SCAG EV Charging Station Study

Plug-In Electric Vehicle (PEV) Infrastructure Plan

Reviewed and Approved
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PEV Infrastructure Plan

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ABOUT SCAG

SCAG is the nation's largest metropolitan planning organization (MPO), representing six counties, 191 cities and more than 19 million residents. SCAG undertakes a variety of planning and policy initiatives to encourage a more sustainable Southern California now and in the future.

VISION

Southern California's Catalyst for a Brighter Future

MISSION

To foster innovative regional solutions that improve the lives of Southern Californians through inclusive collaboration, visionary planning, regional advocacy, information sharing, and promoting best practices.

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EXECUTIVE SUMMARY

In 2018, California passed AB 2127 which formalized the State's goal to have 5 million EVs on the road by 2030 and has accelerated the need for electrifying transportation throughout the SCAG region[1]. In September 2020, California Governor Gavin Newsom issued Executive Order N-79-20 which is expected to increase AB 2127's target to 8 million EVs by 2030, as well as the goals of 100% medium- and heavy-duty vehicles be zero-emission by 2045; and drayage trucks by 2035 where feasible.[2] In August 2022, California Air Resources Board (CARB) passed the Advanced Clean Cars II (ACC II) rule to help the State meet these goals by requiring vehicle manufactures to sell an increasingly higher percentage of zero-emission vehicles (ZEVs) shown in Figure 1, until 100% of new light-duty vehicle sales are zero-emission in 2035.[3]

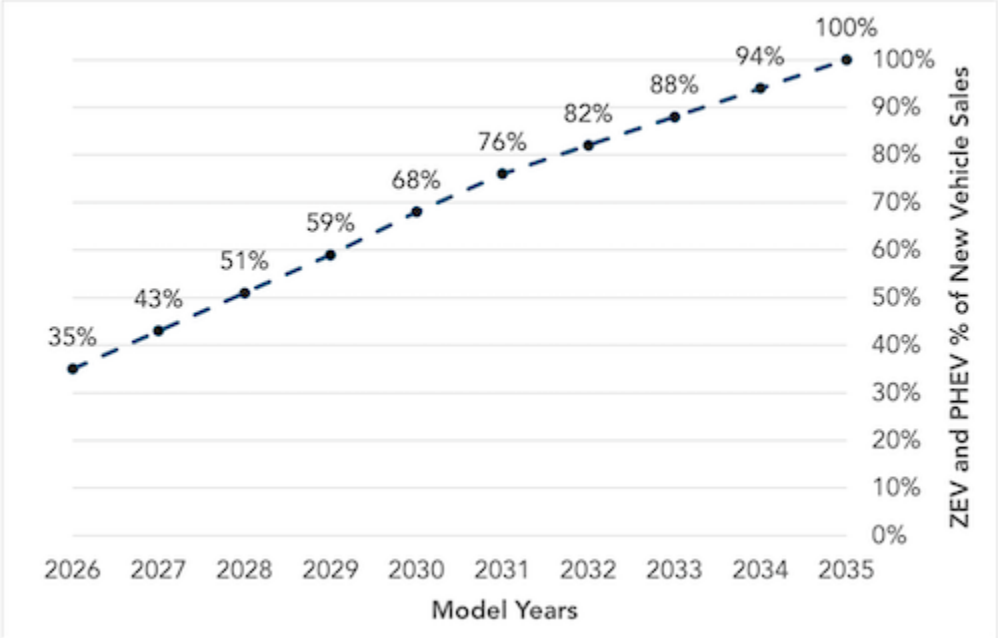

FIGURE 1. ADVANCED CLEAN CARS II PROPOSED ZEV SALES REQUIREMENTS

The intent of this infrastructure plan is to help the Southern California Association of Government (SCAG) promote the development and deployment of electric vehicle (EV) charging infrastructure across the region to accelerate transportation electrification in line with statewide goals. This plan also supports 18 cities and the SGVCOG (Table 1) that participated with SCAG throughout the course of this Study. At the start of the project, Cities were classified by their size or regional location: Small Cities, Large Cities, or San Gabriel Valley Cities. The intent was to group Cities together that may have similar characteristics, such as population, income, demographics, or be at similar stages along their EV journey. In this study, a few Cities already have a significant amount of EV infrastructure in place, other Cities have some EV infrastructure with gaps to fill, and some Cities have little to no existing EV infrastructure. However, the amount of EV existing infrastructure did not necessarily line up with SCAG's initial classifications. As a result, during this Study, participating Cities were classified by their EV infrastructure status, and suitability analysis scenarios were developed to better weight the criteria based on the City's respective needs.

[1] Electric Vehicle Charging Infrastructure Assessment - AB 2127 | California Energy Commission
[2] California Governor Gavin Newsom Executive Order N-79-20, September 23, 2020.
[3] Advanced Clean Cars II | California Air Resources Board

- Expanding – Cities with substantially built out EV infrastructure and are looking to expand into hard-to-reach areas such as Disadvantaged communities (DACs) and multi-unit dwellings (MUDs)
- Progressing – Cities with some EV infrastructure, but still have significant gaps to fill
- Initiating – Cities with little to no existing EV Infrastructure and have a need to start with the most desirable, highly utilized sites

Cities that did not participate in the Study can use the results of the suitability analysis scenario that best aligns with their existing infrastructure status or goals.

TABLE 1 – CITIES IN STUDY REGION

Participating Cities	City Classification	Existing EVCS Infrastructure Status
Anaheim	Large City	Expanding
Artesia	Small City	Initiating
Baldwin Park	San Gabriel Valley	Initiating
Covina	San Gabriel Valley	Progressing
Culver City	Large City	Expanding
Diamond Bar	San Gabriel Valley	Progressing
Glendora	San Gabriel Valley	Initiating
La Puente	San Gabriel Valley	Initiating
La Verne	San Gabriel Valley	Initiating
Long Beach	Large City	Expanding
Los Angeles	Large City	Expanding
Monrovia	San Gabriel Valley	Initiating
Pico Rivera	Small City	Initiating
Redlands	Small City	Progressing
Rosemead	San Gabriel Valley	Initiating
San Dimas	San Gabriel Valley	Progressing
San Gabriel Valley Council of Governments (SGVCOG)	N/A	N/A
South El Monte	San Gabriel Valley	Initiating
Walnut	San Gabriel Valley	Progressing

To help reach California's ambitious transportation electrification goals, SCAG and the participating Cities each have a role to play to facilitate EV adoption and to support EV infrastructure. The California Energy Commission (CEC) projects that about 1,127,000 public and shared Level 2 EV charging stations (EVCS) and 37,000 Level 3 direct current fast chargers (DCFC) will be needed statewide to support 8 million electric vehicles by 2030[4]. The same number of EVs may also be supported by a greater share of DCFCs. Statewide EVCS needs were scaled down to the SCAG region and City-wide level based on population and statewide car ownership rates. Multiple infrastructure pathways were developed, starting with the CEC's estimate as a high Level 2 EVCS baseline. Given the availability of DCFC specific funding sources, other infrastructure pathways with a higher proportion of DCFC were developed. Using California's 2022 CALGreen Code as a guide, every additional DCFC may substitute for five Level 2 charging stations. Different infrastructure pathway targets for the quantity of EVCS throughout the SCAG Region and for each participating City by 2030 are summarized in Table 1Table 2. These targets are above and beyond private EVCS that may be installed at personal single-family residences.

EVCS Terminology

EV Charging stations may be described in several ways including EV Supply Equipment (EVSE), charging stations, chargers, charging ports, or connectors. An EVCS may be equipped with one or multiple charging ports. **For the purposes of this report and the quantity of EVCS discussed, one charging station is assumed to be one charging port.**

TABLE 2 – TARGET QUANTITY OF EVCS BY 2030

Participating Cities	CEC Estimate Pathway		Mixed DCFC Pathway		High DCFC Pathway	
	Level 2 EVCS Target	DCFC Target	Level 2 EVCS Target	DCFC Target	Level 2 EVCS Target	DCFC Target
SCAG Region	546,366	17,937	217,674	72,720	92,596	93,566
Artesia	478	16	190	64	81	82
South El Monte	591	19	235	79	100	101
Walnut	853	28	340	114	145	146
La Verne	919	30	366	122	156	157
San Dimas	971	32	387	129	165	166
Monrovia	1,050	34	418	140	178	180
Culver City	1,117	37	445	149	189	191
La Puente	1,141	37	455	152	193	195
Covina	1,372	45	547	183	232	235
Glendora	1,478	49	589	197	250	253
Rosemead	1,548	51	617	206	262	265
Diamond Bar	1,603	53	639	213	272	275

[4] Alexander, Matt, Noel Crisostomo, Wendell Krell, Jeffrey Lu, and Raja Ramesh. July 2021. Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment: Analyzing Charging Needs to Support Zero-Emission Vehicles in 2030 – Commission Report. California Energy Commission. Publication Number: CEC-600-2021-001 – CMR.

Participating Cities	CEC Estimate Pathway		Mixed DCFC Pathway		High DCFC Pathway	
	Level 2 EVCS Target	DCFC Target	Level 2 EVCS Target	DCFC Target	Level 2 EVCS Target	DCFC Target
Pico Rivera	1,797	59	716	239	305	308
Redlands	2,031	67	809	270	344	348
Baldwin Park	2,165	71	862	288	367	371
Anaheim	9,982	328	3,977	1,329	1,692	1,709
Long Beach	13,314	437	5,304	1,772	2,256	2,280
Los Angeles	113,148	3,715	45,079	15,060	19,176	19,377

A focus of this Study was to better understand the unique needs, challenges, and successes of each participating City on facilitating EVCS installation and increasing EV adoption. This was accomplished through a comprehensive and multi-pronged community and stakeholder engagement effort. To better understand the public's perception and barriers to EV ownership, fact sheets and surveys were distributed at 15 community events and made available online. Over the 15 community events, several common themes become apparent regarding the public's perception towards buying and owning EVs:

- High cost of ownership
- Limited EVCS in their area
- Unable to charge at home or place of business
- Limited amount of various EV models
- Mileage range very limited
- Thankful that SCAG was conducting this Study and providing useful information

The feedback received stressed the need to increase publicly available charging infrastructure to increase confidence in the EV technology and alleviate range anxiety. Survey respondents were asked to indicate where they would like to see more EVCS. The top three responses were their primary residence, public parking lots, and commercial areas.

Given that the SCAG region may need between 185,000 and 564,000 EVCS by the end of the decade, understanding where the EVCS should be equitably located is critical. To accomplish this, a suitability analysis for the entire SCAG region was completed to help prioritize where charging stations could be installed to support the future 8 million EV target in the state. The suitability analysis considered a wide array of variables including demographics, site type, accessibility, equity, convenience, transit, environment, or employment to prioritize potential locations and was informed by the stakeholder and community feedback on which criteria to include and how to weight them. A total of four different scenarios were developed to better align with a City's existing EV infrastructure status including a baseline scenario, Initiating, Progressing, and Expanding. The results of the suitability analysis are available on SCAG's PEV Readiness Atlas. The suitability analysis can be used by City planners, EVCS project developers, or other industry stakeholders as a guide on where to site potential EVCS given a City's existing EV infrastructure status or equity priorities. Highest scoring sites should be evaluated first for viability. The suitability analysis, while comprehensive in the criteria considered, was not able to capture all the factors that make an EVCS project viable or cost effective. Factors like parking lot size and configuration to meet ADA requirements or potential utility points of interconnection were not captured and will need to be evaluated on a site-by-site basis.

Each City has a substantial infrastructure gap to meet their estimated 2030 EVCS targets. After the suitability analysis was completed, the top scoring sites within each participating City were reviewed for their viability to host EVCS that may help target future development. A total of 200 sites were evaluated and each included a recommended EVCS quantity and power level. If all the identified sites were developed as proposed, it would meet approximately 1% of the CEC Pathway/High Level 2 EVCS gap between all the participating Cities (Table 3).

TABLE 3 – SITE EVALUATION CONTRIBUTION TOWARDS EVCS GAP – CEC PATHWAY

City	Level 2 EVCS Gap	DCFC Gap	Site Eval Level 2 EVCS	Site Eval DCFC	Remaining Level 2 EVCS Gap	Remaining DCFC Gap	Percent of Level 2 Gap Filled	Percent of DCFC Gap Filled
Anaheim	9,530	225	115	1	9,415	224	1.2%	0.4%
Artesia	478	16	47	4	431	12	9.8%	25.5%
Baldwin Park	2,121	67	80	0	2,041	67	3.8%	0.0%
Covina	1,354	45	29	2	1,325	43	2.1%	4.4%
Culver City	967	0	62	3	905	0	6.4%	-
Diamond Bar	1,542	11	53	1	1,489	10	3.4%	9.4%
Glendora	1,457	49	85	1	1,372	48	5.8%	2.1%
La Puente	1,141	31	76	2	1,065	29	6.7%	6.4%
La Verne	901	30	41	1	860	29	4.6%	3.3%
Long Beach	12,858	390	87	2	12,771	388	0.7%	0.5%
Los Angeles	108,657	3,458	231	21	108,426	3,437	0.2%	0.6%
Monrovia	1,029	34	87	3	942	31	8.5%	8.7%
Pico Rivera	1,779	55	125	14	1,654	41	7.0%	25.5%
Redlands	1,969	40	58	8	1,911	32	2.9%	20.2%
Rosemead	1,534	45	38	0	1,496	45	2.5%	0.0%
San Dimas	956	26	41	4	915	22	4.3%	15.5%
South El Monte	581	17	56	0	525	17	9.6%	0.0%
Walnut	840	28	57	6	783	22	6.8%	21.4%
Participating City Total	148,854	4,538	1,368	73	147,486	4,465	0.9%	1.6%

The site evaluations completed under this Study identify a very small percentage of the total EV infrastructure the SCAG region may need by 2030. SCAG may need between 151,000 and 530,000 more chargers by the end of the decade to support the State's 8 million EV goal, depending on the type of EVCS installed. Level 2 EVCS typically cost between $10,000-$50,000 per port to install, while DCFC typically cost between $75,000-$200,000+ per port to install. The entire SCAG region may require between $6-$30 billion to install enough EVCS to fill in the 2030 charging gaps (Figure 2). While Cities can lead the way by installing EVCS at publicly owned locations, most of this investment is expected to come from the private sector. The public sector has a role to play in forming public-private partnerships, connecting the private sector to funding sources, creating policies to encourage investment, and streamlining EV permitting to reduce project development timelines.

EVCS Infrastructure Gap

Depending on the mix of Level 2 and DCFCs, between 151,000 and 530,000 more chargers may be needed within the SCAG region by the end of the decade to support the State's 8 million EV goal. This is expected to require between $6B-$30B in investment to install the necessary EVCS.

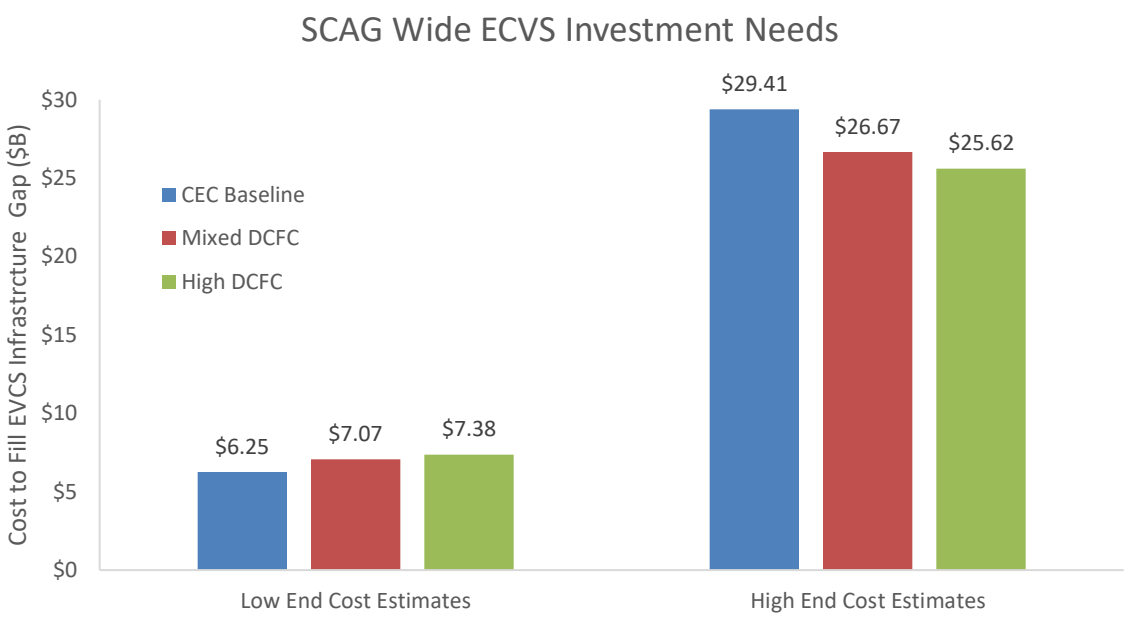

FIGURE 2. LOW- AND HIGH-END COST ESTIMATES TO INSTALL EVCS NEEDED TO MEET SCAG WIDE 2030 TARGETS

During the Study, participating cities were interviewed to understand how they process permit applications for EVCS to determine best practices for streamlining to comply with AB1236 and AB970. Regardless of AB1236 compliance, most cities were found to meet the intent of the law by quickly issuing permits. Residential EVCS permits are typically handled as an electrical permit and issued within a couple of days, though larger projects take longer to review and may require close coordination among multiple specialties to meet the timelines. Some Cities have gone further and automated the process for smaller EVCS projects through online Express permits. As a result, Cities are generally expected to be able to meet the permit review and approval timelines set under AB 970, which came under full effect for all Cities January 1, 2023. For Cities that outsource permitting to third-parties, close coordination or future contract changes may be needed to ensure permits are reviewed and approved within AB970 timelines.

Permitting Best Practices

- Clear and easy to find requirements posted to City website
- Allow for electronic submittals, review, and approval
- Close internally coordination for larger EVCS projects
- Automate permit approval if resources allow

There are still knowledge gaps on EVs and their benefits. Issues like cost, range anxiety, and limited charging infrastructure are still problems that the industry needs to overcome, but the technology continues to improve, and more charging stations are installed each year. SCAG and Cities should continue to engage their community and educate the public on the benefits of EV ownership. Cities should create dedicated EV landing page on their website and link to trusted sources of information on EVs including funding opportunities to reduce the cost of buying an EV or installing an EVCS. Cities may continue to use the educational materials developed under this Study, such as the EV brochure and EVCS Guide for Property managers.

INTRODUCTION

In 2018, California passed AB 2127 which formalized the State's goal to have 5 million EVs on the road by 2030 and has accelerated the need for electrifying transportation throughout the SCAG region[5]. In September 2020, California Governor Gavin Newsom issued Executive Order N-79-20 which is expected to increase AB 2127's target to 8 million EVs by 2030, as well as the goals of 100% medium- and heavy-duty vehicles be zero-emission by 2045; and drayage trucks by 2035 where feasible.[6] In August 2022, California Air Resources Board (CARB) passed the Advanced Clean Cars II (ACC II) rule to help the State meet these goals by requiring vehicle manufactures to sell an increasingly higher percentage of zero-emission vehicles (ZEVs) shown in Figure 3, until 100% of new light-duty vehicle sales are zero-emission in 2035.[7] Creating accessible and reliable electric vehicle (EV) charging infrastructure will play a crucial role in meeting these goals and in reducing pollution and greenhouse gas emissions. California is expected to need 1.2 million EV charging stations (EVCS) to support the 8 million light-duty EVs and an additional 157,000 EVCS to support the 180,000 medium- and heavy-duty vehicles by 2030.

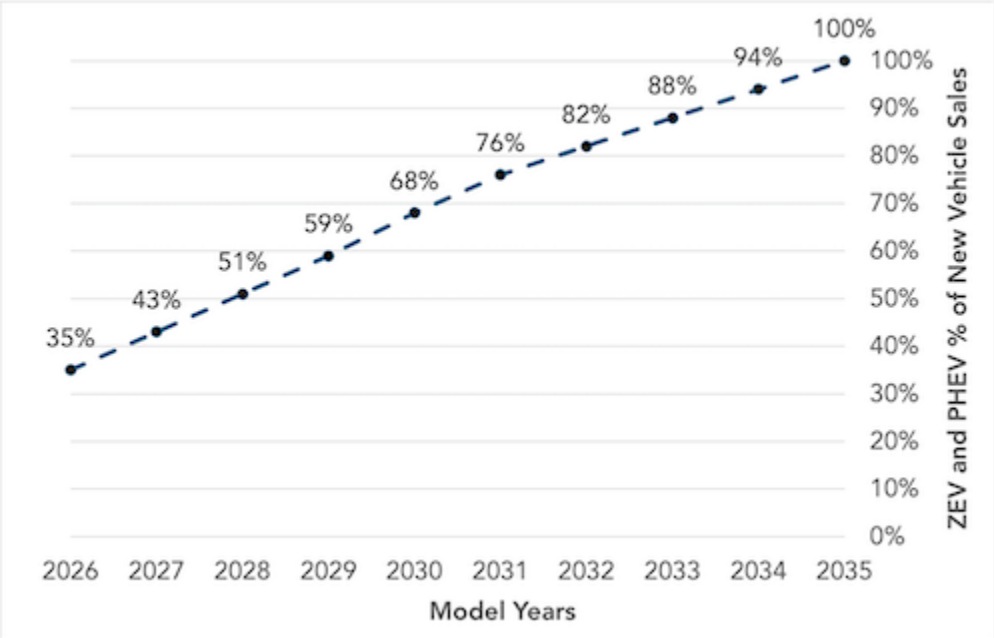

FIGURE 3. ADVANCED CLEAN CARS II PROPOSED ZEV SALES REQUIREMENTS

One of SCAG's goals of this project was to identify where EVCS should be located to best serve EV drivers, with a particular focus on serving people that live in MUDs, DACs, or other hard to reach segments. Developing an EVCS project requires thought and planning to be cost effective and beneficial to EV drivers. In the earliest deployments, vendors and other third parties dictated site selection and charger placement. While that may have worked reasonably well to date with the first wave of EVCS deployments, a lack of knowledge about where to site future charger stations is still a significant barrier to expanding the EVCS network through individual Cities and the SCAG region. Furthermore, without a guiding criterion in place, SCAG and its member cities may not be able to direct the expansion of their EV Charging

[5] Electric Vehicle Charging Infrastructure Assessment - AB 2127 | California Energy Commission
[6] California Governor Gavin Newsom Executive Order N-79-20, September 23, 2020.
[7] Advanced Clean Cars II | California Air Resources Board

network in a way which meets their specific goals such as equitable access to EV Charging or as a key component of economic development. To meet this need, a regionwide suitability analysis was developed to help guide City planners, private project developers, and other stakeholders identify where EVCS may be most suitable or needed. Four different scenarios were developed to better align with different stages of EVCS deployment so Cities could pick a scenario that best aligns with their current needs and goals.

Based on the scoring results and City feedback a total of 100 detailed site evaluations were completed. Detailed site evaluations include a conceptual layout and construction cost estimates for a potential project and describes the quantity and power level of chargers appropriate for the site. Another 100 sites were identified for further evaluation and include a recommended EVCS power level and quantity, but do not provide conceptual layouts or construction cost estimates.

The Study was informed through significant stakeholder and community engagement and feedback. Listening sessions were held with each participating City to understand how they can better streamline their EV permit process and address challenges with installing EVCS on publicly owned property. Additional listening sessions were held with EVCS project developers and MUD property owners. The project team also attended 15 community events throughout the SCAG region to understand the general population's perspective on EVs and to discuss benefits of EV ownership. Information was gathered through a survey and verbal comments. Lastly, a Steering Committee consisting of key stakeholders such as utility representatives, additional Cities, EVCS manufacturers, and EV advocates was developed to provide feedback throughout the Study.

Installing enough EVCS to support 8 million EVs statewide will be a capital-intensive endeavor. Areas that may need EVCS the most, such as in MUDs or DACs, typically do not have the funds to purchase and install new EVCS. As a result, increasing access funding opportunities will be critical to implementing EVCS projects. EVCS funding opportunities exist at the federal, state, utility, and local level, but it remains a patchwork to be navigated. SCAG and Cities have a role to play in highlighting these funding opportunities to their communities and stakeholders.

Overall, this infrastructure plan includes several key elements to help the Cities plan for future charging infrastructure implementation in their jurisdiction including: a review of EV charging basis, a suitability analysis indicating where charging infrastructure is needed, site evaluations for potential project sites, a review of community outreach, a review of funding resources. and policy and permitting recommendations that can support the private sector. Data supporting the site suitability analysis can be obtained from SCAG upon request.

EV INFRASTRUCTURE NEEDS

Charging infrastructure for EVs will look very different than the fueling infrastructure for gasoline vehicles. While personal gasoline vehicles fuel almost exclusively at privately owned gas stations in just a few minutes, charging will be more heterogeneous, as chargers can be located at personal residences, workplaces, commercial destinations, or DCFC charging hubs. The California Energy Commission (CEC) projects that about 1,127,000 public and shared private Level 2 chargers and 37,000 DCFCs will be needed statewide to support the Governor's goal of 8 million electric vehicles by 2030. Shared private chargers are chargers that are designated by a property owner or lessee to be available for employees, tenants, visitors, and/or residents. These charging stations may not be completely publicly accessible, but they are not assigned to individual drivers or vehicles either, such as those at office buildings or in common area parking at apartments. The statewide Level 2 charging station targets are broken up between 327,000 workplace chargers, 330,000 MUD chargers, and 470,0000 public or commercial chargers (Table 4). For the purposes of this report, one charger is defined as one charging port.

TABLE 4 – CEC 2030 STATEWIDE CHARGER TARGETS

EV Target	Charger Quantity	Percentage of Total (%)	Distribution of L2 chargers
Workplace L2	327,000	28.1%	29.02%
Public L2	470,000	40.4%	41.70%
MUD L2	330,000	28.4%	29.28%
DCFC	37,000	3.2%	
Total Chargers	1,164,000	100.0%	

These targets are above and beyond EVCS that may be installed at personal residences. As of December 2022, California has approximately 71,500 Level 2 chargers installed and 8,500 DCFC Installed[8]. This leaves a statewide gap of over one million Level 2 chargers and 28,000 DCFCs. Table 5 summarizes how many Level 2 EVCS and DCFCs may be needed by 2030 throughout the SCAG region and within each participating city if the CEC's statewide estimates are scaled down using California's car ownership rate (20.2%) and the population of each city[9,10]. The CEC report prioritizes Level 2 chargers over DCFCs, so these targets can be considered a high Level 2 pathway.

TABLE 5 – SCAG 2030 CHARGER TARGETS - CEC ESTIMATED/HIGH L2 PATHWAY

Participating Cities	Population	2030 Estimated EV Ownership	Total Charger Target	Public L2	MUD L2	Workplace L2	DCFC
SCAG Region	19,155,405	3,878,376	564,304	158,529	227,855	159,983	17,937
Artesia	16,758	3,393	494	139	199	140	16
South El Monte	20,721	4,195	610	171	246	173	19
Walnut	29,903	6,054	881	247	356	250	28

[8] California Energy Commission (2022). California Energy Commission Zero Emission Vehicle and Infrastructure Statistics. Data last updated September 2022. Retrieved December 29, 2022 from http://www.energy.ca.gov/zevstats.

[9] Car Ownership Statistics in the U.S. - ValuePenguin

[10] California Cities by Population (california-demographics.com)

Participating Cities	Population	2030 Estimated EV Ownership	Total Charger Target	Public L2	MUD L2	Workplace L2	DCFC
La Verne	32,211	6,522	949	267	383	269	30
San Dimas	34,048	6,894	1,003	282	405	284	32
Monrovia	36,816	7,454	1,085	305	438	307	34
Culver City	39,169	7,931	1,154	324	466	327	37
La Puente	40,020	8,103	1,179	331	476	334	37
Covina	48,095	9,738	1,417	398	572	402	45
Glendora	51,801	10,488	1,526	429	616	433	49
Rosemead	54,282	10,990	1,599	449	646	453	51
Diamond Bar	56,211	11,381	1,656	465	669	469	53
Pico Rivera	63,001	12,756	1,856	521	749	526	59
Redlands	71,198	14,415	2,097	589	847	595	67
Baldwin Park	75,892	15,366	2,236	628	903	634	71
Anaheim	349,964	70,857	10,310	2,896	4,163	2,923	328
Long Beach	466,776	94,508	13,751	3,863	5,552	3,898	437
Los Angeles	3,966,936	803,182	116,863	32,830	47,187	33,131	3,715

The CEC analysis results in an overall charging infrastructure that focuses primarily on Level 2 charging, with only 3% of chargers being DCFC. The 2021 federal Infrastructure Investment and Jobs Act (IIJA) included $5 billion in funding specifically for DCFC along Alternative Fuel Corridors (AFCs). California is revamping the CALeVIP incentive program to just focus on DCFCs. Given the available new funding dedicated towards DCFC, SCAG and its member cities should understand how increasing the proportion of DCFC may impact the overall charging needs in their communities. The 2022 California Building Code allows new construction projects to substitute five level 2 chargers with a single DCFC. Using this as a reference, the CEC targets may be revised at a ratio of 1 additional DCFC for every 5 Level 2 chargers. Table 6 illustrates how many of each type of charger would be needed if 150,000 DCFCs are installed in the State, creating a greater mix of DCFCs. This scenario holds the proportion of Level 2 chargers within workplace, public, and MUD locations constant with the CEC's projections. Under this pathway only 599,000 EVCS would be needed to support 8 million EVs. Table 7 scales these statewide charger targets down to just the SCAG region and participating Cities by population and car ownership rates.

TABLE 6 – 2030 STATEWIDE MIXED LEVEL 2 AND DCFC CHARGER ESTIMATES

EV Target	Charger Quantity	Percentage of total (%)	Distribution of L2 chargers
Workplace L2	130,278	21.7%	29.02%
Public L2	187,249	31.3%	41.70%
MUD L2	131,473	21.9%	29.28%
DCFC	150,000	25.0%	
Total Chargers	599,000	100%	

TABLE 7 – SCAG 2030 CHARGER TARGETS - MIXED L2 AND DCFC PATHWAY

Participating Cities	Population	2030 EV Ownership	Total Charger Target	Public L2	MUD L2	Workplace L2	DCFC
SCAG Wide	19,155,405	3,878,376	290,393	63,158	90,778	63,738	72,720
Artesia	16,758	3,393	254	55	79	56	64
South El Monte	20,721	4,195	314	68	98	69	79
Walnut	29,903	6,054	453	99	142	99	114
La Verne	32,211	6,522	488	106	153	107	122
San Dimas	34,048	6,894	516	112	161	113	129
Monrovia	36,816	7,454	558	121	174	123	140
Culver City	39,169	7,931	594	129	186	130	149
La Puente	40,020	8,103	607	132	190	133	152
Covina	48,095	9,738	729	159	228	160	183
Glendora	51,801	10,488	785	171	245	172	197
Rosemead	54,282	10,990	823	179	257	181	206
Diamond Bar	56,211	11,381	852	185	266	187	213
Pico Rivera	63,001	12,756	955	208	299	210	239
Redlands	71,198	14,415	1,079	235	337	237	270
Baldwin Park	75,892	15,366	1,151	250	360	253	288
Anaheim	349,964	70,857	5,305	1,154	1,658	1,164	1,329
Long Beach	466,776	94,508	7,076	1,539	2,212	1,553	1,772
Los Angeles	3,966,936	803,182	60,138	13,080	18,799	13,200	15,060

Should SCAG or participating cities be interested in a focusing heavily on DCFC, a third scenario is presented in Table 8 where DCFC make up about 50% of charger installations. Again, the proportion of Level 2 chargers within workplace, public, and MUDs are the same as the CEC. Under this pathway only 384,000 EVCS would be needed to support 8 million EVs in the State. The high DCFC pathway for SCAG and the participating cities is shown in Table 9. Again, these statewide charger targets are scaled down to just the SCAG region and participating Cities by population and car ownership rates.

TABLE 8 – 2030 STATEWIDE HIGH DCFC CHARGER TARGETS

EV Target	Charger Quantity	Percentage of total (%)	Distribution of L2 chargers
Workplace L2	55,419	14.4%	29.02%
Public L2	79,654	20.7%	41.70%
MUD L2	55,927	14.6%	29.28%
DCFC	193,000	50.3%	
Total Chargers	384,000	100.0%	

TABLE 9 – SCAG 2030 CHARGER TARGET - HIGH DCFC PATHWAY

Participating Cities	Population	2030 EV ownership Target	Total Charger Target	Public L2	MUD L2	Workplace L2	DCFC
SCAG Region	19,155,405	3,878,376	290,393	63,158	90,778	63,738	72,720
Artesia	16,758	3,393	254	55	79	56	64
South El Monte	20,721	4,195	314	68	98	69	79
Walnut	29,903	6,054	453	99	142	99	114
La Verne	32,211	6,522	488	106	153	107	122
San Dimas	34,048	6,894	516	112	161	113	129
Monrovia	36,816	7,454	558	121	174	123	140
Culver City	39,169	7,931	594	129	186	130	149
La Puente	40,020	8,103	607	132	190	133	152
Covina	48,095	9,738	729	159	228	160	183
Glendora	51,801	10,488	785	171	245	172	197
Rosemead	54,282	10,990	823	179	257	181	206
Diamond Bar	56,211	11,381	852	185	266	187	213
Pico Rivera	63,001	12,756	955	208	299	210	239
Redlands	71,198	14,415	1,079	235	337	237	270
Baldwin Park	75,892	15,366	1,151	250	360	253	288
Anaheim	349,964	70,857	5,305	1,154	1,658	1,164	1,329
Long Beach	466,776	94,508	7,076	1,539	2,212	1,553	1,772
Los Angeles	3,966,936	803,182	60,138	13,080	18,799	13,200	15,060

These projections are not meant to be prescriptive targets for SCAG or any particular City to hit but rather illustrate different pathways of building out EV infrastructure within a community, each with its own benefits and drawbacks. DCFCs can serve more drivers with fewer ports, but there will still be a need for some lower cost Level 2 charging in long dwell time areas where people live and work. While fewer DCFC ports may be needed to meet charging demand, they are significantly more expensive to install and more expensive to operate. The cost to deliver electricity from DCFCs is greater than the cost to deliver electricity from Level 2 EVCS due to higher demand charges. Publicly available EVCS are likely to be on a commercial or EV specific rate tariff. These rate tariffs typically include a per-kW fee based on the highest load during the billing cycle month. Since DCFC would result in higher loads than Level 2 EVCS, their total cost per kWh would be higher, all other factors being equal. DCFC owners typically charge higher rates to drivers to compensate for this, which

Infrastructure Pathways

City stakeholders and private sector partners can decide if Level 2 or DCFC is a better fit for their community. DCFC can recharge vehicles more quickly and less of them may be needed to support a fleet of EVs. However, they are more expensive and take longer to install.

could pose equity concerns if residents do not have access to affordable charging[11]. Another factor to consider is time it takes to deploy each type of charging infrastructure. DCFCs projects typically require more complex electrical design, high power transformers and 480V electrical switchgear and other which currently can have lead times as long as 40-70 weeks due to current supply chain constraints. The electrical infrastructure for Level 2 projects such as those for MUDs may only take 12 weeks to procure and are simpler to design.

There is already a significant amount of existing EV infrastructure installed throughout the SCAG region; however, it is not distributed equally among all cities which leaves significant gaps in charging infrastructure throughout the region. Furthermore, the infrastructure that is already in place will not support the State's goals through 2030 and thus must continue to be expanded. As of September 2022, a total of 31,399 Level 2 and 3,309 DCFCs have been installed throughout the SCAG region according to the CEC[12]. Figure 4 shows the EVCS infrastructure charging gap across the SCAG region for each infrastructure pathway. Table 10, Table 11, Table 12, include the breakdowns for each participating City for the High L2 Pathway, Mixed L2 and DCFC Pathway, and High DCFC pathways respectively. Existing chargers installed for each City include public, private, installed, and currently planned chargers per the Department of Energy's Alternative Fuel Data Center (AFDC). CEC's analysis and the following tables do not differentiate between different DCFC plug types and accessibility of these chargers by drivers with different models of EVs. As EV charging infrastructure grows, SCAG and participating Cities may need to consider options to increase or manage the accessibility of different charge plug types.

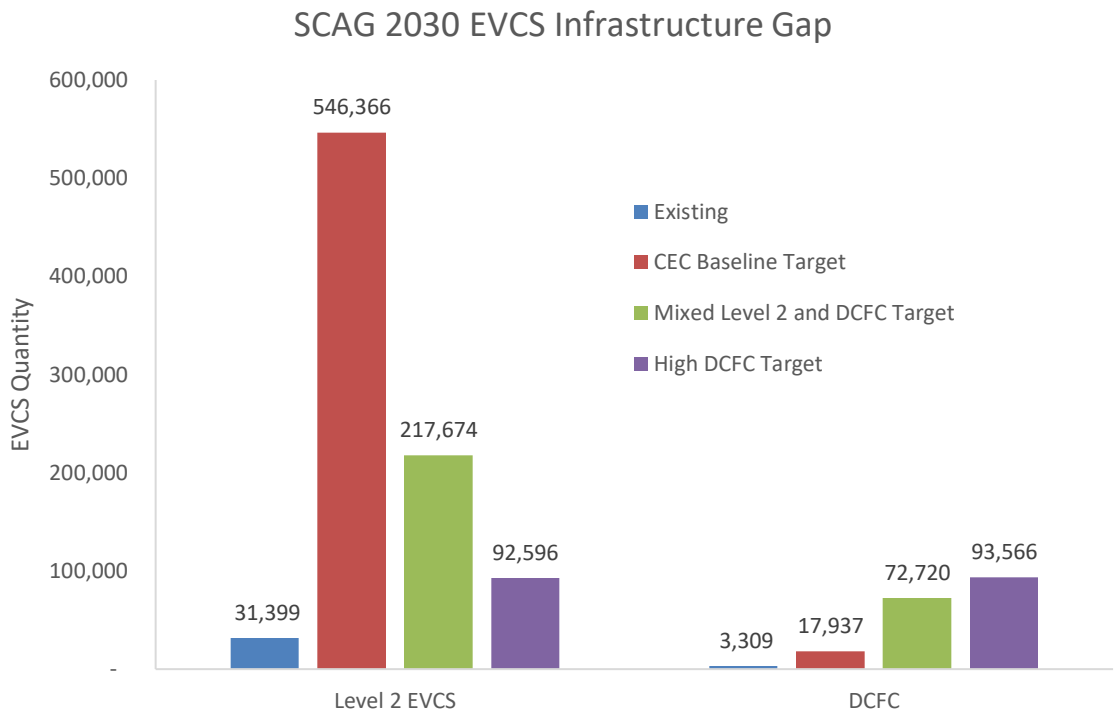

FIGURE 4. SCAG EVCS INFRASTRUCTURE GAP TO MEET 2030 EVCS TARGETS FOR DIFFERENT INFRASTRUCTURE PATHWAYS

[11] Electric Car Charging Overview | DriveClean
[12] Electric Vehicle Chargers in California

TABLE 10 – SCAG 2030 CHARGER TARGET – CEC ESTIMATE/HIGH L2 PATHWAY CHARGING GAP

Participating Cities	2030 Total L2 Target	2030 DCFC Target	L2 Installed 2022	DCFC Installed 2022	L2 Gap	DCFC GAP
SCAG Region	546,366	17,937	31,399	3,309	514,967	14,628
Artesia	478	16	0	0	478	16
South El Monte	591	19	10	2	581	17
Walnut	853	28	13	0	840	28
La Verne	919	30	18	0	901	30
San Dimas	971	32	15	6	956	26
Monrovia	1,050	34	21	0	1,029	34
Culver City	1,117	37	150	50	967	0
La Puente	1,141	37	0	6	1,141	31
Covina	1,372	45	18	0	1,354	45
Glendora	1,478	49	21	0	1,457	49
Rosemead	1,548	51	14	6	1,534	45
Diamond Bar	1,603	53	61	42	1,542	11
Pico Rivera	1,797	59	18	4	1,779	55
Redlands	2,031	67	62	27	1,969	40
Baldwin Park	2,165	71	44	4	2,121	67
Anaheim	9,982	328	452	103	9,530	225
Long Beach	13,314	437	456	47	12,858	390
Los Angeles	113,148	3,715	4,491	257	108,657	3,458

TABLE 11 – SCAG 2030 CHARGER TARGET – MIXED L2 AND DCFC PATHWAY CHARGING GAP

Participating Cities	2030 Total L2 Target	2030 DCFC Target	L2 Installed 2022	DCFC Installed 2022	L2 Gap	DCFC GAP
SCAG Region	217,674	72,720	31,399	3,309	186,275	69,411
Artesia	190	64	0	0	190	64
South El Monte	235	79	10	2	225	77
Walnut	340	114	13	0	327	114
La Verne	366	122	18	0	348	122
San Dimas	387	129	15	6	372	123
Monrovia	418	140	21	0	397	140

Participating Cities	2030 Total L2 Target	2030 DCFC Target	L2 Installed 2022	DCFC Installed 2022	L2 Gap	DCFC GAP
Culver City	445	149	150	50	295	99
La Puente	455	152	0	6	455	146
Covina	547	183	18	0	529	183
Glendora	589	197	21	0	568	197
Rosemead	617	206	14	6	603	200
Diamond Bar	639	213	61	42	578	171
Pico Rivera	716	239	18	4	698	235
Redlands	809	270	62	27	747	243
Baldwin Park	862	288	44	4	818	284
Anaheim	3,977	1,329	452	103	3,525	1,226
Long Beach	5,304	1,772	456	47	4,848	1,725
Los Angeles	45,079	15,060	4,491	257	40,588	14,803

TABLE 12 – SCAG 2030 CHARGER TARGET - HIGH DCFC PATHWAY CHARGING GAP

Participating Cities	2030 Total L2 Target	2030 DCFC Target	L2 Installed 2022	DCFC Installed 2022	L2 Gap	DCFC GAP
SCAG Region	92,596	93,566	31,399	3,309	61,197	90,257
Artesia	81	82	0	0	81	82
South El Monte	100	101	10	2	90	99
Walnut	145	146	13	0	132	146
La Verne	156	157	18	0	138	157
San Dimas	165	166	15	6	150	160
Monrovia	178	180	21	0	157	180
Culver City	189	191	150	50	39	141
La Puente	193	195	0	6	193	189
Covina	232	235	18	0	214	235
Glendora	250	253	21	0	229	253
Rosemead	262	265	14	6	248	259
Diamond Bar	272	275	61	42	211	233
Pico Rivera	305	308	18	4	287	304
Redlands	344	348	62	27	282	321

Participating Cities	2030 Total L2 Target	2030 DCFC Target	L2 Installed 2022	DCFC Installed 2022	L2 Gap	DCFC GAP
Baldwin Park	367	371	44	4	323	367
Anaheim	1,692	1,709	452	103	1,240	1,606
Long Beach	2,256	2,280	456	47	1,800	2,233
Los Angeles	19,176	19,377	4,491	257	14,685	19,120

It should be noted that most of this infrastructure will be hosted, owned and operated by the private sector, and thus outside of the public sector's control. The public sector may own and operate a small portion of this infrastructure on publicly owned sites. The public sector's larger role should be fostering and incentivizing EV infrastructure even if they only directly control a small percentage of it.

The cost to install EVCS can vary significantly based on site specific characteristics such as distance to utility interconnection points, grading to meet ADA requirements, or electrical upgrades required electrical upgrades. Table 13 – Overview of Charging Types and Typical CostsTable 13 summarizes the typical cost range for different types of EVSE. Given these typical costs, it may take between $6B and $30B to install enough EVCS to fill in SCAG's 2030 infrastructure gap (Figure 2) the overall cost is comparable among each infrastructure pathway, so Cities that pursue a higher DCFC may not require additional investment across the entire charging network. Most of this investment is expected to come from the private sector, and various funding from the federal, state and local level should help spur that investment. These costs; however, do not capture ongoing costs including the cost of electricity, networking fees, or maintenance. These costs do not account for potential revenue site hosts may generate by selling the dispensed electricity to EV drivers.

EV CHARGING BASICS

CHARGER TYPES AND TYPICAL COSTS

EV chargers are categorized into three different levels depending on the amount of power they can output to an EV. Product and installation costs generally increase as power output increases because increased loads are more likely to trigger site or utility electrical upgrades. Product costs for chargers may decrease over time as manufacturers realize economies of scale, particularly for DCFCs; however, installation costs are not likely to decrease over time as electrical equipment is a mature industry and labor costs are expected to increase over time.

After charging stations are installed, there are two primary non-electricity related ongoing costs: networking costs and maintenance/repair costs. Most Level 2 EVCS and DCFCs are networked charging stations; they connect to a cloud platform that allow the charging stations owner to monitor utilization and set charging rates. EVCS may have a cloud platform hosted by the charging manufacturer (i.e ChargePoint) or a 3rd party (i.e. Shell RechargePlus). Charger maintenance responsibility, while typically minimal, generally falls on the charging station owner. Most charger issues are software related and can be resolved by rebooting the charging station. Typical hardware maintenance items include worn out or broken ports, damaged or removed cables, and cracked screens. Most EVCS OEMs recommend conducting inspections of charging stations 1-2 times per year. Charging station owners can choose to maintain the stations in-house or contract this service out to the charging manufacturer or other 3rd party

companies through a service level agreement (SLA). Table 13 summarizes the key differences, use cases, and typical costs per port.

TABLE 13 – OVERVIEW OF CHARGING TYPES AND TYPICAL COSTS

Charger Level	Plug Type and Power Output	Recommended Use Case	Typical Installation Costs ($/port)	Typical Ongoing Costs ($/port/yr)	Image
Level 1	Standard household outlet, 1.9kW @ 110V	Overnight residential charging. Optional low-cost charging option in MUDs. Can use pre-existing outlets. Recharges 3.5-6.5 miles per hour.	$1,000-$2,000	Networking: N/A. Maintenance: minimal	
Level 2	Standard SAE J1722; 1.9kW-19.2kW. Typical 7.2kW @ 240V.	Overnight residential, workplace, and commercial charging (2-4+hrs). Recharges 14-35 miles of range per hour.	$10,000-$50,000	Networking: $120-$360. Maintenance: $150-$1,000	
Level 3 (DCFC)	Multiple types CCS1, CHAdeMO, Tesla; 25kW-350kW+ @ 480V 3 Phase	Short stops along major corridors and commercial charging (<1hr). The typical EV can expect to recharge from 20% up to 80% in under 30 minutes.	$75,000-200,000+	Networking: $120-$360. Maintenance: $1,000+	

In North America, the EV industry has standardized the Level 1 and Level 2 Plug Types. Level 1 plugs are generally only suitable at a driver's primary residence as the low power output only provides between 3.5-6.5 miles of range per hour[13]. This may be a viable option to install low-cost charging infrastructure at MUDs; however, this may not give enough confidence for a driver to convert to an electric vehicle depending on their driving habits. Given that battery capacities are expected to increase, and higher power chargers will be needed to fully recharge them, MUD owners should look to install Level 2 charging options before evaluating Level 1 options. There are strategies to reduce the infrastructure costs of Level 2 chargers at MUDs including circuit sharing where multiple charging ports are connected to a single circuit. The 2022 Building Code essentially allows two charging ports to be connected to a single 40A circuit for new MUDs. Existing MUDs looking to retrofit with EVCS may consider installing as many as four charging ports on a single 40A circuit. With this configuration, when a single charging port is in use it receives the maximum available power output, and then splits the power when multiple ports are in use.

There are currently three available plug types for DCFC: CCS1, CHAdeMO, and Tesla. Given the variety of plug types, not all EVs can use all available DCFCs. CCS1 and CHAdeMO are both open access charging plugs; however, the EV industry in North America is currently coalescing around the CCS1 plug type. This is reflected in most major light, medium, and heavy-duty vehicles automakers building vehicles with the CCS1 port. Another example the CALEVIP 2.0 program only considering the CCS1 plug type for the maximum rebate. Some notable automakers that do not use the CCS1 plug are Nissan and Tesla. The Nissan Leaf is currently made with the CHAdeMO port. As the industry focuses on installing more CCS1

[13] Electric Car Charging Overview | DriveClean

DCFC's Nissan Leaf drivers may not have access to needed DCFCs. The Tesla plug is proprietary to Tesla and is currently only available to Tesla drivers. Currently, Tesla vehicles made in North America only come equipped with a Tesla DCFC port. At the time of this report Tesla has more DCFC ports in North America than CCS1 and CHAdeMO combined so Tesla drivers are expected to have access to an adequate number of DCFC ports[14]. This may change in the near future as Tesla ports do not qualify for several funding sources. Tesla vehicles in Europe are produced with both Tesla and CCS1 ports, so it is possible Tesla will eventually do the same for vehicles produced in North America. Tesla has announced plans to develop adapters to go between CCS1 and Tesla, and eventually opening its charging stations to non-Tesla drivers, though Tesla is behind schedule in implementing this step[15].

CHARGER MAINTENANCE

EVCS are assets that need to be maintained throughout their useful life. When chargers are not maintained it can degrade consumer confidence in purchasing an EV, particularly if the are unable to charge at home. In 2022, over 1 in 5 EV drivers experienced a problem charging their EV at a publicly available EVCS (Figure 5). Most EVCS are designed to have a 10-year useful operating life, though how well or poorly they are maintained will impact this.

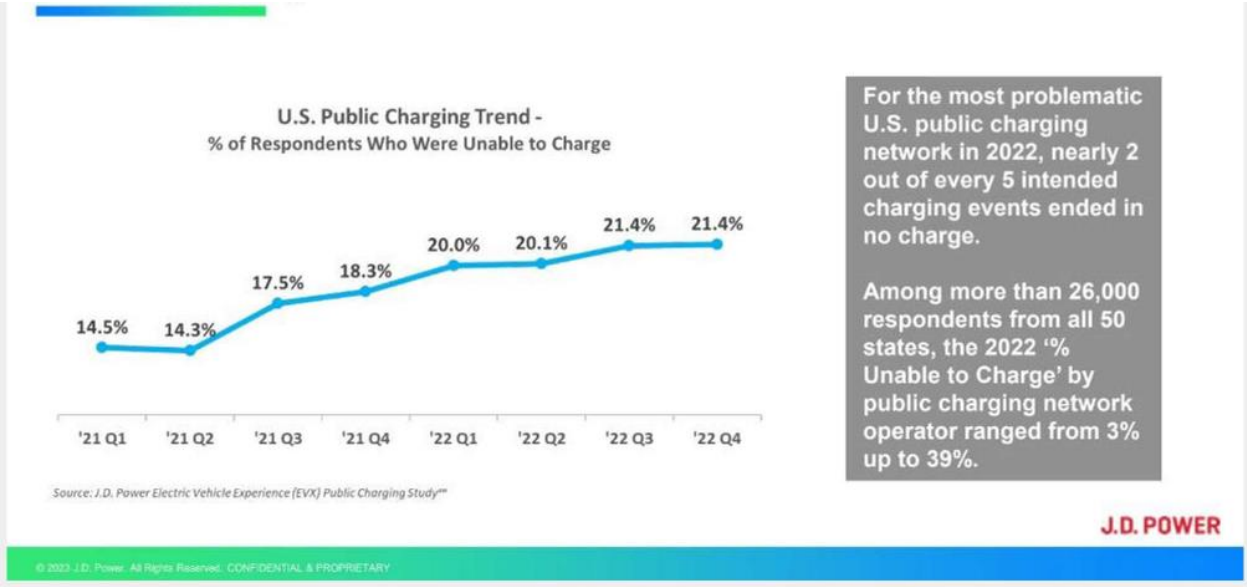

FIGURE 5. U.S. PUBLIC EVCS CHARGING ISSUES OVER TIME

Owners of the charging station are typically responsible for maintenance and should have a plan in place on how they will keep the EVCS functional throughout its useful life. While generally minimal, proper charger preventative maintenance and repairs is key to maximizing the use from the equipment. Typical hardware maintenance items include worn out or broken ports, damaged or removed cables, and cracked screens. Software issues can typically be resolved by rebooting the chargers or coordinating with the charger manufacturer on installing software updates. Most EVCS manufacturer offer extended warranties for up to five years which typically covers normal wear and tear on the equipment but may not cover damage due to improper use or vandalism. Some Cities have reported higher rates of vandalism or misuse of publicly available EVCS, so site hosts should budget accordingly for unforeseen repairs.

[14] Opening the North American Charging Standard | Tesla
[15] Elon Musk says Tesla will open Superchargers to other cars in 2021 (cnbc.com)

Industry stakeholders have suggested a good rule of thumb is to budget 10% of the charger equipment cost for annual repairs and maintenance.

Charging station hosts may elect to train existing in-house staff to maintain the EVCSs or look to contract the service out. EVCS vendors may offer up maintenance packages where a technician will conduct inspections of the equipment and replace equipment components if needed for up to 5 years. Maintenance agreements may also be contracted to independent third parties. Some funding sources will require chargers to come with a 5-year maintenance agreement to be eligible for funding. Maintenance agreements will typically include 1-2 inspections per year. Charging station owners should refer to specific equipment specifics to determine what specific maintenance activities, such as filter replacements, are required and at what frequency.

SUITABILITY ANALYSIS

As EVCS infrastructure continues to be deployed throughout the SCAG region, there is a need to target infrastructure development thoughtfully and equitably to foster EV adoption where is it most needed. Several major utility, state, and federal funding sources prioritize or allocate portions of funding for priority populations such as low-income, DACs as defined by CalEnviroScreen and/or Justice 40. The goal of the site suitability analysis is to prioritize EVCS development in these areas at sites that also make for strong candidates based on EV fundamentals.

The site suitability analysis was developed to provide stakeholders in the study area with the information and tools they need to identify ideal locations for the placement of EV charging stations (EVCS) in their areas given a set of stated priorities. Since each city in the SCAG region is at a different phase in their efforts to deploy EV infrastructure and incentivize the use of EVs, different sets of priorities were developed to better align with where a City might be along their EV journey. The evaluation criteria and scoring matrix were informed through City, stakeholder, and community feedback gathered throughout the Study. Cities are invited to use the data and methodology presented here to help inform their decision-making process by applying the evaluation criteria to their regions to focus on optimal locations for the placement of EVCS. If Cities or other stakeholders are interested in recreating and modifying this analysis to better reflect individual priorities, the scored dataset can be requested from SCAG and a complete methodology of the suitability analysis is available at Alternative Fuels & Vehicles Projects - Southern California Association of Governments.

Lastly, there is a need to visualize the results of the analysis so planners, developers, and other stakeholders can quickly see where EVCS may be needed or desirable within the SCAG region, particularly in equity-focused populations[16]. Results from this analysis have been integrated into SCAG's PEV Readiness Atlas. Stakeholders can quickly see which areas might make good candidates for EVCS to better target outreach efforts. Conversely stakeholders can save time and resources by avoiding areas that score poorly in this analysis.

APPROACH

The purpose of the scoring criteria is to help cities within the SCAG region prioritize locations for installing EV charging stations based on data-driven analysis, and with a focus on high-density residential areas, high-density employment sites, job training/education facilities, and commercial areas suitable for

[16] Using Mapping Tools to Prioritize Electric Vehicle Charger Benefits to Underserved Communities

morning or mid-day charging, that the private market may not otherwise address. The evaluation methodology and scoring metrics are based on industry experience, SCAG's stated priorities for this project, literature reviewed and best practices, as well as comments and feedback from SCAG members, cities, and stakeholders. The comments and feedback from SCAG, cities, stakeholders, and community members ground the analysis based on the actual needs of the areas. Recognizing that EV readiness varies between the Cities throughout the SCAG region, four different scoring scenarios were developed to better align with different stages of adoption. Overall SCAG, cities, stakeholders, and community members locating new EV charging stations should highlight the following qualities:

- **Accessibility** – EVCS should be accessible. The US Infrastructure Investment Jobs Act (IIJA), Section 11401, "Grants for Charging and Fueling Infrastructure," established the criteria for funding a grant program to strategically deploy publicly accessible EV charging infrastructure. One of the criteria for the IIJA grant is accessibility, which is defined as "public accessibility of charging or fueling infrastructure proposed to be funded with a grant under this subsection, including-- (I) charging or fueling connector types and publicly available information on real-time availability; and (II) payment methods to ensure secure, convenient, fair, and equal access."17 This requires prioritizing the placement of EV charging stations in public areas (public parking, parks & recreation areas) as opposed to private locations or restricted areas (e.g., military bases, industrial areas, etc.). This does not preclude the possibility of placing an EV charging station in these locations, it merely lowers its prioritization. Additionally, this increases the number of publicly available EV charging stations. Beyond site accessibility, charging stations should use industry-standard plug types, payment methods, and open network protocols so that charging stations are able to be used by all EV drivers.
- **Equity** – Prioritizing DACs per CalEnviroScreen scores, high density, and environmental vulnerable areas for new EV charging stations.
- **High-Capacity Locations** – Identifying locations where EV charging stations are likely to be in high demand and provide continuous use for the community. This emphasizes placing EV charging station near high-capacity locations which are sites, other than major employment centers, that typically have on-site or adjacent parking and large numbers of visitors or usage. These locations may include hospitals, schools and universities, shopping centers, sports venues, entertainment venues, airports, and public services centers. These locations tend to be highly trafficked and EVCS may see higher utilization. These locations also support EV charging for ridesharing drivers as they can charge their EVs while waiting to pick up riders or after dropping off their passengers.
- **Convenience** – Placing charging stations near main streets or highways may increase utilization as they may be more visible to drivers. This becomes more important for Cities just starting to build out their EV infrastructure.
- **Transit** – When possible, new EV charging stations should be located near public transportation stations or hubs to support a multi-modal transportation system. This placement will encourage drivers to charge their EVs at transit parks and ride lots.
- **Environment** – Tailpipe emissions from internal combustion engine (ICE) vehicles impacts the local environment and air quality. Prioritizing installing EV charging stations in areas with high pollution burden and health impacts from asthma could increase local EV adoption and improve air quality and health.

[17] US Congress (2021) *H.R.3684 - Infrastructure Investment and Jobs Act*, Rep. DeFazio, Peter A. [D-OR-4] (Introduced 06/04/2021), Section 11401, "Grants for Charging and Fueling Infrastructure," Page 135 STAT. 548.

- **Employment** – Prioritizing the placement of EV charging stations in locations with high employment and education centers could support the use of EVs for commuting.[18]

DATA SOURCES

The sources used in the evaluation criteria in this methodology were provided by SCAG, by the city participants, or were publicly available. The specific data sources used in the scoring criteria are outlined in Table 14 and utilized the most recent version of data available when this analysis was developed.

TABLE 14 – DATA SETS USED FOR SCORING CRITERIA

NO.	THEME	DATA	METRIC
1	Proximity to Existing EV Charging Station	Department of Energy Alternative Fuels Data Center, Electric Vehicle Charging Station Locations https://afdc.energy.gov/fuels/electricity_locations.html	Distance - Miles
2	EV Charging Stations - Existing and Planned	Department of Energy Alternative Fuels Data Center, Electric Vehicle Charging Station Locations https://afdc.energy.gov/fuels/electricity_locations.html	Distance - Miles
3	California Motor Vehicle Fuel Types Battery Electric Vehicles	California Department of Motor Vehicles, via SCAG by ZIP Code, January 1, 2020.	CA Motor Vehicle Fuel Types by Zip Code - Number of Battery Electric Vehicles
4	California Motor Vehicle Fuel Types Plug-In Hybrid Vehicles	California Department of Motor Vehicles, via SCAG by ZIP Code, January 1, 2020	CA Motor Vehicle Fuel Types by Zip Code - Number of Plug-In Hybrid Vehicles
5	Population Density	USA Population density based on Census 2010 data	Density per square mile
6	Median Household Income	SCAG Open Data Portal 6-County SCAG Region 2016	US Dollar Median Income levels
7	Disadvantaged Communities	SCAG GIS Open Data Portal 2017 Data, CalEnviroScreen 3.0 (this analysis was completed before CalEnviroScreen 4.0 was released)	Percent DAC Score Scores from 0-100%
8	Low-income community Census Tracts	The 2012-2016 American Community Survey, FGDB: Low_Income_Community_Census_Tracts_-_2016_ACS.gdb	Population % Below Poverty Level, Scoring is the >20%.
9	Pollution Burden	Pollution Burden scores from CalEnviroScreen 3.0 (analysis was completed before CalEnviroScreen 4.0 was released)	Scores range 0.1-10, with as score of 10 as highest pollution burden.
10	Health Impacts - Asthma	Asthma scores from scores from CalEnviroScreen 3.0 (averaged over 2011-2013) in percentiles	Scores range from 0-100%, with 100% being the highest asthma score.

[18] J.R. DeShazo (2021) "An Electric Vehicle Charging Station Siting Strategy for the South Coast: Expanding Opportunities in Multi-unit Dwellings and Workplaces," UCLA Luskin Center for Innovation, Mobile Source Review Committee (MSRC), and Clean Transportation Funding.

NO.	THEME	DATA	METRIC
11	High Quality Transit Areas	High Quality Transit Areas (HQTAs) in the SCAG Region 2016, SoCal / 2020-2045 RTP/SCS. SCAG Open Portal GIS Data, February 2021 https://gisdata-scag.opendata.arcgis.com/datasets/43e6fef395d041c09deaeb369a513ca1	Locations are within or outside a High-Quality Transit Areas (HQTA)
12	Highways and arterial streets	SCAG GIS Open Data Portal, Street Centerline Data	Proximity to highways or major streets, distance in miles
13	MTA Metro stations	Geographic locations of MTA Stations Los Angeles MTA GIS Data 2021, https://developer.metro.net/gis-data/	Proximity to MTA stations, distance in miles
14	MTA Metro stations parking lots	MTA Stations with parking, MTA GIS and Lot Data 2021 https://www.metro.net/riding/parking/lotsbyline/	MTA station with or without a parking lot
15	Metrolink stations	Metrolink Stations Los Angeles County Arc GIS Hub Data https://hub.arcgis.com/datasets/a7395919500449a8b05efdead9738e72/explore?location=33.800844%2C-118.295000%2C8.81	Proximity to Metrolink stations, distance in miles
16	Railroad Stations: Metrolink and Amtrak	Amtrak Stations USDOT Geospatial Bureau of Transportation Statistics, U.S. Department of Transportation ArcGIS Online, Amtrak Station database, July 2021 https://data-usdot.opendata.arcgis.com/datasets/baa5a6c4d4ae4034850e99aaca38cfbb/explore?location=36.184993%2C-96.584950%2C4.69	Proximity to Metrolink and Amtrak stations, distance in miles
17	Airports - SCAG Region	SCAG Open Portal, March 2016 DataWarehouse.SDEADMIN.Airport_pnt_scag https://gisdata-scag.opendata.arcgis.com/maps/d50b1caf8f64436ea19fc844d811195a/about	Proximity to airports, distance in miles
18	LA City-owned and other parking lots	Los Angeles City Parking Lot Data https://geohub.lacity.org/datasets/city-owned-parking-lots	Parking lot types
19	LA City-owned parking lots convenience	Los Angeles City Parking Lot Data https://geohub.lacity.org/datasets/city-owned-parking-lots	Parking Proximity
20	Park & Ride Lots: LA County	Los Angeles County Park and Ride Lots GIS Location Data https://public.gis.lacounty.gov/public/rest/services/LACounty_Dynamic/LMS_Data_Public/MapServer/187	Location of a Park & Ride parking lot
21	Employment Locations	Employment locations 2016 ESRI's Info Group	Distance in miles
22	PEV Propensity To Purchase (point features)	ArcGIS PEV Propensity To Purchase- Heatmap, UCLA Luskin Center for Innovation 2018 https://maps.scag.ca.gov/scaggis/rest/services/PEV_ATLAS/PEV_Propensity_To_Purchase_Heatmap/MapServer/0	PEV Propensity to Purchase Score (prpnst_0 - 10 score)

NO.	THEME	DATA	METRIC
23	PEV AM Destinations Registrations	SCAG 2012 Regional Model SCAG Open Portal Data PEV_AMDestinations_Registrations_poly_scag	PEV AM Destinations Registration AM Sums score range 0 - 238.51
24	PEV PM Destination Registrations	SCAG 2012 Regional Model Open Portal Data PEV_PMDestinations_Registrations_poly_scag	PEV PM Destinations Registration MID Sums score range 0 - 251.17
25 - 35	Land Use Classifications	SCAG 2016 Land Use Data** Available by county at https://gisdata-scag.opendata.arcgis.com/explore?layout=list&query=land%20use	Land Use Categories
36	Streamlined Permitting	California State "EV Charging Station Permit Streamlining Map" (EVCS Streamlining Map) is a living companion to the July 2019 Electric Vehicle Charging Station Permitting Guidebook ZEV Permit Streamlining https://business.ca.gov/industries/zero-emission-vehicles/plug-in-readiness/	Permitting process: Green – streamlined Yellow – in process Red – not streamlined

**slightly after this was done, SCAG 2019 Annual Land Use (ALU v.2019.2) at the parcel-level, updated as of February 2021 became available at https://gisdata-scag.opendata.arcgis.com/maps/3b27b21e9aa64e4a8200d0385ccfe3ac/explore?location=34.185395%2C-116.867750%2C7.72

EXCLUDED CRITERIA

This research intended to include as many criteria as possible to incorporate the qualities outlined in the previous section to promote equity, accessibility, and convenience to site EVCS locations. There are boundaries in the data that was included in this analysis, due to availability of the appropriate information and the relevance to this stage of the methodology. Data that was considered but not included in this analysis:

- **Grid capacity** - Electric grid capacity is an important criterion when developing EVCS projects, but a reliable dataset was not available throughout the entire study region. Grid capacity should be evaluated as implementation projects are developed. Limited grid capacity is also not a fixed barrier, as utilities can add capacity, though it may increase final cost and delay implementation.
- **Utility Infrastructure** – The availability of connectivity points to the electrical grid such as distance to substations or transformers, was not included, because not all the utilities in the Study region had data available. This was evaluated for during the site evaluations
- **Public schools** – Data on the locations of public schools was not included in this research as it presented a possibility of over counting of school locations. It was determined that the land use associated with schools and education centers was sufficient and did not exclude other learning centers that were not classified as public schools.

SCENARIO ANALYSIS

As the suitability analysis was being developed, stakeholder engagement, outreach to cities, and discussions with SCAG determined that a single set of scoring criteria would not adequately reflect the

diversity of the SCAG region. Recognizing that each of the cities in the study area are at different stages of identifying and installing EV charging stations, a total of four different scenarios were developed. Each scenario weights key scoring criteria differently for jurisdictions based on their needs and approximate readiness for EV infrastructure.

Stakeholder feedback directly influenced the final scoring criteria used in each scenario. One example of feedback gathered from stakeholders indicated that "Communities with a greater number of early adopters are likely to be wealthier, single-family homeowners who charge from home and/or work. They don't need more public charging stations. Communities that don't have many EV owners probably consist of lower-income residents who live in MUDs and don't have access to home charging. Moreover, many of them probably work in places without workplace charging. So, these communities should be given more points for public charging stations that will foster EV adoption by residents." This comment influenced how weighting existing EV ownership should change for Cities that already have established charging networks. As another example, one stakeholder comment maintained that, "religious facilities should rank higher. Cultural institutions are important in increasing exposure to EVs and people can charge while at church and events." These types of comments influenced the final scoring related to certain land use types.

Four different scenarios were developed to better meet Cities where they are at along their EV journey: "Regionwide Standard", "Expanding", "Progressing" and Initiating". The SCAG Regionwide Standard focused on maximizing the scoring for the qualities that SCAG, the stakeholders, and the cities had emphasized during the initial scoping of this study and the various points of feedback. The Expanding scenario is comprised of cities or areas that are generally more advanced in their EV planning efforts. The emphasis for cities in this group is in expanding existing efforts and siting EVCS in disadvantaged communities and areas that lack EV infrastructure. The Progressing scenario is tailored for cities or areas that have made initial steps in developing EV charging infrastructure and could benefit from increasing accessibility to EV charging stations. The Initiating scenario is designed for cites or areas that just started building EV infrastructure and need to determine locations for the placement of their first few EV charging stations.

SCAG REGIONWIDE STANDARD

This scenario focused on aligning with the overall qualities that SCAG, the cities, and the stakeholders wanted to focus on; prioritizing high employment areas, accessibility, high-capacity, convenience, public transit, and the environment. To accomplish this the Regionwide Standard scoring gave higher scores to locations in close proximity to public transit stations, large employers, and high-capacity locations (hospitals, shopping centers, schools, etc.). Additionally, the Regionwide Standard scoring criteria focused on having a larger geographic coverage of EV charging stations. The Regionwide Standard scoring also awarded maximum points to low-income, high-density, and DAC areas. Yet, the Regionwide Standard scoring did not take into account the level of EV readiness and existing EV infrastructure of the area. Based on feedback from SCAG, cities, and stakeholders it became apparent that depending on a city's level of EV readiness and existing EV infrastructure different cities may have different priorities, and should adjust the weighting of the scoring criteria. For example, cities with minimal existing EV infrastructure should still target traditional locations close to highways and arterial streets, while cities with more built out EV infrastructure have likely already addressed these areas.

EXPANDING

The Expanding category recognizes that certain cities have a more robust EV infrastructure network and many publicly accessible EVCS installed at high-capacity locations throughout their jurisdictions. These cities have a high level of EV readiness and have a need to expand EV charging infrastructure to underserved locations within their jurisdiction. Future EVCS infrastructure should be prioritized in areas with an absence of EV charging infrastructure. New EV chargers should be located at further distances from their existing infrastructure to address gaps in the system. EV charging stations should be in DACs and lower-income areas to reduce barriers to EV infrastructure to historically underserved groups. Installing EVCS in DACs is further supported by the California Energy Commission (CEC), which is working to provide Clean Transportation Program funds from the investment plan toward projects that benefit low-income and disadvantaged communities.[19] Public support or ownership of the EVCS may be needed to address these areas previously underserved by the private market.

Objectives:

- Expand existing EVCS network
- Address gaps in EV infrastructure
- Prioritize DACs and low-income areas
- Prioritize areas with lower EV ownership to catalyze additional purchases

The Expanding cities scoring criteria awarded the highest number of points to areas furthest from any existing or planned EV charging stations to increase the geographic coverage of the EV infrastructure network. Furthermore, cities in the Expanding scenario awarded the highest points to areas with the lowest current EV ownership to concentrate on expanding new areas and reducing barriers to charging EVs. The Expanding scenario also awards the highest points for lowest-income, DACs, and highest pollution burden locations.

As noted in the CEC Clean Transportation Program Final Project Report; installing EVCS in low-income and DAC areas provides the opportunity to not only expand EV charging infrastructure, but also increase equity and reduce barriers to EV ownership.

- The installation of 16, Level 2 EVCS in a 900-vehicle parking structure at a Los Angeles County Service Center at 8300 S. Vermont Avenue in South Central Los Angeles, a community of color in the 85th percentile as a disadvantaged community, was a bold move. When this project was approved, there were only two public Level 2 EVCS within a four-mile radius of the site and only two or three employees drove plug-in vehicles. The project's goal was to install Electric Vehicle Supply Equipment at scale to enable and accelerate the adoption of plug-in vehicles and provide public access for the secondary (used) car market. After 9 months of usage the operation data found that: 1) the total number of Charging Sessions has almost doubled, from 59 sessions in May 2021 to 111 in February 2022; the EVCS usage has steadily increased from 162 kWh to 806 kWh per month; actual charging time more than tripled from 5,232 minutes to almost 16,000 minutes; and at 4 miles per kWh, that is 16,232 miles or a reduction of GHG emission of apparently 12,750 pounds of carbon dioxide.[20]

[19] California Energy Commission (2021) "2021–2023 Investment Plan Update for the Clean Transportation Program," Commission Report, CEC-600-2021-038-CMF.

[20] Teebay, Richard. County of Los Angeles. 2022. Electric Vehicle Charging at County of Los Angeles South Vermont Street Location. California Energy Commission. Publication Number: CEC-600-2022-047.

PROGRESSING

Cities that are in the Progressing scenario have some existing EV infrastructure that needs to be expanded into a more robust network. Cities in the Progressing scenario may want to prioritize locations that provide a wider accessibility to the public and promote increased usage, specifically types of land use that are high density, such MUDs.[21] EVCS should continue to be focused on high-capacity locations such as shopping centers, restaurant, public services / post offices, civic centers, and theaters for high visibility and growing the EV network. Additionally, EVCS should be located in DACs and lower-income areas to reduce barriers to EV ownership.

Objectives:

- Locate new EVCS in high-capacity locations
- Locate new EVCS in high density locations
- Prioritize DACs and low-income areas
- Prioritize areas with some EV ownership

Cities in the Progressing scenario are working to build up an EV infrastructure network and locate publicly available charging stations in areas that are starting to see EV ownership increase. Progressing cities scored areas with mid-range current EV ownership the highest. The reasoning is that cities in the Progressing scenario are focusing EV charging stations in areas that are attempting to increase EV usage and capacity for charging. Progressing cities are moving beyond areas that already have EV charging stations to areas that need increased support. Similarly, in Progressing scenario the assumption is that cities would want to locate new EV charging stations in a mid-range distance existing or planned EV charging stations, thus boosting the amount of EV chargers in an area as well as growing the overall geographic network of EV charging stations.

INITIATING

Cities that are in the Initiating scenario have little to no existing EV infrastructure and are looking to create a network. These Cities may not have made EV infrastructure a priority due to limited funding and/or minimal demand from their communities. This may result in a "chicken or the egg" scenario where minimal EV ownership has not triggered demand for EV infrastructure and private investment may avoid these areas due to low forecasted utilization rates. Initiating cities, like cities in the Progressing scenario, also prioritize areas that have high-capacity locations such as shopping centers, restaurant, public services / post offices, civic centers, and theaters to ensure areas of high visibility and use are covered by the network. Initiating cities also prioritize locations that provide accessibility to the public and promotes increased usage, specifically types of land use that are high density, such as MUDs. Yet, Initiating cities and regions are different from the Expanding cities, in that they are concentrating on placing charging stations in areas with high existing EV ownership to ensure usage of the new charging stations and support an increase in EV ownership. Additionally, these cities may choose to prioritize placing EV charging stations in DACs to increase equity and improve access to EV infrastructure. However, unlike the Progressing and Expanding scenarios, the Initiating scenario would initially focus on areas where the median household income levels are higher. Higher income households are more likely to own EVs or to purchase EVs in the future and locating charging infrastructure in these areas may increase EV usage.

[21] J.R. DeShazo (2021) "An Electric Vehicle Charging Station Siting Strategy for the South Coast: Expanding Opportunities in Multi-unit Dwellings and Workplaces," UCLA Luskin Center for Innovation, Mobile Source Review Committee (MSRC), and Clean Transportation Funding.

Objectives:

- Locate new EVCS in high-capacity locations
- Locate new EVCS in high density locations
- Prioritize areas with higher EV ownership

Cities and regions in the Initiating scenario are creating a new EV charging network and should target on locations that are highly trafficked where EVCS would be highly utilized. Conversely, to the Expanding and Progressing cities, initiating cities scored locations with high current EV ownership with the highest points. The reasoning is that cities in the Initiating scenario are focusing EV charging stations in areas that have high EV ownership and usage, which will have an immediate demand for new EV charging stations.

SCORING

The scoring provides point values for a set of criteria to evaluate how each parcel within a city is rated as a site for potential EVCS. Each criterion is given a score of 0, 1, 3, 5, 7, or 10 points, with 0 points representing the lowest score and 10 representing the highest. It was important for a range of scores for the criterion to reflect the variability of EV readiness, as well as geographic and demographic difference, between the various cities. Parcels that received the highest score (10 points) for a particular criterion have attributes that would be optimal or highly prioritized for the placement of an EV charging station. Parcels were given a score for each criterion and received a total score value. Parcels that received the highest scores are recommended for further site investigation. Parcels with the lowest scoring brackets are suboptimal for placement of EVCS in the near-term based on the evaluation criteria but could be considered as the EVCS network expands.

EVALUATION CRITERIA

Multiple criteria were used in the suitability analysis and include a range of variables including demographics, site type, accessibility, equity, high-capacity, convenience, transit, environment, or employment. Each of the Three Scoring Scenarios for Cities are scored on the same 0 – 10-point scale, with 10 points as the highest score per each criterion. However, each of the Three Scoring Scenarios for Cities have slightly different prioritizations for various criterion. The breakdown of scoring for individual criterion for each scenario is outlined in Appendix A.

SITE SUITABILITY ANALYSIS RESULTS

Each suitability analysis scenario was performed for each county in SCAG, as well as for each participating City. As an example, the maps for LA County are shown in Figure 6, Figure 7, Figure 8, and Figure 9. Complete results for each County and City are in the Appendices. As previously mentioned, the multiple scenarios can be used by developers, planners, and other stakeholders to help target EVCS projects throughout the SCAG region. There may be additional benefits for cities earlier in the EV journey as comparing the Initiating, Progressing, and Expanding scenarios creates a roadmap of how to target EVCS over time. Comparing all the scenarios against each other can provide useful insights such as:

- Areas that score high across all scenarios may warrant additional consideration for near term outreach, evaluation, and installation
- Areas that score low across all scenarios can be avoided and thus save stakeholders time by focusing on other prioritized sites
- Areas that score low in some scenarios, but high in others can help inform the timing of when sites should be targeted for outreach, evaluation, and installation

A few examples of these situations occurring in LA County include:

- The blue circle shows that the area around Pomona is generally high scoring across all scenarios and could be a prime target for future evaluation.

- The purple circle shows how the northwestern portion of the county scores higher as the scenarios move from Initiating, Progressing, to Expanding, which shows how initially unlucrative sites become a higher priority after EV infrastructure in the prime areas have been targeted.
- The red circle in the northeastern portion of the County scores low across all scenarios and should generally not be considered

These same types of insights can be found in each County and within each City. Other notable takeaways from the suitability analysis:

- In rural areas, sites near freeways or other major travel corridors score slightly higher than the surrounding areas. This may help highlight current or future Alternative Fuel Corridors for specific funding sources.
- Several variables were based on distances from existing reference points. This creates a clustering of sites that all score similarly. In certain situations, this could lead to developing a project that serves multiple sites or end users.
    - For example, in some Cities there are multiple blocks of small MUDs such as duplexes, triplexes, and quadplexes. While MUDs this small are more likely to have dedicated off street parking or private garages, renters may have limited control over installing EVCS at these locations or there may not be enough off-streety parking to serve all tenants. In situations where these sites score high, they may make for good candidates for Level 2 curbside charging. One charger could potentially serve multiple nearby MUDs. This is an example where Cities could install chargers to support traditionally hard to reach populations.

It should be noted that there are some limitations to this analysis.

- The analysis was completed at the parcel level based on data maintained by each county. There are cases where multiple parcels make up a single contiguous property, such as a large commercial plaza. Site evaluations should then be conducted at the property level.
- In some cases, data may not be fully up to date or differences in nomenclature may result in inaccurate scoring. One example occurred in the City of Glendora. Upon City review of their suitability results, it was determined that parcels alongside major travel corridors in the City – Grand Avenue and Route 66 – did not score high because their land use classification was "Specific Plan". Has the parcels been listed as "commercial" they would have scored higher.
- The suitability analysis excluded single family residential parcels as that was not a priority of this study. Most EV owners at single-family properties are expected to be able to meet most of their charging needs at home.
- The suitability analysis cannot account for certain site-specific features that influence the viability or cost effectiveness of installing EVCS.
    - A dataset that included the number of parking stalls on a parcel was not available. If this dataset were available in the future, larger parking lots could be prioritized to result in larger, more cost-effective buildouts.
    - There was no dataset that includes the parking stall configuration which influences how ADA requirements can be met.
- The analysis does not consider grid capacity or distance to potential utility interconnection points.
    - Based on stakeholder feedback from utilities, projects with a nameplate load less than 500kW are typically within utility planning forecasts and is not expected to be an issue for most smaller buildouts. Sites with DCFC may face utility grid capacity constraints.
    - Datasets for possible grid interconnection points were not included and should be evaluated during site evaluations.

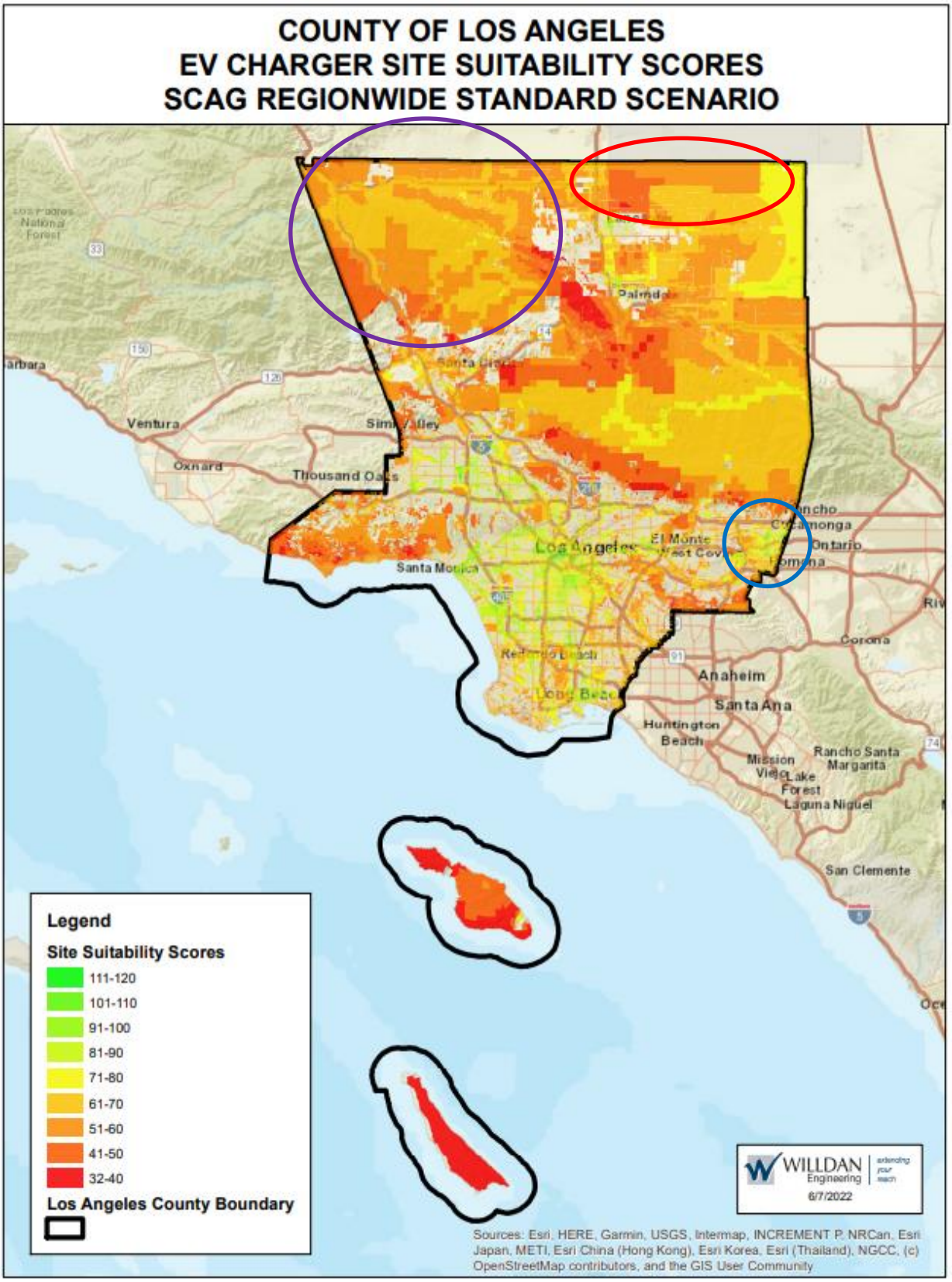

FIGURE 6. LA COUNTY REGIONWIDE STANDARD EVCS SUITABILITY RESULTS

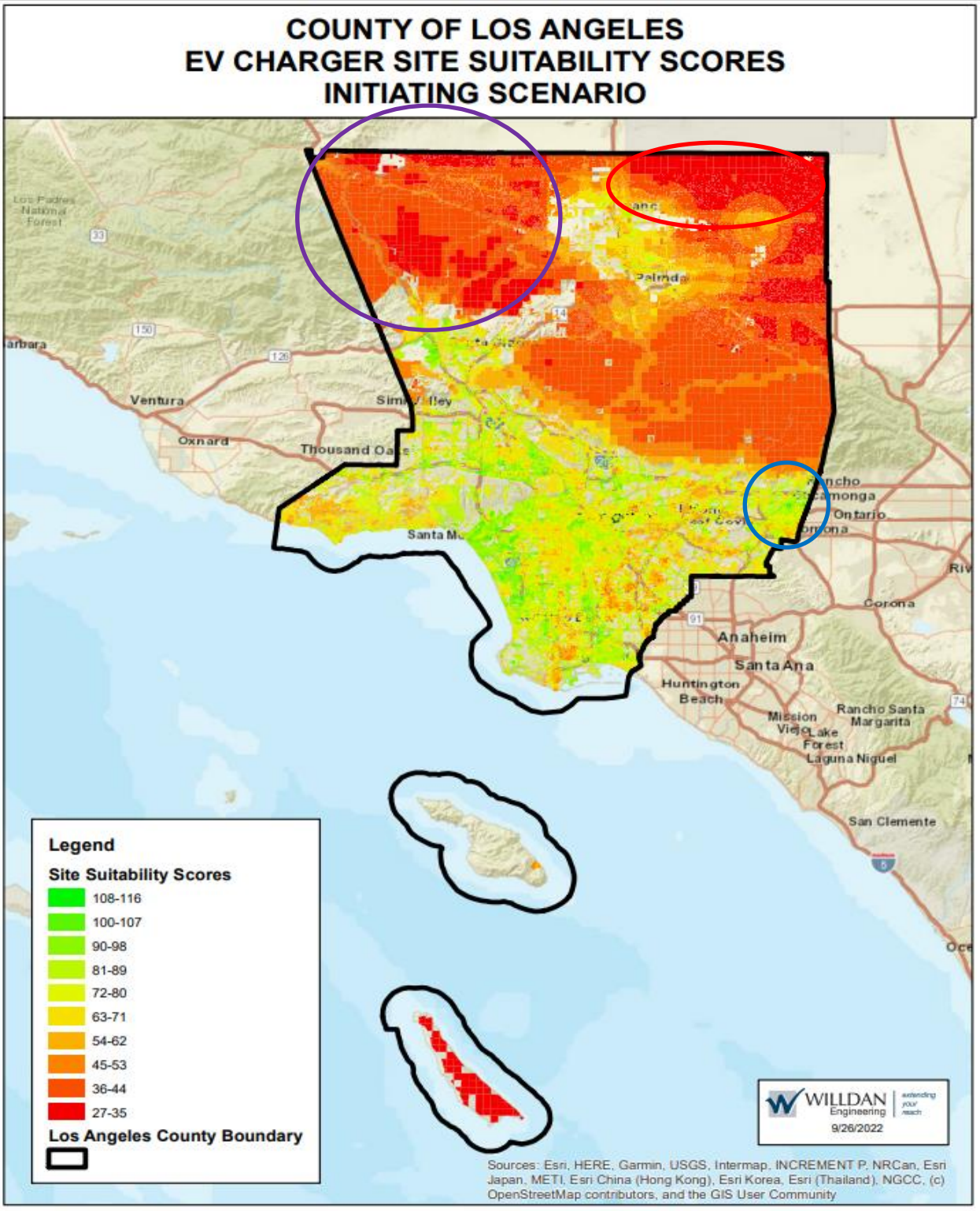

FIGURE 7. LA COUNTY INITIATING EVCS SUITABILITY RESULTS

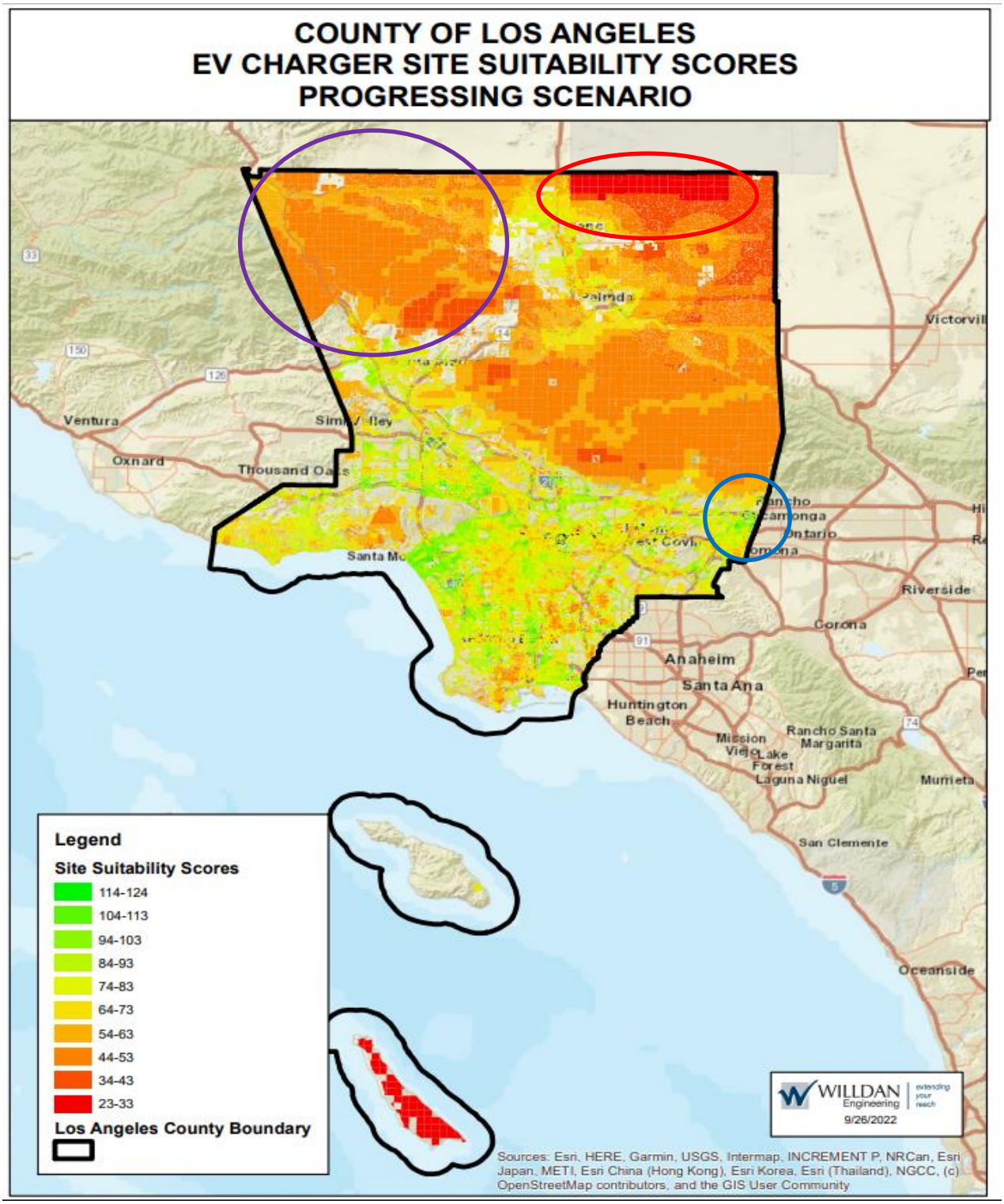

FIGURE 8. LA COUNTY PROGRESSING EVCS SUITABILITY RESULTS

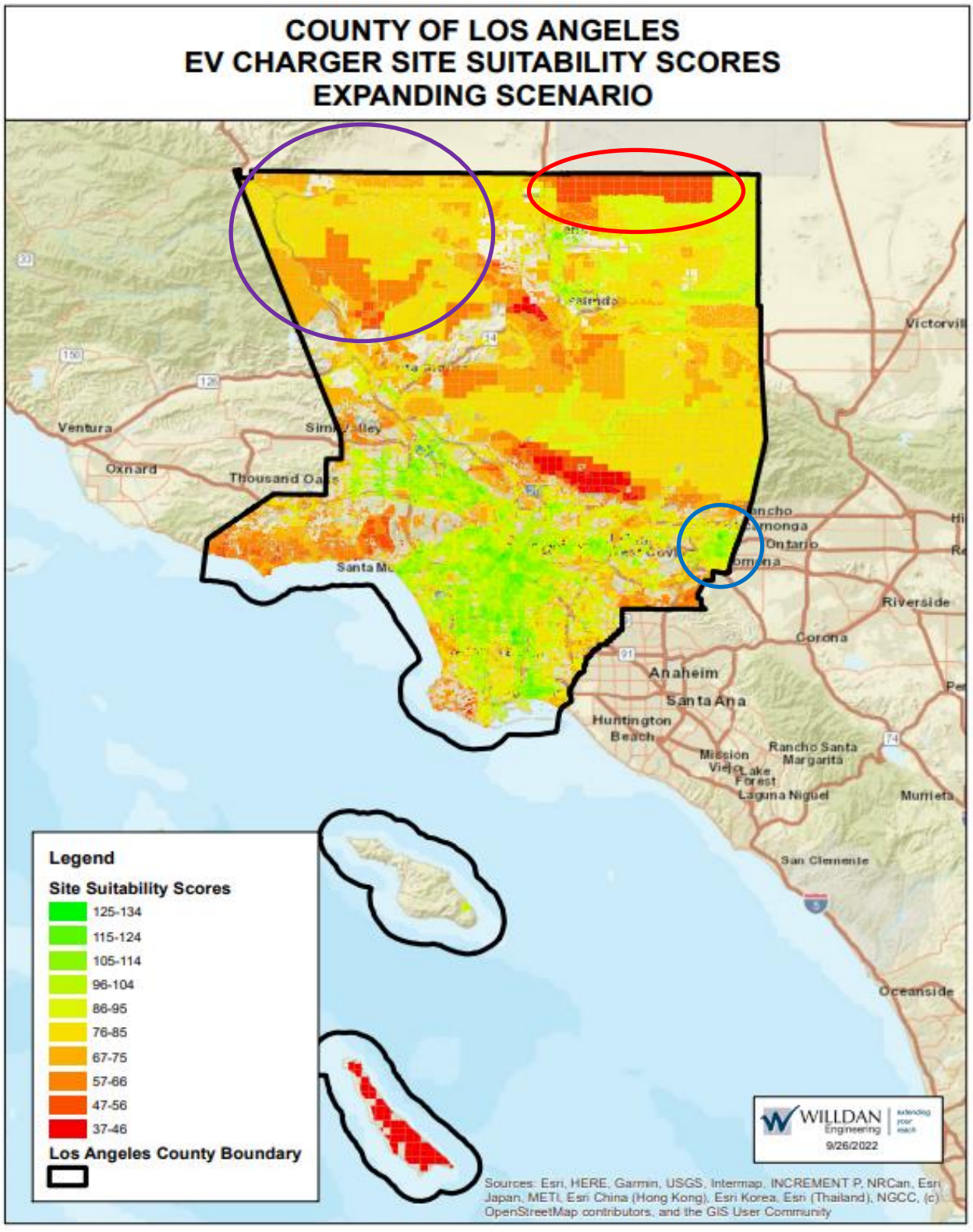

FIGURE 9. LA COUNTY EXPANDING EVCS SUITABILITY RESULTS

SITE EVALUATIONS

OVERVIEW

The suitability analysis was performed for each participating City for all four scenarios. Then a review of the top scoring sites was completed to select specific sites for evaluation. Site evaluations were completed based on the City's current EV infrastructure status. Site evaluations did not use the results of the regional baseline scenario. A review of the publicly available EVCS within each City was completed to determine its infrastructure status and then categorized per the following:

- Cities with two or fewer sites that contained charging stations were classified as "Initiating"
- Cities with more than 100 charging stations were classified as "Expanding"
- All other Cities were classified as "Progressing"

As EVCS infrastructure continues to grow, additional metrics to categorize cities into these different EV infrastructure statuses may include looking at chargers on a per capita basis, density basis, or in relation to EV ownership rates.

A total of 200 sites were evaluated throughout the SCAG EV Study: 100 detailed site evaluations and 100 basic evaluations, broken down in Table 15. Detailed site evaluations include a conceptual layout for a possible EVCS project and a construction cost estimate. Basic site evaluations include general site information and recommended EVCS, but do not include conceptual layouts or cost estimates.

TABLE 15 – SITE EVALUATION BREAKDOWN

City	EVSE Infrastructure Status	Number of Detailed and Basic Site Evaluations (each)
Anaheim	Expanding	7
Artesia	Initiating	5
Baldwin Park	Initiating	5
Covina	Progressing	5
Culver City	Expanding	5
Diamond Bar	Progressing	5
Glendora	Initiating	5
La Puente	Initiating	5
La Verne	Initiating	5
Long Beach	Expanding	8
Los Angeles	Expanding	10
Monrovia	Initiating	5
Pico Rivera	Initiating	5
Redlands	Progressing	5
Rosemead	Initiating	5
San Dimas	Progressing	5
South El Monte	Initiating	5
Walnut	Progressing	5
Total	N/A	100

SITE SELECTION PROCESS

As sites were selected for evaluation, top scoring sites may have been excluded from evaluation for a variety of reasons including but not limited to:

- Lack of or prohibitively small parking lots
- MUDs without open, shared or visitor parking areas such as:
    - MUDs with private parking such as detached garages for each unit,
    - MUDs with no off-street parking. Curbside charging was generally not a consideration for the site evaluations, though City's may consider it beyond this study.
- Sites with vacant lots with no nearby amenities

After filtering through unviable sites, a list of top-scoring sites was sent to City stakeholders for review and input to further guide the final site selection process. Cities were asked which sites they wanted to include in the detailed site evaluations or removed for any reason. For instance, a site with plans to be redeveloped or demolished would not be included in the analysis. Generally, if a site was going to be redeveloped, new construction building codes would already require minimum amounts of EVCS infrastructure, and thus there would be minimal benefit to completing a site evaluation under this study.

Throughout this process Cities were very interested in including a publicly owned site, such as parks or City Hall in the detailed site evaluations because they could implement that project directly. In many cases publicly owned sites were not among the highest scoring sites, so Cities were allowed to include one site of their choosing regardless of how it scored. Several Cities that elected to provide a site for evaluation were publicly owned.

After Cities provided feedback to the initial list of sites, five of the highest scoring sites were selected for detailed site evaluations, including any City-requested sites. Cities were given another opportunity to provide feedback on the detailed site evaluation list or include a City-owned site if one was not provided during the previous step. Cities generally wanted to see a variety of site types in the final selection. Any remaining top-scoring sites were allocated for basic site evaluations, up to the total allocated for each City in Table 15.

A full summary list of sites included in the detailed and basic evaluations are included in the Appendices. Some overview statistics of all the sites including in the detailed and basic site evaluations are summarized in Table 16. The total number of charging ports for each City included in the evaluation is summarized in Table 17.

TABLE 16 – OVERVIEW OF SITE EVALUATIONS

Site Characteristics	Detailed Site Evaluations	Basic Site Evaluations	Total
Site is an MUD	20	39	59
Site is publicly owned	11	7	18
Site is in a DAC	51	54	105
Eligible for SCE Charge Ready	63	40	104
Eligible for NEVI/CALEVIP 2.0	2	1	3
Total Number of Level 2 Ports	784	584	1,368
Total Number of DCFC Ports	31	42	73

TABLE 17 – SITE EVALUATION CHARGING PORT TOTAL

City	Level 2 Charging Ports	DCFC Ports	Total EVCS Ports
Anaheim	115	1	116
Artesia	47	4	51
Baldwin Park	80	0	80
Covina	29	2	31
Culver City	62	3	65
Diamond Bar	53	1	54
Glendora	85	1	86
La Puente	76	2	78
La Verne	41	1	42
Long Beach	87	2	89
Los Angeles	231	21	252
Monrovia	87	3	90
Pico Rivera	125	14	139
Redlands	58	8	66
Rosemead	38	0	38
San Dimas	41	4	45
South El Monte	56	0	56
Walnut	57	6	63
Study Total	1368	73	1441

DETAILED SITE EVALUATIONS

Detailed site evaluations were completed for top scoring sites. Detailed site evaluations consist of a conceptual layout and rough order of magnitude (ROM) cost estimate to install the recommended quantity and power level of chargers. These detailed site evaluations are not engineering drawings and are meant to be used as a starting point for Cities to develop potential projects with community stakeholders.

The design guidelines in Table 18 were used to determine the quantity and type of chargers recommended for each detailed site evaluation. Construction cost estimates were developed for each site evaluation. Cost estimates are broken up into three major cost categories: electrical upgrades (meters, panels, etc.), civil upgrades (ADA, trenching, etc.), and EVCS equipment.

TABLE 18 – EVCS DETAILED SITE EVALUATION DESIGN GUIDELINES

Category	Criteria	Basis of Design/ Assumption
Equipment Siting	Placement of chargers on a parcel	Stalls closer to an identified utility power source are preferred to those further away. Where possible, prime parking stalls (those closest to main site amenity) are avoided based on historic aversion of site hosts to consume prime parking for charging services.
	Visibility from surrounding areas	Charger locations with better visibility from surrounding areas are preferred

Category	Criteria	Basis of Design/ Assumption
Equipment and Stall Scoping	Quantity of Level 2 (L2) charging stalls	L2 EV charging stall quantities are based on mandatory measures detailed in the 2019 California Green Building Standards Code for new projects[22]. Prescribed quantities are based on total number of parking spaces provided for all types of parking facilities in accordance with Tables 5.106.5.3.3 (Non-Residential) or 4.106.4.3.1 (Residential). Calculations for required number of EV spaces shall be rounded up to the nearest whole number. This is exceeded for MUDs, where each stall is assigned a charging port. While the total quantity of EV charging spaces detailed in the 2019 California Green Building Standards Code does not apply to retrofit projects, it is used to provide guidance on target charging stalls quantities for SCAG EV charger site evaluations.
	Quantity of Level 3 (L3) charging stalls	L3 EV charging stall quantities based on mandatory measures detailed in the 2019 California Green Building Standards Code for new projects. L2 port conversion to L3 based on 2022 California Green Building Standards Code where one DC fast charger port supplements five L2 charge ports as identified in Tables 5.106.5.3.3 (Non-Residential) or 4.106.4.3.1 (Residential). Calculations for required number of EV spaces shall be rounded up to the nearest whole number.
	Quantity of accessible EV charging stalls	The required quantity and type of accessible charging stalls is based on the California Building Code Section 11B-812 for van accessible, standard accessible, and ambulatory stalls. Quantities are prescribed based on the total number of EV charging stalls at a facility. Stall dimensions, charger placement, grading, reach, and identification is based on the same code. Exemptions include fleets and sites with reserved or assigned parking like apartment buildings or condominiums.
	Type of charger proposed Level 2 (L2) or DCFC	L2 chargers are proposed in most cases except where (1) the SCAG city specifically requests DCFC, (2) DCFC already exists at the site, (3) where the quantity of proposed L2 chargers would be an excessive space burden on the property (20+ charging ports), or (4) at sites with limited parking and an existing short dwell time use such as gas stations or quick service restaurants.
Civil Design	Selection of bollards vs. wheel stops for charger protection	Wheel stops are scoped where possible based on cost efficiency. Bollards are scoped where added protection is required, where L3 chargers are proposed, or where wheel stop placement will not prevent a vehicle from hitting the charger such as wall-mount chargers in a parking garage with limited space at the head-end of the stall.
	Asphalt finish treatment	Asphalt surfaces assumed to be slurry sealed and striped as part of the construction project. Concrete surfaces assumed to be striped.
	Asphalt depth	Asphalt repairs over backfilled trenches assumed to be 7" thick.
	Trenching specification	Trenches assumed to be 24" wide and 36" deep. Backfill assumed to be native soil compacted to minimum 95% under any finished surfaces and 90% in planters.

[22] Codes (ca.gov)

Category	Criteria	Basis of Design/ Assumption
	Electrical equipment protection	Electrical panelboards and distribution equipment protected with standard concrete embedded or removable utility bollards at maximum spacing of 4'6."
	Surface restauration	Assumes disturbed surfaces (finished or unfinished) are restored to match the existing condition. Examples: turf removed for trenching is restored with sod, trenching through concrete is repaired with like, asphalt patch-backs are matched to existing asphalt spec.
	Accessible Path of Travel (POT)	Any existing POT is assumed to be code-compliant unless noted. Accessible improvements related to EV charger installation end at the connection to an existing POT. Where accessibility rules apply and where the is no apparent POT, a new POT is proposed however no determination of ADA-compliant slopes are made.
	Accessible charging stall grading	Assumes new accessible charging stalls, access aisles, and POT will be regraded to code-compliant slopes and taper/ rise to match existing grades outside of the accessible area footprint. No determination is made as to the overall feasibility of regrade and match scope, only that asphalt and concrete removal/ replacement quantities are included in the project.
Site Protection	Temporary fencing and trench plates	Assumes contractor use of temporary fencing and trench plates to secure work area and safe-off trenches for the duration of construction activities.
Electrical Equipment	New service vs. existing service	In most cases new utility service is assumed for proposed charging circuits to leverage EV-specific rates, SCE make-ready programs, and because existing panel loading information is not available. On a case-by-case basis, existing service is proposed as an alternative option for small projects, e.g., two L2 chargers can be assumed to tie into existing building electrical infrastructure.
	Service and panel sizing	New electrical service power requirements are based on anticipated new EV charging load in Kilovolt-Amperes (kVA) at 480V or 208V AC. No charge management software or load-shedding capabilities assumed. Chargers treated as "continuous loads" per the California Electrical Code. Equipment spec conservatively assumes 480V utility feed to 480V meter main, dry step-down transformer, and 208V/120V distribution board for L2 chargers.
	Equipment footprint	Assumes footprint for concrete housekeeping pad for meter main service panel, transformer, and distribution panel for L2 chargers. No transformer or 208V distribution assumed for L3 chargers. Wall-mount equipment assumed for small projects where applicable.
Utility Power	Point of utility connection	Where visible, anticipated point of connection to the utility distribution network is identified on the site plan (underground vault, existing pad-mount utility transformer, power pole, or pole-mount transformer). No loading or availability determination is included in the evaluation. Viability of proposed utility connection is subject to utility review and Local Planning design.

Category	Criteria	Basis of Design/ Assumption
	Siting of new utility structures and equipment	When evident, a footprint of proposed utility equipment is shown on the site plan. In most cases, utility equipment is not shown as it is subject to utility Local Planning design.
Cost	Quantities	Material takeoffs estimate the quantities of demolition/ export, wire, conduit, trenching and backfill, asphalt concrete paving, concrete pads, curb, and gutter, bollards, landscape repair, chargers, etc.
	Conduit materials	All above grade conduit exposed to damage assumed to be rigid metal conduit (RMC), above-grade interior conduit not subject to damage assumed to be electrical metallic tubing (EMT), and below grade conduit assumed to be Polyvinyl Chloride Conduit (PVC).
	Wire materials	All wire assumed to be stranded copper (CU) THHN or XHHW.
	General conditions (GCs)	GCs included in each individual project and assumed a construction duration of five weeks.
	Exclusions	Not included in Rough Order of Magnitude (ROM) estimates are utility civil and electrical costs, permit fees, special inspections, design fees, consultant fees, additional ADA site upgrades (if required), DSA fees, or code-required upgrades to existing charging stalls.

The final list of detailed site evaluations included a variety of site types among the cities. Complete site evaluations for each City are included in the Appendices and use the template shown in Figure 10 and Figure 11. The template is available on SCAG's website for Cities that wish to conduct further site evaluations beyond this Study. For cities in the SCAG region that did not participate in this study, conceptual level plans for desired site locations may be developed using this template and aforementioned design guidelines. The following samples (Figure 12, Figure 13, Figure 14, and Figure 15) illustrate different typical projects, how EVCS type, quantity and placement were determined, and other notable takeaways.

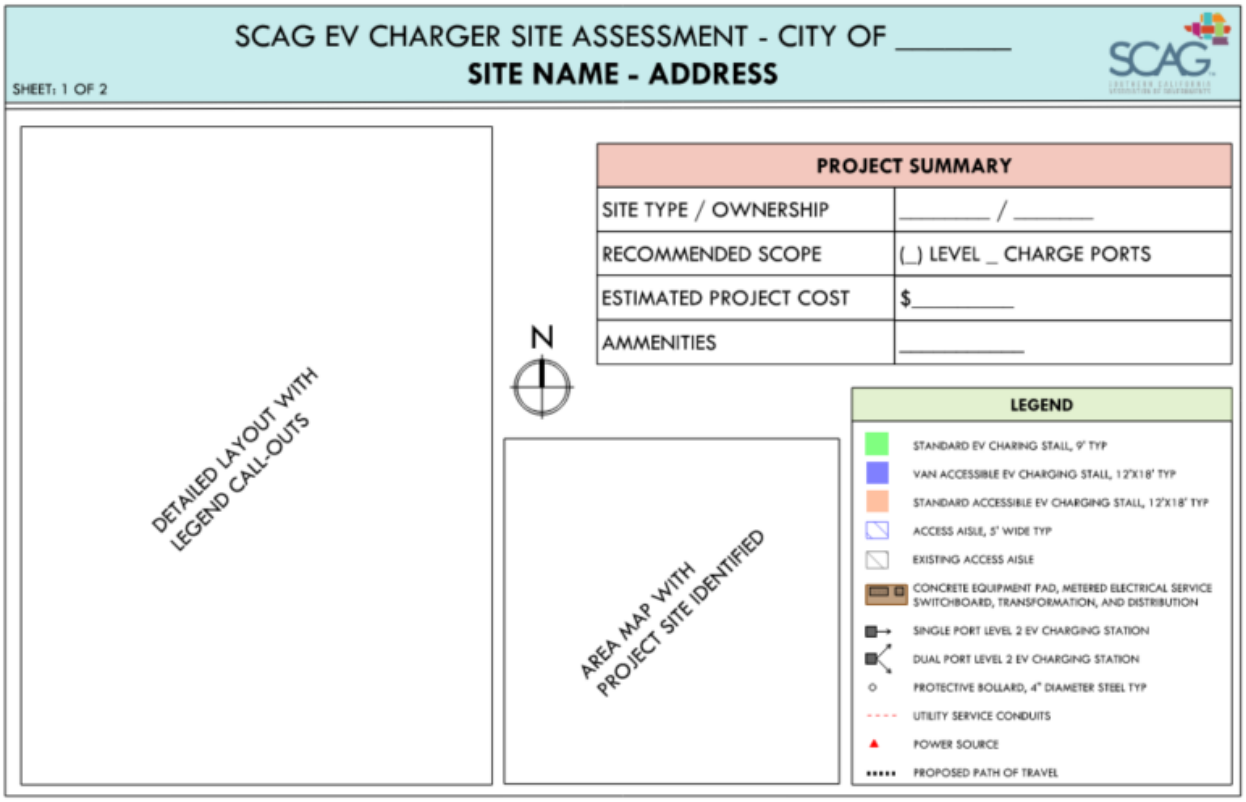

FIGURE 10. TEMPLATE SITE EVALUATION FRONT SHEET

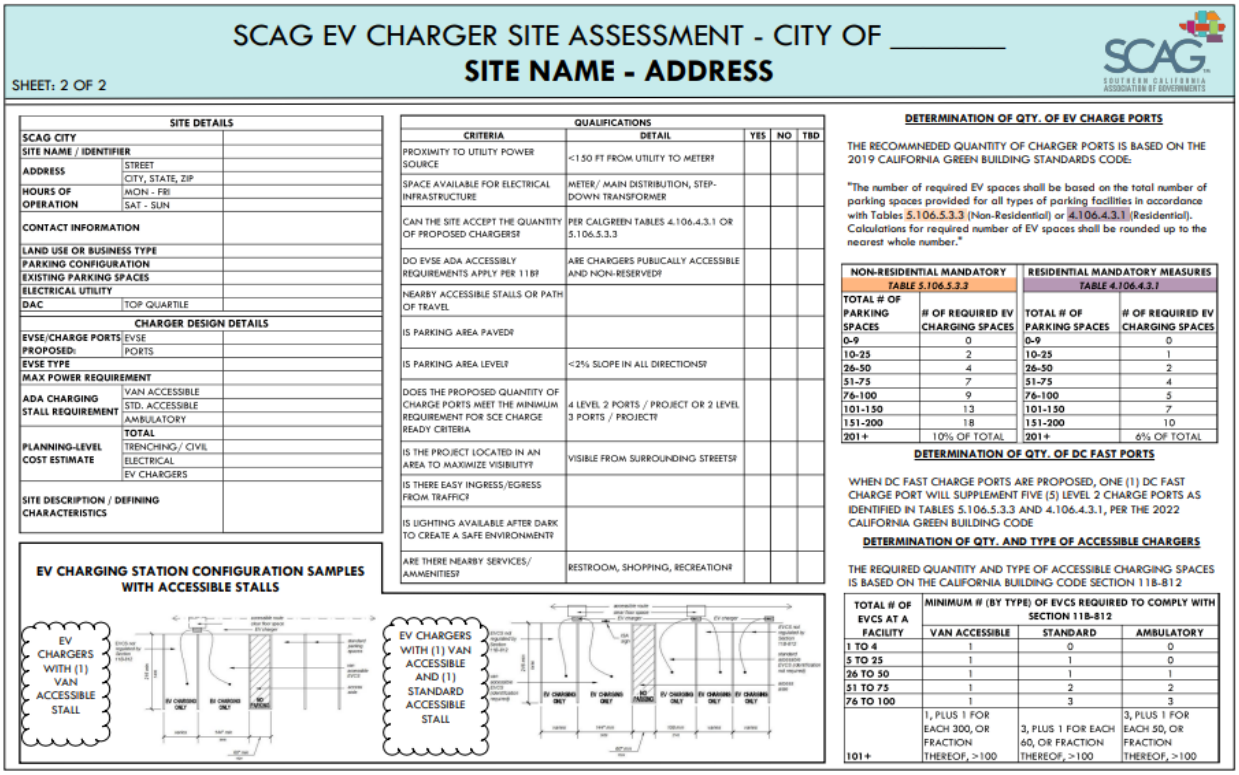

FIGURE 11. TEMPLATE SITE EVALUATION BACK SHEET

Artesia Park provides an example of a relatively simple, cost-effective Level 2 EVCS project (Figure 12). The park has a large open parking lot that can accommodate many EVCS. Larger buildouts are typically more cost effective on a per-port basis since fixed costs such as a new electrical service or ADA improvements can be spread out among more charging ports. Larger, more cost-effective projects are more likely to qualify for SCE's Charge Ready Program which heavily subsidizes the cost of EVCS infrastructure and provides rebates on qualified charging stations, though at the time of this report SCE's Charge Ready program for light duty vehicles is currently on hold due to being oversubscribed. At this location, EVCS can be installed close to potential utility power and ADA improvements are relatively minor. This results in an average cost of $18,153 per port.

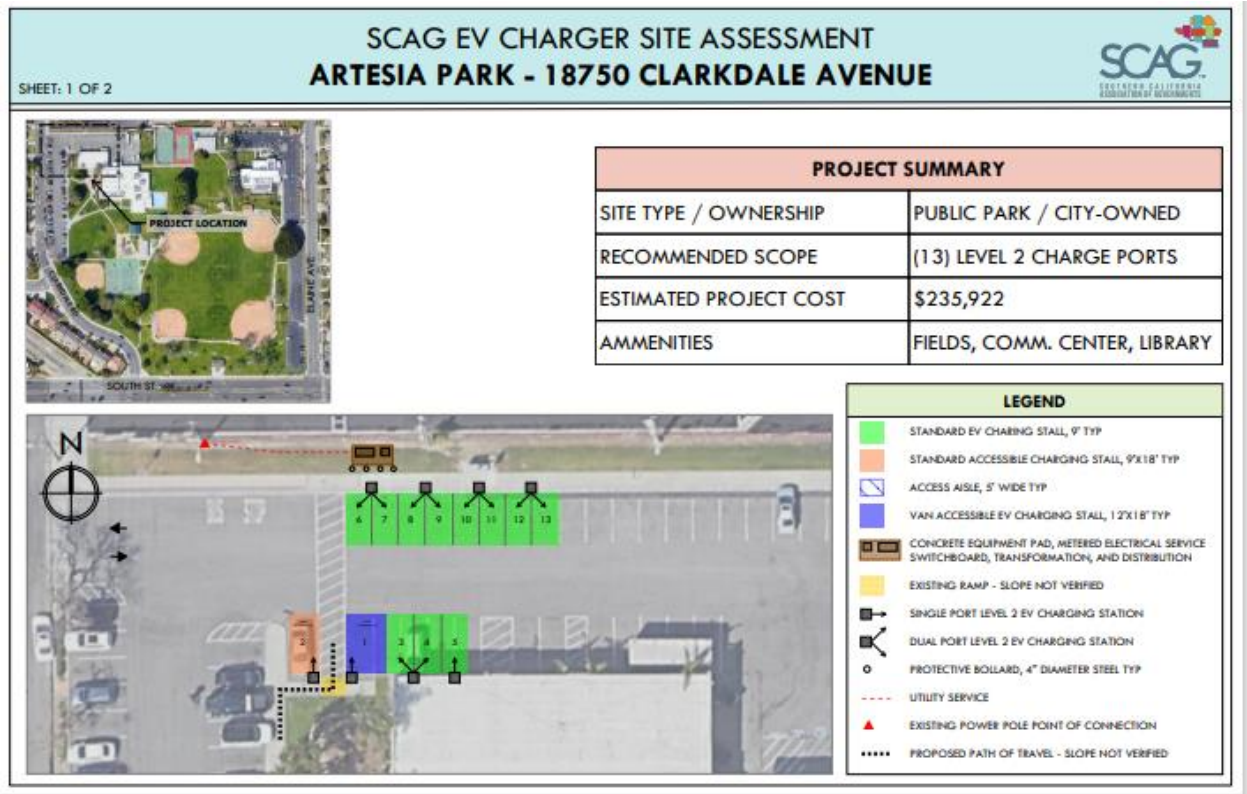

FIGURE 12. SAMPLE SIMPLE LEVEL 2 DETAILED SITE EVALUATION

Figure 13 illustrates a relatively simple Level 2 EVCS project at a small MUD in South El Monte. EVCS are installed in each surface stall so that each tenant would have access to a charging station. Installing as many charging ports as possible at this location would increase the overall cost effectiveness on a per-port basis. It is assumed that each stall would receive a dedicated 7.2kW charging port but sharing multiple chargers on a single circuit could be considered given vehicles would likely charge overnight. Since only four EVCS are proposed at this site, all the EVCS could be shared on one or two 40A circuits. This could help limit electrical upgrade costs. Since EVCS would be dedicated to specific tenants, this project would be exempt from ADA requirements. This project would have an estimated average cost of $19,168 per port.

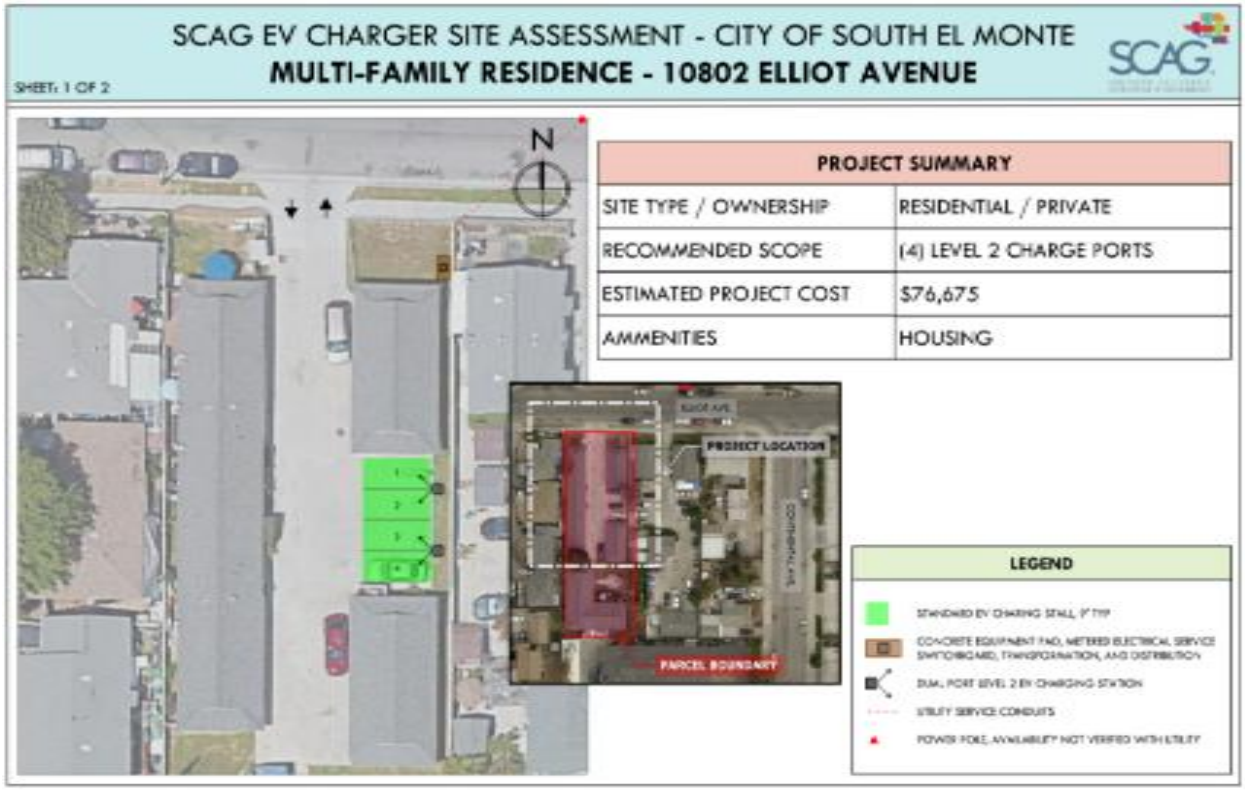

FIGURE 13. SAMPLE MUD DETAILED SITE EVALUATION

Figure 14 illustrates a smaller, more expensive Level 2 EVCS project at a housing community in San Dimas. This small housing community provides an example of townhomes and condos that each have their own private off-street parking, as well as shared visitor parking. This community has multiple small visitor parking areas, usually consisting of a few stalls each, that were considered for EVCS. In this example only a couple of EVCS would be installed, and parking stalls were further away from potential power sources. The visitor lots had no existing ADA features, so access aisles and curb ramps would need to be installed. Overall, this results in a much more expensive project with an average cost of $41,237 per port. A developer would likely need to coordinate with the HOA to implement this project. The challenges do not mean that the site should not be considered for EVCS, but it highlights the variability in EVCS project costs and some of the limitations of the suitability analysis and when design guidelines could be modified. If two or three more EVCS were added to the project, it may increase the overall cost effectiveness.

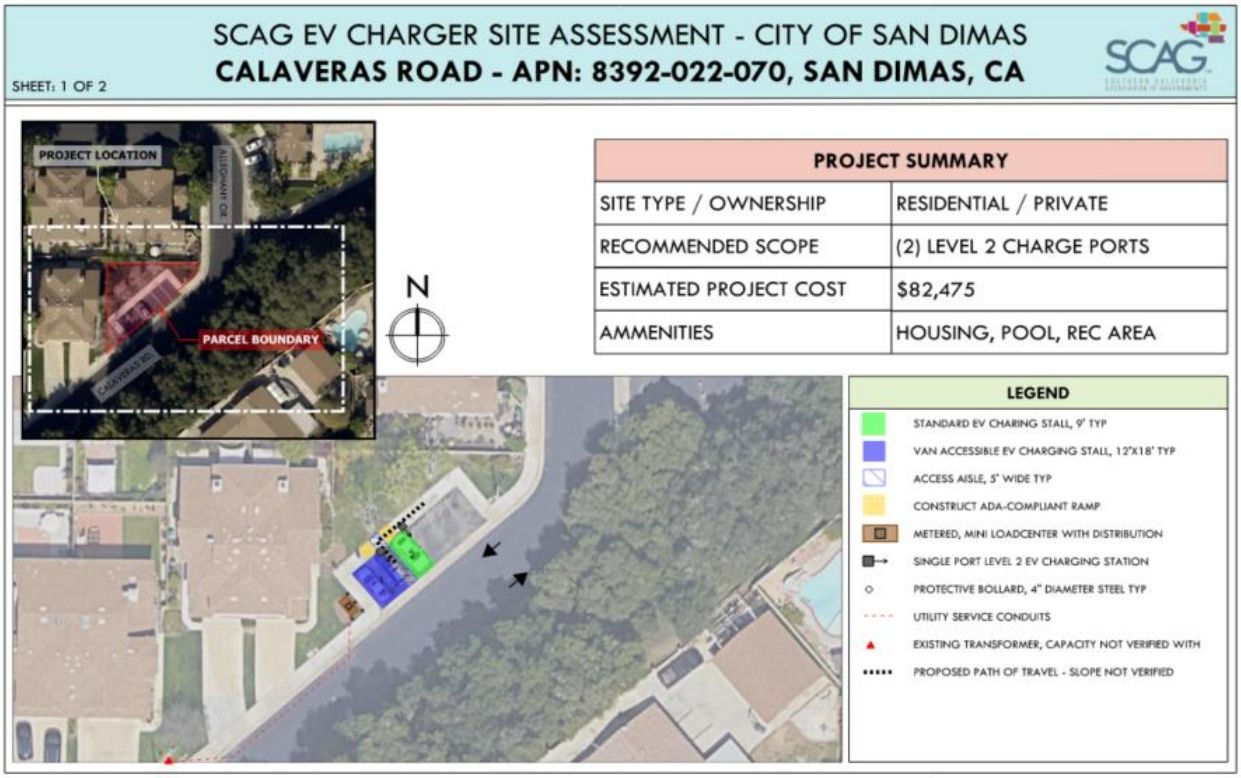

FIGURE 14. SAMPLE DIFFICULT LEVEL 2 SITE EVALUATION

Figure 15 showcases an example that lends itself to DCFC as opposed to Level 2 EVCS - a coffee shop in Long Beach. Coffee shop patrons are generally expected to leave the site in under an hour, so a higher charging output better aligns with an EV driver's dwell time. DCFCs are typically more expensive than Level 2 projects because the EVCS hardware is much more expensive and typically require more extensive electrical upgrades. This project would cost $119,659 per port. This parking lot is relatively small so only a single DCFC would be recommended, though if the site wanted to increase the total number of DCFC ports to 4, it may be eligible for DCFC-specific funding sources such as CALeVIP 2.0 or NEVI.

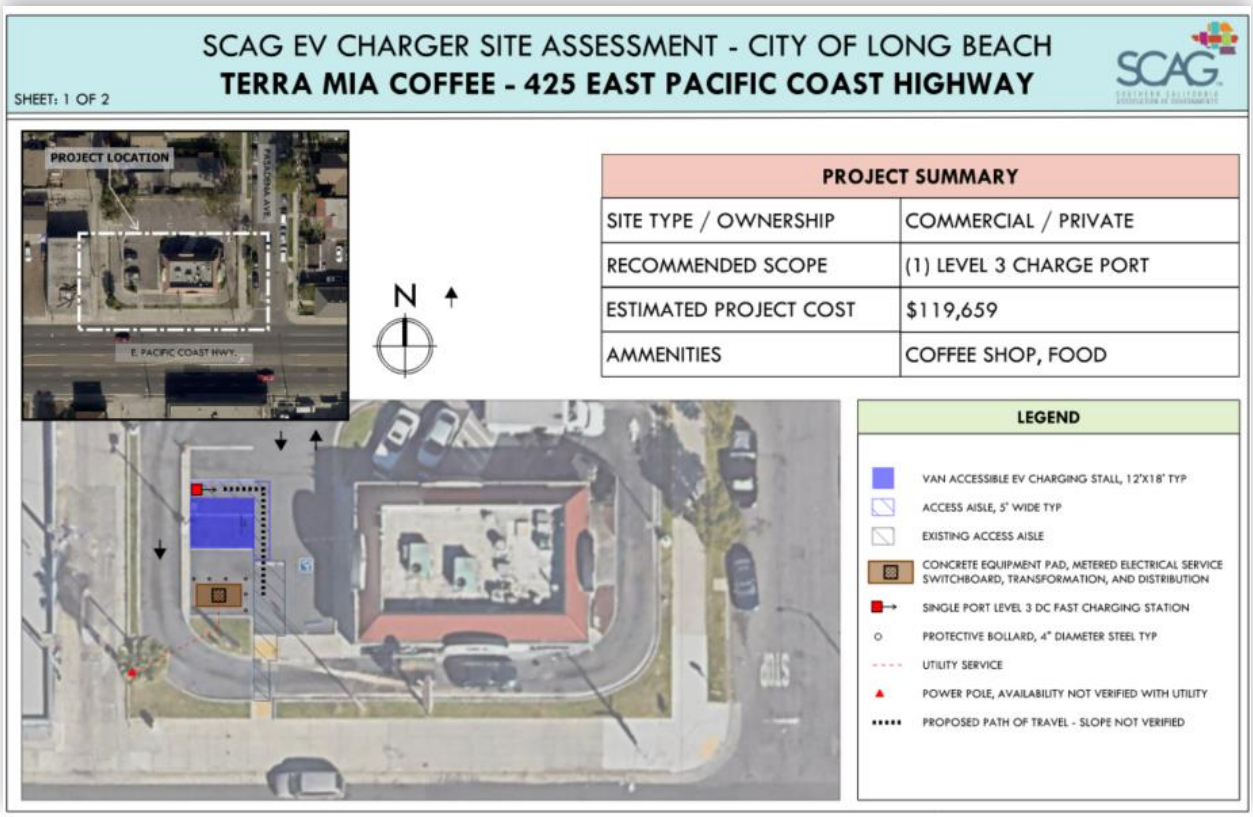

FIGURE 15. SAMPLE DCFC INSTALLATION AT A COFFEE SHOP

BASIC EVALUATIONS

Other top scoring sites were selected for basic site evaluations which includes site address, contact information (if available), site characteristics, and recommended EVCS power level and quantity. The basic site evaluations use the same guidelines as the detailed evaluations for determining the recommended EVCS power level and quantity. Cost estimates are not included in the basic site evaluations. A table showing all of the basic site evaluations is contained in the Appendices.

NEXT STEPS

Most of the top scoring sites are privately owned, limiting how Cities can directly impact project development and installation. Cities should review the detailed site evaluations and can use them as an outreach tool to the site owners to spark project development. Cities may not be expected to help fund projects on private property but should come prepared with funding resources available to the site owner. AN overview of available funding sources is presented later in this report. Funding sources may change in

availability or site eligibility over time, so Cities should maintain the list as a living document. The Department of Energy also maintains a list of EV funding sources Cities can leverage[23].

Most cities included a publicly owned site in the site evaluations and should engage project developers and/or contractors to begin developing their sites. If Cities have developed partnerships with EVCS vendors or contractors, they may review the rest of the suitability analysis results to target other potential public or private sites for EVCS installation.

Project timelines from initial development through installation will vary depending on the complexity of the design, quantity and power level of chargers selected, required site upgrades, and how engaged stakeholders are throughout the process. Smaller, simpler EVCS projects for publicly accessible Level 2 chargers may be completed in under six months assuming major site upgrades are not needed. This could include smaller projects at MUDs that have spare capacity for a couple of charging stations. Larger projects with higher quantities of Level 2 chargers or DCFCs can take 12-18+ months to complete, in part due to extended lead times for large electrical equipment. For example, 480V switchgear needed for DCFC are still suffering from supply chain constraints and current lead times can be between 40-70 weeks.

COMMUNITY AND STAKEHOLDER OUTREACH AND ENAGEMENT

The Study included a comprehensive outreach campaign both to the public and key city stakeholders. The Study consisted of informing the public about EVs and EV charging, stakeholder surveys and collateral distribution via 15 community events. Comments and feedback received from public and stakeholder engagement at the events helped form the analysis and the development of the Study and its final observations. The Study also contains feedback, Q&A responses and general comments received during facilitated listening sessions among 18 participating cities focused on streamlining permitting for EV charging station infrastructure. Listening sessions were held for other industry stakeholders to understand barriers to installing EVCS from the contractor and property owner perspectives.

The Study's team's outreach objectives for the Study included the following:

- Identifying priority stakeholders
- Raise awareness and build enthusiasm among identified key stakeholders to increase EV adoption
- Effectively communicate the scope and intent of the Study to its diverse audiences that are included in the Study's jurisdiction and groupings
- Presenting technical information to the communities (via pop-up events) about EVs and EVCS
- Analyze and understand feedback, opportunities, and challenges to expand EVCS infrastructure
- Understand needs for EVCS deployment to inform the final EVCS plan.

Public involvement plays an important role in the expansion and rollout of EV charging infrastructure to accelerate transportation electrification. Likewise, it is crucial for the public and stakeholders to have a clear understanding of the Study's purpose, need, and benefits including the role it serves in the community and the region.

The outreach and engagement approach consisted of informing the public about EVs, EV charging, facilitating listening sessions focused on EV charging, and documenting comments and feedback from

[23] Alternative Fuels Data Center: Federal and State Laws and Incentives (energy.gov)

these outreach sessions. The comments and feedback collected from the public and stakeholder engagement events were used to informed other elements of the Study.

KEY STAKEHOLDER GROUPS

Several key stakeholders were involved throughout the course of this study as illustrated in Figure 16. Different stakeholder groups were involved in the study in different ways and at different frequencies.

FIGURE 16. STAKEHOLDER GROUPS

The most frequently engaged stakeholder group was the 18 participating cities. The Cities including small, medium, and large cities with varying demographics (Table 19). The participating cities met with SCAG and the project team regularly, up to twice a month to review project progress, exchange information, and provide feedback on deliverables. City stakeholders provided specific feedback to the suitability analysis scoring criteria, final sites for detailed site evaluations, EV guides for City staff and property managers, and this Infrastructure plan. Cities were met with individually to review their EVCS permitting process as part of the listening sessions.

TABLE 19 – PARTICIPATING CITY DEMOGRAPHICS

City	Population	Average Household Income	Race/Ethnicity	Renter vs. Homeowner
Anaheim	357,059	$71,763	Black 2.5% Hispanic 54.3% Indian 0.2% Other 2.3% White 24.2% Asian 16.6%	Renter 55.1% Homeowner 44.9%
Artesia	16,600	$67, 647	Black 5.1% Hispanic 39.9% Indian 0.3% All Other 3.4% White 15.2% Asian 36%	Renter 51.7% Homeowner 48.3%

City	Population	Average Household Income	Race/Ethnicity	Renter vs. Homeowner
Baldwin Park	76,388	$65,904	Black: 1.3% Hispanic: 74.5% Indian: 0.2% Other: 0.9% White: 3.9% Asian: 19.2%	Renter: 43.3% Homeowner: 56.7%
Covina	48, 899	$70,780	Black: 3.3% Hispanic: 58.8% Indian: 0.3 Other: 2.5 White: 22.5% Asian: 12.7%	Renter: 45.6% Homeowner: 54.4%
Culver City	39, 785	$95, 044	Black 8.7% Hispanic 23.7% Indian 0.1% Other 5.5% White 45.8% Asian 16.2%	Renter 47.8% Homeowner 52.2%
Diamond Bar	57,088	$99,083	Black: 3.5% Hispanic: 18.6% Indian: 0.3% Other: 2.4% White: 17.0% Asian: 58.2%	Renter: 24.0% Homeowner: 76.0%
Glendora	51,879	$96,132	Black: 1.8% Hispanic: 34.4% Indian: 0.4% Other: 4.2% White: 47.9% Asian: 11.3%	Renter: 30.8% Homeowner: 69.2%
La Puente	40,358	$64,592	Black: 0.8% Hispanic: 82.9% Indian: 0.2% Other: 0.7% White: 3.7% Asian: 11.6%	Renter: 43.2% Homeowner: 56.8%
La Verne	33,313	$88,131	Black: 3% Hispanic: 36.1% Indian: 0.2% Other: 2.0% White: 49.6% Asian: 9.2%	Renter: 25.9% Homeowner: 74.1%

City	Population	Average Household Income	Race/Ethnicity	Renter vs. Homeowner
Long Beach	472,052	$63,017	Black 12.2% Hispanic 42.6% Indian 0.3% Other 3.9% White 28.2% Asian 12.8%	Renter 60.2% Homeowner 39.8%
Los Angeles	3,975,234	$62,142	Black 8.6% Hispanic 48.5% Indian 0.2% Other 2.8% White 28.5% Asian 11.5%	Renter 63.2% Homeowner 36.8%
Monrovia	37,964	$77,111	Black: 5.3% Hispanic: 41.1% Indian: 0% Other: 4.4% White: 34.5% Asian: 14.7%	Renter: 53.2% Homeowner: 46.8%
Pico Rivera	63, 530	$67, 636	Black 0.8% Hispanic 90.7% Indian 0.1% All Other 0.5% White 5.3% Asian 2.6%	Renter 31.8% Homeowner 68.2 %
Redlands	71, 164	$74, 839	Black 5.3% Hispanic 32.7% Indian 0.2% All Other 3.3% White 50.6% Asian 8.0%	Renter 38.6% Homeowner 61.2 %
Rosemead	54,471	$57,999	Black: 0.4% Hispanic: 32.6% Indian: 0.32% Other: 1.1% White: 4.1% Asian: 61.6%	Renter: 51.7% Homeowner: 48.3%
San Dimas	34,226	$86,410	Black: 1.8% Hispanic: 33.6% Indian: 0.4% Non-Hispanic: 3.5% White: 46.8% Asian:13.8%	Renter: 29.1% Homeowner: 70.9%

City	Population	Average Household Income	Race/Ethnicity	Renter vs. Homeowner
South El Monte	21,252	$52,204	Black: 0.3% Hispanic: 82.3% Indian: 0.1% Other: 0.1% White: 0.5% Asian:14.6%	Renter: 49.2% Homeowner: 50.8%
Walnut	30,015	$108,669	Black: 4.2% Hispanic: 20.2% Indian: 0% Other: 2.6% White: 10.4% Asian: 62.5%	Renter: 15.1% Homeowner: 84.9%

SCAG created a Steering committee consisting of EV industry stakeholders to inform the Study and included representatives from electric utilities, EVCS vendors, cleantech incubators, regional collaboratives, and additional Cities. The Steering committee met a total of 6 times throughout the course of the Study to provide insight and feedback to key deliverables including the suitability analysis. Some specific pieces of feedback to the suitability analysis included:

- Excluding grid capacity since most EVCS projects under 500kW are within the utility's planning models. This would cover most Level 2 projects.
- Informed scoring for specific land use types
- Suggested adding a City's AB 1236 compliance status as a criteria

Other industry stakeholders were engaged through two other listening sessions. One for EVCS project developers and contractors and one for commercial or MUD property managers. The goal of these listening sessions was to understand how the private sector experiences potential barriers to installing EVCS such as funding or getting permits approved.

Lastly, the general public was engaged throughout the SCAG region by attending 15 pop up events. Brochures were passed out that highlighted some of the benefits of EV ownership and surveys were used to understand barriers to adopting an EV or installing a charging station.

COMMUNITY EVENTS AND LESSONS LEARNED

Local community events like the Anaheim Night Market (Figure 17) served as the primary method of public engagement to distribute Study information to the greatest diversity of geographic and demographic representation. The initial plan to secure 15 events hit several roadblocks in late 2021 through early 2022 due COVID-19 issues and challenges. Many events that had been scheduled were either postponed or canceled altogether. Because of this, outreach events ran into Fall of 2022.

The goal of the public events was to involve stakeholders, especially at the start of the Study, to

FIGURE 17. ANAHEIM NIGHT MARKET

maximize public participation, stimulate discussion and encourage feedback from diverse stakeholders, while identifying local community concerns regarding EVs. Verbal comments were also captured at some events via a questionnaire and summarized in Table 20.

TABLE 20 – COMMUNITY EVENTS AND GENERAL FEEDBACK

Community Event	Date	City	General Feedback
Dia De Los Muertos Downtown Festival	Saturday, November 6, 2021	La Puente	• Family-friendly event that celebrates Latin culture and heritage • Residents had concerns about EV mileage/range • Not enough EVCS in their city • Very old school car culture, attached to their gas-powered cars. Residents were not interested in moving towards EV's at this time. • Residents would like more education on EV's
Move Culver City*	Saturday, November 20, 2021	Culver City	• Event to educate about converting existing streets in Culver City to mobility lanes • Residents had concerns about EV mileage/range • Not enough EVCS in their city • Lots of EV Owners stopped at our table
Holiday Tree Lighting & Snowflake Firework Show	Saturday, December 4, 2021	Pico Rivera	• Holiday Event held for community members to enjoy fireworks, vendors, and entertainment • Not enough EVCS in their city • Safety of EV batteries disposal • High price of EV's is seen as a major barrier • Residents were aware of some charging station locations, but felt they are not close by
CicLAvia*	Sunday, December 5, 2021	Los Angeles	• Streets of Los Angeles are shut down to promote active transportation • Not enough EVCS in their city • Safety of EV batteries disposal • High price of EV's is seen as a major barrier • EVs seen as good for the environment • Not enough EV auto options for purchase • Attendees said they aren't able to charge at home or their place of business
Anaheim Friday Night Street Market	Friday, March 25, 2022	Anaheim	• A night market where residents can visit with vendors • Not enough EVCS in their city • High price of EV's is seen as a major barrier • Most attendees that stopped by the booth had questions about the Study and felt the Fact Sheet contained useful information.

Community Event	Date	City	General Feedback
Saturday Morning Certified Farmers Market	Saturday, March 26, 2022	Redlands	• Farmers market where residents can purchase groceries • Residents had concerns about EV mileage/range • Not enough EVCS in their city • High price of EV's is seen as a major barrier • Higher electricity bills from charging at home was mentioned as an obstacle • Most residents did not want to take the survey.
Public Safety Expo and Youth Spring "Eggstravaganza"	Saturday, April 16, 2022	Artesia	• An egg hunt festival that features family activities and SWAT vehicles • High price of EV's is seen as a major barrier • Most attendees approached our booth and asked about EV's • Most vendors sold craft items and/or provided city services information
Earth Day Festival	Saturday, April 16, 2022	Glendora	• Festival the features workshops about living sustainably and tours • Safety of EV batteries disposal • High price of EV's is seen as a major barrier • Most attendees approached our booth and asked about EV's • Some homeowners were not aware how to add the proper charger • Quite a few people already own an EV or Hybrid
SCAG GA Event	Thursday, May 5, 2022	Multiple Cities	• Workshop held for city officials to help them improve the overall quality life of their city • This is an annual event held by SCAG for city officials. • Most attendees that approached our booth wondered how they can get additional planning support for their city. • Attendees suggested Hydrogen cars were slightly better than electric • City officials took our online survey and gathered feedback to take back to their respective city councils.

Community Event	Date	City	General Feedback
Culver City Arts-district Night Market-at Ivy Station	Friday, July 8th, 2022	Culver City	• Held every third Friday of the month to promote vendors • Not enough EVCS in their city • High price of EV's is seen as a major barrier • There was a lot of foot traffic at this monthly event held every third Friday of the month • EVCS need to be closer to destinations (for safety reasons) • Mentioned need to have more EVCS at grocery stores, public parking, train stations and at off ramps. • Apartment dwellers – no place to charge. • Quote: "I do not want the lower income neighborhoods to be neglected. Could put them in parking lots and shared spaces to encourage those areas to also go electric."
CicLAVia	Sunday, July 10th, 2022	Los Angeles	• Streets of Los Angeles are shut down to promote active transportation • Residents had concerns about EV mileage/range • High price of EV's is seen as a major barrier • Not enough EV auto options for purchase • Quote: "No electric vehicle but I have an electric scooter. It is easier to get around Koreatown where I live. I ride the buses, but I support electric vehicles and it would be a good idea if charging stations were around each city." • Property Owner – Lack of understanding of potential benefits as a property owner. However, interested in subsidies and/or rebates to help with the cost of EVCS.
Monrovia Street Fair	Friday, August 5, 2022	Monrovia	• A weekly event held every Friday to promote local vendors • There was a lot of foot traffic at the event. People were excited to discuss EVs and gather info. • This is a weekly event held every Friday of the month to promote local vendors. • Happy with the new EVCS that have popped up all over the area including Target, Kohl's, and Downtown Monrovia. • The City has made EVCS a top priority. • Quite a few people already own an EV or Hybrid

Community Event	Date	City	General Feedback
So. Cal Auto Club Clean Vehicle Car Show	Friday, September 9, 2022	Los Angeles	• A car show that features zero emission vehicles • Concern over EV strain on the power grid • This event was sponsored by SCAG and took place at Automobile Association of America (AAA.) • People were eager to take the survey and provide details about their thoughts in EV.
Clean: Air, Ride, Money	Saturday, September 24, 2022	Diamond Bar	• Event held to promote EV's, part of National Drive Electric Week • Concern over EV strain on the power grid • Passionate group, with strong opinions • Felt more EVCS would encourage more ownership.
Riverside EV Deep Dive	Saturday, October 1, 2022	Riverside	• Event held to promote EV's, part of National Drive Electric Week • Not enough EVCS in their city • High price of EV's is seen as a major barrier • Not enough EV auto options for purchase • Lots of foot traffic at the event. • This event was held to promote electric vehicles and offer the community additional information on electric vehicles. • There were families and college students who attended. • EVCS should be in every shopping center • Some EV owners do charge from their homes.

Over the 15 community events, several common themes become apparent regarding the public's perception towards buying, owning, or leasing EVs:

- High cost of ownership
- Limited EVCS in their area
- Unable to charge at home or place of business
- Limited amount of various EV models
- Mileage range very limited
- Thankful that SCAG was conducting this Study and providing useful information

Key Outreach Takeaways

- Lack of EVCS in at home (in MUDs), at work, or in publicly available spots or at MUDs is a key barrier to EV adoption
- Awareness of EVs is still low in underserved areas
- EV technology is still limited and may not meet all driving needs

Overall, most stakeholders were appreciative of the information they received on EVs and EVCS at the events. Although a small percentage of people currently own an EV, those that don't were open to the idea of having one in the future. However, in smaller, less affluent cities, there is still a lot of uncertainty surrounding EV ownership. Barriers that need to be addressed included: EV costs, lack of charging stations at MUD level and mileage limitations. Over the 15 outreach events, the project team collected general feedback and engaged with communities. Impressions from this outreach were further validated through a survey.

PROJECT OUTREACH COLLATERAL

Fact Sheets (hard copy and electronic copy) were developed and distributed at all Community Events and uploaded on the virtual meeting room (VMR). The overall purpose of the Fact Sheet was to inform stakeholders, agencies, and the public of SCAG's key messages. This collateral included a brief history and purpose of the Study and its goals. The Fact Sheet was available in English and Spanish.

A document with Frequently Asked Questions (FAQs) about the Study was created and made available to stakeholders at Community events, during virtual Listening Sessions and online in the VMR. The FAQs addressed specific questions or areas of concern expressed by the public. This included addressing technical or environmental issues, providing a more detailed description of why the Study is needed, and resources with more information.

A full color, double sided brochure was provided at each event (Figure 18). The brochure provided stakeholders with valuable information such as: Cost of EV ownership, personal benefits of driving an EV, and environmental benefits. The brochure also included various ways to charge EVs and time-of-use rates. This brochure was available in Spanish and English.

Copies of all the project collateral are available on SCAG's website[24]. Cities are welcome to use this collateral as part of future outreach efforts beyond this Study.

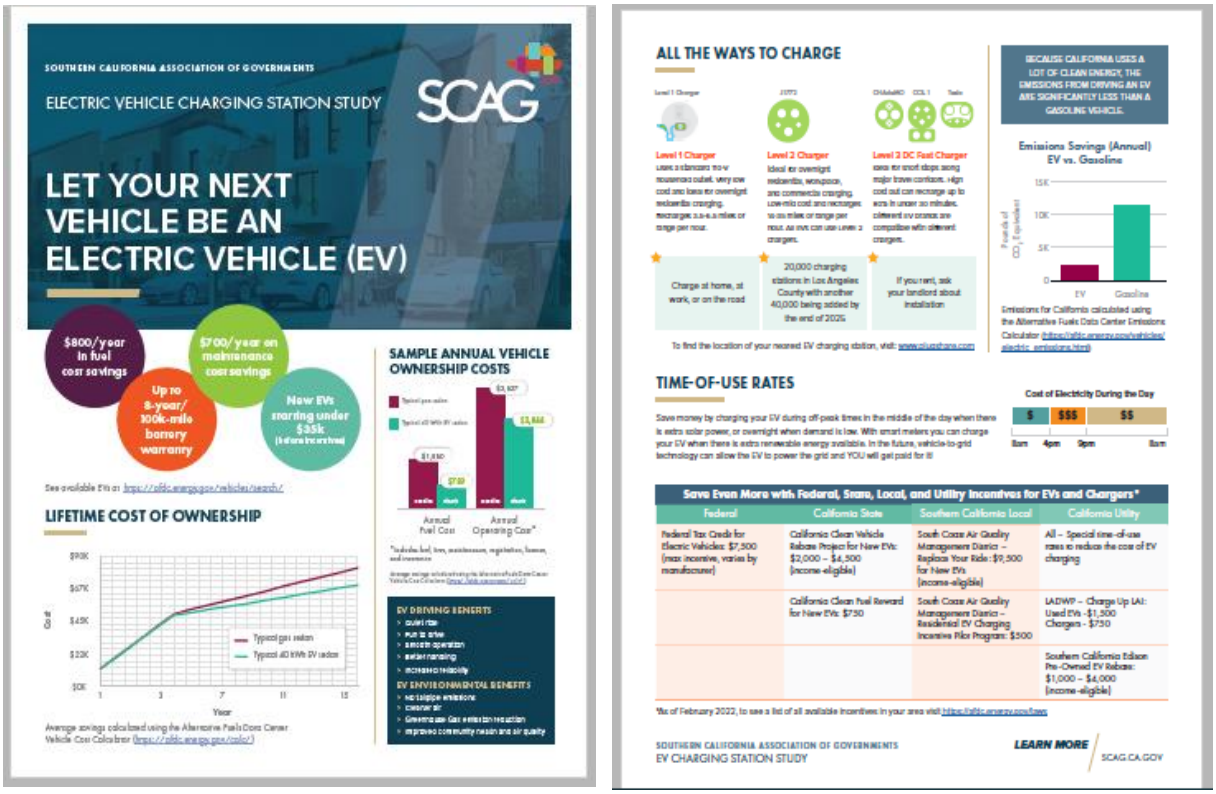

FIGURE 18. EVCS BROCURE DEVELOPED IN STUDY

[24] Alternative Fuels & Vehicles Projects - Southern California Association of Governments

SURVEY RESULTS

A survey was developed and used throughout the course of the project to understand where people generally spend their time, their barriers to owning an electric vehicle, and their barriers to installing a charging station (if they were a property owner). The survey was available in the project's virtual meeting room, distributed as a hard copy at community events, and available via a QR code at community events. Cities were provided links to the survey and virtual meeting room to then pass on to their residents via listservs or social media. The survey was available in English and Spanish. A copy of the survey is contained in the Appendices.

The project survey received 499 respondents. Of the 499 comments, 496 stakeholders shared demographic information relating to where they lived, worked, or regularly visited (Figure 19). Large cities such as Anaheim, Culver City, Long Beach and Los Angeles and SGV Cities had more respondents who regularly visit followed by those who live in those cities. A high number of responses within the SGV Cities came from Monrovia (181 respondents) because Monrovia included the survey in their weekly community newsletter.

In Los Angeles, 90 of those 212 respondents (42.3%) regularly visit the city, 88 (41.5%) live in the city, and 34 (16%) work in the city. Of the 181 respondents, 149 (82.3%) live in the city of Monrovia, 28 (15.5%) regularly visit the city, and 4 respondents (2.2%) work in the SGV city. Unidentified cities within Southern California 87 of the 175 respondents live in these cities, 51 (29%) regularly visit, and 37 (21.1%) work.

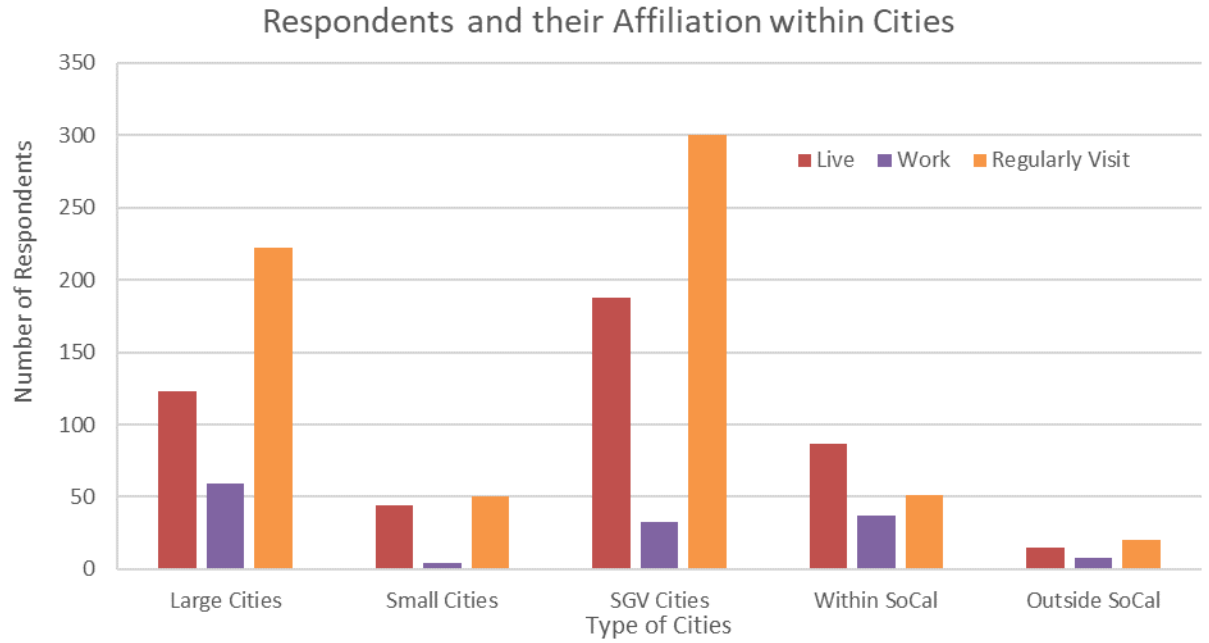

FIGURE 19. SURVEY RESPONSES TO CITY AFFILIATION

Participants were asked which city they resided, worked, or visited. There were 404 respondents coming from large cities, as shown in Figure 20. Each city had more respondents who regularly visit, followed by those who live in those cities. Los Angeles, however, had about the same number of respondents who also live in the city. The affiliation that was less chosen by respondents was "work in the city," with only 60 respondents in total, with about half of them working in Los Angeles.

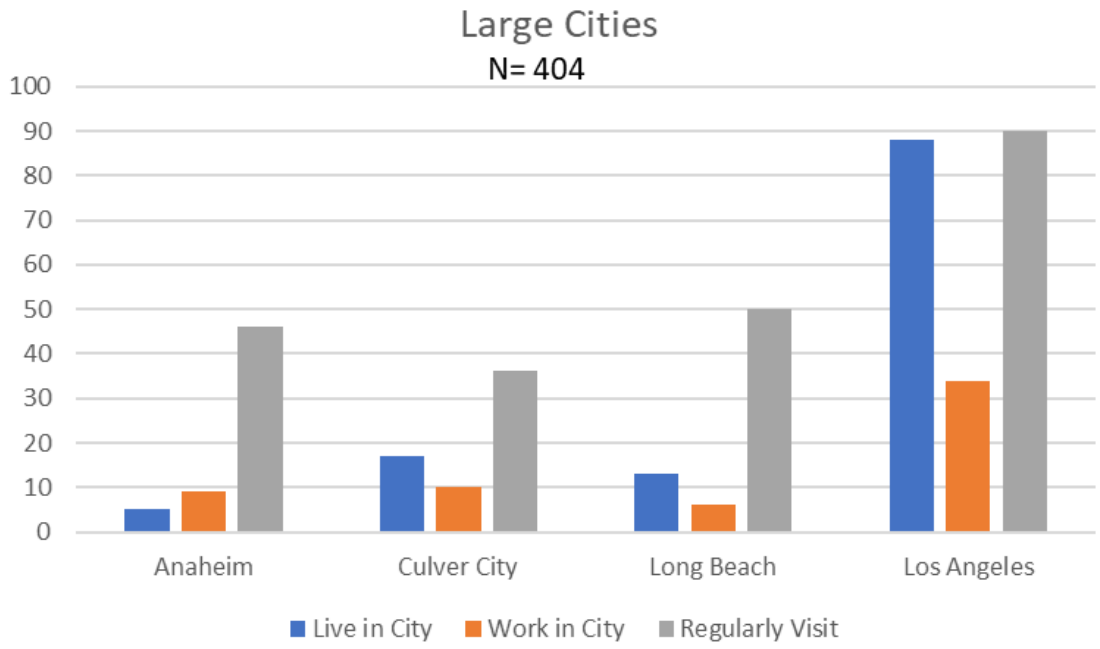

FIGURE 20. SURVEY RESPONSES FOR LARGE CITY LOCATIONS

For the small cities, there were a total of 98 respondents, as shown in Figure 21. Most of the respondents were regular visitors of Artesia, Pico Rivera, and Redlands. Sixty of the 98 respondents were residents of Pico Rivera. The cities of Artesia and Redlands had a small difference in the number of respondents, most of them being regular visitors. The number of respondents who work in these small cities was also low, with only 4 respondents.

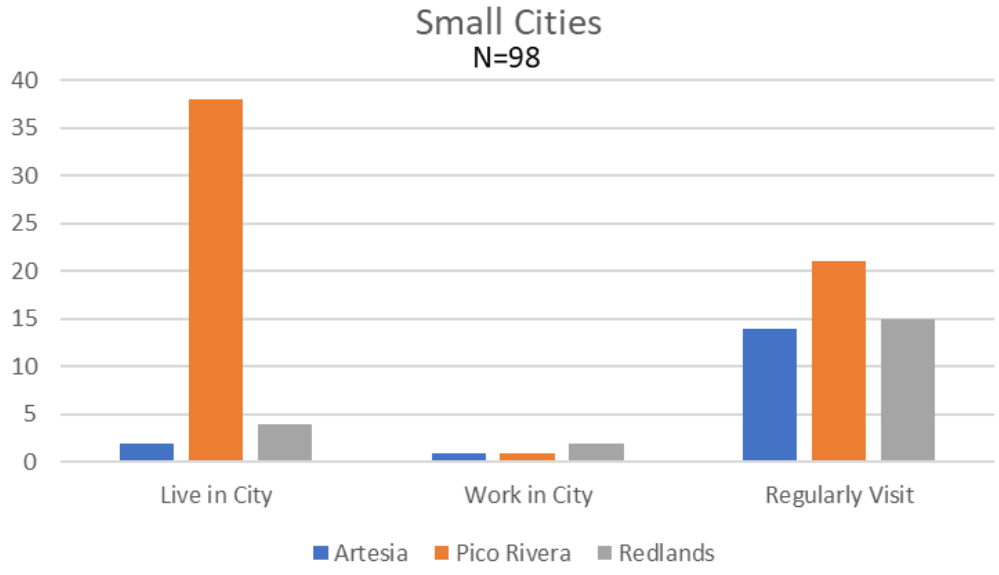

FIGURE 21. SURVEY RESPONSES FOR SMALL CITY LOCATIONS

The number of responses coming from San Gabriel Valley Cities (SGV) were, on average, about the same amount. However, as shown in Figure 22. Monrovia had an exceedingly high response rate, coming from respondents who live in that city. This is due to Monrovia (a SGV City) including the survey in their weekly community newsletter. A total of 521 data points were collected for the SGV cities. Most responses came from regular visitors to the city, most of them (39 visitors) going to Covina.

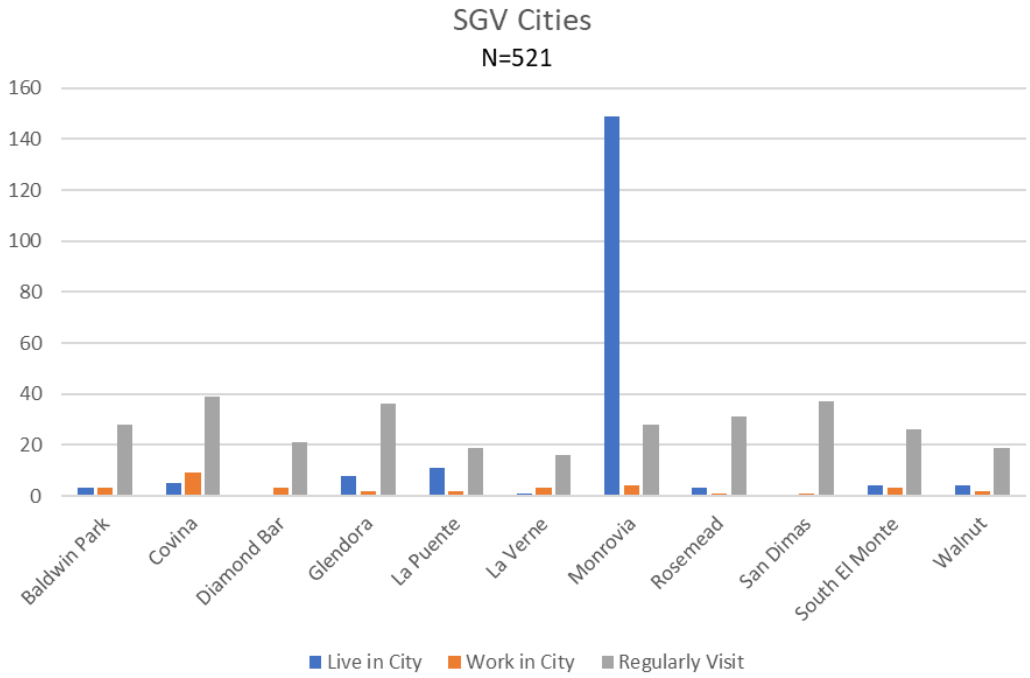

FIGURE 22. SURVEY RESPONSES FOR SGV CITY LOCATIONS

About 61% of the respondents (272) were homeowners, 119 were renters of an apartment or home. A small percentage were business and/or multi-unit family / residential property owner. As shown on Table 21 below, there were only a few respondents who were commercial property owners or hospital building manager or facilitator. As presented below, respondents have more of a residential affiliation than commercial or business affiliation.

TABLE 21 – AFFILIATION WITH CITY OF CHOICE

Affiliation	Responses
Business Owner	47
Building Facility Manager	6
Multi-Unit Family/ Residential Property Owner	42
Commercial property owner	4
Renter of Commercial Space	14
Head of School or University	6
Manager of Community Organization or Facility	9
Hospital Building Manager of Facilitator	3
Homeowner	272
Renter of Apartment or Home	119

Survey Respondents were asked about their top barriers to buying an EV (Figure 23). Approximately 30% of respondents are considering owning an electric vehicle but are not sure when, while 29% of the 474 respondents already own or lease one. The top two barriers or concerns for EV are purchase costs and limited range followed by:

1. Lack of publicly accessible charging stations
2. Cannot charge at home.
3. Preferred Vehicle Type not available

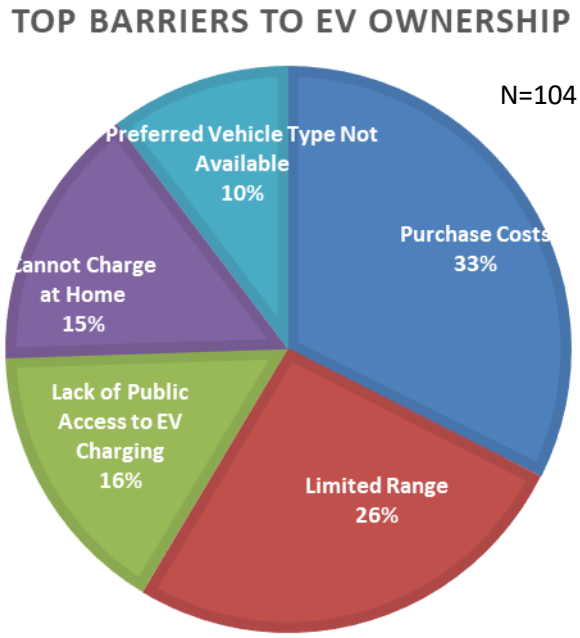

FIGURE 23. SURVEY RESPONSES FOR BARRIERS TO OWNING AN EV

Survey respondents were asked if they own or are considering purchasing or leasing an electric or plug-in hybrid electric vehicle (Table 22Table 20)Table 22Several key stakeholders were involved throughout the course of this study as illustrated in Figure 16. Different stakeholder groups were involved in the study in different ways and at different frequencies.

The most frequently engaged stakeholder group was the 18 participating cities. The Cities including small, medium, and large cities with varying demographics (Table 19).
The participating cities met with SCAG and the project team regularly, up to twice a month to review project progress, exchange information, and provide feedback on deliverables. City stakeholders provided specific feedback to the suitability analysis scoring criteria, final sites for detailed site evaluations, EV guides for City staff and property managers, and this Infrastructure plan. Cities were met with individually to review their EVCS permitting process as part of the listening sessions.
Table 19. Approximately 30% of respondents are considering owning an electric vehicle but are not sure when, while 29% of the 474 respondents already own or lease one.

TABLE 22 – CURRENT OR PROSPECTIVE EV PURCHASES

Own or are considering purchasing or leasing?	Responses
Yes, I already own or lease one	138
Yes, I'm considering purchasing or leasing in the next 6 months	45
Yes, I'm considering purchasing or leasing in 12-24 months	52
Yes, I'm considering purchasing or leasing but not sure when	142
Yes, I am considering purchasing an EV for my business	3
No	94
N=	474

Survey respondents were asked where they would like to see charging stations installed (Figure 24). Since lack of charging stations is still a top barrier for EV ownership, understanding where the public wants to see EVCS provides valuable insight for siting potential projects, particularly for EV drivers that would not be able to charge at home. While over 50% of respondents have the ability to install EVCS at their residence, there were a high number of respondents who are not able to charge at their workplace.

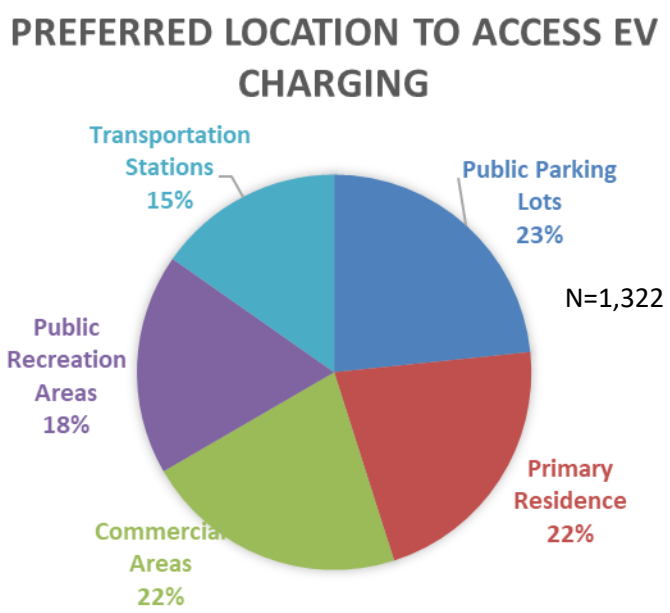

FIGURE 24. SURVEY RESPONSES FOR PREFERRED EVCS LOCATION

A high percentage of respondents listed the following locations as places where they would like access, listed from highest to lowest:

1. Public parking lots
2. Primary residence
3. Commercial areas (grocery stores, restaurants, etc.)
4. Public Recreation centers

Key Survey Results

Survey results highlight the need to prioritize EVCS in highly trafficked public or commercial areas, as well as at MUDs. Commercial and MUD property owners need to be made aware of EVCS benefits as well as be connected to funding sources to reduce implementation barriers.

One focus of this study was to understand how to reduce barriers to installing EVCS in MUDs. As shown previously, approximately 100 respondents indicated they are business owners or own multi-family residential homes. One focus of this study was to understand how to reduce barriers to installing EVCS in MUDs. The survey asked commercial and MUD property owners what their biggest barriers were to install EVCS for their tenants (Figure 25). The cost of chargers and installation is the top barriers to installing EV chargers (appx 53%) and 12% indicated that the permitting process was the biggest barrier.

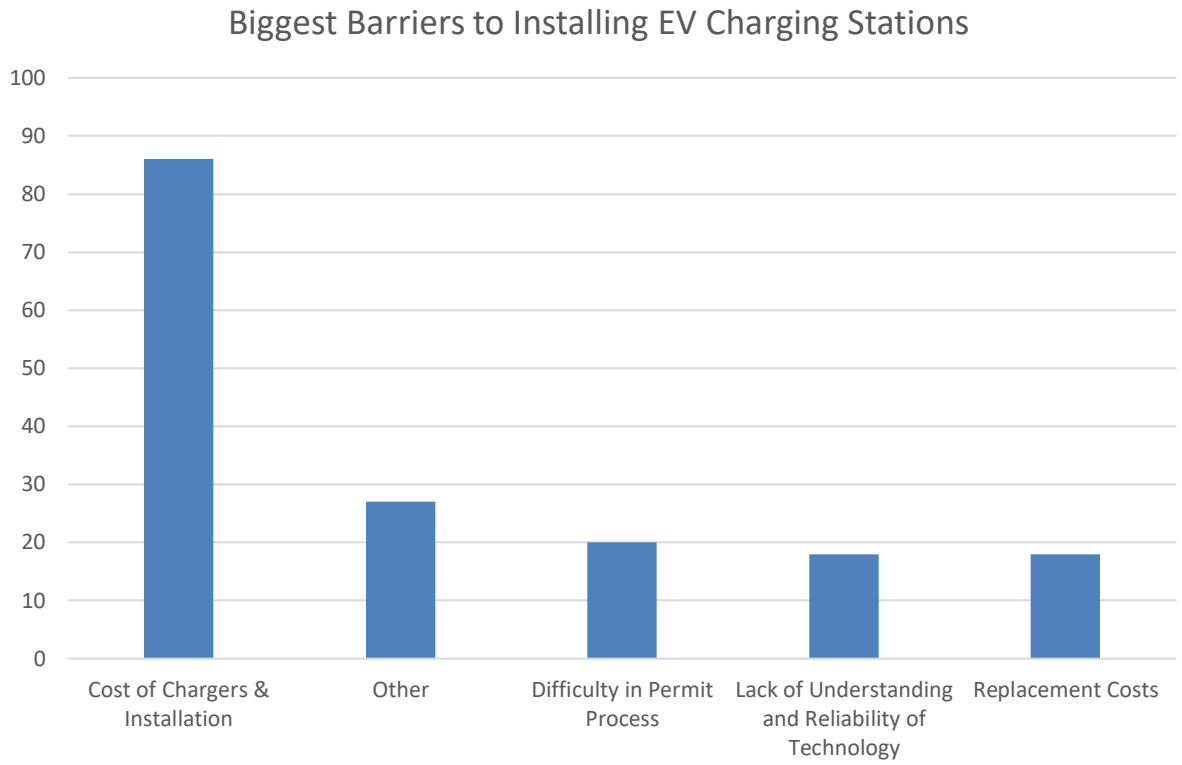

FIGURE 25. SURVEY RESPONSES FOR COMMERICAL AND MUD PROPERTY OWNER BARRIES TO INSTALLING EVCS

Given the cost barriers, 62% of commercial or MUD property owner respondents would be more interested in installing if there was a rebate or subsidy to help cover costs (Table 23). Ten of those respondents already have EV charging stations installed while 35 are not planning to install EV chargers at their property. However, as shown on Figure 26, 95 respondents responded with the minimum rebate or subsidy that would interest them to install an EV charging station. A total of 17 respondents would be interested if 25% of the total installation costs were covered, 47 respondents prefer more than half of the total cost to be covered, while 31 respondents chose 25-50% of total cost to be covered.

TABLE 23 – COMMERICIAL OR MUD PROPERTY OWNER EVCS INSTALLATION

Would you be interested in installing a charging station if offered a subsidy or rebate to help cover the cost?	Respondents
I already have charging stations	10
Yes	75
No	35
N=	120

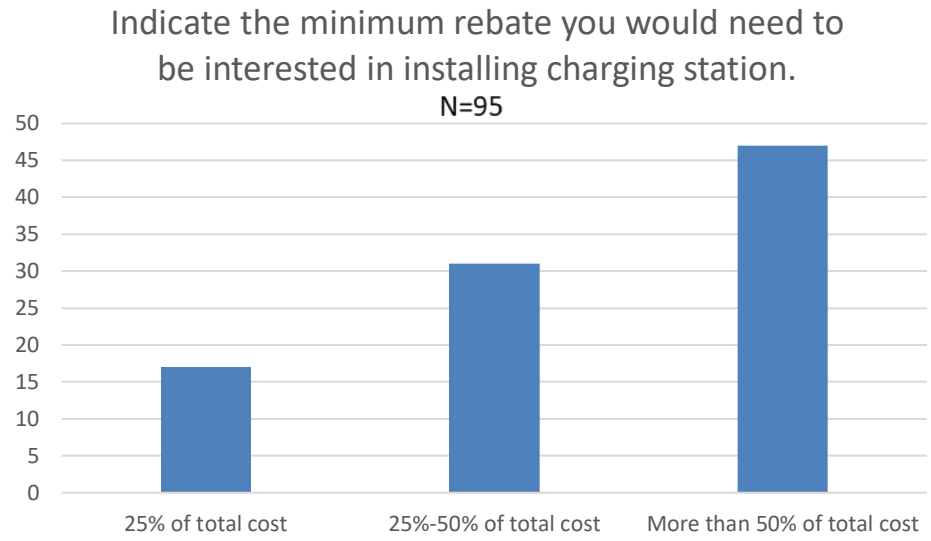

FIGURE 26. MINIMUM REBATE NEEDED TO INSTALL EVCS

CITY AND STAKEHOLDER LISTENING SESSIONS

Listening session were held throughout the course of the Study with Participating Cities and other stakeholder to understand their perspective on increasing access to EVCS with a particular focus on the permitting process.

CITY LISTENING SESSIONS

Sessions were held for the 18 participating cities. The purpose of the Sessions was to help cities understand how to overcome barriers to facilitating EV charger installations. A focal point of the session was to help cities streamline their EV charging station permitting processes in accordance with Assembly Bill 1236 and AB 970 (further described in the policy section of this report). At the start of the study multiple cities were not in compliance with AB 1236 (Figure 27). The Outreach Team targeted specific participants for these sessions, including City Planning divisions, Engineering & Building divisions, City Managers, and Public Works departments.

Each session consisted of an opening presentation, followed by strategic questions meant to facilitate a strong conversation among the city representatives. The 18 listening sessions took place between September 2021 and March 2022 and were conducted virtually, with approximately 5-10 participants per session. Key takeaways from each listening session are summarized in Table 24.

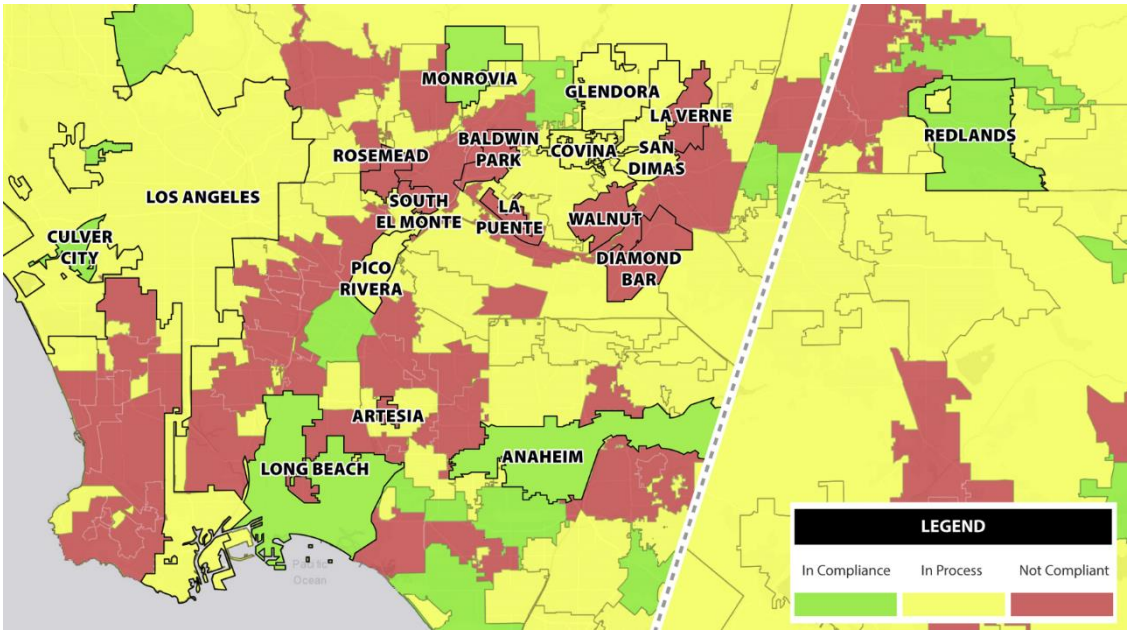

FIGURE 27. AB1236 COMPLIANCE AT THE START OF THE STUDY

TABLE 24 – KEY TAKEAWAYS FROM LISTENING SESSIONS

Virtual Session	Date & Time	City	Attendees	Noteworthy Takeaways
1	Thursday, September 16, 2021 11-12pm	Glendora	4	• Glendora is currently facing infrastructure challenges. When considering installing EVCS, coordinate with Edison. They've heard there is not enough electricity in certain areas. • They are currently working on an ordinance for transportation demand management, which would help offset transportation issues. They are working on a grant which will help buy chargers for their bus fleet.
2	Tuesday, September 21, 2021 11-12pm	Covina	2	• All new construction essentially falls underneath the categories of current building and green energy codes. • EV charging is a priority with every parking lot renovation project Covina initiates. Currently they're trying to gauge whether there's additional EVCS interest, especially in downtown Covina.

Virtual Session	Date & Time	City	Attendees	Noteworthy Takeaways
3	Thursday, September 23, 2021 11-12pm	Artesia	2	• Currently Artesia doesn't have a checklist or ordinance. They currently send documentation to L.A. County for review before they issue a permit. (Everything is currently out of their control) • Artesia has an electric bus and is looking at grants for an EV fleet. • They need more funding, personnel, and resources to help streamline EVCS installs.
4	Tuesday, October 5, 2021 11-12pm	Monrovia	4	• Monrovia's City Council supports EVCS • Monrovia is currently not prepared to install more EV stations due to the lack of parking spaces with the appropriate electrical requirements. However, they are planning to make renovations to overcome this challenge. • Monrovia recently added multiple charging spaces in a downtown public lot.
5	Thursday, October 14, 2021 11-12pm	Culver City	5	• Culver City has received complaints from EV charger owners regarding people that stay plugged in long after their cars are charged. • They currently are looking at buildings that meet electrical compliance, in order to install new EVCS.
6	Thursday, October 21, 2021 11-12pm	South El Monte	2	• South El Monte currently doesn't receive many applications for commercial chargers or residential applications. • They would benefit from additional information on the ordinance and implementation. South El Monte doesn't have in-house engineers, so they outsource, which hinders the approval process.
7	Thursday, November 4, 2021 11-12pm	La Puente	2	• Currently there is no process for site selection for EVCS, but La Puente representatives hope to obtain guidance from the Study results. • Participants felt that the checklist would help with permit streamlining. • They recognize that this will be demand driven. The City is currently installing charging stations and can potentially install some in their three main buildings. However, they do not see a huge demand forthcoming in their City.

Virtual Session	Date & Time	City	Attendees	Noteworthy Takeaways
8	Tuesday, November 9, 2021 11-12pm	Pico Rivera	2	• Pico Rivera hired a project manager to oversee all things EV, hoping to streamline all efforts and stay current. • They are facing capacity funding, outdated infrastructure, and lack of a clear strategy across all departments. • They are moderately prepared and are currently focusing on redeveloping old electrical infrastructure in order to be prepared to install EVCS.
9	Tuesday, November 16, 2021 11-12pm	Diamond Bar	3	• Diamond Bar face obstacles on the commercial side. Approvals are delayed due to the site planning that ensure chargers aren't being installed in areas with an easement or any existing infrastructure that may conflict with the placement of the EVCS. • Their current goal is to work on passing the ordinance and streamlining the permit process to meet AB 970 requirements. • Diamond Bar does see the importance of streamlining however, they seek further information on how to follow what is being requested in the assembly bills.
10	Thursday, November 18, 2021 11-12pm	Anaheim	3	• Anaheim has partnered with "Envoy EV Ride Share" which provides EVs to multi-family residents or apartment complexes, and property management companies. • They recognize the need to educate their disadvantaged communities about EV benefits and incentives. • Their current goal is to streamline their permitting process, so they are compliant with AB 970.
11	Tuesday, December 7, 2021 11-12pm	Long Beach	4	• Long Beach Representatives shared how engineers, architects, and contractors all need checklists as well, since they are not all familiar with what is being requested re: EVCS. • Streamlining would help if the process was done electronically and if the checklists helped them with the nuances of permitting. • Long beach currently has a relationship with Charge Point - they have been installing stations all throughout the City in mostly public areas.

Virtual Session	Date & Time	City	Attendees	Noteworthy Takeaways
12	Tuesday, December 14, 2021 11-12pm	Walnut	3	• Currently Walnut does not have an online permitting process and don't handle the permitting process in-house (they must outsource) • They are moderately prepared and are awaiting installations on a few EVCS, but they have no system to help streamline their processes for business and residents. • The City is debating if they should charge residents to use chargers since they currently don't.
13	Thursday, December 16, 2021 11-12pm	Redlands	2	• Redlands currently is not prepared to meet the need. They haven't implemented a checklist or ordinance to meet the needs of AB970. • Currently there is no process in choosing locations because there hasn't been a huge demand. • Streamlining would help if Redlands had checklist examples.
14	Tuesday, January 11, 2022 11-12pm	Los Angeles	3	• Los Angeles is currently facing a personal shortage. Current personnel are overworked and are unable to process as quickly as possible. • They are trying to address their housing crisis and installing EV chargers in unserved areas. • The City's infrastructure is older which prevents certain areas of from having EVCS installed. They are a leader in the EV sector but recognize that infrastructure is a huge problem.
15	Thursday, January 13, 2022 11-12pm	Baldwin Park	6	• Baldwin Park currently has increased EVCS throughout the City, mostly in the commercial areas. However, they receive more residential applications than commercial applications. • They currently are working with Edison to receive grants to help with their infrastructure and reviewing the vehicles that will be part of their fleet that will be converted into EV.
16	Thursday, January 20, 2022 11-12pm	San Dimas	3	• San Dimas is currently facing issues with Edison, as they are experiencing many power outages. • The City needs more financial assistance, personal, and checklist examples to help streamline their system • The city's infrastructure is older, which can prevent certain areas of the cities from having EVCS.

Virtual Session	Date & Time	City	Attendees	Noteworthy Takeaways
17	Thursday, March 3, 2022 11-12pm	La Verne	5	• La Verne recognizes finances are a barrier to more EVCS. The City is currently working with Edison to implement chargers with no additional cost. • Most of the centers are older and have multiple owners, which makes it more complicated for EVCS installation on the commercial side. • They only have one commercial area where chargers are offered.
18	Thursday, March 10, 2022 11-12pm	Rosemead	6	• Permits are approved by planning first. If the project does not take up any parking spaces, then it can be approved over the counter. Normally it takes about five business days for each plan review. Residents can get a permit over the counter. • Rosemead is currently installing EVCS near City Hall and will be implementing 15-20 new ones soon. • Currently their goal is to implement more sustainable infrastructure.

All participating cities agree that implementing AB1236 will help streamline the EV charging station permitting process, thereby reducing staff time and costs. They also understand that this will help facilitate installing EV infrastructure in their city which will lead to additional benefits. Although the large cities tend to have more resources to facilitate the installation of additional EVCS, they face the challenge of older infrastructure which hinders construction. As for the smaller cities, their challenge tends to come from lack of funding and personnel.

At the conclusion of the Study, several cities had taken actions to come into compliance with AB 1236 including using the materials provided after the listening sessions to pass ordinances and develop checklists (Figure 28). Several Cities were found to comply with AB1236 via adopting LA County Electrical code, noted with an * (see policy section for additional context information).

Listening Session Impact

At the conclusion of the Study, several cities had taken actions to come into compliance with AB 1236 including using the materials provided after the listening sessions to pass ordinances and develop checklists (Figure 28). Several Cities were found to comply with AB1236 via adopting LA County Electrical code, noted with an * (see policy section for additional context information).

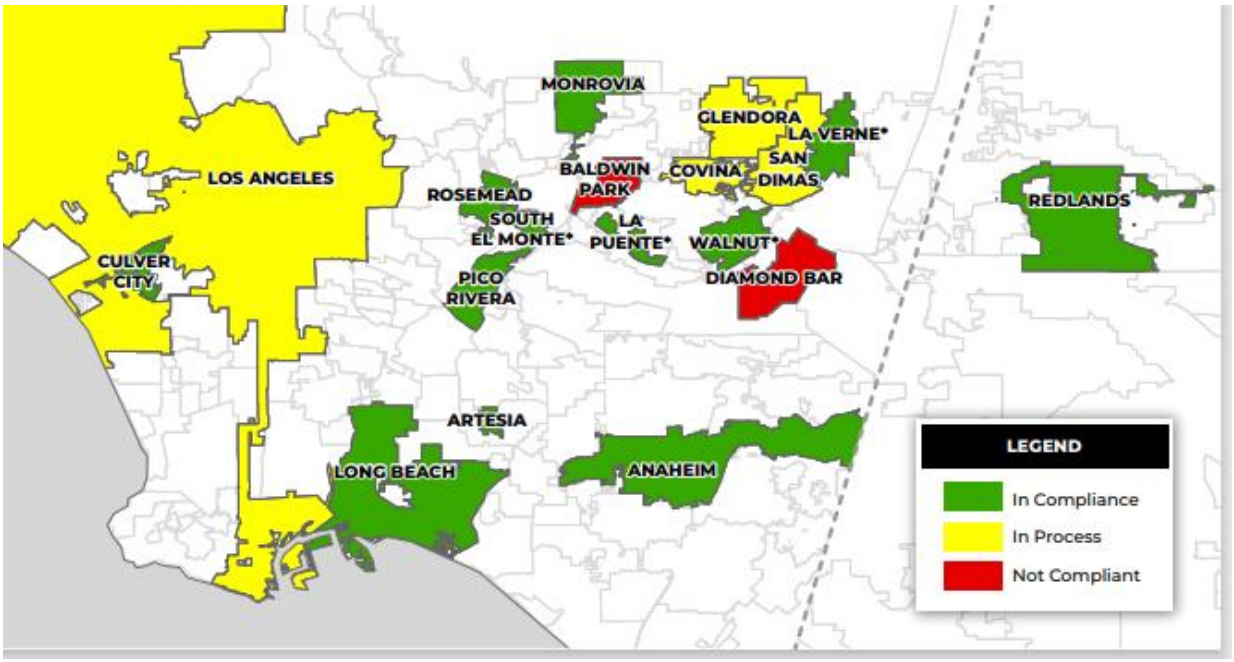

FIGURE 28. AB1236 COMPLIANCE STATUS AT THE END OF THE STUDY

STAKEHOLDER LISTENING SESSIONS

In addition to the Sessions that featured City personnel, the Study also included listening sessions that focused on property owners, contractors, and owners of MUD. The focus of these discussions was to obtain feedback as it pertains to EV infrastructure opportunities and challenges related to installing EV charging infrastructure at multifamily locations. A listening session where all cities were invited to share concerns and best practices about funding was also held.

The Study Team created a database that contained contact information for builders, contractors, MUD owners and apartment complex owners/managers. Initially most were called so that we could provide them details about the listening sessions. Then the team followed up with an email to request their participation. Emails included date and time of the session, as well information on the study and topics to be discussed.

Stakeholders were invited to 1-hour listening sessions with topics that included:

- Benefits and challenges of installing EV infrastructure at multifamily properties
- Lessons learned from previous projects
- How the public sector can better support property owners installing EV infrastructure
- Opportunities for public-private partnership

Table 25 summarizes the dates and times these sessions took place from May 17, 2022 – December 13, 2022, along with noteworthy comments received during each meeting.

TABLE 25 – ADDITIONAL STAKEHOLDER LISTENING SESSION TAKEAWAYS

Virtual Session	Date & Time	Attendees	Noteworthy Takeaways
19	Tuesday, May 17, 2022 11-12pm	4	• Project installation was a success when the cities had a clear rebate program and permitting. • The main problem is charger connectivity – currently they use an octopus device that checks the signal before installation is implemented. • They must update panel errors, which are not their issues, but become their issue once they start working on the project. • The cities need to have funds available for issues that arise. A rebate program assists but does not cover all costs. The city should have a budget in place to help pay for costs. • The city should also have an approved product list which will help the contractor move the process along faster. • Continued need for maintenance resources, skills, and funding.
20	Tuesday, June 7, 2022 11-12pm	2	• Owners would like additional knowledge pertaining to where to install EVCS. The property owners also must see how many parking spaces they want to make available. They feel this will add to their electricity costs if they have many EVCS spots. • Property managers would like to know about available funding sources if they move forward with installing EV chargers. They would like more information on how to not incur the cost of electricity. If they take on these additional costs, they will then need to raise either rent or charge a fee to the tenant to charge their car possibly monthly. • It would be good if the city had a list of good contractors, it would help the property managers build good relationships with the contractors and have more installations.
21	Wednesday, June 8, 2022 2-3pm	3	• The cities debate whether to own and operate their own chargers or have vendor owned and operated chargers • At time, can be difficult to work through SCE's programs. Charge Ready does not support DCFCs, which some Cities (Culver City) want to pursue. • The city applies to grants to receive funding. Some of the grants they have applied for are Mobile Source Air Pollution Reduction Review Committee (MSRC) and South Coast AQMD (SCAQMD) • Some cities prefer the private sector to own chargers because they don't have as many hoops they have to jump through like the public sector.

One of the main takeaways from these listening sessions (featuring contractors and owners of MUD) was that funding is a major obstacle to installing, operating, and maintaining EVCS on their properties. Almost all conversations centered around the availability of grants or other available funding sources. Owners of

MUDs felt that if there is not revenue to support this construction, then the costs would trickle down to the tenants of their buildings, which means higher rent prices. Although some had heard of rebate programs, they felt that they did not cover enough of the costs.

Other factors that hamper installation of EVCE are the lack of parking spaces and higher utility costs that owners may incur. Participants discussed a variety of options for passing on costs to tenants. One MUD owner indicated that they charged a flat monthly fee for the amenity to recoup expected electricity costs. Another MUD owner installed networked charging stations that charged users based on the amount of kWh dispensed to the vehicles.

Participants also requested that their cities provide an approved list of contractors that are skilled in this specific type of build-out.

A checklist would help this group with support in moving forward with EVCS at their property. The list could include:

- Estimate the demand – Survey current residents who currently own EVs or have plans to purchase one.
- Consider EVCS options and appropriate charging equipment types.
- Determine the number and type of EVCS you want to install, then estimate capital costs.
- Evaluate cost recovery options – available incentive and funding programs.

One final listening session was held as part of SCAG's Toolbox Tuesday series to provide an overview of the results of this study to the participating cities, steering committee members, and other cities invited by SCAG.

VIRTUAL MEETING ROOM

A Virtual Meeting Room (VMR) with Study stations was created to simulate an in-person meeting room (Figure 29)[25]. Virtual Study stations included materials such as Study background information, maps of participating cities, common EVCS infrastructure challenges, and a comment station. These materials allowed attendees to participate and obtain specific Study information at their own convenience.

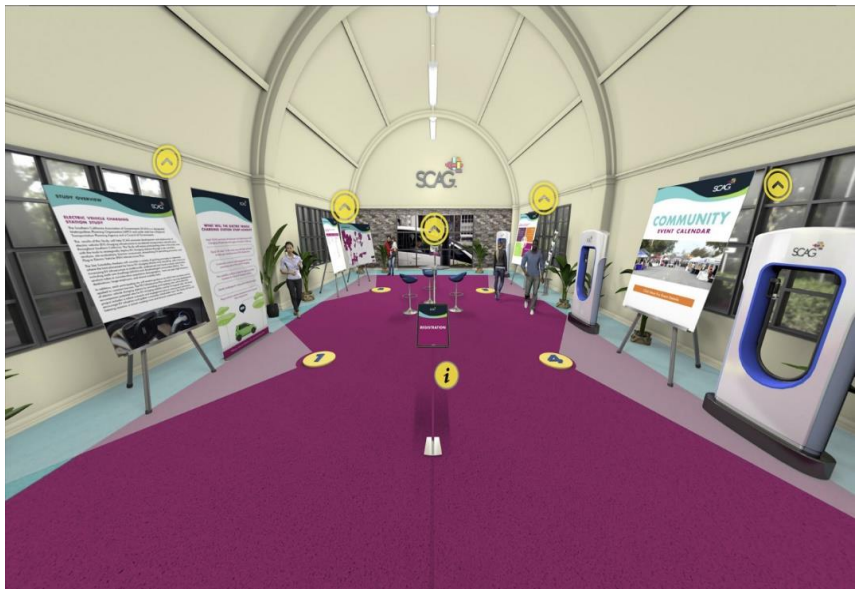

FIGURE 29. VIRTUAL MEETING ROOM

User activity was tracked during the study between October 1, 2021, through December 31,

[25] SCAG EV Study VMR

2022 (Figure 30). The page was viewed a total of 14,000 times with an average general engagement period of 2 minutes and 14 seconds. Engagement peaked between November 15 – 23, 2021 (3576 views) which coincided with the City of Anaheim listening session on November 18, 2021.

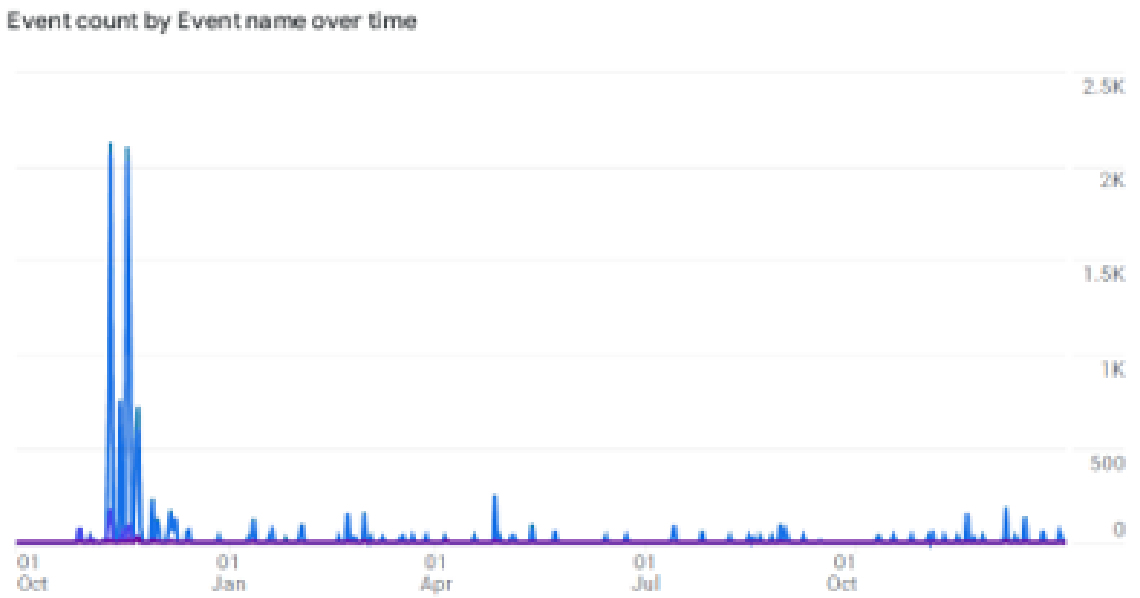

FIGURE 30. VMR STATS

POLICY RECOMMENDATIONS

The majority of publicly accessible EVCS will be owned and operated by the private sector. Therefore, one of the City's tools to increase EVCS in their jurisdiction is through their policy. One action Cities can take to directly support the private sector to deploy EVCS is to streamline the EVCS permitting processes, particularly for non-residential applications.

STREAMLINED PERMITTING AB1236 AND AB 970

Permitting requirements and prolonged approval timelines have been, and still are, significant barriers to installing EVCS. To encourage a consistent and efficient permitting process for EVCS, California passed Assembly Bill 1236 in October 2015 requiring all Cities and Counties to develop streamlined EV charging station permitting protocols by September 30, 2017. Then, on October 8, 2021, California passed Assembly Bill 970 as follow-on legislation to establish timelines for cities to approve EVCS permit applications (Figure 31) which went into effect for all cities starting January 1, 2023. The legislation is designed to create uniform standards to facilitate permitting and decrease overall EVCS installation costs to support increased EV ownership.

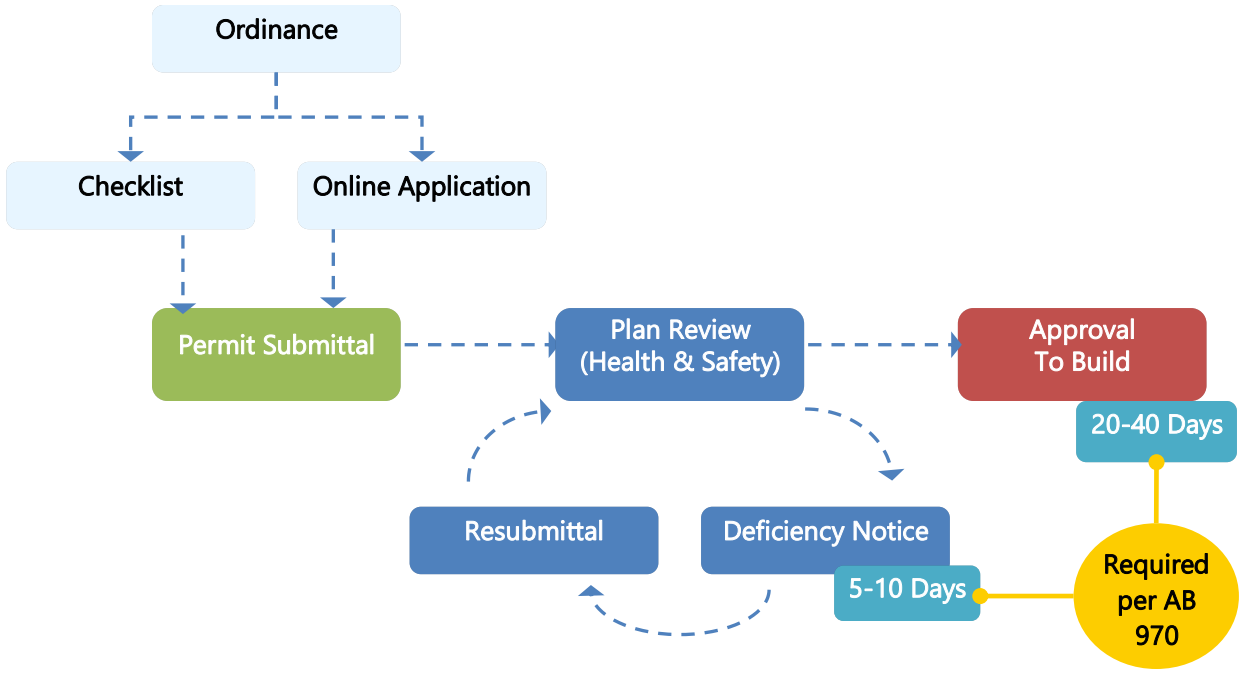

FIGURE 31. EVCS PERMIT PROCESS AND TIMELINE PER AB1236 AND AB970

As previously mentioned, a listening session was held with each participating City to educate them on the requirements of AB1236 and AB970 and to understand how Cities process EVCS permit applications. Key elements of AB1236 and AB970 include:

- Cities must pass an ordinance that creates an expedited, streamlined permitting process for EVCS including Level 2 and DCFCs
- Posting a checklist of all requirements needed for expedited review on the County or City website
- EVCS projects that meet expedited checklist are administratively approved through building or another non-discretionary permit
- EVCS projects should be reviewed with a focus on health and safety
- Authority Having Jurisdiction (AHJ) accepts electronic signatures on permit applications
- EVCS permit approval not subject to approval of an association (as defined in sec. 4080 of Civil Code)
- AHJ commits to issuing one complete written correction notice detailing all deficiencies in an incomplete application and any additional information needed to be eligible for expedited permit issuance
- Cities must deem an application complete within the following timeframes if the City has not deemed the application incomplete or issued a written notice of deficiencies
    - 5 business days for applications for up to 25 charging stations.
    - 10 business days for applications with more than 25 charging stations.

AB1236 Compliance

LA County's electrical code contains a streamlined ordinance and a checklist. Throughout the course of the study, it was realized that several cities adopted LA County's Electrical Code, and thus could be considered compliant with AB1236. GOBIZ may not recognize this when they review cities for compliance.

- Cities must deem applications approved within the following timelines after an application has been deemed complete if the City has not (i) administratively approved the application, (ii) found any adverse impact on public health and safety (iii) denied the permit, or (iv) made an appeal to the planning commission.
    - 20 business days for applications for up to 25 charging stations.
    - 40 business days for applications with more than 25 charging stations.
- If an EV charging station or associated equipment would reduce the number of parking spaces at a site, the City shall reduce the number of required parking spaces required for existing uses at the location.

Following each listening session, a policy memo was prepared to outline specific actions the City could take to come into compliance with AB 1236 (if not already) and other best practices for increasing EVCS throughout their City. Some best practices and recommendations for other cities include:

- Checklists clearly posted to City permitting websites. In some cases, having multiple checklists for different types of projects (i.e., one for residential and one for commercial) can provide additional clarity to project requirements
- Online permit application submittals. Some cities have not converted to online submittals yet, which may help expedite other types of permit applications.

AB970 establishes timelines for Cities to review and approve EVCS permit applications. For residential use cases, EVCS are typically handed under an electrical permit and may be issued over the counter or within a few days - well within AB 970 timelines. Larger projects at commercial locations, or projects that contain DCFC are typically more complex and may be subject to the approval of multiple departments including engineering, building and safety, and planning. These reviews should be coordinated to minimize processing time and be completed with AB970 requirements. In some cases, smaller cities have outsourced permit review and approval to LA County or hire a consulting firm when they do not have the staff to process permits in-house. Permit approval times may outside of the City's direct control in these situations or may be subject to contractual timelines. While plan check consulting contracts will vary, typical turnaround time for a first review is 10 business days and 5 business days for rechecks. Cities should work closely with their partners to make sure permits are reviewed and approved within AB970 timelines. A summary of each participating City's typical EVCS permit turnaround period and if plan check is handled in-house or contracted out is summarized in Table 26.

Permitting Coordination

EVCS permit applications may involve multiple City departments. The Building and Safety department permit technicians are ultimately responsible for approving permits and should be the main point of contact throughout the permitting process. They will route to other City departments such as engineering or planning as needed.

TABLE 26 – CITY EVCS PERMITTING PROCESS AND TYPICAL TURNAROUND

CTIY	Organization Responsible for Permitting and Plan Check	Typical Residential Permit Timeline (Business Days)	Typical Commercial Permit Timeline (Business Days)
ANAHEIM	In-House	1 -2	10 - 14
ARTESIA	LA County	Varies by County Workload	Varies by County Workload
BALDWIN PARK	In-House	3	5 - 10
COVINA	In-House	1 - 2	5 - 10

CTIY	Organization Responsible for Permitting and Plan Check	Typical Residential Permit Timeline (Business Days)	Typical Commercial Permit Timeline (Business Days)
CULVER CITY	In-House	1 - 2	5 - 10
DIAMOND BAR	In-House	1	7
GLENDORA	In-House	1 - 3	5 - 10
LA PUENTE	3RD Party Firm	2	5 - 10
LA VERNE	In-House	3	10
LONG BEACH	In-House	1	10 - 15
LOS ANGELES	In-House	1	1 - 15
MONROVIA	In-House	2 - 3	2 - 3
PICO RIVERA	In-House	5	5 - 10
REDLANDS	In-House	Varies by City Workload	Varies by City Workload
ROSEMEAD	In-House	3	5
SAN DIMAS	In-House	3	5 - 10
SOUTH EL MONTE	3RD Party Firm	3	10
WALNUT	3RD Party Firm	10	10

Los Angeles and Long Beach have developed online, express permitting systems that can automatically issue permits, including small EVCS projects. This may only be a viable option with larger cities that have the resources to implement this type of system but may be valuable as cities grow and expand EVCS in the future.

VOLUNTARY BUILDING CODE REQUIREMENTS

The California Green Building Code (CALGreen) has requirements for EV Infrastructure as part of new construction projects. The 2022 CALGreen code, effective January 1, 2023, significantly increases previous minimum EV infrastructure requirements. The next code cycle is expected to be released in 2025. CALGreen codes include minimum mandatory measures that must be adopted by all Cities as part of the triannual building code update. Cities may choose to adopt one of two tiers of voluntary requirements that have more stringent requirements. Initiating or Progressing cities can adopt voluntary Tier I and Tier II measures during their tri-annual building code update to further increase minimum requirements for new construction projects if they have not considered voluntary measures before. Expanding Cities or Cities that have previously adopted Tier II requirements may also want to adopt more stringent EVCS reach codes that go beyond building code requirements. SCAG cities can review reach codes passed by other Cities in the state to model what might be appropriate for their own City[26]. Regions within SCAG, just as the SGVCOG may want to consider standardizing CALGreen voluntary measures or reach codes to create consistency in building requirements within an area.

Consistent Code Adoption

While Cities have the flexibility to go behind the minimum CALGreen Measures, regions such as the SGVCOG should seek to coordinate consistent code adoption within its member Cities to avoid a patchwork of requirements. In conjunction with consistent checklists and other permit requirements, these steps can streamline project developer efforts to design and install EVCS.

While building codes address new construction and major

[26] Adopted Ordinances (localenergycodes.com)

modifications, CEC's assessment of EV charging infrastructure finds that new construction building codes alone may not be enough to meet EV demand in 2030[27]. It may be cost prohibitive to include EV infrastructure in building retrofits; therefore, Cities may consider allowing technology options such as mobile charging or sharing multiple chargers on a circuit should to meet local requirements. Site hosts and project developers may also consider these options as alternatives if they are interested in installing EVCS.

OTHER CONSIDERATIONS

EVCS AT MUDS

MUDs have traditionally been a hard-to-reach market for EVCS for several reasons. It can be expensive to install EVCS at MUDs because building and parking lot layouts may require running conduit and wiring through walls or under buildings. Older buildings in particular may have limited electrical capacity, requiring additional electrical upgrades and potential coordination with the local utility to support the load of multiple EVCS. These barriers should be reduced in newer buildings as new construction building codes have required minimum percentage of stalls to have electrical capacity and/or conduit available to accommodate future EVCS.

Landlords and HOAs should engage their residents on what their charging needs may be to help inform how many and what type of chargers may be needed. When in doubt, Level 2 charging should be the starting point. If electrical capacity is limited, circuit sharing with 2-4 ports on a single 40A circuit may be suitable. DCFC are generally not needed or recommended given that most tenants likely park overnight.

Once chargers are installed, landlords and HOAs need to determine if or how they will pass on the cost of electricity, networking fees, maintenance, or repairs to tenants. During the stakeholder engagement process MUD properties with EVCS found that absorbing the cost and charging a flat monthly fee was the simplest way to recover costs. As EV adoption grows, MUD landlords and HOAs may start to think of owning and operating EVCS as a building amenity and a cost of doing business to be competitive with neighboring MUDs. Landlords could explore networked chargers that could then charge users based on the actual energy used. Networked chargers usually have additional monthly networking fees so landlords and HOAs may need to mark up the cost of electricity to recover those costs or factor it into their cost of doing business.

CURBSIDE CHARGING

Throughout the Study, several Cities expressed an interest in curbside charging because Cities control the right of way. While generally not a focal point of this Study, installing curbside charging may be a viable option for areas that scored highly on the suitability analysis but have limited off-street parking such as MUDs. One potential advantage of curbside charging to reduce installation costs is to mount EVCS to existing streetlights or power poles to reduce trenching costs. Street side parking may be an underutilized EVCS opportunity for Cities and could create additional revenue generation opportunities.

There are certain challenges that typically come with curbside EVCS. While pairing with streetlights that already have power running to them may seem intuitive, most streetlights use single phase power which

[27] Crisostomo, Noel, Wendell Krell, Jeffrey Lu, and Raja Ramesh. January 2021. Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment: Analyzing Charging Needs to Support Zero-Emission Vehicles in 2030. California Energy Commission. Publication Number: CEC-600-2021-001

is not compatible with commercial EVCS. Close coordination with the utilities to identify streetside transformers or underground vaults may be needed to keep total installation costs low. Streetlights typically have their own rate tariff with limited metering, so additional metering may be needed to properly account for electricity dispensed to EVs versus what is used for streetlights. Curbside EVCS may require additional signage or curb management, particularly in areas that already have parking restrictions. Cities may need to consider how they treat curbside charging the same or differently than existing metered parking zones.

FIGURE 32. SAMPLE CURBSIDE EVCS

While curbside chargers can be more challenging and expensive to install, they can help supplement more traditional EVCS locations, as shown in Figure 32. Some cities including Los Angeles have deployed several curbside EVCS throughout their jurisdiction with great success[28]. One reason Los Angles has been successful with curbside EVCS is they have her own electric utility – LADWP, allowing them to control their own electrical infrastructure. Los Angles was able to tap spare electrical capacity made available after converting its streetlights to LEDs. Los Angeles could make a great example for other publicly owned utilities throughout SCAG. Cities in SCE territory would require close coordination to ensure the right power is available and for a cost-effective installation.

STATE FLEET CONVERSION REQUIREMENTS

One area Cities may be able to influence EV adoption is to lead the way by looking to electrify their own fleets. In many cases Cities will need to electrify their fleets due to current or upcoming legislative requirements. This helps increase the visibility and demonstrate the viability of electric vehicles in the community and provides additional benefits of improving the local air quality. Installing EVCS infrastructure and fleet conversions can be capital intensive, and outside funding or creative ownership structures may be needed to scale.

Specific CARB requirements applicable to City-owned fleets include the Innovative Clean Transit (ITC), Advanced Clean Trucks (ACT), Advanced Clean Fleets (ACF), and executive order N-79-20. The ICT requires all transit vehicles to be zero emission by 2040; starting in 2029 only zero emission transit buses may be purchased. The ACT does not directly impact fleets, as this imposes purchasing requirements from vehicles manufactures to sell minimum percentages of medium and heavy duty zero emission vehicles. It is expected that vehicle manufacturers will rely on fleet sales to meet these requirements. The ACF is the compliment to the ACT. While still being finalized and barring certain vehicle exemptions, for public fleets it is expected that 50% of new medium and heavy-duty vehicle purchases must be zero emission in 2024 and 100% of new medium and heavy-duty vehicle purchases must be zero emission in 2027. Lastly under ACC II, California is requiring all new light duty vehicle sales to be zero emission by 2035.

PARKING AND SIGNAGE CONSIDERATIONS

EVs still require at least 20-30 minutes to charge, even with DCFCs; therefore, clear signage that directs EV drivers where to park and charge will help ensure a positive and safe user experience. It is generally considered best practice that an EV can only park in an EV charging stall if the vehicle is actively charging

[28] EV Charging Stations | LA Bureau of Street Lighting (lacity.org)

to increase availability for other EV drivers. Other best practices include placing time limits for vehicle charging, generally up to 4 hours for Level 2 EVCS, or one hour for DCFCs. One strategy to encourage drivers to not charge beyond stated time limits is to increase the cost of charging past established time limits. While uncommon, non-EVs have been noted to occasionally park in EV charging stalls. As EV ownership increases, the need for consistent signage and enforcement of parking policies may increase. Cities reserve the right to issue warnings, ticket or tow vehicles that do not abide by EVCS parking rules. This should be considered as a last resort for repeat offenders or reserved until EVs have become widely adopted and drivers are generally aware of EVCS etiquette. Cities can reference the California Plug in Vehicle Collaborative which provides sample EV parking and charging signage[29]. The California Manual of Uniform Traffic Control Devices contains updated directions and guidance for EV related signage placed on public streets[30].

FUNDING OPPORTUNITIES

The following funding opportunities may be used by the public or private sector to reduce the cost of EV infrastructure or EVs for municipal and commercial fleets. Cities should consider providing information related to available incentives towards EV purchases and EVCS installation on an EV landing page on the City' website. In several instances funding is prioritized for DACs or LICs and should be highlighted on the City's website. The City of Santa Monica provides a useful example of this.

DIRECT INCENTIVES AND REBATES

There are currently multiple funding sources available to offset the upfront and ongoing costs of EV charging stations. Table 27 summarizes available incentives and rebate programs available in within the SCAG Region (as of December 2022). Some funding programs may be in high demand and funds can be exhausted quicky. It is recommended to identify available funding sources, eligibility, and availability requirements early in the planning process to increase the chance of securing funds. Some of these funding sources are explained in further detail in this section.

TABLE 27 – EVCS FUNDING OPPORTUNITIES – DECEMBER 2022

Entity	Program Name	Summary	Other Notes
California Energy Commission (CEC)	National Electric Vehicle Infrastructure Program (NEVI)	Funding from Infrastructure Investment and Jobs Act (IIJA) for DCFC along Alternative Fuel Corridors (AFCs)	Will be issued as competitive grants by region. Only private sector entities may apply. 4 150kW port minimum
Varies/TBD	Inflation Reduction Act (IRA)	Includes tax credits for multiple clean energy measures including electric vehicles and chargers	Starting in 2024 public sector entities may be able to take advantage of tax credits as direct payments. Pending final guidance.
Southern California Edison (SCE)	Charge Ready	No-cost infrastructure up to charger stub out and incentives on eligible charging stations. Waitlist for new applications effective September 1, 2022.	4 charging port minimum (10+ recommended). Preference for multifamily and DACs

[29] https://www.calbo.org/sites/main/files/file-attachments/ca_accessibility_for_ev_charging.pdf
[30] https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/f0018447-13-01-a11y.pdf

Entity	Program Name	Summary	Other Notes
Los Angeles Department of Water and Power	Charge Up LA!	Rebates on qualifying L2 and DCFCs for qualifying site types	Funding must be reserved before installation
Anaheim Public Utility (APU)	Public Access EV Charger Rebates	Rebates for Level 2 or higher plug-in chargers installed at commercial, schools, industrial, or municipal properties	Subject to funding availability. Funds need to be reserved before installation. Rebate issued after installation is complete
California Energy Commission	CAleVIP	Starting in 2023, only DCFC projects will be eligible for this rebate	Funding must be reserved before installation. Funding allocated by region and may be exhausted quickly.
California Air Resources Board	Clean Vehicle Rebate Project	Rebates for qualifying low or zero emission light duty vehicle purchases.	Rebates vary on technology type and are limited to vehicles under certain price thresholds. Income limits.
California Air Resources Board	Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project	Voucher for qualifying low or zero emission medium and heavy-duty vehicle purchases.	Voucher issued at point of sale through qualified vendors and manufacturers. Value vary by vehicle and technology type
California Air Resources Board	Low Carbon Fuel Standard	Program that issues credits for low carbon fuels. Credits can be generated from the electricity dispensed from EVCS.	Credits can be banked or sold up to once per quarter. Credit values fluctuate based on market conditions.
Department of Energy	Energy Efficiency and Conservation Block Grant Program	As part of the IIJA, block grants for capital investments or financing energy efficiency, renewable energy, and zero-emission transportation (and associated infrastructure), projects	Issued as formula funds directly to Cities that may be used for energy projects at their discretion.

LOW CARBON FUEL STANDARD

Under AB32, in 2009 California created the low carbon fuel standard (LCFS) to reduce GHG emissions from the transportation sector. The goal is to decrease the carbon intensity of the CA transportation fuel pool, 20% by 2030, and provide financial incentives for low carbon alternative fuel sources[31]. Fuel providers can generate credits for producing low carbon fuels, including dispensed electricity from EVCS. After charging stations are installed, the site host should reach out to brokerages that specialize in the sale of LCFS credits. Fuel data and metered energy usage must be reported quarterly to CARB. Site hosts should coordinate with the EVCS manufacturer so that energy usage is automatically sent to brokers who can facilitate the sale of credits generated each quarter. The total number of and value of the credits generated will be impacted by the carbon intensity of the electricity used, the amount of electricity

[31] https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard/about

dispensed from the chargers, and the overall supply and demand of credits in the market. Credit values have fluctuated over time, at one point peaking at $200/credit. As of January 2023, credit prices have fallen to a low of $60-70/credit[32]. Public and private sector EVCS owners can use this LCFS revenue to offset EVS infrastructure costs, hardware costs, and other ongoing costs (maintenance, networking fees, etc.) not recovered by selling electricity.

NEVI

The 2021 Infrastructure Investment and Jobs Act (IIJA) included $7.5B in to support a national electric vehicle infrastructure (NEVI) program. Of the $7.5B, $5B is allocated specifically for DCFCs along Alternative Fuel Corridors (AFCs) to support long distance travel and reduce range anxiety for EV drivers. This funding will be issued as formula funds to states over five years. California is set to receive $384M. The CEC will issue this funding as competitive grants and in September 2022 released preliminary guidance on eligible projects and how funds will be issued[33]. Some elements of this guidance, current proposals, and how this Study aligns with them are summarized below:

- Projects must have a minimum of four (4) 150kW ports where each port can simultaneously output a maximum of 150kW.
    - This is an IIJA requirement, but California will require infrastructure to support up to five (5) 350kW ports long term.
- Projects must be within 1 mile of an AFC exit and no more than 50 miles apart. This is set from the IIJA.
    - The suitability analysis weighted sites close to highways and major travel corridors higher, though not all highways and major travel corridors are AFCs.
- The projects must include a 5-year networking and maintenance agreement, with a 97% uptime guarantee. Chargers must be available 24/7/365.
- California has evaluated AFCs in the state and broken up the highway system into corridors (Figure 33). The CEC is expected to release solicitations every 6 months; each solicitation will only be for a select number of corridors.
    - Depending on the corridor, project applicants may need to contribute 50% in match share funding. Some corridors will only require 20% match share funding– in line with typical federal funding requirements.
- Only private sector entities will be able to apply for funds. Cities and other public agencies cannot be the lead applicant, though they may be a partner on project applications.
- At least 50% of EVCS must be in a DAC or Low-Income Community (LIC). At least 40% of chargers must benefit Justice 40 communities.
    - The suitability analysis prioritized DACs and areas with lower income (though LIC designations were not used).

CEC's final approach to issuing funds may change based on stakeholder's feedback. During the CEC's September 2022 workshop, the CEC anticipated the first round of solicitations being related in Q1 2023, and future solicitations every six months thereafter. At the time of this Study, the first solicitation has not been announced.

[32] https://www.neste.com/investors/market-data/lcfs-credit-price

[33] National Electric Vehicle Infrastructure Program (NEVI) | California Energy Commission

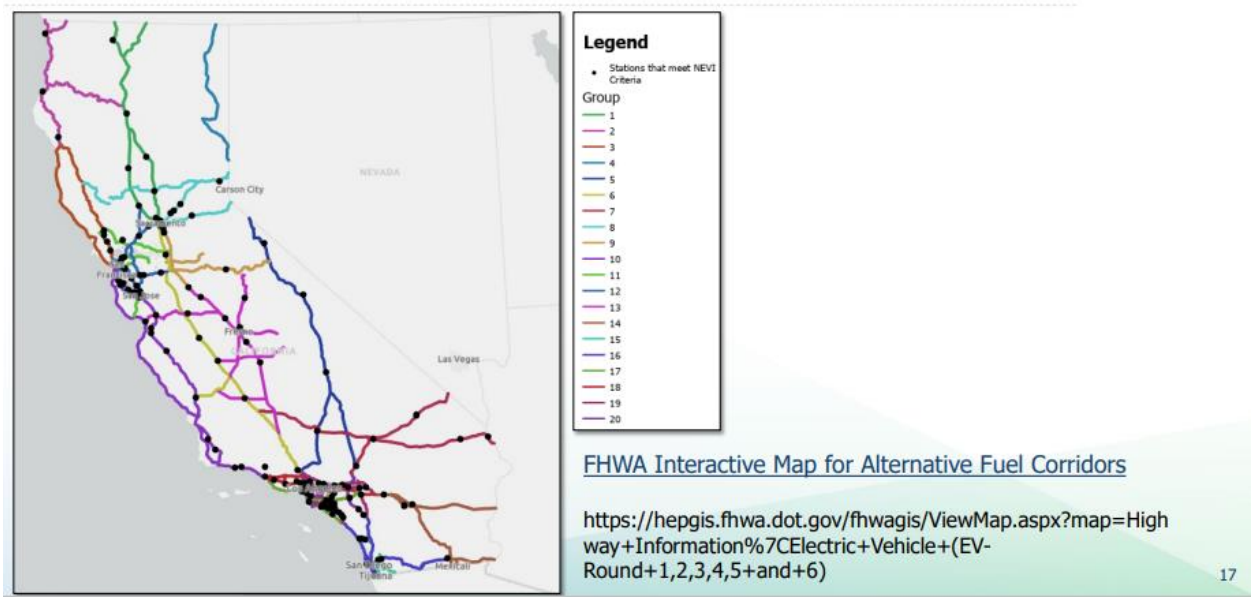

FIGURE 33. CEC'S PROPOSED NEVI CORRIDORS GROUP

While, SCAG or its member cities cannot directly apply for NEVI funds, they can partner with a private sector developer on project applications. If public owned sites are eligible for NEVI, public sector site hosts can help influence the final project design, contribute towards match funding, and/or expedited the permitting review and approval. SCAG can build on the work completed in this project to narrow down the suitability analysis to just sites that may qualify for NEVI, filtering for sites within one mile from AFCs, and exist within priority populations including DACs, LICs, or Justice 40 census tracts. This can help project developers target the most suitable or prioritized sites for EVCS. SCAG can form partnerships with project developers to further investigate highly ranked sites or provide a list of qualified contractors to member cities.

INFLATION REDUCTION ACT (IRA)

The Inflation Reduction Act (IRA) passed in 2022 provides funding for EVs and charging stations in the form of tax credits. Individuals and commercial/public entities are eligible for different credits with different conditions.

For individuals, the IRA extends the previous $7,500 tax credit for EV purchases and removes the previous sales volume cap but instituted several other eligibility requirements including[34]:

- U.S. has a free trade agreement or use critical minerals that were recycled in North America.
- Only vehicles assembled in North America will be eligible.
- Only cars under $55,000 or SUVs, vans, and pickup trucks under $80,000 are eligible for the credit.
- On the consumer side, the income cap to be eligible for the credit is $150,000 for single filers, $225,000 for head of household and $300,000 for joint filers.
- Starting in 2024 individuals can transfer the tax credit to the car dealer to receive the value of the tax credit at the point of sale.
- Starting in 2023 the tax credit will be broken up into two portions, though the following requirements are waived until final guidance is issued.

[34] Inflation Reduction Act (IRA) EV Incentives, Explained - (pluginamerica.org)

- A vehicle is eligible for one-half of the total credit ($3,750) if the vehicle has battery components that are manufactured or assembled in North America. The percentage of battery components will increase up to 80% starting January 1, 2027.
- To be eligible for the other $3,750, a vehicle must have critical minerals that were extracted or processed in the U.S. or countries with a free trade agreement with the U.S. The percentage of battery components will increase up to 80% starting January 1, 2027.

The IRA also establishes new tax credits for used EVs that goes into effect January 1, 2023. The used EV tax credit is for $4,000 or up to 30% of the vehicle price (whichever is lower.) The used EV tax credit has a few requirements:

- The vehicle must be under $25,000.
- The vehicle model year must be at least 2 years old (based on when the consumer is purchasing the used vehicle.)
- In order to be eligible, the vehicle must be sold by a dealer.
- The income cap to be eligible for the used EV credit is $75,000 for single filers, $112,500 for head of household and $150,000 for joint filers.
- The credit can only be applied once per vehicle.

The EV charger credit, formally known as the alternative fuel refueling station credit, has been extended through 2032. The credit is available for both individual and commercial uses to help cover the cost of charging stations.

- For individual/residential uses, the tax credit covers 30% (up to $1,000 per unit) of the cost of the equipment
- For commercial uses, the tax credit covers 6% (up to $100,000 per unit) of the cost of the equipment
- Bidirectional charging equipment is eligible
- Starting January 1, 2023, equipment must be placed in a low-income community or non-urban area to qualify

EV tax credits will be available for commercial and public entities as well, with fewer eligibility restrictions. EVs with a gross vehicle weight rating (GVWR) under 14,000 pounds will be eligible for a $7,500 tax credit without the aforementioned assembly or sourcing requirements. EVs with a GVWR over 14,000 pounds will be eligible for a $40,000 tax credit. In both cases the tax credit is capped at up to 30% of the vehicle cost and cannot exceed the incremental cost difference of a comparable internal combustion engine vehicle.

Public agencies have previously not been able to take advantage of tax credits directly, because they are tax exempt. Starting in 2024 public agencies will be able to receive the tax credits as a direct payment, though final guidance on how this will be issued is still pending.

SCE CHARGE READY

Cities within Southern California Edison (SCE) territory may apply for the utility's Charge Ready program which opened on July 12, 2021. This program covers utility side infrastructure and behind the meter infrastructure for EV charger installations that have at least four level 2 charging ports and provides rebates to qualified EV chargers, though due to cost effectiveness criteria SCE is required to meet, typically projects must contain at least 10 charging points to get approved. The program has a focus on MUDs and sites located within DACs. SCE has additional Charge Ready Programs to turnkey EVCS in

MUDs within DACs, new construction rebate program, and Charge Ready Transport for medium and heavy-duty fleets. The program will help make EVSE installation projects more economically viable. Due to an abundance of applications, SCE has stopped accepting new applications as of September 1, 2022, for public Level 2 EVCS rebates and MUD turnkey application projects[35]. Between September 2022 and January 2023, new applications for these programs were placed on a waitlist. As of February 2023, only sites in DACs may apply for the waitlist for those programs. New construction rebates and Charge Ready Transport project applications are still being accepted.

SCE Charge Ready on Hold

Due to an abundance of applications, SCE created a waitlist for new Charge Ready applications starting September 1, 2022. As of February 2023, additional waitlist applications may only be submitted by the sites in DACs.

CALEVIP 1.0 AND 2.0

CALeVIP is a state rebate program that provides rebate funding for Level 2 EVCS and DCFCs. The previous (CALeVIP 1.0) project allocated funding by county and was issued on a first come-first serve basis. At the time of this plan, Ventura and Imperial Counties still have funding available for Level 2 charging station projects. All other SCAG counties have exhausted their CALeVIP 1.0 funds.

Starting in 2023, the CALeVIP program will be rebranded as the Golden State Priority Project (CALeVIP 2.0) and focus exclusively on DCFC projects that have a minimum power output of 150kW. Eligible applicants can qualify for rebates up to $100,000 per port or up to 50% of their project's total approved costs, capped at $100,000 per port. Funding is only available for sites located in DAC or low-income community (LIC) census tracts. The suitability analysis prioritized DACs and areas with lower income (though LIC designations were not used).

FIGURE 34. CALEVIP 2.0 INITIAL FUNDING REGIONS

Funding will be issued regionally, but instead of issuing funds on a first come first serve basis, funding will be prioritized based on how shovel-ready the project is. This will encourage some initial development so that only the projects with the highest likelihood of getting completed are funded. The first application window will be open from January 24, 2023 through March 10, 2023 and cover eastern and central California including Ventura, San Bernardino, Riverside, and Imperial Counties (Figure 34). After the application window closes, sites will be catagorized based on how shovel-ready they are and then funding will be reserved for the most shovel-ready projects.

ALTERNATIVE FUELS DATA CENTER

The Study provides a snapshot of some of the most common EV and EVCS funding opportunities available at the time of this Study. The list is far from comprehensive; new funding sources may be available; and funding sources may be exhausted and not renewed. The Department of Energy (DOE) Alternative Fuels Data Center (AFDC) maintains a comprehensive, up-to-date database of federal, state, utility,

DOE AFDC Database

The Department of Energy Alternative Fuels Data Center maintains a comprehensive, up-to-date database of funding and financing opportunities for EVs and EVCS.

[35] Charging Infrastructure and Rebate Program (sce.com)

or local funding and financing opportunities for EVs and EVCS (AFDC Laws and Incentives). Cities are encouraged to review this database regularly and include links to the AFDC on City websites. SCAG, Cities, and EVCS project stakeholders should review the AFDC website early in project development to determine what funding sources may be available or appropriate for the given project. Users can search for incentives, rebates, financing, or policies for a variety of fuel types, end users (Figure 35).

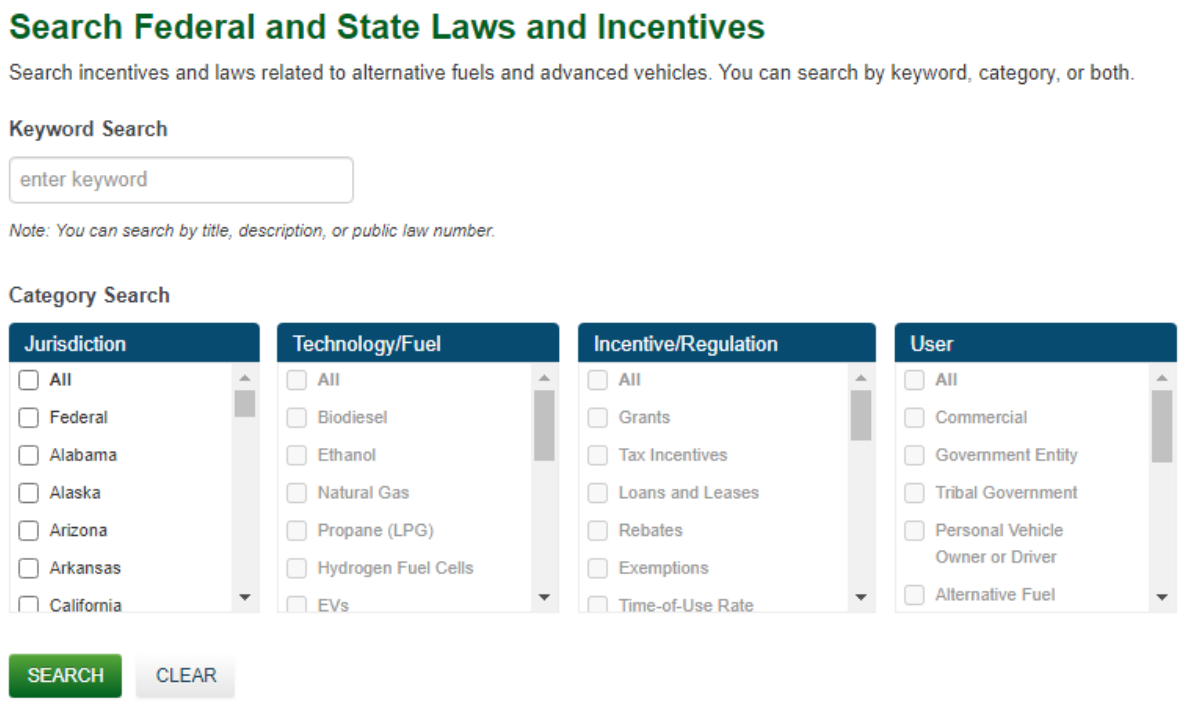

FIGURE 35. AFDC EV INCENTIVE SEARCH AND FILTER FEATURE

SUPPORTING PUBLIC PRIVATE PARNTERSHIPS

EV INFRASTRUCTURE OWNERSHIP MODELS

While California will likely continue to provide funding for EV infrastructure, it remains highly competitive. Forming public-private partnerships and exploring alternative financing or ownership models can help reduce financial barriers. Cities or site hosts can purchase, own, and operate the chargers themselves but that typically comes with networking fees and the responsibility of maintaining the chargers. For this reason, its generally recommended for site hosts to charge users for the electricity to recover ongoing costs. In some cases, the site hosts such as employers or MUD owners may choose to not charge for dispensed electricity and instead consider EVCS a differentiator and a perk for their employees or tenants. For highly utilized sites, Cities may be able to provide an easement or lease parking spaces to third parties where the vendor retains sole ownership of the charging stations and is responsible for maintaining them. Other successful ownership models include charging as a service (CaaS), where the site host pays little to no money upfront and pays the vendor over time via a subscription model, typically on a per kWh basis. Lastly, shared ownership and revenue models may be possible. These ownership models, summarized in Table 28, may not be viable for all projects, so site hosts should work closely with project developers and the charging vendors to determine the best ownership model for the specific project. For third party ownership models, Cities should work closely with project partners to ensure sites meet local design requirements and goals such as multiple payment mechanisms and open-access plug types.

TABLE 28 – SAMPLE EV OWNERSHIP MODELS

Line Item	Host Owned	Charging as a Service (CaaS)	Hybrid Host-Vendor Owned	Vendor Owned
Service Model	Host own and operate	Vendor own and operate via subscription	Shared ownership	Vendor own and operate
Ideal for:	Pilot projects, site desire to control charging revenue	Large fleet electrification projects	Sites that want limited control on charger O&M	Sites with very high expected EVCS utilization
Equipment Ownership	Host	Vendor	Host or Vendor	Vendor
Installation Costs	Host	Vendor	Host or Vendor	Vendor
Electricity Costs	Host	Vendor	Vendor	Vendor
Support & Maintenance Costs	Host	Vendor	Vendor	Vendor
Charging Revenue	Goes to Host	Varies	Split with Vendor	Majority Percentage to Vendor
Pricing Controls	Host	Vendor	Vendor	Vendor
Contract Term	Contract Typically Not Required	Contract Typically Required	Contract Typically Required	Contract Typically Required
Network Fees	Yes	No	Yes	Yes
Monthly Subscription Fee	No	Yes	No	No

CONCLUSION AND NEXT STEPS

A significant amount of charging infrastructure will need to be installed in the SCAG region to support 8 million EVs in the state by 2030. This report presented targets on the type and quantity of EVCS that might be needed in each City to support statewide EV adoption goals. Cities should review existing EV infrastructure within their jurisdictions and look to formalize or revise their own EVCS by 2030 targets. Cities may consider intermediate targets to help hold themselves accountable. These targets can be incorporated into other plans Cities already work on such as General plans, Climate Action Plans, or other sustainability-oriented plans. Cities may extrapolate these targets beyond 2030 for longer term planning.

This Study identified locations that could support over 1,400 potential charging ports in the SCAG region. That is just a start to the several hundred thousand needed throughout the SCAG region by the end of the decade to support future EV adoption in line with statewide goals. The suitability analysis developed in the Study should be used to identify further opportunities to target EVCS. Cities can use the site evaluations completed under this project as an outreach tool to property owners to spark project development.

While Cities can lead the way by installing EVCS at publicly owned locations such as City Hall, libraries, parks, and public parking lots, the majority of EVCS will be owned and operated by the private sector. SCAG and Cities still have a role to play in fostering adoption through things they can control including policy, engagement and awareness, and funding. Cities can continue to streamline their permitting processes, so they do not create delays for contractors and developers in installing EVCS. Cities can also adopt more stringent reach codes to increase the amount of EV infrastructure that must be installed as part of new buildings. Regional governments can help coordinate consistent code adoption between neighboring cities. Cities may explore other policy options to target EVCS in existing buildings.

There are still knowledge gaps on EVs and their benefits. Issues like cost, range anxiety, and limited charging infrastructure are still problems that the industry needs to overcome, but the technology continues to improve, and more charging stations are installed each year. SCAG and Cities should continue to engage their community and educate the general public on the benefits of EV ownership. Cities should create dedicated EV landing page on their website and link to trusted sources of information on EVs including funding opportunities to reduce the cost of buying an EV or installing an EVCS. Cities may continue to use the educational materials developed under this Study, such as the EV brochure and EVCS Guide for Property managers.

While not all Cities may be able to offer their own financial incentives for EVCS there is a host of funding available at the federal, state, regional, and utility level. Cities can compile this information on a dedicated EV landing page to make it easier for property owners and contractors to know what funding is available and how to apply for it. Cities should familiarize themselves for these funding sources as many would pertain to projects on publicly owned sites and allow City staff to speak intelligently about them in their communities.

SCAG™
INNOVATING FOR A BETTER TOMORROW

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APPENDICES

APPENDIX A – SUITABILTY ANALYSIS SCORING MATRIX

TABLE 29 – EVALUATION CRITERIA AND SCORING FOR SCAG REGIONWIDE STANDARD AND THE THREE SCORING SCENARIOS FOR CITIES

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
		Explanation of data and scoring criteria	Method of measurement	Point scale 0 - 10 (10 being the most beneficial) Highest - 10 points High - 7 points Medium - 5 points Medium/Low - 3 points Low - 1 Point Lowest - 0 Points	Point scale 0 - 10 (10 being the most beneficial) Highest - 10 points High - 7 points Medium - 5 points Medium/Low - 3 points Low - 1 Point Lowest - 0 Points	Point scale 0 - 10 (10 being the most beneficial) Highest - 10 points High - 7 points Medium - 5 points Medium/Low - 3 points Low - 1 Point Lowest - 0 Points	Point scale 0 - 10 (10 being the most beneficial) Highest - 10 points High - 7 points Medium - 5 points Medium/Low - 3 points Low - 1 Point Lowest - 0 Points
				The Regionwide Standard scores maximize scoring potential for high density, low-income, DAC areas. It prioritizes high-capacity locations and prioritize areas with higher EV ownership.	Expanding has substantial investments in EV infrastructure & charging stations. Increasing EV charging network and prioritize DACs, DVCs, and lower-income areas to reduce barriers to EV infrastructure.	Progressing has made some investment in EV infrastructure and looking to build a robust EV charging network. Prioritize areas to increase EV usage, specifically high-density land use such as multi-unit dwellings (MUDs).	Initiating has not yet invested in EV infrastructure and need to create a network. Prioritize areas that have high-capacity locations such as shopping centers, public services, and high-density land use such as multi-unit dwellings (MUDs).
1	Proximity to Existing EV Charging Station	Ideally placement of new EV charging stations should be placed at a distance from existing or planned stations to increase coverage of EV stations throughout the geography and increase overall accessibility to a wider geography.	Distance - Miles	<1 Mile – 1 point 1-3 Miles – 3 points 3-5 Miles – 5 points 5 -7 Miles – 7 points > 7 Miles – 10 points	<0.5 Mile – 1 point 0.5 - 1 Miles – 3 points 1 - 3 Miles – 5 points 3 - 5 Miles – 7 points > 5 Miles – 10 points	<0.5 Mile – 1 point 0.5 - 1 Miles – 5 points 1 - 3 Miles – 10 points 3 - 5 Miles – 7 points > 5 Miles – 3 point	<0.5 Mile – 3 point 0.5 - 1 Miles – 7 points 1 - 3 Miles – 10 points 3 - 5 Miles – 5 points > 5 Miles – 1 point

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
2	EV Charging Stations - Existing and Planned	Ideally placement of new EV charging stations should be placed at a distance from existing or planned stations to increase coverage of EV stations throughout the geography and increase overall accessibility to a wider geography.	Distance - Miles	<1 Mile – 1 point 1-3 Miles – 3 points 3-5 Miles – 5 points 5 -7 Miles – 7 points > 7 Miles – 10 points	<0.5 Mile – 1 point 0.5 - 1 Miles – 3 points 1 - 3 Miles – 5 points 3 - 5 Miles – 7 points > 5 Miles – 10 points	<0.5 Mile – 1 point 0.5 - 1 Miles – 5 points 1- 3 Miles – 10 points 3 - 5 - Miles – 7 points > 5 Miles – 3 point	<0.5 Mile – 3 point 0.5 - 1 Miles – 7 points 1- 3 Miles – 10 points 3- 5 Miles – 5 points > 5 Miles – 1 point
3	California Motor Vehicle Fuel Types Battery Electric Vehicles	Higher number of points in areas with larger numbers of electric vehicles in the zip code. Higher number of EVs in an area need more charging stations and will be in more demand.	CA Motor Vehicle Fuel Types by Zip Code - Number of Battery Electric Vehicles	1 - 240 - 1 points 241 - 480 - 3 points 480 -720 - 5 points 481 - 960 - 7 points 961 - 1,200 - 10 points	1 - 240 - 10 points 241 - 480 - 7 points 480 -720 – 5 points 481 - 960 - 3 points 961 - 1,200 - 1 point	1 - 240 - 1 point 241 - 480 - 5 points 480 -720 – 10 points 481 - 960 - 7 points 961 - 1,200 - 3 points	1 - 240 - 1 point 241 - 480 - 3 points 480 -720 – 5 points 481 - 960 - 7 points 961 - 1,200 - 10 point
4	California Motor Vehicle Fuel Types Plug-In Hybrid Vehicles	Higher number of points in areas with larger numbers of electric vehicles in the zip code. Higher number of EVs in an area need more charging stations and will be in more demand.	CA Motor Vehicle Fuel Types by Zip Code - Number of Plug-In Hybrid Vehicles	1 - 584 - 1 points 585 - 1,168 - 3 points 1,169 - 1,752 - 5 points 1,753 - 2,336 - 7 points 2,335 - 2,920 - 10 points	1 - 584 - 10 points 585 - 1,168 – 7 points 1,169 - 1,752 - 5 points 1,753 - 2,336 - 3 points 2,335 - 2,920 - 1 point	1 - 584 - 1 point 585 - 1,168 – 5 points 1,169 - 1,752 - 10 points 1,753 - 2,336 - 7 points 2,335 - 2,920 - 3 point	1 - 584 - 1 point 585 - 1,168 – 3 points 1,169 - 1,752 - 5 points 1,753 - 2,336 - 7 points 2,335 - 2,920 - 10 points
5	Population Density	Depending on the scenario, areas with the highest population density receive the highest scores. Placement of EV charging stations in these locations would be accessible by the most people.	USA Population density per square mile	0 - 235 - 0 points 236 - 19,852 - 1 point 19,853 - 39,704 - 3 points 39,705 - 59,556 - 5 points 59,557 - 79,408 - 7 points 79,409 - 99,261 - 10 points	0 - 235 - 0 points 236 - 19,852 - 3 points 19,853 - 39,704 - 5 points 39,705 - 59,556 - 10 points 59,557 - 79,408 - 7 points 79,409 - 99,261 - 1 point	0 - 235 - 0 points 236 - 19,852 - 1 point 19,853 - 39,704 - 3 points 39,705 - 59,556 - 5 points 59,557 - 79,408 - 7 points 79,409 - 99,261 - 10 points	0 - 235 - 0 points 236 - 19,852 - 1 point 19,853 - 39,704 - 3 points 39,705 - 59,556 - 5 points 59,557 - 79,408 - 7 points 79,409 - 99,261 - 10 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
6	Median Household Income	Measuring the average household income to identify lower income areas. .	Median Household Income data 6-County SCAG Region 2016	>$150,001 - 0 points $100,001 - $150,000 - 1 point $75, 001 - $100,000 - 3 points $50,001 - $75,000 - 5 points $25,001 - $50,000 - 7 points <$25,000 - 10 points	>$150,001 - 0 points $100,001 - $150,000 - 1 point $75, 001 - $100,000 - 3 points $50,001 - $75,000 - 5 points $25,001 - $50,000 - 7 points <$25,000 - 10 points	>$150,001 - 0 points $100,001 - $150,000 - 5 point $75, 001 - $100,000 - 10 points $50,001 - $75,000 - 7 points $25,001 - $50,000 - 3 points <$25,000 - 1 point	>$150,001 - 10 points $100,001 - $150,000 - 7 points $75, 001 - $100,000 - 5 points $50,001 - $75,000 - 3 points $25,001 - $50,000 - 1 point <$25,000 - 0 points
7	Disadvantaged Communities	Disadvantaged communities designated by CalEPA for the purpose of SB 535. These areas represent the 25% highest scoring census tracts in CalEnviroScreen 3.0, along with other areas with high amounts of pollution and low populations.	SCAG GIS Open Data Portal 2017 Data Percent DAC Score. Scores from 0-100%	<75% - 0 points >75% - 10 points			
8	Low-income community Census Tracts	The poverty rate is at least 20 percent, or the median family income does not exceed 80 percent of statewide median family income. Areas with higher poverty percentages receive higher points to encourage placement of EV charging stations in lower-income areas.	Population % Below Poverty Level, higher the % is higher the poverty level. Scoring is the >20%.	<1.0% - 0 points 1.0 - 4.9% - 1 point 5.0 - 9.9% - 3 points 10.0 - 14.9% - 5 points 15.0 - 19.9% - 7 points 20.0 - 100% - 10 points	<1.0% - 0 points 1.0 - 4.9% - 1 point 5.0 - 9.9% - 3 points 10.0 - 14.9% - 5 points 15.0 - 19.9% - 7 points 20.0 - 100% - 10 points	<1.0% - 1 point 1.0 - 4.9% - 3 points 5.0 - 9.9% - 7 points 10.0 - 14.9% - 10 points 15.0 - 19.9% - 5 points 20.0 - 100% - 0 points	<1.0% - 10 points 1.0 - 4.9% - 7 points 5.0 - 9.9% - 5 points 10.0 - 14.9% - 3 points 15.0 - 19.9% - 1 point 20.0 - 100% - 0 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
9	Pollution Burden	Pollution Burden scores are derived from the average percentiles of the seven Exposures indicators (ozone and PM2.5 concentrations, diesel PM emissions, drinking water contaminants, pesticide use, toxic releases from facilities, and traffic density) and the five Environmental Effects indicators (cleanup sites, impaired water bodies, groundwater threats, hazardous waste facilities and generators, and solid waste sites and facilities). Areas with a higher percent have higher scores have a higher pollution burden and would benefit from improved air quality from low or zero-emission vehicles. The areas with higher pollution burden scores receive higher points.	SCAG GIS Open Data Portal 2017 Data. Scores range 0.1-10, with as score of 10 as highest pollution burden.	0 - 1.0 - 0 points 1.0 - 2.0 - 1 points 2.1 - 4.0 - 3 points 4.1 - 6.0 - 5 points 6.1 - 8.0 - 7 points 8.1 - 10.0 - 10 points			

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
10	Health Impacts - Asthma	Spatially modeled, age-adjusted rate of emergency department (ED) visits for asthma per 10,000 people (averaged over 2011-2013) in percentiles. Areas with a higher percentage have higher rates of asthma and would benefit from improved air quality from low or zero-emission vehicles. The areas with higher asthma percentages receive higher points.	SCAG GIS Open Data Portal 2017 Data Percent DAC Score. Scores range from 0-100%, with 100% being the highest asthma score.	0 - 20% - 1 points 21 - 40% - 3 points 41 - 60% - 5 points 61 - 80% - 7 points 81 - 100% - 10 points			
11	High Quality Transit Areas	High Quality Transit Areas (HQTAs) in the SCAG Region for the year 2016, developed for the Final Connect SoCal / 2020-2045 RTP/SCS. SCAG's HQTA is within one-half mile from a "major transit stops" and a "high-quality transit corridor" and developed based on the language in SB375 and codified in the CA Public Resources Code. Higher points are awarded to locations within a close proximity in miles to HQTA.	Locations are within or outside a High-Quality Transit Areas (HQTA)	Within HQTA - 10 points Outside HQTA - 0 points			

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
12	Highways and arterial streets	SCAG on maps of highways and major arterial streets, higher points awarded to locations closer to highways and major arterial streets	Proximity to highways or major streets, distance in miles	>1.0 miles - 1 point 0.75 - 1.0 miles - 3 points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points	>1.0 miles - 1 point 0.75 - 1.0 miles - 3 points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points	>1.0 miles - 1 point 0.75 - 1.0 miles - 3 points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points	>1.0 miles - 1 point 0.75 - 1.0 - 3 miles points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points
13	MTA Metro stations	Proximity to MTA Stations provides an opportunity to locate an EV charging station with accessibility to public transportation; promoting EV usage in coordination with public transportation. Points awarded to closer proximity in miles to an MTA station.	Proximity to MTA stations, distance in miles	>1.0 miles - 1 point 0.75 - 1.0 miles - 3 points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points			
14	MTA Metro stations parking lots	MTA Stations with parking lots provides an opportunity to locate an EV charging station at an MTA, promoting EV usage in coordination with public transportation. Points awarded to locations with a parking lot at the station.	MTA station with or without a parking lot	Yes parking lot - 5 points No parking lot - 0 points			

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
15	Metrolink stations	Proximity to Metrolink Stations provides an opportunity to locate an EV charging station with accessibility to public transportation; promoting EV usage in coordination with public transportation. Points awarded to closer proximity in miles to an Metrolink station.	Proximity to Metrolink stations, distance in miles	>1.0 miles - 1 point 0.75 - 1.0 miles 3 points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points			
16	Railroad Stations: Metrolink and Amtrak	Proximity to co-located Amtrack and Metrolink Stations provides an opportunity to locate an EV charging station with accessibility to public transportation; promoting EV usage in coordination with public transportation. Points awarded to closer proximity in miles to an Metrolink station.	Proximity to Metrolink and Amtrak stations, distance in miles	>1.0 miles - 1 point 0.75 - 1.0 miles 3 points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points			
17	Airports - SCAG Region	Opportunity to locate an EV charging station within closer proximity to an airport; promoting EV usage in coordination with a larger travel system, rideshare, etc. Higher points awarded for closer proximity in miles to an airport.	Proximity to airports, distance in miles	>4.1 miles - 1 points 3.1 - 4.0 miles 3 points 2.1 - 3.0 miles - 5 points 1.1 - 2.0 miles - 7 points <1 mile - 10 points			

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
18	LA City-owned and other parking lots	Locating an EV charging station in City-owned parking lots may provide higher accessibility to the public to use the EV charging stations. Higher points awarded to locations that are city owned and operated. +C18	Parking lot types	Other/blank – 0 points (excluded from analysis) Other high capacity locations – 1 points Private Parking Facility – 3 points Public Owned - Private Operated – 5 points Public Parking Facility & Operated – 7 points MUD – 10 points			
19	LA City-owned parking lots convenience	Locating an EV charging station in City-owned parking lots may provide higher accessibility to the public to use the EV charging stations. Higher points awarded to locations in proximity to high capacity locations (shopping centers, restaurant, public services / post offices, civic centers, and theaters)	Parking Proximity	No/blank – 0 points Yes Located near HCL - 5 points			
20	Park & Ride Lots: LA County	Locating EV Charing Stations at Park & Ride parking lots provides an opportunity to locate an EV charging station at major transportation hubs, promoting EV usage in coordination with public transportation. Points awarded to locations at a Park & Ride location.	Location of a Park & Ride parking lot	Yes Park & Ride - 5 points No Park & Ride - 0 points			

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
21	Employment Locations	Employment locations for 2016 by ESRI's Info Group. Locating EV charging stations near large employers / employment centers will promote use of EVs for commuting. Points awarded for proximity to large employers / employment centers, where large employers have 200 or more employees.	Distance from large employers (200 or more employees)	>1.0 miles - 1 point 0.75 - 1.0 miles - 3 points 0.5 - 0.75 miles - 5 points 0.25 - 0.5 mile - 7 points <0.25 mile - 10 points			

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
22	PEV Propensity To Purchase (point features)	This spatial layer focuses on MUD properties and provides a score for ranking MUD parcels in the South Coast Air Basin according to the relative demand of building residents for PEV ownership, assuming barriers to chargers are removed. The score accounts for (a) the historical adoption rate of PEVs in each census tract, (b) the likelihood that PEVs are likely to belong to households of different income groups, and (c) the likelihood that those income groups are likely to live in a home of a certain value. The score is based on the average value of the unit within the MUD. Final scores are not weighted by the size of the MUD (i.e., the total number of units). The higher the PEV Propensity to Purchase score the more likely the residents are likely to purchase a PEV and would benefit from include EV infrastructure.	PEV Propensity to Purchase Score (prpnst_0 - 10 score)	0 - 0.9 - 0 points 1.0 - 2.0 - 1 points 2.1 - 4.0 - 3 points 4.1 - 6.0 - 5 points 6.1 - 8.0 - 7 points 8.1 - 10.0 - 10 points	0 - 0.9 - 0 points 1.0 - 2.0 - 3 points 2.1 - 4.0 - 7 points 4.1 - 6.0 - 10 points 6.1 - 8.0 - 5 points 8.1 - 10.0 - 1 point	0 - 0.9 - 0 points 1.0 - 2.0 - 1 point 2.1 - 4.0 - 3 points 4.1 - 6.0 - 5 points 6.1 - 8.0 - 7 points 8.1 - 10.0 - 10 points	0 - 0.9 - 0 points 1.0 - 2.0 - 1 point 2.1 - 4.0 - 3 points 4.1 - 6.0 - 5 points 6.1 - 8.0 - 7 points 8.1 - 10.0 - 10 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
23	PEV_AMDestinations_Registrations_poly_scag	Regional Model and shows the arrival locations and densities of PEVs during peak morning hours. The morning peak period represents weekday trips that occur between 6 and 9 a.m. and the mid-day period 9 a.m. and 3 p.m. Higher destinations sums indicate a higher number of vehicles at the destination and the larger benefit of installing an EV charging station at the destination.	PEV AM Destinations Registration AM Sums score range 0 - 238.51	0 - 1.0 - 0 points 1.1 - 47.0 - 1 points 47.1 - 95.0 - 3 points 95.1 - 142.0 - 5 points 142.1 - 189.0 - 7 points 189.1 - 238.51 - 10 points			
24	PEV_PMDestinations_Registrations_poly_scag	Regional Model and shows the arrival locations and densities of PEVs during peak evening hours. The evening peak period 3 p.m. to 7 p.m. Higher destinations sums indicate a higher number of vehicles at the destination and the larger benefit of installing an EV charging station at the destination.	PEV PM Destinations Registration MID Sums score range 0 - 251.17	2 - 1.0 - 0 points 1.1 - 50.0 - 1 points 50.1 - 100.0 - 3 points 100.1 - 150.0 - 5 points 150.1 - 200.0 - 7 points 200.1 - 251.17 - 10 points			

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
25	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Single Family Residential	1111 High Density Single Family Residential (9 or more DUs/ac) - 7 points 1112 Medium Density Single Family Residential (3-8 DUs/ac) - 7 points	1111 High Density Single Family Residential (9 or more DUs/ac) - 7 points 1112 Medium Density Single Family Residential (3-8 DUs/ac) - 7 points	1111 High Density Single Family Residential (9 or more DUs/ac) - 7 points 1112 Medium Density Single Family Residential (3-8 DUs/ac) - 7 points	1111 High Density Single Family Residential (9 or more DUs/ac) - 7 points 1112 Medium Density Single Family Residential (3-8 DUs/ac) - 7 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
26	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Multi-Family Residential	1120 Multi-Family Residential - 10 points 1121 Mixed Multi-Family Residential - 10 points 1122 Duplexes, Triplexes and 2- or 3-Unit Condominiums and Townhouses - 7 points 1123 Low-Rise Apartments, Condominiums, and Townhouses - 7 points 1124 Medium-Rise Apartments and Condominiums - 10 points 1125 High-Rise Apartments and Condominiums - 10 points 1131 Trailer Parks and Mobile Home Courts, High-Density - 5 points	1120 Multi-Family Residential - 10 points 1121 Mixed Multi-Family Residential - 10 points 1122 Duplexes, Triplexes and 2- or 3-Unit Condominiums and Townhouses - 7 points 1123 Low-Rise Apartments, Condominiums, and Townhouses - 7 points 1124 Medium-Rise Apartments and Condominiums - 10 points 1125 High-Rise Apartments and Condominiums - 10 points 1131 Trailer Parks and Mobile Home Courts, High-Density - 5 points	1120 Multi-Family Residential - 10 points 1121 Mixed Multi-Family Residential - 10 points 1122 Duplexes, Triplexes and 2- or 3-Unit Condominiums and Townhouses - 7 points 1123 Low-Rise Apartments, Condominiums, and Townhouses - 7 points 1124 Medium-Rise Apartments and Condominiums - 10 points 1125 High-Rise Apartments and Condominiums - 10 points 1131 Trailer Parks and Mobile Home Courts, High-Density - 5 points	1120 Multi-Family Residential - 10 points 1121 Mixed Multi-Family Residential - 10 points 1122 Duplexes, Triplexes and 2- or 3-Unit Condominiums and Townhouses - 7 points 1123 Low-Rise Apartments, Condominiums, and Townhouses - 7 points 1124 Medium-Rise Apartments and Condominiums - 10 points 1125 High-Rise Apartments and Condominiums - 10 points 1131 Trailer Parks and Mobile Home Courts, High-Density - 5 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
27	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Mixed Residential	1140 Mixed Residential - 10 points 1100 Residential - 5 points	1140 Mixed Residential - 10 points 1100 Residential - 5 points	1140 Mixed Residential - 10 points 1100 Residential - 5 points	1140 Mixed Residential - 10 points 1100 Residential - 5 points
28	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	General Office	1210 General Office Use - 5 points 1211 Low- and Medium-Rise Major Office Use - 5 points 1212 High-Rise Major Office Use - 10 points 1213 Skyscrapers - 10 points	1210 General Office Use - 5 points 1211 Low- and Medium-Rise Major Office Use - 5 points 1212 High-Rise Major Office Use - 10 points 1213 Skyscrapers - 10 points	1210 General Office Use - 5 points 1211 Low- and Medium-Rise Major Office Use - 5 points 1212 High-Rise Major Office Use - 10 points 1213 Skyscrapers - 10 points	1210 General Office Use - 5 points 1211 Low- and Medium-Rise Major Office Use - 5 points 1212 High-Rise Major Office Use - 10 points 1213 Skyscrapers - 10 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
29	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Commercial Services	1200 Commercial and Services - 7 points 1220 Retail Stores and Commercial Services - 10 points 1221 Regional Shopping Center - 10 points 1222 Retail Centers (Non-Strip With Contiguous Interconnected Off-Street Parking) - 10 points 1223 Retail Strip Development - 10 points 1230 Other Commercial - 5 points 1232 Commercial Recreation - 5 points 1233 Hotels and Motels - 3 points	1200 Commercial and Services - 7 points 1220 Retail Stores and Commercial Services - 10 points 1221 Regional Shopping Center - 10 points 1222 Retail Centers (Non-Strip With Contiguous Interconnected Off-Street Parking) - 10 points 1223 Retail Strip Development - 10 points 1230 Other Commercial - 5 points 1232 Commercial Recreation - 5 points 1233 Hotels and Motels - 7 points	1200 Commercial and Services - 7 points 1220 Retail Stores and Commercial Services - 10 points 1221 Regional Shopping Center - 10 points 1222 Retail Centers (Non-Strip With Contiguous Interconnected Off-Street Parking) - 10 points 1223 Retail Strip Development - 10 points 1230 Other Commercial - 5 points 1232 Commercial Recreation - 5 points 1233 Hotels and Motels - 7 points	1200 Commercial and Services - 7 points 1220 Retail Stores and Commercial Services - 10 points 1221 Regional Shopping Center - 10 points 1222 Retail Centers (Non-Strip With Contiguous Interconnected Off-Street Parking) - 10 points 1223 Retail Strip Development - 10 points 1230 Other Commercial - 5 points 1232 Commercial Recreation - 5 points 1233 Hotels and Motels - 7 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
30	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Facilities	1240 Public Facilities - 7 points 1241 Government Offices - 7 points 1242 Police and Sheriff Stations - 3 point 1243 Fire Stations - 3 point 1244 Major Medical Health Care Facilities - 7 points 1245 Religious Facilities - 0 points 1246 Other Public Facilities - 7 points 1247 Public Parking Facilities - 10 points 1250 Special Use Facilities - 3 points 1251 Correctional Facilities - 5 points 1252 Special Care Facilities - 7 points 1253 Other Special Use Facilities - 5 points	1240 Public Facilities - 7 points 1241 Government Offices - 7 points 1242 Police and Sheriff Stations - 3 point 1243 Fire Stations - 3 point 1244 Major Medical Health Care Facilities - 7 points 1245 Religious Facilities - 7 points 1246 Other Public Facilities - 10 points 1247 Public Parking Facilities - 10 points 1250 Special Use Facilities - 3 points 1251 Correctional Facilities - 5 points 1252 Special Care Facilities - 7 points 1253 Other Special Use Facilities - 5 points	1240 Public Facilities - 7 points 1241 Government Offices - 7 points 1242 Police and Sheriff Stations - 3 point 1243 Fire Stations - 3 point 1244 Major Medical Health Care Facilities - 7 points 1245 Religious Facilities - 7 points 1246 Other Public Facilities - 10 points 1247 Public Parking Facilities - 10 points 1250 Special Use Facilities - 3 points 1251 Correctional Facilities - 5 points 1252 Special Care Facilities - 7 points 1253 Other Special Use Facilities - 5 points	1240 Public Facilities - 7 points 1241 Government Offices - 7 points 1242 Police and Sheriff Stations - 3 point 1243 Fire Stations - 3 point 1244 Major Medical Health Care Facilities - 7 points 1245 Religious Facilities - 7 points 1246 Other Public Facilities - 10 points 1247 Public Parking Facilities - 10 points 1250 Special Use Facilities - 3 points 1251 Correctional Facilities - 5 points 1252 Special Care Facilities - 7 points 1253 Other Special Use Facilities - 5 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
31	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Education	1260 Educational Institutions - 7 points 1261 Pre-Schools/Day Care Centers - 7 points 1262 Elementary Schools - 7 points 1263 Junior or Intermediate High Schools - 7 points 1264 Senior High Schools - 10 points 1265 Colleges and Universities - 10 points 1266 Trade Schools and Professional Training Facilities - 10 points	1260 Educational Institutions - 7 points 1261 Pre-Schools/Day Care Centers - 7 points 1262 Elementary Schools - 7 points 1263 Junior or Intermediate High Schools - 7 points 1264 Senior High Schools - 10 points 1265 Colleges and Universities - 10 points 1266 Trade Schools and Professional Training Facilities - 10 points	1260 Educational Institutions - 7 points 1261 Pre-Schools/Day Care Centers - 7 points 1262 Elementary Schools - 7 points 1263 Junior or Intermediate High Schools - 7 points 1264 Senior High Schools - 10 points 1265 Colleges and Universities - 10 points 1266 Trade Schools and Professional Training Facilities - 10 points	1260 Educational Institutions - 7 points 1261 Pre-Schools/Day Care Centers - 7 points 1262 Elementary Schools - 7 points 1263 Junior or Intermediate High Schools - 7 points 1264 Senior High Schools - 10 points 1265 Colleges and Universities - 10 points 1266 Trade Schools and Professional Training Facilities - 10 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
32	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Transportation, Communications, and Utilities	1400 Transportation, Communications, and Utilities - 3 points 1410 Transportation - 7 points 1411 Airports - 7 points 1412 Railroads - 7 points 1413 Freeways and Major Roads - 7 points 1414 Park-and-Ride Lots - 10 points 1415 Bus Terminals and Yards - 7 points 1416 Truck Terminals - 0 points 1417 Harbor Facilities - 3 points 1440 Maintenance Yards - 0 point 1441 Bus Yards - 0 point 1450 Mixed Transportation - 5 point 1460 Mixed Transportation and Utility - 3 point	1400 Transportation, Communications, and Utilities - 3 points 1410 Transportation - 7 points 1411 Airports - 7 points 1412 Railroads - 7 points 1413 Freeways and Major Roads - 7 points 1414 Park-and-Ride Lots - 10 points 1415 Bus Terminals and Yards - 7 points 1416 Truck Terminals - 0 points 1417 Harbor Facilities - 3 points 1440 Maintenance Yards - 0 point 1441 Bus Yards - 0 point 1450 Mixed Transportation - 5 point 1460 Mixed Transportation and Utility - 3 point	1400 Transportation, Communications, and Utilities - 3 points 1410 Transportation - 7 points 1411 Airports - 7 points 1412 Railroads - 7 points 1413 Freeways and Major Roads - 7 points 1414 Park-and-Ride Lots - 10 points 1415 Bus Terminals and Yards - 7 points 1416 Truck Terminals - 0 points 1417 Harbor Facilities - 3 points 1440 Maintenance Yards - 0 point 1441 Bus Yards - 0 point 1450 Mixed Transportation - 5 point 1460 Mixed Transportation and Utility - 3 point	1400 Transportation, Communications, and Utilities - 3 points 1410 Transportation - 7 points 1411 Airports - 7 points 1412 Railroads - 7 points 1413 Freeways and Major Roads - 7 points 1414 Park-and-Ride Lots - 10 points 1415 Bus Terminals and Yards - 7 points 1416 Truck Terminals - 0 points 1417 Harbor Facilities - 3 points 1440 Maintenance Yards - 0 point 1441 Bus Yards - 0 point 1450 Mixed Transportation - 5 point 1460 Mixed Transportation and Utility - 3 point

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
33	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Mixed Commercial and Industrial	1500 Mixed Commercial and Industrial - 3 points	1500 Mixed Commercial and Industrial - 3 points	1500 Mixed Commercial and Industrial - 3 points	1500 Mixed Commercial and Industrial - 3 points
34	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Mixed Residential and Commercial	1600 Mixed Residential and Commercial - 10 points 1610 Residential-Oriented Residential/Commercial Mixed Use - 10 points 1620 Commercial-Oriented Residential/Commercial Mixed Use - 10 points	1600 Mixed Residential and Commercial - 10 points 1610 Residential-Oriented Residential/Commercial Mixed Use - 10 points 1620 Commercial-Oriented Residential/Commercial Mixed Use - 10 points	1600 Mixed Residential and Commercial - 10 points 1610 Residential-Oriented Residential/Commercial Mixed Use - 10 points 1620 Commercial-Oriented Residential/Commercial Mixed Use - 10 points	1600 Mixed Residential and Commercial - 10 points 1610 Residential-Oriented Residential/Commercial Mixed Use - 10 points 1620 Commercial-Oriented Residential/Commercial Mixed Use - 10 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
35	Land Use Classification	Types of land use that provide wider accessibility to the public and promotes increased usage. Types of land use that are accessible to the public or have large traffic volumes will have higher scores. Land uses that are considered inaccessible to the general public, low accessibility, or privately owned and operated will receive lower points. Locations will only receive a score for their specific land use category.	Open Space and Recreation	1800 Open Space and Recreation - 7 points 1810 Golf Courses - 3 points 1820 Local Parks and Recreation - 7 points 1830 Regional Parks and Recreation - 5 points 1840 Cemeteries - 3 points 1850 Wildlife Preserves and Sanctuaries - 3 points 1860 Specimen Gardens and Arboreta - 3 points 1870 Beach Parks - 7 points 1880 Other Open Space and Recreation - 3 points	1800 Open Space and Recreation - 7 points 1810 Golf Courses - 7 points 1820 Local Parks and Recreation - 7 points 1830 Regional Parks and Recreation - 5 points 1840 Cemeteries - 3 points 1850 Wildlife Preserves and Sanctuaries - 3 points 1860 Specimen Gardens and Arboreta - 3 points 1870 Beach Parks - 7 points 1880 Other Open Space and Recreation - 3 points	1800 Open Space and Recreation - 7 points 1810 Golf Courses - 7 points 1820 Local Parks and Recreation - 7 points 1830 Regional Parks and Recreation - 5 points 1840 Cemeteries - 3 points 1850 Wildlife Preserves and Sanctuaries - 3 points 1860 Specimen Gardens and Arboreta - 3 points 1870 Beach Parks - 7 points 1880 Other Open Space and Recreation - 3 points	1800 Open Space and Recreation - 7 points 1810 Golf Courses - 7 points 1820 Local Parks and Recreation - 7 points 1830 Regional Parks and Recreation - 5 points 1840 Cemeteries - 3 points 1850 Wildlife Preserves and Sanctuaries - 3 points 1860 Specimen Gardens and Arboreta - 3 points 1870 Beach Parks - 7 points 1880 Other Open Space and Recreation - 3 points

NO.	THEME	CRITERIA	METRIC	SCAG REGIONWIDE STANDARD	EXPANDING CITIES	PROGRESSING CITIES	INITIATING CITIES
36	Streamlined Permitting	Areas with streamlined permits for EVs charging stations will have an easier time installing EV charging stations. Cities in the progressing category can prioritize areas with streamlined permitting as they will reduce the barriers to installing new chargers into existing EV network. Higher points are awarded to areas with a streamlined permitting process. Green – City or County is EVCS Permit Ready, charging infrastructure permitting is streamlined Yellow – City or County EVCS permit streamlining is in progress, or partially complete Red – City or County is not streamlined for EVCS permitting	Permitting process: Green – streamlined Yellow – in process Red – not streamlined	Green Permitting – 10 points Yellow Permitting – 5 points Red Permitting – 1 point			

APPENDIX B – COUNTY SUITABILTY ANALYSIS RESULTS MAPS

APPENDIX C – COMPLETE LIST OF SITE EVALUATIONS

APPENDIX D – COMPILED OUTREACH COLLATERAL AND SURVEY