Association of Monterey Bay Area Governments

Monterey Bay Electric Vehicle Climate Adaptation and Resilience Framework Report

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This Monterey Bay EV CAR project created an opportunity to fill a critical gap in climate vulnerability analysis with respect to EV charging and to envision the role that the EV charging network can play in enhancing regional resilience.

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Artificial Intelligence Disclaimer

Generative artificial intelligence tools were used to assist with editing and synthesis tasks during preparation of the Framework Report and Roadmap. All content was reviewed, revised, and validated by the project team using project data, technical analyses, community engagement findings, and professional judgment.

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1 Project Purpose and Partner Roles

1.1 Project Purpose and Goals

Electric vehicle (EV) adoption is growing across California and the Monterey Bay region, creating an important opportunity to reduce greenhouse gas emissions, lower dependence on fossil fuels, and expand access to cleaner transportation. While EV's mostly function as a drop-in replacement for gasoline- or diesel-powered vehicles, charging EVs requires new equipment, new technologies, sufficient grid capacity, and careful planning to ensure that charging remains reliable during power outages. These challenges could be further exacerbated by climate change impacts to grid reliability. Furthermore, left to market trends, EV expansion will remain concentrated in wealthier and more urban populations, leaving lower-income and underserved community members behind, and reinforcing existing inequitable EV infrastructure access. Advanced planning for EV infrastructure also presents opportunities to accelerate alternative transportation modes in the region, such as shared mobility, and build a resilient future for all community members. This report explores these topics within the context of the Association of Monterey Bay Area Governments (AMBAG) region (seen in Figure 1 below) which refers to the Monterey Bay Area, a tri-county region that includes Monterey County, San Benito County, and Santa Cruz County. AMBAG is a joint powers authority that coordinates regional planning and governance. The report provides a framework for assessing risk and pursuing solutions that advance equitable adoption of EV technology and enhance community resilience.

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 through direct damage to infrastructure. These climate change-induced threats can also increase the likelihood of Public Safety Power Shutoffs (PSPS). PSPS is a planned, temporary power outage initiated by an electric utility to reduce wildfire risk when weather and environmental conditions make energized power lines more likely to spark a fire. 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 Framework (EV CAR Framework) is intended to quantify these challenges by evaluating existing grid capacity and climate risks to EV charging infrastructure. The EV CAR Framework project also identifies twelve robust adaptation strategies to strengthen resilience across the region in response to these potential impacts. These strategies are presented in detail in the EV CAR Roadmap (Appendix A), an implementation-focused companion to this Framework.

The purpose of the EV CAR Framework is to provide AMBAG with a long-term strategic framework to guide EV infrastructure planning and investment under a changing climate. The Framework is anchored by two key analyses. The first evaluates where current grid capacity is, or is not, sufficient to support EV charging deployment and forecasts when EV charging may exceed grid capacity in the future. The second focuses on climate impacts, specifically wildfire and PSPS events, to identify where and how often power outages may occur. These analyses are designed to ensure that the region's growing network of EV charging infrastructure is resilient to climate hazards, supports equitable access, and aligns with broader transportation and energy system transitions.

Leveraging these key analyses, the EV CAR Framework seeks to help AMBAG and its partners clarify roles within an evolving and crowded EV ecosystem. In a landscape of emerging technologies, funding opportunities, and overlapping institutional responsibilities, this effort identifies how AMBAG and its partners can most effectively add value by setting regional priorities, coordinating partners, and integrating climate resilience into EV planning decisions.

Figure 1 Monterey Bay Region

Community engagement was central to the development of the EV CAR Framework. The effort explicitly focused on understanding the needs and priorities of underserved communities and establishing strategies that ensure that EV infrastructure investments increase resilience and are distributed equitably across the region. Community feedback underscores that equitable deployment must address more than the physical location of chargers; it must also respond to affordability concerns, renter constraints, language access needs, and uncertainty about EV performance during outages and emergencies. Community members also emphasized the importance of reliable equipment, safe and accessible charging locations, and amenities that make charging practical for daily use. Grounding the Framework in these priorities can help ensure that future investments build community trust, reduce barriers to adoption, and strengthen transportation resilience for residents who may have the fewest alternatives during climate-related disruptions.

By engaging communities early and meaningfully, the analysis aims to build confidence in EV technologies, especially in places where people may be more skeptical of EV reliability compared to familiar gasoline vehicles. This engagement should be understood as an ongoing and two-way learning process: while the EV CAR Framework can help share information about EV technology and resilience strategies, AMBAG and its partners are also learning directly from community members about the barriers they face, the needs that shape their transportation choices, and the conditions required for EV infrastructure to be useful, trusted, and accessible. A resilient and visible charging network can help reinforce that EVs function not only in normal conditions but also during disruptions.

Finally, the EV CAR Framework explores opportunities to align EV infrastructure planning with broader regional initiatives. The strategies, in particular, help AMBAG and its partners identify actionable, fundable strategies with clear recommendations and next steps, positioning policymakers and implementers to pursue implementation and leverage future funding opportunities. The Framework and the accompanying adaptation strategies surface the full spectrum of actions that could be taken, from infrastructure design and redundancy to policy coordination and operational planning, and provides a durable structure that can be utilized to inform and guide critical infrastructural investments. For more detail on the strategies, please refer to EV CAR Roadmap Appendix A.

1.2 Background

The Monterey Bay region is entering a period of rapid EV infrastructure expansion, and in anticipation of this growth, agencies and other partners across the region are considering climate hazards and grid capacity, and whether the rollout of this new infrastructure exacerbates existing socioeconomic inequities. Based on the analysis of regional, statewide, and corridor-focused plans, the following core themes emerged:

1. The need to expand charging access, and close gaps in geographic and demographic service,
2. The importance of improving coordination among public agencies and utilities, and
3. The value of ensuring future investments are resilient to climate-related disruption.

These themes align closely with the purpose of the EV CAR Framework, which is designed to help AMBAG and its partners move beyond conventional infrastructure configurations and toward a longer-term strategy that integrates climate vulnerability, transportation demand, energy system readiness, and community priorities.

Based on the technical analyses conducted as part of this Framework, findings clearly indicate that the region's current charging network is not sufficient to support the pace of EV adoption anticipated over the next decade. Existing infrastructure is concentrated in cities and along selected major corridors, while rural areas, interregional travel routes, and underserved communities have limited access. This growing infrastructure deficit is not only a question of quantity, but also of reliability, visibility, and strategic placement. For the Monterey Bay region, where trips often span county lines and where tourism, agriculture, freight, and daily commuting all shape travel demand, future charging investments will need to support both local access and regional network performance under a range of normal and disrupted conditions.

Overall, the existing policy landscape suggests that the Monterey Bay region requires a regional resilience strategy that clarifies the challenges ahead, priorities, and implementation pathways in a rapidly changing environment. This Framework capitalizes on the opportunity to synthesize information that is currently distributed across transportation plans, energy studies, equity analyses, climate adaptation efforts, and site-specific charging strategies, and translate that information into a practical framework for future institutional decision-making. Utilizing this Framework, AMBAG and its partners can advance EV charging investments that support not just adoption goals, but also system reliability, emergency readiness, equitable access, and long-term climate adaptation.

1.3 Challenges and Opportunities

By guiding and directing EV infrastructure deployment, AMBAG and its partners have the opportunity to enhance equity and resilience. However, a central challenge in planning for resilient EV infrastructure deployment is that climate resilience must move from a supporting consideration to a core organizing principle. Previous EV charging planning efforts recognize risks from heat, wildfire, flooding, sea level rise, severe storms, PSPS events, and grid stress, but the EV CAR Framework shows that these hazards affect more than individual charging assets. Climate risks also influence substations, distribution systems, access roads, evacuation routes, and the broader transportation network that all users rely on during both daily travel and emergencies. This Framework is primarily focused on how new EV infrastructure can be deployed to address these risks and create a more resilient mobility system. This creates a planning challenge: future charger deployment cannot be guided by projected demand alone but must also account for where infrastructure must remain operational, accessible, and useful during disruptions. At the same time, this challenge creates an important opportunity for AMBAG and its partners to use climate risk information proactively by prioritizing resilient siting, redundancy, backup power, and coordination with emergency planning so new charging investments strengthen the region's overall climate adaptation strategy.

Another challenge is planning and designing EV infrastructure as part of an interconnected transportation and energy system rather than as isolated site-by-site infrastructure. Electrification will increase pressure on the grid as charging expands in residential and public settings and as higher-powered charging for medium- and heavy-duty vehicles and bus fleets grows. This creates both a spatial and institutional challenge: charging investments must align with travel demand and corridor function while also accounting for utility capacity, transformer constraints, managed charging, and backup or redundant power strategies. At the same time, these constraints create opportunities to invest in solutions that enhance grid performance rather than simply add load, including managed charging, distributed energy resources, battery storage, microgrids, and bidirectional charging technologies that may allow EVs to support buildings, critical facilities, or the grid during peak demand or outage conditions. The opportunity inherent in this challenge is in helping advance integrated transportation, energy, and resilience planning into a shared decision-making framework, rather than allowing these topics to advance as separate workstreams.

Despite the relative uncertainty surrounding the siting of and demand for EV charging infrastructure, and the challenges inherent in planning for grid upgrades, significant opportunities remain for agencies and partners in the transportation domain to create an EV charging network that contributes to rather than jeopardizes overall grid and community resilience. Most significantly, opportunity lies in the design and siting of the significant amount of EV infrastructure yet to be built. Local jurisdictions across the region may take the lead in directly influencing how and where this infrastructure is built and who it serves, while regional coordination can help ensure that investments do not occur in isolation or reinforce existing gaps. Better partnerships and communication among public agencies, utilities, community-based organizations, landowners, EV infrastructure providers, and transportation partners will be essential to identify feasible sites, coordinate funding, understand community priorities, address grid constraints before they delay or limit deployment, and evaluate where backup power or battery storage may be appropriate. However, community feedback (as seen in Appendix C) also indicates that battery-based resilience strategies cannot be treated as purely technical solutions. While battery storage, mobile backup power, and bidirectional charging could help maintain charging access during outages, there is public discomfort surrounding battery fire and safety risks which may limit acceptance if these systems are not clearly explained and paired with transparent safety standards. In advancing EV infrastructure resilience, organizations that elect to exercise agency in deploying resilient EV infrastructure have the potential to enhance public health and community resilience overall. Another key area of opportunity that could help shift public perception and boost EV adoption is culturally appropriate education and outreach to the general public that shows the benefits of EVs and explains the role and limitations of batteries and backup power, and addresses common misperceptions about them, including concerns about EVs, charging reliability, and battery safety.

Finally, planning for equitable access to EVs and the requisite infrastructure presents an important challenge and opportunity. Existing plans and community feedback gathered throughout this project identify persistent disparities in charging access between urban and rural communities, higher-income households and residents without home charging, and communities already benefitting from EV investment and those that remain underserved. Community engagement, detailed below in section 4, highlights broader barriers within the community to adoption, including upfront EV costs, limited familiarity with EV technology, language and outreach gaps, renter constraints, and skepticism about whether EVs will perform reliably during outages or emergencies. These challenges are significant because unreliable, unaffordable, or poorly located infrastructure could reinforce existing inequities and weaken public confidence in the transition to EVs. Conversely, equity-focused deployment creates an opportunity for public agencies, utilities, community-based organizations, landowners, and other partners to understand the specific needs of underserved communities and use that information to complement private-sector investment where the market may not otherwise provide sufficient service. By targeting chargers, outreach, incentives, and supportive programs toward residents who face the greatest barriers, partners can help ensure that EV infrastructure caters directly to those users rather than only to early adopters or higher-income markets. This approach can improve EV adoption rates while expanding economic opportunity for communities, since EV ownership can reduce household transportation costs over time through lower fuel expenses, reduced maintenance needs, and access to cleaner, more reliable transportation options. For the EV CAR Framework, engagement is therefore not only a procedural step; it is a resilience and equity strategy. Culturally relevant outreach, multilingual communication, and direct community involvement can help identify priorities, define benefits, improve charger placement, and build long-term confidence in EV deployment across underserved communities.

1.4 EV Charging Growth Projections

The AMBAG project and consultant team conducted an analysis to understand EV ownership patterns, driving behavior, trends of EV owners compared to general gas-powered vehicle users, and modeled anticipated EV growth through 2045 to provide insights into what may be needed for future charging infrastructure. Analysis of travel patterns suggest significant distinctions between EV and gasoline-powered vehicle driver behaviors, with EV trips predominantly limited to urban corridors and zones already supported by charging infrastructure, and gasoline-powered vehicle trips reflecting a much broader utilization of road networks, including rural areas with limited EV activity. This could mean that infrastructure availability influences EV travel behaviors and barriers like limited home and public charging accessibility are obstacles to broader adoption. The analysis also indicates that longer commutes have a slightly higher propensity toward EV use than shorter trips, which may reflect fuel cost savings, high-occupancy-vehicle lane benefits for longer-distance commuters, or greater EV data availability in more populated areas. This suggests that current longer-distance EV commuters have been able to address range anxiety, while barriers may be more pronounced in places where charging infrastructure remains limited or less visible.

The forecast analysis demonstrates substantial anticipated growth in EV adoption, particularly in residential and public charging needs through 2030 and even more significantly by 2045. Public charger demand projections suggest major growth near highways, especially along United States (U.S.) Highway 101 and in areas previously underserved or minimally equipped with charging infrastructure, such as southern San Benito County and regions east of Monterey. Today, public charging stations cluster around urban centers and major highways, serving the needs of early adopters and city commuters. By 2030, models predict the region will witness a surge in demand for charging infrastructure. The Monterey Bay region is expected to require 5,000 additional public chargers, both Level 2 and Direct Current (DC) Fast Chargers, beyond the base year analyzed (2023). This expansion will not only service the urban core but also service increased demand in corridors, such as the stretch between San Juan Bautista and Monterey, the area surrounding Soledad, and to south of Hollister. Residential charging will see more expansive growth. By 2030, nearly 35,000 new home chargers are expected to be installed, tripling the number projected for 2025. This growth mirrors the anticipated rise in EV ownership, especially in communities like Watsonville, Scotts Valley, Monterey, Hollister, and San Juan Bautista.

Charger Type	Existing Chargers	Planned Chargers	Total Chargers by 2030	Total Chargers by 2045
Level 2	590	254	5,039	18,020
DCFC	349	28		

As shown in Figure 2 and Figure 3, by 2045, the demand for public charging infrastructure will leap to nearly 18,000 new public chargers and more than 111,000 new home chargers needed from the base year (2024). Public charger demand is expected to concentrate along major travel corridors, particularly Highway 101, southern San Benito County, east of Highway 101, and the area east of Monterey along Highway 68, including places that are currently underserved or minimally equipped with charging infrastructure. Residential charging demand, which is linked to EV ownership forecasts, is projected to grow notably around Watsonville, Scotts Valley, Monterey, Hollister, and emerging markets such as King City, indicating that EV ownership since 2030 will have nearly tripled. Together, these findings underscore the relationship between infrastructure availability, ownership trends, and travel behavior, and indicate that planning efforts should focus on closing existing infrastructure gaps while preparing AMBAG and its partners for expected regional growth. For more detail on this analysis, see Appendix A, Existing and Expected EV Charging Infrastructure Conditions and Future Needs Analysis Technical Report.

Figure 2 2045 Public Charging Demand

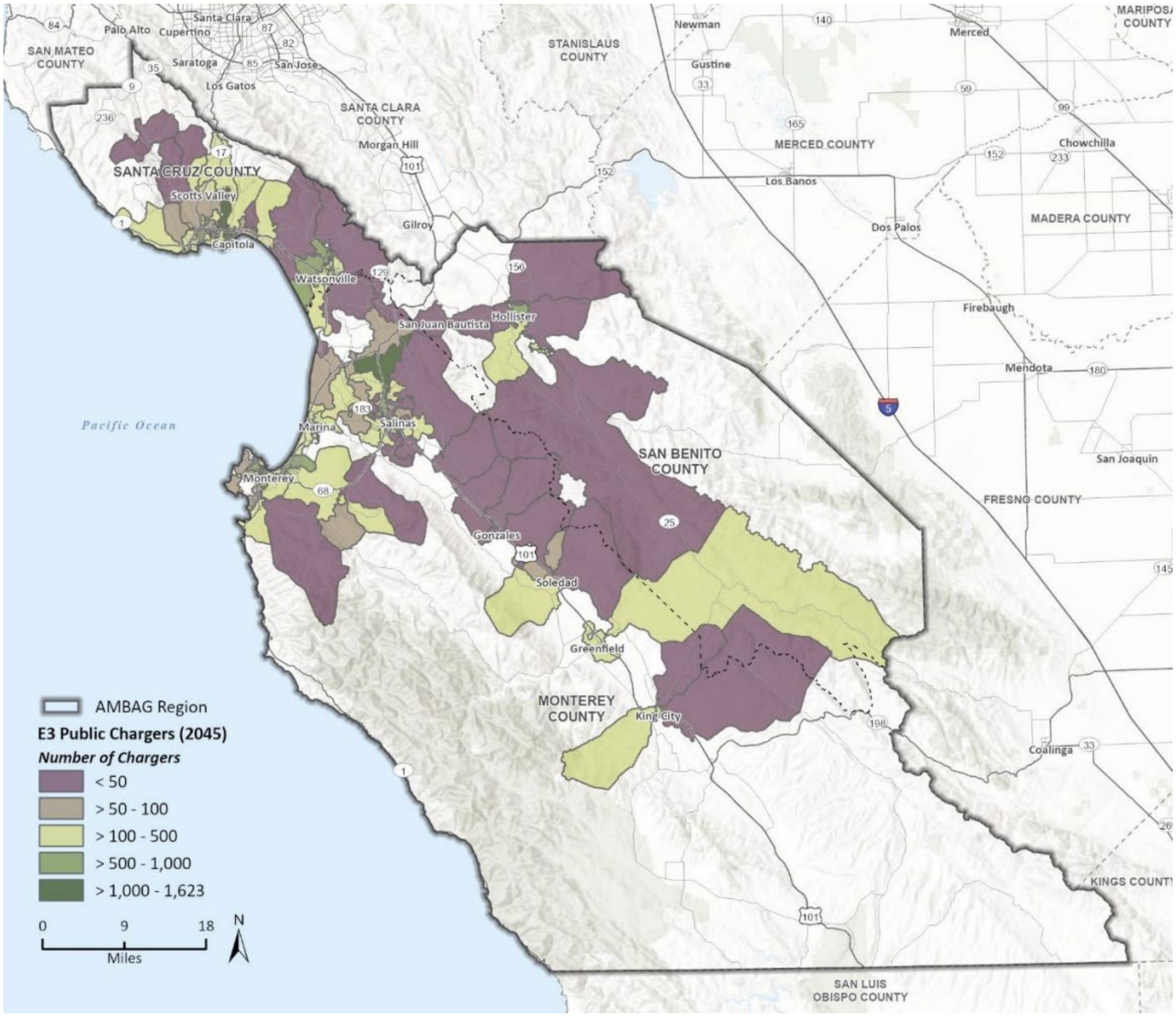
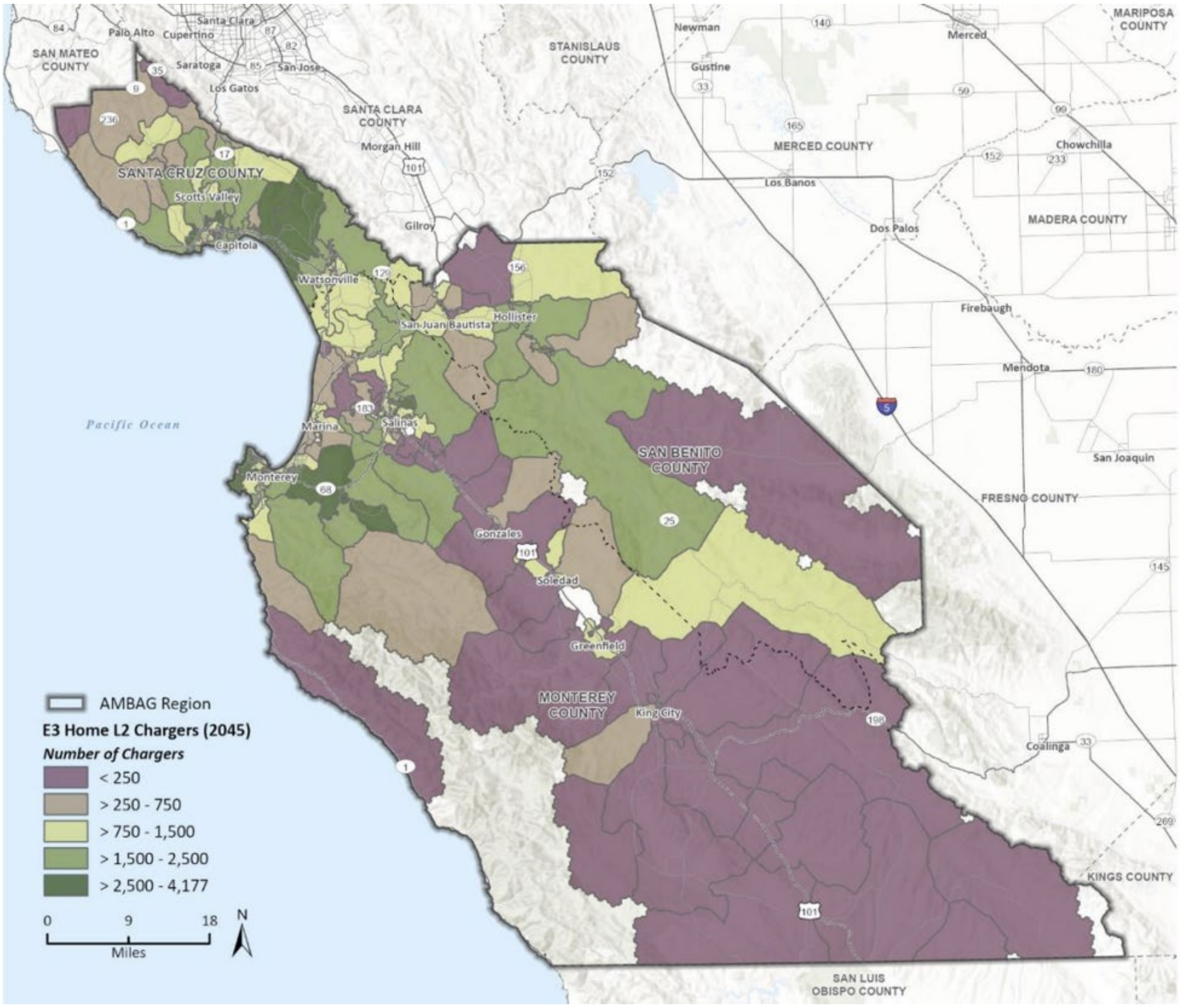


Figure 3 2045 Residential (Level 2) Charging Demand [1]



[1] Level 2 chargers are the next step up from standard household outlets (Level 1), providing a higher voltage feed (208–240V) to EVs.

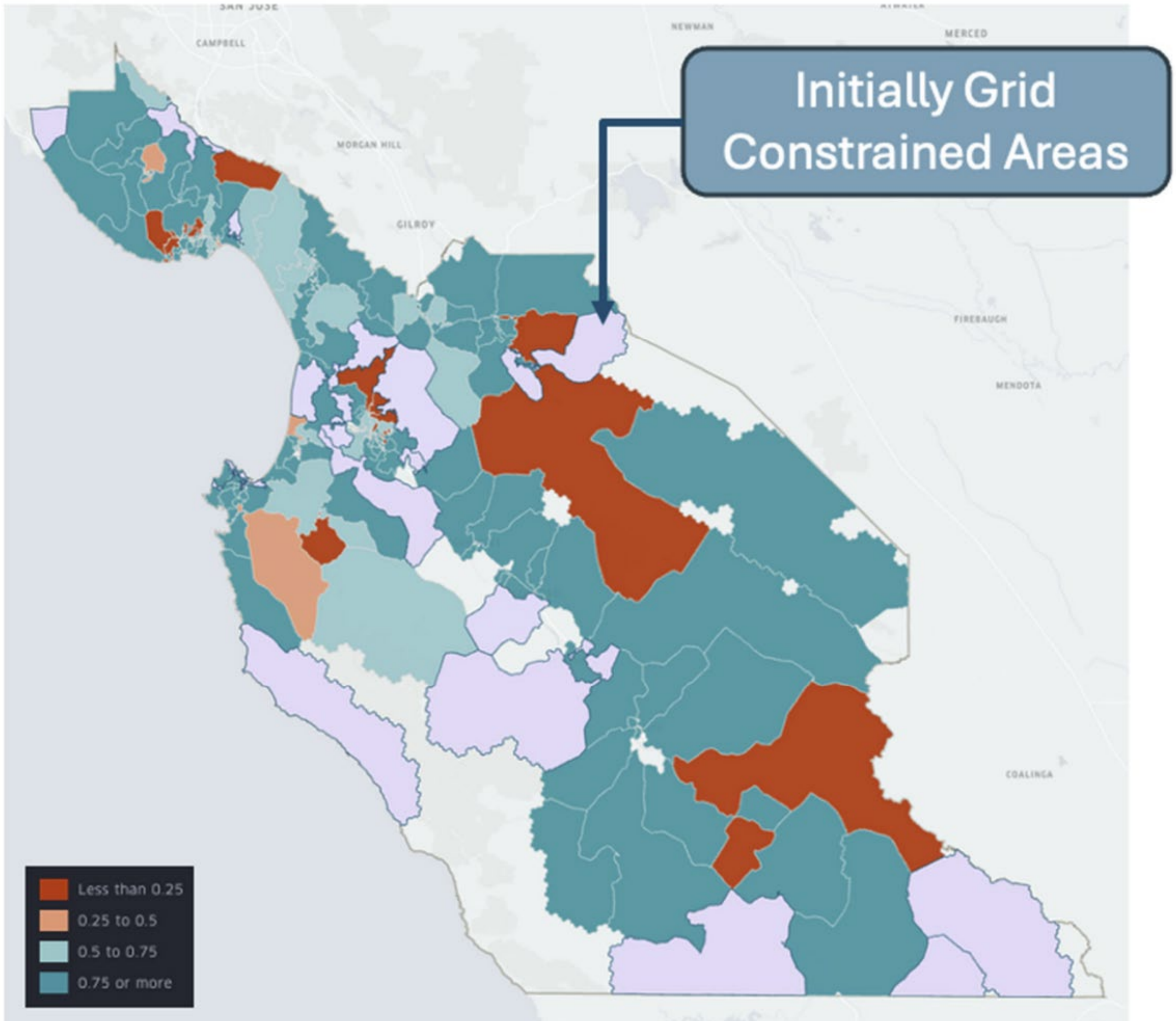
2 Grid Capacity Analysis

2.1 Grid Capacity and Charger Reliability

The AMBAG project and consultant team performed a grid capacity analysis first by mapping EV charging related electricity demand and feeder level capacity and then assessed where EV charging infrastructure may face challenges due to existing grid constraints. This analysis indicates that several parts of the Monterey Bay region already have constrained distribution feeders, and additional areas are projected to become constrained as EV adoption increases. Of greatest concern for planning purposes is not simply whether a feeder is constrained, but whether those constraints overlap with locations where EV charging demand is expected to grow. By 2030, areas of southeastern and southwestern Santa Cruz County, central San Benito County, and southern Monterey County are expected to face greater grid capacity limitations, with constrained areas becoming more widespread by 2045 and 2050.

Figure 4 below shows the remaining feeder-level headroom percent available (the percent of total electricity carrying capacity) in 2030. For this analysis, load capacity was aggregated from the line level to feeder level to align with the geospatial granularity of forecasted EV charging load and to help the AMBAG project and consultant team identify potentially grid-constrained areas without accessing confidential electric infrastructure data. 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. Together, the light purple and red areas show where limited feeder headroom may affect near-term EV charger deployment, while later maps in this section identify where those constraints overlap with projected charger growth. As EV adoption grows, more areas will become constrained throughout the region.

Figure 4 Hosting Capacity Analysis: Remaining Headroom Percent 2030



Not all grid constrained areas will be adding a significant number of chargers, since the adoption of EVs is expected to be concentrated in more urban and developed areas. To 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. Figure 5 shows the grid constraints (in hashmarks) overlayed with highest projected charger areas. The primary areas to prioritize grid demand management and/or grid upgrades by 2030 are where hashmarks overlap with green zones. 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 Pacific Gas & Electric (PG&E).

Figure 5 Grid Capacity and EV Charging Growth 2030

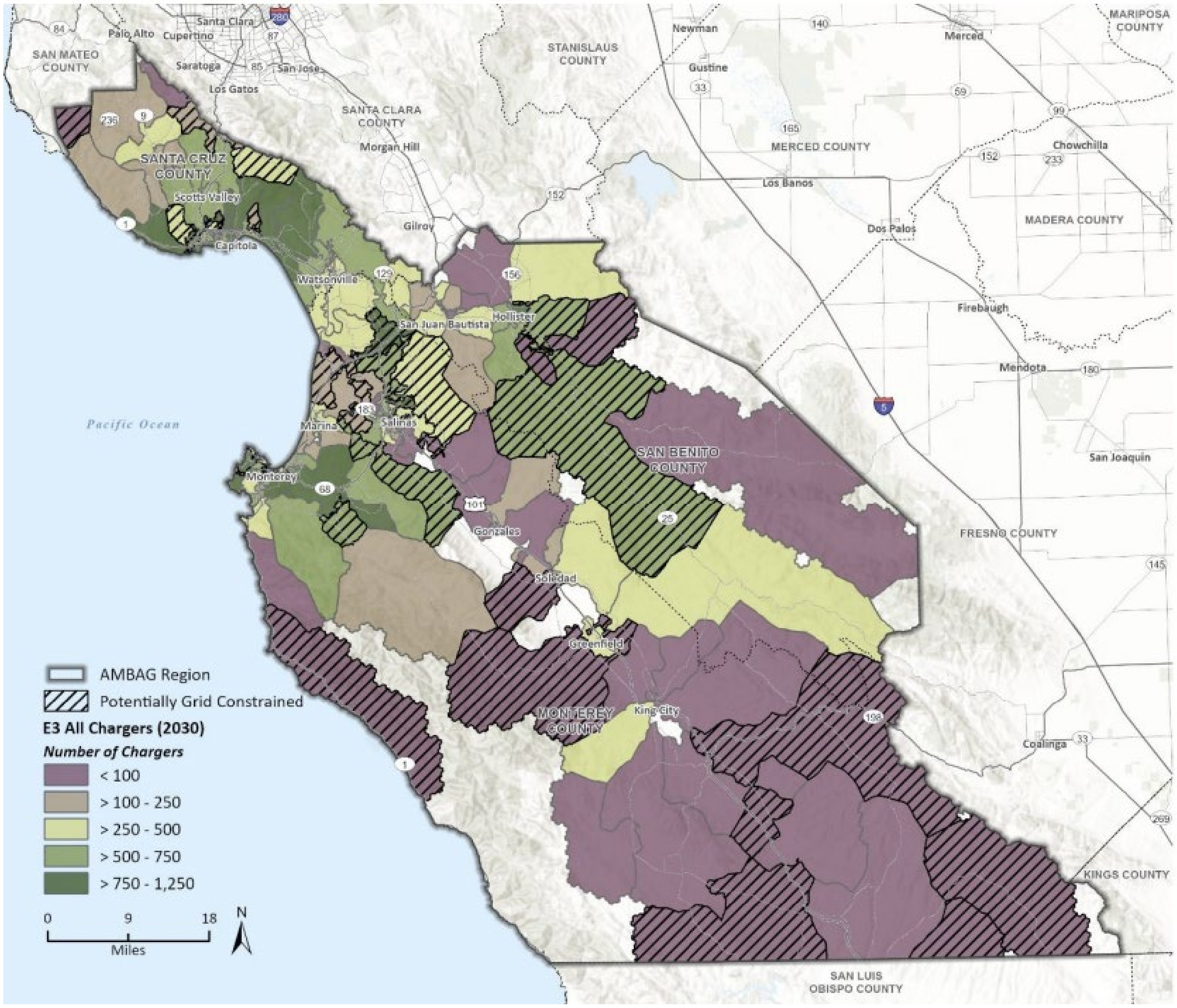
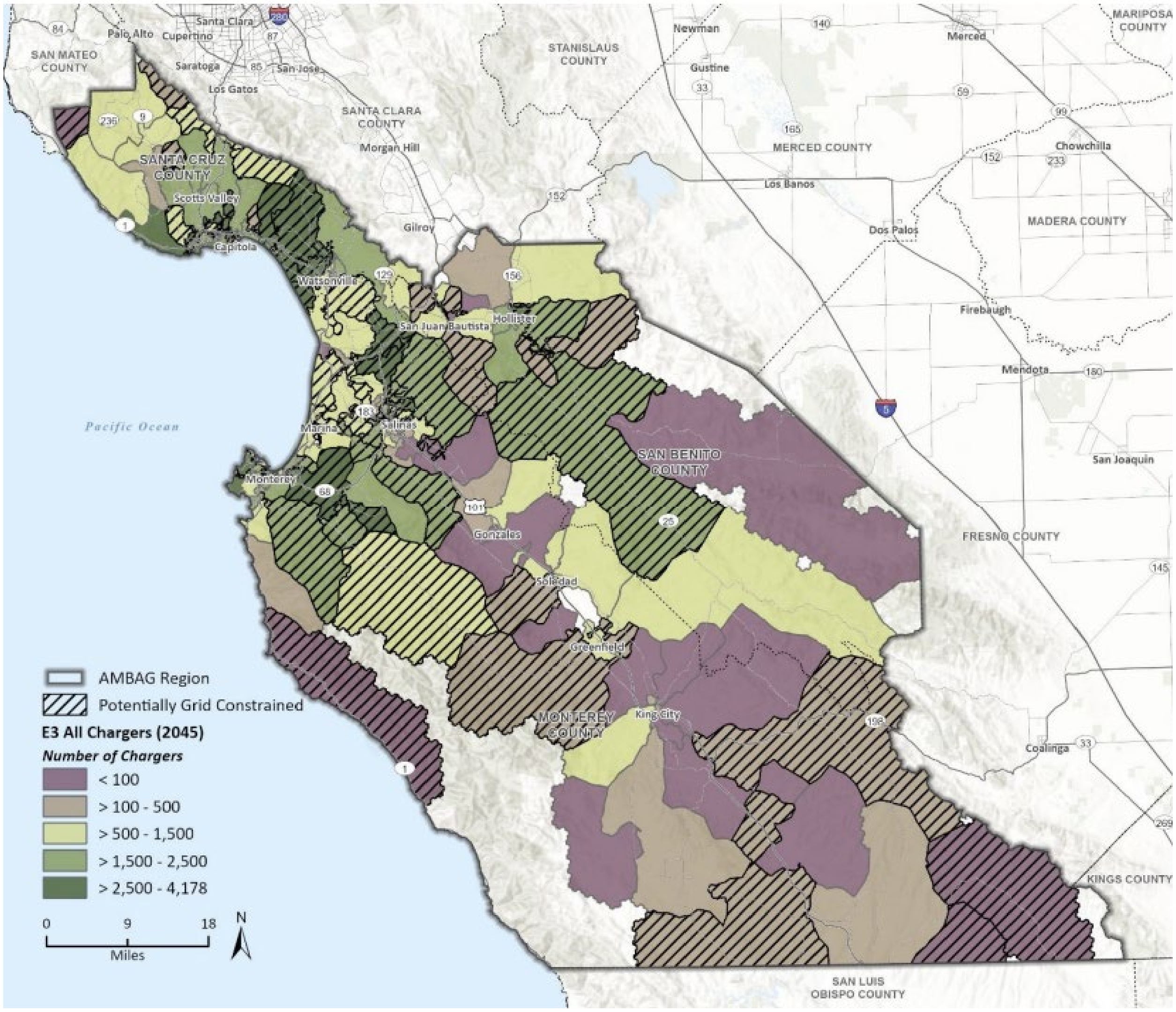


Figure 6 shows that, by 2045, grid constraints are projected to be more widespread as EV charging deployment increases. The areas with the largest overlap in grid constraint and EV charger growth are Salinas, Monterey, Watsonville, and Scotts Valley. These are the areas that will likely need grid upgrades in order to support the extensive EV growth projected for those locations.

Figure 6 Grid Capacity and EV Charging Growth 2045



Analysis reveals important distinctions between urban and rural capacity challenges. In more urbanized areas, higher charging demand may justify grid upgrades because the costs of those upgrades can be spread across a larger number of users and a larger increase in electricity consumption. In rural areas, however, even a small number of new chargers can stress already constrained infrastructure, and conventional grid upgrades may serve relatively few customers. This creates a different resilience challenge for rural communities and travel corridors, where distributed energy resources, managed charging, lower-power charging options, battery storage, solar photovoltaic systems, or microgrid configurations may provide more practical and cost-effective reliability benefits than traditional upgrades alone. For more information on grid capacity and EV charging infrastructure, please see Appendix B, Vulnerability Assessment.

3 Climate and Grid Vulnerability Analysis

3.1 Vulnerability Assessment

In addition to other hazards that impact traditional transportation infrastructure, the Monterey Bay region's future EV charging network will be affected by two related forms of grid vulnerability: the ability of the electric distribution system to accommodate new charging load in the future, and the reliability of electricity service during climate-driven outage conditions. The AMBAG project and consultant team conducted a climate and grid vulnerability assessment based on the Existing and Expected EV Charging Infrastructure Conditions and Future Needs Analysis Technical Report (Appendix A). This integrated analysis helped identify where EV charging demand is expected to grow, where the grid may have limited remaining capacity, and where climate conditions may increase the likelihood of charging disruptions over time due to power outages.

EV charging access can be affected not only by the number and location of chargers, but also by the capacity and reliability of the grid serving those chargers. This analysis builds on the Existing and Expected EV Charging Infrastructure Conditions and Future Needs Analysis Technical Report by asking whether forecasted charging infrastructure can be supported by existing distribution system conditions and whether future climate hazards could reduce charging availability in specific locations due to power outages. The analysis focuses primarily on the distribution system, the power lines that move electricity within a city and to homes, because distribution-level outages are the most common type of power outage and are the most directly relevant to whether individual charging sites remain available to users.

3.2 Climate Change Projections and Potential Impacts

Climate Hazards and the Grid

To clarify the context around climate vulnerability as it pertains to the electric grid and future EV charging infrastructure, the AMBAG project and consultant team utilized downscaled climate model data from California's Fifth Climate Change Assessment to analyze the geographic distribution of future climate hazards and associated outage risks. The Monterey Bay region is expected to experience several climate hazards that could impact the overall reliability of the power grid over the coming decades, including rising temperatures, more frequent and prolonged heat waves, wildfire risk, extreme precipitation events, landslides, and coastal hazards. These hazards can affect the electric grid by increasing electricity demand, damaging distribution infrastructure, disrupting equipment through flooding or landslides, bringing trees and debris into contact with power lines, or creating wildfire conditions that lead utilities to proactively de-energize portions of the grid through PSPS events. As a result, EV charging infrastructure can become unavailable even when chargers themselves remain undamaged.

Several climate hazards are important to understand as broader grid stressors, even though this assessment focuses on wildfire-related outages and PSPS events. Temperatures are projected to rise substantially in the Monterey Bay region, with greater increases in the inland region. Residential electricity demand is likely to be affected by more frequent heat waves due to increases in cooling requirements and warming temperatures. While higher electricity demand could cause bulk electricity system outages, planners at the state level are including projections for electrification and climate in their energy needs forecasting[2]. Winter storms and extreme rainfall are another potential issue for the electrical 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

[2] As of 2023, the California Energy Commission now includes climate impacts and electrification trends in their demand forecasts.[11]

and event-driven rather than continuous. These events could cause flooding, vegetation issues, or landslides that could impact and disrupt the distribution grid.

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.

Wildfire is a frequent occurrence within the Monterey Bay region, and the past decade has seen several major fires with substantial impacts on ecosystems and human infrastructure. Wildfire mitigation measures, particularly PSPS events, are also a major driver of outage risk in the region. The vulnerability assessment found that wildfire-related outages already represent one of the largest causes of naturally occurring service interruptions. Utilities initiate PSPS events when combinations of high wind speeds, low humidity, elevated temperatures, and critically dry vegetation create conditions that increase the likelihood of wildfire ignition from electrical infrastructure. For these reasons, the detailed analysis focuses on wildfire-related conditions as the most significant climate threat to EV charging reliability because of their direct relationship to unanticipated grid outages, such as PSPS events.

Fire frequency and impacts are influenced by climate conditions and by population growth, particularly where development expands into the wildland urban interface, which is the zone of transition between unoccupied land and human development[3]. Climate modeling and analysis indicates that areas already prone to wildfire-related outages are likely to see increased exposure in the future. Using a mid-century global warming scenario (approximately 2°C global warming), the analysis projected a substantial increase in weather conditions associated with PSPS events, particularly in eastern and southwestern portions of the Monterey Bay region. Some locations could experience roughly 40 additional PSPS-risk days per year compared to current conditions. Higher-elevation, forested, and rural areas are expected to experience the greatest increases in wildfire-related hazards and PSPS exposure, while many urban centers such as Salinas, Monterey, and Santa Cruz are projected to experience relatively limited changes in climate-driven outage conditions.

Climate Exposure and EV Infrastructure Vulnerability

In order to develop power outage scenarios and assess the impact on EV charging infrastructure, the AMBAG project and consultant team conducted an analysis that used modeled PSPS events since they are currently the most prominent climate-related power outage experienced in the region.[4] However, the region could experience outages from many other causes including equipment failures, increasingly powerful winter storms, extreme heat, or company initiated work programs. In assessing the occurrence of conditions likely leading to PSPS events, analysis shows an increase in the average annual number of PSPS events in some areas of the Monterey Bay region as the overall climate warms. More PSPS events per year are predicted overall, but that increase is mostly limited to areas that experience PSPS events currently. The largest increases are expected in hilly, forested, and higher-elevation areas, including portions of the Santa Cruz Mountains, Big Sur, Fort Hunter Liggett, Lockwood, Pinnacles, and southern Monterey County. These areas also have the lowest number of forecasted chargers, and a majority of those forecasted chargers are expected to be in private residential locations. Alternatively, many urbanized areas, including Santa Cruz, Monterey, and Salinas, are expected to experience comparatively smaller changes in PSPS conditions.

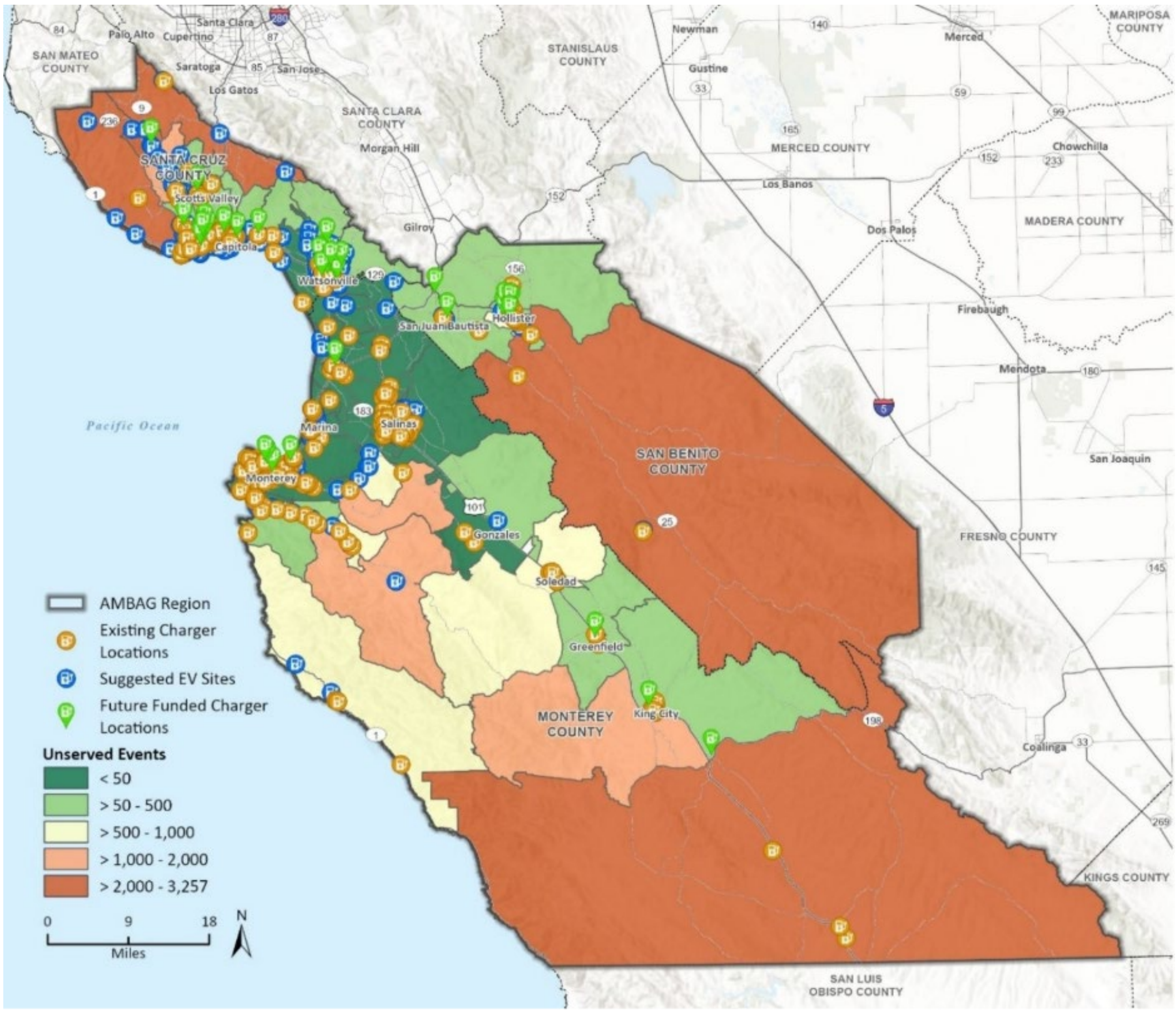
[3] What is the WUI?

[4] https://www.pge.com/en/about/pge-systems/electric-systems/electric-reliability-reports.html

PSPS events can affect areas beyond the immediate area where high-risk weather conditions occur because utilities may de-energize larger electrical circuits or line segments for safety reasons. As a result, communities such as the Salinas Valley and the City of Santa Cruz may still experience outage effects even when they are not located in the highest-risk modeled areas.

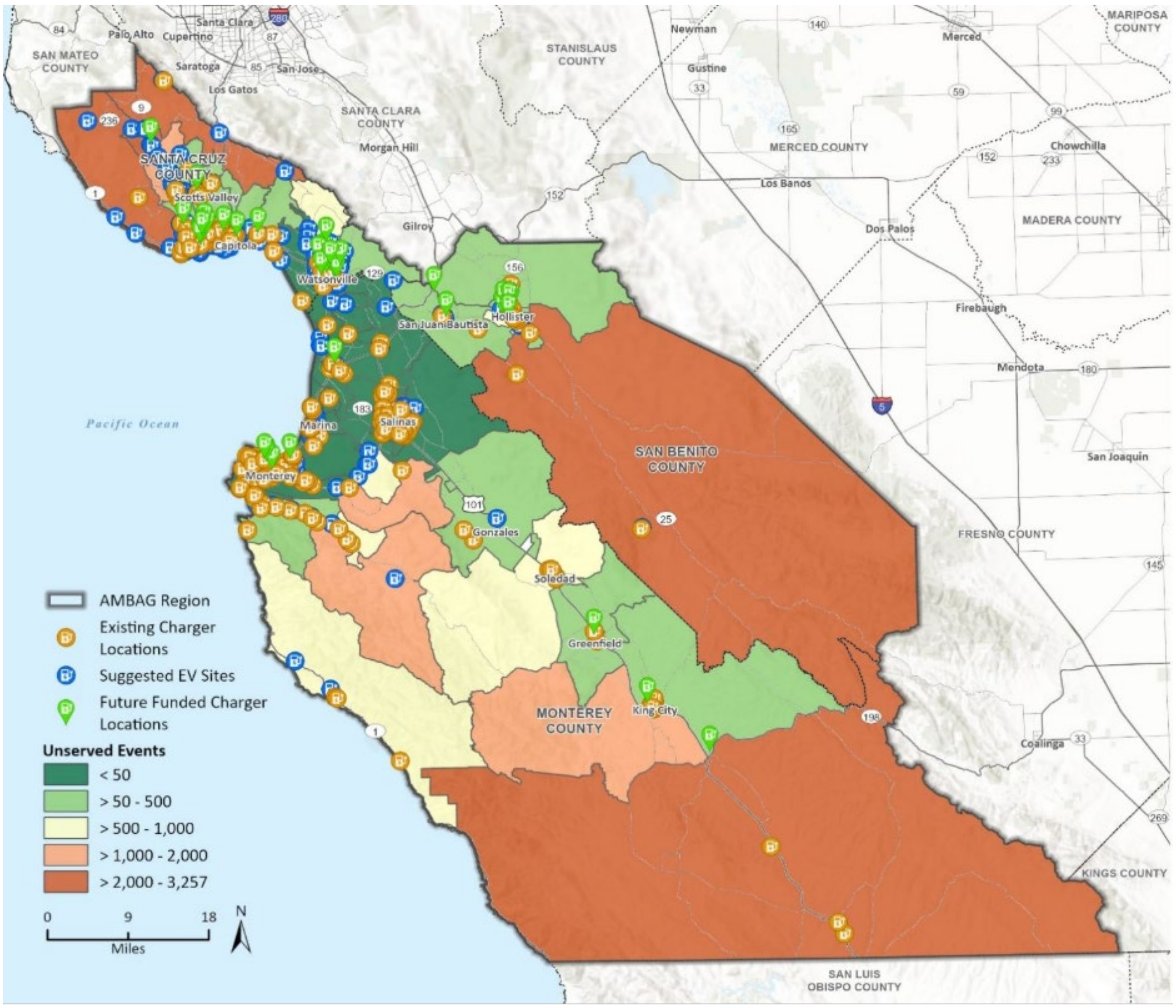
Figure 7 below shows the total unserved charging events per year in 2035 in the base case scenario, which does not account for increased funding for underserved areas, along with existing, suggested, and future funded charger locations for reference. An unserved charging event is any day which a charger 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. A majority of the more urban areas within the Monterey Bay region are not likely to see significant changes in PSPS event conditions, and most forecasted charging infrastructure is expected to be located in urban and highway-adjacent areas such as the cities of Santa Cruz, Monterey, and Salinas, and along U.S. 101 and California State Route 1.

Figure 7 Number of Unserved Charging Events 2035



Analysis also included a demographic scenario of EV infrastructure deployment, which shows a scenario wherein additional EV charging adoption is deployed in under-resourced communities to support more equitable access. Figure 8 shows that per-charger vulnerability remains largely driven by the climate conditions of the area where a charger is located, but total unserved charging events can increase when more chargers are introduced into areas with PSPS exposure. This finding does not suggest that equity-focused deployment should be avoided. Rather, it underscores that resilience must be built into equity-focused charging investments from the outset, particularly through siting decisions, backup power, storage, operations and maintenance requirements, and coordination with local emergency planning. For more detail, please refer to Appendix B, Vulnerability Assessment.

Figure 8 Number of Unserved Charging Events 2035 (Demographic Scenario)



Key Takeaways

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.

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, evolving outage risks, travel corridors, and community needs. 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.

Urban areas with high charger growth may require proactive grid coordination and managed charging strategies to avoid capacity bottlenecks. Rural and corridor locations with fewer chargers may require targeted resilience investments because each charger plays a larger role in maintaining access across longer distances. For AMBAG and its partners, the central planning implication is that charger deployment, grid readiness, climate resilience, and equity should be evaluated together rather than as separate considerations. Doing so can help ensure that the region’s EV charging network supports adoption goals while remaining reliable, accessible, and useful during the climate-related disruptions that are expected to become more common over time.

4 Community Transportation Barriers and EV Adoption Priorities

4.1 Community Needs, Barriers, and Lived Experience

Community feedback, gathered from outreach conducted by Ecology Action with support from Regeneración and Proyecto Mixteco, highlights persistent transportation barriers and vulnerabilities that shape local mobility needs and priorities. In designing and carrying out community engagement, the AMBAG project and consultant team focused on community-centered survey development, in-person engagement, and data collection within underserved communities in the Monterey Bay region. The outreach effort prioritized trust-building with underserved communities, including underserved residents, agricultural workers, undocumented individuals, and speakers of Spanish and Mixteco. At both in-person community events and remotely, the AMBAG project and consultant team, in partnership with community-based organizations, surveyed 637 and 54 community members, respectively.

While roughly half of respondents rely on a personal vehicle as their primary mode of transportation, many face affordability, infrastructure, and safety challenges. Public transit and walking are common alternatives, yet both modes raise concerns related to accessibility, personal safety, and reliability, particularly during extreme weather events. Participants expressed deep concern about climate-related hazards such as flooding, extreme heat and wildfire, including the difficulty of evacuating safely during emergencies, especially for those without vehicles. Many reported lacking access to air conditioning, leaving them particularly vulnerable during periods of extreme heat and power outages. Across modes, respondents emphasized the lack of redundancy in the transportation system, noting that when one option fails, there are few viable alternatives.

There was clear interest in electric vehicles as part of a more resilient transportation future, but significant barriers to adoption remain. Cost, limited charging infrastructure, and insufficient information about EVs and their benefits all constrain uptake. Renters in particular reported feeling disempowered to install home charging and fearful of landlord retaliation, effectively excluding them from EV ownership. Spanish- and Mixteco-speaking participants frequently described feeling uninformed about EV technology and charging options, pointing to gaps in outreach and culturally appropriate information. While some charging access exists at workplaces and select residential locations, participants stressed that broader, more equitable deployment, paired with education and community engagement is needed to ensure EV investments respond to real community needs and improve system-wide resilience. For a more detailed report by Ecology Action on outreach and engagement, reference Appendix C, Vulnerability and Barriers Assessment—Outreach Summary.

4.2 Charging Network Feedback and Siting Priorities

The AMBAG project and consultant team conducted a regionwide effort to gather public input, using an interactive, map-based public engagement tool called Padlet, on existing, planned, and potential EV charging locations across the Monterey Bay region. It allowed community members to review the existing and planned EV charging network and provide location-specific feedback to help inform future investments. Users could click on one of the 214 existing EV charging sites, indicate whether they had a positive or negative experience using upvote and downvote buttons, and leave comments about charger reliability, maintenance, speed, amenities, and overall user experience. The map included 49 planned charging locations, where participants could express support through upvotes and leave comments regarding proposed locations, implementation timelines, coordination with local agencies, and charger types. Community members could add new pins directly to the map to identify locations where they believed additional EV charging infrastructure was needed. When adding a pin, participants could optionally explain why the location was important, estimate demand, recommend charger types or quantities, and identify preferred charging networks. Participants could upvote or downvote charging locations proposed by other community members, helping identify areas with broad public support and revealing priorities for future investment.

Overall, the Padlet generated substantial engagement, including 42 comments, 314 upvotes, 11 downvotes, and 286 community-suggested charging locations. The resulting feedback provided both quantitative indicators of community support and qualitative insights into charging reliability, accessibility, preferred locations, and gaps in the regional charging network. Engagement, however, was concentrated in more coastal and affluent communities, with comparatively less participation from inland areas such as the Salinas Valley.

The most frequently cited concerns with existing chargers included broken or unreliable equipment, insufficient charging capacity at high-demand locations, and a lack of basic amenities, particularly restrooms, while charging. Participants broadly supported planned EV charging sites, though feedback also indicated that the map captured only a portion of ongoing regional efforts, reflecting the involvement of many partners installing chargers beyond the 49 planned sites shown. Among planned locations, Pinto Lake Park in Watsonville received the highest level of support, followed by Cannery Row Parking Lot, Freedom Branch Library, and San Carlos Beach Park.

Interest was highest in proposing new EV charging locations, with community members suggesting 286 potential sites. These recommendations largely align with places already frequented by EV drivers or located along key transportation corridors, including city-owned lots, commercial and retail hubs, parks, recreational areas, schools, and higher-density neighborhoods. Sites receiving the strongest support included Del Monte Center in Monterey, where respondents called for replacing a frequently non-operational charger with a more reliable installation, and Andrew Molera State Park in Big Sur, highlighting the need for charging access at remote and recreational destinations. Overall, suggested sites cluster in higher-density areas and popular tourist destinations such as Santa Cruz, Monterey/Pacific Grove, Salinas, and Watsonville, with fewer locations identified in San Benito County, pointing to both geographic gaps and opportunities for more balanced regional investment. For more detail, please refer to Appendix D, Padlet Summary: Monterey Bay Area Electric Vehicle Charging Network Feedback.

5 Risk Analysis

The previous sections of the EV CAR Framework examine the two primary factors that influence risk to EV charging infrastructure in the region: grid capacity constraints and PSPS events, which were used to understand the prevalence of anticipated power outages and grid reliability. While each presents challenges independently, additional challenges occur where these conditions overlap. To better understand these combined risks, the Framework overlays the results of the grid capacity and climate vulnerability analysis and group's locations into a series of risk archetypes. These archetypes provide a planning framework for identifying vulnerabilities, prioritizing investments, and targeting resilience strategies to the areas where they may have the greatest benefit.

5.1 Scope and Methodology

The risk analysis combined the results of the grid capacity and climate vulnerability analysis to evaluate risk to existing and future EV charging infrastructure across the Monterey Bay region. Risk was assessed across two dimensions: anticipated grid reliability risk, represented by projected PSPS exposure and projected grid capacity constraints in 2030 and 2045. PSPS events which are implemented as a safety measure in response to wildfire conditions were modeled over time since they are currently the most prominent climate-related power outage experienced in the region.[5] However, the region could experience outages from many other causes including equipment failures, increasingly powerful winter storms, extreme heat, or company initiated work programs. PSPS events, therefore, are intended to represent broader risks associated with electrical service interruptions and reliability challenges that could affect EV charging operations. This analysis captures both the reliability of electrical service and the ability of the electric system to accommodate future charging demand.

The EV CAR Framework organizes locations into six risk archetypes to support planning and decision-making. An archetype is a planning category that groups areas with similar risk and infrastructure characteristics. Rather than identifying each location independently, archetypes simplify the categories into a set of common conditions that can be used to identify site level project attributes and priorities, and guide future decisions.

The archetypes were developed using two variables. The first variable is grid reliability risk, as represented by the average number of projected PSPS events. Based on the Vulnerability Assessment, locations were classified as having low exposure (fewer than five PSPS events per year), medium exposure (five to 25 events per year), or high exposure (more than 25 events per year).

The second variable used to define EV charging risk is current and projected grid capacity. Grid conditions across the region were derived from the feeder capacity analysis described in Section 2. Areas with less than 25 percent remaining feeder headroom by the analysis year were classified as constrained, indicating that additional electrical load may require engineering review, infrastructure upgrades, or other measures before new charging demand can be accommodated.

Combining these variables through a geospatial analysis resulted in six distinct archetypes (or combinations of conditions). Each archetype represents a different combination of outage/grid reliability risk and deployment constraints, ranging from areas with low reliability risk and sufficient electrical capacity to areas where high reliability risk and limited grid capacity may affect the availability and resilience of EV charging services. Different archetypes may warrant different resilience approaches, including utility coordination, grid upgrades, managed charging, battery storage, microgrids, backup power systems, or alternative charging technologies.

[5] https://www.pge.com/en/about/pge-systems/electric-systems/electric-reliability-reports.html

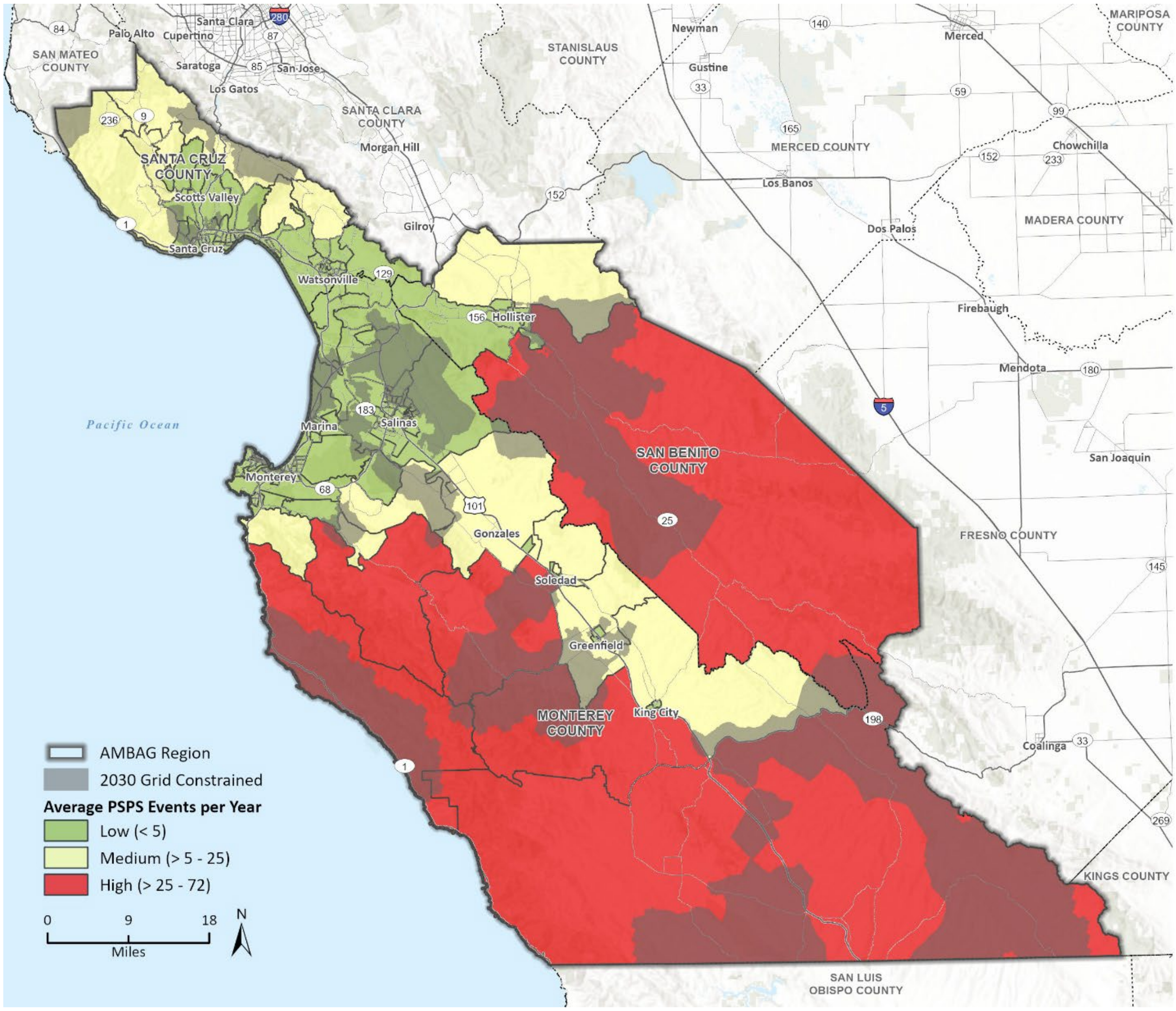
While the archetypes are based on grid reliability risk and grid capacity constraints, their implications vary by EV charger type. This analysis focuses on the two most common charger types; Direct Current Fast Charging (DCFC) and Level 2 (L2). These charger types serve different functions within the regional charging network and place different demands on the electrical system that influence the strategies needed to support their resilient operation. DCFC installations require substantially more electrical capacity and are therefore more sensitive to existing and future grid constraints. In constrained areas, deployment of DCFC infrastructure may require utility upgrades, demand management approaches, or other supporting infrastructure before installation can occur. L2 chargers generally require less electrical capacity and may be more feasible in constrained locations, particularly when paired with managed charging or load-sharing strategies. As a result, the types of deployment challenges and resilience measures associated with each archetype may differ depending on the charger technology being considered. The archetype framework translates technical findings into a practical planning tool. By grouping locations according to their dominant risks, the archetype framework helps AMBAG and its partners prioritize investments, evaluate proposed charging locations, and align the adaptation strategies presented in the Roadmap Appendix A with local conditions.

The following sections present the combined grid capacity and grid reliability conditions for 2030 and 2045 to show how risk changes over time. The 2030 analysis provides a near-term planning horizon for identifying areas where grid constraints and potential outage exposure may affect early EV infrastructure deployment, while the 2045 analysis illustrates longer-term conditions as EV adoption and charging demand continue to grow across the region.

5.2 Grid Condition in 2030

Figure 9 combines 2030 projected grid constraints with projected PSPS exposure. While the individual analyses describe these conditions independently, overlaying the two datasets reveals where multiple risks converge. Areas with constrained electrical infrastructure and elevated PSPS exposure face the greatest challenges for EV charging deployment and reliability, while areas with only one risk factor may require more targeted interventions. In the figures below, Areas with green, yellow, and red colors denote a high, medium, or low number of PSPS events per year respectively, while areas with a dark shading denote areas that are expected to have less than 25% grid capacity remaining.

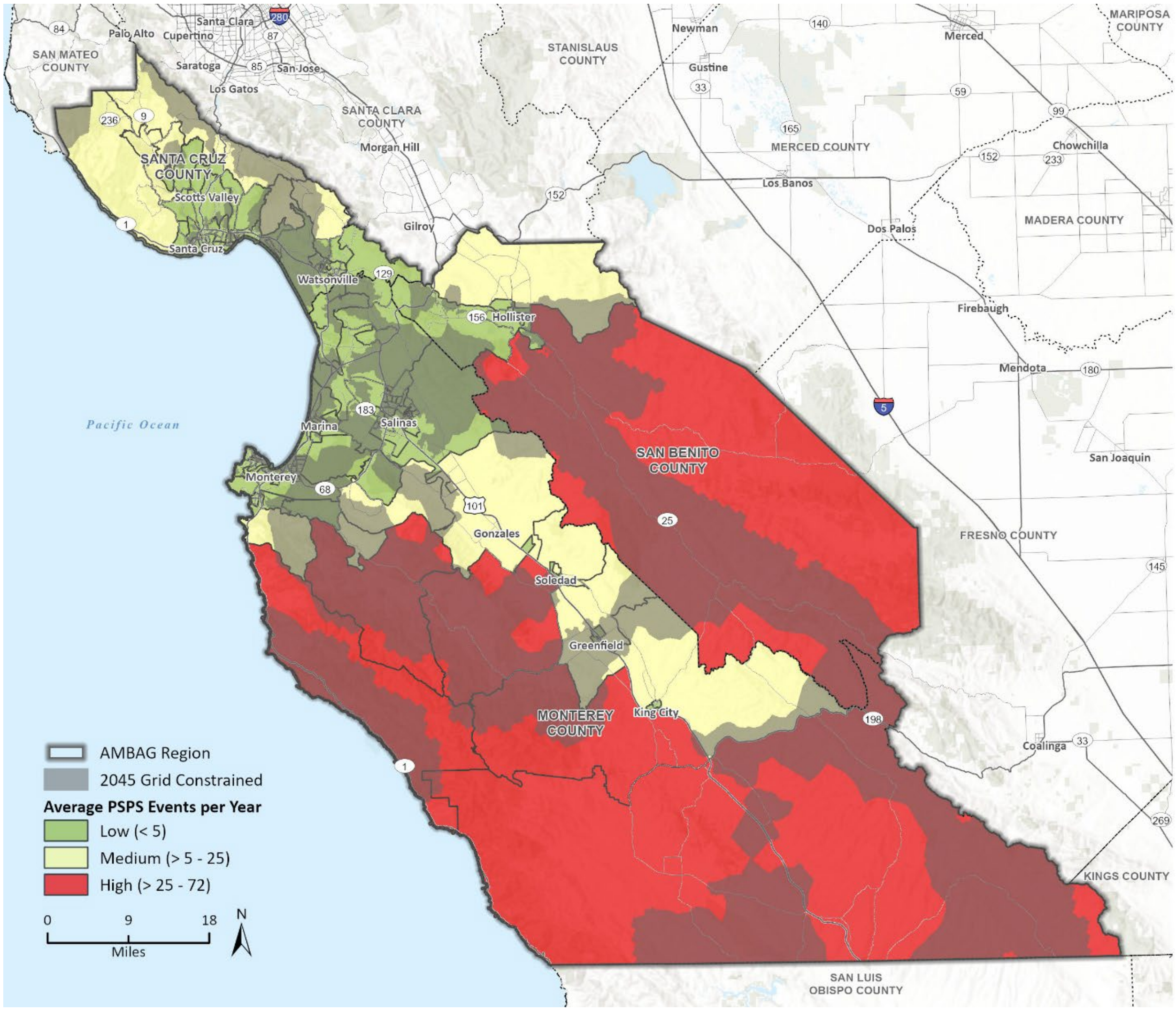
Figure 9 2030 Risk Conditions



5.3 Grid Condition in 2045

Figure 10 presents the same analysis for 2045. Compared to 2030, projected grid constraints become more widespread, increasing the number of locations where grid limitations coincide with climate-related outage risk. While PSPS exposure remains concentrated in many of the same areas identified in the climate vulnerability analysis, the expansion of grid constraints suggests that electrical capacity may become an increasingly important consideration for future EV charging deployment. Together, the two maps illustrate how risk conditions evolve over time and provide the basis for the archetype framework described further below.

Figure 10 2045 Risk Conditions



5.4 Aligning Grid Constraints With Archetypes

The risk archetypes provide a framework for translating the combined PSPS and grid capacity analyses into planning categories. While the data provided in Figure 9 and Figure 10 are specific to PSPS areas, the archetypes provided can apply to any region with electrical reliability issues. Each archetype represents a combination of outage exposure and electrical capacity constraints and can be used to identify the types of resilience strategies that may be most appropriate in different parts of the region.

ARCHETYPE 1: High PSPS + Grid Constrained

Challenge: Current or future grid constraints limit or prohibit charger deployment (grid at capacity or near capacity) + Frequent electrical shutoffs (25+ events/year)

Map Example

These areas are seen in Figure 9 and Figure 10 as red with the grid constrained grey shading underneath. In Figure 9 an example of this would be southern Monterey County and in Figure 10 would be northern Monterey County.

DCFC

CANNOT DEPLOY WITHOUT GRID UPGRADE. High power demand consumes feeder capacity. Grid upgrades may be a prerequisite. Once grid is upgraded: consider dedicated battery storage to limit peak demand impacts/charges. Consider off-grid or grid-edge solutions if grid upgrades are not feasible.[6]

L2

LIMITED DEPLOYMENT POSSIBLE. Limit the number of L2 ports to avoid grid overload. If more ports are needed, implement smart charging technology to manage demand. Grid upgrades may be required for larger deployments. Including smart charging could help decrease need for grid upgrades later.

ARCHETYPE 2: High PSPS + Not Grid Constrained

Challenge: Grid has capacity + Frequent electrical shutoffs (25+ events/year)

Map

These areas are seen in Figure 9 and Figure 10 as red with no shading underneath. In Figure 9 an example of this would be east San Benito County and in Figure 10 would be southwest Monterey County.

DCFC

DEPLOY WITH GRID CONNECTION. Grid has adequate capacity for standard deployment. Battery storage/microgrid optional for additional load management/backup for PSPS or other outage events.

L2

DEPLOY WITH GRID CONNECTION. Grid has adequate capacity for standard deployment. For multiple ports, implement smart charging to manage demand and optimize grid use. Including smart charging could help decrease need for grid upgrades later.

ARCHETYPE 3: Medium PSPS + Grid Constrained

Challenge: Cannot deploy chargers (grid at capacity or near capacity) + Moderate electrical shutoffs (5-25 events/year)

Map

These areas are seen in Figure 9 and Figure 10 as yellow with the grid constrained grey shading underneath. In Figure 9 an example of this would be northwest Santa Cruz County and in Figure 10 would be Greenfield.

DCFC

CANNOT DEPLOY WITHOUT GRID UPGRADE. Grid upgrade/off-grid solution may be a prerequisite for deployment. Technologies to increase PSPS and other outage resilience is secondary priority due to moderate event frequency.

L2

LIMITED DEPLOYMENT POSSIBLE. Limit the number of full power L2 ports to avoid grid overload. If more ports are needed, implement smart charging technology. Grid upgrades may be required for larger deployments. Including smart charging could help decrease need for grid upgrades later.

[6] https://utahcleancities.org/wp-content/uploads/2023/07/ChargeWest-Off-and-Low-Grid-Assessment.pdf

ARCHETYPE 4: Medium PSPS + Not Grid Constrained

Challenge: Grid has capacity + Moderate electrical shutoffs (5-25 events/year)

Map

These areas are seen in Figure 9 and Figure 10 as yellow with no shading underneath. In Figure 9 an example of this would be Gonzales and in Figure 10 would be western Santa Cruz County.

DCFC

DEPLOY WITH GRID CONNECTION. Grid has adequate capacity. Battery storage optional for load management or peak shaving.

L2

DEPLOY WITH GRID CONNECTION. Standard deployment. For multiple ports, implement smart charging for demand management.

ARCHETYPE 5: Low PSPS + Grid Constrained

Challenge: Cannot deploy necessary chargers (grid at capacity) + Rare ELECTRICAL shutoffs (<5 events/year)

Map

These areas are seen in Figure 9 and Figure 10 as green with the grid constrained grey shading underneath. In Figure 9 an example of this would be the City of Santa Cruz and in Figure 10 would be Watsonville.

DCFC

CANNOT DEPLOY WITHOUT GRID UPGRADE. Grid upgrade/off-grid solution may be a prerequisite for deployment. Technologies to increase PSPS and other outage resilience is secondary priority due to moderate event frequency.

L2

LIMITED DEPLOYMENT POSSIBLE. Limit the number of L2 ports. Lower priority unless high EV adoption is projected. Including smart charging could help decrease need for grid upgrades later.

ARCHETYPE 6: Low PSPS + Not Grid Constrained

Challenge: None - standard conditions

Map

These areas are seen in Figure 9 and Figure 10 as green with no markings underneath. In Figure 9 an example of this would be Scotts Valley and in Figure 10 would be the City of Monterey.

DCFC

DEPLOY AS-IS. Standard deployment.

L2

DEPLOY AS-IS. Standard deployment.

Key Takeaways

The risk analysis highlights that grid capacity constraints remain one of the primary challenges to future EV charging deployment, particularly for larger charging installations. DCFCs require substantially more electrical capacity than L2 chargers and are therefore more likely to require utility upgrades in constrained areas. In contrast, L2 chargers (or even smaller Level 1 chargers for multi-family residential use) may be more feasible in some constrained locations through managed charging, load sharing, or limiting the number of charging ports. As EV adoption increases throughout the region, coordination with utilities will remain an important consideration for ensuring that charging infrastructure can be deployed where it is most needed.

6 Approaches to Advance Resilient EV Deployment

With a stronger understanding of EV infrastructure needs, community barriers to EV adoption, climate-related grid impacts, and grid capacity constraints, twelve implementation strategies were developed to improve the resilience and equitable distribution of EV charging infrastructure. These strategies, presented in detail in the EV CAR Roadmap Appendix A, are informed by analysis of existing EV infrastructure, community feedback, grid constraints, and where charging is most needed now and in the future. Together, they provide a framework for guiding decisions, clarifying roles, facilitating action, and coordinating investment among AMBAG and its partners.

6.1 Equity Guardrails Criteria and Analysis

AMBAG is invested in promoting an equitable and community-driven approach to expanding EV infrastructure in communities most affected by climate change. To help ensure that the EV CAR Framework advances equitable outcomes, the AMBAG project and consultant team developed Equity Guardrails Criteria as a framework for evaluating proposed adaptation and resilience strategies through an equity lens. The Equity Guardrails Criteria are informed by community engagement and organized around procedural, distributional, and structural equity, that are intended to help identify and address potential unintended consequences while prioritizing investments that benefit underserved communities. This equity framework aligned with EV infrastructure goals will help ensure that underserved communities' needs and interests are incorporated into project design and implementation. Foundational equity concepts are explained below, and are subsequently reflected in the adaptation strategies (see EV CAR Roadmap Appendix A) and embedded in the partner roles, creating an equity-informed framework.

While this framework identifies what equity might look like and point at solutions that can help bring about equitable outcomes, it is also the case that a few equity-inspired actions taken on by actors in isolation will not bring about a hoped-for outcome. For agencies and partners to meaningfully engage in this work, equity must be considered in the majority of interventions made rather than solely in the preliminary selection of programs or projects.

The risk that, without public intervention, EV infrastructure will continue to serve a small minority of more affluent community members further underscores the critical importance of approaching this work with equity as a central guiding concept. Presently, EV charging is located in areas with heavier use by more urban community members who are more likely to be able to afford an EV. Without targeted intervention and investment by AMBAG and its partners in the region, this trend will likely continue and opportunities for creating a more resilient Monterey Bay Area will be lost. For more detail, please reference Appendix E" Equity Guardrails Criteria and Analysis Memorandum.

Procedural Equity

- **Adopt a Fair and Transparent Process for EV Infrastructure Decision-making:** Ensure that community members, particularly those from underserved 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 underserved residents.

- **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 the strategies (see EV CAR Roadmap Appendix A), 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.

Distributional Equity

- **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 underserved 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, strategically placing EV infrastructure next to public transit stops and stations can enhance the regional transportation system and strengthen first-last mile connections.
- **Prioritize EV Infrastructure Investments for Highest Need Communities:** Prioritize EV infrastructure investments in communities that have been 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 or CalEnviroScreen. This may include prioritizing the maintenance, reliability, and charging capacity of EV charging equipment in communities that have experienced historic disinvestment. Expanding equitable access to EV infrastructure strengthens emergency evacuation and response capabilities for underserved communities with limited transportation options.

Structural Equity

- **Increase EV-related Knowledge in Underserved 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.
- **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 underserved communities.

6.2 Adaptation Strategy Framework

Building on the analyses presented throughout this Framework, the twelve adaptation strategies presented in the EV CAR Roadmap Appendix A provide a practical roadmap for strengthening the resilience and equity of the Monterey Bay region's EV charging network. The strategies are organized into four complementary categories:

- **Energy Resilience**, which focuses on improving grid reliability and flexibility during power outages;
- **Siting and Design**, which promotes resilient, accessible, and user-centered charging infrastructure;

- **Mobility**, which expands transportation options and integrates EV charging into the broader transportation network; and
- **Collaboration, Funding, and Outreach**, which emphasizes regional coordination, equitable investment, and sustained community engagement.

These strategies translate the Framework's technical analyses and community-informed priorities into actionable approaches that AMBAG and its partners can pursue to build a more climate-resilient, reliable, and equitable EV charging system for the region. More detailed information about each strategy, along with implementation actions, is included in the EV CAR Roadmap Appendix A.

Energy Resilience

1. Install Renewable Energy and Battery Storage at Priority Charging Sites
2. Enhance Community and Grid Resilience Through Bidirectional Charging
3. Preserve Grid Capacity Through Smart Charging and Load Management

Siting and Design

4. Develop Installation Tools and Guidelines for Public-Benefit Sites
5. Create Accessible, User-Centered EV Infrastructure Design and Service Delivery
6. Address Charging Needs at Multi-Family Housing
7. Address Charging Needs at Rural and Agricultural Community-Serving Properties

Mobility

8. Co-locate EV Charging at Mobility Hubs and Resiliency Centers
9. Design and Deploy Shared EV Mobility Options

Collaboration, Funding and Outreach

10. Facilitate Regional Collaborative Planning and Implementation to Advance Equitable Climate-Resilient EV Infrastructure
11. Direct Funding and Incentives Towards Underserved Communities
12. Sustain Local EV Awareness Campaigns that Advance EV Adoption with Local Partners Partnerships and Coordination

Successful implementation of resilient and accessible EV infrastructure in the Monterey Bay region requires a clarification of the roles among AMBAG and its partners based on an assessment of which entity is best suited to advance the strategies and associated actions (see EV CAR Roadmap Appendix A). Partners in implementing the Framework and the adaptation strategies alongside AMBAG include EV infrastructure providers, cities and counties, transportation agencies, PG&E, local and regional funders, and community-based organizations. Each of these entities could play a pivotal role in advancing many of these roles in collaboration with AMBAG.

Given its unique relationship to the Framework project, AMBAG is well positioned to help carry the Framework's findings through a more focused coordination structure. Rather than continuing the Advisory Committee, the AMBAG project and the consultant team recommend establishing a subcommittee under a regional convening to support ongoing coordination around resilient EV infrastructure. This subcommittee could help play a unique role in advancing its existing findings. This subcommittee would be best suited to help determine the risk posed by climate change to an expanding EV infrastructure network and clarify the timing of that risk, make recommendations to partners on how to address the challenges and problems identified in the Framework, and identify unmet charging needs in the region. In this vein, AMBAG could develop best practices, case studies, play a key role in disseminating information, and advance partnerships between and with other agencies. This strategy is expanded upon in Appendix A of the EV CAR Roadmap.

7 Conclusion and Next Steps

Implementing the EV CAR Roadmap will require sustained coordination among AMBAG, local jurisdictions, utilities, community-based organizations, transportation agencies, property owners, and EV infrastructure providers. While the twelve strategies provide a long-term roadmap, several near-term actions can help build momentum and establish the foundation for equitable and resilient EV infrastructure deployment across the region.

The nearest-term actions include Strategies #8 and #9 from Appendix A, co-locating EV charging at resiliency centers and deploying shared EV mobility options, such as shared EV car-share, short-term rental, and vanpool services. These strategies are already underway with implementation partners actively seeking funding to deploy the strategies across the Monterey Bay region. Collaboration, funding, and outreach strategies (Strategies #10, #11, #12) are also near-term strategies that will be advanced through existing partnerships, community engagement efforts, and funding development. For these strategies, ongoing discussions among partners will continue while new opportunities for regional collaboration will be explored. The focus of these discussions will be to review priority geographies, track implementation needs, coordinate funding opportunities, discuss grid and permitting barriers, and identify where joint action could reduce costs or accelerate deployment.

Strategies #1 and #2, installing renewable energy and battery storage at priority charging sites and enhancing community and grid resilience through bidirectional charging, will be considered priorities as EV infrastructure grows across the region. These strategies are still in the conceptualization phase, and near-term steps will focus on identifying the partners, site types, operating models, and funding opportunities needed to move them from concept to implementable projects.

This Roadmap presents an important first step toward building a more equitable, resilient, and reliable EV charging network across the Monterey Bay region. The strategies presented here provide a practical foundation for coordinated action among public agencies, utilities, community organizations, and private-sector partners to ensure that EV infrastructure investments advance both climate resilience and transportation equity. As EV adoption accelerates and climate risks intensify, proactive planning and collaboration will be essential to ensure that all communities can benefit from a charging network that is reliable during disruptions, responsive to community needs, and aligned with the region's long-term sustainability goals. By acting now, the Monterey Bay region can position itself as a leader in advancing EV infrastructure that not only supports California’s clean transportation goals but also strengthens community resilience for decades to come.

Appendix A

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

Appendix B

EV CAR Framework: Vulnerability Assessment, February 2026

Appendix C

AMBAG EV Framework: Vulnerability and Barriers Assessment – Outreach Summary

Appendix D

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

Appendix E

Equity Guardrails Criteria and Analysis Memorandum, February 2026

Appendix F

Workshop Summaries