CALIFORNIA ENERGY COMMISSION

California Energy Commission
Clean Transportation Program
FINAL PROJECT REPORT

Electrifying California’s Highway 101 Corridor

Prepared for: California Energy Commission
Prepared by: Cleantek Electric Inc on behalf of PlugShare, LLC.

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- Redwood Coast Energy Authority and Mendocino Council of Governments for supporting this project.
- The businesses, cities, and tribes hosting charging on their properties.
- The local jurisdictions committed to streamlining permitting for electric vehicle charging stations.
- The California Governor's Office of Business and Economic Development (GO-Biz), which is working with local jurisdictions to streamline permitting for charging stations.
- Electric utilities across the state supporting electric vehicle charging and working to energize stations as quickly as possible.
- California Department of Transportation, which installed highway signs to help drivers find the stations.
- Electric vehicle drivers, who have made the personal decision to move to cleaner transportation that benefits us all.

PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program, formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program. The statute authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to $20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about $100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued GFO-15-603 to fund projects that will install direct current fast charging stations (DCFC) along major corridors that will fill in the existing gaps for interregional travel for electric vehicles travelling in the state. In response to GFO-15-603, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards October 10, 2016, and the agreement was executed as ARV-16-010 on March 15, 2017.

ABSTRACT

California has set ambitious goals to deploy 5 million zero-emission vehicles by 2030 and 250,000 electric vehicle (EV) charging stations by 2025. To support these objectives, PlugShare constructed 13 EV charging sites in Northern California between 2020 and 2022. These sites are strategically located in Smith River, Orick, Fortuna, Crescent City, Eureka, Miranda, Leggett, Willits, Hopland, Healdsburg, Santa Nella, Los Banos, and Chowchilla, enhancing the EV infrastructure along key transportation corridors.

The installation process encompassed site acquisition, design and engineering, permitting, construction, utility coordination, activation on the PlugShare network, and the implementation of highway and wayfinding signage. Over a six-month reporting period in 2024, these charging stations collectively facilitated 15,000 charging sessions, delivering approximately 300,000 kWh of electricity. This energy enabled over 900,000 miles of travel, displaced more than 35,000 gallons of gasoline, and reduced greenhouse gas emissions by approximately 280 metric tons of CO_2-equivalent.

Key insights from this project include the importance of educating potential site hosts about EV charging benefits; the necessity of streamlining the permitting process, as mandated by AB 1236, to prevent delays; the variability in the interpretation of California's EV charging station accessibility regulations across jurisdictions; the challenges in coordinating with utilities for timely energization; the scarcity of contractors experienced in charging station installations in rural areas; the significant impact of demand charges on the financial viability for station owners; and the advantages of combining incentive programs to enhance cost efficiency.

Keywords: Electric vehicles, EVs, charging stations, charging infrastructure, fast charging, DCFC, Level 2, transportation electrification, highway corridors, rural development, Shell Oil, PlugShare.

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Executive Summary

California has established ambitious targets to deploy 5 million zero-emission vehicles (ZEV) by 2030 and 250,000 EV charging stations by 2025. While many of these charging stations support local travel, strategically positioned charging infrastructure along major highway corridors is crucial for enabling long-distance EV trips. To address this need, PlugShare, in partnership with Shell New Energies US LLC ("Shell"), Broadband Telcom Power Inc ("BTC" or "BTC Power"), and Cleantek Electric Inc ("Cleantek"), successfully designed, constructed, and activated 13 EV charging sites along Northern California's Highway 101 corridor and beyond, creating a robust and accessible charging network to support the state's transportation electrification goals.

Charging Station Installations

Upon award and between March 2017 and November 2024, PlugShare executed site license agreements with site hosts, coordinated deployment partner selections, formed an agreement with Shell as the project off taker, coordinated with utilities, developed, permitted, procured and contracted the installation of direct current fast chargers (DCFCs) and Level 2 chargers across 13 sites in Smith River, Orick, Fortuna, Crescent City, Eureka, Miranda, Leggett, Willits, Hopland, Healdsburg, Santa Nella, Los Banos, and Chowchilla. These sites were strategically located near key highway exits and high-traffic areas, such as fueling stations, dining establishments, retail centers, municipal parking, and lodging facilities.

The project encompassed all critical stages of infrastructure development, including:

- Site acquisition/licensing
- Design and engineering
- Permitting and compliance (including adherence to AB 1236)
- Utility coordination
- Construction
- Energization and commissioning
- Activation
- Addition on the PlugShare and AFDC maps
- Highway and wayfinding signage installation

These steps ensured seamless integration of the stations into the surrounding communities and transportation networks.

CHAPTER 1: Introduction

California's commitment to transportation electrification has positioned the state as a global leader in reducing greenhouse gas emissions and improving air quality. With ambitious goals to achieve 5 million ZEVs on the road by 2030 and deploy 250,000 EV charging stations by 2025[1], the state is working to build the infrastructure necessary to support this transition. As part of this effort, the CEC has prioritized the development of EV charging networks along major highways and in underserved communities, ensuring that all drivers can confidently access clean transportation options.

Between March 2017 and November 2024, PlugShare, in coordination with Shell as the project off taker, contributed to this vision by designing and constructing 14 strategically located EV charging sites across Northern California. These sites, positioned along Highway 101 and other critical corridors, address a key infrastructure gap by supporting both long-distance travel and local commuting. The project aimed to create an accessible, reliable charging network that would reduce range anxiety, facilitate the adoption of electric vehicles, and contribute to California's overarching climate and mobility goals.

This report provides a comprehensive overview of the PlugShare project, detailing the site selection, permitting, construction, activation, and utilization processes, as well as the environmental and economic benefits achieved. It also examines lessons learned during the project's execution, offering valuable insights to inform future EV infrastructure deployments. By sharing these findings, PlugShare demonstrates its commitment to advancing California's transportation electrification goals, fostering collaboration between public and private stakeholders, and promoting sustainable mobility solutions for all.

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[1] California Executive Order B-62-18. 2019. https://www.ca.gov/archive/gov39/2019/01/04/executive-order-b-62-18/index.html.

CHAPTER 2: Charging Station Installations

Charging Sites and Equipment

The project initially encompassed 14 sites, but after receiving CEC approval, one site in Laytonville, CA, was removed due to contractual and physical challenges. These challenges included ADA compliance, necessary improvements to an existing undeveloped gravel driveway and parking area, and the site's proximity to an alternative CEC project site.

At each of the remaining 13 sites, two 350 Amp BTC Power DCFCs were installed, sharing power from a single 200 kW BTC Power unit. This configuration allows a single vehicle to charge at up to 200 kW. However, if two vehicles charge simultaneously, each receives 100 kW. This innovative approach also provides the option to add power units in the future to increase charging capacity. Each DCFC dispenser is equipped with both CCS and CHAdeMO connectors for compatibility with a wide range of EVs. Additionally, a BTC Power 30 Amp dual-port AC Level 2 pedestal unit was installed at each site to provide charging for EVs that may not be capable of using a DCFC or plan on staying in the area for a longer duration.

Table 1: Charging Station Addresses

#	Site	Address	City	State	Zip Code
1	La Joya Mexican Market	10700 US-101	Smith River	California	95567
2	Valley Garden Store	66150 Drive Thru Tree Rd	Leggett	California	95585
3	Pioneer Market	23519 Roberson Blvd	Chowchilla	California	93610
4	Miranda Market	6685 Avenue of the Giants	Miranda	California	95553
5	España's Bar & Grill	1460 E Pacheco Blvd	Los Banos	California	93635
6	NPS South Center	121200 US-101	Orick	California	95555
7	Brutocao Cellars	13500 US-101	Hopland	California	95449
8	Super 8 Motel	1805 Alamar Way	Fortuna	California	95540
9	Village Pantry	1912 Broadway St	Eureka	California	95501
10	Max Machinery	33 Healdsburg Ave	Healdsburg	California	95448
11	Motel 6	28821 Gonzaga Rd	Santa Nella	California	95322
12	City Owned Lot	1000 Front St	Crescent City	California	95531
13	Willits Shipping Center	871 S. Main St	Willits	California	95490

Source: PlugShare LLC

Figure 1: Map of Charging Station Locations

Source: Google Maps

Table 2: Charging Station Descriptions

#	Address	Rating: % Multi-Family	Rating: Housing Density	AADT	Highway Type	Assessment
1	10700 US-101, Smith River, CA 95567	Lowest	Lowest	7300	Minor Artery	Corridor Dominant
2	66150 Drive Thru Tree Rd, Leggett, CA 95585	Lowest	Lowest	5400	Major Collector	Corridor Dominant
3	23519 Roberson Blvd, Chowchilla, CA 95531	Low	Lowest	9800	Minor Artery	Corridor Dominant
4	6685 Avenue of the Giants, Miranda, CA 95553	Low	Lowest	9500	Minor Artery	Corridor Dominant
5	1460 E Pacheco Blvd, Los Banos, CA 93635	Low	Lowest	20150	Major Artery	Corridor Dominant
6	121200 US-101, Orick, CA 95555	Lowest	Lowest	5150	Minor Collector	Corridor Dominant
7	13500 US-101, Hopland, CA 95449	Lowest	Lowest	1125	Local	Corridor Dominant
8	1805 Alamar Way, Fortuna, CA 95540	Lowest	Moderate	20600	Major Artery	Corridor Dominant
9	1912 Broadway St, Eureka, CA 95501	Moderate	High	18550	Major Artery	Split Corridor and Local
10	33 Healdsburg Ave, Healdsburg, CA 95448	High	Moderate	41500	Major Artery	Split Corridor and Local
11	28821 Gonzaga Rd, Gustine, CA 95322	Lowest	Lowest	3325	Minor Collector	Corridor Dominant
12	1000 Front St, Crescent City, CA 95531	High	High	7300	Major Collector	Split Corridor and Local
13	871 S. Main St, Willits, CA 95490	Moderate	Lowest	4625	Minor Collector	Split Corridor and Local

Source: PlugShare LLC

We used the following data to predict the probable local vs. corridor charging use cases at the listed locations.

- **% multi-family and housing density.** Data Source: 2023 ULCA Center for Neighborhood Knowledge. Uses a 5-point system (very high, high, moderate, low, very low) to classify locations by both % of multi-family dwelling sin the community and the overall housing density. Both high multi-family housing density and high housing density are drivers of higher local DCFC usage. Compared to average US BEV drivers, public DCFC dependent drivers with no home charging (L1 or L2) are more than 5 times as likely to be living in multifamily homes, according to a study from PlugShare Research in 2024.
- **AADT.** AADT (average annual traffic data) is drawn from CALTRANS (2021) and is a measure of how heavily traveled a highway/road is. In this case, we averaged the peak back and peak ahead AADT into a single number and took a reading at the closest road location to the DCFC location.
- **Highway type.** We used NHTSA's AADT classification scheme.
- **Assessment.** This is a qualitative rating based on the preceding four data inputs. As multifamily housing density and overall housing density go down, we expect local market share of public DCFC to decrease, and vice versa. Likewise, as traffic density (AADT) rises, it increases the probability of corridor usage, especially in non-urban environments. The average population of the 12 communities in which the charging locations are sited is only 11.5K residents, and this makes "local dominant" usage highly unlikely.

Installation

The installation of EV charging stations is a comprehensive process that extends well beyond the physical construction and activation of the stations. Each step requires careful planning, coordination, and execution to ensure the successful deployment of reliable and accessible charging infrastructure. Figure 2 provides a high-level summary of the key steps involved in the installation process, with a detailed description of each step provided below. Many of these steps are revisited in Chapter 5: Lessons Learned, offering valuable insights to guide future projects and streamline deployment efforts.

Figure 2: Charging Station Installation Process

Source: Cleantek Electric Inc.

Site acquisition

Site acquisition was split into three corridors along US-101 and surrounding area. The first corridor was located from South of Oregon to Garberville and included seven distinct locations. The second corridor was located along US-101 from Leggett to North of Santa Rosa and included three locations. The third corridor was located along SR-152 from SR 99 to East of Gilroy and included three locations. Initially this was a 14-site project, however, the decision and CEC approval was granted for the removal of one site in Laytonville, CA. This was due to contractual and physical challenges of the proposed location. Specifically, Americans with Disabilities Act (ADA) challenges and the required improvements of the existing undeveloped gravel driveway and parking, in addition to the close proximity to an alternative CEC project site, it was determined that in the interest of this project it would be to the benefit of all to remove this location. The selection of the remaining 13 locations were leveraged with several resources, including local EV readiness plans, charging data from PlugShare, traffic data, and local community members and businesses. The goal by acquiring these locations is to install a DCFC corridor to complement existing and planned charging stations to decrease EV range anxiety, but most importantly one that is structured at its core to induce rapid adoption of the next wave of long-range battery electric vehicles (BEVs) by providing multiple, scalable high-powered fast chargers at each location.

Site Design and Engineering

Once site acquisition was completed, the engineering and design phase of the project could begin. Several factors influence the placement of the chargers on the existing property, including considerations for Americans with Disabilities Act (ADA) compliance, street visibility, and the specific requests of the site host regarding charger locations. These factors must all be carefully evaluated to ensure the installation meets both functional and regulatory requirements.

The engineering process follows a series of stages, known as construction drawings (CD), which include CD30%, CD50%, and CD100%. The CD30% stage is the initial phase, focusing solely on the site layout. This preliminary design is then sent to the site host for approval, allowing them to provide feedback or request adjustments to the layout. Once the site host has approved the layout, the project moves to the CD50% stage, which includes the finalized site layout as well as a single-line diagram of the electrical system. At this point, the plans are sent to the utility company to initiate the process for obtaining new electrical service for the site.

Finally, the CD100% stage represents the completion of the engineering plans. At this stage, the plans are fully developed, including an engineering stamp of approval, and are ready for submission to the relevant authorities for permitting. This final set of plans ensures that all aspects of the design are ready to move forward into the construction phase, pending approval from local authorities.

Utility Coordination Pre-construction

At the CD50% stage, the application for new electrical service was completed and submitted. This step marked the beginning of the process for securing the necessary electrical service to power the project. The utility companies involved in this project were Pacific Gas and Electric (PG&E), which was responsible for 10 of the sites, Pacific Power for two sites, and Healdsburg Electric for one site. While each utility company has its own process for deploying new electrical service, they generally follow the same sequence of steps: pre-construction, application submission, pre-assessment, final design, and final contract.
The process for obtaining electrical service can be time-consuming, and the timeline for each step can vary depending on several factors. These include the time of year, the workload of utility project management teams, and the complexity of the site location. For instance, utility companies may experience delays during peak times of the year, or at sites with challenging logistics, further complicating the process. These challenges, and how they affect the overall timeline of the project, will be explored in greater detail in Chapter 5: Lessons Learned.

Permitting

The permits required for the installation of charging stations can vary depending on the local authority having jurisdiction but typically include several key permits. The Electrical Permit is one of the most common, necessary for any electrical work related to the installation of charging stations. This includes tasks such as wiring, installing electrical panels, and connecting the charging stations to the grid. A Building Permit is also typically required if any structural changes are necessary, such as the addition of parking spaces or modifications to existing structures. Additionally, an Encroachment Permit may be required if the charging station is located near public infrastructure, such as sidewalks, streets, or other public areas that could be affected by the installation.

In many jurisdictions, the AB1236 ordinance has been implemented to help streamline the permitting process and reduce delays. This ordinance is intended to shorten the timeline for obtaining permits, making it easier for projects like charging station installations to move forward. However, not all jurisdictions have adopted this ordinance, and in areas where it has not been implemented, the review and issuance of permits can be significantly delayed. These delays can affect the overall timeline of the project, adding complexity and uncertainty to the process.

Once all necessary permits have been approved and received, the project is able to move into the construction phase. At this point, the groundwork for the charging station installation can begin, with all required legal and regulatory steps having been completed.

Construction

The construction phase of the project began with a series of preconstruction meetings, first between the site host and the project team, and then with the utility company. These initial meetings were essential to align all parties on the scope, responsibilities, and timelines for the work ahead. The construction process itself is divided into two main phases: utility construction and customer-side construction, each with distinct tasks and requirements. Customer-side construction refers to all work performed beyond the utility meter. This phase encompasses a variety of tasks, including clearing landscaping, trenching and excavation, installing conduit, pouring concrete pads, setting bollards, and installing and wiring electrical equipment. Once the electrical equipment is properly set and wired, the work must be inspected by the Authority Having Jurisdiction (AHJ). The AHJ's approval, typically in the form of a "green-tag" or "meter release," signifies that the switchboard containing the utility meter socket is set and meets local standards and is ready for further progress.

Simultaneously, utility construction is carried out. This phase includes the installation of primary and secondary conduit, as well as the placement of pre-cast transformer pads or vaults. The utility company is responsible for inspecting all the utility infrastructure work. Once the utility company completes its final inspection of the substructures and the AHJ issues the meter release for the customer-side work, the project can proceed to the energization phase.

The energization process, managed by the utility company, involves setting the meter and scheduling a crew to complete the necessary energization steps. Coordinating this process can be challenging, as scheduling conflicts and other logistical hurdles can arise. These difficulties will be discussed in more detail in Chapter 5: Lessons Learned. After the energization is completed, the AHJ performs a final inspection to ensure all work complies with safety and regulatory standards. Once this inspection is successfully completed, the permit is closed out, officially marking the end of the construction phase.

Commissioning and Testing

After the construction phase is completed, the chargers were then commissioned and tested before officially being open to the public. The construction commissioning consists of conductor megger tests (post install testing of the conductor insulation integrity), continuity, and upon utility energization, voltage tests. Upon construction completion BTC and the Shell service teams were notified for mobilization for final configuration, testing, and commissioning for use by the public.

Current Status

While 11 of 13 sites are operational, Hopland and Los Banos projects are pending utility energization, despite having been fully constructed in 2022. Issues with changing project managers, inspectors and processes at the utility have created ongoing and ever-changing requirements, in additional to increased betterment work at Los Banos further causing delays. While at Orick and Smith River, despite having operational public charging stations the battery energy storage units (also deployed) are pending utility interconnection permits to become operational.

PlugShare and Shell intends on completing the work on the remaining sites, even though the agreement term has expired and that they will notify the CEC when the remaining work is completed and provide proof/documentation such as final permits cards and photos of operational equipment.

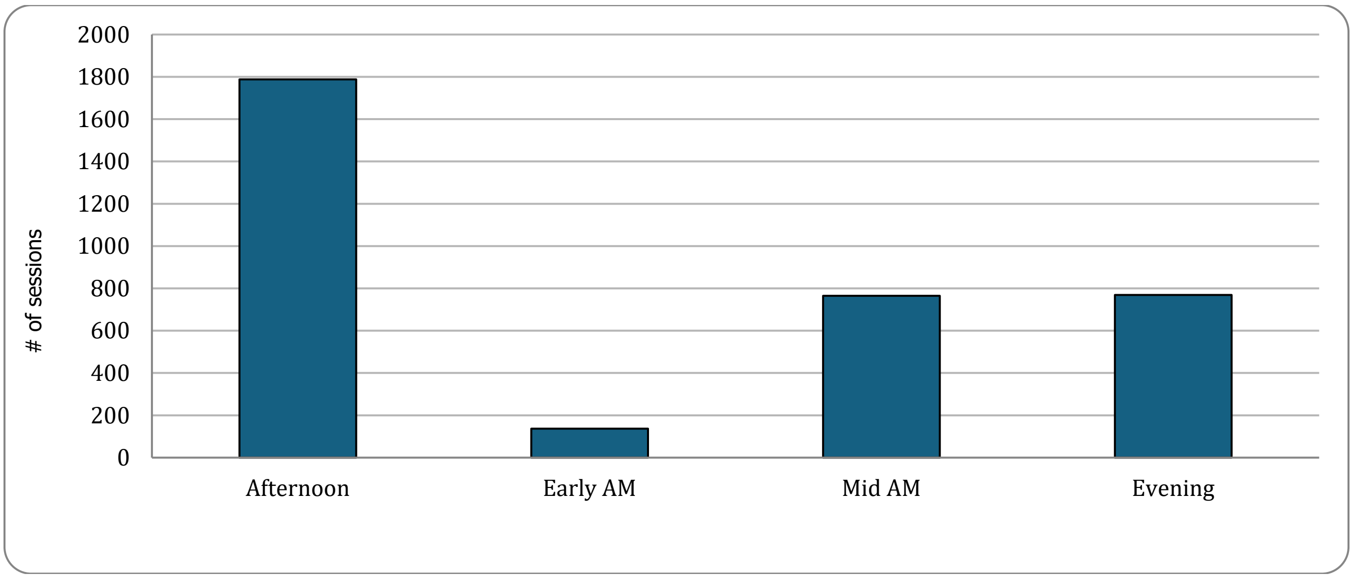
Table 3: Current Status of Charging Stations

#	Site Name	City	Utility Service Provider	Charging Station Operational Date	Outstanding Work	Anticipated Operational Date for Outstanding Work
1	La Joya Mexican Market	Smith River	Pacific Power	9/3/21	BESS permit approval & integration	EOY 2025
2	Valley Garden Store	Leggett	PG&E	2/19/21	None	N/A
3	Pioneer Market	Chowchilla	PG&E	2/9/21	None	N/A
4	Miranda Market	Miranda	PG&E	11/16/22	None	N/A
5	España's Bar & Grill	Los Banos	PG&E	N/A	Replace vandalized charging cords, Utility energization, & Commissioning	4/25
6	NPS South Center	Orick	PG&E	2/23/23	BESS permit approval & integration	EOY 2025
7	Brutocao Cellars	Hopland	PG&E	N/A	Easement approvals, Utility construction, Interconnection, Energization, & Commissioning	5/25
8	Super 8 Motel	Fortuna	PG&E	8/26/22	None	N/A
9	Village Pantry	Eureka	PG&E	4/5/23	None	N/A
10	Max Machinery	Healdsburg	Healdsburg Electric Dept	7/1/22	None	N/A
11	Motel 6	Santa Nella	PG&E	1/26/22	None	N/A
12	City Owned Lot	Crescent City	PG&E	8/25/22	None	N/A
13	Willits Shipping Center	Willits	PG&E	9/30/22	None	N/A

CHAPTER 3:
Charging Station Metrics - 6 Months

The following graphs and tables provide statistics of charger operations, usage, uptime and carbon offset metrics across the deployed and operational charging stations for the period of January 1st, 2024, through June 31st, 2024. During this period all stations except for Los Banos and Hopland were operational. Also note that stations across this project had been placed into service at different dates as provided in Table 4. Traction for charger utilization takes time and with the Orick and Eureka sites having only been fully commissioned in mid-2023 may not have realized their full utilization potential.

Figure 3: Time of Day Utilization



Source: Shell Recharge

The data gathered from all operational sites indicates that the afternoon period experienced the highest demand, with nearly 1,800 charging sessions recorded. This surpasses the usage during any other time of day. Comparatively, the later morning and evening periods demonstrated moderate and relatively similar levels of utilization. Conversely, early morning usage was notably the lowest, with less than 200 charging sessions logged over the entire 6-month duration.

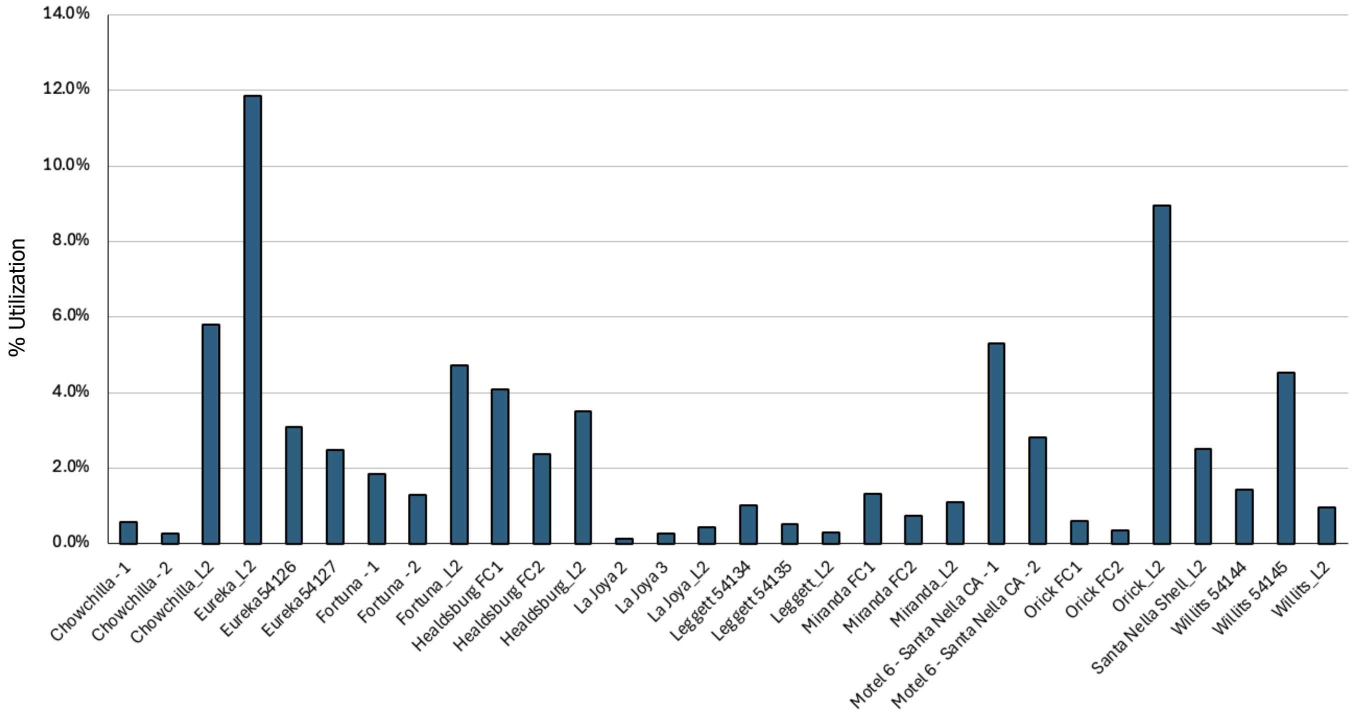
Table 4: Station Operational Date

Charging Station Name	Commissioned Date
Chowchilla_L2	1/25/21
Eureka_L2	1/25/21
Fortuna_L2	1/25/21
Chowchilla - 1	2/9/21
Chowchilla - 2	2/9/21
Leggett 54134	2/19/21
Leggett 54135	2/19/21
La Joya_L2	9/3/21
La Joya 3	9/3/21
La Joya 2	9/3/21
Santa Nella Shell_L2	1/25/22
Motel 6 - Santa Nella CA - 1	1/26/22
Motel 6 - Santa Nella CA - 2	1/26/22
Healdsburg_L2	6/29/22
Healdsburg FC2	6/30/22
Healdsburg FC1	7/1/22
Fortuna - 2	8/26/22
Fortuna - 1	8/26/22
Willits_L2	9/30/22
Willits 54144	9/30/22
Willits 54145	9/30/22
Miranda_L2	10/4/22
Miranda FC1	11/16/22
Miranda FC2	11/16/22
Orick FC1	2/23/23
Orick FC2	2/23/23
Eureka54126	4/5/23
Eureka54127	4/5/23
Orick_L2	5/16/23

Source: Shell Recharge

Station dates above are provided as a reference, since early utilization is often driven by when chargers first become operational. It often takes many months for utilization to gain traction, as many existing EV drivers are tuned to use stations out of habit. It may not be until they have a difference in the routine or have issues with their usual station that they seek new alternatives.

Figure 4: Charging Station Utilization %

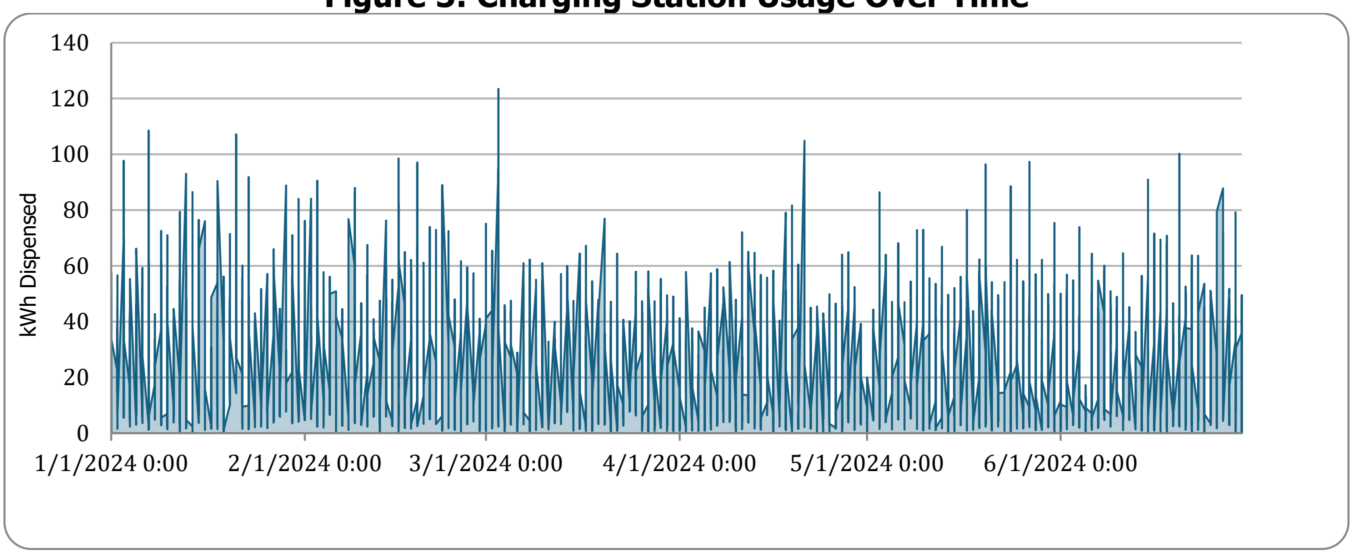


Source: Shell Recharge

Charger utilization analysis reveals that Level 2 chargers in Orick, Chowchilla, and Eureka are experiencing the highest demand. The extended charging time required for Level 2 chargers results in longer dwell times for each charging session. This pattern suggests that these chargers are primarily being utilized by individuals who have the need for longer charging durations, such as hotel guests in Eureka and employees in Chowchilla and Orick, who may leave their vehicles charging overnight or during work hours.

In contrast, the data indicates that DC fast chargers in Santa Nella and Willits exhibit the highest usage rates. The faster charging capabilities of DC chargers attract users who require quick turnaround times, such as travelers passing through these locations.

Figure 5: Charging Station Usage Over Time



Source: Shell Recharge

Daily usage across all sites, show frequent weekly peaks at weekends, with 26 clearly identifiable blocks between peaks representing each of the 26 reporting weeks during the 6-month period. The highest peak was over the weekend of 3/1/24-3/3/24. Analysis of daily usage data across all sites reveals a clear pattern of heightened activity during weekends. This trend is evident throughout the six-month period, with 26 distinct peaks observed, each corresponding to a weekend within the reporting timeframe. This consistent pattern highlights a significant increase in usage during weekends compared to weekdays.

Furthermore, the data pinpoints the weekend of March 1st through 3rd, 2024, as the period with the absolute highest usage peak. This specific timeframe experienced significantly greater activity than any other weekend within the six-month window, indicating a potential anomaly or event that drove exceptionally high usage during those dates.

Table 5: Charging Station Utilization Data: 1/1/24 - 6/30/24

Charger Name	Count of Session ID	Sum of Duration (min)	Sum of Usage (kWh)	Sum of Petroleum Displaced (US Gal)	Sum of GHG Displaced (MT)	Average Utilization %
Chowchilla - 1	51	1475	1877.554	58.35443667	1.480601533	0.57%
Chowchilla - 2	30	685	564.38	17.54094794	0.44505878	0.26%
Chowchilla_L2	61	12562	1180.574	36.69227661	0.930977045	4.85%
Eureka_L2	243	30731	2076.91	64.55042735	1.637809688	11.86%
Eureka54126	209	8006	3821.265	118.765035	3.013373154	3.09%
Eureka54127	134	5346	2431.057	75.55732712	1.917082929	2.06%
Fortuna - 1	116	4787	2694.312	83.7393007	2.124680557	1.85%
Fortuna - 2	83	3378	1885.657	58.60627817	1.486991397	1.30%
Fortuna_L2	62	12234	995.593	30.94306138	0.785104728	4.72%
Healdsburg FC1	349	10583	9099.554	282.8144211	7.175726293	4.08%
Healdsburg FC2	165	6156	4048.052	125.813582	3.192212846	2.38%
Healdsburg_L2	45	9077	731.253	22.72736597	0.576651491	3.50%
La Joya 2	7	258	112.386	3.492960373	0.088625352	0.10%
La Joya 3	24	688	373.906	11.6210101	0.294854793	0.27%
La Joya_L2	9	588	64.544	2.006029526	0.050898108	0.23%
Leggett 54134	90	2658	2482.019	77.14122766	1.957270543	1.03%
Leggett 54135	44	1387	1240.658	38.5596892	0.978358086	0.54%
Leggett_L2	9	634	66.513	2.067226107	0.052450822	0.24%
Miranda FC1	98	3428	2151.524	66.86943279	1.696648796	1.32%
Miranda FC2	61	1960	1282.171	39.84991453	1.011094407	0.76%
Miranda_L2	32	2888	360.686	11.21013209	0.284429766	1.11%
Santa Nella CA 1	448	13743	14703.348	456.9805128	11.59476617	5.30%
Santa Nella CA 2	378	7276	7400.944	230.0215695	5.83623642	2.81%
Orick FC1	71	1601	1365.31	42.43387723	1.07665616	0.62%
Orick FC2	30	748	489.607	15.21700078	0.386094288	0.29%
Orick_L2	117	23221	1149.821	35.73647242	0.906725844	8.96%
Santa Nella Shell_L2	53	6491	762.127	23.68693085	0.60099811	2.50%
Willits 54144	83	3127	2345.878	72.90996115	1.849912473	1.21%
Willits 54145	287	11722	8116.96	252.2753691	6.400872317	4.52%
Willits_L2	53	2524	297.684	9.252027972	0.234747649	0.03%
Grand Total	**3442**	**189962**	**76172.247**	**2367.435804**	**60.06791054**	

Source: Shell Recharge

Table 6: Charging Station Uptime: 1/1/24 - 6/30/24

Station ID	Station Name	Location	Uptime (%)	Downtime (%)	Available (%)	Busy (%)	Reserved (%)	Faulted (%)	Offline (%)	Unknown (%)	Unavailable (%)	Removed (%)
54121	Orick FC2	Orick	65.7	34.3	65.2	0.4	0	12.9	0	21.4	0	0
54140	Santa Nella CA - 1	Santa Nella CA	97.9	2.1	90.5	7.2	0	0	0	2.1	0.2	0
54130	Healdsburg FC1	Healdsburg	97.2	2.8	90.1	7.1	0	0	0	2.8	0	0
54141	Santa Nella CA - 2	Santa Nella CA	97.7	2.3	92	5.6	0	0	0	2.3	0.1	0
54145	Willits 54145	Willits	97.6	2.4	89.8	7.3	0	0	0	2.4	0.5	0
54131	Healdsburg FC2	Healdsburg	97.3	2.7	91.8	5.5	0	0	0	2.7	0	0
54126	Eureka54126	Eureka	98.8	1.2	95.4	3.4	0	0	0	1.2	0	0
52638	Leggett_L2	Leggett	94.9	5.1	94.8	0.1	0	0	0	5.1	0	0
54127	Eureka54127	Eureka	98.6	1.4	88.3	6.3	0	0	0	1.4	4	0
52639	Eureka_L2	Eureka	98.6	1.4	92.7	5.9	0	0	0	1.4	0	0
54125	Fortuna - 1	Fortuna	98.3	1.7	95.4	2.9	0	0.2	0	1.5	0	0
54132	Miranda FC1	Miranda	95.7	4.3	91.7	4	0	2.1	0	2.1	0	0
52640	Miranda_L2	Miranda	52.3	47.7	35.7	0.9	0	0	0	47.7	15.7	0
52641	Healdsburg_L2	Healdsburg	97.9	2.1	96.3	1.6	0	0	0	2.1	0	0
52642	Orick_L2	Orick	96.8	3.2	92.9	3.8	0	0	0	3.2	0	0
54120	Orick FC1	Orick	63.1	36.9	62.4	0.7	0	25.6	0	11.4	0	0
54133	Miranda FC2	Miranda	95.6	4.4	93	2.6	0	2.1	0	2.3	0	0
54124	Fortuna - 2	Fortuna	98.2	1.8	91.4	6.7	0	0.1	0	1.7	0	0
54134	Leggett 54134	Leggett	95.2	4.8	94.1	1	0	0	0	4.8	0	0
52648	Santa Nella Shell_L2	Santa Nella CA	93.8	6.2	92.6	1.2	0	0	0	6.2	0	0
52636	Willits_L2	Willits	97.4	2.6	96.9	0.5	0	0	0	2.6	0	0
52643	Fortuna_L2	Fortuna	98	2	94.7	2.2	0	0	0	2	1.1	0
54135	Leggett 54135	Leggett	93.3	6.7	92.7	0.6	0	0	0	6.7	0	0
52645	Chowchilla_L2	Chowchilla	98.3	1.7	96.3	2	0	0	0	1.7	0	0
54144	Willits 54144	Willits	77.2	22.8	75.9	1.3	0	20.9	0	1.9	0	0
52637	La Joya_L2	Smith River CA	96.8	3.2	96.7	0.1	0	0	0	3.2	0	0
54136	Chowchilla - 1	Chowchilla	98.7	1.3	97.8	0.8	0	0	0	1.3	0	0
54137	Chowchilla - 2	Chowchilla	96.2	3.8	95.2	0.5	0	1	0	2.8	0.5	0
54123	La Joya 3	Smith River CA	98	2	97.6	0.3	0	0.1	0	2	0	0
54122	La Joya 2	Smith River CA	98.4	1.6	98.3	0.1	0	0.1	0	1.5	0	0

Source: Shell Recharge

Uptime and availability of each charging station.

Table 7: Greenhouse Gas Displacement

Charging Station Name	Sum of Petroleum Displaced (US Gal)	Sum of GHG Displaced (MT)
Chowchilla - 1	58.35443667	1.480601533
Chowchilla - 2	21.85550894	0.554530245
Chowchilla_L2	37.77258741	0.958387297
Eureka_L2	65.77168609	1.66879615
Eureka54126	118.765035	3.013373154
Eureka54127	75.55732712	1.917082929
Fortuna - 1	84.74666667	2.150240012
Fortuna - 2	58.60627817	1.486991397
Fortuna_L2	30.94306138	0.785104728
Healdsburg FC1	285.7809479	7.250994677
Healdsburg FC2	127.6073349	3.237724952
Healdsburg_L2	22.72736597	0.576651491
La Joya 2	3.492960373	0.088625352
La Joya 3	11.6210101	0.294854793
La Joya_L2	2.006029526	0.050898108
Leggett 54134	77.14122766	1.957270543
Leggett 54135	38.5596892	0.978358086
Leggett_L2	2.120808081	0.053810333
Miranda FC1	67.04599845	1.701128719
Miranda FC2	39.84991453	1.011094407
Miranda_L2	11.21013209	0.284429766
Santa Nella CA - 1	458.124289	11.6237867
Santa Nella CA - 2	230.0215695	5.83623642
Orick FC1	44.10483294	1.119052586
Orick FC2	15.21700078	0.386094288
Orick_L2	35.73647242	0.906725844
Santa Nella Shell_L2	23.72767677	0.602031938
Willits 54144	72.90996115	1.849912473
Willits 54145	254.687366	6.462070856
Willits_L2	9.252027972	0.234747649
Grand Total	2385.317203	60.52160742

Source: Shell Recharge

Per station carbon offset metrics in equivalent gasoline and greenhouse gas (GHG) displacement.

CHAPTER 4: Benefits to California

During the initial six-month period of operation, from January 1, 2024, to June 30, 2024, the EV charging stations installed through this project have already demonstrated their efficacy in reducing greenhouse gas emissions. By facilitating the use of electric vehicles, these stations have displaced 4,770 gallons of gasoline, resulting in a notable reduction of 121 metric tons of GHG emissions. To put this into perspective, this reduction is equivalent to the amount of carbon sequestered by 42.5 acres of U.S. forests in one year. This tangible outcome underscores the immediate and positive environmental impact of investing in EV charging infrastructure. Data from the U.S. Department of Energy further reinforces the potential of electric vehicles to displace gasoline consumption and reduce emissions. According to their research, each electric vehicle has the capacity to displace approximately 1,000 gallons of gasoline annually. This displacement not only translates to lower emissions but also contributes to improved air quality and decreased demand for petroleum. As charging station networks continue to expand and become more accessible, it fosters greater confidence and convenience in EV ownership, encouraging more drivers to make the switch to electric vehicles. This increased adoption creates a positive feedback loop, amplifying the environmental benefits and accelerating the transition towards a sustainable transportation system.

The establishment of a robust and interconnected network of EV chargers is of paramount importance for California. This network, connecting key regions such as the Oregon border to Santa Rosa and extending from Gilroy to Chowchilla, is not only instrumental in supporting the state's transportation electrification goals but also in building confidence among California residents as they transition to electric vehicles. By ensuring that charging stations are readily available and accessible, the state can alleviate concerns about range anxiety and promote the widespread adoption of electric vehicles.

Furthermore, this initiative has not only yielded environmental benefits but has also generated economic opportunities and supported local communities. During the implementation of the project, at least 15 construction jobs, 3 engineering roles, and 3 project management positions were created, contributing to employment and economic growth. Additionally, the project has fostered the development and expertise of companies specializing in the e-mobility sector, such as PlugShare, Shell, BTC, and Cleantek. By supporting these companies, the initiative has helped to position California as a leader in the burgeoning clean technology industry.

In conclusion, the installation of EV charging stations represents a multifaceted and impactful approach to addressing climate change, improving air quality, and promoting sustainable transportation. By investing in this critical infrastructure, California is taking bold steps towards a cleaner and more sustainable future. The environmental, economic, and social benefits of this initiative are substantial and will continue to grow as the network of charging stations expands and electric vehicle adoption increases.

CHAPTER 5: Lessons Learned

COVID-19 & Permitting

The COVID-19 pandemic significantly disrupted many industries, and the permitting process for EV infrastructure was no exception. Several factors related to the pandemic contributed to delays in obtaining the necessary permits for EV charging stations, which slowed down the rollout of this essential infrastructure during a critical time of growing demand for electric vehicles.

One of the primary reasons for these delays was the closure or reduced capacity of permitting offices due to health and safety protocols. Many local governments and permitting authorities temporarily shut down or limited in-person operations, making it difficult for applicants to submit physical documents or engage in face-to-face meetings with permit reviewers. This created a backlog of applications, as many jurisdictions were unable to process permits at their usual pace. Even when permitting offices remained open, the shift to remote work for city employees slowed the review process, as it often led to slower communication and limited access to physical files.

Moreover, many jurisdictions had to adapt to new procedures and technology quickly, which resulted in confusion and inefficiencies. While some areas implemented online permitting portals to mitigate the challenges of in-person interactions, many cities and counties struggled to fully transition to digital platforms. This inconsistency in technological readiness further exacerbated delays, as not all stakeholders had the necessary resources or training to adapt to the new systems effectively.

Additionally, the pandemic disrupted supply chains, which affected the availability of materials and equipment needed for the installation of EV charging stations. Many vendors faced delays in shipping equipment, and construction teams often had to contend with labor shortages due to COVID-19 restrictions or illness. These challenges further slowed the pace of installation, even after permits were eventually issued.

The pandemic also shifted the priorities of many local government agencies. With a focus on public health and safety, some departments put less emphasis on non-urgent infrastructure projects, including EV charging station installations. As a result, many permit reviews were postponed or deprioritized, adding to the overall delay in the deployment of EV infrastructure.

In summary, COVID-19 delayed the permitting process for EV infrastructure through a combination of office closures, remote work challenges, inconsistent technological adaptation, supply chain disruptions, and shifting priorities within local governments. These factors collectively hindered the timely rollout of the infrastructure needed to support the growing adoption of electric vehicles.

Permitting delays by different jurisdiction standards & AB1236

The permitting process for EV charging stations in California varies significantly across different AHJs, especially in more rural areas. In some jurisdictions, permitting offices require wet-stamped and physically submitted plans, which can cause delays in the submission and review process. For example, the City of Willits required five sets of physical printed 24x36-inch construction plans to be submitted for review. If revisions were needed, an additional three sets of revised plans had to be submitted, further adding resources, expense and extending the timeline. Fortunately, some jurisdictions have adopted permitting portals that allow for online submissions, streamlining the process and reducing delays.

The adoption of the AB1236 ordinance has played a key role in simplifying the permitting process for electric vehicle charging stations. This ordinance aims to expedite the issuance of permits by creating a standardized process across jurisdictions. However, not all jurisdictions, particularly smaller offices, especially those in rural areas, complied with the ordinance, which can lead to inconsistencies and slower approval times. One challenge that complicates the process further is the involvement of multiple departments in reviewing plans. Each department may review the plans at different times, resulting in a disjointed and delayed process. Under AB1236, however, jurisdictions are required to issue a "Single Corrective Action Notice," which consolidates all deficiencies and requests for additional information into one comprehensive notice, helping to streamline the correction and approval process. This change is outlined California Governor's Office of Business and Economic Development's (GO-Biz) Electric Vehicle Charging Station Permitting Guidebook, which states that the AHJ commits to issuing a single written corrective action notice detailing all necessary revisions for the permit to be expedited (https://business.ca.gov/wp-content/uploads/2019/12/GoBIZ-EVCharging-Guidebook.pdf).

Another challenge faced during the permitting process was the review of plans for aesthetic purposes, which sometimes added significant costs to the installation. Several jurisdictions required that charging equipment be screened or even fully enclosed, driving up installation costs. While GO-Biz helped mitigate some of these costs, the aesthetic requirements still delayed the timeline for receiving an approved permit. These challenges highlight the complexities and variations in the permitting process across different jurisdictions in California, underscoring the need for continued efforts to streamline procedures and ensure timely approvals for the expansion of EV charging infrastructure.

Utility design and energization

The development of EV infrastructure within PG&E's territory has faced significant delays throughout the course of this project, stemming from a variety of factors. The project, which involves 10 sites in PG&E's service area, has been impacted by issues at several stages, including the utility final design, land documents for easements, inspections, and energization scheduling. Moreover, the abandonment of PG&E's EV-dedicated division mid-way through the project has further contributed to these delays, as the company's internal restructuring caused disruption and inefficiencies. These setbacks have significantly extended the timeline of the project and created frustration for all parties involved.

One of the earliest and most impactful delays occurred during the final utility design phase. It took an average of 14 to 18 weeks to receive the final designs, only to discover that there

were major issues with the routing of power. This required multiple redesigns for two sites, further extending the timeline and delaying the overall progress of the project. Such issues, which should have been identified earlier in the design process, added unnecessary complications and wasted valuable time.
The land documents for easements presented another significant challenge. Initially, PG&E informed the project team that land documents would not be necessary for most sites in their territory. However, in November 2021, it was revealed that land documents were indeed required for these sites. By the time this information was provided, most of the sites had already been green-tagged by the AHJ and were ready for PG&E's meter set. Unfortunately, the process for PG&E to draw up the land documents took until June 2022 in some cases, further delaying the project.

A further complication arose when PG&E seemingly abandoned its dedicated EV division mid-way through 2021. This division consisted of project managers (PMs), planners, and designers who were dedicated to the EV infrastructure projects. The dissolution of this division left many of the project's sites without consistent leadership. As a result, the project was assigned new PMs, and some sites were reassigned to their third PM. This lack of continuity created significant setbacks, as the new PMs had to get up to speed on the projects without proper handoffs from the previous team members. Moreover, it was discovered that critical tasks, such as filing land documents and forwarding requests for information (RFIs) to project planners, had been neglected by the prior PMs. These oversights further delayed key milestones, including meter sets and energization dates.

The delays didn't stop with project management changes. PG&E's inspection process was also impacted, as at a key period during construction there was only one PG&E inspector assigned to seven of the ten sites before the dissolution of the EV division. After the division was dissolved, the new inspectors needed to re-inspect several sites, as earlier signoffs by the single inspector were not recorded and issues that had previously been cleared were found to now need further corrections. This re-inspection process caused further delays and incurred substantial additional costs in the energization phase, which had already been delayed due to other factors.

Another challenge was PG&E's scheduling for energization. The company's project managers were often stretched thin, dealing with delays from other projects and taking on emergency and fire hardening tasks, which diverted resources away from the EV infrastructure projects. This caused delays in energization, as PG&E could not prioritize these installations alongside other urgent work.

The remaining two sites, Hopland and Los Banos, experienced delays of their own due to Caltrans permits, redesigns, and additional changes in the project's PMs. PG&E was required to pull Caltrans permits for betterment work, but the process took many months. Once the permits were eventually issued, it was discovered that the entire scope of work had not been included in PG&E's permit, which caused another three to four months of delay.

Today, two-and-a-half years after the construction completion at both Hopland and Los Banos, we only recently received word of Los Banos' energization, while Hopland has remained at a standstill despite dozens of attempts to seek updates from the PG&E team.

In conclusion, while COVID-19 may have contributed to some of the earlier development delays, the primary cause of the extensive delays in this project stems from poor project management by PG&E and a lack of transparency regarding the timeline for key processes. The abandonment of the EV-dedicated division and the subsequent reorganization created a lack of continuity and communication in project leadership and oversight, which led to significant inefficiencies. However, once a new project manager was assigned to the northern territory sites, the pace of progress improved considerably. These sites were completed within 6 to 7 months, a timeline that was much more in line with expectations and far more reasonable for how long these projects should take. This experience highlights the importance of effective project management and clear communication in the successful execution of large infrastructure projects.

Construction

The construction process for projects in California for EV charging stations can be influenced by a variety of factors, ranging from seasonal weather conditions to jurisdiction-specific inspection processes, the timing of meter releases and pandemics. These factors must be carefully navigated to ensure that the construction timeline remains on track and the project progresses smoothly.

In Northern California, the time of year plays a critical role in the construction schedule, especially during the winter months. Due to the region's climate, the winter season can present challenges such as rain, cold temperatures, and limited daylight hours, all of which can delay construction activities. For this reason, timing is a top priority to ensure that construction proceeds without unnecessary delays. Additionally, certain areas of California impose a "no-dig" season, typically between October and May, during which excavation work is restricted to prevent damage to the soil or underground utilities during wet conditions. This further complicates the construction timeline and requires careful planning to avoid work stoppages during these months.

Another key element that affects the construction process is the inspection requirements set by each local AHJ. Different AHJs may have distinct inspection protocols, which can vary widely, especially for projects like EV charging stations. For example, one AHJ might require both an electrical final inspection and a building final inspection to close the permit, while another AHJ may only require an electrical final inspection. This variation can introduce uncertainty into the project timeline, as it’s essential to understand the specific inspection requirements of the relevant AHJ from the outset.

In addition to understanding which inspections are needed, the process for scheduling them is another consideration. Some AHJs require inspections to be scheduled by phone, while others have online portals for this purpose. This can create logistical challenges, especially when the project is located in rural areas where inspections may only be conducted on specific days or in particular regions of the county. These restrictions can lead to significant delays, as construction work essentially halts until the necessary inspection is completed. Therefore, it is crucial to plan ahead and be aware of any potential inspection scheduling challenges.
One of the most effective ways to minimize delays is by holding a preconstruction meeting with the AHJ’s inspector, if possible. While not all AHJs allow for this type of meeting, when it is available, it can be a valuable opportunity to ensure that everyone is aligned on the project’s requirements. During the preconstruction meeting, the contractor and inspector can discuss

any unique aspects of the project, clarify inspection procedures, and address any potential concerns before work begins. This upfront communication can help to prevent misunderstandings and streamline the inspection process, ultimately contributing to a smoother construction timeline.

Furthermore, some AHJs may allow for an early meter release inspection, which can significantly improve the efficiency of the project. This inspection, which can be requested once the electrical switchgear is delivered and set, permits the utility company to begin its process for setting the meter on site, even before the final electrical inspection is completed. Typically, the electrical final inspection could take days or even weeks after the switchgear is set, but by securing an early meter release inspection, this gap can be reduced, allowing the utility company to set the meter more quickly. This can save valuable time and reduce downtime between the completion of construction and the utility's final installation of the meter.

In conclusion, the construction of EV charging stations in Northern California is subject to a range of external factors that can influence the project timeline. Seasonal weather conditions, inspection processes, and early meter release options all play crucial roles in ensuring a successful and timely completion. By carefully planning the schedule, understanding the specific requirements of each AHJ, and exploring opportunities such as preconstruction meetings and early meter release inspections, contractors can minimize delays and keep the construction process running smoothly. Ultimately, attention to detail and proactive communication with the AHJ can make a significant difference in the efficiency and success of the project.

Final note: Two remaining EV charging sites remain unenergized despite years of construction completion at Hopland and Los Banos. We will continue to push and coordinate PG&E for the energization of these sites due to ongoing requests, especially due to changing leadership. Furthermore the prolonged process for Battery Energy Storage permits at Smith River and Orick with Pacific Power and PG&E, respectively, despite being installed for over 18 months, remains a priority to help offset costly demand charges and support the grid by peak shaving, eliminating high power draws from the grid, by charging batteries during the night when grid demand is low and utilizing battery power during high power peak periods.

GLOSSARY

ALTERNATING CURRENT (AC)—Flow of electricity that constantly changes direction between positive and negative sides. Almost all power produced by electric utilities in the United States moves in current that shifts direction at a rate of 60 times per second.

AMERICANS WITH DISABILITIES ACT (ADA) -- ADA refers to the Americans with Disabilities Act of 1990 which is one of the most significant federal laws governing discrimination against persons with disabilities. This Act prohibits discrimination against individuals with disabilities in employment, housing, education, and access to public services. The ADA defines a disability as any of the following: 1. "a physical or mental impairment that substantially limits one or more of the major life activities of the individual." 2. "a record of such impairment." or 3. "being regarded as having such an impairment."

ASSEMBLY BILL (AB) -- A proposed law, introduced during a session for consideration by the Legislature, and identified numerically in order of presentation; also, a reference that may include joint and concurrent resolutions and constitutional amendments, by Assembly, the house of the California Legislature consisting of 80 members, elected from districts determined on the basis of population. Two Assembly districts are situated within each Senate district.

AUTHORITY HAVING JURISDICTION (AHJ) -- An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

BATTERY ELECTRIC VEHICLE (BEV)—Also known as an "All-electric" vehicle (AEV), BEVs utilize energy that is stored in rechargeable battery packs. BEVs sustain their power through the batteries and therefore must be plugged into an external electricity source in order to recharge.

CALIFORNIA DEPARTMENT OF TRANSPORTATION (Caltrans)—Responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries.[2]

CALIFORNIA ENERGY COMMISSION (CEC)—The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's five major areas of responsibilities are:

1. Forecasting future statewide energy needs
2. Licensing power plants sufficient to meet those needs
3. Promoting energy conservation and efficiency measures
4. Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels
5. Planning for and directing state response to energy emergencies.

COMPRESSED NATURAL GAS (CNG)—Natural gas that has been compressed under high pressure, typically between 2,000 and 3,600 pounds per square inch, held in a container. The gas expands when released for use as a fuel.

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[2] Department of Transportation glossary webpage https://dot.ca.gov/az.html

DIRECT CURRENT (DC)—A charge of electricity that flows in one direction and is the type of power that comes from a battery.

ELECTRIC VEHICLES (EV) -- A broad category that includes all vehicles that are fully powered by Electricity or an Electric Motor.

GOVERNOR'S OFFICE OF BUSINESS AND ECONOMIC DEVELOPMENT (GO-Biz) -- The Governor's Office of Business and Economic Development (GO-Biz) serves as the State of California's leader for job growth and economic development efforts. They offer a range of services to business owners including: attraction, retention and expansion services, site selection, permit assistance, regulatory guidance, small business assistance, international trade development, and assistance with state government.

GREENHOUSE GAS (GHG) -- Any gas that absorbs infra-red radiation in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), halogenated fluorocarbons (HCFCs), ozone (O_3), perfluorinated carbons (PFCs), and hydrofluorocarbons (HFCs). (EPA)

KILOWATT (kW) -- One thousand (1,000) watts. A unit of measure of the amount of electricity needed to operate given equipment. On a hot summer afternoon a typical home, with central air conditioning and other equipment in use, might have a demand of four kW each hour.

KILOWATT-HOUR (kWh) -- The most commonly-used unit of measure telling the amount of electricity consumed over time. It means one kilowatt of electricity supplied for one hour. In 1989, a typical California household consumes 534 kWh in an average month.

METRIC TON (MT) -- a unit of mass equal to 1000 kilograms.

PG&E -- The acronym for Pacific Gas and Electric Company an electric and natural gas utility serving the central and northern California region.

ZERO-EMISSION VEHICLE (ZEV) -- Vehicles which produce no emissions from the on-board source of power (e.g., an electric vehicle).