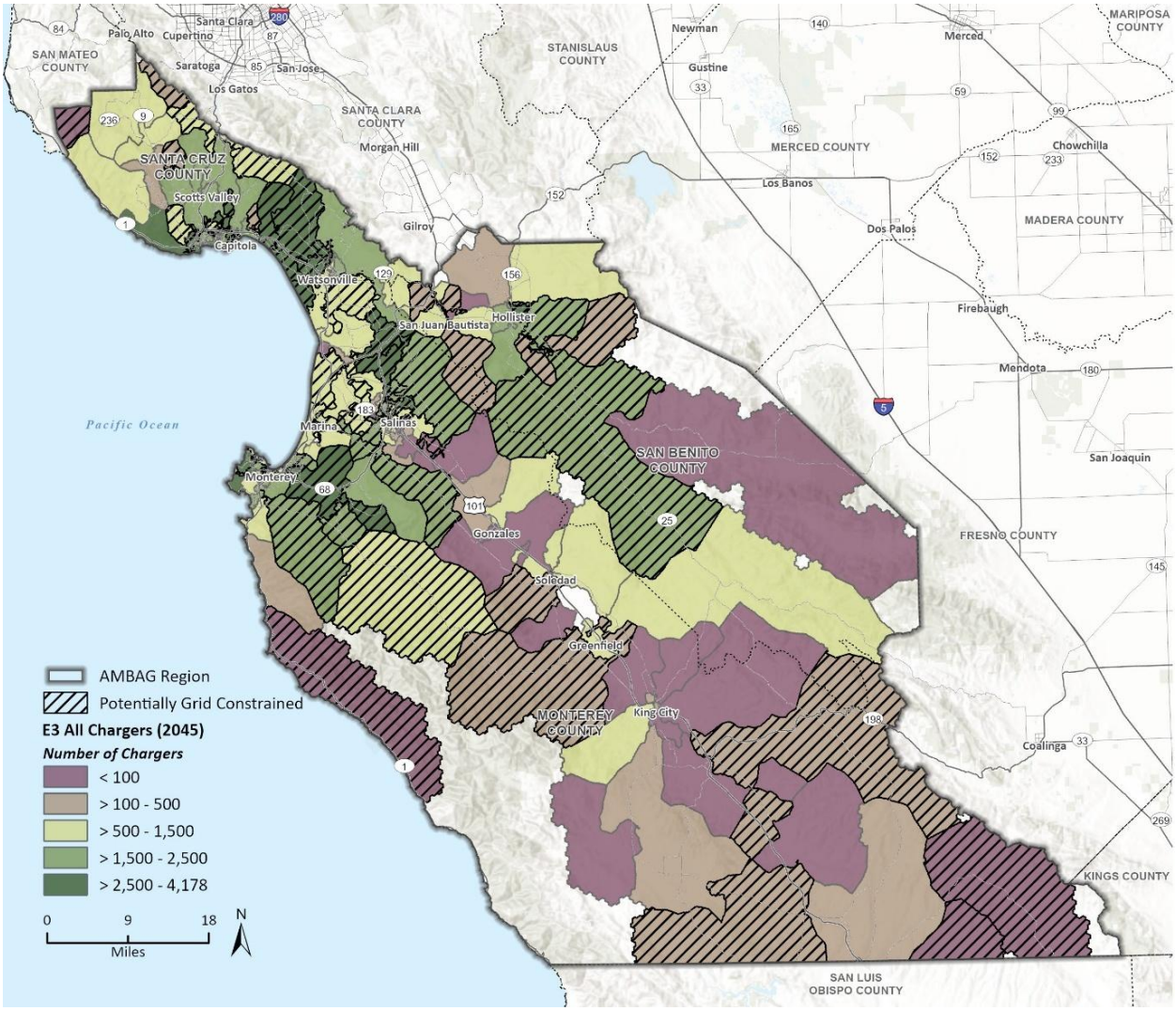
Areas with a relatively low number of new chargers and grid constraints could be good opportunities to deploy distributed energy resources such as battery storage and solar PV or switch to lower demand Level 1 chargers which do not require grid upgrades to install.

Figure 6 Grid Capacity and EV Charging Growth 2030



As shown in Figure 7 below, by 2045 grid constraints are projected to be more widespread as EV charging deployment increases. The areas with the largest overlap in grid constraint and EV charger growth are Salinas, Monterey, Watsonville, and Scotts Valley. These are the areas that will likely need grid upgrades in order to support the extensive EV growth projected for those locations. Again, each charger will need individual evaluation and grid management strategies such as placing Level 2 chargers “behind” existing meters or leveraging smart chargers that control electricity demand could help free up feeder capacity in some cases. Strategies like these will be further evaluated in the final EVCAR Framework.

Figure 7 Grid Capacity and EV Charging Growth 2045

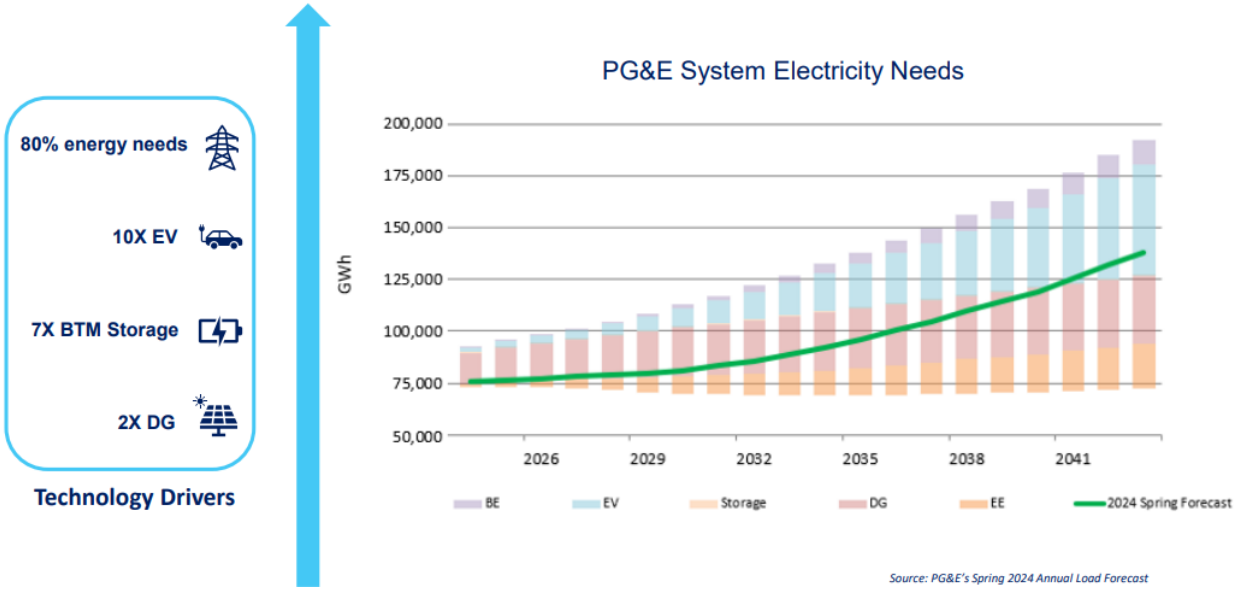


Future Planning and Grid Upgrades

These findings provide a directional identification of where capacity challenges are most likely to occur under current ICA conditions, while acknowledging that future utility investments and grid upgrades may alter these outcomes over time. PG&E is actively planning for electrification of buildings and EV's throughout their territory as discussed in their 2027 Grid Modernization Plan.[10] While transmission and distribution upgrades will be needed in the areas identified above, future planning should be able to stay ahead of demand as EV adoption increases over time. Based on PG&E's 2024 Annual Load Forecast, the Utility is expecting an 80% growth in electricity demand and ten times increase in EV adoption by 2045 as shown in Figure 8.

[10] PG&E. "2027 GRC Grid Modernization Workshop." March 2025. PowerPoint Presentation.

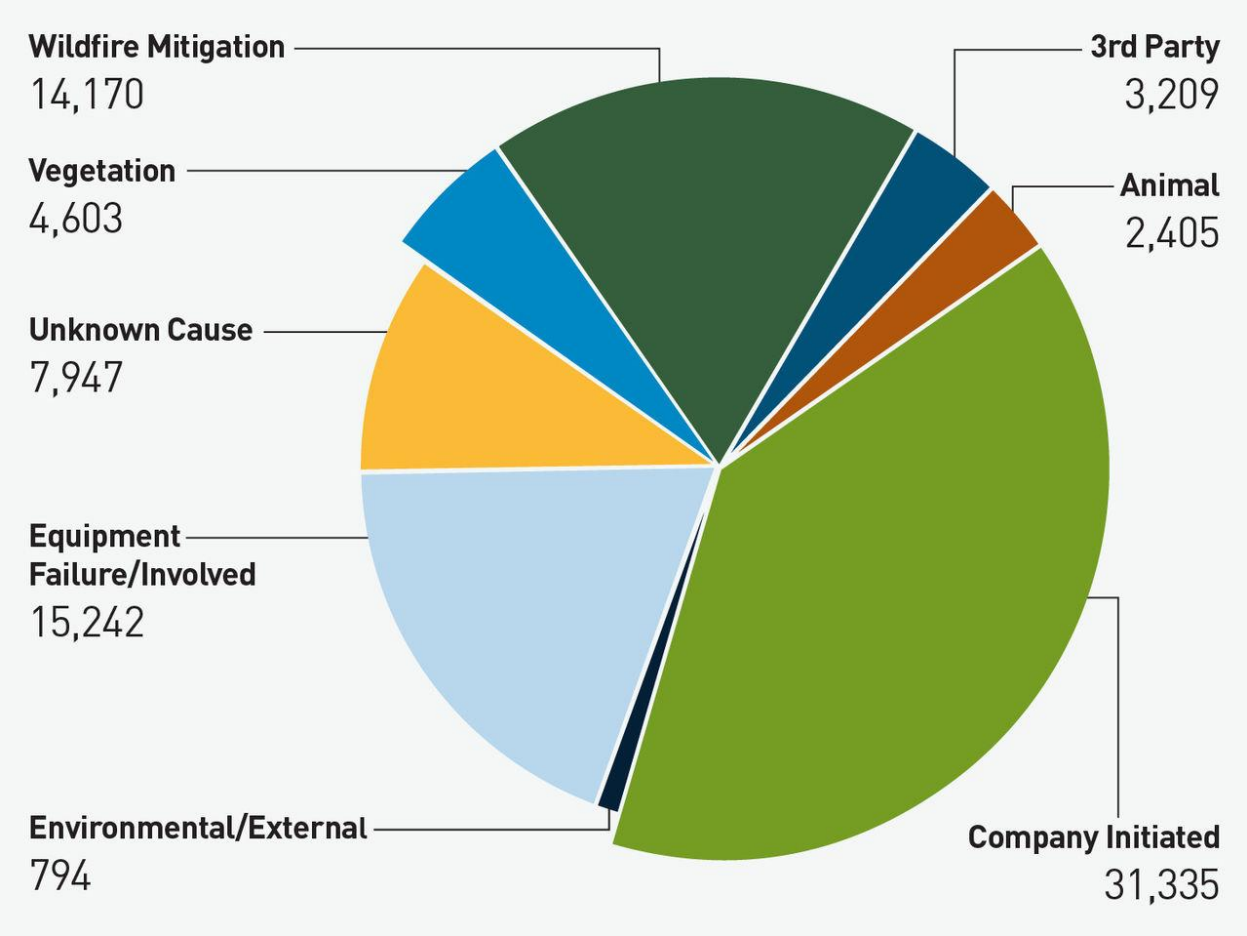
Figure 8 2024 Annual Load Forecast PG&E



Climate Change Impacts

Distribution system outages are the most common type of power outages. While there has only been one bulk system outage since the CA energy crisis, there were thousands of smaller distribution-system outages during this time period. Outages are primarily driven by local factors like weather and maintenance (e.g. power safety power shutoff due to fire risk, planned maintenance projects, animal disturbance, trees falling on power lines, etc.) as shown in Figure 9. Furthermore, these distribution failures are also linked to climate hazards and the frequency of these climate driven events are expected to change over time. Of the various distribution system failures, wildfire mitigation and vegetation (from winter storms) could cause increases in distribution system failures.

Figure 9 2024 Basic Cause - By Number of Sustained Outages



Climate Impacts and the Electric Grid

The AMBAG region is expected to experience several climate hazards that could impact the overall reliability of the power grid over the coming decades. Overall temperatures are projected to rise substantially, with greater increases in the inland region. These rising temperatures and more frequent heat waves represent the dominant climate-related stressor on the power grid. Residential electricity demand is likely to be affected by more frequent heat waves due to increases in cooling requirements from warming temperatures. While higher electricity demand could cause bulk electricity system outages, as discussed above, planners at the state level are including projections for electrification and climate in their energy needs forecasting. As of 2023, the CEC now includes climate impacts in their demand forecasts.[11]

Winter storms and extreme rainfall are another potential issue for the distribution grid. While precipitation totals are expected to increase slightly, precipitation variability will see a greater increase through the next century. Compared to heat-related impacts, these hazards are more localized and event-driven rather than continuous. These events could cause flooding, vegetation issues, or landslides that could impact the distribution grid.

[11] State of California. "Incorporating Climate Change in California's Energy Demand Forecast." June 2023. Energy- to Support Electricity Sector Vulnerability Assessment and Resilient Planning Request for Comments on Forthcoming Solicitation.

However, other reports in the region already identify AMBAG's climate vulnerabilities, such as *PG&E Climate Vulnerability and Adaptation Plan, AMBAG Central Coast Highway 1 Climate Resilient Study, Santa Cruz County Climate Action and Adaptation Plan, Monterey Multijurisdictional Hazard Mitigation Plan, Santa Cruz County Hazard Mitigation Plan, San Benito Multijurisdictional Hazard Mitigation Plan, District Five Climate Change Vulnerability Assessments, and California's Fourth Climate Change Assessment for the Central Coast.* This assessment will focus on wildfire and wildfire mitigation including public safety power shutoff (PSPS) events that are currently the most common climate variable tied to the distribution grid. With higher temperatures and longer heat waves forecasted for the region, wildfire and related mitigation strategies such as PSPS events are the focus of EV infrastructure vulnerability.

Wildfire Events and Public Safety Power Shutoffs (PSPS Events)

Wildfire is a frequent occurrence within the region, and the past decade has seen several major fires with substantial impacts on ecosystems and human infrastructure. Fire frequency and impacts are influenced by climate conditions and by population growth, particularly where development expands into the wildland urban interface. Although suppression efforts are more common in these areas, human activity also increases the likelihood of ignition. Warmer and drier conditions reduce fuel moisture and increase fire risk, and projected temperature increases are expected to further intensify these conditions. As seen in Figure 9, wildfire events are the largest drivers for unplanned and naturally occurring outages in the AMBAG region. Wildfire mitigation events are commonly called Public Safety Power Shutoffs (PSPS).

These PSPS events are a safety procedure utilized by electric utilities to proactively turn off power when and where conditions present an increased fire risk. PSPS events may be triggered by a range of conditions that increase the likelihood of infrastructure-related hazards. These conditions include high winds, dry vegetation, elevated temperatures, and low humidity. Utilities also consider local topography and condition of electrical equipment when determining a PSPS event.

Climate Vulnerability PSPS Data

ERA evaluated future climate hazard conditions relevant to AMBAG using high resolution downscaled CMIP6 climate simulations developed for California's Fifth Climate Change Assessment. These datasets represent the State's most advanced, peer reviewed climate projections. The Global Warming Level (GWL) framework, which groups projections by the amount of global temperature increase relative to preindustrial conditions, was used to evaluate climate hazard conditions under a warming climate This approach allows for the comparison across multiple possible futures and aligns with current state guidance and common climate planning scenarios. To evaluate potential future impacts, the analysis examined how often PSPS-related environmental conditions occur under: historical conditions (0.8°C of warming) and a future scenario (2°C of warming). While global climate efforts can change when we reach 2°C of warming, the IPCC suggests earth reaches this level of warming around 2040, representing a mid-century planning scenario. The 2°C warming scenario was chosen as the planning horizon since it aligns with the States long term goals for EV adoption and overlaps with the expected lifespan of chargers being installed today. Impacts beyond 2040 may not be relevant to infrastructure planning today due to the high pace of change in EV technology.

This section summarizes how climate change may affect the frequency of the environmental conditions that lead to PSPS events in the region over time. PG&E and other utilities determine when to initiate a PSPS event based on several conditions, some of which are proprietary. However, based on a literature review and publicly available data, there are four underlying environmental drivers that will trigger the process for considering a PSPS event: wind speed, humidity, 10 hour and 100 hour dead fuel moisture.[12] Each environmental driver has an individual condition required to be met. The final PSPS event metric was based on whether these individual four metrics were above or below their corresponding thresholds:

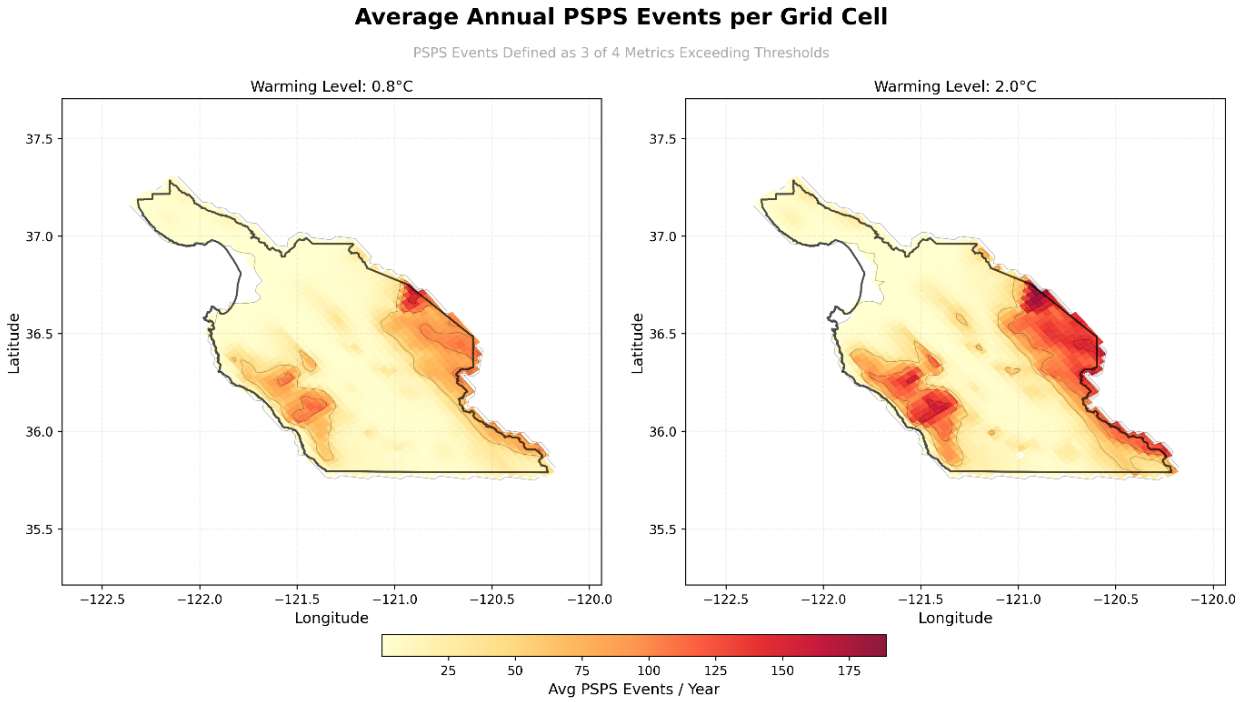
[12] The PSPS event metric is based on a literature review which included reviewing utility decision making guidelines as well as peer-reviewed papers (PG&E, Huang et al., 2023, Piansky et al. 2024).

- Wind Speed: > 19 mph
- Relative Humidity: < 30%
- Dead Fuel Moisture 100 hour < 12%
- Dead Fuel Moisture 10 hour < 9%

ERA's PSPS risk was evaluated on a daily basis. A day was classified as having PSPS risk when at least three of the four metrics met their respective threshold values. The total number of high risk days was then summed for each year to estimate annual PSPS exposure under both GWLs.

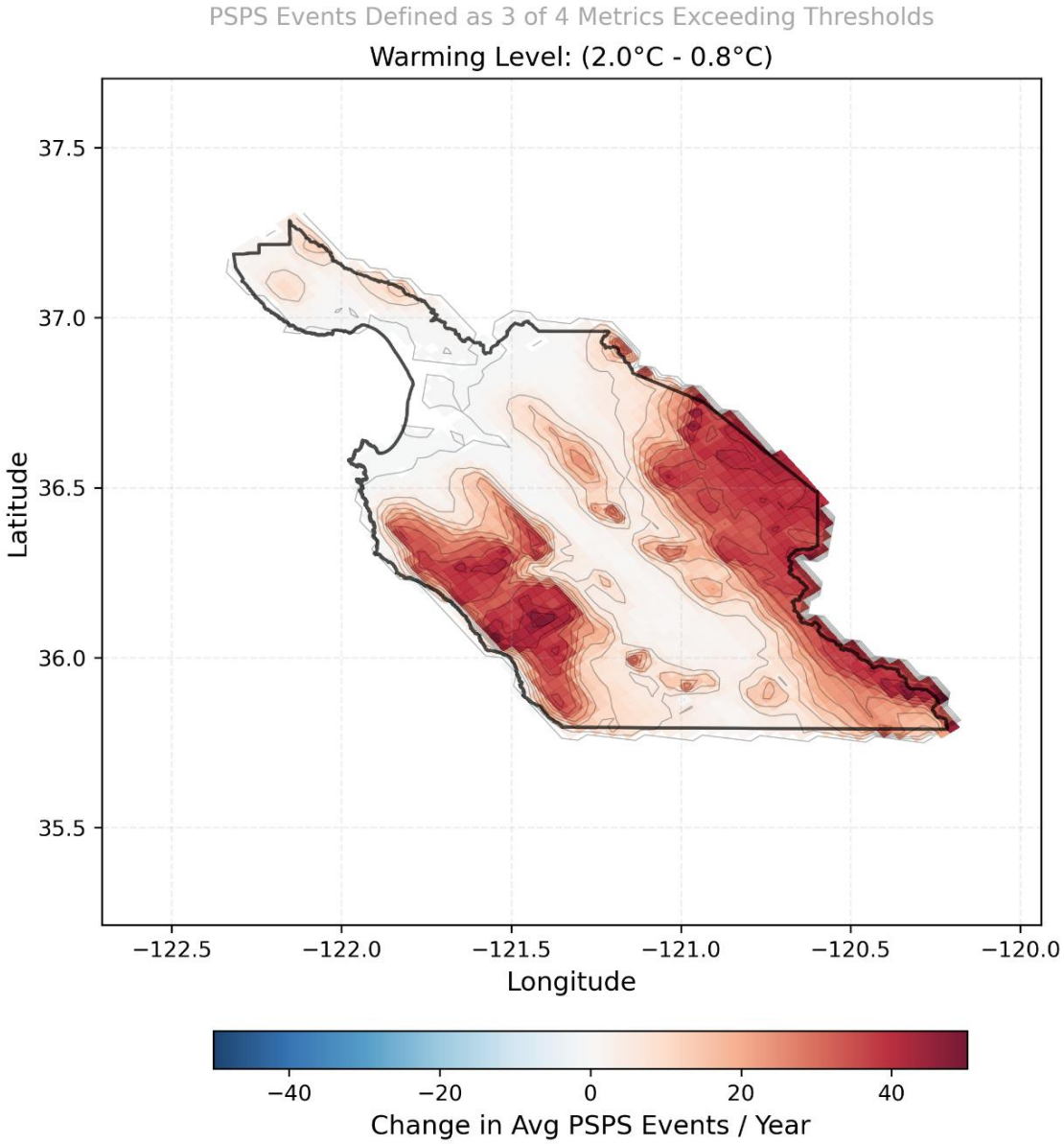
Composite modeling of PSPS-relevant conditions shows a clear increase in the average annual number of PSPS events in some areas of the AMBAG region as GWLs rise (Figure 10). The modeling shows that there will be more PSPS events per year overall, and that increase is mostly limited to areas that are experiencing PSPS events today. As seen in Figure 11 below, the frequency of these events increases in the east and southwest of the AMBAG region from today's conditions (GWL 0.8) to future conditions (GWL 2.0). These areas experience a change of about 40 more PSPS risk days per year, as seen by the increase in dark red spots on the right image. However, a majority of the more urban areas within the AMBAG region show no significant change in relevant PSPS environmental event conditions.

Figure 10 Average Annual PSPS Events/Year by GWL



This analysis assigns PSPS risk based on the 3km grid cell where each individual charger is located, it does not capture how utilities may de-energize larger portions of the grid during a PSPS event. Because data on outage boundaries are not publicly accessible, this analysis cannot determine the full geographic extent of outages which may extend beyond the 3km gridded cells. As a result, areas such as the Salinas Valley or the City of Santa Cruz may still experience outages during PSPS events even if they are not located within the highest-risk modeled areas.

Figure 11 Change in Average Annual PSPS Events/Year (Absolute Values)



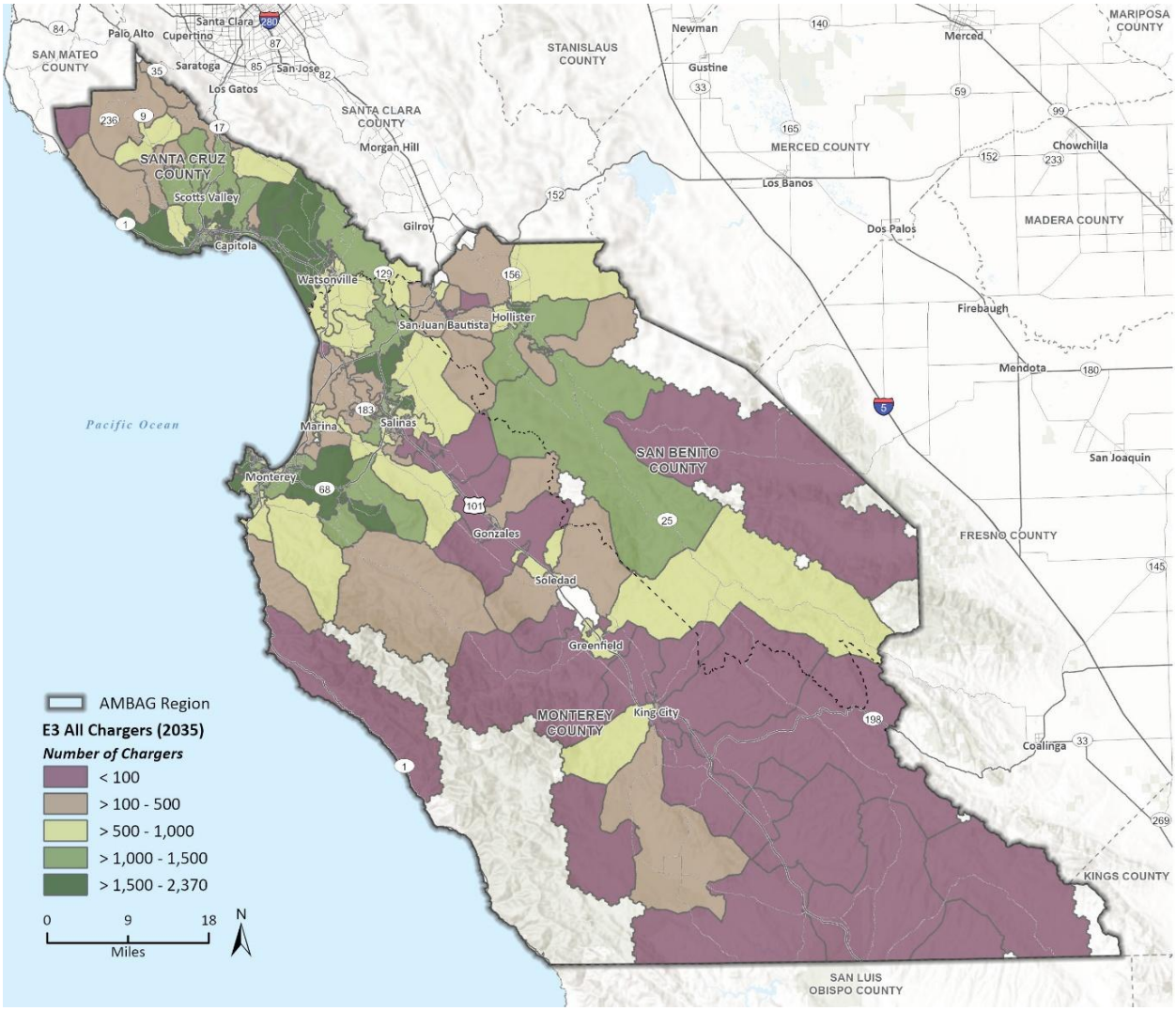
Grid Resiliency and Vulnerability Analysis

To understand how these projected PSPS risk days could effect both current and future installed chargers the PSPS event dataset seen in Figure 10 above was then overlayed with the Forecasting Anywhere Model, which spatially allocates projected chargers. Both private residential and publicly available chargers are included. This analysis estimated the number of chargers we expect to be impacted in the region and the number of unserved charging events that will occur related to PSPS impacts. An unserved charging event is any day which a charger experienced a PSPS event. The total unserved charging events is equal to the number of days each charger experienced a PSPS event times the number of chargers.

To begin the analysis, the projected charging infrastructure based on Forecasting Anywhere Model results was determined for 2035 as shown in Figure 12. This figure shows that most of the forecasted charging adoption in the region is centralized around urban-dense cities such as Santa Cruz, Monterey,

and Salinas, and along the major highways such as the U.S. Route 101 and coastal routes along Highway 1. More rural and sparsely populated areas also add chargers but generally much fewer.

Figure 12 2035 Forecasting Anywhere Model Charging Forecast (Private Residential and Public)



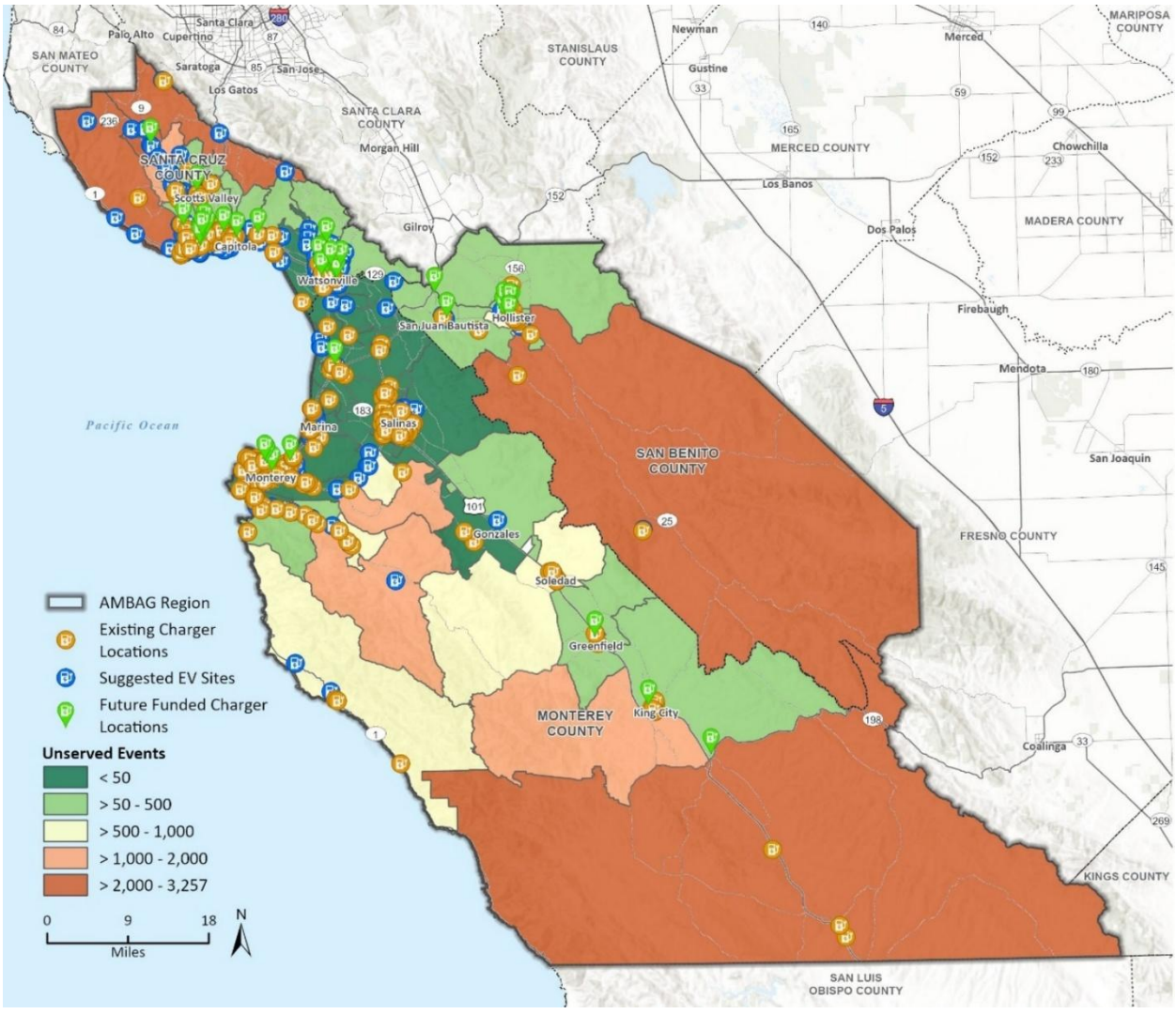
The next step was to overlay the gridded PSPS events data overtop the forecasted charger data. Each simulated charger was assigned to the specific 3km PSPS grid in which it is located. This spatial approach allows each PSPS condition event to be attributed to the chargers within that region only. The Study then aggregates all charger-level PSPS values to compute a total number of PSPS-driven unserved charging events.

Figure 13 below shows the total unserved charging events per year in 2035 in the base case scenario along with existing, suggested, and future funded charger locations for reference. As seen below, most of the unserved charging events are concentrated in hilly, forested, and higher-elevation areas such as Pinnacles, Big Sur, Fort Hunter Liggett, Lockwood, and the Santa Cruz Mountains. These areas also have the lowest number of forecasted chargers, and a majority of those chargers are expected to be private residential. The total number of unserved events is considered conservative as the assumption is that every time 3 of the 4 PSPS weather conditions are present, it would result in an unserved charging event. In reality, only a portion of these events would result in depowering of electrical lines.

A majority of EV chargers are forecasted to be located in areas relatively untouched by PSPS events. Those areas marked in dark green will see fewer than 50 unserved charging events (meaning 50 chargers who experience one day of PSPS conditions). While moderately effected areas including the Santa Cruz Mountains might see up to 1000 unserved charging events.

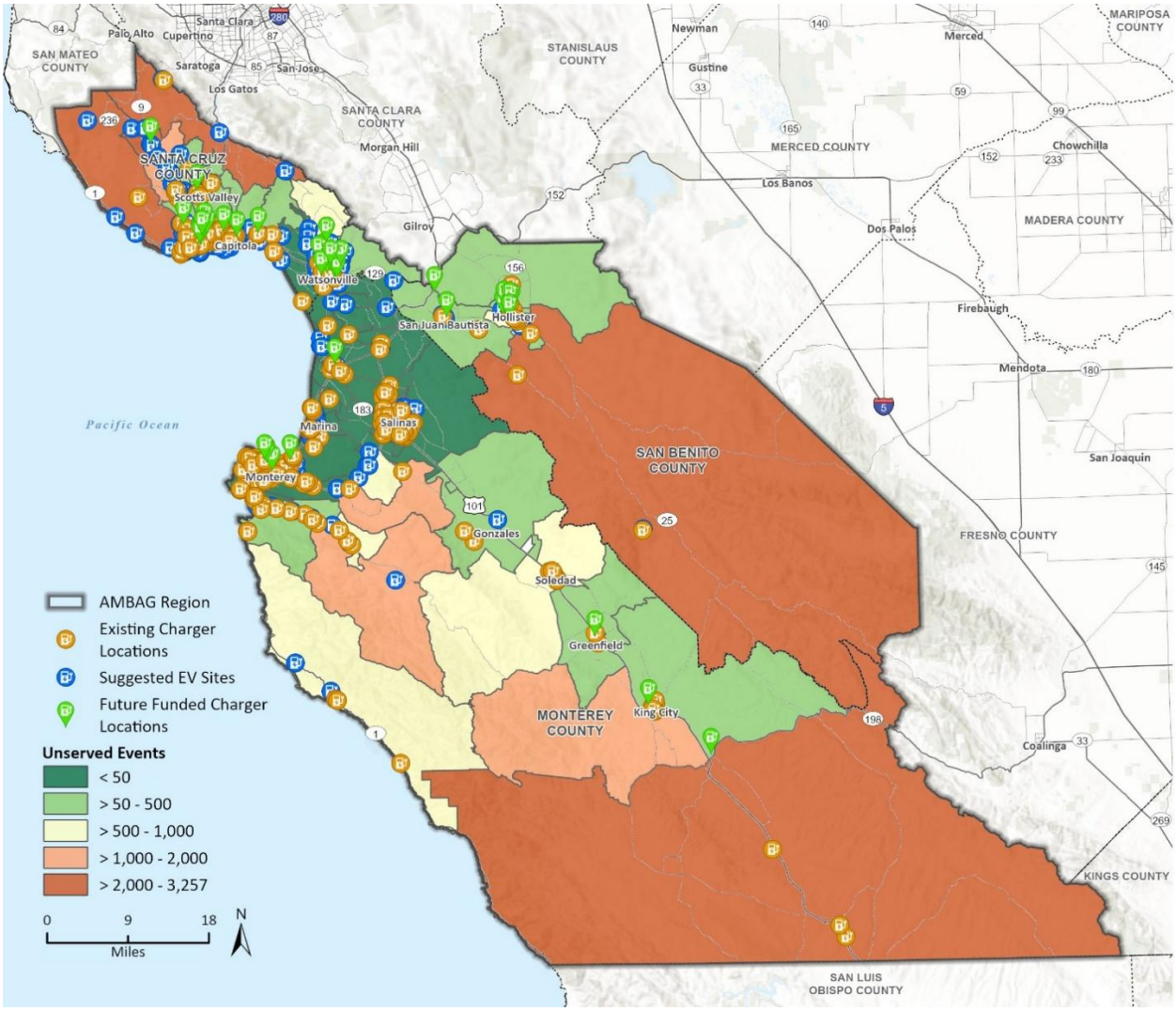
Some of the most critical areas impacted by PSPS events include the 1 corridor south of Monterey, south of Hollister, and the 101 corridor south of King City. These areas experience a high number of unserved charging events spread across very few chargers. This means that the charging infrastructure located in those areas will be rather unreliable, posing real challenges for these major corridors. These areas might be good candidates for distributed energy resources that can provide redundancy to the grid supplied electricity.

Figure 13 Number of Unserved Charging Events 2035 (Base Case Scenario)



The same analysis was also completed using the demographic scenario which targets additional EV charging adoption in under resourced communities. The results are shown in Figure 14. While changes are minimal, one area in the northern portion of the AMBAG region changes from between 50 and 500 unserved events into between 500-1000. This is due to a larger number of chargers being present in areas designated as experiencing PSPS event weather.

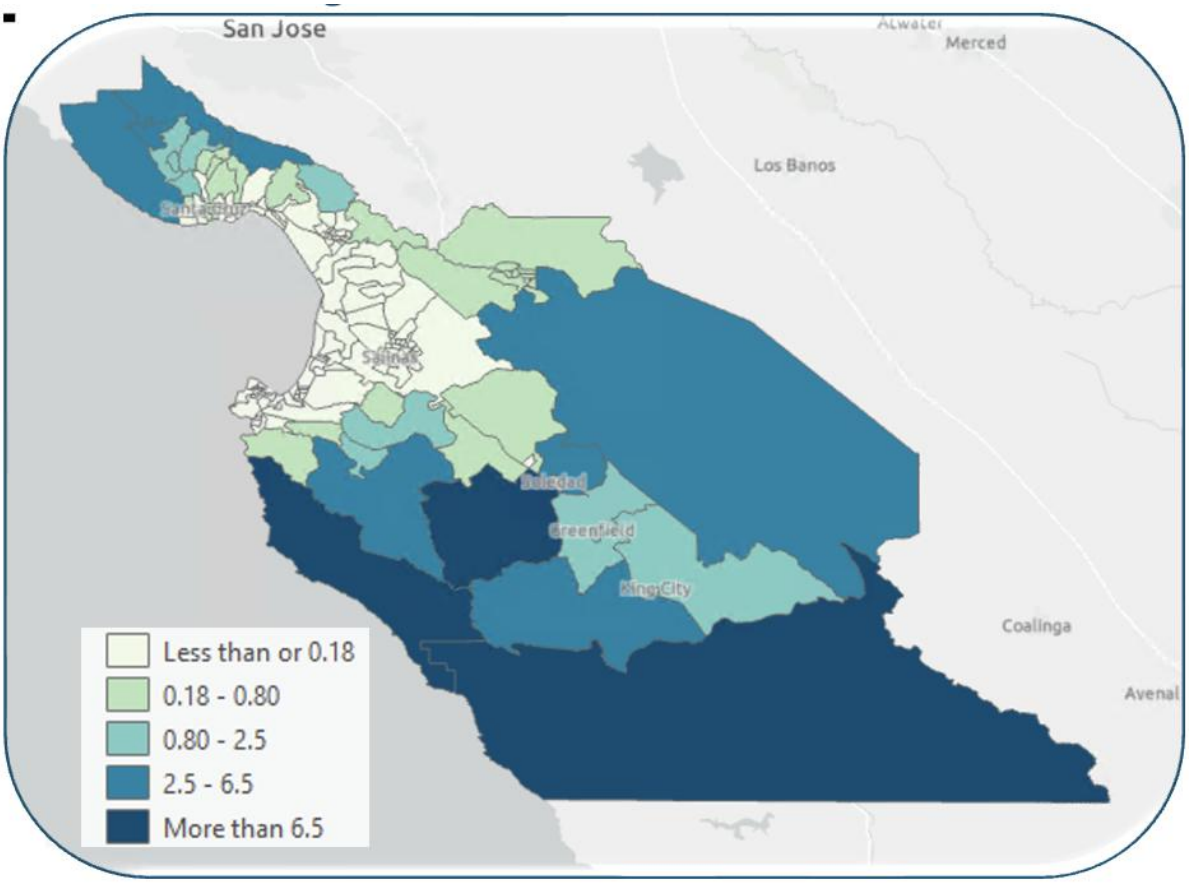
Figure 14 Number of Unserved Charging Events 2035 (Demographic Scenario)



Another useful way of understanding the impact of PSPS events over time is looking at per charger PSPS impacts rather than cumulative events. The total increase in unserved charging events (per charger) represents the change in the number of missed charging sessions due to climate-driven PSPS conditions. Rather than comparing EV adoption scenarios, this metric captures the difference in unserved charging days under the two GWLs.

This increase quantifies how many additional charging disruptions a specific charger in each PSPS grid cell would experience because of climate-exacerbated PSPS events, holding EV adoption constant within the given scenario year (2035). As seen in Figure 15 below, the chargers that experience the most unserved charging events are in Soledad, the Santa Cruz Mountains, and southern Monterey County. These chargers could experience an increase of over 6.5 unserved charging events per year. However, the average charger in more urban areas including Monterey, Santa Cruz, Salinas, see very little increase in unserved charging events (less than .18 per year on average).

Figure 15 Increase in Unserved Charging Events (Per Charger)



The results show that increases in PSPS-driven unserved charging days vary widely across the region and reflect both climate exposure and charging density. Some areas—particularly in Monterey County near the Los Padres National Forest—are expected to see large increases in unserved events due to more common wildfire conditions, even though these areas may have relatively few chargers. While these areas contribute relatively little to the EV adoption of the region, PSPS events in these areas will pose a real challenge to community members as well as those traveling on the 101, a major north/south corridor in the State. Rural areas are expected to experience more frequent PSPS events and longer travel distances to access charging, which highlights the importance of prioritizing investments that improve reliability and/or alternative charging options in these communities. In contrast, urban tracts tend to experience smaller changes in PSPS frequency and represent a significant portion of the regions forecasted EV adoption. Overall, increases in unserved charging events are driven by the combined effects of climate-related PSPS risk and the spatial distribution of charging infrastructure.

SAIDI/SAIFI Reliability Summary

As an additional lens on grid resilience, SAIDI and SAIFI metrics have been summarized for the geographical division that falls within the study area. SAIDI and SAIFI are industry-standard electric reliability metrics:

System Average Interruption Duration Index (SAIDI): Measures the average total outage duration experienced by a customer over a given period (typically a year), usually expressed in minutes or hours per customer.

System Average Interruption Frequency Index (SAIFI): Measures the average number of outages experienced by a customer over a given period, expressed as interruptions per customer.

These reliability metrics provide another dimension for understanding how local grid conditions may affect EV charging reliability, especially during high-impact weather events or extended outages.

The CPUC-mandated Electric Reliability Report from PG&E,[13] reports the following reliability metrics for the Central Coast division:

- SAIDI (duration): 413 minutes per customer in 2023 (~7 hours)
- SAIFI (frequency): 2.465 outages per customer in 2023

These values reflect an increase in average outage duration relative to earlier years, driven largely by severe weather and wildfire-related safety shutoffs. For example, in 2018 metrics were:

- SAIDI (duration): 162.4 minutes per customer in 2018
- SAIFI (frequency): 1.447 outages per customer in 2018

The 2023 SAIDI metric was 73.5% higher than the previous five-year average of 238 minutes per customer. However, this may have been an outlier year as the Central Coast division experienced several prominent equipment failures, rather than PSPS events. SAIFI metrics in 2023 were 38% higher than the five-year average of 1.786 outages per customer which was also attributed to several equipment failures (including vehicles hitting power poles).

Key Takeaways

This assessment investigated two of the major EV charging growth challenges in the AMBAG region, grid capacity and grid reliability. This analysis was conducted using the best available grid capacity, climate, and EV adoption forecast data and shows a robust picture of what future conditions could look like in the AMBAG region.

The grid capacity and EV adoption analysis identified areas where EV adoption has the potential to exceed the available grid capacity. The analysis uncovered two types of capacity issues. The first is locations which are projected to add significant charging infrastructure which could stress feeders that currently have moderate capacity. These areas are good candidates for grid upgrades, as the cost of these upgrades will be covered by significant increase in electricity consumption, spreading the cost out over time. The second type of capacity issue is found in rural areas with existing constraints that will be further stressed by even a few chargers. In these areas, grid infrastructure upgrades would only serve a few community members, increasing the average cost. These areas may benefit from distributed energy resources, smart chargers, or other solutions.

The PSPS analysis shows that climate change is expected to increase the frequency of wildfire weather conditions that could lead to PSPS events, with the largest increase in hilly, forested, and higher-elevation areas that are currently experiencing the bulk of these events. However, the charger-aligned PSPS results demonstrate that many of the areas with high PSPS event activity are not forecasted to add many chargers. These areas may benefit from strategies that provide backup power, especially in key areas like the 101 and 1 corridors.

Together, these findings highlight that future EV charging reliability will be driven less by climate hazard intensity in isolation and more by where charging infrastructure is sited relative to both grid constraints and evolving outage risks. As EV adoption continues to grow, maintaining reliable charging access across the entire region will require planning that aligns charging deployment with grid capacity expansion and targeted resilience strategies in key areas, such as backup solar and battery storage, smart chargers, and microgrids in areas where charging density and grid reliability risk intersect.

[13] PG&E. “Energy Division Compliance Report.” July 2024. PG&E Annual Electric Reliability Report, 2023.

Appendix A

AMBAG EV Car E3 Technical Memorandum

Energy+Environmental Economics
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Monterey Bay EV CAR Framework
Grid Resiliency and Vulnerability Analysis

January 9, 2026

This memorandum summarizes E3's analysis in support of AMBAG's regional electric vehicle (EV) climate adaptation and resiliency framework. E3's analysis includes a grid capacity hosting analysis as part of Task B, Future Needs Analysis, as well as a grid resilience and climate hazard assessment as part of Task C, Vulnerability Assessment of the Monterey Bay EV Charging Infrastructure. As subsequently detailed in this memo, E3's analysis focused on the following:

1. Quantify LDV EV charging needs through 2050
2. Spatially allocate LDV charging demand across AMBAG's territory
3. Assess the interaction between projected EV load and existing grid hosting capacity
4. Evaluate how climate-driven hazards may affect EV charging reliability and grid vulnerability across the region
5. Recommend strategies for increasing grid and charging resilience based on analysis findings

E3 previously provided the mapping files and supporting documentation for Task B. The mapping files and geodata produced as part of Task C are summarized in this memo's appendix.

Task B: Future Needs Analysis

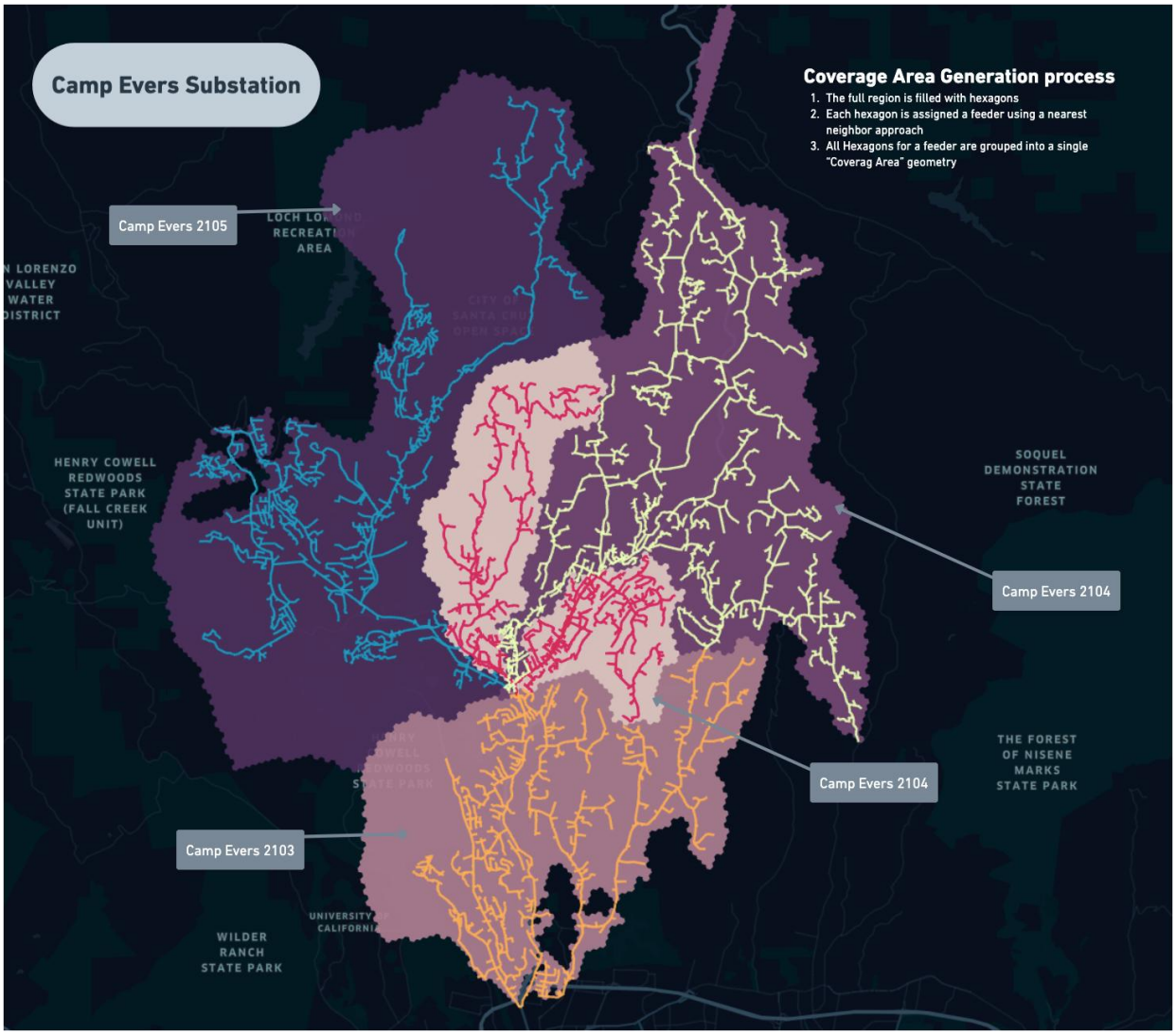
Task B evaluated the future need for EV charging infrastructure by:

- Developing two EV adoption scenarios through 2050 (Base Case and Demographic Scenario).
- Downscaling statewide EV energy forecasts to the counties within AMBAG's territory
- Converting energy forecasts into charger requirements using NREL EVI-Pro EV/charger ratios.
- Spatially allocating projected chargers using E3's Forecasting Anywhere model.
- Overlaying projected charging loads onto PG&E's ICA feeder hosting capacity dataset to identify existing and future grid constraints.
- Highlighting grid capacity considerations of relevance to AMBAG as a regional government, especially areas where infrastructure may be needed despite limited utility-driven deployment.

Grid Infrastructure and ICA Data from PG&E

The ICA data[14], published by PG&E, includes a simplified geospatial representation of PG&E's transmission and distribution system. This dataset reports the load capacity, defined as the amount of load (at the line level) that can be installed at that location without any thermal or voltage violations (at the time the integration capacity analysis was conducted, 2023-2024). For this analysis, the load capacity (headroom) was aggregated from the line level to the feeder level to align the geospatial granularity of the forecasted load and help AMBAG identify potentially grid-constrained areas (feeders with <10kW of headroom) without accessing confidential electric infrastructure data.

Figure1. PG&E Grid Infrastructure Data



Given the ICA data reports available headroom at the circuit segment level and this analysis requires capacity at the circuit (feeder) level, the maximum of uniform load estimated at the circuit segment level is calculated and assigned as the uniform load for that circuit instead of summing the uniform load. This ensures that the overall circuit capacity is determined by the most constrained segment.

[14] Grid Resource Integration Portal, PG&E

ICA results are reported for all 3-phase, primary system line sections. The ICA dataset was assumed to represent existing (2023) grid conditions prior to any incremental EV charging load additions.

EV Adoption Modeling

Annual forecasts for the base case leverage the 2023 Integrated Energy Policy Report (IEPR) Planning Scenario[15], specifically the AATE Scenario 3 results. This is the scenario being used by CA utilities in their forward-looking planning efforts. The statewide forecasts from the IEPR were downscaled to counties within AMBAG's territory via vehicle-weighted downscaling using publicly available 2023 DMV registration data[16] (for all LDVs) to generate a vehicle ratio from statewide to AMBAG counties. These forecasts were translated into projected numbers of EVs by applying vehicle-miles-traveled (VMT) assumptions that convert total energy demand into an implied on-road EV population. The projected EV totals were then converted into required charger counts using established EV-to-charger ratios, generating a mix of Home Level 2 and public charging infrastructure needed to support the forecasted fleet.

The spatial allocation of EV adoption was then modeled in Forecasting Anywhere. This included the following steps:

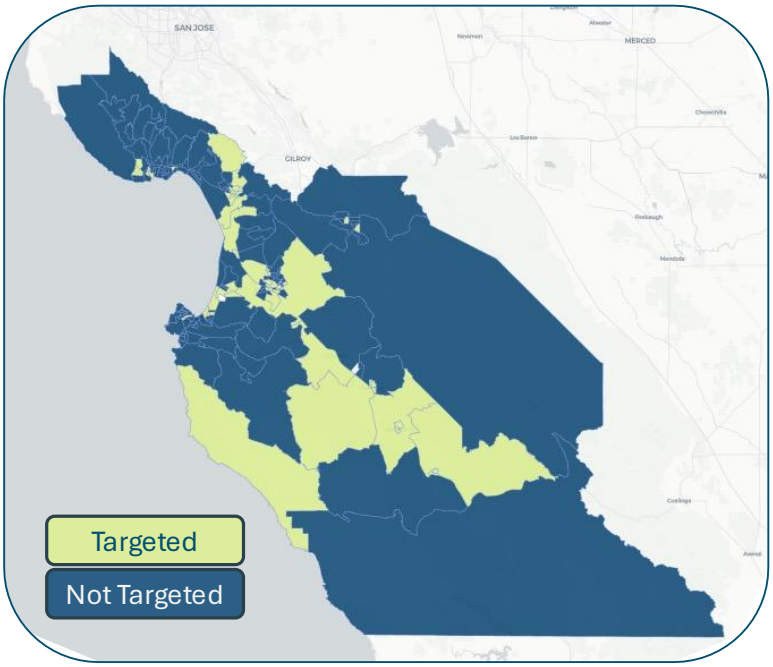
- Define the upper bounds (or technical potential) of siting EV chargers. For technical potential, the framework assumed that every single-family (SF) residential premises is capable of hosting at least one Level 2 home charger with a caveat for homes greater than twice the median home size (in square feet) is assumed to have capacity for two chargers.
- Define likelihood of adoption (propensity) using business & demographic information
- Simulate Future Adoption by combining technical potential and propensity datasets with the downscaled IEPR forecast in a probabilistic allocation model.
- Calculate load impacts based on forecasted adoption for a given feeder

For the demographic scenario, E3 reallocated forecasted adoption from the base scenario to targeted census tracts based on ACS census data regarding average household income, education-level and minority population share. Figure 2 shows the targeted census tracts as determined using a weighted score to define DAC status, based on the aforementioned criteria.

[15] California Energy Demand 2023 Demand Side Modeling

[16] Vehicles registered by County - California DMV

Figure 2. Target Census Tracts in AMBGAG Territory for Demographic Scenario



Downscaling Approach

Statewide EV energy forecasts from the IEPR were downscaled to AMBAG's counties using a vehicle-weighted proportional method:

- 2023 DMV light-duty vehicle registration data were used to calculate the ratio of AMBAG vehicles to statewide vehicles.
- These ratios were applied to statewide EV load forecasts to produce county-level EV energy projections consistent with statewide planning assumptions.
- The Forecasting Anywhere model operated on EV chargers, not EVs. EV counts were inferred using EV-per-charger assumptions derived from NREL EVI-Pro.
- All model outputs represented incremental charger additions relative to the base year, not total charger stock.

Base Case Results

The following table summarizes forecasted adoption by county and charger type for selected forecast years.

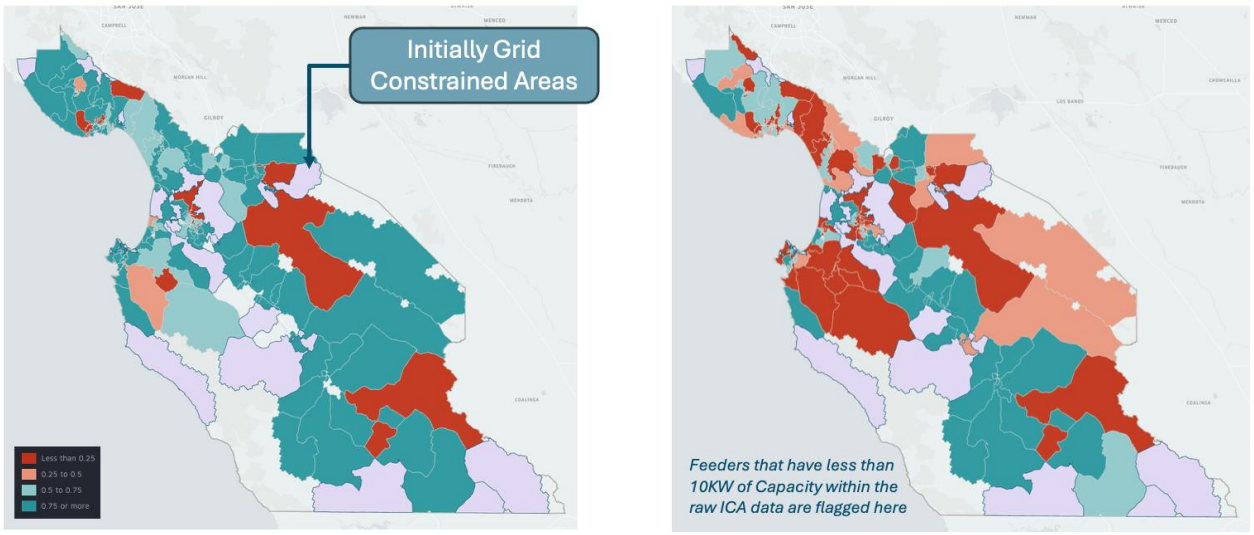
Table 1. EV Forecasted Adoption Summary by County for Base Scenario

EV Adoption (% of Technical Potential)	Forecast Year					
	2024	2030	2035	2040	2045	2050
Monterey County						
Home L2	1%	5%	10%	15%	18%	20%
Public (L2 + DCFC)	0%	3%	7%	10%	13%	14%
Total	1%	5%	10%	14%	17%	19%
San Benito County						
Home L2	1%	6%	12%	17%	20%	23%

EV Adoption (% of Technical Potential)	Forecast Year					
	2024	2030	2035	2040	2045	2050
Public (L2 + DCFC)	0%	3%	5%	7%	8%	9%
Total	1%	6%	10%	15%	18%	21%
Santa Cruz County						
Home L2	1%	7%	12%	17%	20%	23%
Public (L2 + DCFC)	0%	4%	9%	13%	15%	17%
Total	1%	6%	12%	16%	19%	22%
AMBAG Territory Total						
Home L2	1%	6%	11%	16%	19%	22%
Public (L2 + DCFC)	0%	4%	8%	11%	13%	15%
Total	1%	5%	10%	15%	18%	20%

The figure below shows the spatial allocation results using remaining headroom percent as the output metric. ICA value used for the map display is the minimum of the ICA results for that line section. Areas highlighted as red on the map (i.e. an ICA output of zero) does not necessarily mean that there isn't integration capacity at that location – it means an engineer needs to review. Areas highlighted as pink in the map represent the initially grid constrained regions.

Figure 3. Hosting Capacity Analysis Results, Remaining Headroom Percent - 2030 (left) and 2050 (right)



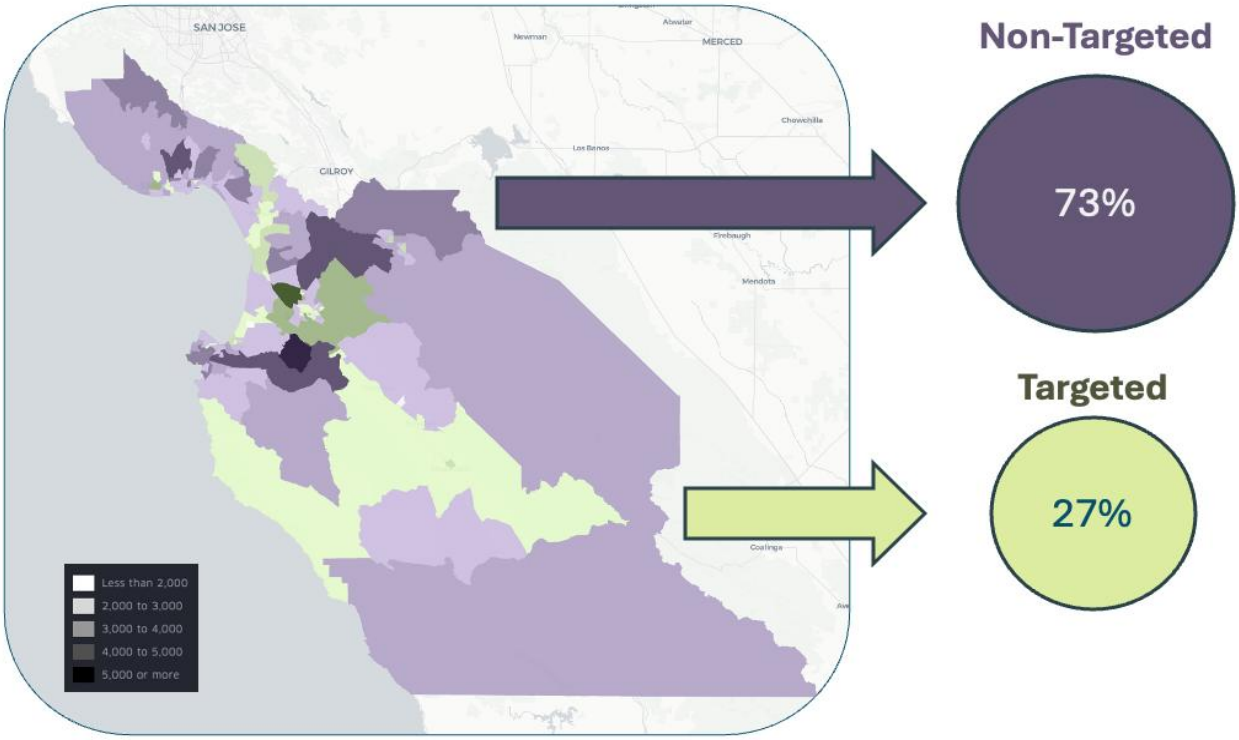
Demographic Scenario Spatial Allocation Results

Under the demographic scenario:

- 24% of homes in non-targeted areas adopt charging in the Base Case.
- 18% of homes in targeted areas adopt charging in the Base Case.
- Incremental adoption is added until targeted areas reach 24% adoption.

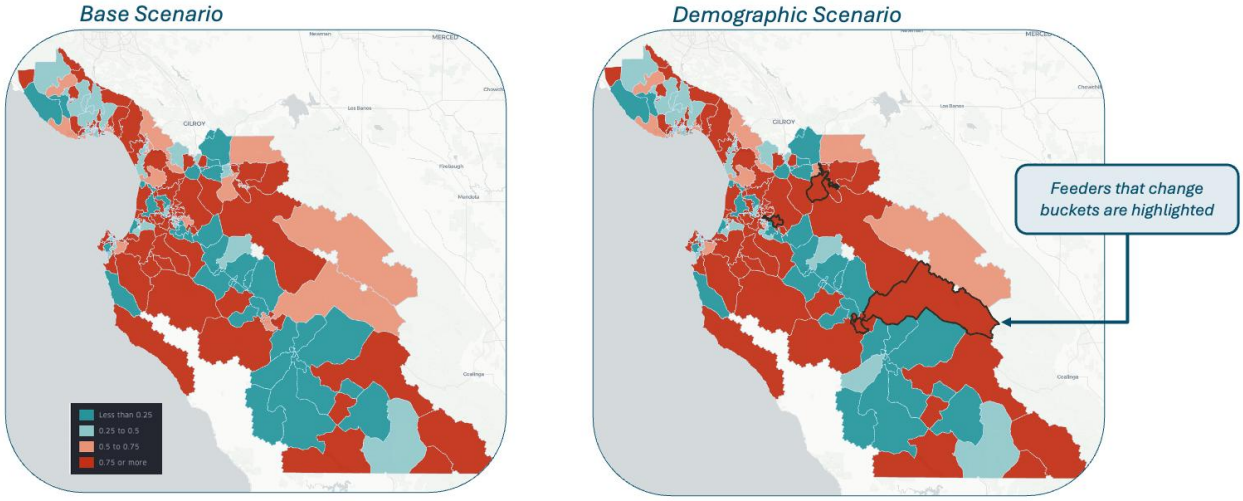
Although adoption increases significantly in the targeted tracts, the majority of total load impacts continue to occur outside targeted areas, reflecting broader housing and population distribution trends.

Figure 4. Total Adoption Load in 2050 based on Demographic Scenario (kW)



Grid impacts under the demographic scenario are limited to a small number of feeders, with only a modest increases in constrained locations relative to the Base Case.

Figure 5. 2050 Feeder Headroom



Task B Conclusions

The Task B analysis demonstrates that comparing the spatial distribution of projected EV charging demand with remaining feeder headroom is the primary way to understand how future EV loads interact with existing grid constraints. The results indicate that the grid already contains numerous constrained feeders, particularly those with less than 10 kW of available headroom, and that additional areas across

AMBAG's territory become constrained as EV adoption increases, especially by 2050. Even under the demographic scenario, most incremental charging load remains concentrated in non-targeted areas, although targeted tracts achieve greater adoption parity. Overall, the findings provide a directional assessment of where EV infrastructure is most likely to encounter grid limitations, while recognizing that future utility investments and upgrades may alter conditions over the long term.

Task C: Vulnerability Assessment of the Monterey Bay EV Charging Infrastructure

Task C integrates future climate hazards with the EV adoption results from Task B to assess vulnerabilities in distribution capacity and regional outage exposure. This section summarizes the outcomes of the analysis, focusing on Public Safety Power Shutoff (PSPS) event distributions as a result of climate-change induced extreme weather events and estimates unserved charging events at both the charger and aggregate levels. A complete data dictionary for all fields referenced in this analysis is provided at the end of this document.

The analysis was completed in two parts:

1. Assessment of system sufficiency to determine whether the distribution infrastructure can support future EV loads under changing climate conditions.
2. Integration of climate-driven hazards, using future climate projections to evaluate increases in outage frequency, unserved energy, and grid disruptions.

Climate Vulnerability PSPS Data

The climate vulnerability analysis was conducted using ERA's climate datasets. ERA generated:

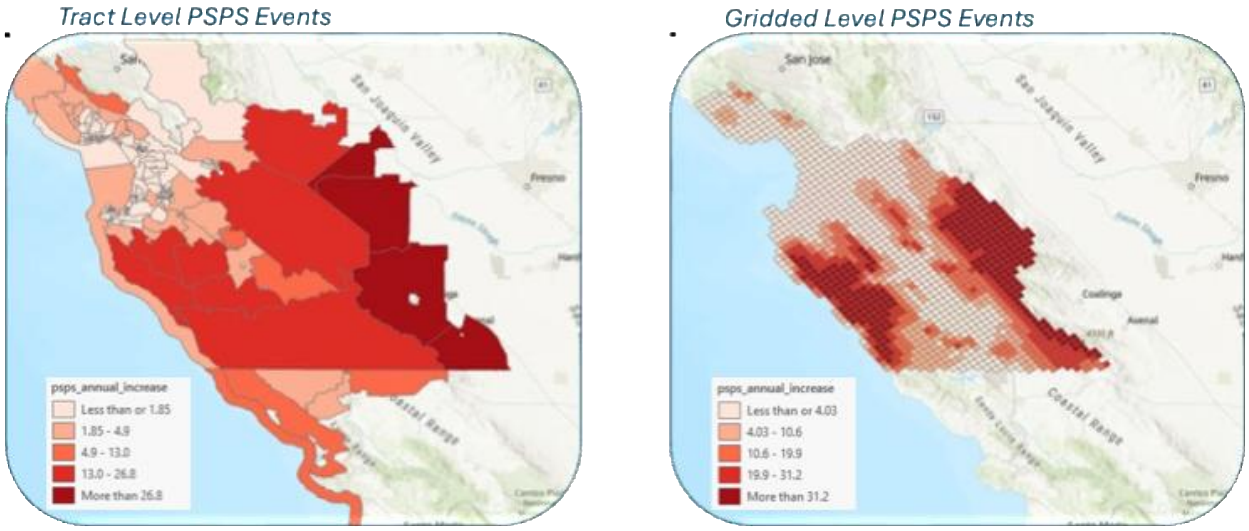
- 3 km gridded data showing the frequency of environmental conditions relevant for PSPS events
- Historical, current, and future climate conditions reflecting evolving risk patterns.
- A dataset informed by both utility-supplied information and public research on PSPS events across California.

PSPS Exposure Patterns Across Tracts and Gridded Cells

Analysis began with ERA's gridded PSPS dataset (3 km resolution), which provides the number of PSPS-relevant weather days under baseline and future climate scenarios. These gridded values were then aggregated to census tracts using an area-weighted averaging method. The tract-level PSPS metric is therefore not weighted by population, EV adoption, or charger deployment; rather, it is simply a spatial summary to visualize climatic exposure across the region.

Increases in PSPS days are concentrated in hilly, forested, and higher-elevation areas. Urbanized regions such as Santa Cruz and Monterey see relatively small increases, despite accounting for a much larger share of EV adoption. Consequently, tract-level maps of PSPS increases do not align with where most people or EVs are located and should be interpreted only as contextual visuals, not as direct indicators of EV charging network impacts.

Figure 6. Tract and Gridded Level PSPS Raw Data



Site-Level PSPS Exposure and Alignment with EV Chargers

To quantify EV charging vulnerability in the face of climate-change induced weather events, the analysis preserves the full gridded granularity rather than relying on tract averages. The workflow proceeds as follows:

1. Each simulated EV charger (from Task B) is assigned to the specific 3 km PSPS grid cell in which it is located.
2. The change in PSPS days for that grid cell (e.g., +20 PSPS days relative to baseline) is attributed directly to the charger.
3. The study aggregates all charger-level PSPS values to compute the total number of PSPS-driven unserved charging events.

This method ensures that high-PSPS grid cells influence results only when a charger is present, prevents tracts with forested or high-risk environments but few residents or chargers from distorting systemwide estimates, and preserves spatial granularity until the final aggregation step, when results are summarized by tract or region while retaining site-level accuracy. This approach is particularly important in AMBAG's territory, where much of the PSPS-prone terrain does not overlap with areas of significant EV adoption.

Unserved Charging Events Methodology

Unserved charging events are defined as the number of number of days in the year where unserved charging occurred due to PSPS conditions at the charger's location. Two metrics were computed:

1. Unserved Charging Events per Charger
2. Total Unserved Charging Events (Regional Aggregate)

Unserved events per charger are calculated by normalizing charger-level PSPS exposure by the number of chargers present in that scenario. Because this value is normalized, it does not change materially between the Base and Demographic scenarios; the underlying PSPS exposure at the grid-cell level remains unchanged.

Total unserved events, however, can change moderately because the Demographic scenario introduces additional chargers in targeted tracts, some of which fall within grid cells experiencing higher or lower PSPS changes compared to regional averages. As a result, even if per-charger disruption remains similar,

aggregate disruption increases due to the larger number of chargers exposed to climate-driven PSPS conditions. This distinction is essential for interpreting the results.

Unserved Charging Events per Charger Output

Across both the Base IEPR-aligned scenario and the Demographic scenario, the unserved charging events per charger remain consistent. Because this metric is normalized, differences between scenarios largely disappear. The per-charger values represent the average annual number of charging opportunities lost for a typical EV in the region and reflect the climate-driven PSPS conditions specific to the grid cell where chargers are located. For example, if the analysis shows an average increase of 5 unserved charging events per year, this means that - averaged across all EVs - vehicles will face approximately 5 more disruptions annually due to PSPS activity in the affected grid cells.

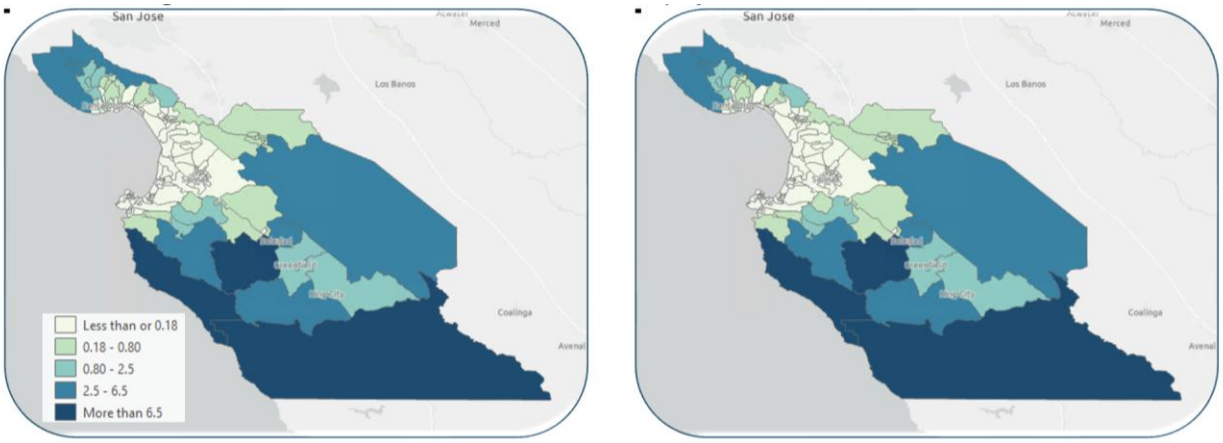
Increase in Unserved Charging Events (Per Charger) (2035)

The total increase in unserved charging events (Per Charger) represents the *change* in the number of missed charging sessions in a census tract caused specifically by climate-driven PSPS conditions. Rather than comparing EV adoption scenarios, this metric captures the difference in unserved charging days under two climate conditions:

1. Baseline climate case (no climate hazard increase)
2. Future climate hazard case (with additional PSPS-driven outages)

This increase quantifies how many additional charging disruptions EV users would experience *because of climate-exacerbated PSPS events*, holding EV adoption constant within the given scenario year (2035).

Figure 7. Increase in Unserved Charging Events (Per Charger) – IEPR Planning Scenario (left) and Demographic Scenario (right)



Several patterns emerge from the results:

- Some census tracts show large increases in PSPS-driven unserved charging days, particularly in hilly or heavily vegetated areas where wildfire risk intensifies under future climate conditions.
- The increase in unserved events does not necessarily align with EV population density. Tracts with high climate exposure but very few chargers may show substantial increases in climate hazard - but contribute little to the regional total.

- Conversely, urban tracts may show relatively small PSPS changes yet still contribute meaningfully to systemwide unserved charging totals because these areas contain a dense concentration of vehicles and chargers.
- The increase in unserved charging events therefore reflects a dual influence: the magnitude of climate-driven PSPS changes, and the presence of chargers exposed to those changes.

In practice, this means a tract with a 20-day increase in PSPS exposure will have zero impact on EV charging if no chargers are present there. Likewise, a tract with only a modest PSPS increase may contribute significantly more if it contains hundreds or thousands of chargers. The metric therefore isolates climate-driven risk while still accounting for the actual spatial distribution of EV infrastructure.

SAIDI/SAIFI Reliability Summary

As an additional lens on grid resilience, SAIDI and SAIFI metrics areas summarized for the geographical division that falls within the study area. SAIDI and SAIFI are industry-standard electric reliability metrics:

- System Average Interruption Duration Index (SAIDI): Measures the average total outage duration experienced by a customer over a given period (typically a year), usually expressed in minutes or hours per customer.
- System Average Interruption Frequency Index (SAIFI): Measures the average number of outages experienced by a customer over a given period, expressed as interruptions per customer.

These reliability metrics provide another dimension for understanding how local grid conditions may affect EV charging reliability, especially during high-impact weather events or extended outages.

The CPUC-mandated Electric Reliability Report from PG&E,[17] reports the following reliability metrics for the Central Coast division:

- SAIDI (duration): 413 minutes per customer in 2023
- SAIFI (frequency): 2.465 outages per customer in 2023

These values reflect an increase in average outage duration relative to earlier years, driven largely by severe weather and wildfire-related safety shutoffs.

Task C Conclusions

The Task C analysis demonstrates that climate-driven increases in PSPS events pose a growing risk to EV charging reliability across AMBAG's territory, but that this risk is highly uneven and driven primarily by where chargers are located, not simply by where climate hazards intensify. As shown in the gridded and tract-level PSPS maps and reinforced by the charger-aligned results in Figure 7, areas with the largest increases in PSPS exposure are concentrated in hilly, forested, and higher-elevation terrain, while the region's urban centers experience comparatively modest changes in PSPS frequency.

Crucially, high PSPS exposure does not automatically translate into high EV charging disruption. Figure 7 illustrates that census tracts with large climate-driven increases in unserved charging events per charger often do not coincide with areas of high EV adoption, whereas urban tracts with dense charger deployment can contribute disproportionately to total regional disruption despite smaller PSPS changes. This reflects the dual drivers of vulnerability identified in the analysis: the magnitude of climate-driven PSPS exposure and the presence of charging infrastructure within affected grid cells.

By assigning PSPS exposure at the 3 km grid-cell level directly to simulated charger locations, the analysis avoids distortions that would arise from relying on tract averages alone. This approach ensures

[17] PG&E Annual Electric Reliability Report, 2023

that PSPS risk only influences results where chargers are actually sited and that sparsely populated or lightly electrified tracts with high wildfire risk do not overstate systemwide impacts. As a result, the findings more accurately reflect real-world EV user experience and infrastructure vulnerability across the region.

The comparison between the IEPR-aligned Base Case and the Demographic (Equity) scenario further clarifies the nature of risk. Per-charger unserved charging events remain largely unchanged across scenarios, indicating that climate exposure at the grid-cell level is the dominant driver of individual charger disruption. However, total unserved charging events increase under the Demographic scenario because additional chargers are introduced into the system, expanding the number of assets exposed to PSPS conditions rather than increasing exposure severity itself. This distinction is essential for interpreting aggregate results and understanding how equity-focused deployment strategies interact with climate risk

Climate Adaptation Recommendations

Based on the combined findings from the climate vulnerability assessment, grid reliability metrics, forecasted EV adoption, and feeder-level hosting capacity analysis, the following high-level strategies identify actions AMBAG can pursue as a regional planning and coordination body to strengthen the resilience of EV charging infrastructure across its service territory.

1. **Target Resilience Investments Where Chargers and Climate Risk Intersect**

   AMBAG can incorporate the charger-aligned PSPS vulnerability findings into its Regional Transportation Plan (RTP) and related planning documents to help prioritize EV infrastructure investments in locations where moderate climate risk coincides with high or growing charger density. Rather than using hazard exposure alone, AMBAG can guide jurisdictions toward projects that measurably reduce regional unserved charging events, as highlighted in Figure 7. This spatial framework can also inform AMBAG's grant coordination role by strengthening applications for state and federal funding that emphasize climate resilience, reliability, and systemwide benefits.

2. **Coordinate Proactive Grid Readiness and Non-Wires Solutions in Constrained Feeders**

   Using the feeder-level headroom analysis from Task B, AMBAG can identify priority areas for early coordination between local governments, PG&E, and charging providers before capacity constraints or PSPS exposure materially affect service. Through technical assistance and regional convenings, AMBAG can help align land use planning, charging siting decisions, and utility planning processes to support targeted grid upgrades or non-wires alternatives such as managed charging or localized storage. Embedding this coordination into RTP implementation and regional funding guidance can reduce the risk of stranded or unreliable charging investments as EV adoption accelerates.

3. **Embed Charging Resilience into Equity-Focused Deployment Programs**

   As equity-oriented charging deployment expands under the RTP and associated programs, AMBAG can encourage jurisdictions to integrate resilience criteria (e.g., backup power, on-site storage, or siting outside the highest-risk grid cells) into project design and funding decisions. The memo shows that total unserved charging events increase under the demographic scenario due to an increase in chargers across the system, making resilience an essential complement to access goals. AMBAG can support this through grant guidance, model project requirements, and technical assistance to ensure that chargers serving priority communities remain reliable during climate-driven outages.

Collectively, these strategies emphasize that improving EV charging resilience requires integrating climate risk, grid constraints, and infrastructure deployment decisions rather than addressing each in isolation. By leveraging its regional planning authority, grant coordination role, and technical assistance capabilities, AMBAG can help ensure that future EV charging investments remain reliable under evolving climate conditions while advancing equity and adoption goals. This framework also positions AMBAG to

adapt as utility planning assumptions, grid investments, and climate projections continue to evolve over time.

Appendix. Geospatial Data Deliverables

The geospatial deliverables produced as part of the Task C analysis are included in a single geodatabase which includes the following shapefiles:

- iepr_planning_tract_ev_impacts
- equity_tract_ev_impacts
- gridded_psps_data
- tract_psps_data_raw

The data dictionary for the shapefiles is summarized in the table below.

Column Name	Definition
iepr_planning_tract_ev_impacts, equity_tract_ev_impacts	
geoid	Census Tract GEOID
psps_annual_pct_increase	Percentage change in annual average PSPS events from 0.8°C to 2.0°C scenario
chg_tot	Total number of electric vehicles in the Tract
unsrv_p_c	change in unserved charging events per electric vehicle
unsrv_even	Total change in unserved charging events in the tract
gridded_psps_data, tract_psps_data_raw	
base_psps	Annual average number of PSPS events per grid cell under baseline (0.8°C) warming scenario.
clim_psps	Annual average number of PSPS events per grid cell under 2.0°C warming scenario.
psps_annual_increase	Difference in annual average PSPS events between 2.0°C and 0.8°C scenarios
psps_annual_pct_increase	Percentage change in annual average PSPS events from 0.8°C to 2.0°C scenario.

Appendix B

AMBAG EV Car Existing and Expected EV Charing Infrastructure Conditions and Future Needs Analysis Tech Report

Monterey Bay EV CAR Framework

Existing and Expected EV Charing Infrastructure Conditions and Future Needs Analysis Technical Report

prepared by

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March 2025

RINCON CONSULTANTS, INC. SINCE 1994

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Tables

Figures

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1 Introduction

1.1 Approach

This report summarizes the technical analysis conducted to better understand the existing electric vehicle (EV) charging infrastructure and the current EV landscape within the Association of Monterey Bay Area Governments (AMBAG) region. The data and analysis results outlined in this report will be used as the baseline conditions in the Monterey Bay Electric Vehicle CAR Framework. This assessment included a review of relevant technical documents, studies, and existing reports, including the Central Coast Zero Emission Vehicles (CCZEV) study, a baseline assessment of existing EV ownership leveraging the Replica Model, and the completion of the Forecasting Anywhere Model which provides both baseline and forecasted EV charging numbers across the entire AMBAG region.

Specifically, the existing conditions study integrated data on charger locations provided by the U.S. Department of Energy's Alternative Fuels Data Center, along with anticipated future charger installations funded through initiatives such as the Santa Cruz County Monterey Bay Charging and Fueling Infrastructure Discretionary Grant Program (CFI).

The analysis also examined current EV ownership patterns based on the latest available 2023 DMV ownership data, establishing a baseline for current infrastructure availability and vehicle ownership scenarios within the region. This baseline analysis was further expanded by assessing the driving behavior trends of EV owners compared to general internal combustion engine (ICE) vehicle users, utilizing the Replica platform. Replica employs activity-based scenario modeling to depict the ratio of electric to ICE private vehicles and to highlight differences in driving patterns between these vehicle categories.

Finally, current and future EV charging infrastructure locations (both residential and public) were modeled using E3's Forecasting Anywhere Model. This model allows for projections of anticipated EV growth and provides insights into the required charging infrastructure to effectively support and sustain the EV growth trajectory through 2050.

Each of these data points will help to identify current and future EV charging locations based on projected demand and ownership rates. These locations, EV charging types (Level 2 vs. DC Fast), and overall charger counts will subsequently inform the vulnerability assessment by providing location-based information which can be mapped against future climate hazards (such as fire and landslides) as well as inform the feeder level electricity grid impact analysis to be completed in future phases of the project. All applicable data points will be incorporated into a GIS web map tool to analyze the spatial overlap of various layers.

2 Document Review

The first step in reviewing the existing EV charging infrastructure within the AMBAG region involved a review of relevant technical documents, existing studies, and reports relevant to the Monterey Bay EV CAR Framework. As seen in Table 1 below, the review involved analyzing 21 documents, assessing their relevance to this project, summarizing key points, and providing a link to each document. To highlight the aspects relevant to this project, the following points were drafted as key considerations during the review.

Other key documents that were identified to review, but not yet available were the Cal State Monterey Bay EV Infrastructure Master Plan, North Monterey County Climate Adaptation study, and the Salinas Climate Action Plan.

2.1 Relevance to the Monterey Bay EV CAR Framework

- **Existing electric vehicle charging infrastructure**
  - Level 2 chargers
  - DCFC fast chargers
  - Locations of both
  - Forecasts or expected growth
- **Climate vulnerability to the region**
  - Extreme weather events or other hazards
  - Impacts to EV charging infrastructure, grid reliability, roads
- **Road infrastructure and travel patterns**
  - For cars and trucks
- **Energy demand forecasts**
- **Population growth projections**
- **Underserved communities in the region (DACs)**
  - How are they defined
  - Where they are
- **Equity issues**
  - What are main equity considerations for EV infrastructure
- **Community outreach and engagement in the region**
  - Results from that engagement
  - Community concerns regarding EV adoption
- **Public process in the region**
- **EV ownership projections**

Table 1 Monterey Bay EV CAR Framework Document Review

Document Name	Relationship with the Monterey Bay EV CAR Framework	Summary	Link
Central Coast ZEV Strategy (DKS)	The Santa Barbara County Association of Governments (SBCAG), San Luis Obispo Council of Governments (SLOCOG), and Association of Monterey Bay Area Governments (AMBAG) partnered to develop the Central Coast Zero-Emission Vehicle Strategy (CCZEVS) in 2022. The document is a comprehensive strategy for deploying zero-emission vehicle (ZEV) charging infrastructure along California's Central Coast including the three county AMBAG area. It assesses existing infrastructure, identifies gaps and barriers to ZEV adoption (including grid capacity and equity concerns), and proposes recommendations for equitable infrastructure deployment and public education. Extensive community engagement, including surveys and focus groups, shaped the strategy's recommendations. The plan also examines relevant state and federal regulations and funding opportunities to support implementation.	CCZEV Purpose and Objectives (p.29): ▪ Assess existing EV infrastructure in the Central Coast region ▪ Identify challenges and barriers to EV adoption ▪ Ensure equitable access to charging infrastructure ▪ Recommend infrastructure improvements and implementation strategies Current Infrastructure Status (p.13): ▪ 2,095 total public EV chargers in the six-county study area ▪ Most chargers concentrated in cities ▪ Limited charging along many key interregional travel routes Future Infrastructure Needs (p.16): ▪ By 2030, six county regions need approximately: ▪ 25,481 additional public Level 2 charging stations ▪ 1,223 additional public DC Fast Charging stations ▪ 2,031 stations in unincorporated areas along highways ▪ By 2030, the three county AMBAG area needs approximately: ▪ 8,605 Public Level 2 charging stations ▪ 537 additional public DCFC charging stations Key Recommendations (p.20): ▪ Create a cooperative regional ZEV planning committee (p.20) ▪ Prioritize charging infrastructure deployment at identified high-priority locations (p.20) ▪ Provide education and outreach about ZEV technologies (p.24) ▪ Address grid capacity and transformer constraints (p.25) ▪ Ensure equitable access for disadvantaged communities (p.25) ▪ Improve charging access at multi-family housing (p.25) ▪ Streamline permitting processes (p.26) ▪ Simplify payment systems for charging (p.24) Implementation (p.27): ▪ Leverage federal, state and local funding opportunities (p.28) ▪ Partner with utilities on infrastructure planning (p.25) ▪ Work with local jurisdictions on building codes and permits (p.27) ▪ Focus on both urban and rural charging needs (p.25) ▪ Consider climate resilience in infrastructure deployment (p.26)	Central Coast ZEV Strategy
Central Coast Community Energy Blueprint	▪ Existing EV charging infrastructure ▪ Public process ▪ Climate vulnerability ▪ Road infrastructure and travel patterns ▪ Energy demand and population growth ▪ Underserved communities (DACs) ▪ Equity considerations ▪ Community outreach ▪ EV ownership projections	Existing EV charging infrastructure: ▪ The Central Coast region currently has 118 public DC fast chargers, mainly along major routes like U.S. 101. However, these chargers are largely inaccessible for heavy-duty trucks, but fine for a variety of medium-duty trucks. There is a map showing the locations of Level 2 and DCFCs in the region (p. 41). ▪ Recommendations for installing EV chargers focus on agricultural hubs (particularly for wine), population centers, and critical transportation corridors like U.S. 101 (p. 47). ▪ The Central Coast region's growing population is reliant on trucks and buses moving along the US 101 corridor and within its major population centers (p. 4). ▪ The use of MHD fleets to transport people is concentrated among municipal fleets and school districts (p.45). Climate vulnerability ▪ Recognizes the importance of establishing charging hubs for emergency events and enhancing hardware resilience to support climate adaptation efforts (p. 29). ▪ Key areas of concern identified by the TAC were grid capacity for MHD vehicle charging (p. 26). Road infrastructure and travel patterns	Central Coast Community Energy Blueprint

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		▪ U.S. 101 is a critical freight route with 75% of shipments transported by trucks in the region. Other major routes include SR 46, SR 152, SR 156, and SR 129 (p. 42). Energy demand and population growth ▪ The Central Coast's population is projected to grow to 1.7 million by 2030 (p. 13). ▪ Increased demand for clean energy to meet charging needs, with strategies like energy storage and grid integration outlined (p. 83). Underserved communities (DACs) ▪ Maps and demographic analyses identify disadvantaged communities in areas like Salinas and Marina Region, parts of Watsonville and the surrounding area, Guadalupe and Mussel point region. Priority is given to EV programs in these areas to address equity (p. 36). ▪ Funding programs for DACs (p. 74). Equity considerations ▪ Barriers to EV adoption in disadvantaged communities include high upfront costs (p. 89-91). ▪ Recommendations include partnering with community organizations to identify suitable locations for EV infrastructure and offering targeted rebates (p. 88). Community outreach ▪ Need for continued community outreach and a central web location for regulatory and funding resources (p. 81). ▪ Concerns include insufficient planning for medium- and heavy-duty vehicle electrification and more communication between public agencies, stakeholders, governments and regional industry (p. 91). EV ownership projections ▪ Ownership and adoption rates for MHD vehicles lag due to supply chain delays and high costs. Recommendations focus on phased deployment and incentives (p. 63).	
Assembly Bill 2127 Second EV Charging Infrastructure Report	▪ Existing EV charging infrastructure ▪ Climate vulnerability ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Underserved communities (DACs) ▪ Equity considerations ▪ EV ownership projections	Existing EV charging Infrastructure ▪ California currently has nearly 94,000 public and shared private chargers, with plans to meet the target of 250,000 chargers (including 10,000 DC fast chargers) by 2025. However, access remains uneven, particularly in rural and disadvantaged communities (p. 35, 57). ▪ By 2035, California will require about 2.1 million chargers (including 83,000 DC fast chargers) for light-duty vehicles and 264,500 chargers for medium- and heavy-duty vehicles (p. 3, 7, 39). ▪ DC charging is widely used in charging situations with short dwell times such as at highway-adjacent stations serving road trippers, grocery stores, or urban stations serving residents without at-home charging (p. 33). Climate vulnerability ▪ Anticipated load from EV charging on the grid, especially for medium- and heavy-duty vehicles (p. 10). Road infrastructure and travel patterns ▪ As DCFC charging speeds increase, more drivers might opt to fit DCFC charging events as brief stops during their regular travel patterns rather than relying on lower-speed charging at longer dwell-time destinations. (p. 86). Energy demand forecasts ▪ A systemwide load analysis as part of the 2022 IEPR Planning Scenario, which incorporates the AATE 3 scenario used in this report, anticipates vehicle charging to account for less than 10 percent of daily average load and less than 5 percent of load peak in 2030. This systemwide load analysis anticipates that vehicle charging will account for less than 20 percent of daily average load and less than 10 percent of load at peak in 2035 (p. 56). ▪ Localized and circuit-specific impacts will require significant upgrades (p. 78). ▪ Managed charging models to shift peak demand (p. 56, 75). Underserved communities (DACs) ▪ About 88 percent of urban communities are within 10 minutes of a public DC fast charger; in ▪ contrast, about 40 percent of rural communities are within 10 minutes of one (p.39). ▪ Lack of access to charging infrastructure is a significant barrier to EV adoption and use. Despite investments within low-income and disadvantaged communities, charging coverage gaps persist. Solutions to improve charging access will vary and depend on the intersecting characteristics of a community (p.41). ▪ Deployment programs under SB 1000 aim to prioritize disadvantaged areas for infrastructure development (p. 38). Equity considerations ▪ Legislation such as AB 2061 introduces standards for charger reliability and equitable distribution (p. 36).	Assembly Bill 2127 Second EV Charging Infrastructure Report

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		EV ownership projections ▪ By 2030, California is projected to have 7.1 million light-duty plug-in electric vehicles (PEVs) (p. 4). ▪ By 2035, this figure is expected to rise to 15.2 million light-duty PEVs, including battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) (p. 4, 49). ▪ By 2030, the projection is 155,000 medium- and heavy-duty PEVs (p. 4, 70). ▪ By 2035, this will grow to 377,000 medium- and heavy-duty PEVs (p. 4, 70).	
Monterey-Salinas Transit (MST) Unveils ZWB Plan	▪ Existing EV charging infrastructure ▪ Climate vulnerability ▪ Public process	Existing EV charging infrastructure ▪ The Plan recognizes a significant and unfunded financial investment of between $71M to $107M over 19 years to fully implement. This unfunded investment includes Zero Emissions Buses (ZEBs), equipment, and charging/fueling infrastructure (paragraph 2). ▪ MST has already invested in 5 ZEBs, representing 6% of its existing fleet of 86 heavy-duty diesel-powered buses (paragraph 2) Climate vulnerability ▪ The goal of the ZEB rollout is to reduce GHG emissions and improve air quality (paragraph 1). Public process ▪ In 2018, the California Air Resources Board (CARB) adopted the Innovative Clean Transit (ICT) regulation, which requires all bus fleets to be converted to zero-emissions by 2040. As part of this mandate, small transit operators must submit a zero-emission bus rollout plan to CARB by July 2023 (paragraph 3).	Monterey-Salinas Transit (MST) Unveils ZWB Plan
Santa Cruz ZEB Rollout Plan	▪ Energy demand forecasts ▪ Existing EV charging infrastructure ▪ Underserved communities (DACs)	Energy demand forecasts ▪ Metros's ZEB rollout plan will enable the agency to fully transition its fleet to zero-emission by 2037 (p. 4). ▪ Metro will begin purchasing fuel cell electric buses (FCEB) in 2023/2024 to achieve cycles of longer routes and blocks with larger energy demands (p. 4). Existing EV charging infrastructure ▪ Metro currently has one CNG fueling station, 4 BEB charging stations with conduit ready for an additional 6 charging stations (p.11). Underserved communities (DACs) ▪ The proposed hydrogen fueling station at JKS has an explicit goal of enabling Metro to convert 100% of its fleet serving Watsonville's Historically Disadvantaged Communities (HDCs) to ZEBs by 2027 (p.11).	Santa Cruz ZEB Rollout Plan
UCSC EV Charging	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region	Existing EV charging infrastructure ▪ UCSC offers Level 2 and Level 1 charging options in various lots throughout campus (detailed locations offered on webpage). ▪ Chargers are first-come, first-served, and users must be plugged in or actively charging while parked in a Level 2 charging space. ▪ Level 2 chargers are part of either the ChargePoint or JuiceBox (Enel) network and a fee of $0.25/kWh while charging and $1/kWh idle time will be collected for active charging and while plugged in. Climate vulnerability to the region ▪ Disclaimer that EV chargers may be affected by larger grid issues due to wind, fire, heat, and other power shortages. Resources are available to report any outages.	UCSC EV Charging
California's Deployment Plan for the National Electric Vehicle Infrastructure Program Annual Update	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Population growth projections ▪ Underserved communities in the region (DACs) ▪ EV ownership projections	Existing EV charging infrastructure ▪ Figures 10, 11, and 12 show existing public DC fast charging and Level 2 charging stations in California as of June 28, 2024 (p. 44) ▪ There are now 14,708 public and shared private DC fast chargers in California according to analysis by the CEC as of August 2024 (13,943 of the DC fast chargers are public and 765 are shared private) (p. 43) ▪ There are currently more than 15,500 public Level 2 chargers in California (p. 43). Climate vulnerability to the region ▪ Between January and March 2024, nine atmospheric river storms in California caused flooding and impacted priority populations in Monterey County (p. 35). Road infrastructure and travel patterns ▪ Maps in Figures 7 and 8 identify freight corridors with significant truck traffic (p. 38). Underserved communities (DACs) ▪ Caltrans and the CEC will continue to use the NEVI program to bring benefits to both Justice40 communities and California-designated disadvantaged and low-income communities (p. 52). ▪ Figure 14 on page 53 maps disadvantaged and priority populations across California (Alternative fuel corridors) (p. 53).	California's Deployment Plan for the National Electric Vehicle Infrastructure Program Annual Update

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		EV ownership projections ▪ To support the 7.1 million light-duty EVs projected by 2030, the state will need 1 million chargers, including 39,000 DC fast chargers. In 2035, California's projected 15.2 million light-duty EVs will need 2.1 million chargers, including 83,000 DC fast chargers (p. 19). ▪ More than 441,283 light-duty electric vehicles were sold in 2023, or 25 percent of total sales, and a 28 percent increase over 2022 sales. Cumulative light-duty ZEV sales now total nearly 2 million vehicles, and an estimated 1 million electric vehicles are now on the road (p. 35) ▪ For medium- and heavy-duty trucks, analysis by the CEC projects that 114,500 chargers will be needed in 2030 to support 155,000 vehicles: 109,000 low power (20–150 kW) depot chargers and 5,500 high powers (350–1,500 kW) in route chargers (p. 21).	
Southern California Plug-In Electric Vehicle Readiness Plan	▪ Existing EV charging infrastructure ▪ Equity issues	Existing EV charging infrastructure ▪ Currently, there are three major levels of PEV charging: Level 1 (120 volts), Level 2 (240 volts), and DC fast charging (up to 500 volts) charging can demand differing levels of power even within a given charging level category, limited by how much current the circuit and charging equipment (on- and off-board the vehicle) supply. PEVs typically come with either 3.3- or 6.6-kilowatt (kW) chargers onboard the vehicle. (p. 14). Equity issues ▪ Multi-unit dwellings (MUDs) and workplaces are potential charging environments that would disproportionately benefit from effective PEV readiness. This is largely because these environments may potentially have an advantage of economies of scale in charge station capacity, able to charge multiple PEVs at once and at lower per-kilowatt-hour costs (p. 26). ▪ Concerns like "range anxiety" and access to charging are concerns for people in general (p.5).	Southern California Plug-In Electric Vehicle Readiness Plan
Electric Vehicle Charging Equity Considerations	▪ Equity issues	Equity issues ▪ The Justice40 Initiative... states a goal that at least 40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities (DACs). ▪ Clean transportation is identified as a Justice40 covered program and identifies access to electric vehicle charging stations as an example benefit of a covered program. ▪ The joint interim definition of DACs for the NEVI program includes three components: combined census tracts from DOT's and DOE's working definitions of DACs, tribal lands, and U.S. territories.	Electric Vehicle Charging Equity Considerations
AMBAG 2045 Metropolitan Transportation Plan and SCS	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Population growth projections ▪ Underserved communities in the region (DACs) ▪ Equity issues	Climate vulnerability to the region ▪ The Monterey Bay region is expected to change due to climate, even under the most optimistic scenarios. Potential impacts include more frequent and intense heat waves and wildfires, rising sea levels and higher storm surges, the loss of native plant and animal species, and a higher demand for electricity, particularly during peak periods (p. 103). ▪ Page 67 outlines recent wildfire events in the region under FEMA funding. ▪ The SCS outlines the region's plan for integrating the transportation network within an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands while reducing GHG emissions (p. 19). Road infrastructure and travel patterns ▪ The Monterey Bay Area includes many highways that connect people between the three counties as well as outside the region... Projects for these roadways are included within the 2045 MTP/SCS (p. 36): ▪ Improvements to U.S. 101, SR 1, SR 68, SR 156 West, SR 25, SR 152 widening, and SR 1 bus on shoulder lane improvements (Santa Cruz). Population growth projections ▪ By 2045, the population is expected to reach 869,776... The region is expected to add more than 42,000 housing units by 2045 and more than 65,000 new jobs (p. 15). Underserved communities in the region (DACs) ▪ Major goal and policy objective is social Equity – Provide an equitable level of transportation services to all segments of the population (p. 30). ▪ Social equity areas are defined on page 133 and figures 5-1 and 5-2 display them geographically in the AMBAG region. Equity issues ▪ By 2045, the region is envisioned to have more travel choices and a safer, more efficient transportation system that provides improved access to jobs and education. In addition, the Plan will support job creation, expand the region's economic competitiveness through investments in freight, and improve environmental quality for the region's nearly one million residents by 2045 (p. 24).	AMBAG 2045 Metropolitan Transportation Plan and SCS

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Monterey Regional Transportation Plan	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Population growth projections ▪ Underserved communities in the region (DACs) ▪ Equity issues	Climate vulnerability to the region ▪ Extreme weather events along the Central Coast have included temperature impacts, precipitation resulting in landslides and flooding, wildfires, and sea level rise. These climate impacts have resulted in millions of dollars in damage to the state highway system (p. 19). Road infrastructure and travel patterns ▪ Key goods movement routes in Monterey County include the U.S. 101 and State Route 156. Freight routes in Monterey County are identified as significantly important for the movement of freight, particularly agricultural products, as Salinas Valley is home to the top vegetable producing land in the nation. The U.S. 101 serves as the main north-south corridor for goods movement between Los Angeles and San Francisco and is the primary corridor for goods movement into and out of the Central Coast Counties (p. 31). ▪ State Route 1 between Castroville and Carmel serves as a commute corridor for work trips between Salinas and Marina during weekdays and is the primary route between Santa Cruz and Monterey. State Route 1 provides interregional access to the Monterey Peninsula and coast from the San Francisco Bay Area and Northern California on weekends, holidays and peak travel periods (p. 41). Population growth projections ▪ The population of Monterey County will grow 14% during the 20-year planning period. Sand City and the Salinas Valley cities are expected to have the largest percentage increase in population and housing units (p. 11). Underserved communities in the region (DACs) ▪ The Plan aims to promote equity through proactively reducing the risk of disproportionate impacts from transportation construction or operations; engaging low-income, minority, and low-mobility groups in the transportation planning process; and reducing barriers to safe transportation options for youth and seniors (p. 5). Equity issues ▪ Advancing equity in Monterey County is a core goal of the Regional Transportation Plan, touching on equity across race, income, and geography (p. 5).	Monterey Regional Transportation Plan
Santa Cruz Regional Transportation Plan	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns ▪ Population growth projections ▪ Underserved communities in the region (DACs)	Climate vulnerability to the region ▪ Santa Cruz County is susceptible to a wide range of climate change effects including increased temperatures, changing precipitation patterns, increased number and severity of wildfires, sea-level rise, extreme weather events, and numerous effects on biodiversity and habitats. The transportation sector has been identified as a major contributor of climate impacting greenhouse gas emissions, and in return the transportation system is impacted by increased flooding, landslides or mudslides, sea level rise, coastal and other erosion, and more frequent and intense heat waves or fires that cause roadways to buckle (p. 147). Road infrastructure and travel patterns ▪ Highway 1 is the key thoroughfare running through the most heavily populated areas of the county. Between Watsonville and the City of Santa Cruz, it is a separated freeway with at least two lanes in each direction, with a few auxiliary lanes that connect on-ramps with the next off-ramps. Highway 1 has the highest average daily traffic volumes (number of vehicles) of all local streets and highways, connects the region with other coastal areas to the north and south, and is roughly parallel to Highway 101 for the middle stretch of the state. Highway 1 is also the county's premier access route to the coast. The rural sections of State Route Highway 1 in the coastal zone are scenic two-lane roads pursuant to California Coastal Act Section 30254 (p. 31). Population growth projections ▪ The population in Santa Cruz County is projected to grow by 9% between 2020 and 2045 (p. 65). Underserved communities in the region (DACs) ▪ Nearly one-third of Santa Cruz County residents—notably children, the elderly and disabled, and low-income individuals and families who cannot afford a car—do not drive a personal vehicle (p. 84). ▪ Figure 3.21 highlights minority and low-income areas in Santa Cruz County identified as disadvantaged communities (p. 82).	Santa Cruz Regional Transportation Plan
San Benito Regional Transportation Plan	▪ Existing electric vehicle charging infrastructure ▪ Road infrastructure and travel patterns ▪ Underserved communities in the region (DACs) ▪ Population growth projections ▪ Community outreach and engagement in the region	Existing electric vehicle charging infrastructure ▪ The success of long-term transportation electrification will depend in part on the near-term deployment of charging infrastructure. In the San Benito region, there are several public electric vehicle charging stations and residential chargers (see Figure 6) (p. 17). Road infrastructure and travel patterns ▪ Within the San Benito region, there are several key goods movement highways, including U.S. 101, SR 156, and SR 129 (p. 60). Population growth projections ▪ San Benito County is projected to grow from 56,445 in 2015 to 74,668 by 2040, representing a 32% increase (p. 46). Underserved communities in the region (DACs) ▪ In San Benito County, 10.8 percent of the population lives below the poverty line (p. 35).	San Benito Regional Transportation Plan

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		Community outreach and engagement in the region ▪ Interested parties expressed support for local roadway maintenance and improvements to State Route 25, as well as a desire for healthier, more walkable, and bike-friendly communities (p. 16).	
Electric Vehicle Infrastructure for the Monterey Bay Area	▪ Existing electric vehicle charging infrastructure ▪ Road infrastructure and travel patterns ▪ Energy demand forecasts ▪ Public process in the region	Existing electric vehicle charging infrastructure ▪ Level II and Level III charging are most appropriate for public use, where people are parked for shorter periods of time, because of their ability to deliver a charge quickly (p. 18). ▪ Map of existing and planned stations in AMBAG 2013 – only levels 1 and 2 (p. 48). ▪ An electric vehicle charging with a Level II EVSE at 220 V on a 15-amp circuit can draw 3.3 kilowatts of power, the equivalent of a typical household (p.22). Road infrastructure and travel patterns ▪ In 2005 the AMBAG region drove 16,075,936 miles a day (p. 11). Energy demand forecasts ▪ New charging stations put an increased demand on the grid and therefore on local transformers. Coordinating with PG&E is the only way to ensure that the demand and grid infrastructure improvements can be managed in such a way that the chance of overloading the grid is minimized or eliminated (p. 61). Public process in the region ▪ Ensure local governments adopt supportive policies, including streamlined EV charging station permit processing and increased number of EVs in their fleets (p. 64).	Electric Vehicle Infrastructure for the Monterey Bay Area
Charging up the Central Coast: Policy Solutions to Improve EV Charging Access in Watsonville	▪ Existing EV charging infrastructure ▪ Energy demand forecasts ▪ Underserved communities (DACs) ▪ Equity issues ▪ Community outreach and engagement in the region	Equity issues ▪ Low and medium-income residents will face barriers to the 2035 statewide goal of ending the sale of internal combustion engine passenger vehicles. This is due to lower home ownership rates and higher rates of tenancy in apartment buildings, those who don't own garages, and inadequate grid infrastructure to support electrical loads required for vehicle chargers in lower-income areas (p. 8). ▪ Barriers include insufficient planning and mapping to identify and deploy EV chargers, high cost of installing; high cost of installing, operating and using chargers; and limited public awareness, education, and outreach (p. 10). ▪ While about half of all public Level 2 and Direct Current Fast Chargers (DCFCs) in California are deployed in low-income communities, low-income communities have fewer Level 2 chargers per capita (p. 17). Underserved communities (DACs) ▪ The study focused on Watsonville due to its diversity (p. 8). Watsonville also straddles two disadvantaged communities (DACs) as defined under Senate Bill 535 (De León, 2012), covering most of the southern part of the city and including the downtown area (p. 13). ▪ Chargers are available at the locations and times necessary for users in priority communities (p. 8). ▪ Respect for the privacy of those charging, to allow people of all backgrounds to charge without fear of discrimination (p. 9). Energy demand forecasts ▪ 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 (p. 8). ▪ Granular data collected by public charging transactions, collated in a simple manner to encourage better siting decisions (p. 8). Community outreach and engagement in the region ▪ 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 (p. 8). Existing EV charging in the region ▪ Existing policies include Zero-emission Vehicle Regulation, Clean Cars 4 All, Low Carbon Fuels Standard (p. 14). ▪ 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 (p. 15).	Charging up the Central Coast - Watsonville.pdf
PG&E Climate Vulnerability and Adaptation Plan (Executive Summary)	▪ Climate vulnerability to the region	Climate Vulnerability in the Region ▪ How rising average and extreme temperatures, extreme storms and flowing, sea level rise, and wildfire, may impact PG&E's ability to provide safe and reliable energy to the communities it is serving (p. 2). ▪ Electrical assets such as transmission and distribution are at high risk of high heat and wildfire (p. 5). ▪ Gas assets such as compression and processing storage are at high risk of heavy rain and flooding as well as sea level rise (p. 5). ▪ Power generation assets such as hydropower are at high risk of heavy rain and wildfire (p. 5).	CAVA-executive-summary.pdf

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		Recommendations from the communities PG&E is serving are (p. 7): ▪ Center equity ▪ Expand weatherization programs, ▪ Provide distribution of free safety resources. ▪ Provide direct reimbursements. ▪ Maximize enrollment and longevity. ▪ Improve energy notifications. ▪ Enable the expansion of distributed energy resources. ▪ Expand urban greening. ▪ Improve emergency evacuations. ▪ Invest in and expand existing workforce.	
AMBAG Central Coast Highway 1 Climate Resiliency Study (Executive Study)	▪ Climate vulnerability to the region ▪ Road infrastructure and travel patterns	Climate vulnerability in the region ▪ The eight-mile stretch of Highway 1 through Elkhorn Slough is a critical transportation asset for the region and beyond and is vulnerable to sea level rise. It is essential to freight movement and the economy and is a major community route connecting two regionally important cities (Monterey and Santa Cruz) (p. 11). ▪ With two feet of sea level rise, major disruptions to Highway 1 transportation function are anticipated (p. 11). ▪ The refined flood hazard mapping indicates Highway 1 will be impacted by a 100-year flood by 2030 (less than one foot of sea level rise), and by monthly high water by 2050 (about 2 ft of sea level rise) (p. 14). ▪ Choosing not to adapt to sea level rise will result in widespread loss of coastal habitat, significant transportation impacts and economic losses (p. 18). ▪ Adaptation needs to be in place by 2050 to ensure benefits to transportation and habitats (p. 18). Road infrastructure and travel patterns ▪ Allowing the roadway to flood would limit access to transportation for DACs (p. 13). ▪ Widening Highway 1 to four lanes would provide the greatest relief to congestion and delay, leading to less time spent on the roadway and greater ease of travel (p. 13).	Central Coast Highway 1 Climate Resiliency Study.pdf
Capitola Climate Action Plan (CAP)	▪ Public process in the region	Public process in the region • Measures related to EVs include supporting the local uptake of EVs by providing incentives and considering free parking spaces for EVs in the Village and Beach parking lots (p. 69). Also requiring new major non-residential development to include designated or preferred parking for vanpools, carpools, and EVs (p. 72).	Capitola Climate Action Plan.pdf
Monterey Climate Action Plan (CAP)	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region ▪ Public process in the region	Existing EV charging infrastructure ▪ Major GHG reductions in Monterey are projected to come from EV charging installations (p. 24). ▪ The City currently has four EV parking spaces (p. 43). Public process in the region ▪ Actions relating to EVs include replacing the City fleet with EVs and hybrids as cars age out. Climate vulnerability to the region ▪ In April 2009, Monterey adopted an updated report and map detailing fire hazard zones within and surrounding Monterey. City staff also participate in regional efforts to evaluate and address sea level rise and the loss of shoreline (p. 29).	Monterey Climate Action Plan.pdf
Santa Cruz County Climate Action and Adaptation Plan (CAAP)	▪ Climate vulnerability to the region ▪ Public process in the region	Public process in the region ▪ Actions related to EVs include to prioritize the transition to EVs using a standardized vehicle replacement schedule, providing an evaluation of the cost difference between different types of EVs and available charging stations, installing new EV charging infrastructure at select County-owned properties for use by public, and supporting a cost recovery system of EV charging stations on County facilities during the normal work week – moving to market rate charge facilities only during evenings and weekends (p. 40). Climate vulnerability to the region ▪ Climate hazards related to Santa Cruz County include extreme heat, wildfire, landslides, riverine and stormwater flooding, sea level rise, and sea water intrusion. Other notable hazards include air quality and drought. These hazards pose a threat to vulnerable populations, natural resources, and buildings, services, and infrastructure (p. 25).	Santa Cruz County Climate Action and Adaptation Plan.pdf

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Watsonville Climate Action and Adaptation Plan (CAAP) Executive Summary	▪ Existing EV charging infrastructure ▪ Climate vulnerability to the region	Existing EV charging infrastructure ▪ The largest contributor to Watsonville's GHG emissions is gas-powered cars and trucks. 22% of the solution to lowering the GHG emissions are to facilitate EV infrastructure through the EV master plan, public-private partnerships, and getting people into EVs equitably through state and federal grants and partnerships with nonprofits and Central Coast Community Energy (p. 4). Another major goal is to electrify the City fleet as 4% of the solution (p. 5). ▪ Climate vulnerability to the region ▪ Climate adaptation focuses on strategies for energy and agricultural resilience to address issues such as the strain on the electrical grid because of increasing temperatures and reduced agricultural productivity and food security due to droughts (p. 6). ▪ Climate adaptation measures include (p. 6): ▪ Preparing for flooding, wildfires, extreme heat, and sea level rise. ▪ Improving grid resilience and having power backups and critical City facilities (p. 6).	Watsonville Climate Action and Adaptation Plan.pdf

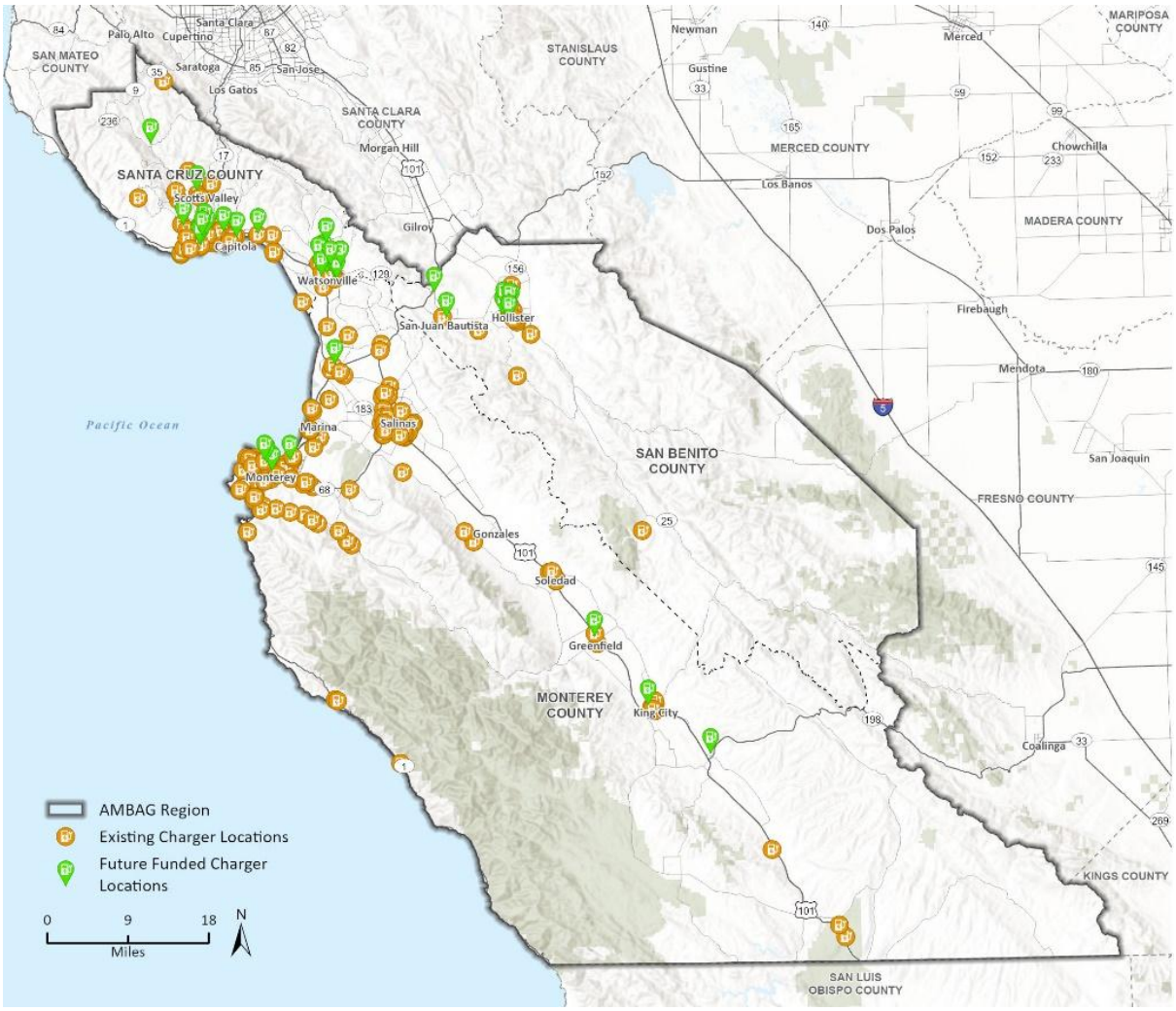
3 Baseline Conditions

3.1 Existing Charging Locations

Figure 1 displays a map of the existing and planned, future funded publicly available Level 2 and DC Fast EV charging locations in the AMBAG region. The orange dots are current EV chargers based on the US Department of Energy's Alternative Fuels Data Center as of December 9th, 2024. The green dots represent planned, future funded charger locations based on the Santa Cruz County CFI application award.

As seen on the map, most of the current public charging landscape in the region is centralized around urban-dense cities such as Santa Cruz, Monterey, and Salinas, and along the major highways such as the US-101 and coastal routes along Highway 1. The future funded charging locations follow similar patterns to the existing charging landscape but with more placement along inland routes leading to southern parts of Monterey County.

Figure 1 Existing EV Charger Locations from the US Department of Energy's Alternative Fules Data Center



3.2 Existing Travel Patterns

The travel pattern analysis consisted of two primary components: To assess the regional travel behavior for all vehicle types and to assess how EV specific travel behavior differs from the baseline. The goal of this analysis was to gain insights into potential shifts in travel behavior as EV adoption accelerates and ICE vehicles transition to EVs. Additionally, the analysis aimed to highlight differences in travel patterns between EVs and ICE vehicles to assess how EV mobility may evolve over time. This evaluation provides insight into where people are currently driving EVs, where they may travel in the future, and how those patterns could align more closely with existing ICE travel behaviors, supporting a broader resilience analysis of EV charging.

The existing travel patterns analysis was done using Replica, a location-based scenario model looking at trips within the AMBAG region on an average Thursday in 2024. The analysis comprised four primary components, beginning with a comparison of the existing road networks, to identify the most frequently traveled routes by EVs compared to ICE vehicles. Additionally, the analysis included examining major trip destinations and highlighting key locations frequently visited by EVs compared to ICE vehicles. It also involved evaluating major trip origins to identify differences in the typical origin points for trips by EVs versus ICE vehicles. Finally, average trip lengths were assessed and compared between ICE and EV's to identify travel distance variation between the two groups.

Network Link Volumes

Figure 2 and Figure 3 illustrate the differences in road usage by EVs compared to ICE vehicles. It's important to note that the scales used in these figures are not directly proportional due to the relatively lower volume of EVs. However, the figures effectively highlight the distinct travel patterns of each vehicle type. Key observations from this analysis reveal that EV travel is primarily concentrated along connecting routes between and within cities, utilizing smaller roads adjacent to major highways. In contrast, ICE vehicle trips predominantly utilize major highways, such as the US 101. Additionally, the EV patterns align with areas where charging infrastructure is already established, including Santa Cruz, Monterey, and Salinas, underscoring infrastructure availability as a factor influencing current EV travel behaviors. It is unclear whether the presence of chargers reflects the higher demand from EV's in those areas, or if EV's frequent those areas due to the presence of EV charging infrastructure.

Figure 2 EV Network Link Volumes

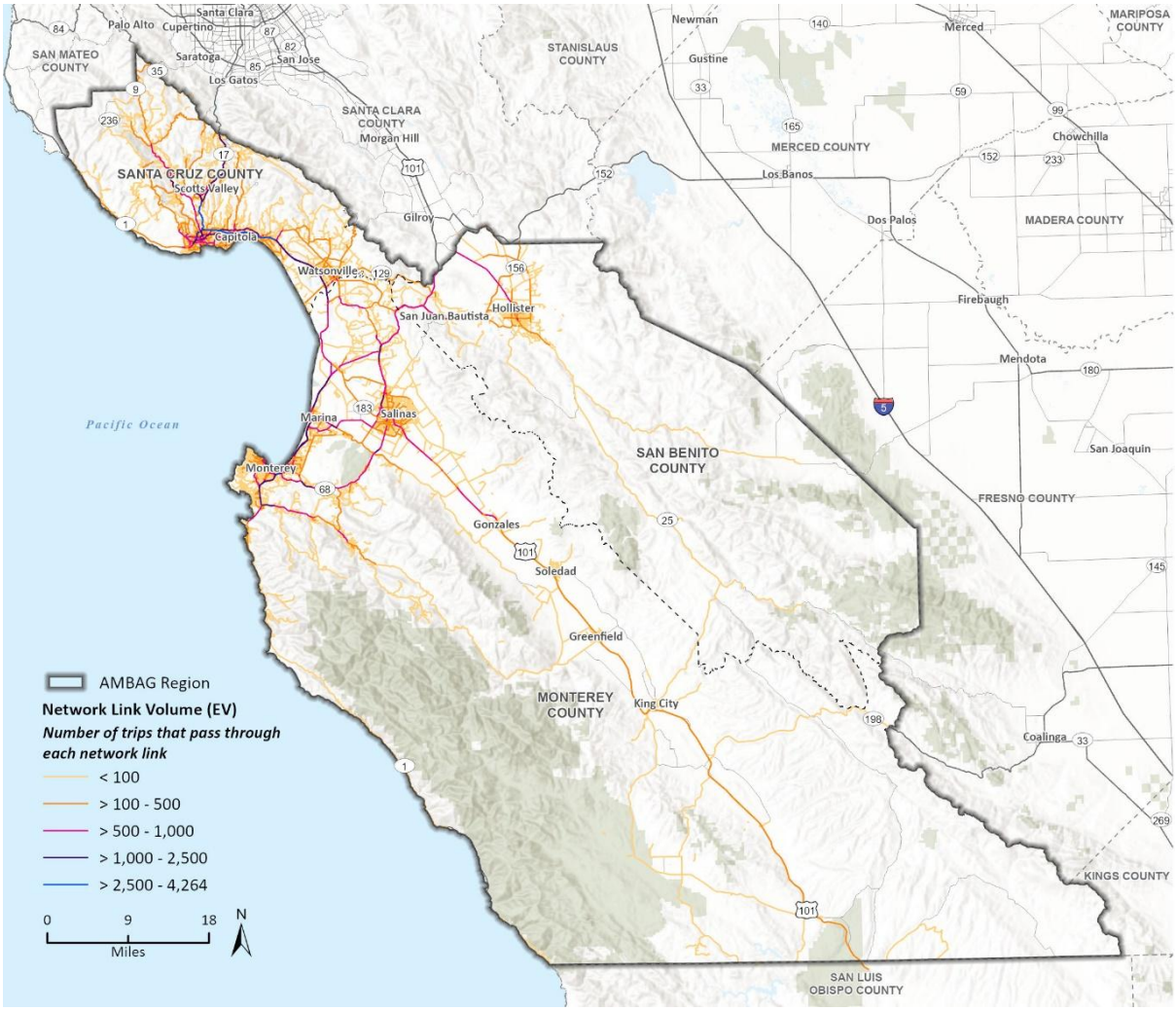
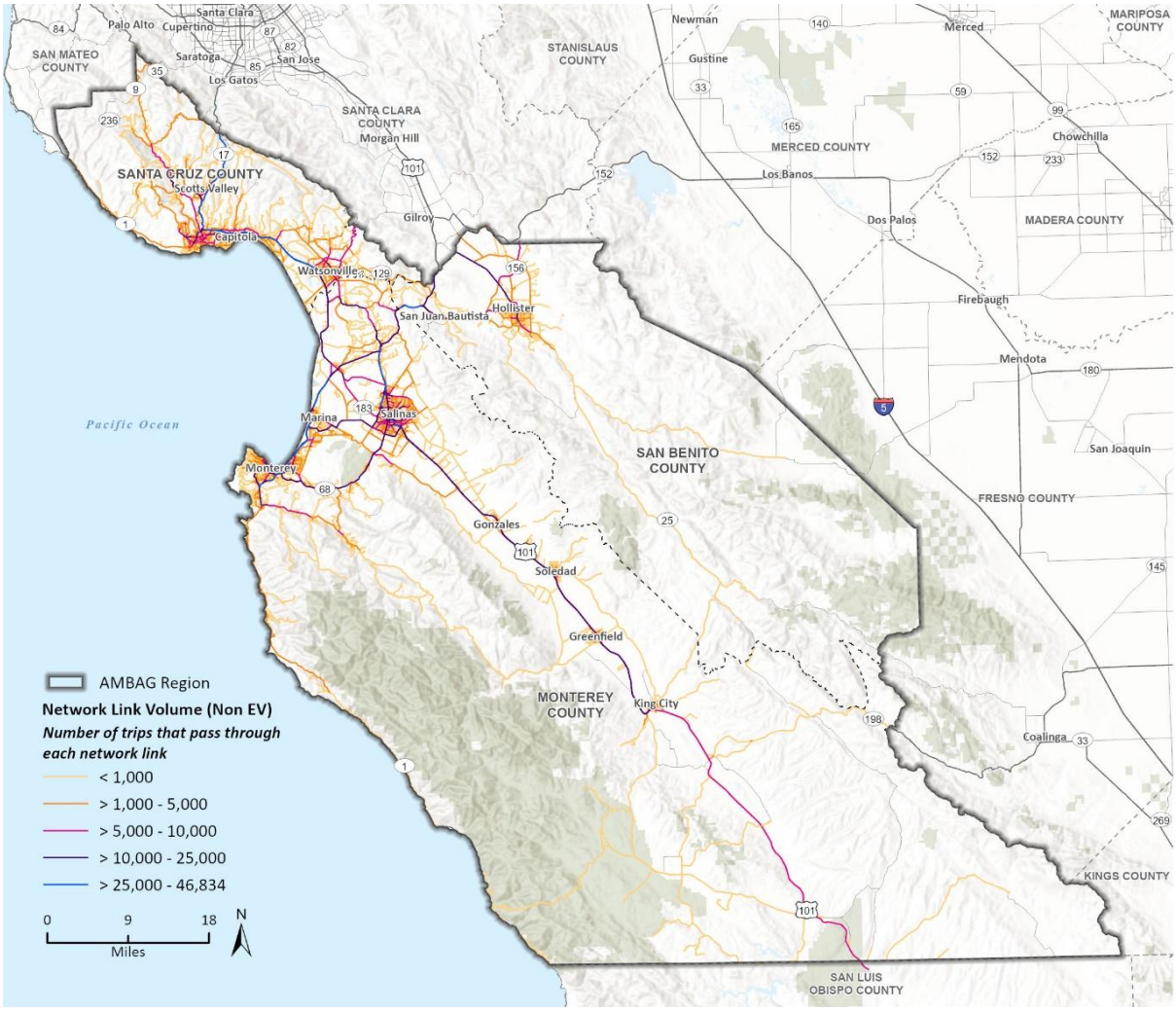


Figure 3 ICE Vehicle Network Link Volumes



Trips by Destination

Figure 4 and Figure 5 compare destination patterns for EVs and ICE vehicles, showing trends similar to those shown previously in Figure 2 and Figure 3. Again, it is important to note that the scales differ due to the comparatively low volume of EV trips represented. ICE vehicle trips end across a significantly broader area, evident by the wider presence of high-density urban zones represented by orange and yellow shading. In contrast, EV trips demonstrate a more concentrated pattern, confined to fewer specific zones. Additionally, many rural regions such as Gonzales, King City, and the Big Sur region exhibit minimal to no EV trip activity, a discrepancy likely influenced by limited charging infrastructure availability, lower overall EV adoption rates in those areas, or lack of trip data available through the Replica platform (due to small sample sizes). Range anxiety may also play a factor as more rural areas must travel greater distances on average.

Figure 4 EV Trips by Destination

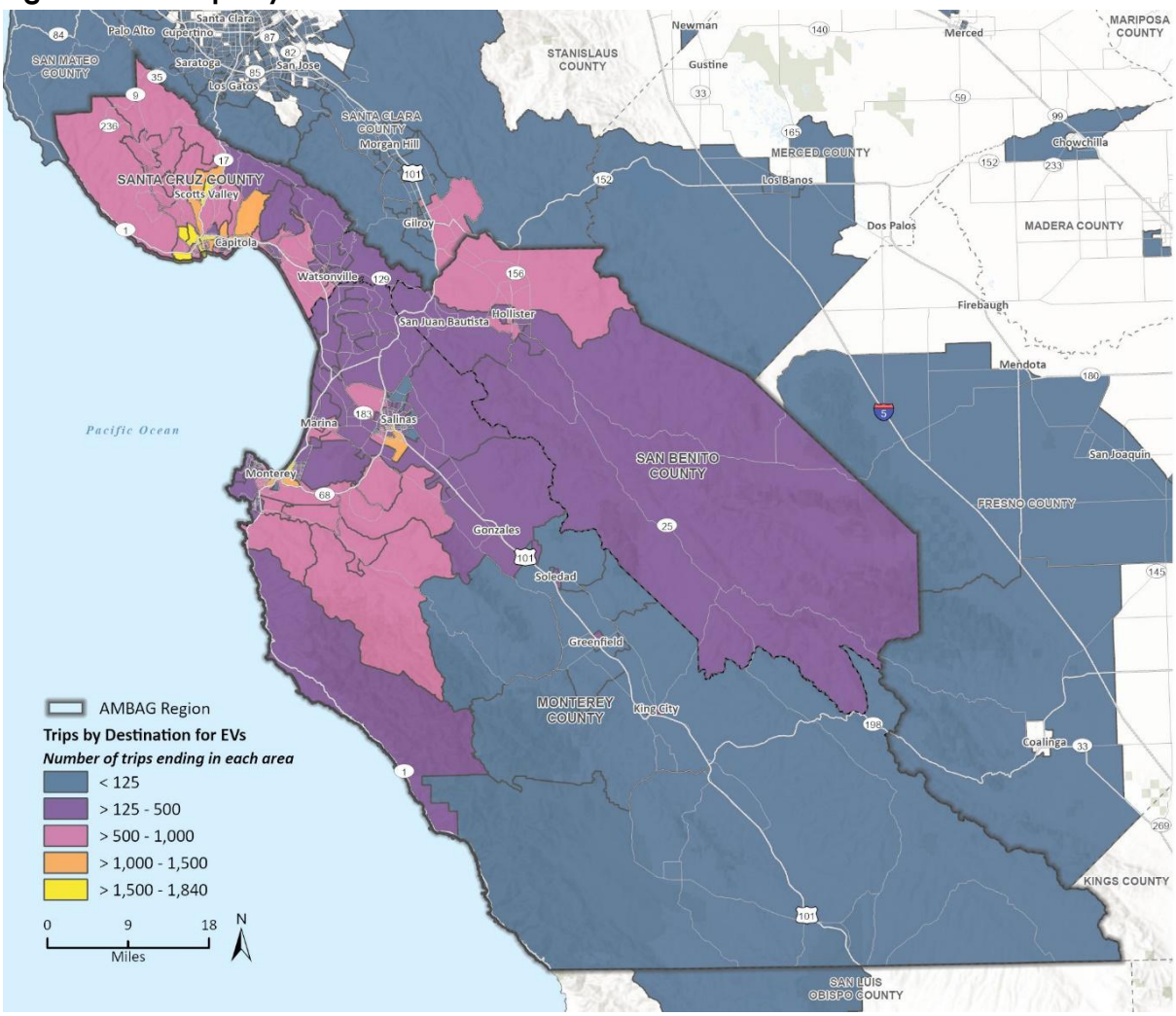
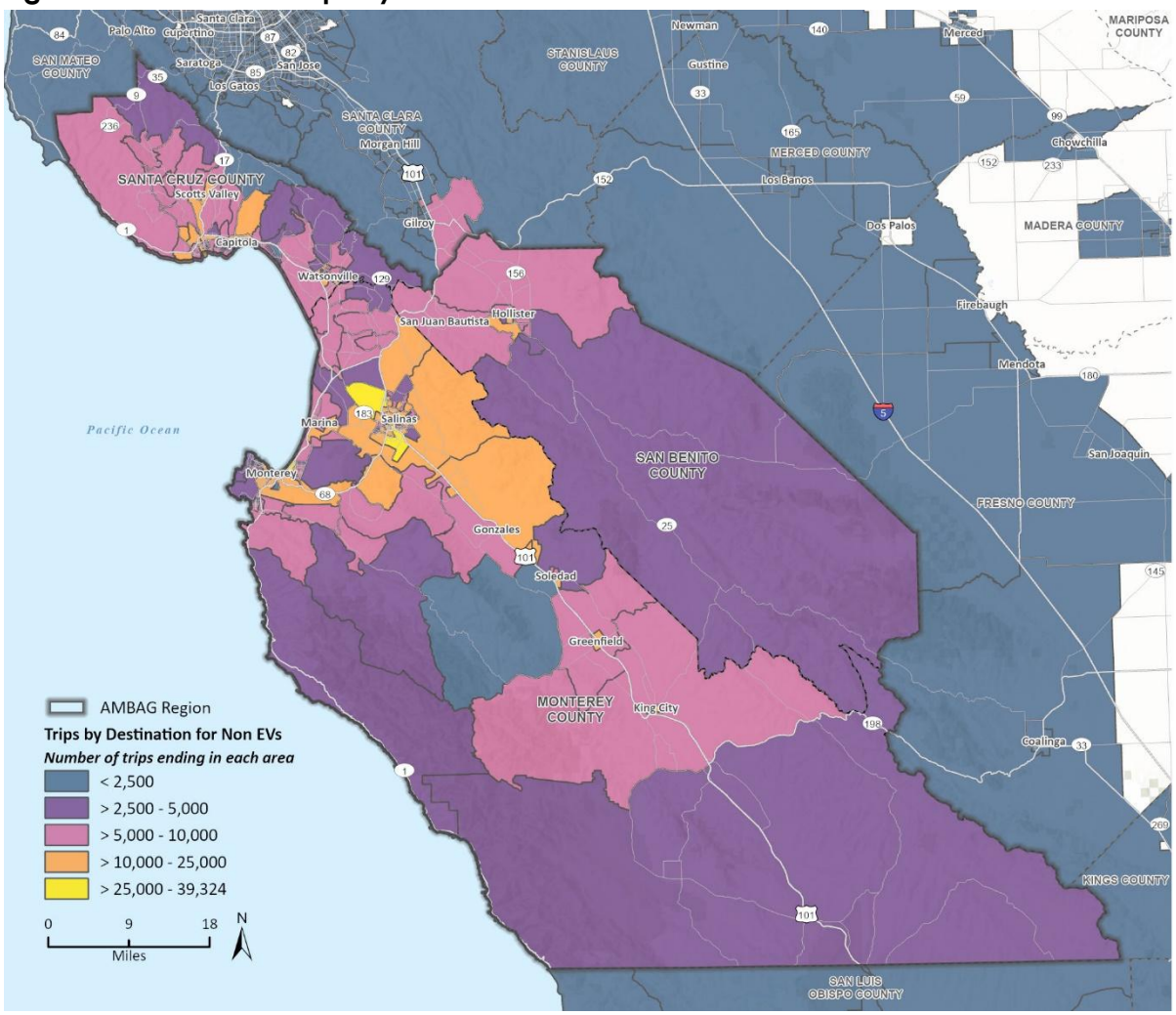


Figure 5 ICE Vehicle Tips by Destination



Trips by Origin

Figure 6 and Figure 7 compare the origins of EV trips with those of ICE vehicle trips, again noting differences in the scale due to lower volumes of EV trips recorded. ICE vehicle trips show significantly higher origin densities spread broadly across the region, with numerous locations exceeding 10,000 trips. Higher density of trips is indicated by yellow and orange zones. In contrast, EV trip origins remain concentrated primarily within urban and suburban areas. This concentration suggests lower EV adoption rates in rural areas, potentially due to fewer residential charging opportunities, limitations in the vehicle data captured by Replica for these regions, or concerns regarding vehicle range caused by limited public charging infrastructure. Overall, ICE trips originate from a diverse and expansive set of locations, whereas EV trips are predominantly initiated within fewer, more densely populated areas.

Figure 6 EV Trips by Origin

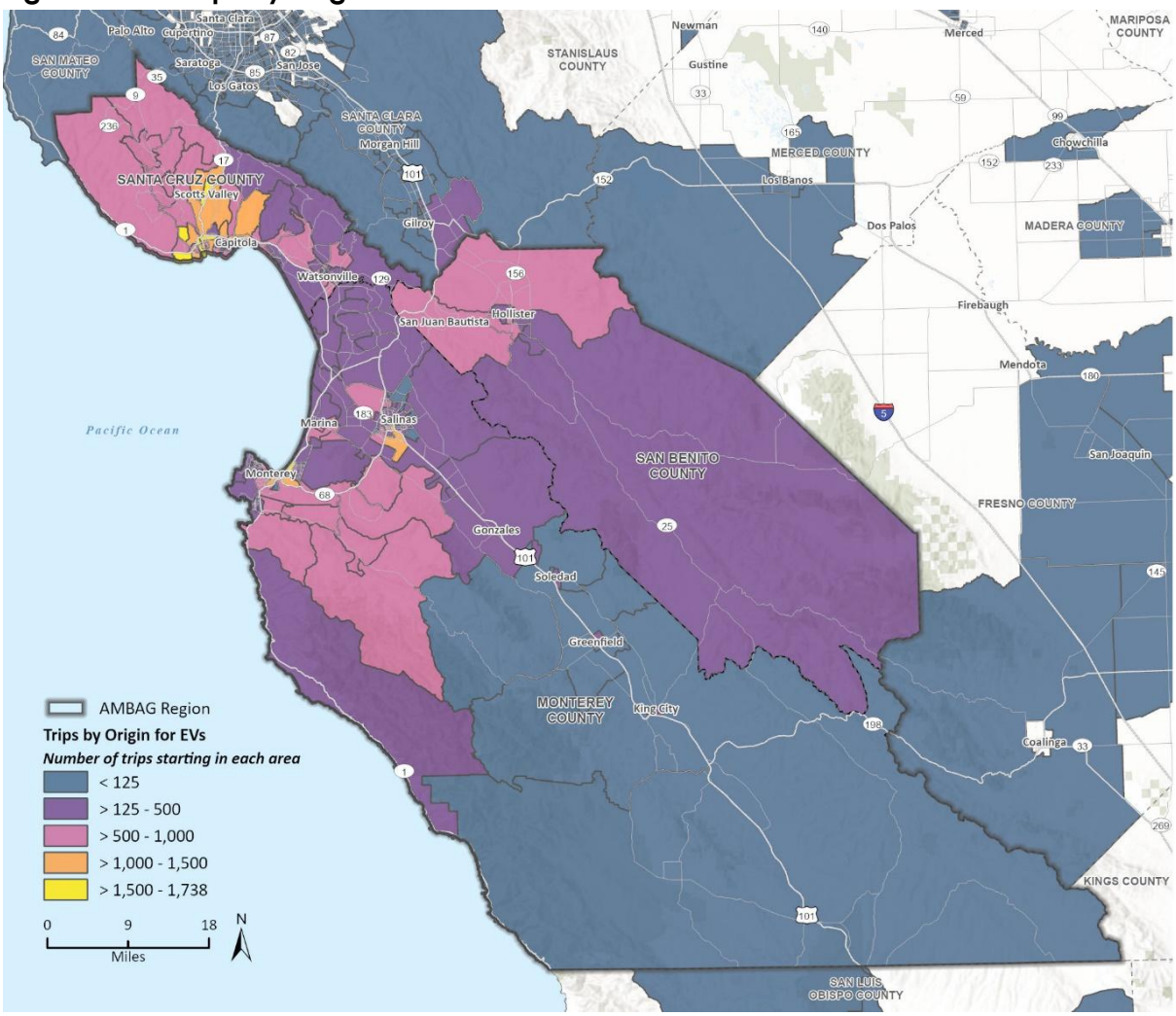
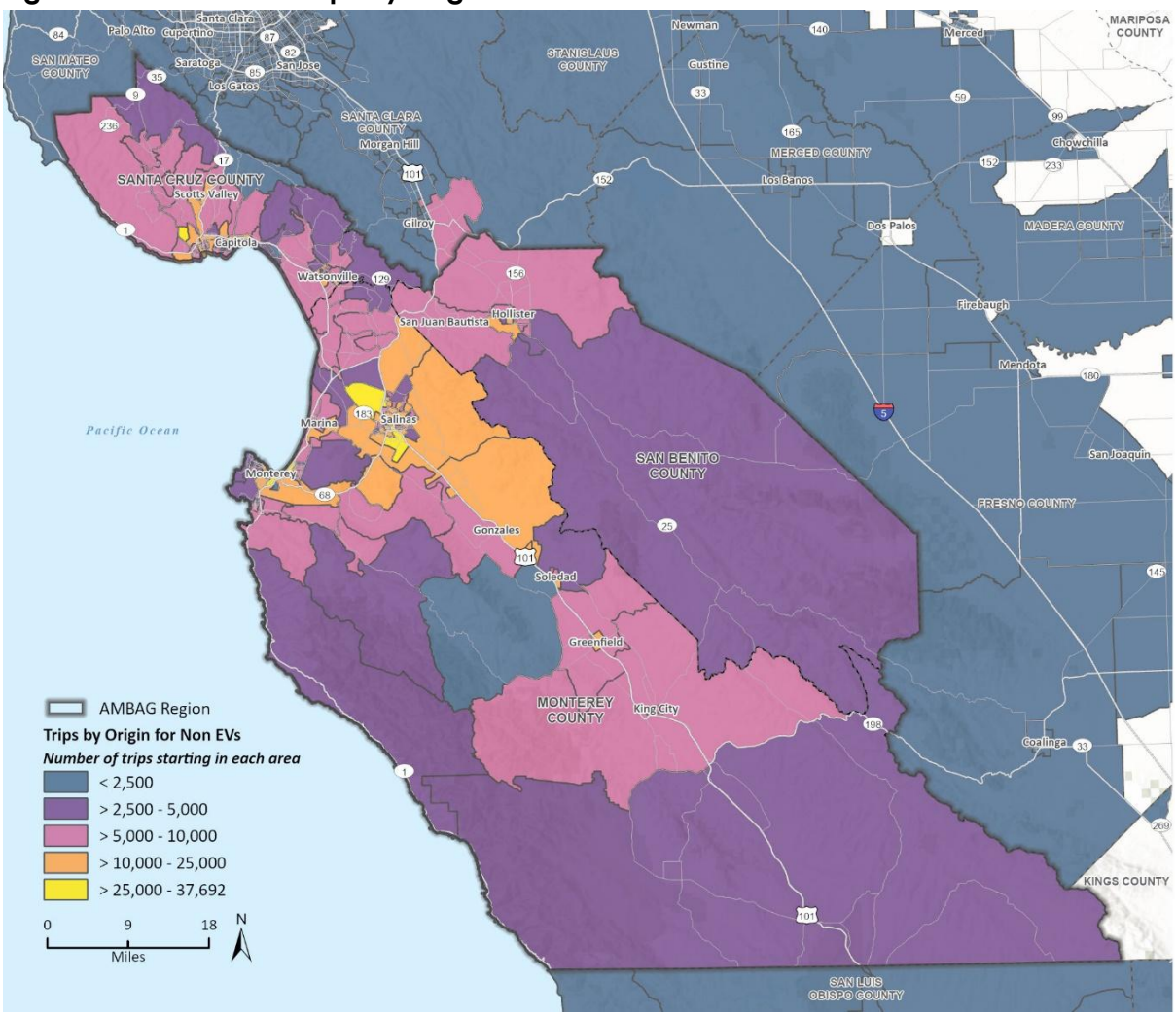


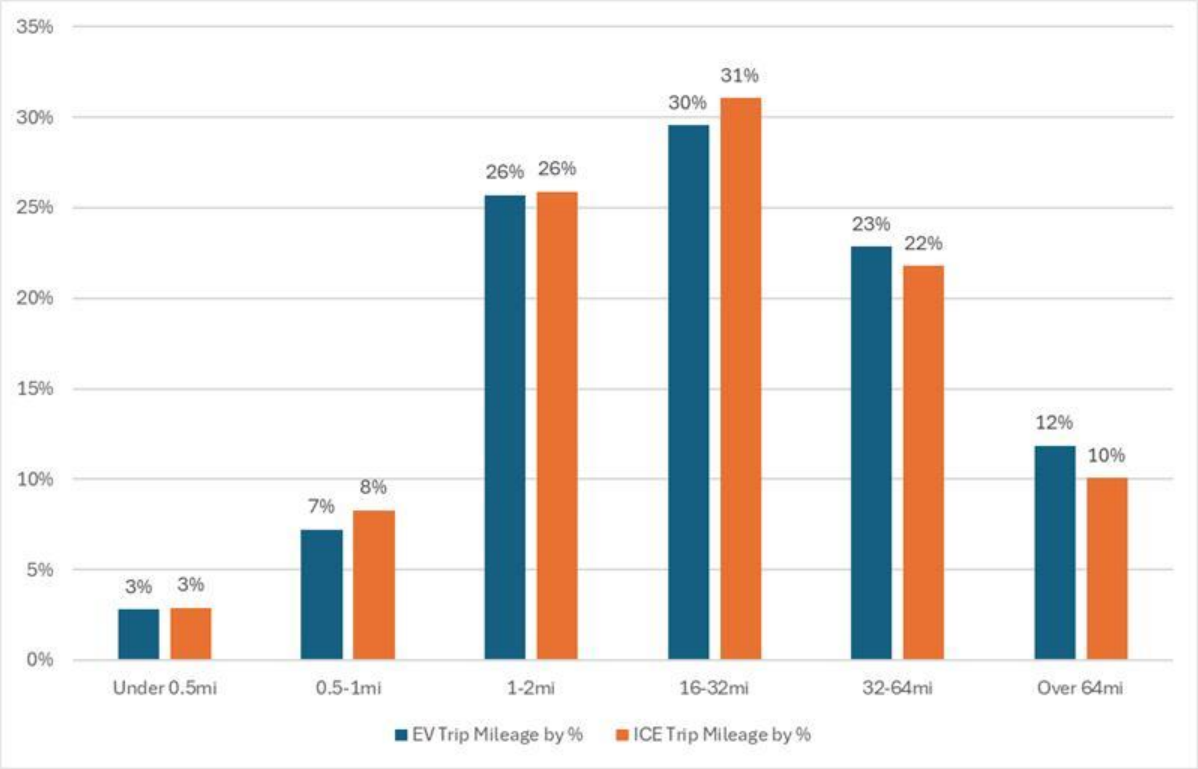
Figure 7 ICE Vehicle Trips by Origin



Average Trip Lengths

Lastly, Figure 8 presents a comparison of EVs versus ICE vehicle trips based on trip distance. Notably, mid-range trips spanning 32 to 64 miles and beyond exhibit a higher percentage of EV trips versus ICE vehicle trips. Alternatively, shorter-distance trips, 0-32 miles, show a higher percentage of ICE vehicle percentage when compared to EVs. The primary insight from this analysis is that shorter distance trips have a higher propensity towards ICE vehicles and longer distance trips tend to lean more towards EV use.

Figure 8 Average Trip Length EVs vs ICE Vehicles (Normalized)



Key Findings

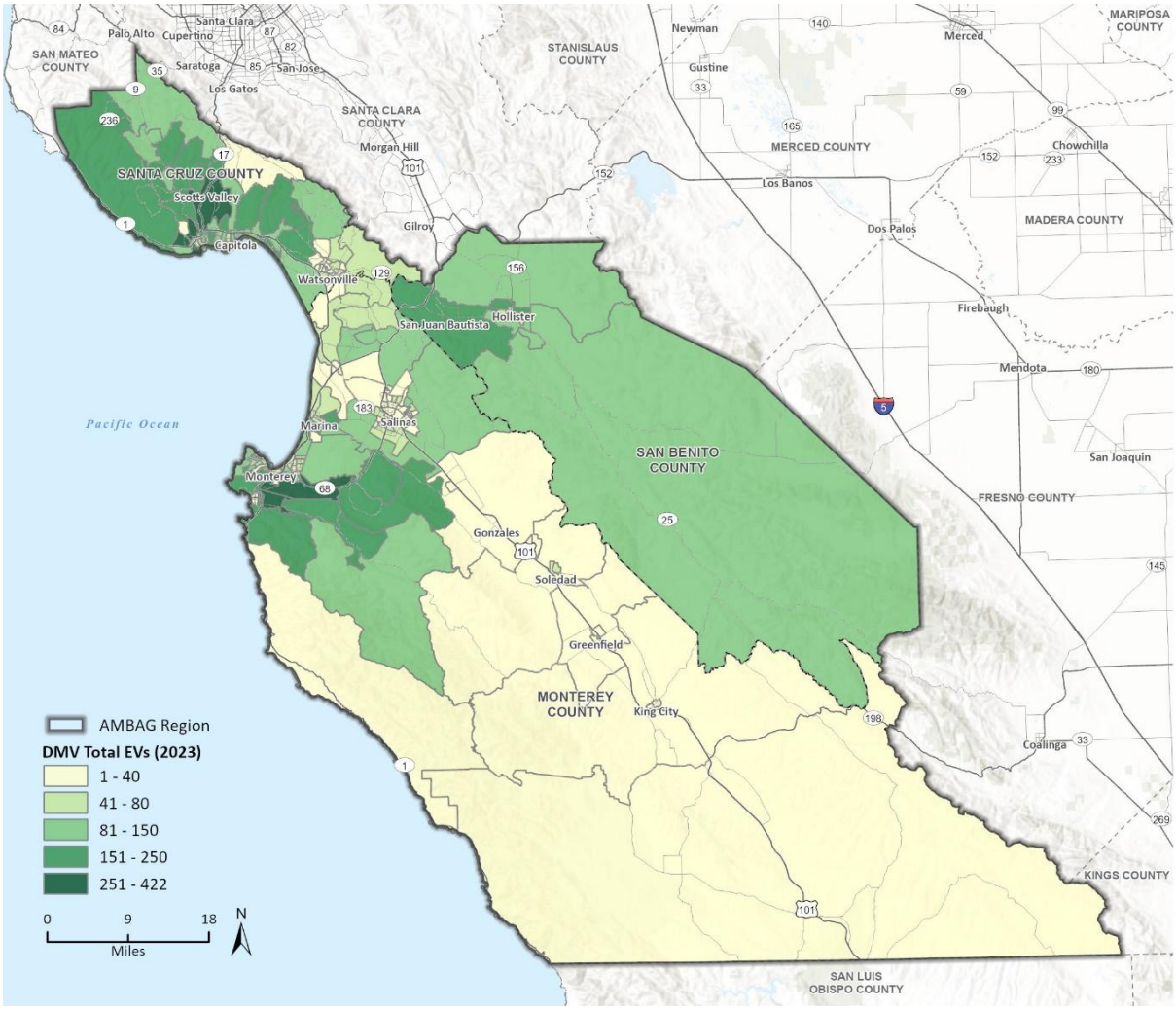
The travel pattern analysis highlights the slight differences between EVs and ICE vehicles across the region. EV travel is notably concentrated in urban and suburban areas with established charging infrastructure, suggesting infrastructure availability could influence current EV usage patterns. In contrast, ICE vehicles show broader utilization of road networks, originating from and ending in a wider variety of locations, including rural areas with limited EV activity. These differences could also be due to the overall lower vehicle data availability on Replica in more remote locations. The analysis also highlighted that longer commutes have a higher propensity towards EVs than shorter distance trips. Possible explanations include cost savings on fuel for longer-distance drivers or commuters leveraging EVs for HOV lane access, especially when commuting into the Bay Area. Overall, this indicates that current EV drivers commuting longer distances are unlikely to experience significant range anxiety.

3.3 Existing EV Ownership

The data utilized for the Existing EV Ownership analysis originates from the 2023 Department of Motor Vehicles (DMV). According to this dataset, the total number of EVs in the region in 2023 was 15,816. As illustrated in Figure 9, Carmel-by-the-Sea, Scotts Valley, and Santa Cruz exhibit the highest concentrations of EV ownership. Other areas demonstrating notable, though comparatively lower, EV ownership include San Juan Bautista, Swanton, Monterey, and Corralitos. In contrast, locations with minimal EV ownership include Salinas, the southern portion of Monterey County—from Gonzalez extending southward to Nacimiento—and Watsonville.

The EV ownership trends in Figure 9 do not fully align with the existing public charger locations depicted in Figure 1. Many current and planned public chargers are in areas such as Watsonville, Hollister, Salinas, Capitola, and southern Monterey County regions along the US 101 corridor—locations that currently exhibit relatively low EV ownership concentrations as seen in Figure 9. Since many EV drivers in the region are relying on publicly available charging for their vehicle, it is important to note that the alignment of publicly available chargers existing in 2024 does not match where many EV owners live.

Figure 9 2023 EV Ownership



4 Forecast

4.1 Methodology for EV Forecasting

This section outlines the approach to forecasting future EV charging based on adoption and electrification trends. For this analysis, E3 leveraged its "Forecasting Anywhere Model" to evaluate the expected growth of EVs and identify the charging infrastructure needed to sustain the growth effectively through 2050. This section also looks at the EV forecasting performed by DKS in the Central Coast Zero Emission Vehicle (CCZEV) Strategy.

Both the Forecasting Anywhere Model and the CCZEV Strategy employ approaches to identify optimal locations for EV charging infrastructure. However, the Forecasting Anywhere Model's methodology emphasizes granular forecasting of EV adoption tied to the 2023 Integrated Energy Policy Report.[18] The Additional Achievable Transportation Electrification (AATE Scenario 3) scenario for EV growth was used for the baseline. AATE 3 includes estimates of sales proportions of vehicle fuel type as well as impacts from Advanced Clean Cars II and Advanced Clean Trucks and is the recommended scenario for planning. Under this scenario 45% of statewide VMT is zero-emission by 2035. The Forecasting Anywhere model then specially allocates charging based on a variety of geospatial datasets including parking lots and buildings and parcel/zoning code considerations. Finally, the model looks at propensity to adopt EV and EV charging infrastructure based on demographic information which varies across charger types.

In contrast, the CCZEV Strategy looked at fewer but more specific charging station locations that were identified as priorities due to the focus on unincorporated corridors in the study area. The prioritization was based on a weighted scoring system focused on regional transportation corridors, prioritizing highway interchanges and areas of high community demand based on community engagement. This process resulted in the selection of the top 10 locations for public chargers across each of the three counties in AMBAG territory.

Because of the differences in methodology, the comparison was not meaningful as the Forecasting Anywhere Model and the CCZEV Strategy fill different roles in forecasting EV charger adoption. Therefore, this analysis combines each of these data points by identifying the CCZEV sites as planned future charging sites and leveraging the Forecasting Anywhere model to look farther out over time and across multiply charger types including residential level 2 (L2) charging which will allow for a more detailed grid impact analysis.

As seen below in Figure 10 and Figure 11, the CCZEV looks at 10 priority EV charger sites within each County whereas the Forecasting Anywhere Model looks at predicted EV charging infrastructure across all charger types and across multiple years. Despite differences in their methodologies, the results from both analyses show overlap regarding priority areas for EV charging. In Santa Cruz County, both studies highlighted the corridor between Watsonville and Scotts Valley as a significant area for expected growth and charger prioritization. Differences arise in Monterey County, with the CCZEV identifying priority sites primarily around the intersection of Highway 1 and Holman Highway, whereas the Forecasting Anywhere Model focused on areas slightly west of this location. Both analyses overlap on prioritizing San Juan Bautista, Hollister, and Salinas as key locations for EV charging infrastructure growth. However, differences emerge further south along Highway 101; the

[18] https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report-iepr/2023-integrated-energy-policy-report

CCZEV identifies the southern region of Monterey County as a high-priority area, whereas the Forecasting Anywhere Model did not forecast substantial EV adoption growth in this region.

The differences between these two results show how community priorities and baseline forecasted projections (such as who is most likely to purchase and drive an EV based on current trends) can inform decisions. While the Forecasting Anywhere Model results will inform analysis on overall grid impacts and projected adoption rates, community driven feedback on charging needs and priority locations will continue to be important.

Figure 10 CCZEV EV Charging Site Prioritization

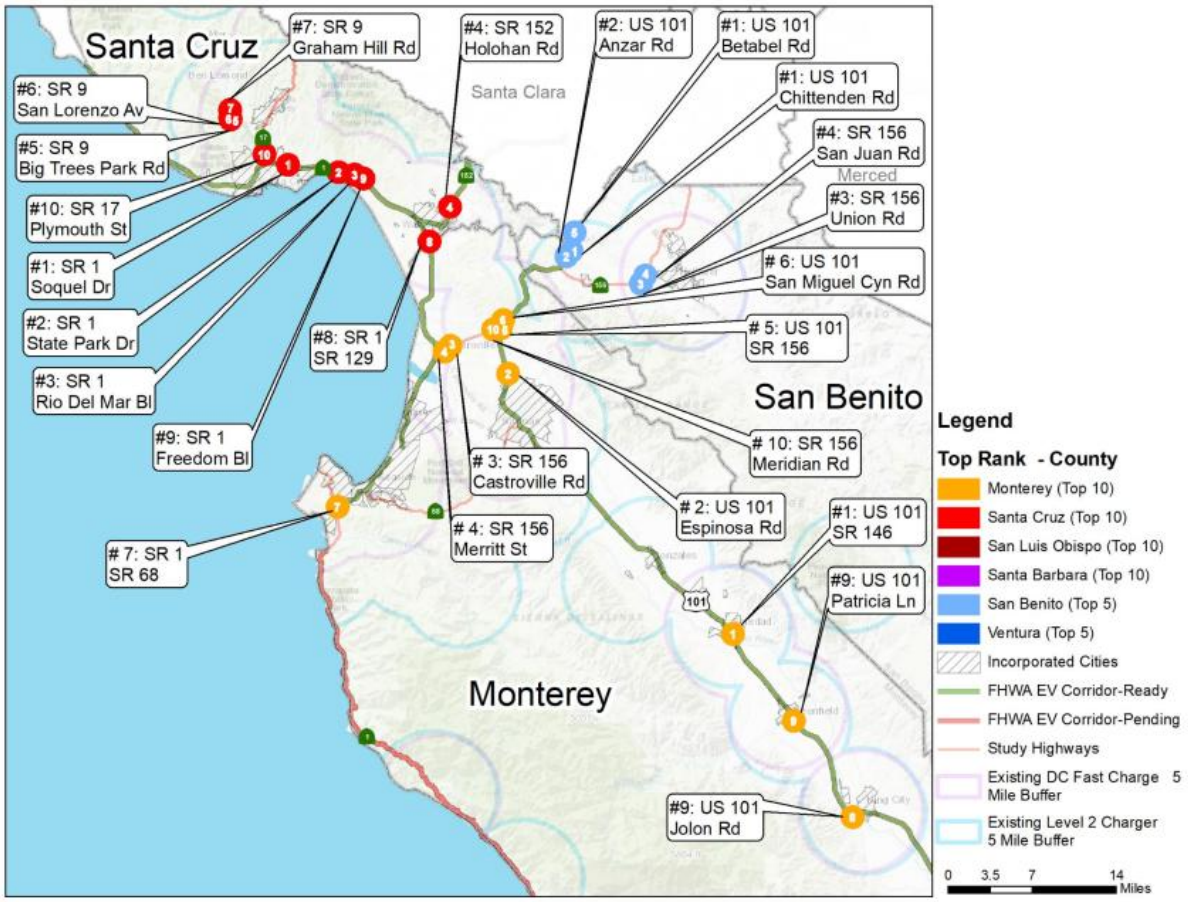
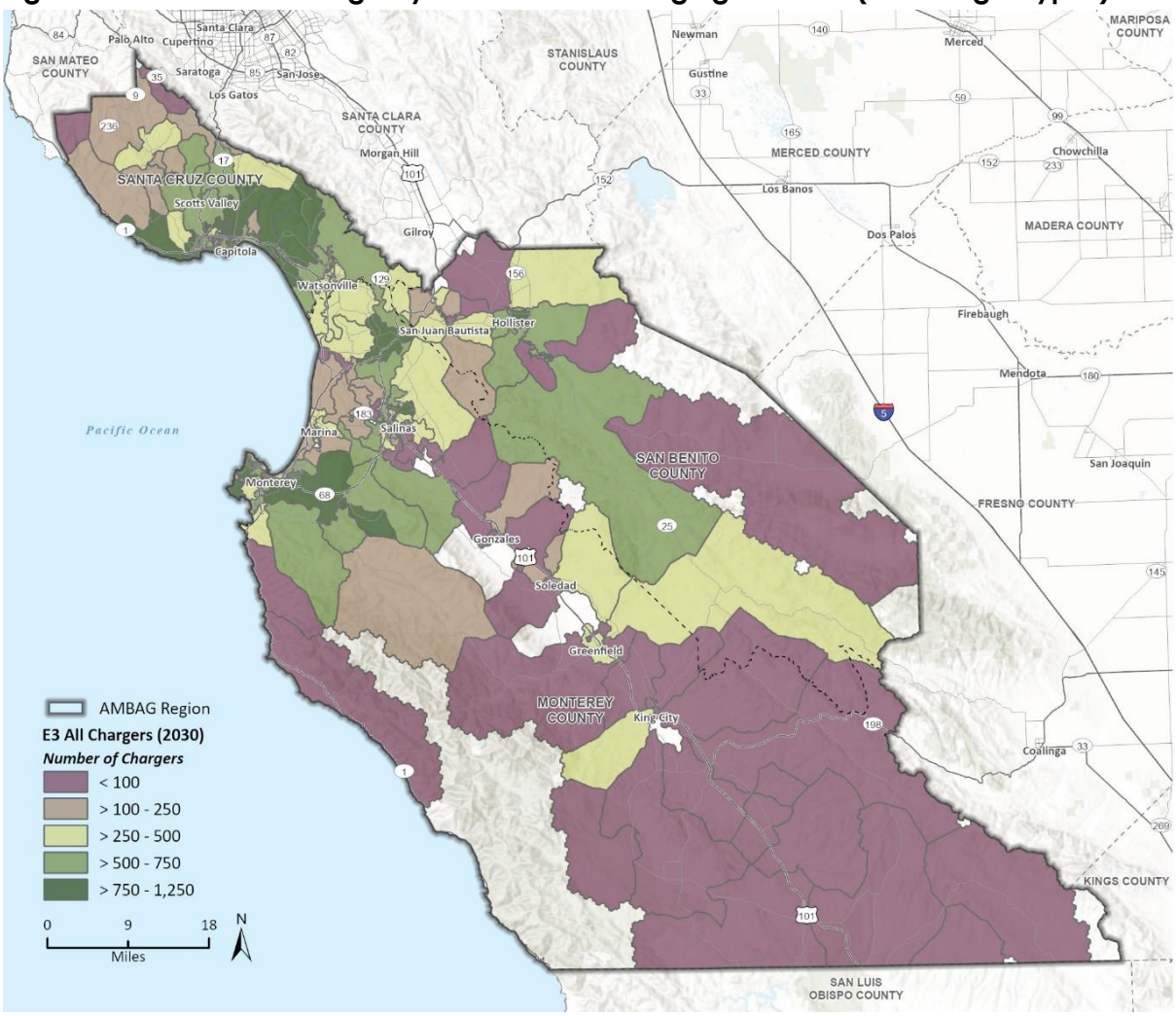


Figure 11 2030 Forecasting Anywhere Model Charging Forecast (All Charger Types)



4.2 Total Achievable % of EV Chargers

The Forecasting Anywhere model provides an estimate of both home (L2) and public (DCFC + L2) chargers that are expected to be installed between 2024 and 2050. These estimates are displayed in a percentage of technical potential below. The technical potential is defined as the total number of locations available for EV charger installations for each EV type. For home L2 chargers, this number would be essentially the number of homes/home parking spaces in AMBAG territory. For public chargers, feasible locations include locations such as public parking spaces. Table 2 summarizes EV charger installation as a percentage of the technical potential over time.

Table 2 Percentages of the total achievable percentage of EV Chargers in the region

	Forecast Year					
EV Adoption (% of Technical Potential)	**2024**	**2030**	**2035**	**2040**	**2045**	**2050**
Monterey County						
Home L2	1%	5%	10%	15%	18%	20%
Public (L2 + DCFC)	0%	3%	7%	10%	13%	14%
Total	1%	5%	10%	14%	17%	19%
San Benito County						
Home L2	1%	6%	12%	17%	20%	23%
Public (L2 + DCFC)	0%	3%	5%	7%	8%	9%
Total	1%	6%	10%	15%	18%	21%
Santa Cruz County						
Home L2	1%	7%	12%	17%	20%	23%
Public (L2 + DCFC)	0%	4%	9%	13%	15%	17%
Total	1%	6%	12%	16%	19%	22%
AMBAG Territory Total						
Home L2	1%	6%	11%	16%	19%	22%
Public (L2 + DCFC)	0%	4%	8%	11%	13%	15%
Total	1%	5%	10%	15%	18%	20%

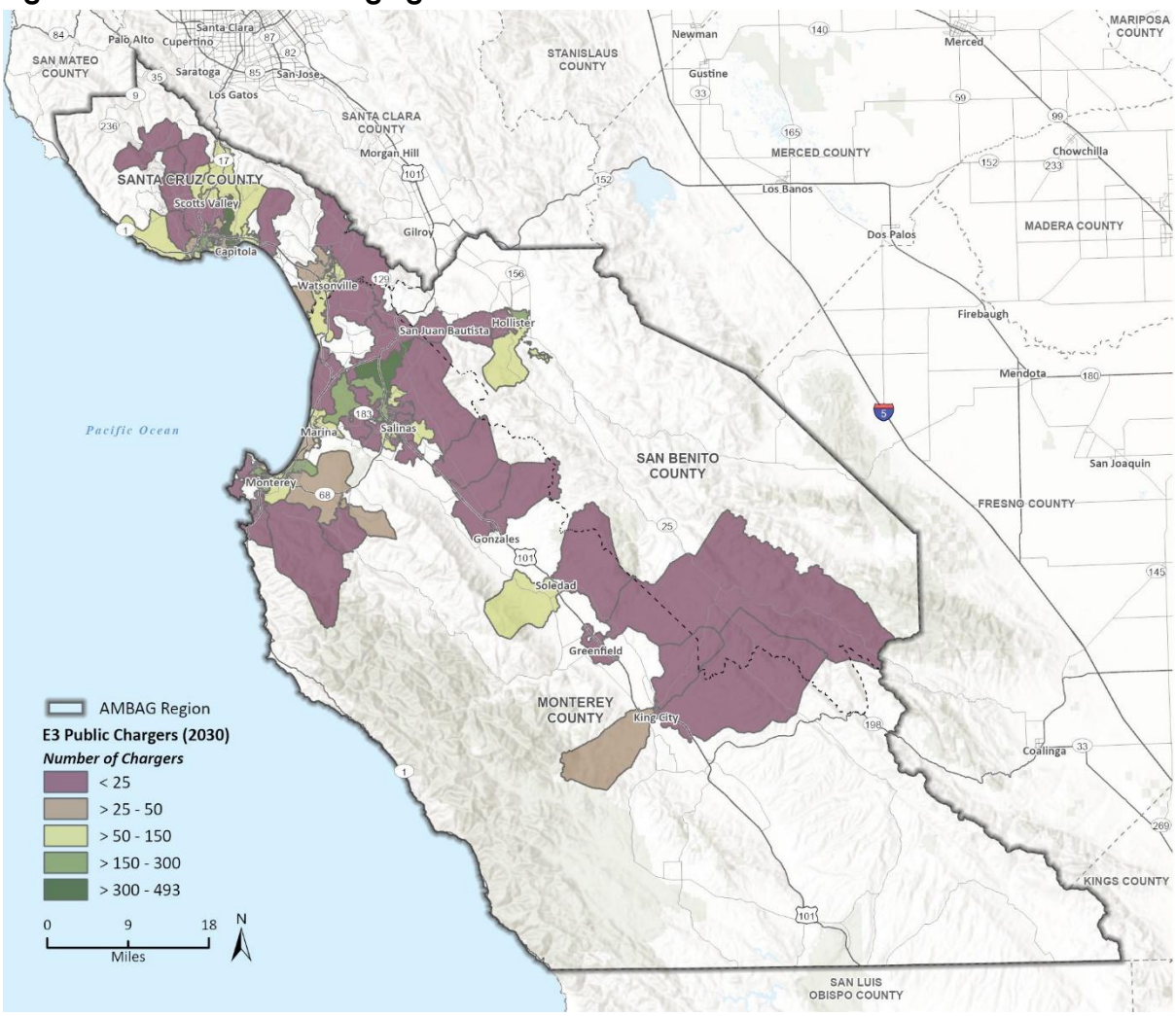
4.3 Forecasting Anywhere Model

2030 Forecast

Public Charging (L2 and DCFS)

According to projections from the Forecasting Anywhere model for the year 2030, the AMBAG region is anticipated to require approximately 4,998 additional public chargers from the base year (2023), encompassing both Level 2 (L2) and Direct Current Fast Chargers (DCFC). Statewide, AB2127 establishes a goal of 700,000 shared private and public EV chargers by 2030 to support 5 Million ZEVs. The Forecasting Anywhere model projections consider EV demand alongside existing infrastructure conditions and constraints and include detailed hourly electricity demand forecasts based on expected charging load profiles. When comparing this forecast in Figure 12 with the existing public charger locations shown in Figure 1, it illustrates that the region between San Juan Bautista and Monterey will experience increased demand for public chargers. Additionally, there is a notable anticipated demand for public charging infrastructure and gap in existing conditions near Soledad and to the south of Hollister, highlighting key areas that will require focused infrastructure development efforts in the coming years.

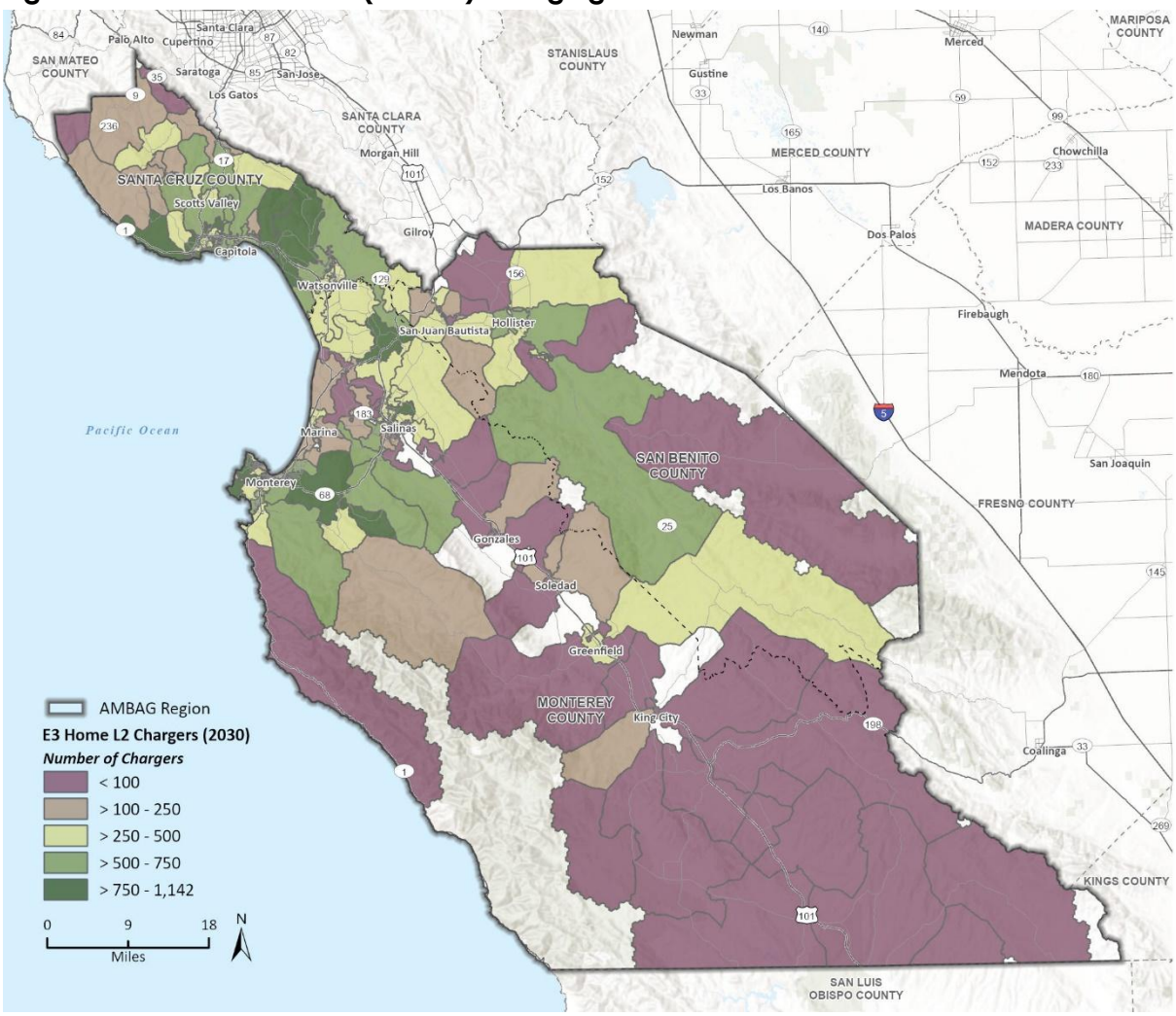
Figure 12 2030 Public Charging Demand



Level 2 Residential Charging

This analysis in Figure 13 examines projected residential L2 charging demand for the year 2030, with an additional 34,970 residential chargers expected to be installed beyond the base year estimates, which is nearly three times the number projected for 2025 based on the Forecasting Anywhere Model. As this assessment specifically addresses residential charging based directly on EV demand, the results are assumed to closely mirror anticipated EV ownership patterns. When compared to the EV ownership data from 2023, presented in Figure 9, notable growth trends emerge. Specifically, EV ownership is projected to significantly increase between Watsonville and Scotts Valley, along with substantial expansion around Monterey, particularly near Highway 68. Additionally, San Benito County is expected to experience new growth in EV ownership, notably between Hollister and the City of San Benito, with San Juan Bautista anticipated to nearly double its current EV ownership rates.

Figure 13 2030 Residential (Level 2) Charging Demand

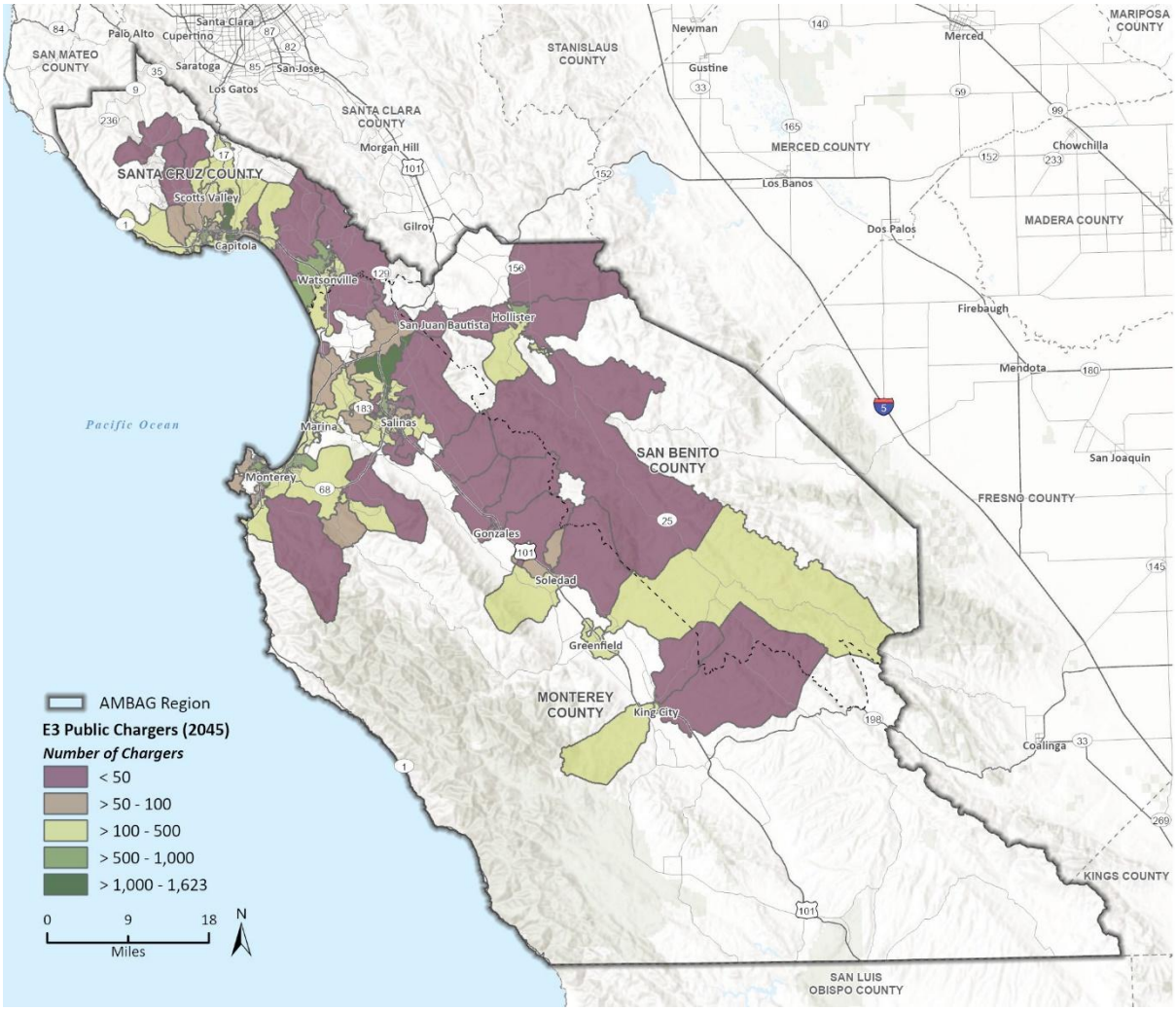


2045 Forecast

Public Charging (L2and DCFS)

When comparing the projected 2045 demand for public charging infrastructure in Figure 14, including both L2 and DCFCs, significant growth is anticipated, particularly in southern San Benito County, specifically east of the US 101 corridor, extending outward from Greenfield. The demand for public charging in 2045 jumps to 17,882 additional public chargers from the base year. This region was previously projected in 2030 to have fewer than 25 chargers in Figure 12 and is expected to expand, reaching between 150 and 300 chargers by 2045. Additionally, substantial growth is forecasted east of Monterey along Highway 68, a region demonstrating consistent and progressive increases in charging infrastructure demand from the existing conditions shown in Figure 1 in 2024 through the projections for 2045.

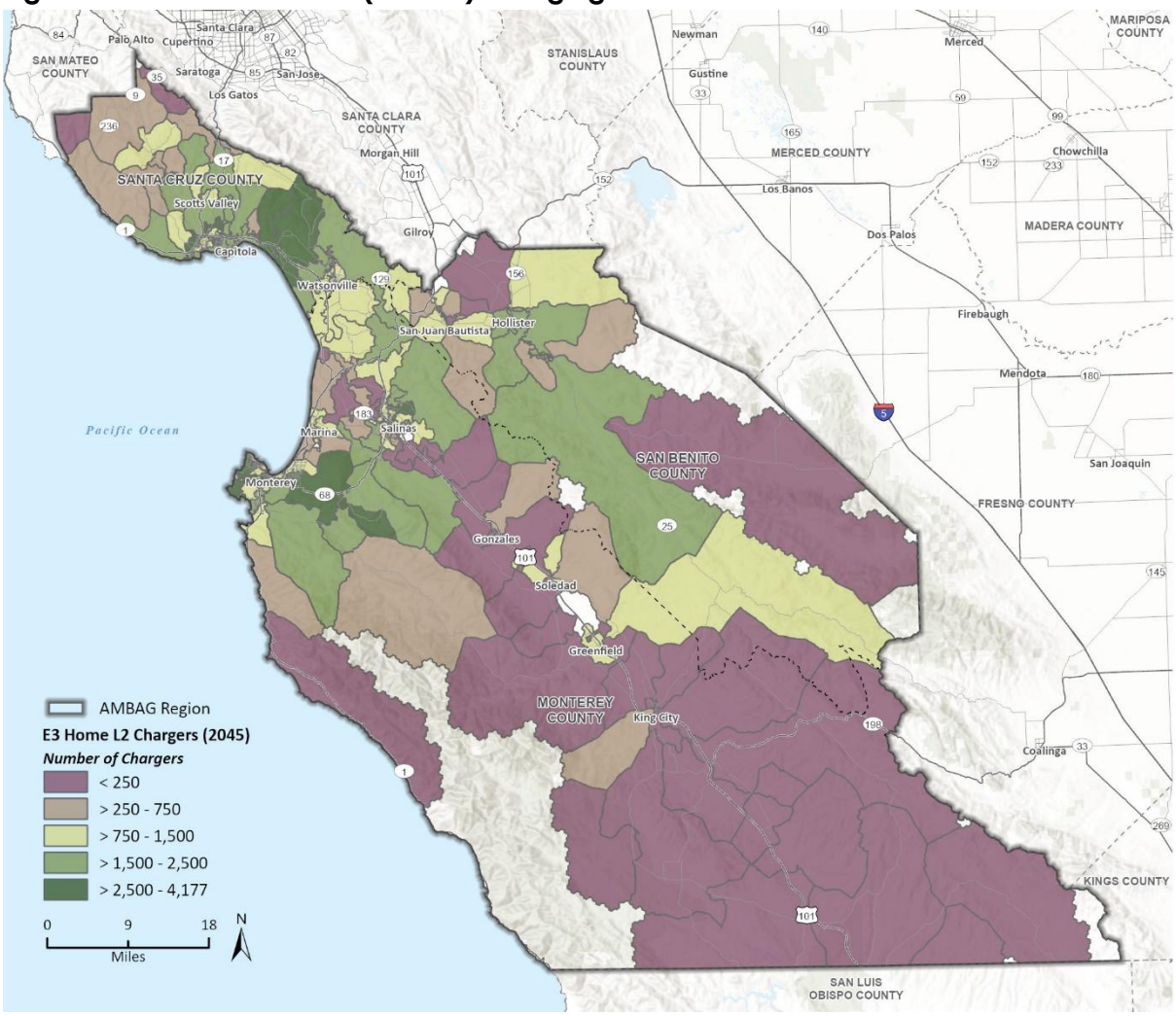
Figure 14 2045 Public Charging Demand



Level 2 Residential Charging

When comparing home charger demand projections for 2045 in Figure 15 to those of 2030 in Figure 13—again assumed reflective of EV ownership due to direct correlation with EV demand—only small changes in new locations is observed. However, there are expected to have 111,096 additional residential chargers in 2045 from the base year which means ownership since 2030 has nearly tripled. The most significant shifts in EV ownership patterns appear in and around Hollister and Salinas, where noticeable growth occurs. Additionally, King City emerges as a new area of EV ownership by 2045, representing a change from previous conditions, where EV presence was virtually absent.

Figure 15 2045 Residential (Level 2) Charging Demand



5 Conclusion and Key Takeaways

The analysis of existing and forecasted EV charging infrastructure and adoption trends in the AMBAG region reveals several important insights. Firstly, there is a current spatial mismatch between current EV charger locations and existing EV ownership patterns. However, the current EV charging infrastructure does follow the demand seen in the Forecasting Anywhere model, so it will eventually align with the forecasted trends.

The travel pattern analysis highlights significant distinctions between EV and ICE vehicle behaviors, with EV trips predominantly limited to urban corridors and zones already supported by charging infrastructure. This could mean that infrastructure availability influences EV travel behaviors and points to existing barriers like limited home and public charging accessibility as obstacles to broader adoption.

The forecast analysis demonstrates substantial anticipated growth in EV adoption, particularly evident in residential and public charging needs through 2030 and even more significantly by 2045. Public charger demand projections suggest major growth near highways, particularly along Highway 101 and areas previously underserved or minimally equipped with charging infrastructure, such as southern San Benito County and regions east of Monterey.

Residential charging demand projections which are linked to EV ownership forecasts are growing notably around Watsonville, Scotts Valley, Monterey, Hollister, and emerging markets like King City. The forecast highlights the importance of also expanding public charging infrastructure to meet future demands and facilitate wider regional adoption near these areas.

Overall, these findings emphasize the role infrastructure plays in ownership trends and travel behaviors. Planning efforts should focus on addressing existing infrastructure gaps and preparing AMBAG for the expected growth in the region.

Appendix C

AMBAG EV Framework: Vulnerability and Barriers Assessment – Outreach Summary

AMBAG EV FRAMEWORK: VULNERABILITY AND BARRIERS ASSESMENT

Outreach Summary

Prepared by:

Ecology Action

Table of Contents

Acknowledgements

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Executive Summary

The Monterey Bay Electric Vehicle Climate Adaptation and Resiliency (EV CAR) Framework is a collaborative initiative led by the Association of Monterey Bay Area Governments (AMBAG), in partnership with Caltrans, Ecology Action, Rincon Consultants, and Regeneración. The project aims to assess transportation challenges and climate vulnerabilities across the Monterey Bay region and to develop equitable strategies for expanding electric vehicle (EV) infrastructure in communities most impacted by climate change.

This report documents the outreach and engagement efforts conducted between March and July 2025, focusing on community-centered survey development, in-person engagement, and data collection within underserved communities in Santa Cruz, San Benito, and Monterey Counties. The outreach team prioritized trust-building with underserved communities, including low-income residents, agricultural workers, undocumented individuals, and speakers of Spanish and Mixteco.

A total of 691 survey responses were collected, with over 92% gathered through in-person engagement at 74 community events. The survey explored transportation access, barriers to EV adoption, climate-related concerns, and demographic information. Key findings include:

- **Transportation Barriers**: Many respondents rely on personal vehicles but face affordability, infrastructure, and safety challenges. Public transit and walking were common alternatives, though both presented accessibility and safety concerns.
- **Climate Vulnerability**: Respondents expressed deep concern about floods, extreme heat, and wildfires. These events disrupt transportation and disproportionately affect underserved communities, especially agricultural workers.
- **EV Awareness and Adoption**: While interest in EVs exists, barriers such as cost, lack of charging infrastructure, and limited knowledge hinder adoption. Renters in particular feel disempowered to install chargers at home.
- **Demographic Insights**: The majority of respondents were women, Spanish-speaking, and renters. Agricultural work was the most common occupation, highlighting the need for climate-resilient transportation solutions tailored to this workforce.

The outreach process revealed the importance of culturally relevant, multilingual engagement and the need for visual, accessible survey tools. It also underscored the emotional toll of climate events and the value of community-based mental health support.

Recommendations for future research and planning include:

- Disaggregating data by region to inform localized strategies.
- Exploring modal flexibility and commute patterns.
- Expanding EV education programs in underserved communities.
- Improving survey design for accessibility and inclusivity.

This report serves as a foundation for the EV CAR Framework and offers actionable insights to guide equitable transportation planning and climate adaptation efforts in the Monterey Bay region.

I. Introduction:

Project Background:

The state of California has established ambitious decarbonization goals. Executive Order N-79-20 establishes that by 2035 all new passenger cars and trucks sold in California must be zero-emission. The order also sets a goal that 100 percent of medium- and heavy-duty vehicles will be zero-emission by 2045 where feasible. In addition, California's Innovative Clean Transit regulation requires that beginning in 2029 all new bus purchases made by transit agencies must be zero-emission, with the goal of transitioning to a fully zero-emission bus fleet by 2040.

The Association of Monterey Bay Area Governments (AMBAG) is working in partnership with local jurisdictions, transportation agencies, and community-based organizations (CBOs) to create the Monterey Bay Electric Vehicle Climate Adaptation and Resiliency (EV CAR) Framework (project).

The goal of the project is to assess how climate hazards, grid limitations, and transportation system vulnerabilities affect the reliability and accessibility of EV charging in the region and implement strategies to ensure the build-out of EV charging infrastructure increases equity and resiliency in the face of accelerating climate impacts.

The Monterey Bay region is vulnerable to climate change risks that threaten to disrupt and damage the electric grid and transportation system, hazards which disproportionately impact underserved communities. Winter storms in 2022 and 2023 caused severe damage, and ongoing sea level rise, wildfires, and extreme weather pose ongoing threats.

A main objective of the project is to work with community members and local organizations to understand community transportation needs, identify climate vulnerabilities, and barriers regarding EV's and charging infrastructure to collaboratively create a framework for an equitable and resilient future of EV infrastructure and adoption throughout the Monterey Bay region.

Project Team:

The project team currently includes the California Department of Transportation (Caltrans), AMBAG, Ecology Action, Rincon Consultants, and Regeneración - Pajaro Valley Climate Action (Regeneración). The roles of each entity are briefly discussed below.

Caltrans is the grant funder. On August 31, 2023, Caltrans announced the Sustainable Transportation Planning Grant Program awards for Fiscal Year (FY) 2023-24. A statewide total of 161 grant applications were received with requests totaling approximately $66.8 million for Sustainable Communities Competitive and Strategic Partnerships Grants. Of these applications, 90 were selected for grant awards, totaling approximately $41.6 million. The project is one of the grants awarded under this cycle.

AMBAG is the grant awardee selected by Caltrans. AMBAG is responsible for leading overall implementation of the project and managing their subconsultants, Ecology Action and Rincon.

Rincon is a consultant to AMBAG. Rincon's role involves technical analysis related to EV charging infrastructure and preparation of the EV CAR Framework. Rincon contracted Eagle Rock Analytics, Energy and Environmental Economics, Inc., Farallon Strategies, and DKS Associates to serve as subconsultants.

Ecology Action is a grant co-applicant with AMBAG. Ecology Action's role involves leading the outreach efforts and managing CBO subconsultants. They collaborated in the process of survey creation. They conducted outreach throughout Monterey County and provided updates of the outreach efforts at the monthly EV Advisory Committee meetings.

Regeneración was selected as a partner CBO to aid in outreach in some areas of the focus region. They aided in survey creation and participated in EV Advisory Committee meetings. They also served as collaborators for data analysis and report development.

Proyecto Mixteco was contracted by Regeneración to aid in outreach of Mixteco speakers in the region.

Project Area

The project focused on areas across the Monterey Bay region where communities are especially vulnerable to climate impacts and could benefit from enhanced EV infrastructure.

Santa Cruz County

- City of Watsonville and surrounding unincorporated communities
- Freedom, an unincorporated community
- Live Oak, an unincorporated community
- Twin Lakes, an unincorporated community
- City of Santa Cruz, including Beach Flats

- North Santa Cruz County, including Ben Lomond, Boulder Creek, Davenport, and Felton

Monterey County

- Unincorporated communities in North Monterey County, including Castroville, Elkhorn, Las Lomas, Moss Landing, and Pajaro
- Portions of the Monterey Peninsula, including Marina
- City of Salinas and surrounding unincorporated communities
- City of Gonzales and surrounding unincorporated communities
- City of Soledad and surrounding unincorporated communities
- City of Greenfield and surrounding unincorporated communities
- King City and surrounding unincorporated communities

San Benito County

- Hollister
- San Juan Bautista

Target Populations

The project aimed to engage diverse populations across the Monterey Bay region, with a special focus on communities that face disproportionate climate hazards or transportation challenges. Key demographics included:

Socioeconomic and Linguistic Diversity

- Low-income individuals
- People born outside the U.S.
- Spanish-speaking individuals
- Mixteco-speaking individuals
- People who speak languages other than English

Students

- College students

Occupational Groups

- Farmworkers
- Commuters, including those reliant on public transportation

Housing and Mobility

- Homeowners
- Business owners
- Renters
- Landlords
- Car owners
- Individuals without personal vehicles who rely on public transit, biking, or walking

Geographic and Vulnerability-Based Groups

- Residents on the outskirts of cities, who may have limited access to EV infrastructure
- Individuals living in areas prone to hazards, as shown in the following maps (Figures 1-6):
    - Flood Hazard Areas, as identified by the Federal Emergency Management Agency (FEMA)
    - Fire Hazard Severity Zones, as identified by the California Department of Forestry and Fire Protection (CAL FIRE)
    - National Risk Index, as identified by FEMA

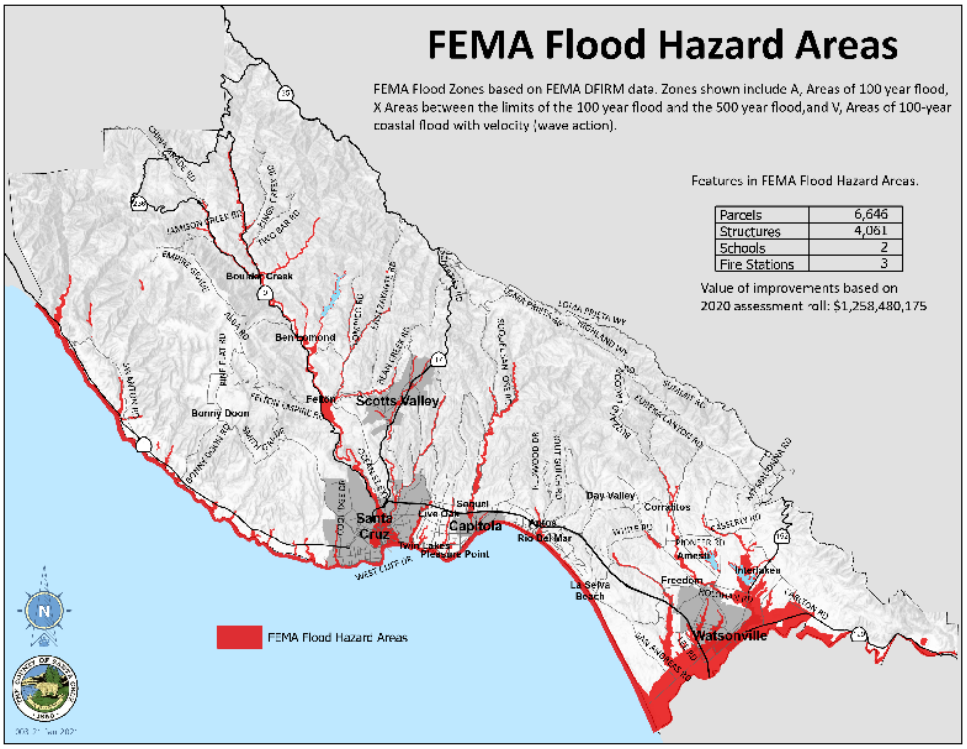

Figure 1. Flood Hazard Areas in Santa Cruz County.

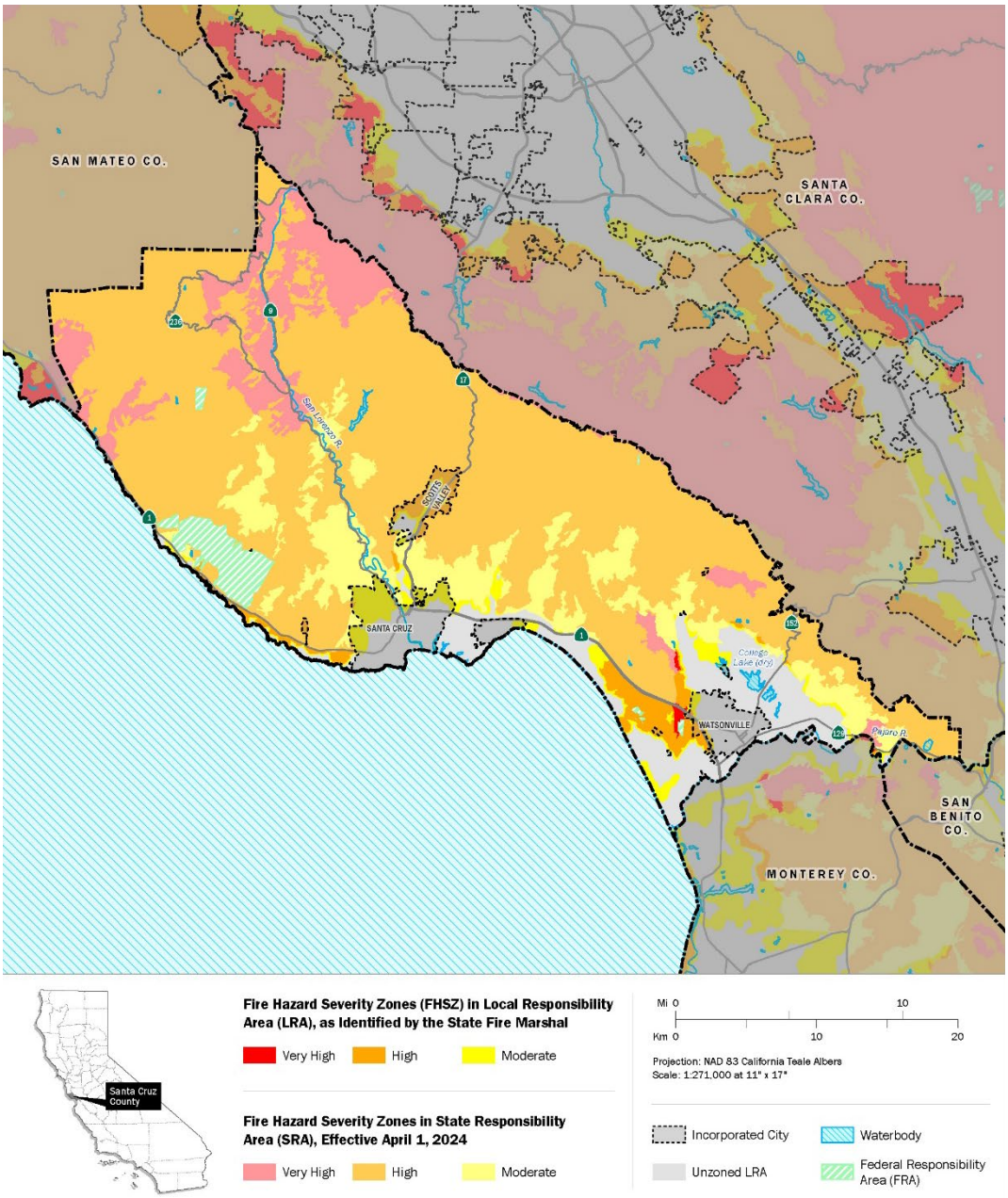

Figure 2. Fire Hazard Safety Zone map for Santa Cruz County

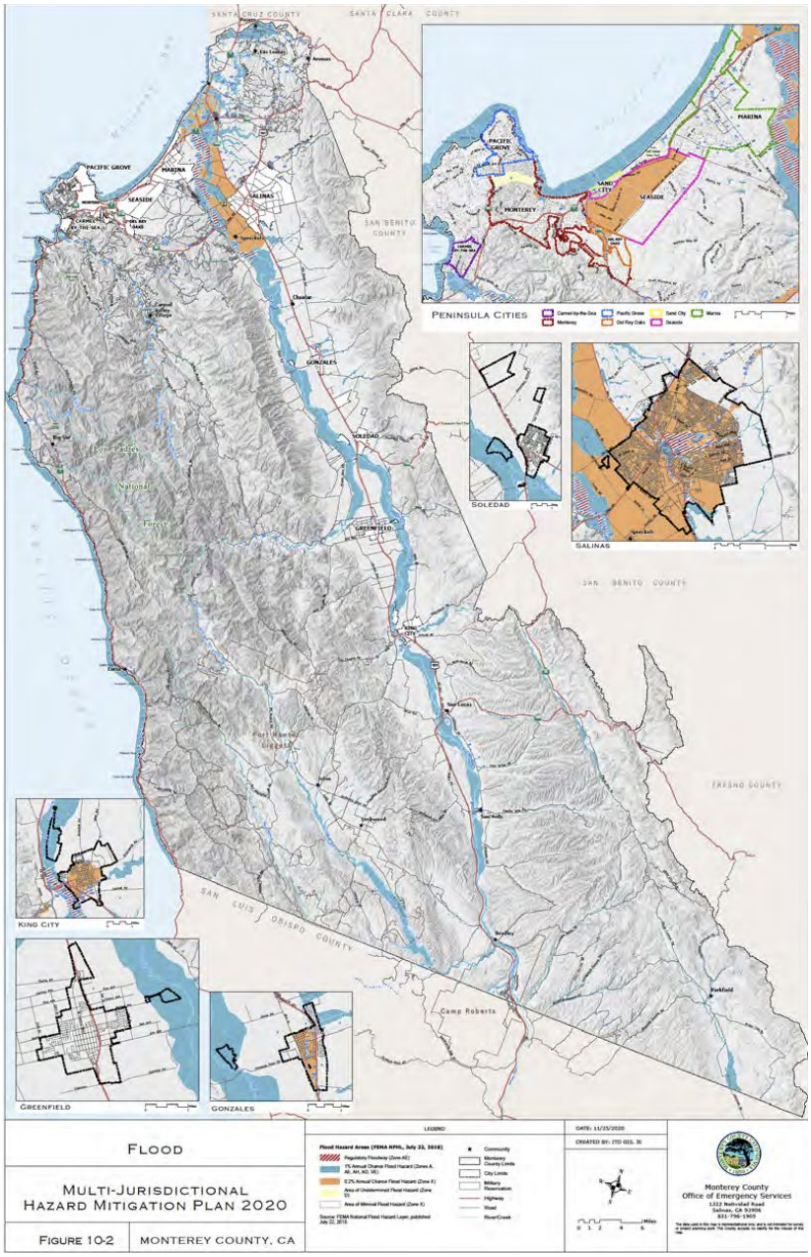

Figure 3. Flood Hazard Areas in Monterey County.

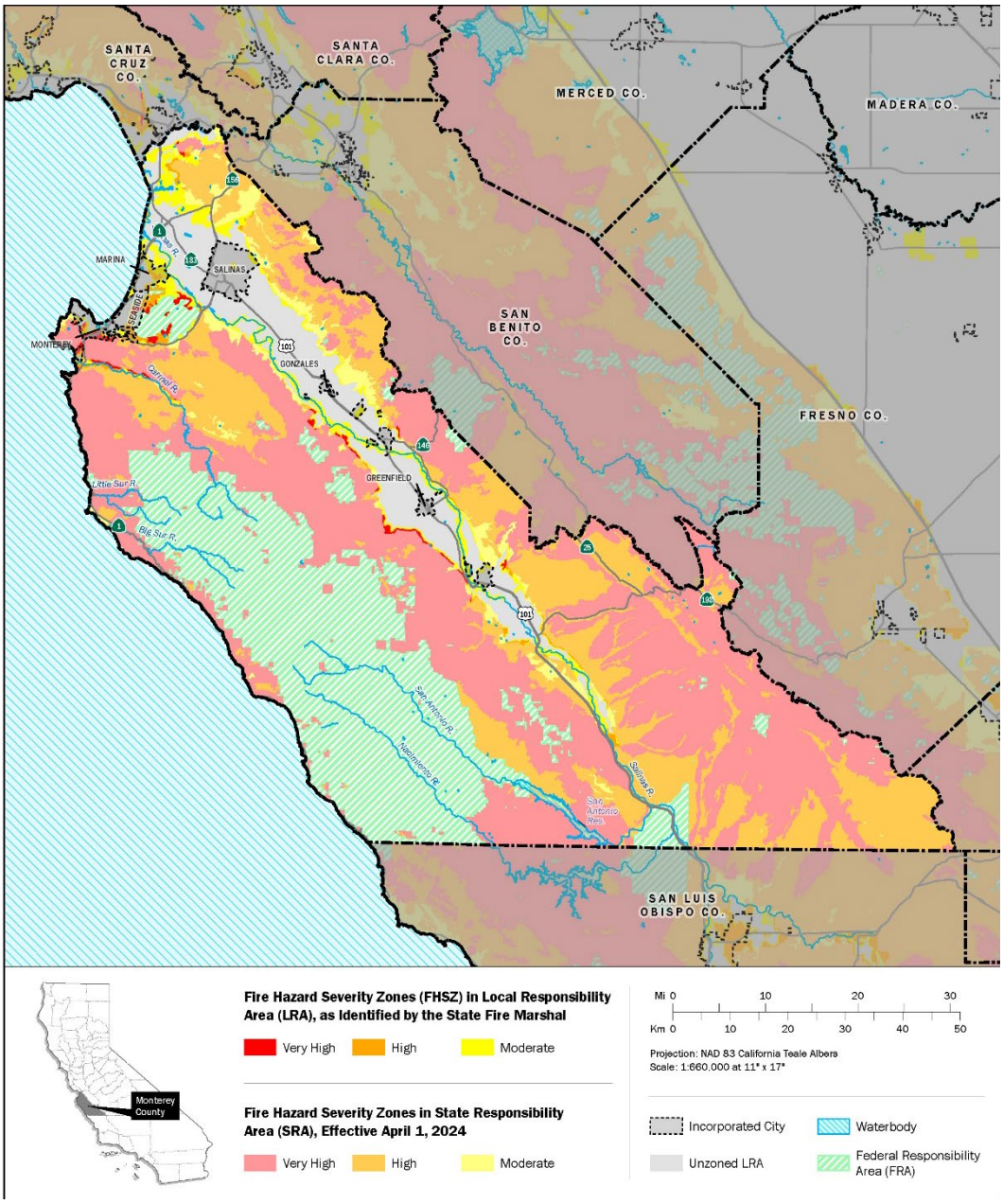

Figure 4. Fire Hazard Safety Zone map for Monterey County

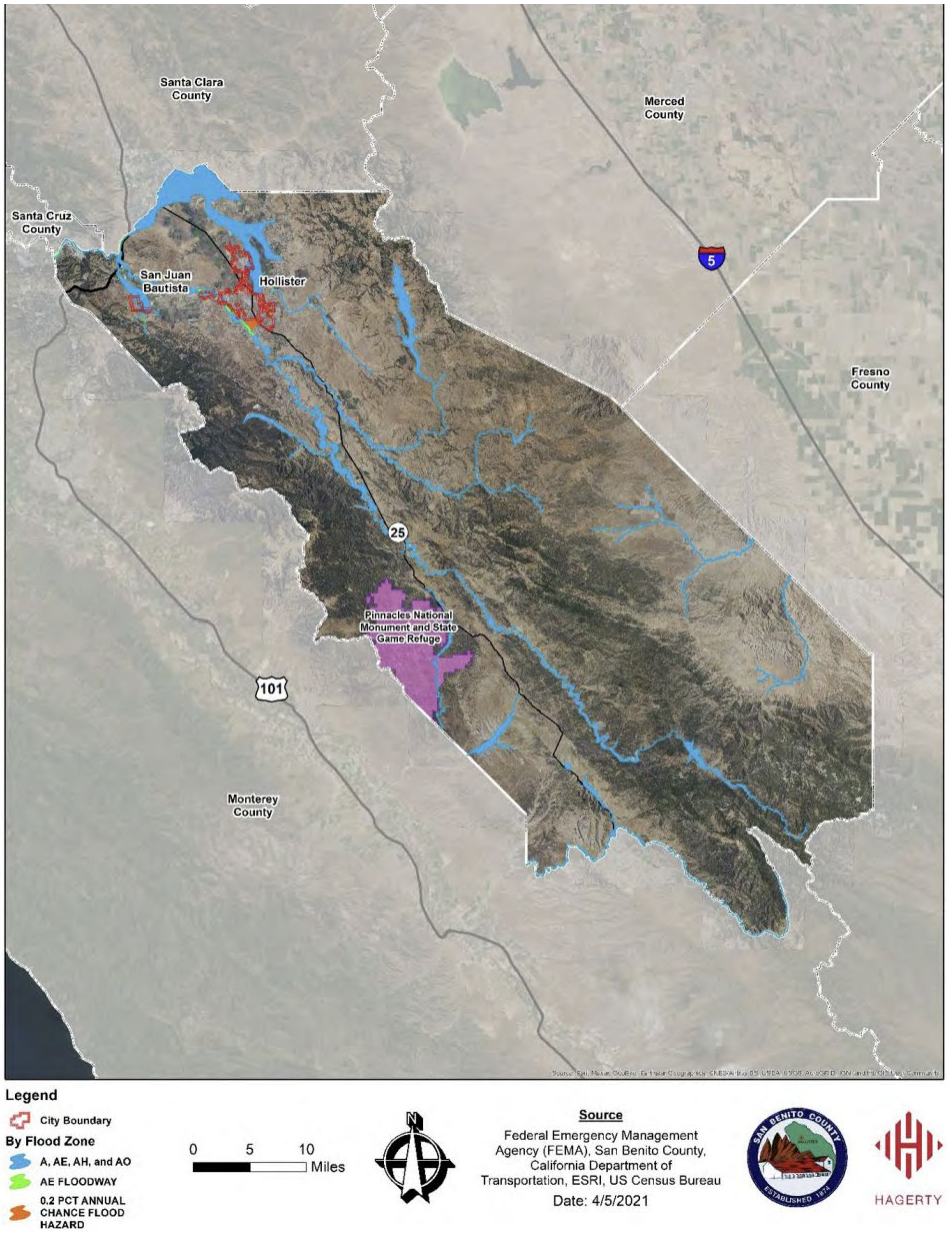

Figure 5. Flood Hazard Areas in San Benito County.

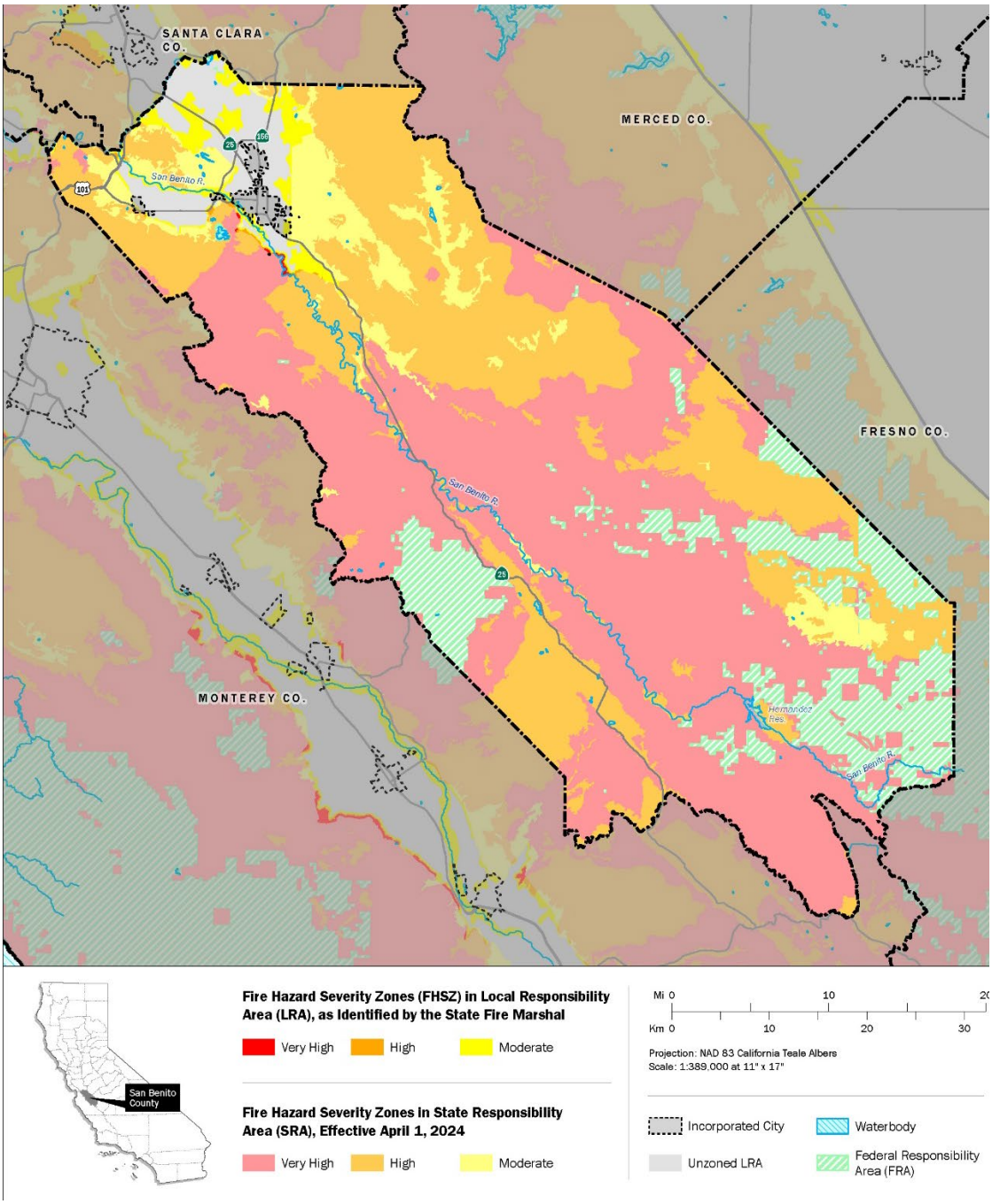

Figure 6. Fire Hazard Safety Zone map for San Benito County

II. Survey Development, Community Engagement, and Outreach Strategies

Goals

This project was grounded in the following outreach goals:

1. **Build Trust and Strengthen Relationships:** Establish and reinforce connections with diverse communities throughout the Monterey Bay region, prioritizing trust-building with groups often underserved in transportation planning.
2. **Facilitate Open Dialogue:** Create opportunities for community members to share their transportation experiences, barriers, and specific concerns related to EVs and climate vulnerabilities.
3. **Educate and Inform:** Provide accessible information on EV technology, charging infrastructure, and the project's goals for climate resilience and equity, ensuring that materials address local issues and are culturally relevant and accessible.

To achieve these goals, the project team conducted a survey targeting participants' current transportation needs, barriers to EV adoption, and their concerns regarding EV infrastructure. In addition to survey outreach, the team attended local events to connect directly with the community, encourage survey participation, and share information.

Community-Centered Survey Design

The Vulnerability and Barriers Community Survey was developed by the project team to gather comprehensive feedback from community members on transportation access, EV awareness, concerns, misconceptions, and aspirations related to preferred modes of transportation. The survey also aimed to understand community concerns about extreme weather events and how such events impact daily transportation experiences.

The survey underwent a multi-step development process, including initial question design, translation into Spanish, a pilot testing phase with ten participants, and subsequent revisions before its official launch. The project team aimed to create a survey that was accessible and inclusive to individuals with varying literacy levels and language backgrounds.

Feedback from Spanish-speaking participants who took the pilot survey highlighted several areas for improvement. The survey contained three core sections: Transportation, Electric Vehicles/Electric Vehicle Charging Infrastructure, and "About You" (aimed at collecting

demographic information). To refine the survey and its translation, pilot participants were asked questions such as:

- "How long did it take to complete the survey?" *("¿Cuánto tiempo le llevó completar la encuesta?")*
- "How easy was it to respond to the first two questions?" *("¿Qué tan fácil fue responder las primeras dos preguntas?")*
- "Is the language accessible to different literacy levels?" *("¿Está el lenguaje fácil de entender para personas con diferentes niveles de lectura?")*.

The pilot process revealed that English-speaking participants felt fairly comfortable responding to the survey and, on average, took about 5-10 minutes to complete it. These participants required little to no assistance. In contrast, Spanish-speaking participants took between 15 to 30 minutes to complete the survey, often needed support from the surveyor, and requested that some questions be rephrased for clarity. Many Spanish-speaking participants also expressed feeling "uninformed" about electric vehicles and charging infrastructure, indicating a need for more targeted outreach and education in future engagement efforts.

Based on the pilot, the survey was revised in a number of ways. All questions were made optional to encourage participants to engage regardless of their perceived knowledge of the topic. In particular, the entire Electric Vehicles/Electric Vehicle Charging Infrastructure section was made optional, as pilot surveyors expressed uncomfortable responding those questions. The transportation section was broadened to include general questions about transportation modes and preferred alternatives to capture current transportation modes and challenges related to accessibility, regardless of whether participants currently owned electric vehicles or had background knowledge on the topic. Spanish translation was updated to include more descriptive language and some "informal" language to increase comprehension. For example, "carpool" was translated as: *"Viajo como pasajero/a en el vehículo de otra persona (Carpool/ 'raite')."* More options were added to the occupation question.

The final survey included a total of 30 questions and was available online via Jotform in both Spanish and English. A paper version was also developed for community members who preferred to respond offline, particularly those who faced challenges using or accessing technology.

Community Outreach and Survey Implementation

Given the feedback received during the survey development phase, the team concluded that prioritizing in-person community engagement was essential. This decision was based on several key considerations:

Building Trust and Relationships: In-person interactions allowed surveyors to establish rapport and credibility with community members, which was especially important in populations that may be cautious about talking to strangers or outreach workers. It gave the team opportunities to encourage individuals to share their stories and lived experiences. Surveyors made it clear that there were no right or wrong answers, that all questions were optional, and that participants could stop answering at any time if they no longer wished to continue. To compensate people for their time the team offered all in-person survey participants entry into a monthly $50 gift card raffle. (AMBAG used general fund dollars to sponsor the raffle in order to address a limitation in the grant guidelines that does not allow compensation for participation.)

Language and Literacy Accessibility: Many participants preferred communication in Spanish or had limited digital literacy. Bilingual surveyors were able to provide real-time translation and support, ensuring participants fully understood the survey content.

Limited Internet Access: Recognizing that not all community members have reliable access to the internet or digital devices, the team chose to meet people where they were—at community events—ensuring equitable access to the survey. Although the survey was available online via Jotform, it was intentionally not promoted through email, social media, or other digital platforms.

Clarifying Complex Topics: The survey addressed topics such as electric vehicles and EV infrastructure, which were unfamiliar to many participants. In-person engagement allowed staff to explain these concepts and answer questions, improving the quality and completeness of responses.

Targeted Outreach: The team aimed to reach specific geographic areas and demographics. Attending selected community events was a strategic approach to connect directly with these groups, rather than relying on broad digital outreach that might not reach the intended audience.

Outreach Events

Ecology Action and Regeneración, in partnership with Proyecto Mixteco Interpretation Services, organized and led 74 community events (Appendix E) to promote survey participation and engage with community members in targeted geographic areas and among specific demographics.

The survey team initially attended large community events in selected areas, such as the Pajaro Health Fair in Pajaro, California, and the Gonzales Car Show in Gonzales, California. At these events, the team set up tables to share information and invited community members to complete the survey. Later, the engagement model shifted toward surveying at events or spaces that were already part of the day-to-day routine for community members such as food distributions, public parks and plazas, grocery stores, and adult education schools. Regeneración worked with Proyecto Mixteco, to provide Mixteco language interpretation for Mixteco speakers to be able to participate in the survey.

Some of the most successful engagement efforts in South Monterey County took place at food distributions hosted by the Monterey County Food Bank. These events occur monthly—or bi-weekly in some communities—and due to the limited number of events available, community members often arrive and line up about an hour before the distribution begins. The project team would also arrive early to connect with attendees, introduce themselves and the project, and begin distributing surveys. As word spread through the line more community members approached the team asking for surveys. This approach relied on hard copy surveys, which were handed out directly by team members. The project team also had success distributing surveys in classrooms such as Cabrillo College and the Adult School in Santa Cruz County.

Figure 7. Ecology Action team tabling at an EV Ride and Drive event in Salinas.

Over 92% of respondents completed the survey at in-person events, where staff were present to support them by answering questions or administering the survey directly. The 8% who completed the survey online typically received the link or QR code from in-person engagement events or had the survey link shared with them by a participant.

Geographic Coverage:

- **Santa Cruz County**: Watsonville Plaza, Cabrillo College (Watsonville & Aptos), Live Oak, Freedom Laundry, Romo Park
- **Monterey County**: Salinas Mall, Gonzales, Greenfield, King City, Soledad, Las Lomas, Chualar, North Monterey County
- **San Benito County**: Hollister (Downtown, Library, Gavilan College)

- **Event Types**:
  - Health fairs
  - Farmers markets
  - School tabling (elementary, adult education, college)
  - Food distributions
  - Earth Day and cultural festivals
  - Door-to-door outreach
  - Neighborhood outreach
  - Traffic and resource meetings

Conducting Outreach in Mixteco

The project team subcontracted an interpreter from Proyecto Mixteco staff for outreach in Mixteco-speaking communities. The interpreter has previous experience with those communities from working as an interpreter for the WIC (Special Supplemental Nutrition Program for Women, Infants, and Children) program. Her existing personal connections and friendships made it easier to engage survey participants, and she often led with humor and personal connections as a starting point into the more technical survey. She reported that that the raffle was a great incentive to encourage community members participation.

Interpretation Challenges and Barriers

Not all terms or questions in the survey could be translated to Mixteco. For example, there is no direct translation of “electric vehicles,” making it challenging to describe some basic concepts, especially to monolingual Mixteco speakers. Rephrasing and explaining questions in Mixteco for full understanding added time to administering each survey. Initially the survey took about 45 minutes per person to but decreased to about 30 minutes as the interpreter became familiar with the survey.

The survey was originally developed in English, with careful attention to how it would translate into Spanish to minimize jargon and improve clarity, but considerations for Mixteco speakers were not considered until after the survey was completed. The interpreter was also not fully versed in how electric vehicles function, so if people asked her questions she could not go into detail or provide much clarification.

The interpreter suggested that future surveys should be shorter and include more visuals, including videos, to improve outreach to Mixteco speakers. QR codes are preferred to website URLs due to varying levels of literacy. Mixteco-speaking respondents shared concerns that they have felt ignored or misrepresented by other translators, which made them less likely to attend events, even if they might want more information on a topic.

Total Events in Mixteco: 10

- **Geographic Coverage**:
    - **Santa Cruz County**: Watsonville
    - **Monterey County**: Pajaro
- **Event Types**:
    - Plaza tabling
    - Outreach at parks and markets
    - Engagement at laundromats and supermarkets

Key Outreach Takeaways and Reflections

As with many outreach efforts, respondents did not limit their concerns to transportation and EV infrastructure needs that were the focus of the survey. At multiple events, community members opened up and shared their broader needs and hopes for improving their communities. Including Question 30 as an open-ended survey item captured a wide variety of concerns and request for amenities such as a community pool, better sidewalks, improved Monterey-Salinas Transit routes, and much more. Some shared a sense of hopelessness about seeing any improvements in their small rural communities.

The in-person engagement allowed the team to reassure respondents that their feedback was valuable. Some community members would express that they didn't think they had anything to contribute, but the team was able to ask basic follow-up questions (i.e. "How did you get to this event? Did you walk, bike, or drive?" or "If you could get around any way

you wanted, how would you prefer to travel?") that helped respondents understand the context of the survey. The team often emphasized that people could answer whichever questions they felt comfortable with, that there are right or wrong answers, and that the team would help fill out responses. All of these reassurances built trust, increased participation, and made the experience feel lighter and less formal for participants, encouraging them to open and share additional insights.

While the survey was carefully crafted, the length was still a challenge for both the team and respondents. There was greater participation at the Watsonville Plaza during Farmers Markets or in Pajaro Park – places where people go to relax and are not in a rush. There was less participation at grocery stores and laundry locations where people were busier.

Outreach for the project was conducted in 2025 during a period of increased Immigration and Customs Enforcement (ICE) activity across the United State. Participation at large-scale events was inconsistent and often impacted as residents stayed away from public spaces for fear of having negative encounters with immigration authorities. This context of tension and fear particularly affected the Latino community. This made it even more crucial for the team to approach community members with care, intentionality, and clear information. Team members wore branded clothing from Ecology Action and Regeneración and would introduce themselves and describe their role at the organizations when approaching potential respondents. The team ensured respondents that their contact information was only for purposes of entering a raffle and would not be shared with any other group. The team included general resources about immigration rights as part of the materials on hand during outreach events.

Another core reflection from this engagement effort is the pivotal role of having staff who are bilingual and deeply aware of the issues currently impacting the communities. Many team members either lived in or were familiar with the areas where outreach was taking place, which greatly enhanced their ability to connect with participants in meaningful ways.

III. Vulnerability and Barriers Survey Results and Analysis

Responses

691 survey responses were recorded – 637 at in-person events, and 54 remotely. Most respondents lived in Santa Cruz County (363), with an additional 285 and 36 responses in Monterey and San Benito Counties, respectively (Figure 8). The City of Watsonville was the most represented city, with 248 respondents.

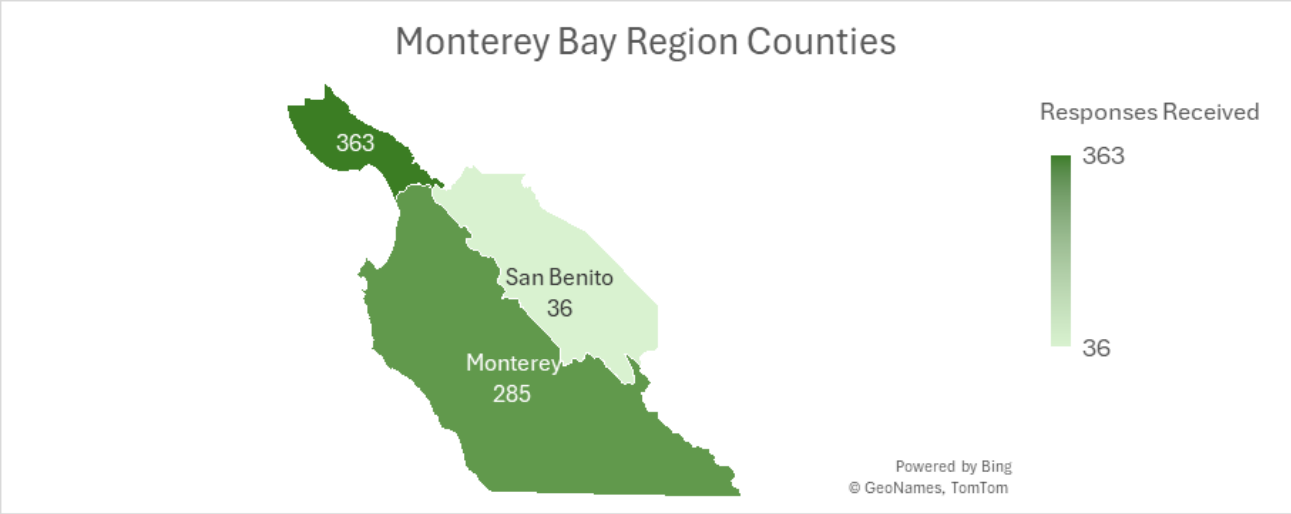

Figure 8. Image showcasing survey responses received by county.

Table 1. Table showcasing the top 10 cities with the most responses

City	Response rate
Watsonville	**248**
Santa Cruz	**59**
Pajaro	**55**
Salinas	**55**
Greenfield	**36**
Hollister	**34**
Soledad	**32**
Gonzales	**24**
Las Lomas	**18**

King City	**17**

Demographics

70% of respondents identified as women. Most respondents were between 34-54 years old (44%) or under 35 (32%), with less representation from the elderly (55 and older, 24%). Most respondents did not identify English as their primary language. Half of the respondents (50%) identified as primarily Spanish speakers, and there were also a small percentage of bilingual English-Spanish speakers (9%) and people who primarily speak Mixteco (11%), an indigenous language from Southern Mexico.

About half of respondents said that they are currently renters, and about 20% said that they stay with family or friends. Less than twenty percent said they owned their home.

The breakdown for respondents' selection for their race/ethnicity was:

Table 2. Breakdown of respondent's Race/Ethnicity.

Race/Ethnicity	Percent
Mexican	34%
Hispanic	29%
Latino/a/e/x	12%
White	11%
Other	10%

Agricultural Worker was the most selected occupation (23% of respondents), followed by Student (18%), and Unemployed (13%).

Transportation: Barriers and Climate Impacts

About half of respondents said that they owned their own vehicle as a primary mode of transportation. The next most cited primary transit modes were walking, bus, carpool, shared vehicle, and bicycle. Respondents said that their primary mode of transportation was fueled by gas (78%) or "muscles" (12%).

When asked if it was easy to find an alternative type of transportation, respondents were about evenly split, and walking, bus, and carpooling were the top three selections for an alternate mode of transportation when the primary one is not available.

"Vehicle (owned)" was chosen as the most reliable and safest form of transportation, and the top choice for mode if all barriers were eliminated. "Bus" was ranked as the second option in those same three categories.

Respondents were asked to select the challenges faced for each mode of transportation, if it applied to them. The top two challenges selected for each mode of transportation were:

Table 3. Top challenges selected by respondents based on mode of transportation.

Mode	Top Challenge	Secondary Challenge
Vehicle	Too expensive	Getting stuck in traffic
Bike or Electric Scooter	Feel unsafe due to lack of infrastructure	Cars drive too fast
Bus	Bus ride takes too long	Delays
Walk	Cars drive too fast	Feel unsafe due to lack of infrastructure
Ride Share Service	Too expensive	(None)
Carpooling	Limited flexibility in schedule	Difficult to arrange

About half of respondents said that they had times where they were unable to travel due to lack of transportation options or transportation barriers. In an open response section, a commonly cited impact was missed medical appointments for themselves, family members, and pets. Other impacts cited included inability to get to work, to shelters, to shop for food, or to visit relatives in other counties.

The survey asked if respondents' transportation had been impacted by extreme weather events in the last five years. The most cited events were heavy rain and floods, followed by strong winds, extreme heat, smoke and fire. An open response question asked if respondents have worries about future climactic events, and the most noted were floods and heavy rain, with respondents referencing recent flooding events in the area.

Respondents expressed concern about lack of access to basic utilities – gas, electricity – as well as roads and jobs during climate events. They also described how climate events impacted the bus system, which they felt was already inadequate. Others mentioned fears that their own cars, which they are dependent on, would be damaged or become unreliable due to bad weather.

Transportation: Electric Vehicles and Infrastructure

57% of respondents (382 of 691) said they felt comfortable answering a final section of questions about electric vehicles and charging stations. (Those who did not feel comfortable answering the EV questions were sent directly to a final open response question.)

Of those who did answer the final section of questions, just over half said they were Somewhat or Very Familiar with electric cars (58%) and electric bikes (54%), with fewer respondents being somewhat or very familiar with electric buses (38%). Respondents were asked if, given what they know today, they would purchase an electric bike or vehicle. 63% said they would not, or were still unsure, about buying an electric car, and 59% felt the same about electric bicycles.

15% of respondents said they had a Level 2 or DC Fast Charge (Figure 9) type of electric vehicle chargers at their work, and 9% said they had one at their home. 41% said there is a Level 2 or DC Fast Charger within a mile from their home.

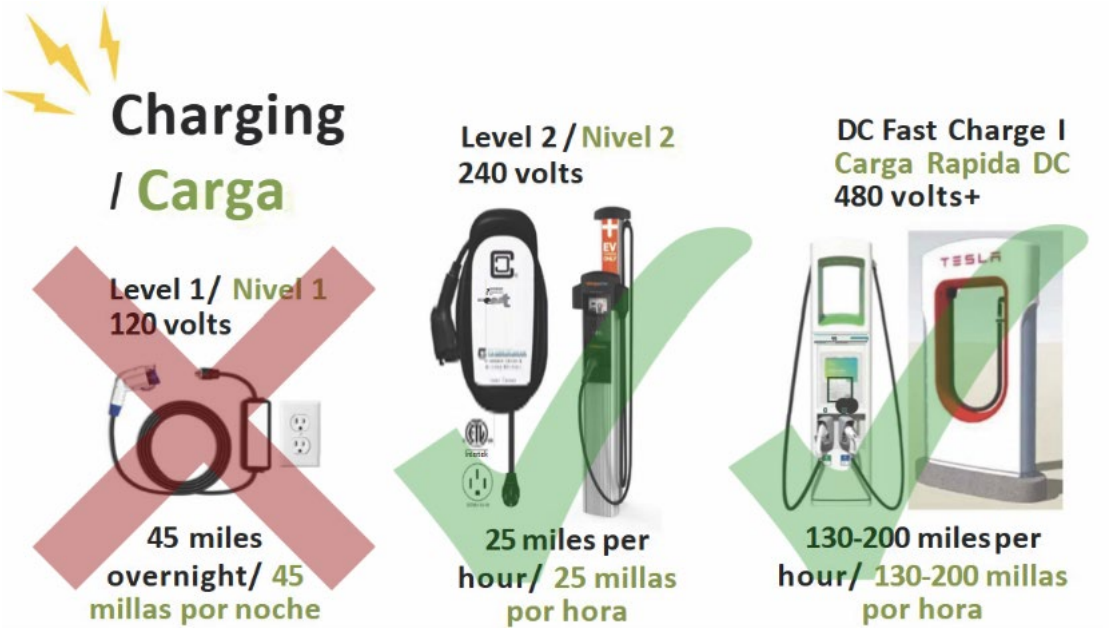

Figure 9. Graphic showing the EV charging types we were asking about in the survey.

The top barriers cited to purchasing an EV were concerns with range, high cost, lack of charging stations nearby, and lack of knowledge about EVs. In an open response section, respondents said that as renters they felt disempowered to add a charger at their home. Some felt disillusioned - would local governments or developers really invest in charging infrastructure given the existing disinvestment and lack of resources in their area?

The top motivators that would encourage respondents to purchase an EV were learning more about them, lower costs through rebates and incentives, and knowing that a charger would be available at home or work. Respondents said that more widespread and accessible chargers and more information at EVs were the top two things that would make them feel "completely secure" about vehicle charging in the region.

Analysis of Results

Figure 10. Project team member surveying a community member.

The survey was successful in reaching disadvantaged communities impacted by climate change. 46% of respondents identified as Mexican or Latino, and many respondents were monolingual Spanish speakers. 54% were renters, and the most represented professions were agricultural workers, or the unemployed. While the survey did not ask directly about income, many respondents noted the high cost of vehicle ownership as a barrier. The outreach team intentionally selected locations and events offering basic services, resources, and food, to target lower income populations. This may account for the overrepresentation of women in the survey, as they may be responsible for providing food and resources for their families and more likely to attend these types of events.

All respondents, aside from 30, have been affected by extreme weather in the last five years. The CZU fires of 2020 and the levee failure and flooding of the community of Pajaro were local climate disasters that had directly impacted many that took the survey. Floods and heavy rain were the most common concerns. Responses captured worries and anxieties based on lived experiences, stories of suffering in the community, and predictions of what might happen next given the already precarious state of infrastructure in the area. People expressed concern about access basic needs and utilities – gas, electricity, roads, jobs - during a climatic event.

The agricultural workers who took the survey cited how extreme weather events impacted both their personal lives and their ability to work outside. Rain or high heat can stop a day of work or can put workers in harm's way. The economic impacts and infrastructural damage caused by climate change are well documented. The survey results provide new insight into the additional mental and emotional toll borne by a vulnerable and large group of agricultural workers within the Monterey Bay Region.

Transportation Barriers and Impacts

The survey also reached many multimodal transportation users in the region. In addition to the common barriers like the cost of owning a vehicle, a lack of active transportation facilities, their responses in open-ended questions illustrative the complex transportation barrier and impacts faced by disadvantaged community members every day.

Half of respondents rely on their own car, but car breakdowns were a common and expensive issue, and some had concerns about the impacts of extreme weather on their car:

> *"I have an older truck so driving in extreme heat can sometimes make my vehicle break down. I do bike a lot of places and extreme weather causes may challenge that as well."*

> *"My Primary mode of transportation is my car. I evacuated my home in the mornings during the wildfire which destroyed my home in August 2020. If I did not own a car, I have no idea how I would have escaped the flames. The bus services in the mountains is minimal."*

Some carpoolers mentioned feeling upset when they can't find a ride, or embarrassed when they asked and were rejected. Some were embarrassed to be asking for a ride in the first place.

> *"When I lived in Salinas, the person that gives me a ride did not pick me up for work. I couldn't go to work and they gave me one day off as punishment."*

The number of respondents who said they mostly walk, or walk when their primary mode of transportation was not available, was striking considering the long distances and rural built environment that makes up much of the study area. Respondents said that health issues make it difficult to walk, and some worry about being victims of violence when walking alone, having heard stories of assaults in the community. Heat and extreme weather also make it difficult to walk.

The survey reached many bus users, who face limited service and long rides to get to jobs and resources. Some bus novices had difficulty navigating the bus system in general, and language barriers added further difficulty. Even more experienced riders felt unsafe on the bus at times or were impacted when stops were removed or routes were rescheduled without enough notice. Connector services like taxis or small lift rides provided by Monterey-Salinas Transit are available but require 2-3 advanced days' notice to reserve. Some simply live too far from a bus stop, or at times didn't have enough funds to pay the

fare. Others feared that busses, already lacking adequate service and facilities, would not be a reliable form of transit during a climate event.

> *“The bus doesn't run in my area and it's hard to get a ride to work and appointments.”*
>
> *“The bus takes a long time and the bus stop is far away. It is difficult to carry groceries.”*
>
> *"There was a shelter in Santa Cruz and I couldn’t get there as I had no gas, and no bus pass. I asked a social worker for passes and they told me they could provide one, although I had to talk to the supervisor. They opened the drawer and provided a bunch of them, but in a disrespectful manner.”*

The small number of cyclists in the survey is also notable given it can be a low-cost transit option, but respondents cited a lack of comfortable cycling facilities - a common barrier for those who are interested in riding but don’t feel comfortable doing so. Many respondents mentioned not knowing how to ride a bike and that they would like to learn.

The Mixteco interpreter noted that speakers from that community shared the same issues as the rest of respondents, such as concerns about the costs for repairing electric vehicles vs gas vehicles, range and charge time, bus delays an accessibility, difficulty in securing rides and the cost of rideshare. Mixteco speakers specifically mentioned that Pajaro has fewer stores within walking distance compared to Watsonville, so community members can carry fewer items, and that for single mothers securing rides to in nearby communities was a particular challenge

The EV Knowledge Gap

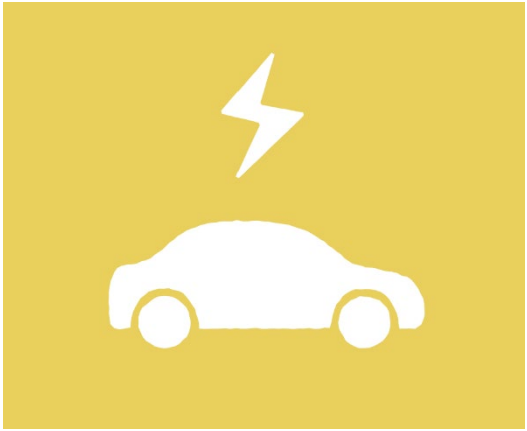

Figure 11. Ecology Action branded Electric Vehicle Graphic

One of the outcomes of the survey pilot was to make all questions optional, and to specifically make the entire final section of questions about EVs optional, as many initial respondents reported not knowing enough about EVs to give an informed response. In the final survey only 57% of respondents felt comfortable or familiar enough with EVs to answer the final set of question, suggesting that widely there is a lack of familiarity with EVs in the target population.

Electric vehicles seemed like a very distant reality for some of the participants and were perceived to be a technology only accessible to well-off individuals.

Only about 15% of respondents said that they would purchase an electric car or bike given what they know about them today. Respondents would like to have more education about electric vehicles, more charging infrastructure to remove range anxiety, and financial incentives to help with costs – all common barriers to EV ownership. The January 2025 fire at a battery storage plane in Moss Landing during the outreach period was referenced by some respondents as an example of their concern with expanding EV adoption and battery technology in the region (Mayorquin, 2025).

IV. Discussion

The outreach team's focus on crafting an accessible but in-depth survey, building trust with underserved communities, and meeting the community in places they are already at led to a significant sample size of responses from traditionally hard to reach groups, including low-income residents, agricultural workers, undocumented individuals, and speakers of Spanish and Mixteco. Most respondents were women, Spanish-speaking, and renters. Agricultural work was the most common occupation, highlighting the need for climate-resilient transportation solutions tailored to this workforce.

Climate change is affecting underserved communities in the AMBAG region and complex and intersectional ways. This outreach helped make clear deep concern about floods, extreme heat, and wildfires, events that disrupt transportation and disproportionately affect underserved communities, especially agricultural workers. Many respondents rely on personal vehicles but face affordability, infrastructure, and safety challenges. Public transit and walking were common alternatives, though both presented accessibility and safety concerns.

While interest in EVs exists among the respondents, barriers such as cost, lack of charging infrastructure, and limited knowledge hinder adoption. While many of these are the same issues slowing EV adoption across demographics, the high number of renters reached in the survey felt disempowered to install chargers at home. Less than half of respondents said that there was a fast charger within a mile of their home. Assembly Bill 2565 (2015) requires landlords to approve the installation of an EV charger by a tenant willing to pay for the installation and charging costs, but the cost and fear of landlord retaliation are still barriers. This points to the particular importance of publicly-accessible chargers in these underserved neighborhoods where renters are unlikely to install their own.

Directions for future research and analysis

The project team identified several areas for further analysis and future planning.

Exploring Modal Flexibility and Accessibility
The survey asked about primary mode of transportation, and ease of finding an alternative when needed. Further disaggregation of the data could provide more detail - i.e. do those who primarily rely on personal vehicles have difficulty finding alternate modes, or what challenges do individuals who primarily walk face when seeking other transportation options? A more direct question about why respondents selected their primary mode of transit could provide more context. Understanding these dynamics could help identify gaps in multimodal infrastructure and inform future investments that support flexibility and accessibility.

Regional Data Disaggregation for Targeted Planning
While the survey results provide a comprehensive regional overview, disaggregating data by county and city could reveal important geographic trends and disparities. Analyzing data at the local level would allow for more targeted recommendations and localized planning efforts that better reflect the unique needs of each community.

Understanding Commute Patterns
Further analysis could explore the relationship between where people live and where they work or attend school. Identifying commute patterns could be especially valuable for planning transit routes and EV infrastructure in areas with high commuter populations.

Protecting Agricultural Workers from Climate Impacts
Given the high representation of agricultural workers among survey respondents, this study can contribute to research on protecting this workforce from climate-related disruptions that impact both their ability to work and their safety.

Expanding EV Education and Outreach in Underserved Communities
Survey responses indicated a need for more education around EVs, particularly in South Monterey County. Expanding programming like Ecology Action's EV team into these areas could help bridge the knowledge gap and increase community readiness for EV adoption. Outreach should be culturally relevant, multilingual, and tailored to local concerns.

Limitations and Challenges

The project originally aimed to employ a variety of partner CBOs to ensure deep connections to underserved communities, but few replied to the RFP. If future efforts want to pursue a multi-CBO model, more time should be spent forming partnership and

informal agreements prior to the issuance of an RFP, and technical assistance may be required to help them submit.

Despite the efforts of the project team to make the survey digestible to community members, there were still times where understanding the content was challenging and responses did not quite answer the intended question. Respondents were also unfamiliar with AMBAG as an organization, and it could be difficult for surveyors to explain in a succinct way.

Figure 12. Regeneracion team member canvassing.

One challenge not unique to this project is that smaller communities have fewer public events to attend and fewer community spaces to survey compared to more populous urban areas. In rural or unincorporated areas, the team relied on door-to-door canvassing and leaving notices (Appendix D), which at times had slow response rates. This may lead to underrepresentation of transportation needs in rural areas.

The outreach for this project was conducted in 2025 during a time of increased Immigration and Customs Enforcement (ICE) activity across the United States. Fear of negative encounters with immigration authorities was widespread in Spanish speaking communities, regardless of immigration status, which led to lower turnout at community events and less willingness to open doors to strangers. As ICE activity increased the outreach team eventually stopped door-to-door canvassing given low response rates.

VIII. Citations

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IX. Appendices

A. English Survey
B. Spanish Survey
C. English & Spanish Flyers
D. English & Spanish Notice Flyers
E. List of Outreach Events
F. All graphs showcasing results

Appendix A. English Survey

Vulnerability and Barriers Community Survey

Monterey Bay Electric Vehicle Climate Adaptation and Resiliency Framework

The goal of this survey is to assess transportation needs and barriers in the Monterey Bay area and is being conducted by Ecology Action and Regeneración. You can decide to stop taking the survey at any time. **All questions are optional.**

1. What city/area do you live in?

2. What neighborhood or street do you live nearest to?

(ex. North Salinas, Bonny Doon, Willow Landing, etc.)

Section 1: Transportation

3. How do you usually get to where you need to go? Please select your primary type of transportation.

- Car, Truck, SUV, Van (Owned)
- Car, Truck, SUV, Van (Shared)
- Bus
- Walk
- Bicycle
- Bike Share service (i.e. BCycle)
- Electric scooter
- Ride share service (i.e. Uber or Lyft)
- Carpool
- Other:

4. If your primary type of transportation is unavailable, is it easy to find an alternative type of transportation?

- Yes
- No

5. If your primary type of transportation is unavailable, what is your backup type of transportation?

- Car, Truck, SUV, Van (Owned)
- Car, Truck, SUV, Van (Shared)
- Bus
- Walk
- Bicycle
- Bike Share service (i.e. BCycle)
- Electric scooter
- Ride share service (i.e. Uber or Lyft)
- Carpool
- Other:

6. Have you ever not traveled due to lack of transportation options or barriers?

- Yes
- No

6a. If yes, please explain:

7. What does your primary type of transportation use?

- Gas
- Electricity
- Muscles (Biking or walking)
- Not sure
- Other:

8. Which of the following extreme weather events have impacted your transportation in the last 5 years? (Select all that apply.)

- Floods
- Heavy rain
- Strong wind
- Landslides
- Mudslides
- Extreme heat
- Fire
- Smoke
- Tornado
- Earthquake
- None of the Above
- Other:

9. What challenges do you face as a car, truck, SUV, or van user? (Select all that apply.)

- This does not apply to me
- Too expensive (i.e. car repairs, gas, car insurance)
- Difficulty finding parking
- I get stuck in traffic
- I don’t face any challenges
- Other:

10. What challenges do you face as a bicycle, bike share service, or electric scooter user? (Select all that apply.)

- This does not apply to me
- Cars drive too fast for me to feel safe
- Bike/scooter isn't working
- I feel unsafe due to lack of infrastructure (i.e sidewalks, crosswalks, protected bike lanes)
- Too expensive (i.e bike share service costs, bike repair costs)
- Difficult to navigate due to a disability
- I don’t face any challenges
- Other:

11. What challenges do you face as a bus user? (Select all that apply.)

- This does not apply to me
- The bus does not take me where I need to go
- The bus ride takes too long
- The bus does not arrive on time
- Waiting at the bus stop feels unsafe
- The bus is difficult to navigate due to a disability
- I don't live near a bus route
- Buses don't come frequently enough
- The bus fare is too expensive
- I don’t face any challenges
- Other:

12. What challenges do you face as a walker? (Select all that apply.)

- This does not apply to me
- Cars drive too fast for me to feel safe
- I feel unsafe due to lack of infrastructure (i.e. sidewalks, crosswalks, streetlights)
- Difficult to navigate due to a disability
- I don’t face any challenges
- Other:

13. What challenges do you face as a ride share service (Uber or Lyft) user?

- This does not apply to me
- Too expensive (paying for rides)
- Unreliable
- I feel unsafe with drivers
- It takes too long to secure a driver
- I don’t face any challenges
- Other:

14. What challenges do you face as someone who carpools?

- This does not apply to me
- Too expensive (paying for rides)
- Unreliable
- Difficult to arrange
- I feel unsafe with drivers
- Limited schedule flexibility
- I don't face any challenges
- Other:

15. What mode of transportation do you find to be the most reliable?

- Car, Truck, SUV, Van (owned)
- Car, Truck, SUV, Van (shared)
- Bus
- Walk
- Bicycle
- Bike share service (i.e BCycle)
- Electric scooter
- Ride share service (i.e Uber/Lyft)
- Carpooling
- Other:

16. If barriers were reduced or eliminated, what would be your preferred transportation option?

- Car, Truck, SUV, Van (owned)
- Car, Truck, SUV, Van (shared)
- Bus
- Walk
- Bicycle
- Bike share service (i.e. BCycle)
- Electric scooter
- Ride share service (i.e Uber or Lyft)
- Carpooling
- Other:

17. What mode of transportation do you find to be the safest?

- Car, Truck, SUV, Van (owned)
- Car, Truck, SUV, Van (shared)
- Bus
- Walk
- Bicycle
- Bike share service (i.e BCycle)
- Electric scooter
- Ride share service (Uber/Lyft)
- Carpooling
- Other:

18. How do you think your type of primary mode of transportation could be affected by extreme weather events?

19. Do you feel comfortable answering questions related to electric vehicles and charging stations? If you selected "no", skip to Question #30 on page 12.

- Yes
- No

Section 2: Electric Vehicles/ Electric Vehicle Charging Infrastructure

20. How familiar are you with the following:

	Not Familiar	Somewhat Familiar	Very Familiar
Electric Cars			
Electric Bikes			
Electric Buses			

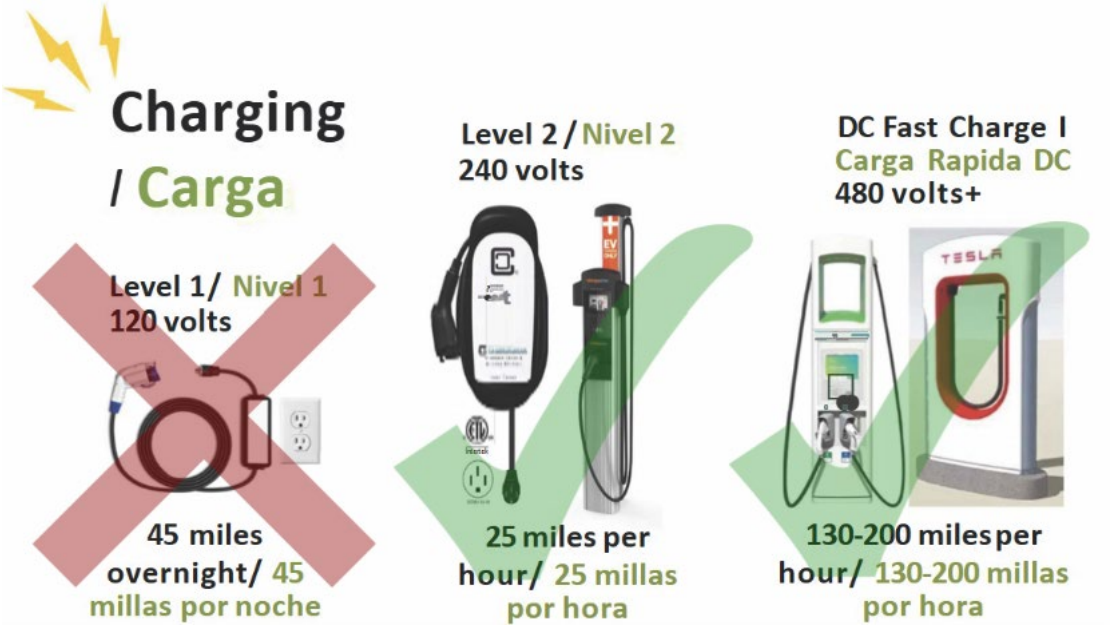
21. With what you know today, would you purchase an electric vehicle?

- Yes
- No
- Not sure
- I already purchased and electric vehicle

22. With what you know today, would you purchase an electric bike?

- Yes
- No
- Not sure
- I already purchased and electric bike

All questions below related to electric vehicle charging stations are referring to Level 2 and DC Fast Charge stations only.



23. Is there an electric vehicle charging station available at your place of work?

- Yes
- No
- Not sure
- Other:

24. Is there an electric vehicle charging station available at your home?

- Yes
- No
- Not sure
- Other:

25. Is there a public electric vehicle charging station available within a mile of your home?

- Yes
- No
- Not sure
- Other:

26. What are some barriers you face or expect to face if purchasing an electric vehicle? (Select all that apply.)

- There are no charging stations near me
- Concerns with range of the car (how far I can travel on one charge)
- I don't have enough information about them compared to gas vehicles
- I don't know anyone who has one
- Too expensive
- Limited availability in market
- Limited brands available
- Unfamiliar with maintenance compared to gas vehicles
- I am worried about how safe the batteries are
- Unable to add charging port because I rent/live in an apartment complex
- I am not interested in purchasing an electric vehicle
- Other:

27. What would encourage you to purchase an electric vehicle? If you already own an electric vehicle, what encouraged you to purchase one? (Select all that apply.)

- Test drives
- Learning more about them
- Rebate incentives (receive money back 30-90 days after purchase)
- Grant incentives (receive discount at time of purchase)
- Knowing that an electric vehicle charging station would be available at my home
- Knowing that an electric vehicle charging station would be available at my work
- Having a personal connection with an electric vehicle owner
- I am not interested in purchasing an electric vehicle
- Other:

28. What would need to change for you to feel completely secure about electric vehicle charging in our region?

29. What are the barriers to adding more electric vehicle charging infrastructure in your neighborhood or region?

30. Is there anything else you'd like to tell us? (For example, anything that you didn't voice earlier in the survey or where in the community you'd like to see EV charging infrastructure)

Section 3: About You

31. What is the primary language you speak?

- English
- Spanish
- Bilingual (English/Spanish)
- Mixteco
- Prefer not to answer
- Other:

32. What is your age?

- Under 17 years of age
- 18-24 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65-74 years
- 75 years or more

33. What is your race or ethnicity? (Select all that apply.)

- American Indian or Alaskan Native
- Asian
- Black or African American
- Caucasian/White
- Hispanic
- Latino/a/e/x
- Mexican
- Chicano/a/e/x
- Central American
- South American
- Middle Eastern
- Native Hawaiian or Pacific Islander
- South Asian
- Prefer not to answer
- Other:

34. What is your gender identity?

- Female
- Male
- Non-binary
- Prefer not to answer
- Other:

35. What is your current occupation?

- Student
- Worker in public sector (including government, public schools)
- Service worker
- Unemployed
- Healthcare worker
- Retail worker
- Non-profit sector
- Agricultural worker
- Other private sector
- Stay at home parent/guardian
- Other:

36. Where do you work or go to school? (Skip if this question does not apply to you)

Please share the city or town

37. What is your current housing situation?

- I own my house
- I rent my house
- I own my apartment/duplex
- I rent my apartment/duplex
- I am staying with family/friends
- Unhoused
- I prefer not to answer
- Other:

38. Are you taking this survey in-person or remotely?

- In-person (with Survey Team Staff or at a community event)
- Remote (online, not at an in-person community event)

The following question is for in-person respondents only.

Would you like to participate in a raffle for a $50 gift card for your participation in this survey? (If yes, please share your contact information below so we can contact you if you win)

- Yes
- No

Contact Information

If you would like to receive updates about this project and be invited to participate in events or in future surveys and focus groups, please fill out the questions below.

I want to be contacted for future surveys, focus groups, community events, and updates related to this project.

- Yes
- No

I am only interested in surveys or focus groups with compensation to participate

- Yes
- No

Name (optional)

First Name		**Last Name**	

Phone Number (optional)	

Can the above phone number receive text messages?

- Yes
- No

Email (optional) Example@example.com	

Appendix B. Spanish Survey

Encuesta Comunitaria sobre Vulnerabilidad y Barreras
Adaptación y resiliencia climática de los vehículos eléctricos de la Bahía de Monterey

El objetivo de esta encuesta es evaluar las necesidades y barreras de transporte en el área de la Bahía de Monterey y está siendo realizada por Ecology Action y Regeneración. Puede decidir dejar de realizar la encuesta en cualquier momento. **Todas las preguntas son opcionales.**

1. ¿En cuál ciudad/area vive?

2. ¿Cuál calle o vecindario es más cercano a donde usted vive?

(por ejemplo, Norte de Salinas, Bonny Doon, Willow Landing, etc.)

Sección 1: Transporte

3. ¿Cómo suele llegar a donde tiene que ir? Seleccione su tipo de transporte principal.

- Carro, Camioneta, SUV, una Ven (su propiedad)
- Carro, Camioneta, SUV, una Ven (compartido)
- Autobús
- Caminar
- Bicicleta
- Servicio de bicicletas compartidas (por ejemplo, BCycle)
- Patinete eléctrico
- Servicio de viaje compartido (por ejemplo, Uber o Lyft)
- Viajo como pasajero/a en el vehículo de otra persona (Carpool/"Raite")
- Otro:

4. Si su principal tipo de transporte no está disponible, ¿es fácil encontrar un tipo de transporte alternativo?

- Sí
- No

5. Si su tipo de transporte principal no está disponible, ¿cuál es su tipo de transporte alternativo?

- Carro, Camioneta, SUV, una Ven (su propiedad)
- Carro, Camioneta, SUV, una Ven (compartido)
- Autobús
- Caminar
- Bicicleta
- Servicio de bicicletas compartidas (por ejemplo, BCycle)
- Patinete eléctrico
- Servicio de viaje compartido (por ejemplo, Uber o Lyft)
- Viajo como pasajero/a en el vehículo de otra persona (Carpool/"Raite")
- Otro:

6. ¿Alguna vez no ha viajado por falta de opciones de transporte o barreras?

- Sí
- No

6a. Si seleccionó "sí", por favor explique:

7. ¿Qué utiliza su transporte principal para andar?

- Gasolina
- Electricidad
- Músculos (andar en bicicleta o caminar)
- No estoy segura/o
- Otro:

8. ¿Cuál de los siguientes eventos climáticos extremos ha impactado su transporte en los últimos 5 años? (Seleccione todo lo que corresponda).

- Inundaciones
- Lluvia fuerte
- Viento fuerte
- Deslizamiento de tierra
- Deslizamiento de lodo

- Calor extremo
- Incendios
- Humo
- Tornado
- Terremoto
- Ninguno de estos
- Otro:

9. ¿Qué desafíos enfrenta como usuario de un carro, camioneta, SUV, o una ven? (Seleccione todo lo que corresponda).

- Esto no se aplica a mi
- Demasiado caro (por ejemplo, reparaciones de carro, gasolina, aseguranza de carro)
- Dificultad para encontrar estacionamiento.
- Me quedo atascada/o en el tráfico
- No enfrento ningún desafío
- Otro:

10. ¿Qué desafíos enfrenta como usuario de bicicleta, servicio de bicicletas compartidas o patinete eléctrico? (Seleccione todo lo que corresponda).

- Esto no se aplica a mi
- Los carros conducen demasiado rápido para que me sienta segura/o
- La bicicleta/patineta no funciona
- Me siento inseguro debido a la falta de infraestructura (por ejemplo, la falta de aceras, cruces peatonales, carriles de bicicletas protegidos)
- Demasiado caro (por ejemplo, costos de servicio de bicicletas compartidas, costos de reparación de bicicletas)
- Difícil de navegar debido a una discapacidad
- No enfrento ningún desafío
- Otro:

11. ¿Qué desafíos enfrenta como usuario de autobus? (Seleccione todo lo que corresponda).

- Esto no se aplica a mi
- El autobus no me lleva a donde necesito ir
- El viaje en autobús dura demasiado
- El autobús no llega a tiempo
- Esperar en la parada de autobús se siente inseguro
- El autobús es difícil usar debido a una discapacidad
- No vivo cerca de una ruta de autobús
- Los autobuses no pasan con suficiente frecuencia
- La tarifa del autobús es demasiada cara
- No enfrento ningún desafío
- Otro:

12. ¿Qué desafíos enfrenta como caminante? (Seleccione todo lo que corresponda).

- Esto no se aplica a mi
- Los carros conducen demasiado rápido para que me sienta segura/o
- Me siento insegura/o debido a la falta de infraestructura (aceras, cruces peatonales, luces en las calles)
- Difícil de navegar debido a una discapacidad
- No enfrento ningún desafío
- Otro:

13. ¿Qué desafíos enfrenta como usuario de un servicio de viajes compartidos (Uber o Lyft)? (Seleccione todo lo que corresponda).

- Esto no se aplica a mi
- Demasiado caro (pagar por los viajes)
- No es confiable
- Me siento insegura/o con los conductores
- Se tarda demasiado en conseguir un conductor
- No enfrento ningún desafío
- Otro:

14. ¿Qué desafíos enfrenta como alguien que viaja como pasajero/a en el vehículo de otra persona (carpool/"raite")? (Seleccione todo lo que corresponda).

- Esto no se aplica a mi
- Demasiado caro (pagar por los viajes)
- No es confiable
- Difícil de agendar
- Me siento insegura/o con los conductores
- Mi flexibilidad de tiempo es limitada
- No enfrento ningún desafío
- Otro:

15. ¿Qué medio de transporte le parece más confiable?

- Carro, Camioneta, SUV, una Ven (su propiedad)
- Carro, Camioneta, SUV, una Ven (compartido)
- Autobús
- Caminar
- Bicicleta
- Servicio de bicicletas compartidas (por ejemplo, BCycle)
- Patinete eléctrico
- Servicio de viaje compartido (por ejemplo, Uber o Lyft)
- Viajo como pasajero/a en el vehículo de otra persona (Carpool/"Raite")
- Otro:

16. Si se redujeran o eliminaran las barreras que impiden el acceso al transporte, ¿cuál sería su opción de transporte preferida?

- Carro, Camioneta, SUV, una Ven (su propiedad)
- Carro, Camioneta, SUV, una Ven (compartido)
- Autobús
- Caminar
- Bicicleta
- Servicio de bicicletas compartidas (por ejemplo, BCycle)
- Patinete eléctrico
- Servicio de viaje compartido (por ejemplo, Uber o Lyft)
- Viajo como pasajero/a en el vehículo de otra persona (Carpool/"Raite")
- Otro:

17. ¿Qué medio de transporte le parece más seguro?

- Carro, Camioneta, SUV, una Ven (su propiedad)
- Carro, Camioneta, SUV, una Ven (compartido)
- Autobús
- Caminar
- Bicicleta
- Servicio de bicicletas compartidas (por ejemplo, BCycle)
- Patinete eléctrico
- Servicio de viaje compartido (por ejemplo, Uber o Lyft)
- Viajo como pasajero/a en el vehículo de otra persona (Carpool/"Raite")
- Otro:

18. ¿Cómo cree que su modo de transporte principal se vería afectado por eventos climáticos extremos?

19. ¿Se siente cómodo respondiendo preguntas relacionadas a vehículos eléctricos y estaciones de carga? (Si respondió "no", pase a la pregunta n.° 30 en la página 11.)

- Sí
- No

Sección 2: Vehículos eléctricos/Infraestructura de carga de vehículo eléctricos

20. ¿Qué tan familiarizado está con los siguiente?

	No familiarizado	Más o menos familiarizado	Muy familiariza
Vehículo eléctrico	○	○	○
Bicicletas eléctricas	○	○	○
Autobuses eléctricos	○	○	○

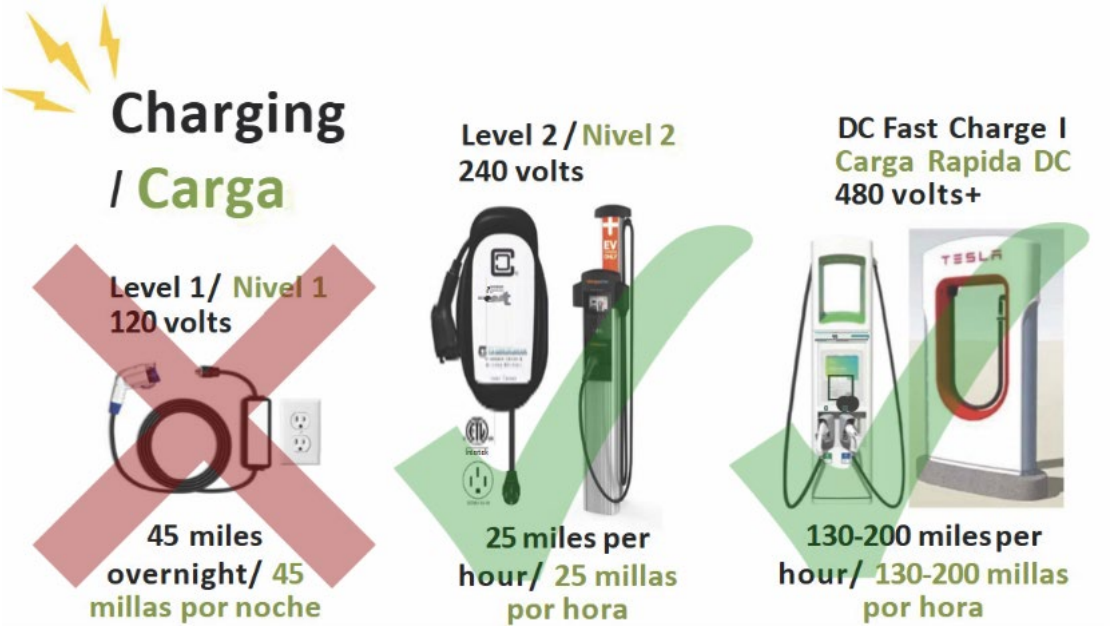
21. Con lo que sabe hoy, ¿se compraría un vehículo eléctrico?

- Sí
- No
- No estoy segura/o
- Ya compré un vehículo eléctrico

22. Con lo que sabe hoy, ¿se compraría una bicicleta eléctrica?

- Sí
- No
- No estoy segura/o
- Ya compré una bicicleta eléctrica

Para las siguientes preguntas sobre estaciones de carga de vehículos eléctricos, nos referimos exclusivamente a las estaciones de carga Nivel 2 y carga rápida de DC.



23. ¿Hay una estación de carga de vehiculos eléctricos disponible en su lugar de trabajo?

- Sí
- No
- No estoy segura/o
- Otro:

24. ¿Hay una estación de carga de vehiculos eléctricos disponible en su vivienda?

- Sí
- No

- No estoy segura/o
- Otro:

25. ¿Hay una estación de carga pública de vehículos eléctricos disponible a una milla de donde vive?

- Sí
- No
- No estoy segura/o
- Otro:

26. ¿Cuáles son algunas de las barreras que enfrenta o piensa que enfrentar al comprar un vehículo eléctrico? (Seleccione todo lo que corresponda).

- No hay estaciones de carga cerca de mí
- Preocupación acerca de la distancia que puedo viajar con una sola carga
- No tengo suficiente información sobre ellos en comparación con los vehículos de gasolina
- No conozco a nadie que tenga uno
- Demasiado caro
- Disponibilidad limitada en el mercado
- Marcas limitadas disponibles
- No estoy familiarizado con el mantenimiento en comparación con los vehículos de gas
- Me preocupa que tan seguras son las baterías
- No puedo agregar una estación de carga porque alquilo o vivo en un complejo de apartamentos
- No estoy interesado en comprar un vehículo eléctrico
- Otro:

27. ¿Qué le animaría a comprar un vehículo eléctrico? Si ya tiene un vehículo eléctrico, ¿qué le animó a comprarlo? (Seleccione todo lo que corresponda).

- Pruebas de manejo
- Aprender más sobre ellos
- Incentivos de reembolso (reciba dinero de vuelta entre 30 y 90 días después de la compra)
- Apoyo financiero (recibir descuento al momento de la compra)
- Saber que en mi vivienda habría una estación de carga para vehículos eléctricos
- Saber que en mi trabajo habría una estación de carga para vehículos eléctricos
- Tener una conexión personal con el propietario de un vehículo eléctrico
- No estoy interesado en comprar un vehículo eléctrico

- Otro:

28. ¿Qué tendría que cambiar para que usted se sienta completamente seguro acerca de la carga de vehículos eléctricos en nuestra región?

29. ¿Cuáles son las algunas de las barreras para agregar más estaciones de carga de vehículos eléctricos en su vecindario o región?

30. ¿Hay algo más que le gustaría contarnos? (Por ejemplo, cualquier cosa que no haya expresado anteriormente en la encuesta o en que areas de la comunidad le gustaría ver estaciones de carga de vehículos eléctricos)

Sección 3: Sobre Usted

31. ¿Cuál es el idioma principal que habla usted?

- Inglés
- Español
- Bilingue (Inglés/Español)
- Mixteco
- Prefiero no responder
- Otro:

32. ¿Cuál es su edad?

- Menor de 17 años
- 18-24 años
- 25-34 años
- 35-44 años
- 45-54 años
- 55-64 años
- 65-74 años
- 75 años o más

33. ¿Cuál es su raza o etnicidad? (Seleccione todo lo que corresponda).

- India americana o nativa de Alaska
- Asiática/o
- Negro o AfroAmericano
- Caucásica/o Blanca/o
- Hispana/o

- Latino/a/e/x
- Mexicana/o
- Chicano/a/e/x
- Centroamericana/o
- Sudamericana/o
- Del Medio Oriente
- Nativa hawaiana o isleña del Pacífico
- Del sur de Asia
- Preferio no responder
- Otro:

34. ¿Cuál es su identidad de género?

- Femenino
- Masculino
- No binario
- Preferio no responder
- Otro:

35. ¿Cuál es su ocupación actual?

- Estudiante
- Trabajador del sector público (incluido el gobierno, escuelas públicas)
- Trabajador de servicio
- Desempleado/a
- Trabajador/a en el area de la salud
- Trabajador/a de ventas (por ejemplo, cajero, gerente de tienda, empleado en tienda)
- En el sector de sin fines de lucro
- A Trabajador/a agricola
- Otro sector privado
- Padre/Madre/Tutor de hogar
- Otro:

36. ¿Dónde trabaja o va a la escuela? (Omita si esta pregunta no se aplica a usted)

Por favor comparte la ciudad o pueblo

37. ¿Cuál es su situación actual de vivienda?

- Soy dueña/o de mi casa
- Aquilo mi casa
- Soy dueña/o de mi apartamento

- Aquilo mi apartamento
- Vivo con familiares/amigos
- Estoy sin vivienda
- Prefiero no responder
- Otro:

38. ¿Está respondiendo esta encuesta en persona o de forma remota?

- En persona (con el personal del equipo organizando la encuesta o en un evento comunitario)
- Remoto (en línea/por internet, no en un evento comunitario o en persona)

La siguiente pregunta es solo para las personas que tomaron la encuesta en persona.

¿Le gustaría participar en una rifa de una tarjeta de regalo de $50 por su participación en esta encuesta? (Si su respuesta es "sí", comparta su información de contacto en la página siguiente para que podamos comunicarnos con usted si gana)

- Sí
- No

<u>Información de contacto</u>

Si desea recibir información sobre este proyecto y ser invitado a participar en eventos o en futuras encuestas y grupos de enfoque, complete las preguntas a continuación.

Quiero que se comuniquen conmigo sobre futuras encuestas, grupos de enfoque, eventos comunitarios y información relacionada con este proyecto

- Sí
- No

Solo me interesan las encuestas o los grupos de enfoque con compensación para participar

- Sí
- No

Nombre (optional)

Nombre		**Apellido**	

Número de teléfono (opcional)	

¿El número de teléfono anterior puede recibir mensajes de texto?

- Sí
- No

Correo electrónico (opcional) ejemplo@ejemplo.com	

Appendix C. English & Spanish Flyers

Appendix D. English & Spanish Notice Flyers

Ecology Action | Community Climate Solutions

REGENERACIÓN

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

HELP CREATE A RESILIENT FUTURE FOR OUR COMMUNITIES

Share your concerns about transportation in your community

HEADS UP! Our team will be available to support with survey completion at:

For any questions you may contact Maria Perez at 831-223-3427 or Maria@regenerationpajarovalley.org

Ecology Action | Community Climate Solutions

REGENERACIÓN

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Ecology Action | Community Climate Solutions

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

AYUDE A CREAR UN FUTURO FUERTE Y ESTABLE PARA NUESTRAS COMUNIDADES.

Comparta sus preocupaciones sobre el transporte en su comunidad

¡ATENCIÓN! Nuestro equipo estará disponible para ayudarle a completar la encuesta en:

Si tiene alguna pregunta, puede contactar a Maria Perez al o 831-223-3427 en Maria@regenerationpajarovalley.org

Ecology Action | Community Climate Solutions

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

AYUDE A CREAR UN FUTURO FUERTE Y ESTABLE PARA NUESTRAS COMUNIDADES.

Comparta sus preocupaciones sobre el transporte en su comunidad

¡ATENCIÓN! Nuestro equipo estará disponible para ayudarle a completar la encuesta en:

Si tiene alguna pregunta, puede contactar a Maria Perez al o 831-223-3427 en Maria@regenerationpajarovalley.org

Appendix E. List of Outreach Events

Events attended by Ecology Action and Regeneración

Date	Event Name	Community
3/1/2025	Pajaro Health Fair - PVPSA	Pajaro Park
3/7/2025	Farmers Market	Watsonville Plaza
3/12/2025	Cafecito Wednesday	Cabrillo Watsonville Campus
3/15/2025	Freedom Laundry & Crystal Laundry	Watsonville
3/21/2025	Watsonville Public Library	Watsonville
4/2/2025	Farmers Market	Santa Cruz
4/4/2025	Romo Park	Watsonville Plaza
4/5/2025	Gonzales Car Show	Gonzales
4/6/2025	Casa de la Cultura - Regeneración's Climate of Hope Fair	Pajaro
4/12/2025	Seaside Moonflower Festival	Seaside
4/13/2025	Farmers Market	Live Oak
4/16/2025	Essential Resource Fair	Cabrillo Watsonville Campus
4/17/2025	Downtown	Hollister
4/19/2025	Salinas EV Ride & Drive	Salinas
4/19/2025	Earth Day Festival	Live Oak
4/22/2025	Earth Day	Cabrillo Aptos
4/23/2025	Earth Day	Cabrillo Watsonville Campus
4/27/2025	Earth Day	Watsonville Plaza
5/4/2025	Cinco de Mayo	Watsonville Plaza

Date	Event Name	Community
5/7/25	Gavilan College	Hollister
5/11/2025	Salinas Mall Tabling	Salinas
5/16/2025	Salinas Mall Tabling	Salinas
5/20/2025	Santa Lucia Elementary School	King City
5/20/2025	Adult Education School	Watsonville
5/20/2025	Adult Education School	Watsonville
5/26/2025	Pajaro Neighborhood Outreach	Pajaro
5/27/2025	Greenfield Food Distribution	Greenfield
5/27/2025	Adult Education School	Watsonville
5/27/2025	Adult Education School	Watsonville
5/27/2025	Adult Education School	Watsonville
5/28/2025	Adult Education School	Watsonville
5/28/2025	Adult Education School	Watsonville
5/29/2025	Soledad Traffic Meeting	Soledad
5/29/2025	Pajaro Neighborhood Outreach	Pajaro
5/31/2025	Greenfield Field Day	Greenfield
6/1/2025	Door to Door Outreach	Las Lomas
6/3/2025	Pajaro Neighborhood Outreach	Pajaro
6/3/2025	Adult Education School (Citizenship Class)	Watsonville
6/3/2025	Adult Education School (ESL Class)	Watsonville

Date	Event Name	Community
6/4/2025	King City Food Distribution	King City
6/5/2025	Pajaro Neighborhood Outreach	Pajaro
6/8/2025	Las Lomas Market	Las Lomas
6/9/2025	Soledad Food Distribution	Soledad
6/11/2025	North Monterey County – Safe Routes to School	North Monterey County
6/12/2025	Salinas (Hebron Family Center) Food Distribution	Salinas
6/12/2025	Chualar Food Distribution	Chualar
6/13/2025	Hall District Elementary /Food Distribution	Las Lomas
6/13/2025	Outreach to connections in the Live Oak community.	Live Oak
6/15/2025	Pajaro Neighborhood Outreach	Pajaro
6/18/2025	Gonzales Food Distribution	Gonzales
6/18/2025	Outreach to connections in the Live Oak community.	Live Oak
6/20/2025	Salinas (Luthern Church) Food Distribution	Salinas
6/20/2025	Outreach to connections in the Live Oak community.	Live Oak

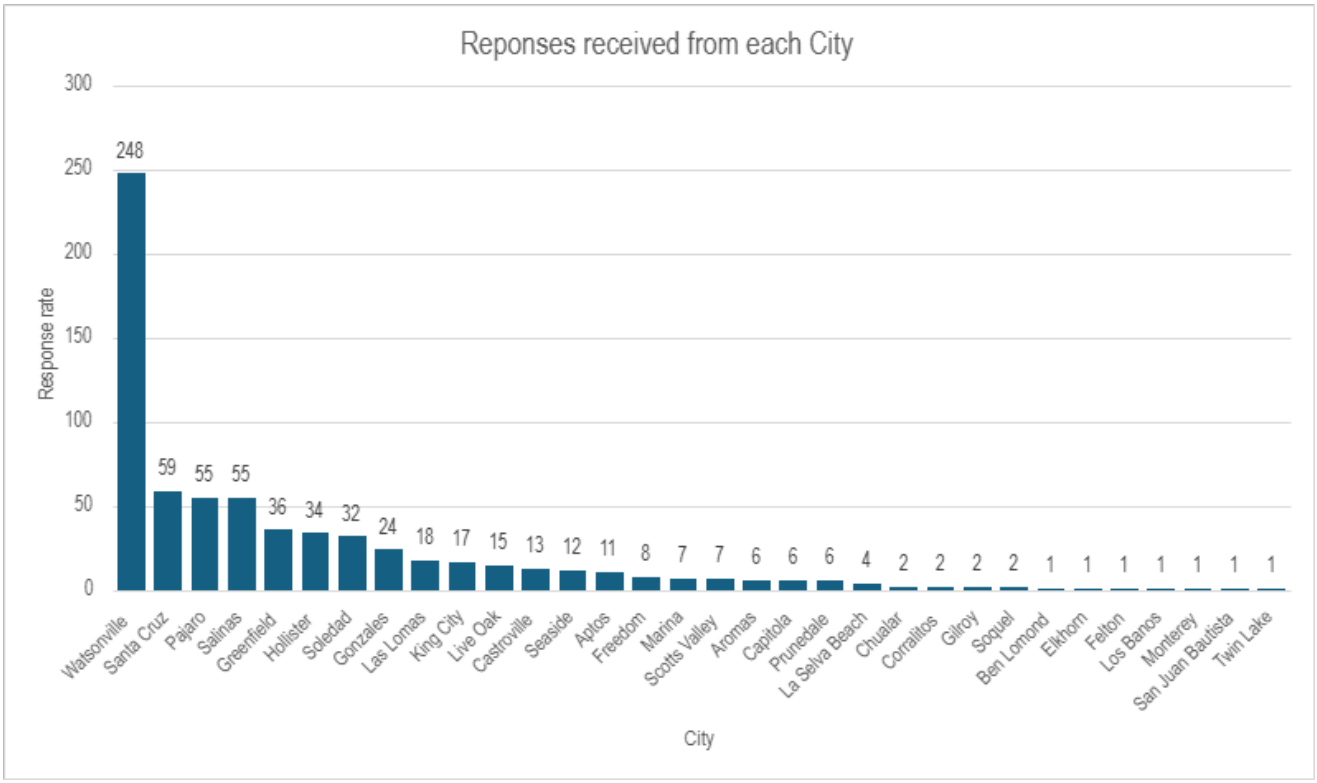
Date	Event Name	Community
6/21/2025	Pajaro Neighborhood Outreach	Pajaro
6/26/2025	Outreach to connections in the Live Oak community.	Live Oak
6/26/2025	Pajaro Neighborhood Outreach	Pajaro
6/27/2025	Outreach to connections in the Live Oak community.	Live Oak
6/27/2025	Outreach to connections in the Live Oak community.	Live Oak
6/28/2025	Pajaro Neighborhood Outreach	Pajaro
6/29/2025	Pajaro Neighborhood Outreach	Pajaro
7/1/2025	Hollister Super #2 , Granny Wash Laundry, and McCarthy Park.	Hollister
7/2/2025	Hollister County Library	Hollister

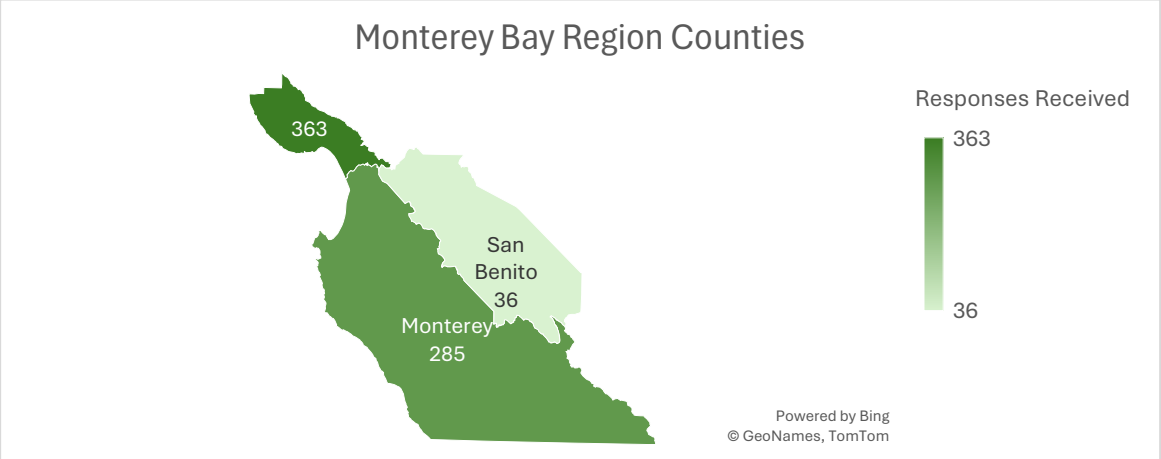
Events attended by Proyecto Mixteco

MIXTECO		
Date	**Event Name**	**Community**
6/6/2025	Watsonville Plaza	Watsonville
6/7/2025	Pajaro Park	Pajaro
6/8/2025	Pajaro Market & Laundry	Pajaro
6/13/2025	Watsonville Plaza	Watsonville
6/14/2025	Pajaro Park	Pajaro
6/14/2025	Vallarta Supermarket	Watsonville
6/15/2025	Watsonville Plaza	Watsonville
6/27/2025	Watsonville Plaza	Watsonville
7/4/2025	Watsonville Plaza	Watsonville
7/5/2025	Vallarta Supermarket	Watsonville

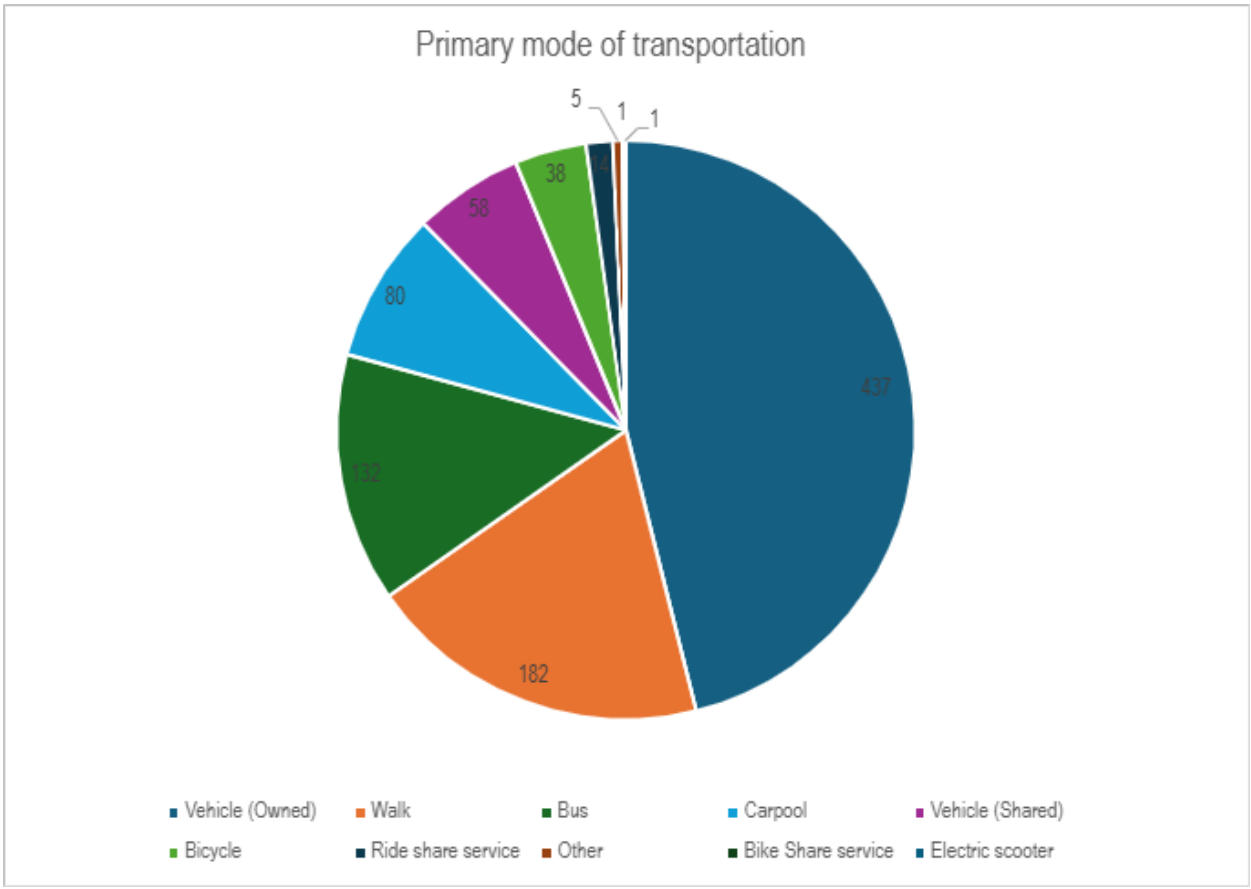
Appendix F. All Graphs Showcasing Results

Questions 1 & 2

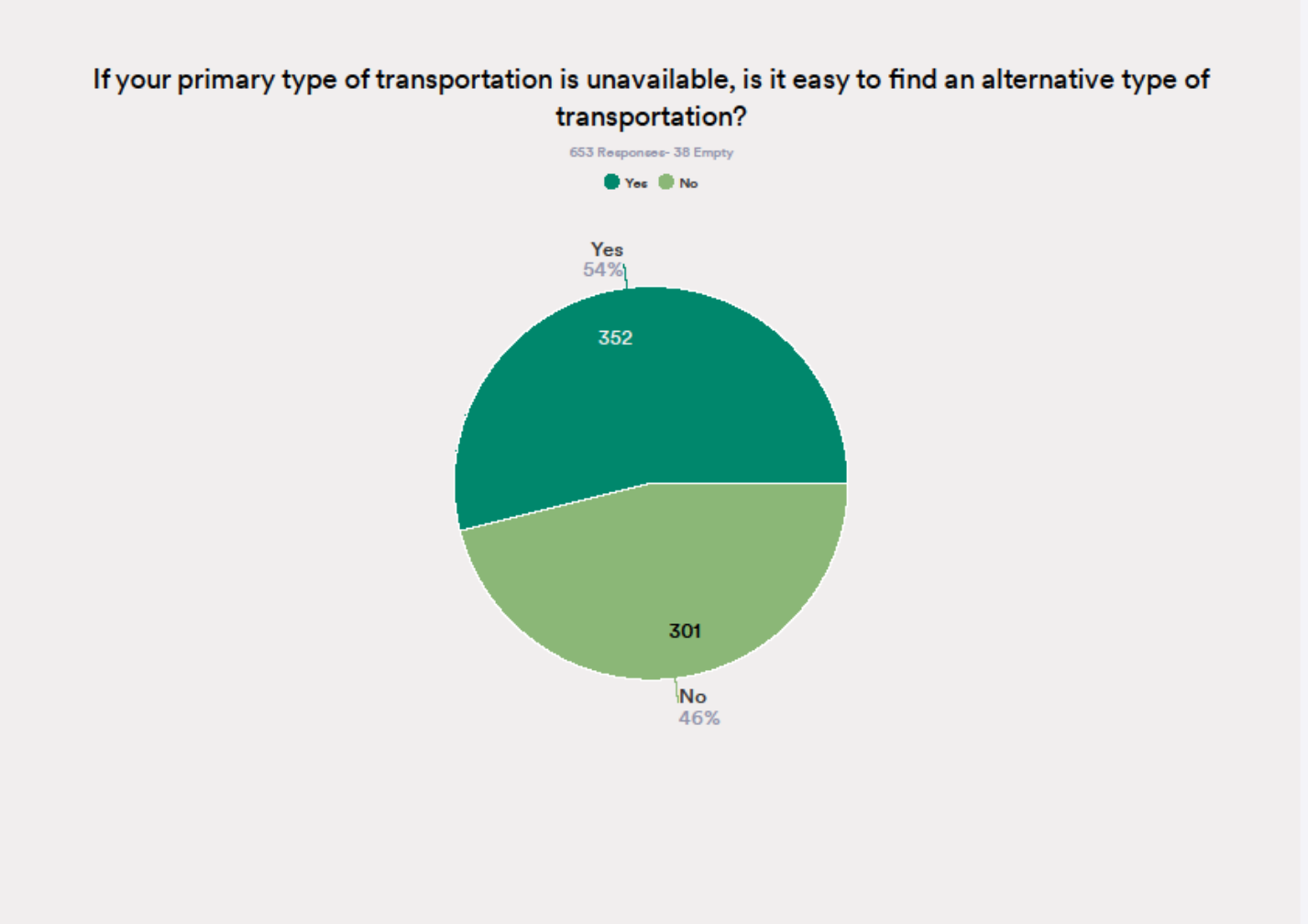




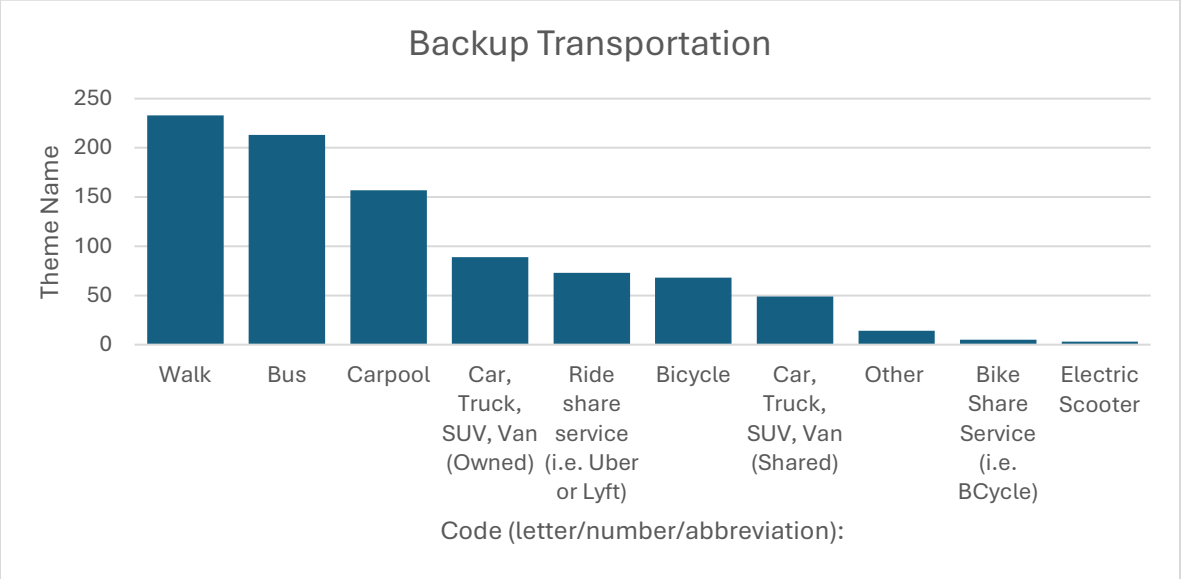
Question 3. How do you usually get to where you need to go?



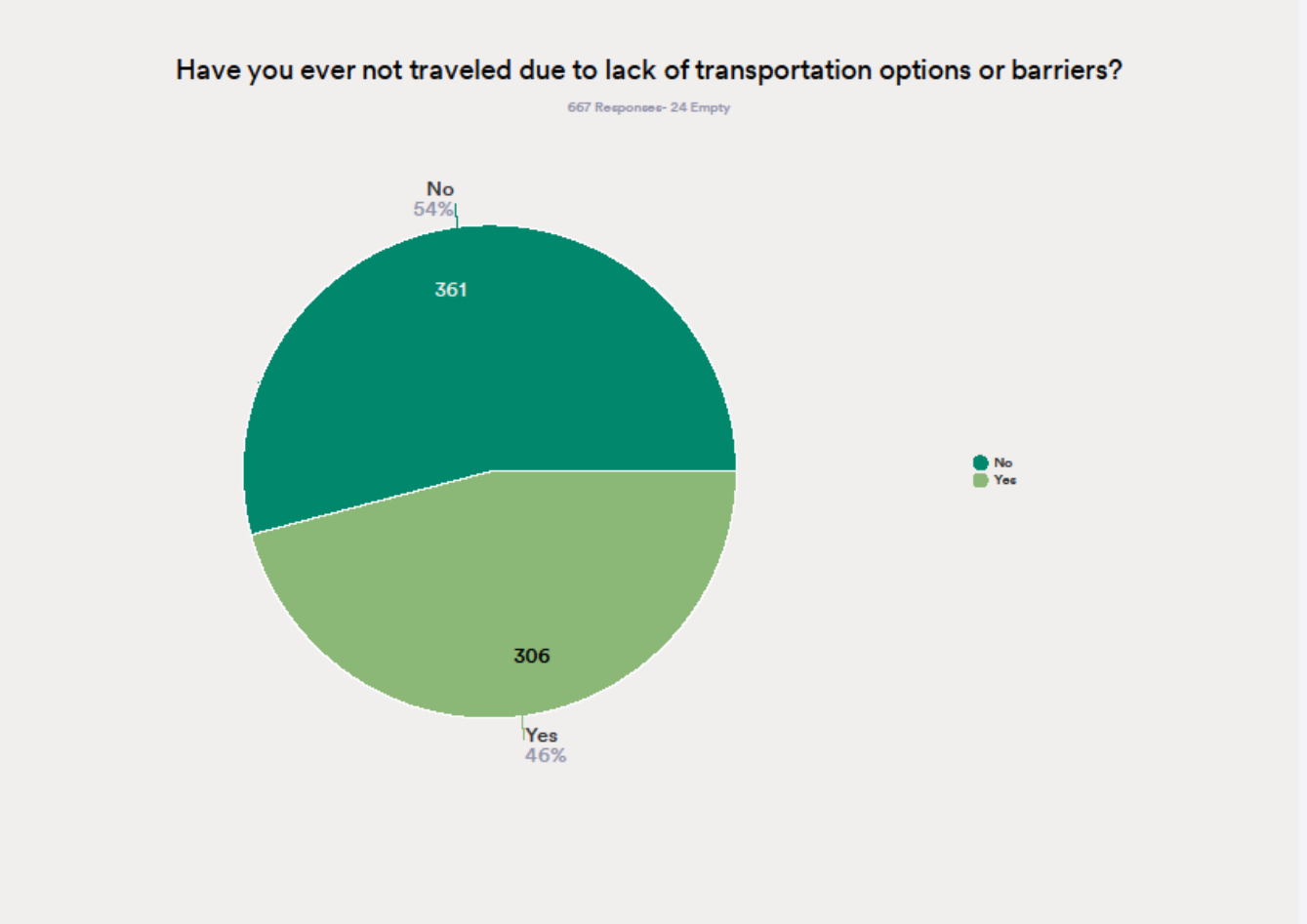
Question 4.


If your primary type of transportation is unavailable, is it easy to find an alternative type of transportation?
653 Responses- 38 Empty
Yes
No
Yes
54%
352
301
No
46%

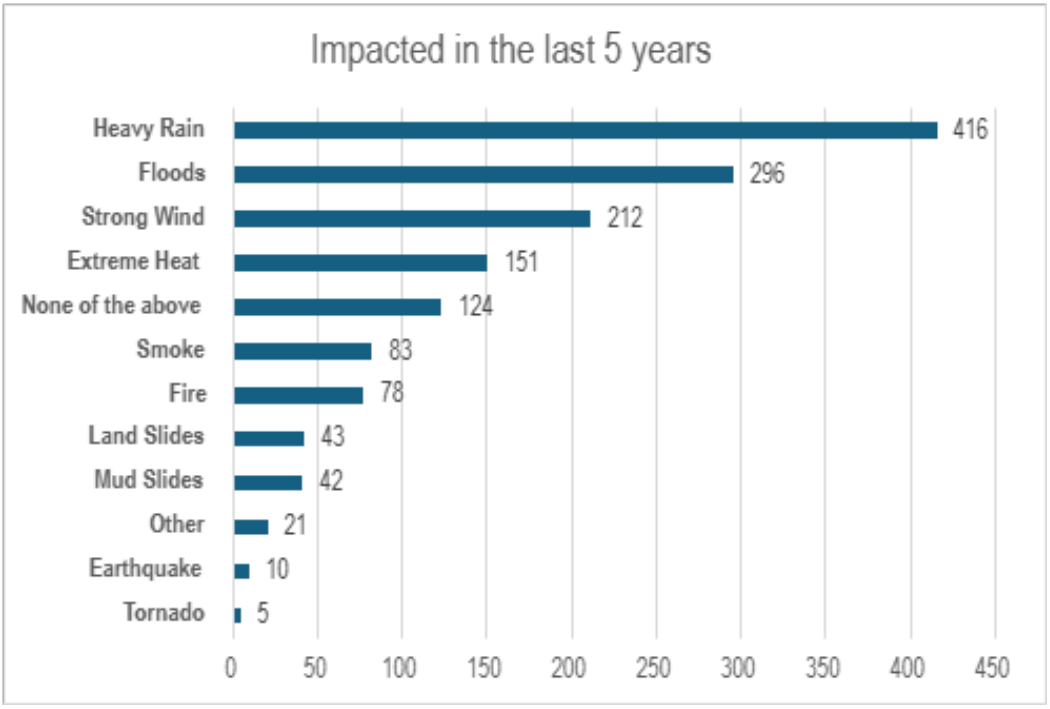
Question 5.



Question 6.



Question 8.



Question 9. Challenges faced as a Car, Truck, SUV, Van user?

Code (letter/number/abbreviation):	**Theme Name**	**Tallies (# of times it appears)**
A	Too Expensive (i.e. car repairs, gas, car insurance)	333
D	I get stuck in traffic	210
B	This does not apply to me	182
F	Difficulty finding parking	156
E	I don't face any challenges	67
C	Other	17

Question 10. Challenges faced as a bicycle, bike share user?

Response:	**Theme Name**
This does not apply to me	402
I feel unsafe due to lack of infrastructure (i.e sidewalks, crosswalks, protected bike lanes)	108
Cars drive too fast for me to feel safe	103
I don't face any challenges	60
Difficult to navigate due to a disability	22
Bike/scooter isn't working	19
Too expensive (i.e bike share service costs, bike repair costs)	18
Other	15
I don't know how to use (A)	13

Question 11. Challenges as a bus user?

Answer	**Response Rate**
This does not apply to me	258
The bus ride takes too long	164
The bus does not arrive on time	135
The bus does not take me where I need to go	131
Buses don't come frequently enough	104

Question 12. Challenges as a walker?

Response	Tallies
Cars drive too fast for me to feel safe	260
I feel unsafe due to lack of infrastructure (i.e. sidewalks, crosswalks, streetlights)	259
This does not apply to me	141
I don't face any challenges	120
Other	71
Difficult to navigate due to a disability	35

Question 13. Challenges as a ride share user?

Theme Name	Tallies (# of times it appears)
This does not apply to me	358
Too expensive (paying for rides)	96
I don't face any challenges	58
Unreliable	40
Difficult to navigate/difficulty for multiple rides	18
I feel unsafe with drivers	11
Difficulty navigating rideshare apps	0

Question 14.Challenges as someone who carpools?

Response	Tallies
This does not apply to me	275
Limited schedule flexibility	145
Difficult to arrange	141
I don't face any challenges	87
Too expensive (paying for rides)	61
Unreliable	56
I feel unsafe with drivers	28
Other	11

Question 15. What mode of transportation do you find to be the most reliable?

Response	Tally
Car, Truck, SUV, Van (owned)	429
Bus	89
Walk	64
Carpooling	48
Car, Truck, SUV, Van (shared)	34
Bicycle	22
Ride share service (i.e Uber/Lyft)	11
Other	6

Bike shre service (i.e Bcycle)	2
Electric scooter	1

Question 16. If all barriers were reduced or eliminated, what would your preferred transportation option?

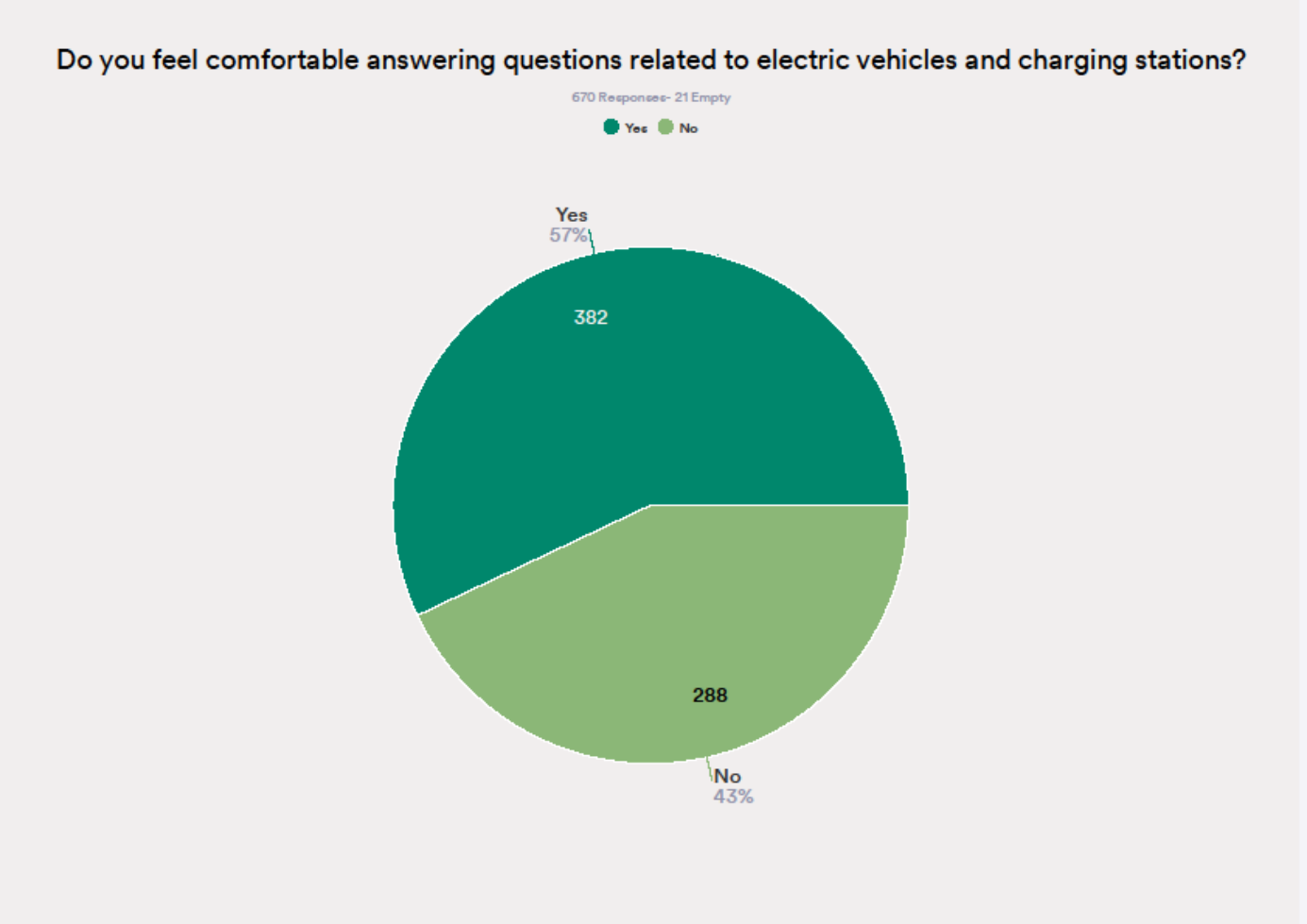
Response	Tally
Car, Truck, SUV, Van (owned)	322
Bus	142
Walk	68
Bicycle	63
Carpooling	29
Car, Truck, SUV, Van (shared)	20
Ride share service (i.e Uber or Lyft)	19
Other	15
Electric scooter	7
Bike share service (i.e. BCycle)	2

Question 17. Which mode of transportation do you find the safest?

Response	Tally
Car, Truck, SUV, Van (owned)	429
Bus	124
Walk	49
Carpooling	28
Car, Truck, SUV, Van (shared)	22
Ride share service (i.e Uber/Lyft)	11
Other	7

Bicycle	6
Bike share service (i.e BCycle)	1
Electric scooter	1

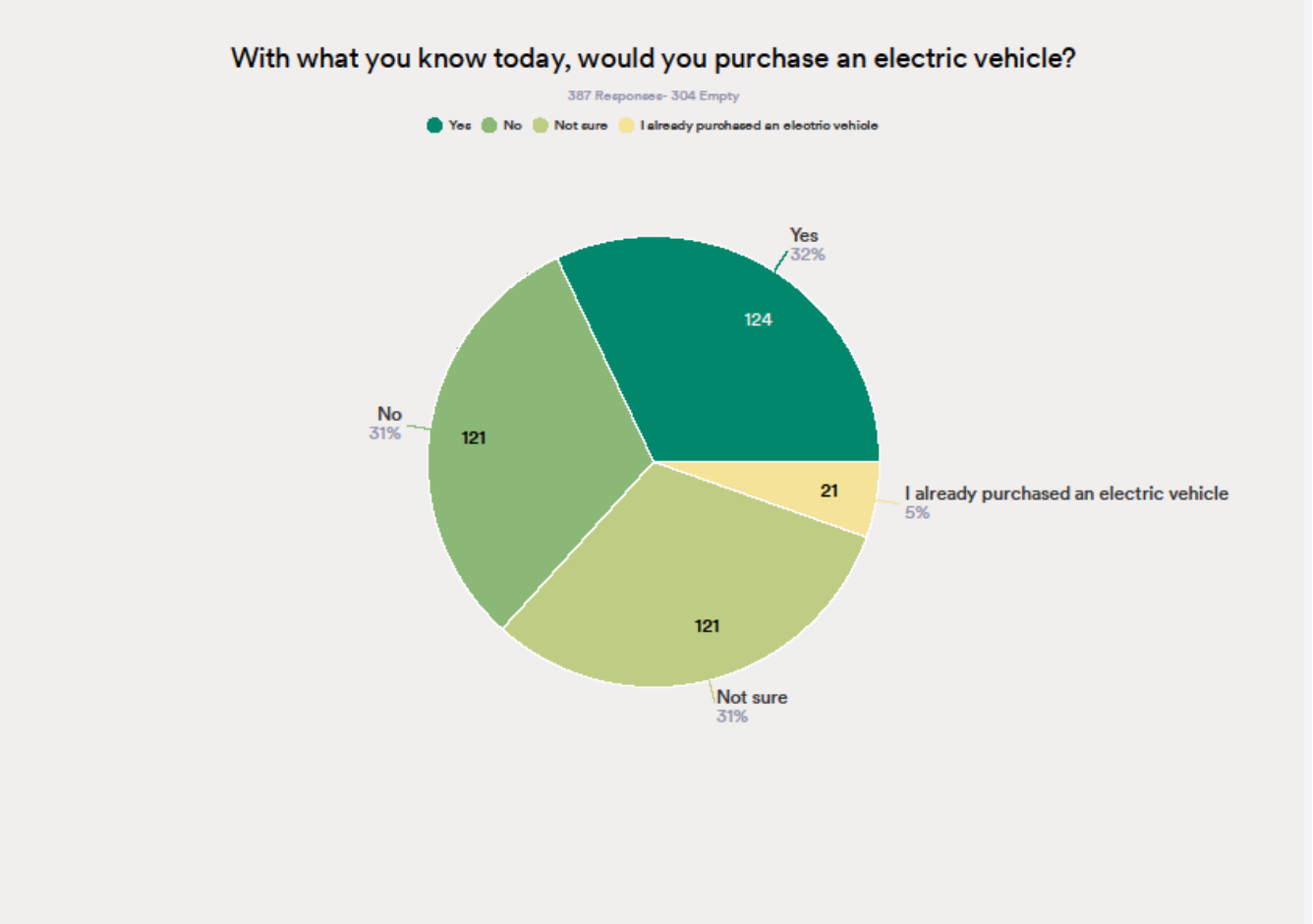
Question 19.



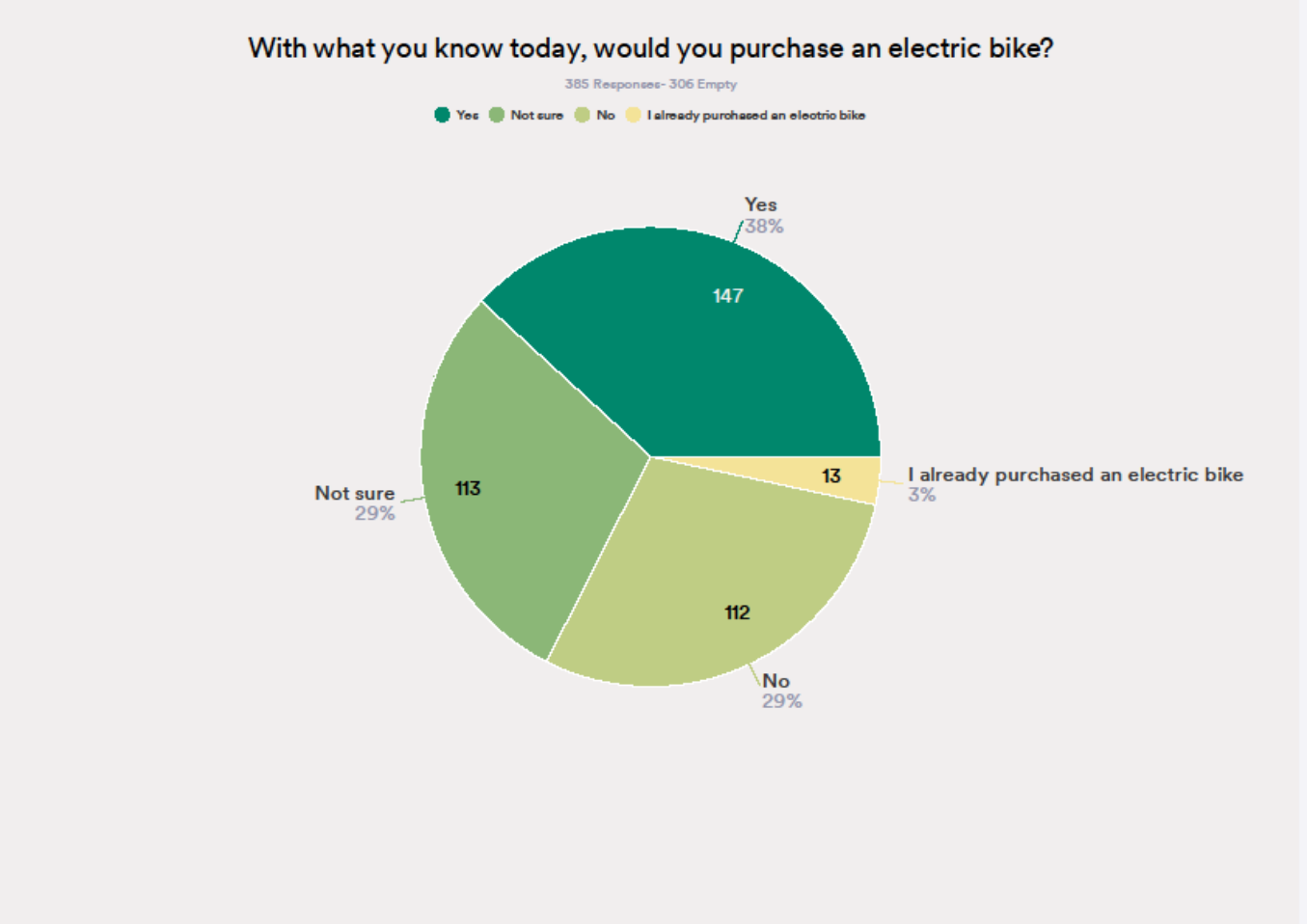
Question 20.

How familiar are you with the following?			
	Not Familiar	Somewhat Familiar	Very Familiar
Electric Cars	152	146	68
Electric Bikes	158	126	60
Electric Buses	209	98	31

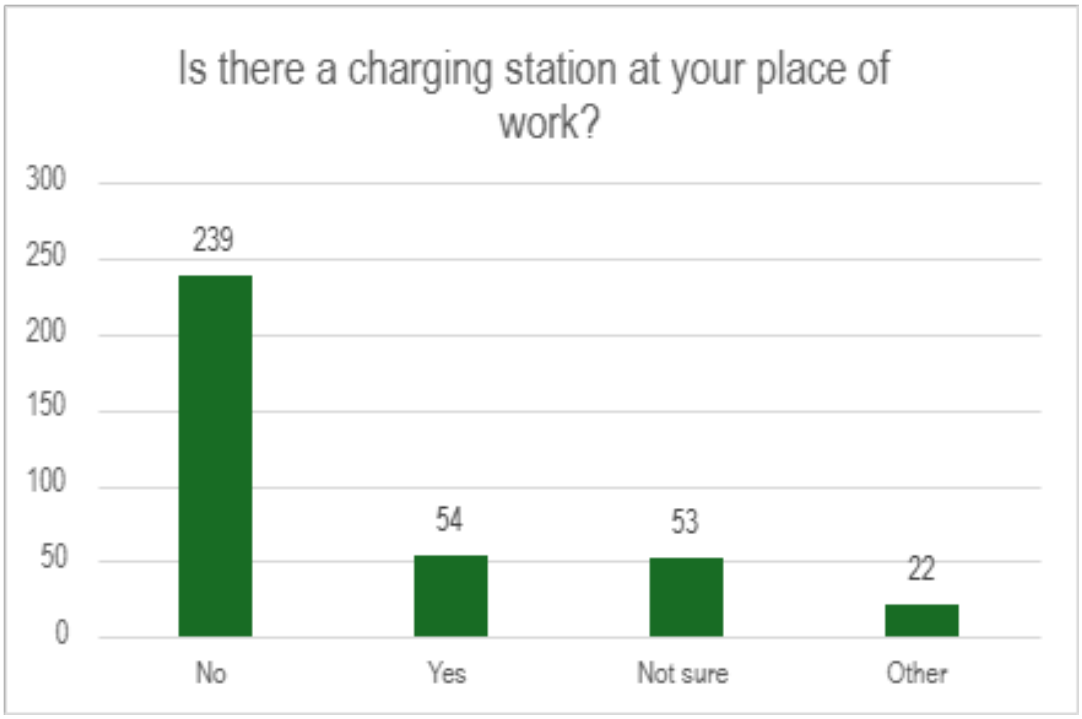
Question 21.



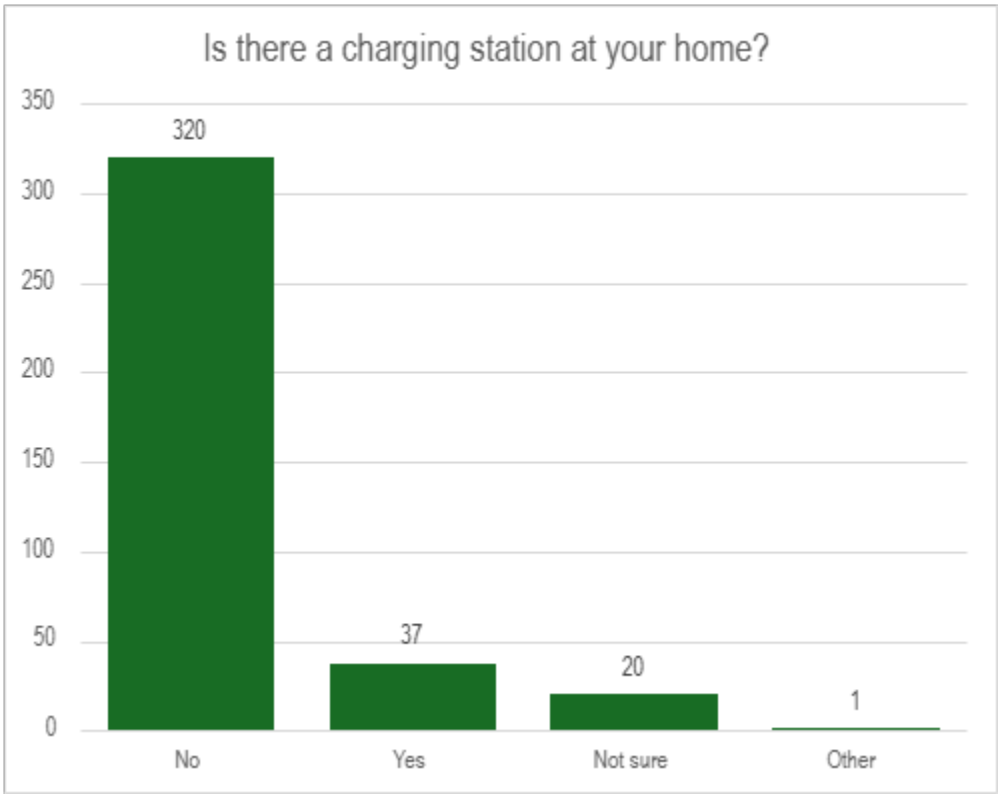
Question 22.


With what you know today, would you purchase an electric bike?
385 Responses- 306 Empty
Yes
Not sure
No
I already purchased an electric bike
Yes
38%
147
Not sure
29%
113
13
I already purchased an electric bike
3%
112
No
29%

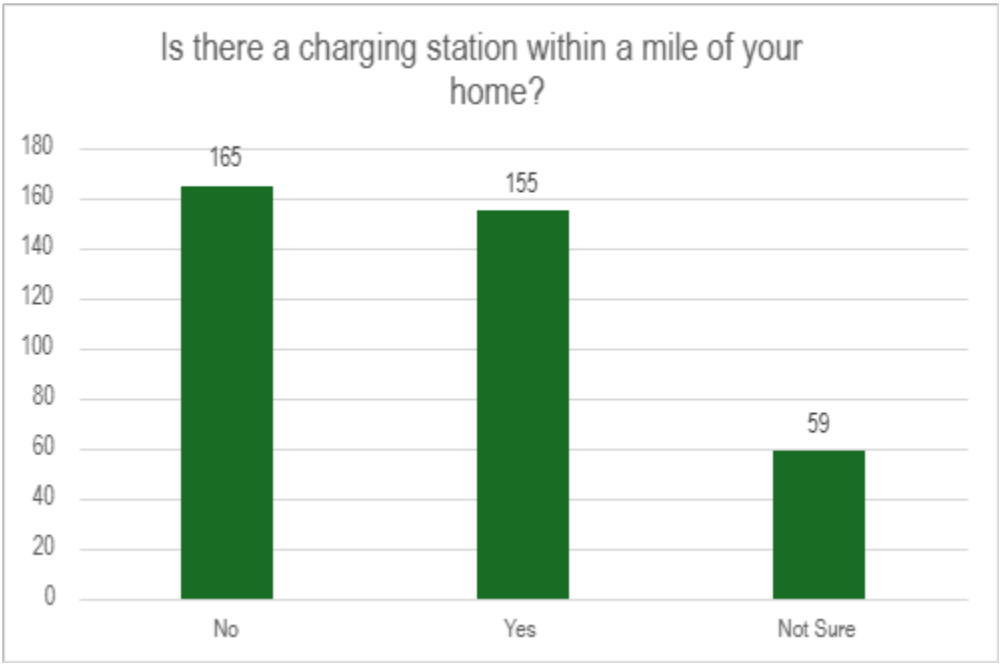
Question 23.



Question 24.



Question 25.



Question 26. What are some barriers you face or expect to face if purchasing an electric vehicle?

Answer	Response Rate
No stations near me	132
Concerns with range of the car	177
Don't have same knowledge as gas vehicles	113
I don't know anyone who has one	78
Too expensive	144
Limited availability in market	28
Limited brands available	33

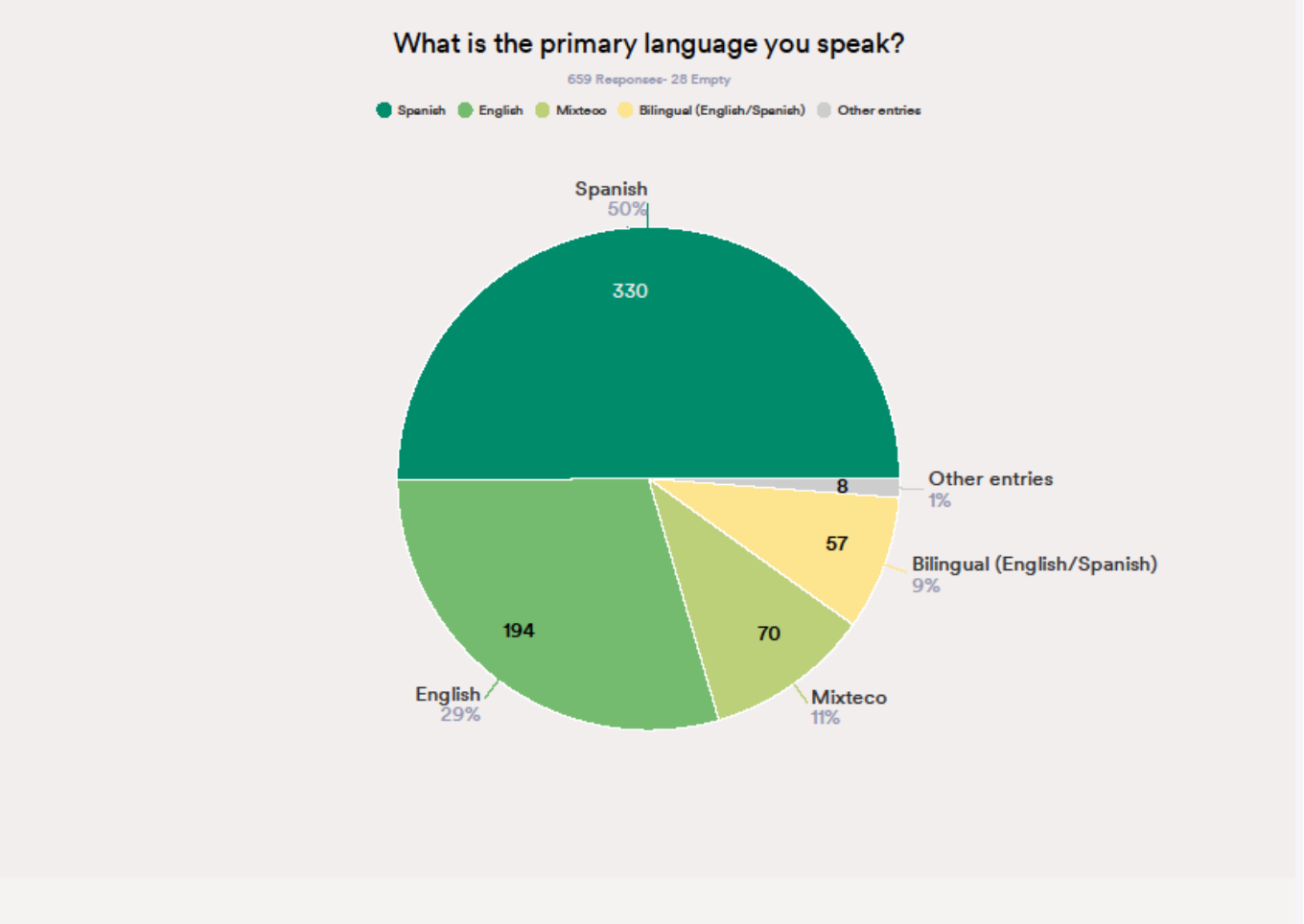
Unfamiliar with maintenance compared to gas vehicles	104

Question 27. What would encourage you to purchase an electric vehicle? If you already own an electric vehicle, what encouraged you to purchase one?

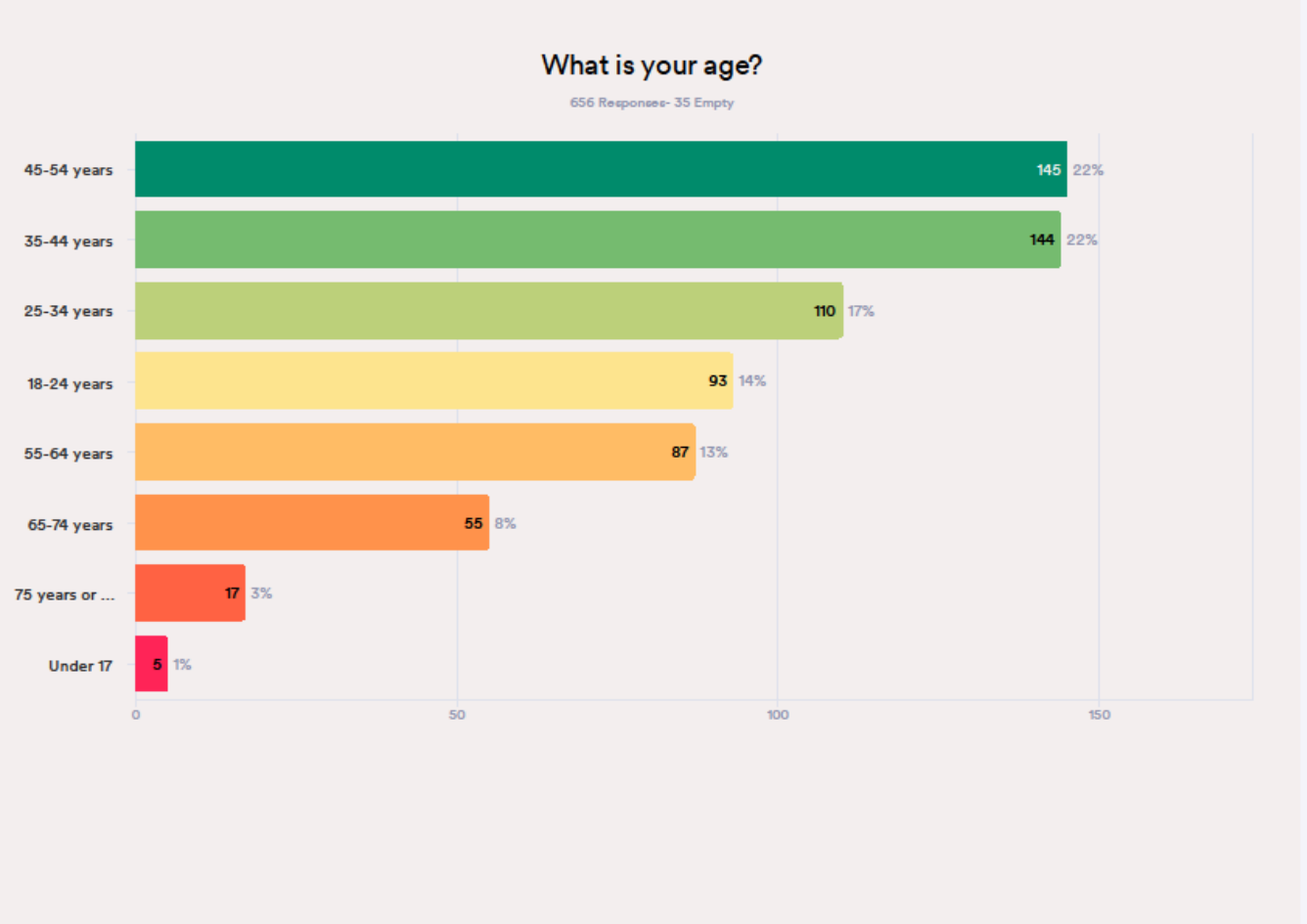
Answer	Response Rate
Test drives	57
Learning more about them	164
Rebate incentives (receive money back 30-90 days after purchase)	118
Grant incentives (receive discount at time of purchase)	163
Knowing that an electric vehicle charging station would be available at my work	70
Having a personal connection with an electric vehicle owner	30
I am not interested in purchasing an electric vehicle	78
Knowing that an electric vehicle charging station would be available at my home	99

Other	20

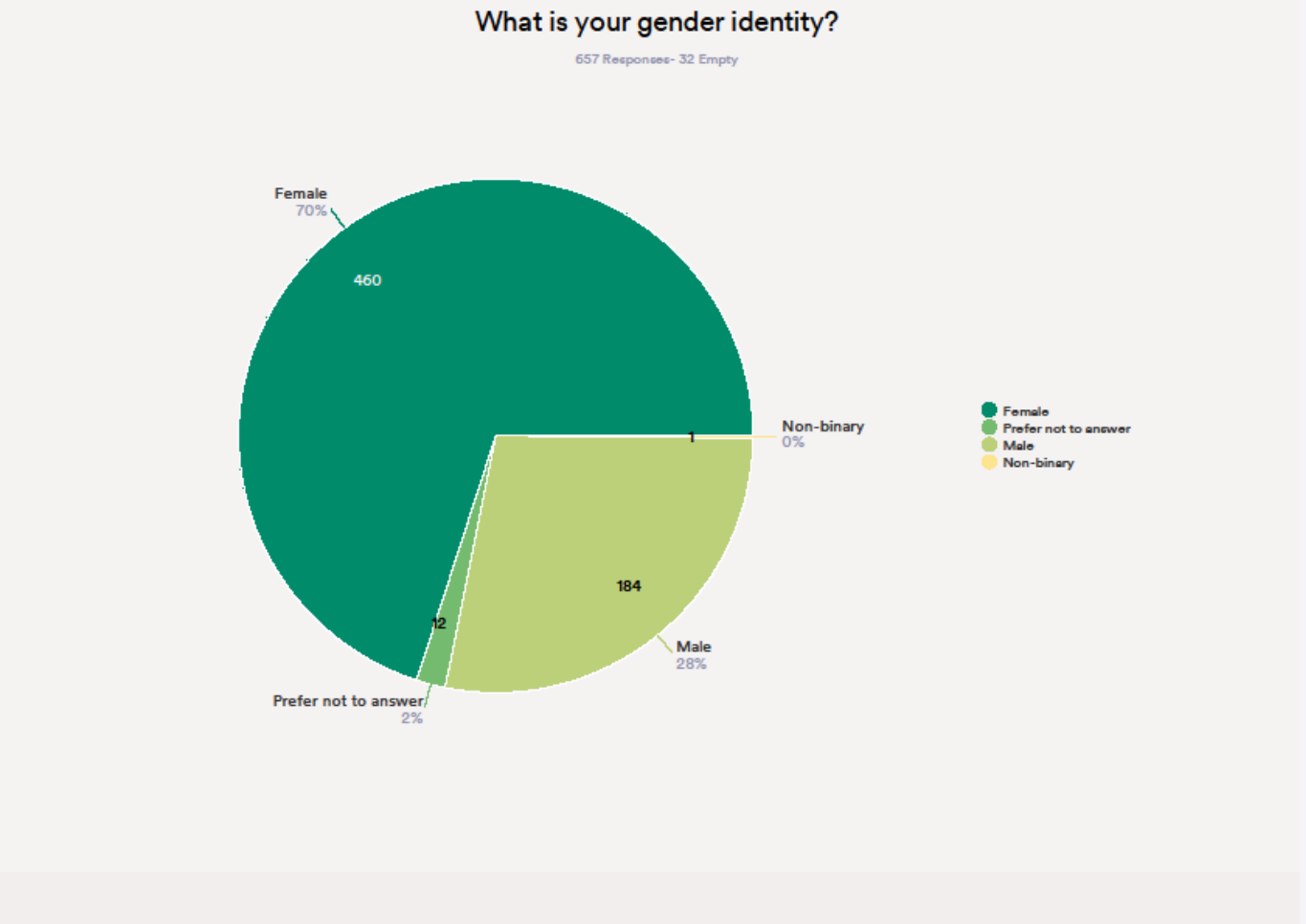
Question 31.



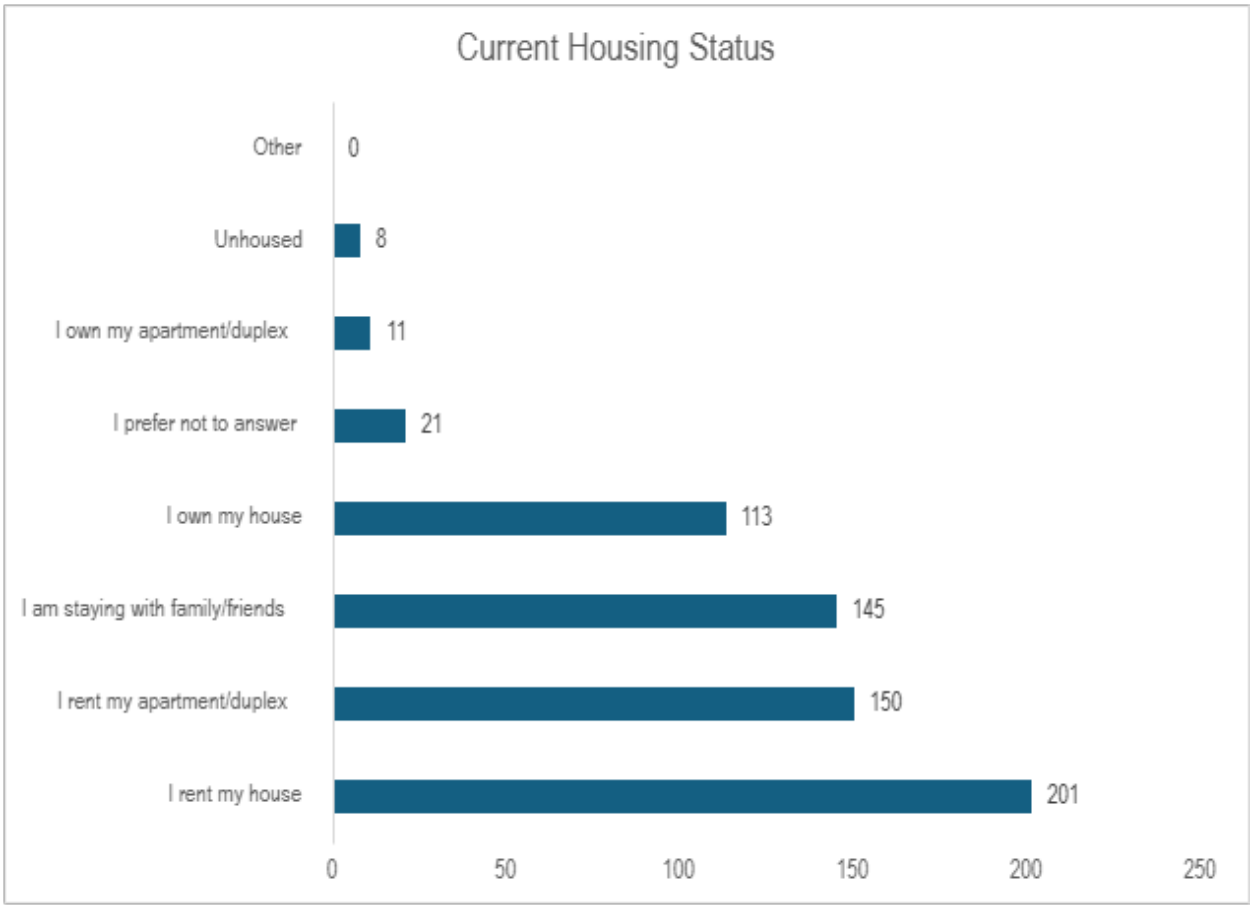
Question 32.


What is your age?
656 Responses- 35 Empty
45-54 years
145
22%
35-44 years
144
22%
25-34 years
110
17%
18-24 years
93
14%
55-64 years
87
13%
65-74 years
55
8%
75 years or ...
17
3%
Under 17
5
1%
0
50
100
150

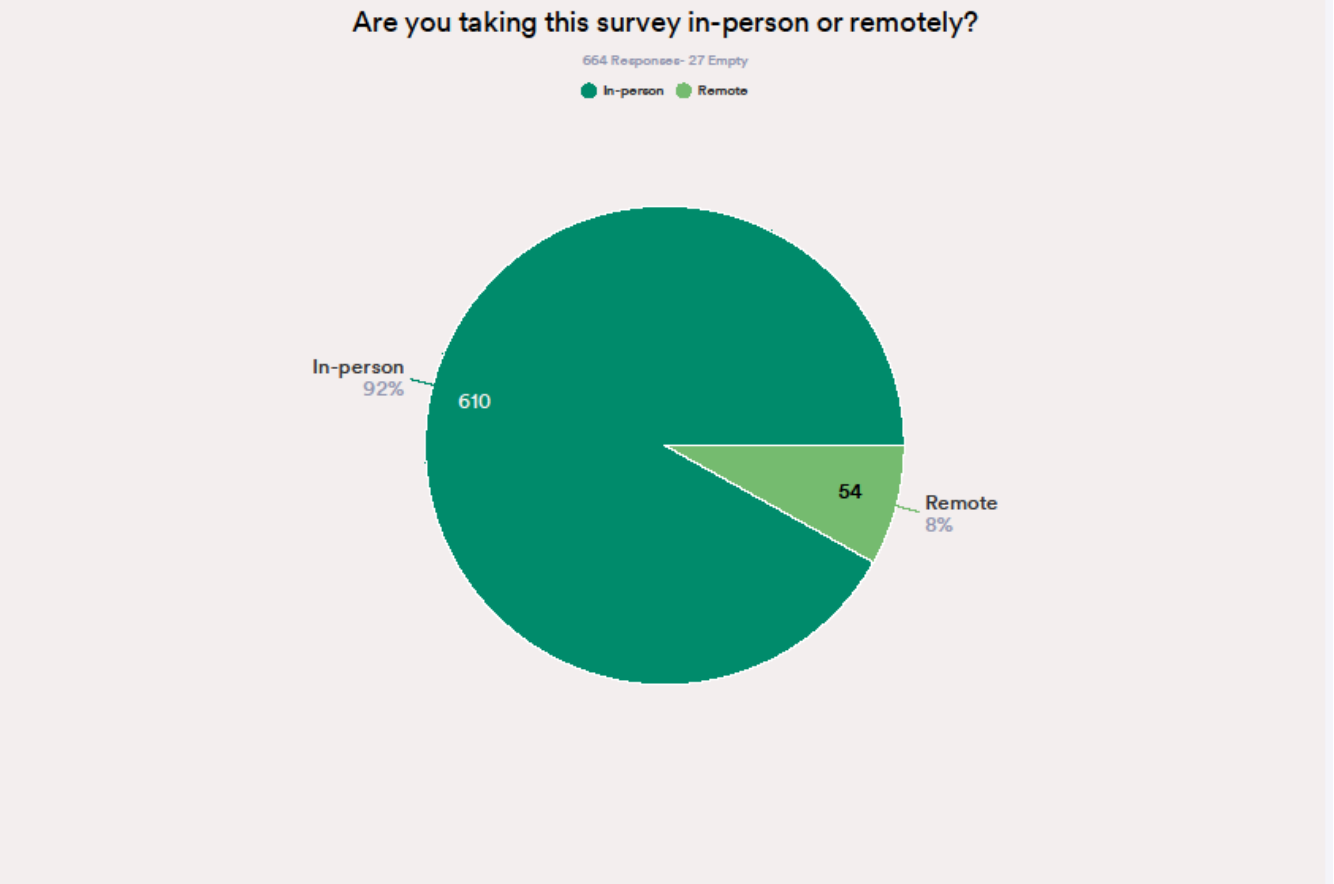
Question 34.


What is your gender identity?
657 Responses- 32 Empty
Female
70%
460
Non-binary
0%
1
184
12
Male
28%
Prefer not to answer
2%
Female
Prefer not to answer
Male
Non-binary

Question 37.


Current Housing Status
Other
0
Unhoused
8
I own my apartment/duplex
11
I prefer not to answer
21
I own my house
113
I am staying with family/friends
145
I rent my apartment/duplex
150
I rent my house
201
0
50
100
150
200
250

Question 38.


Are you taking this survey in-person or remotely?
664 Responses- 27 Empty
In-person
Remote
In-person
92%
610
54
Remote
8%

Appendix D

Padlet Summary: Monterey Bay Area Electric Vehicle (EV) Charging Network Feedback

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

Padlet Summary: Monterey Bay Area Electric Vehicle (EV) Charging Network Feedback

Executive Summary

As part of the Monterey Bay Area Electric Vehicle Climate Adaptation and Resiliency Framework project, AMBAG conducted a regionwide, map-based outreach effort to gather public input on existing, planned, and potential EV charging locations across San Benito, Monterey, and Santa Cruz counties. Community input and feedback gathered will be used to inform AMBAG's EV CAR Framework, including the development of potential adaptation and resiliency strategies.

The Padlet featured 214 existing EV charging sites and 49 planned sites for review. Community members submitted a total of **42 comments**, **314 upvotes**, **11 downvotes**, and **286 suggestions for new charging locations**, demonstrating strong public interest in both improving the current network and shaping future investments. Trends in engagement showed an uneven distribution of input provided with more from coastal, affluent areas and less from the inland areas including Salinas Valley.

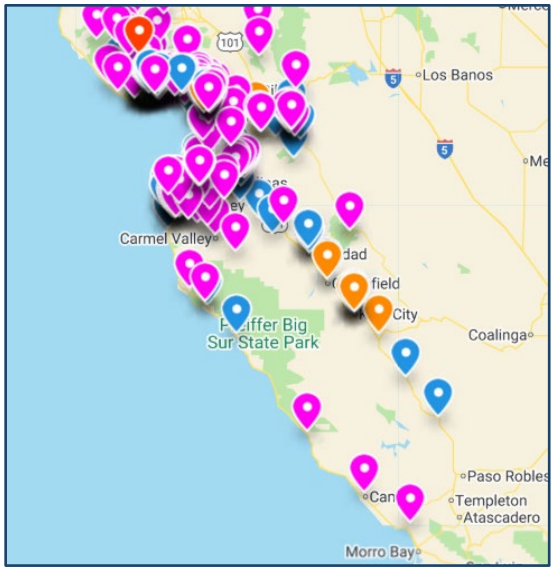
Feedback on existing charging sites showed general support for chargers in downtown and commercial areas, with 30 sites receiving upvotes and only three sites receiving downvotes related to significant operational failures such as broken or removed chargers. Comments highlighted recurring issues with reliability, maintenance, slow charging speeds, and insufficient capacity, as well as broader user experience needs including amenities and accurate mapping.

Planned EV charging sites received strong support and no downvotes, with the most positive feedback concentrated at public and recreational destinations such as parks, libraries, and waterfront areas. Comments on planned sites focused primarily on coordination, timeline updates, and data clarification, rather than opposition.

Community-suggested sites generated the highest level of engagement, with 286 locations proposed and 68 sites receiving two or more upvotes, particularly at major commercial centers, recreational and tourist destinations, and educational campuses. Across suggested sites, users emphasized the need to replace unreliable chargers, prioritize open-access networks, provide sufficient charger capacity, and locate chargers where people already visit, gather, and spend time.

Background

The Monterey Bay Area Electric Vehicle Climate Adaptation and Resiliency (EV CAR) Framework is a regional effort led by the Association of Monterey Bay Area Governments (AMBAG) to plan for a more robust and resilient network of electric vehicle (EV) charging stations across San Benito, Monterey, and Santa Cruz counties. The Framework aims to address existing gaps in EV charging infrastructure, identify evolving and future needs, and integrate climate resilience into regional planning and investment decisions.



The Padlet activity, which launched on November 5, 2025 and closed on December 31, 2025, aimed to gather input and feedback from current and prospective EV drivers on existing EV charging stations, planned EV charging sites, and suggestions for new EV charging locations.

Participants shared feedback on specific sites using reaction buttons (like/upvote and dislike/downvote) to indicate their overall experience and level of satisfaction or support with additional feedback shared through comments. Participants also suggested new EV charging station locations by adding new pins to the map and providing optional details such as reasons for the suggestion, expected demand, charger type, number of chargers, and preferred EV charging networks.


FINDING A CHARGE

Energy infrastructure officials want your opinion

An outreach guide with sample language and graphics was shared with the project's advisory committee, the Monterey Bay Area Regional Climate Project Working Group (RCPWG), the Monterey Bay Area Climate Justice Collaborative (MBACJC), and additional partners across the region.

This opportunity was featured in the Monterey Herald's December 7th issue (pictured left) and by numerous jurisdictions through social media and/or newsletters, including City of Capitola and City of Monterey.

Please note that this summary is intended to be reviewed alongside the Padlet where community input is captured directly.

Feedback on Existing EV Charging Sites

Community members were invited to provide feedback on **214 existing EV charging sites**, which were identified through the U.S. Department of Energy's Alternative Fuels Data Center as of December 9th, 2024. Most of the public charging landscape in the region is centralized around urban-dense cities such as Santa Cruz, Monterey, and Salinas, and along the major highways such as the US-101 and coastal routes along Highway 1.

What's Working

30 sites received upvotes from community members, ranging from one to three upvotes each. Feedback suggests that while many sites are functioning adequately, respondents are especially supportive of chargers located in downtown and commercial areas within more coastal and affluent areas. Locations that received two or more upvotes each include:

- New Leaf Santa Cruz
- Monterey Downtown Garage West
- Santa Lucia Square
- Pacific Grove City Lot 2 (16th Ave)
- Del Monte Shopping Center

What's Not Working

3 sites received one downvote each with the following comments revealing serious operational issues:

- Capitola DMV: Chargers reported to be broken for months.
- Joyce Vineyards: Reported as no longer having EV chargers.
- Whole Foods Market: Limited functionality with only one working charger despite high demand at the location.

Key Themes from Comments

A total of **10 comments** were provided on existing charging sites, shedding insight on a recurring theme of charger reliability and maintenance:

- Multiple respondents noting chargers that were frequently broken or unavailable.
- Slow charging speeds and insufficient capacity, particularly at busy locations such as shopping centers and libraries, where chargers were described as "absurdly slow" or consistently occupied.
- Several comments call attention to broader user experience issues such as the need for additional chargers during peak periods, better amenities for drivers waiting to charge (e.g., restrooms), and more accurate mapping of charger locations.

Feedback on Planned EV Charging Sites

A total of **49 planned EV charging sites** were included in the Padlet map for feedback, which were identified based on the Santa Cruz County Monterey Bay Charging and Fueling Infrastructure Discretionary Grant Program (CFI) award. It is important to note that the list of planned EV charging sites is not comprehensive as several jurisdictions indicated additional planned sites that are not included in the Padlet map or this summary.

Overall, planned EV charging sites received strong support, with many upvotes and no downvotes, indicating broad community approval for proposed investments.

Highest Positive Feedback

14 planned sites received one or more upvotes from community members, each of which included four or more Level 2 chargers. The following four sites received two or more upvotes, demonstrating public interest in additional chargers at public facilities and recreational destinations.

- Pinto Lake Park in Watsonville (highest)
- Cannery Row Parking Lot
- Freedom Branch Library
- San Carlos Beach Park

The ten remaining sites that received single upvotes include public parking lots, government-owned facilities, and local parks.

Key Themes from Comments

A total of **9 comments** were provided on planned charging sites, primarily focused on coordination and location clarification.

- Comments from UC Santa Cruz provided updates on charger installation timelines, noting that while a grant has been paused, Level 2 charger installations are still moving forward at the UCSC Family Student Housing and Childcare Complex and other sites, with activation anticipated by Spring 2026.
- Other comments addressed practical issues, including:
    - Correcting specific map pin locations on the Padlet.
    - Requests for coordination with local agencies.
    - Clarifying the type of chargers planned.

Feedback on Suggested EV Charging Sites

A total of **286 new EV charging locations** were suggested by community members, demonstrating a high level of engagement and interest in shaping the future of the region's charging network. Overall, suggested sites clustered around three main types of destinations: commercial and retail hubs, recreational and tourist destinations, and educational campuses, reflecting where people most want reliable charging access in their daily lives and travel patterns.

Sites with Greatest Community Support

68 suggested sites received two or more upvotes from community members. The strongest consensus emerged around major commercial centers and high-value recreational areas:

- Del Monte Center in Monterey (5 upvotes): Calls for replacing an existing charger that is frequently non-operational with a larger, more reliable installation.
- Andrew Molera State Park in Big Sur (5 upvotes): Highlighted the need for charging at remote recreational destinations for day and overnight visitors.
- Other highly supported locations (2-4 upvotes) included parks, commercial areas and shopping centers, schools and college campuses, libraries, and roadside locations with strong visibility along Highway 1, primarily in Monterey and Santa Cruz counties.

81 additional suggested sites received one upvote each from community members. Similar to the sites that received the most upvotes, parks, major commercial centers and shopping centers, schools and college campuses, and libraries, as well as transit centers.

Sites with Least Community Support

6 suggested sites received one downvote each from community members. Comments provided indicate insufficient space for EV chargers and dedicated EV parking spots due to the size of the existing parking lot.

Key Themes from Comments

A total of **21 comments** were provided on planned charging sites in addition to brief descriptions provided for **106 suggested sites** by community members who added the location to the Padlet map. Overall, the level of input shared for suggested charging sites demonstrates strong community interest in expanding the region's EV charging network, prioritizing locations already frequented by current EV drivers and along key transportation

corridors, particularly existing public lots on city-owned lots or in shopping centers, recreational areas, parks, schools and areas with greater housing density and/or experiencing high congestion.

Key Locations Identified

- Suggested sites are concentrated in coastal and affluent areas with higher population density and popular tourist destinations, particularly in Santa Cruz, Monterey/Pacific Grove, Salinas, and Watsonville. Considerably fewer locations were suggested in Salinas Valley, suggesting the online tool may not have been an effective method for gathering input from key demographics in the region.
- Numerous shopping centers and community facilities were suggested for new EV chargers, particularly at or near grocery stores, farmer's markets, gyms, and business complexes. Respondents noted large parking lots or garages, high congestion, and/or ease of location access for many of these sites.
- Many sites were suggested at popular recreational destinations, including local, regional, and state parks, hiking and mountain biking trailheads, and along key surf breaks. For many of these sites, users expressed interest in both day-use and overnight charging, as well as installing chargers in locations with existing amenities (e.g., restrooms).
- Several school and hospital sites were suggested to support both staff/student and visitor EV charging needs.

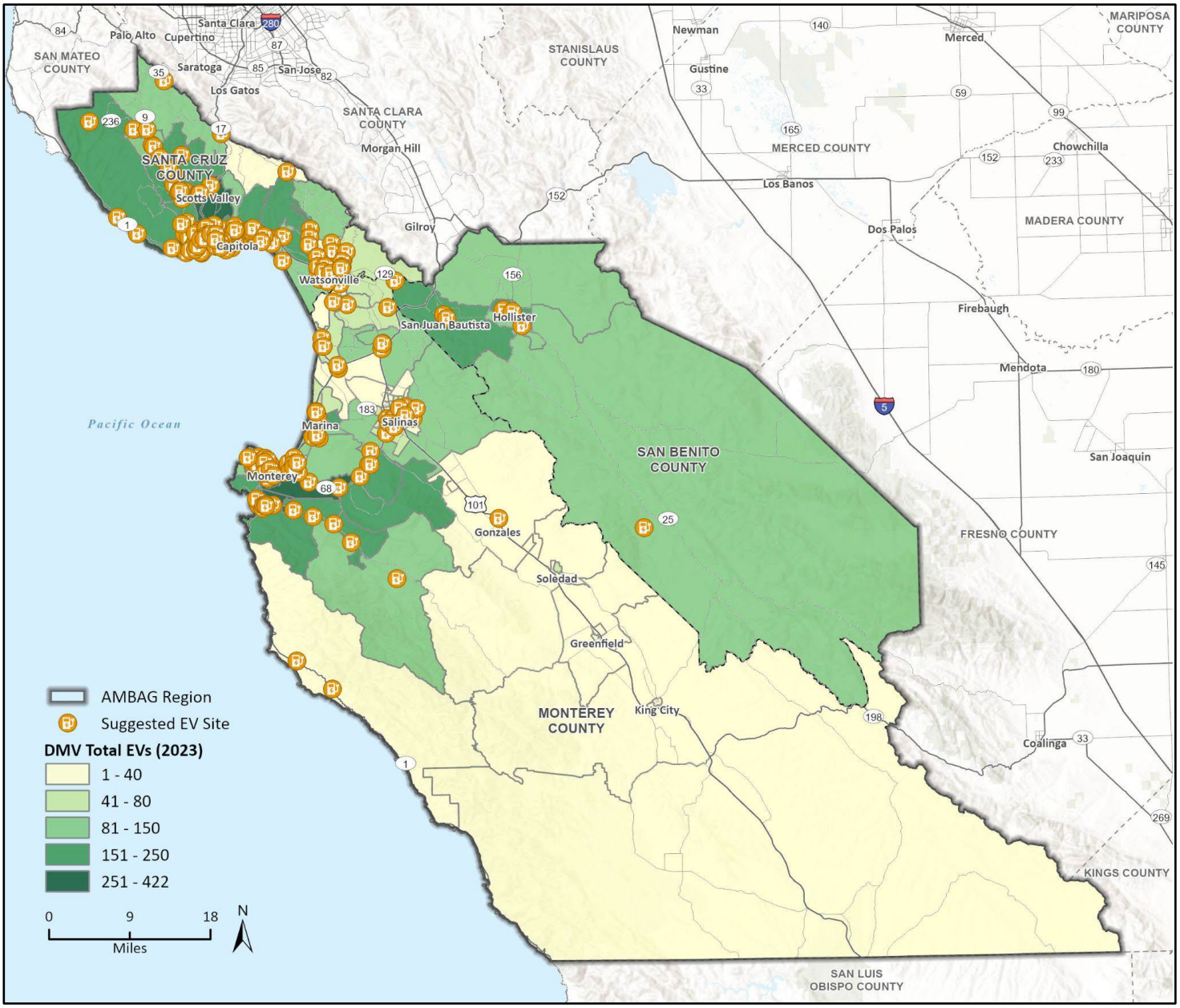
Charger Types and Logistics

- Comments reflect strong and consistent preferences for open-access networks like EVgo or ChargePoint, requests for specific connector types such as J1772, and calls for sufficient capacity to avoid congestion.
- Numerous sites suggested reflect sites with existing plans for installing new EV chargers, such as those planned by UCSC, the Land Trust of Santa Cruz County, and others.

Identified Gaps

- Comments highlight key gaps in the region's existing charging network, including:
    - Ben Lomond
    - Boulder Creek
    - North Fremont Street in the City of Monterey
    - Between Santa Cruz and Half Moon Bay (outside of project scope)

- The map below was developed to highlight gaps by superimposing padlet-suggested EV sites with a map of current EV ownership. Current EV ownership is being used as an indicator for where existing ownership could align with where it would be expected for folks to propose new EV chargers. Please note, this does not consider travel patterns and where people may find EV sites to be most convenient (on their way to/from work, etc.).



Appendix E

Equity Guardrails Criteria and Analysis Memorandum, February, 2026

Rincon Consultants, Inc.
250 East 1st Street, Suite 1400
Los Angeles, California 90012
213-788-4842

February 11, 2026
Project No: 24-16643

Amaury Berteaud, Director of Sustainability Programs
Association of Monterey Bay Area Governments (AMBAG)
24580 Silver Cloud Court
Monterey, California 93940
Via email: aberteaud@ambag.org

Subject: Equity Guardrails Criteria and Analysis Memorandum

Dear Mr. Berteaud:

This memorandum outlines the proposed framework for the Equity Guardrail Analysis which will inform the development of the Electric Vehicle (EV) Climate Adaptation and Resilience (CAR) Framework for the Association of Monterey Bay Area Governments (AMBAG). The proposed equity framework includes:

- Draft approach to develop the equity criteria and the process to solicit feedback for refinement
- Draft equity criteria that will be used to screen climate adaptation and resilience strategies for potential unintended consequences

The contents of this memo were developed based on feedback and insight from community feedback on barriers to accessing EV infrastructure particularly for historically disinvested communities who are most vulnerable to climate impacts. Once further developed, the draft equity criteria are intended to be shared with the Monterey Bay EV CAR Advisory Committee. Feedback provided by the Advisory Committee will inform refinement of the equity criteria. The initial list of climate adaptation and resilience strategies will be screened against the refined equity criteria to select strategies that promote an equitable and community-driven approach to expanding EV infrastructure in communities most impacted by climate change.

Draft Approach

The equity criteria presented below are an initial draft intended to be expanded, refined, and finalized with the Project Team and the Advisory Committee. The equity criteria will first be reviewed and refined by the Project Team. After the Project Team reviews the criteria, they will be presented to the Advisory Committee for review and refinement. The committee's feedback will allow Rincon to finalize a list of criteria that reflect the community's most pressing equity concerns. These steps will prepare the criteria to be more inclusive and mitigate possible unintended consequences.

Once the equity criteria are finalized, they will serve as a guide for screening the list of draft climate adaptation and resilience strategies to be included in the EV CAR Framework. The draft list of strategies will be reviewed against the equity criteria to help identify unintended consequences associated with the strategy. When a strategy does not pass a criterion, it will either be removed or updated to address identified gaps or issues. Rincon will select final strategies using the criteria to ensure each is developed with equity as a priority.

Draft Equity Criteria

AMBAG is taking steps to promote an equitable and community-driven approach to expanding EV infrastructure in communities most impacted by climate change. As stated in AMBAG's 2050 Metropolitan Transportation Plan (MTP) and its Sustainable Communities Strategy (SCS), AMBAG aims to implement EV infrastructure projects to reduce greenhouse gas emissions. Through specific projects, AMBAG aims to address gaps in the existing EV charging infrastructure, assess emerging and future needs, and integrate climate resilience into regional planning and investment decisions. However, AMBAG has not yet established a clearly defined equity framework aligned with its EV infrastructure goals, which is needed to ensure historically underserved communities are meaningfully considered.

Defining Equity in EV Infrastructure

The concept of equitable systems recognizes that communities of color and low-income communities have been historically marginalized and harmed by policies and systems.[1] While AMBAG's definition for an equitable climate and resilience-related EV infrastructure framework will be informed by community input, an equitable EV infrastructure system is generally one that allows everyone, regardless of race, age, ability, gender, or income safe, easy, and affordable access to EV infrastructure such as electric vehicles and charging stations. It is generally one that fosters fair access to EV-related resources, opportunities, and services for all individuals, particularly for those who have historically been underserved or marginalized, and actively works to reduce disparities across various social, economic, and demographic groups. More specifically, equitable systems increase opportunities for historically marginalized communities, confirming that they have access to the same resources, services, and benefits as other groups. These systems prioritize addressing and removing barriers, such as economic inequality, discrimination, and systemic biases, to create fairer outcomes and empower all individuals to thrive. When developing the equity guardrails, three types of equity were considered:

1. **Procedural equity** is about a fair, transparent, and inclusive process that centers those who are most impacted by policies or have had to bear the burdens of inequities. It acknowledges the imbalances in power and technical expertise that often exist when historically marginalized and excluded communities engage in public decision-making processes.
2. **Distributional equity** is about the fair distribution of resources, funding, benefits, and burdens in communities. It prioritizes resources for communities facing the greatest inequities. Distributional equity is not equal distribution, but fair access to needed resources, as defined in partnership with those same communities.
3. **Structural equity** is about changing systems (and the rules that govern them) and paying attention to the ways that systems layer onto one another. Structural equity focuses on addressing the underlying structural factors and policies that contribute to the inequities we see in our communities today and commits to correcting past harms while preventing future unintended consequences. This leads to shifts in intergenerational impacts including new norms, policies, and representation to reduce inequities overtime.

The initial draft of the equity criteria proposed for the Advisory Committee's consideration are included below and draw primarily from existing feedback collected through outreach and engagement activities conducted thus far. Ecology Action's community feedback analysis highlighted key resident concerns about EV adoption, including barriers such as cost, limited charging infrastructure, and lack of EV knowledge—particularly in historically underserved communities. Renters expressed feeling disempowered to install chargers at home. Farallon's spatial feedback collection tool (i.e., Padlet) gathered community input on barriers to accessing EV charging sites, including concerns about charger

[1] Barr Foundation's Community Science and the Center for Neighborhood Technology. Tools for Equitable Mobility Practices Guide (2021). Accessed at https://barrfdn.issuelab.org/resource/tools-for-equitable-mobility.html.

availability, capacity, speed, and reliability, as well as preferences for open-access networks. Community residents also expressed preference for siting charging stations near other highly trafficked areas such as educational campuses, tourist destinations, and busy corridors.

Strategies included in the final EV CAR Framework will incorporate the equity criteria below. The equity criteria are organized by the three equity objectives and are intended to be key components of the final EV CAR Framework to achieve the desired equity objective or outcome (procedural, distributional, or structural equity). To ensure balance across all three objectives, two equity criteria were established for each one.

1) **Procedural Equity**
    a. **Adopt a Fair and Transparent Process for EV Infrastructure Decision-making**: Ensure that community members, particularly those from historically disinvested communities, are regularly informed throughout the implementation and evaluation phases of the EV CAR Framework (e.g., progress, challenges/barriers, and implementation changes). Public agencies need to establish a clear and transparent process for residents to stay informed on the implementation of the climate adaptation and resilience strategies, particularly historically disinvested residents.
    b. **Establish Pathways for Two-Way Communication and Engagement between Public Agencies and Communities**: Public agencies should establish inclusive and equitable pathways for communication and community engagement, so community priorities and concerns are addressed in the implementation of the EV CAR Framework. Given the number and complexity of agencies and partners involved in implementing these strategies, it is essential to establish clear, accessible pathways for community engagement that enable residents to meaningfully inform and shape the implementation process. Examples of approaches to have meaningful pathways for two-way communication and engagement include establishing a community advisory board or oversight committee or contracting/hiring community-based organizations and leaders.

2) **Distributional Equity**
    a. **Provide Fair, Safe, and Inclusive Access to EV Infrastructure**: Distribute EV infrastructure, such as charging stations, in a manner that ensures safe, inclusive, and equitable access for historically disinvested communities. This may include balancing the placement of charging stations across urban and rural areas, incorporating adequate lighting and other safety features, and co-locating EV infrastructure with other services and amenities so residents can access multiple services while charging. Additionally, placing EV infrastructure near transit stops and stations can support regional travel and first-last mile connections; however, in denser areas, careful planning is needed to ensure this does not limit opportunities for other important uses like housing.
    b. **Prioritize EV Infrastructure Investments for Highest Need Communities:** Prioritize EV infrastructure investments in communities that have been historically underserved and disproportionately impacted by environmental harms and climate-related disasters using tools such as CA Governor's Office of Land Use and Climate Innovation's Vulnerable Communities Platform (VCP) or CalEnviroScreen. This may include prioritizing the maintenance, reliability, and charging capacity of EV charging equipment in communities that have experienced historic disinvestment. Reliable access to EV charging in these areas can also play a critical role during emergencies, supporting evacuation and response for residents when other options may be limited, helping ensure that power outages do not become a barrier to safety- especially for historically disinvested communities.

3) **Structural Equity**
    a. **Increase EV-related Knowledge in Historically Disinvested Communities:** Provide culturally relevant, multilingual education programs and trainings for community residents to address gaps in EV-related knowledge, increase awareness of available resources (such as cost-saving and incentive programs), and challenge the perception that EVs are only accessible to higher-income

households. Accessible education and training can help bridge existing knowledge gaps and build community readiness and confidence in EV adoption.

b. **Provide Affordable and Equitable Access to EV Infrastructure**: Ensure that all community residents can access and use EV infrastructure regardless of income, language, or citizenship status. This includes supporting residents on low and fixed incomes through rebates, subsidies, or other programs that reduce the upfront and ongoing costs of purchasing or leasing an electric vehicle. EV-related systems should also be designed with user experience and accessibility in mind (e.g., offering flexible payment options at charging stations). These measures help remove structural barriers and expand equitable access to EV infrastructure for historically disinvested communities.

Note that transportation-related barriers, including the high cost of private vehicle ownership, limited access to reliable transportation options (such as public transit and active transportation infrastructure), and transportation safety concerns, were consistently raised by community residents during outreach and engagement conducted by Ecology Action. While these issues are beyond the scope of this document, it will be important to align the EV CAR Framework with a broader, integrated transportation infrastructure strategy to strengthen AMBAG's overall regional transportation network.

Conclusion and Next Steps

Rincon requests that AMBAG review the proposed draft equity criteria to identify changes or additions to better meet the needs of the community. The updated equity criteria and development approach will be shared at a future Advisory Committee meeting to solicit input. Upon receipt of feedback, the equity criteria will be finalized and utilized to evaluate, modify, and improve the adaptation and resilience strategies to be recommended for the EV CAR Framework.

Sincerely,
Rincon Consultants, Inc.

Reema Shakra, AICP
Principal

Appendix F

Workshop Summaries