Opinion Dynamics

SCE CHARGE READY LIGHT DUTY PROGRAM

DRAFT 2023 EVALUATION REPORT

JUNE 28, 2024

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I. EXECUTIVE SUMMARY

On August 27, 2020, the California Public Utilities Commission (CPUC or Commission) issued Decision (D.) 20-08-045 (the Decision) authorizing Southern California Edison Company's (SCE) Charge Ready 2 Infrastructure and Market Education Programs, also known as SCE's Charge Ready Light Duty (CRLD) Program. The CRLD Program is an extension of the Charge Ready and Market Ready Phase 1 Pilot (Phase 1 Pilot).[1] The CRLD Program supports California's greenhouse gas (GHG) emissions reduction goals by adopting transportation electrification (TE). Pursuant to Ordering Paragraph (OP) 30,[2] this report provides the annual update for the CRLD Program, covering program activities between January 2023 and December 2023, as well as the standard reporting requirements outlined in Senate Bill (SB) 350 TE Program. Additionally, where applicable, this report provides cumulative updates on the CRLD Program from its launch in 2021 through 2023.

The CRLD Program supports local air quality goals and California's GHG emissions reduction targets by providing eligible non-residential SCE customers with low- to no-cost make-ready infrastructure and rebates to offset the costs of charging stations and their installation. The main objective of the CRLD Program is to increase the availability of charging infrastructure for passenger vehicles at locations such as workplaces, destination centers, fleet parking, and multi-unit dwellings (MUDs). Major elements of the CRLD Program address cost and complexity barriers associated with adopting electric vehicle (EV) charging. SCE is targeting over 30,000 EV charging ports. The CRLD Program has specific minimum adoption targets for charging ports in disadvantaged communities (DACs) and MUDs. The CRLD Program is expected to be open to applications until 2025 and end installations in 2027. Since the CRLD Program launch in July 2021, SCE has accepted applications for Level (L) 2 charging stations. In November 2023, the CPUC approved a Direct Current Fast Charging (DCFC) Program offering, which provides financial incentives for L3 charging stations (i.e., DC fast charging stations). Beginning in April 2024, SCE started accepting applications for the DCFC Program. Please note that this report only covers CRLD Program activity from 2021 through 2023, and activity from the DCFC Program will be detailed in subsequent annual reports.

Under the CRLD umbrella, the CRLD Program has multiple offerings that support light-duty passenger EVs. In 2023, the CRLD Program included the following active program offerings available to SCE customer applicants:

- **Charge Ready Make Ready (Make Ready) Expansion Program,** including the Charging Infrastructure and Rebate (CIR) Program, where SCE provides make-ready infrastructure on both the utility- and customer-side of the meter up to a stub-out or connection point for the charging station, and may offer charging station installation rebates for public, workplace, multifamily, and fleet charging. Make Ready also includes the Customer-Side Make Ready Rebate (CSMR) Program, where SCE provides the utility-side of the meter infrastructure, and the participant designs and installs the customer-side. CSMR rebates offset up to 80% of the costs SCE would otherwise incur for performing the work. Like CIR, the CSMR Program may also offer eligible participants a rebate to offset the costs associated with the purchase and installation of SCE-approved charging equipment. In 2022, SCE made the decision to sunset charging station rebates due to limited remaining funds designated for rebates; as such, not all CIR and CSMR applications are eligible for charging equipment rebates. Another Make Ready offering is Charge Ready Own and Operate (Turnkey), where SCE will install, own, and operate charging stations for existing MUDs located in DACs or offer a Maintenance and Networking Rebate to qualified customers who choose to own and operate the stations themselves. The last Make Ready offering is the Small Site Rebate (SSR) Program offering, which provides rebates to MUD, public sector, and commercial sites choosing to install four or fewer L2 charging station ports. The SSR rebate option is available to participants who design, purchase, and install the customer-side of the meter infrastructure work. The SSR Program offering was formally launched in the first quarter of 2023, and SCE has allocated an internal budget of approximately $1.6 million to this offering.

[1] A one-year pilot deploying charging stations and complementary marketing, education, and outreach in support of electric transportation.
[2] Decision, OP 30, p. 151

- **Charge Ready New Construction Rebate (NCR) Program,** a CRLD Program offering that provides rebates to new construction MUD sites that exceed the current mandatory CALGreen code or relevant local requirements by installing charging stations.
- **Transportation Electrification Advisory Services (TEAS) Program**, where SCE provides extra support and education to customers interested in TE. These services provide customers with a no-cost consultation with an SCE TE advisor who provides information on site planning, parking lot considerations, electric vehicle supply equipment (EVSE) infrastructure, rates, managed charging, and more. These consultations are designed to help customers build a business case that supports an electrification investment in infrastructure.

The total approved budget for the CRLD Program is $436 million. From its launch in 2021 through the end of 2023, the CRLD Program received 3,291 applications and 69,640 port requests and completed 97 projects. The CRLD Program has benefited from consistently high market demand for charging infrastructure since its launch. In response to this high demand, SCE created an application waitlist for the Make Ready Expansion Program that began in September 2022. Since January 2023, to ensure the CRLD Program meets its DAC port installation targets, SCE has only accepted applications from sites in DACs onto the Make Ready waitlist for the CIR, CSMR, and Turnkey CRLD Program offerings. In 2023, SCE also accepted applications (both DAC and non-DAC) for the SSR and NCR Program offerings, neither of which had a waitlist that year.

1.1 KEY FINDINGS

- **The CRLD Program has facilitated the commitment of 17,456 electric charging ports in SCE service territory from the start of the program in 2021 through 2023.** This has translated into an estimated total avoided emissions from installed ports of 574 metric tons of carbon dioxide equivalents (MT CO_2e) over the two-and-a-half-year period. The largest share of committed ports under the Make Ready Program[3] are associated with multi-unit dwellings (5,122 or 37% of total committed ports). Additionally, nearly half of ports committed through the Make Ready Program (48%), nearly a quarter of those committed through the NCR Program (22%), and nearly two thirds of those committed through the SSR Program will be located in DACs.

- **Due to high demand, CRLD Program staff were able to focus on supporting cost-effective projects that aligned with goals for installing charging infrastructure in DACs and MUD sites.** In 2023, very high market demand and limited funds motivated staff to prioritize projects aligned with the CRLD Program's key goals and capacity. The criteria CRLD Program staff used to guide their site selection included: (1) sites where the customer seeks to install 20+ charging ports (to maximize project cost-effectiveness), (2) sites located in DACs, (3) sites with long-dwell parking (which is suitable for L2 chargers), and (4) sites that are generally friendly to ADA-compliance requirements (to minimize the need for SCE to make significant accessibility improvements). Simultaneously, SCE became increasingly judicious in its customer outreach, ceasing its digital marketing efforts and instead driving engagement through one-on-one interactions between account managers and customers.

- **There are significant inconsistencies in trade professionals' quality of work and technical knowledge.** Despite a broad registration of about 300 trade professionals, a select group of ~12 play a major role in the CRLD Program, with ~5 accounting for the majority of project contributions. Staff find that applications submitted by these relatively experienced trade professionals tend to flow through the project planning process quickly because they are comfortable with the CRLD Program and understand the CSMR site plan requirements. However, other trade professionals often have insufficient technical knowledge relevant to the CRLD Program—specifically about the CSMR site design planning process. There have been instances where trade professionals have dropped out during the application process when they realized the true cost and scope of work required, based on SCE's feedback on the CSMR site plan. To remedy this knowledge gap, SCE actively educates trade professionals about the CRLD Program's requirements, technical components, and relevant regulatory standards. SCE has implemented an

[3] There are over 3,000 additional committed ports associated with MUDs that will be installed through the NCR and SSR programs, both of which are focused on primarily serving MUD customers.

oversight policy to address these issues, including a "three strikes" policy that mandates additional training for trade professionals who fail to meet established standards.

- **There is a lack of knowledge about what EV charging infrastructure expansion projects entail across all customer segments.** Specifically, customers often fail to grasp the CRLD Program's technical, documentation, and regulatory requirements. Staff noted that many customers mistakenly equate the CRLD Program with simpler energy efficiency programs, not fully appreciating the scope and challenges of the civil work involved in installing EV charging infrastructure. This knowledge gap results in customers making demands that are not technically feasible and submitting improper or inadequate site design plans. Customers' lack of awareness of regulatory challenges can negatively impact their experience with the CRLD Program, as they may not understand or anticipate the regulatory impact on project planning and timelines. This knowledge gap has necessitated the expansion of customer-oriented educational initiatives. For example, in 2023, SCE held periodic educational webinars and published the "Customer Side Make Ready – Detailed Site Design Guide" to set realistic customer expectations and ensure smoother project planning and execution.

- **External factors continue to drive project delays.**
  - In 2023, the CRLD Program staff's foremost challenge was project delays driven by the pervasive shortage of switchgear and other electrical equipment. To adapt to this, SCE ended its dependence on a single equipment supplier by identifying and onboarding two additional suppliers. Staff expect this decision to alleviate project execution constraints by June 2024, when the new suppliers will make their first deliveries.
  - Customers can cause significant delays due to slow project approval processes, poor communication, submissions of improper or inadequate site design plans, project demands that are technically infeasible, or slow vendor selection and charging station purchasing processes. To mitigate these delays, SCE attempts to educate the relevant stakeholders on the customers' side about the technical complexities of the CRLD Program. These educational initiatives include the webinars and site design guide mentioned above, as well as direct engagement with stakeholders during site assessments to ensure they clearly understand their projects' scopes and constraints. For example, during a site assessment, SCE staff may suggest site plan improvements to make projects more cost-effective or compliant with applicable regulations.
  - The CRLD Program continued to face permitting-related delays in 2023, driven by a range of factors, including post-COVID pandemic staffing reductions at Authorities Having Jurisdictions (AHJs) and a shift from in-person to remote interactions. Additionally, increased permitting requirements at government and state agencies, such as the Division of the State Architect (DSA), further contributed to project delays. Despite laws enacted to expedite permitting processes for EV infrastructure projects, CRLD Program staff observed minimal improvements in permitting timelines due to limited adherence to such mandates across jurisdictions. To overcome this, SCE's public affairs team has been proactively working with AHJs to encourage adherence to the state's permit streamlining requirements and prescribed approval timeframes. SCE has also worked to provide advance notice to some AHJs about large forthcoming project permit submittals to raise awareness and help them prepare for the review process. However, due to the overriding impact of switchgear delays in 2023, CRLD Program staff are unable to isolate the impact of these strategies on project timelines.
  - Charging station vendors can cause project delays by either being slow to respond or entirely unresponsive to customers' requests for quotations, an issue where CRLD Program staff have received customer complaints. Staff need to accommodate for these delays during project planning and execution.

2. PROGRAM DESCRIPTION AND BACKGROUND

This report covers the 2023 program year (January 2023–December 2023) of SCE's CRLD Program, as required by the CPUC D.20-08-045, and to meet standard reporting requirements for SB 350 TE Programs. SCE's CRLD Program helps further California's goal to attain a 40% reduction of GHG emissions from 1990 levels by 2030 and an 80% reduction in emissions by 2050. In this evaluation report, we present the results of CRLD Program activity in 2023 and since its inception in 2021.

2.1 PROGRAM DESCRIPTION

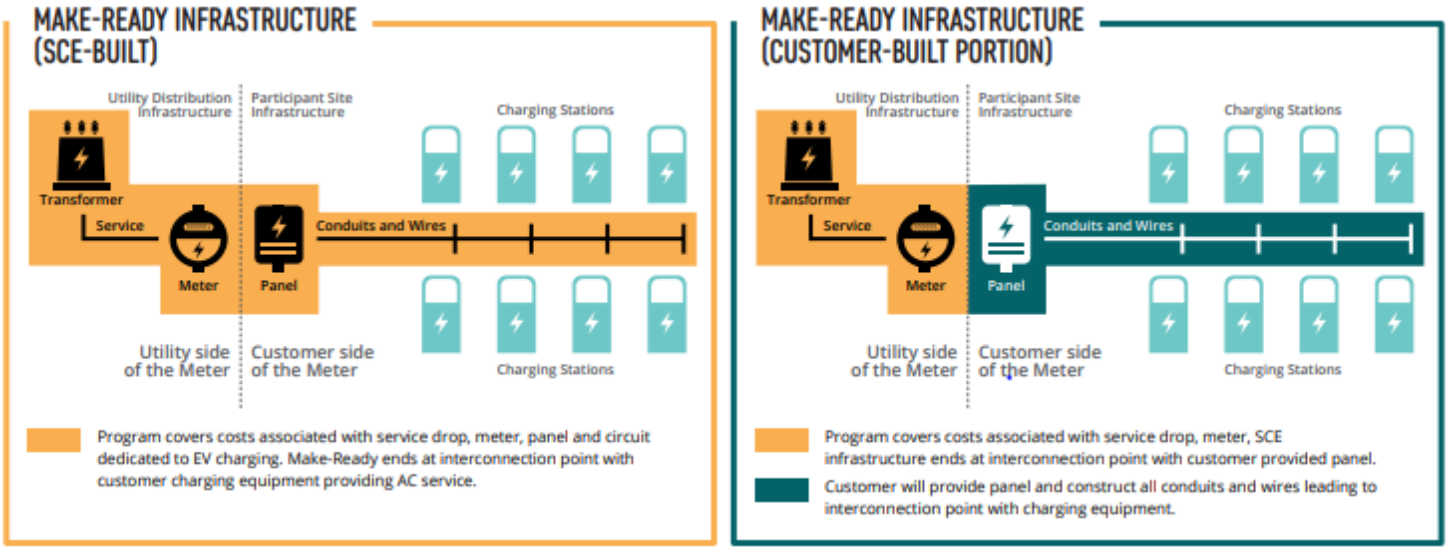
In October 2014, SCE filed its Phase 1 Pilot. SCE proposed a two-phase program in the Phase 1 Pilot application: (1) a one-year pilot to deploy up to 1,500 charging stations and complementary marketing, education, and outreach in support of electric transportation (Phase 1); and (2) a four-year deployment of the remaining charging stations, more than 30,000, and broader EV education and outreach (Phase 2).[4] The CRLD Program is the extension of the Phase 1 Pilot and a key component of SCE's efforts to encourage EV adoption by supporting the installation of charging infrastructure, emphasizing underserved customers living in MUDs and DACs. The CRLD Program includes the Make Ready Expansion Program, the Charge Ready NCR Program, and the TEAS Program, which, combined, aim to support the installation of over 30,000 EV charging ports in SCE territory.

- **Make Ready Expansion Program.** SCE provides options for financial support with the utility side and customer side of the meter-supporting infrastructure (also called Make Ready), and rebates for charging equipment for public, workplace, MUDs, and fleet charging. SCE offers four different participation options under this component. The first two are as follows:
  - **CIR Program.** SCE provides both the utility side and customer side of the meter-supporting infrastructure. CIR may also offer eligible participants a rebate to offset the purchase and installation costs of SCE-approved charging equipment. Note that not all CIR applications are eligible for charging equipment rebates because, starting in 2022, CRLD Program staff prioritized the funding of infrastructure work and technical assistance.
  - **CSMR Program.** SCE provides the utility side of the meter-supporting infrastructure, and the participant designs and installs the customer side. CSMR rebates offset up to 80% of the costs SCE would otherwise incur for performing the customer-side infrastructure work. CSMR may also offer eligible participants a rebate to offset the costs associated with the purchase and installation of SCE-approved charging equipment. Similar to the CIR Program, not all CSMR applications are eligible for charging equipment rebates because, starting in 2022, CRLD Program staff prioritized the funding of infrastructure work and technical assistance.

Figure 1 from SCE's CRLD Program Guidelines illustrates the CIR and CSMR program options. If the customer chooses to self-install the infrastructure on the customer side of the meter (CSMR) (as shown in the graphic on the right in GREEN), they will qualify for this rebate.

[4] D. 16-01-023 at 2; Application (A.) 14-10-014 at 1 to 2.

Figure 1. CRLD Infrastructure Program Option Delineation



Source: SCE CRLD Program Guidelines

- **Turnkey.** SCE will install, own, and operate up to 2,500 charging stations for existing MUDs located in DACs where the cost would be a barrier to installation. There is also a Maintenance and Networking Rebate Option under the Turnkey Option. This rebate option is only available to MUDs in DACs that choose not to participate in the Turnkey Option and prefer to own and operate the charging stations. These participants would enroll in CIR or CSMR and receive this one-time rebate to offset the maintenance and networking fees associated with owning and operating L2 charging equipment.
- **SSR Program.** This CRLD Program offering provides rebates to MUD, public sector, and commercial sites choosing to install four or fewer L2 charging station ports. This rebate option is available to participants who design, purchase, and install the customer side of the meter infrastructure work. The SSR Program provides participants with a fixed rebate of up to $10,000 per port.

- **New Construction Rebate Program**. This CRLD Program offers rebates to new construction MUD sites that exceed the current mandatory CALGreen EV Capable code requirements or relevant local requirements by installing charging stations above what is required in the code.[5]
- **TEAS Program**. The TEAS Program provides support and education to customers interested in TE. These services provide customers with a no-cost consultation with an SCE TE advisor who provides information on site planning, parking considerations, EVSE infrastructure, rates, managed charging, and more. These consultations aim to help customers build a business case that supports an electrification investment in infrastructure.

All charging station equipment must be listed on SCE's Approved Product List (APL) and networked, and the participant must maintain the equipment for ten years. Participants are required to send utilization and pricing data to SCE for ten years. Additionally, participants are required to enroll in an applicable time-of-use (TOU) rate and demand response (DR) program.

2.2 KEY PROGRAM CHANGES

- **CRLD Program Staff made a number of strategic updates to their internal processes in 2023.** The CRLD Program staff significantly overhauled internal processes and cost estimates to improve management efficiency, financial forecasting, and overcoming pervasive supply chain challenges. This effort yielded the following outcomes:

[5] The CALGreen code is formally known as the California Green Building Standards Code, Title 24, Part 11, California Code of Regulations.

- CRLD Program staff pursued a strategic initiative to broaden the base of switchgear sources to mitigate pervasive supply chain challenges that impacted the broader market for charging infrastructure in 2023. Staff noted that prior dependence on a single switchgear supplier had created bottlenecks and significantly extended project timelines amid a nationwide shortage of switchgear and other electrical equipment. As such, SCE initiated a request for proposal (RFP) process in late 2023 to identify and onboard two additional suppliers. They expect this decision to alleviate persistent project execution constraints in the second half of 2024 after the new suppliers make their first deliveries.
- CRLD Program staff cleared the application pipeline to concentrate resources on applications that closely align with the CRLD Program's key goals and capacity. The criteria the CRLD Program staff used to guide their site selection are described below.
- CRLD Program staff became increasingly prescriptive in providing customers with guidance on charging site design and execution. Initially, after the launch of the CRLD Program, SCE was relatively accommodating to customers' specific requests—flexibility that staff attribute to their underestimation of the market's demand for the CRLD Program. However, after realizing the true extent of demand, the range of technical expertise among customers and charging service providers, and the complexity associated with shared decision-making structures (e.g., homeowners associations for MUD projects), staff adopted a more prescriptive approach to site design, project planning, and execution.
- CRLD Program staff revamped their internal cost estimates to ensure Program-related financial forecasting is accurate.
- CRLD Program staff implemented miscellaneous internal process improvements intended to maximize efficiency.

- **Given the high market demand for the CRLD Program in 2023, staff prioritized projects that aligned with several key program goals**:
  - **Achieving DAC targets:** Sites meeting CalEnviroScreen 4.0's "Disadvantaged Community" criteria. CRLD Program staff focus on executing projects in DAC sites to meet the CRLD Program's regulatory requirements.
  - **Cost-effectiveness:** Sites where the customer requests the installation of 20 or more charging ports, deemed by CRLD Program staff to yield the most cost-effective projects. Budgetary constraints motivated staff to focus on projects that maximize cost-effectiveness. The minimum port count determination is based on actual historical cost-effectiveness data.
  - **Long-dwell parking**: Parking facilities suitable for attracting vehicles parked for longer periods (i.e., long-dwell parking), which is appropriate for L2 charging equipment.
  - **Accessibility:** Sites that are generally already friendly to ADA-compliance requirements, minimizing the need for SCE to make significant accessibility improvements. For example, CRLD Program staff prioritize projects at sites with grade-level parking and clear paths of travel to surrounding buildings.
- **The "Small Site Rebate" Program offering was introduced in 2023.** The SSR Program was approved in late 2022 and formally launched in the first quarter of 2023. It targets all customers in all market segments, except single-family homes, seeking to install one to four L2 charging ports. SCE has allocated a budget of approximately $1.6 million to this offering.

- **Program staff focused on targeted, smaller-scale outreach efforts.** Given the strong demand for the CRLD Program and limited funds, customer engagement efforts were focused, small-scale, and targeted at specific customer segments to align with program goals. One-on-one relationships between customers and account managers, focused on meeting the CRLD Program's DAC goals and pursuing cost-effective projects, drove 2023 engagement activities.

Starting in 2024, CRLD Program staff plan to allocate additional marketing funds to expand their DAC-specific outreach efforts.

2.3 BUDGET AND GOALS

On August 27, 2020, the Commission adopted D.20-08-045, which issued $436 million in funding for the CRLD Program. This decision includes approximately $417.5 million for charging infrastructure.[6] The CRLD Program supports California's goals to reduce GHG emissions and criteria pollutants by increasing EV charging infrastructure availability at workplaces, destination centers, fleet parking locations, DACs, and MUDs. The CRLD Program achieves this goal by addressing the cost and complexity barriers to installing charging infrastructure. By placing charging ports in DACs and MUDs, the CRLD Program specifically targets people with lower accessibility to at-home EV charging. SCE aims to install over 30,000 EV charging ports in their service territory. Table 1 shows the percentage of ports SCE is targeting to install in DACs and MUDs by the end of the CRLD Program cycle in 2026.

Table 1. Program Port Targets

	DACs	MUDs
Make Ready: CIR & CSMR & SSR	50%	30%
Make Ready: Turnkey	100%	100%
NCR	50%	100%

2.4 PROCEDURAL HISTORY

On October 30, 2014, SCE filed Application (A.) 14-10-014 for the Charge Ready Pilot Program, the first phase of TE Programs, and the predecessor to Charge Ready 2 (the subject of this evaluation report). The CPUC approved the Pilot Program in Decision (D.) 16-01-023 in 2016. On March 5, 2018, SCE filed a Petition for Modification (PFM) requesting an additional $22 million in bridge funding to avoid a gap in program availability between the Charge Ready Pilot Program and the future launch of Charge Ready 2. On December 21, 2018, the Commission issued D.18-12-006, which granted SCE's PFM authorizing the additional funding for a Charge Ready Bridge Program.

On August 27, 2020, the CPUC issued D. 20-08-045, *Decision Authorizing Southern California Edison Company's Charge Ready 2 Infrastructure and Market Education Programs*. This Decision approved SCE's Charge Ready 2 Program, also known as SCE's CRLD Program, which supports California's GHG emissions reduction goals by adopting TE. Additionally, OP 30 of the Decision required SCE to file annual reports beginning one year after it was initially adopted (i.e., August 27, 2021).

As a subset of the Make Ready Expansion, D. 20-08-045 authorized SCE to offer a "low port rebate" to participants with sites installing four or fewer L2 ports. In response, SCE filed a Tier 2 Advice Letter (AL 4480-E) on April 27, 2021, which sought approval of a proposed, one-time $5,000 per port rebate payable to customers that installed four or fewer charging stations. The CPUC approved the proposal, with modifications specified in Resolution E-5227, issued on October 20, 2022. According to the Resolution, SCE must "include customer and utility-side costs for participating sites as part of the originally allocated funds from the $333 million Commission-approved budget for the Make Ready Expansion Program and to maintain the $16,000 per port cap which includes customer and utility-side costs."[7] The Make Ready Expansion Program, now called the SSR Program, began in March 2023. According to SCE's website, the SSR Program provides a rebate to cover customer costs of up to $10,000 per port for approved sites that install up to four L2 ports.

[6] D.20-08-045 p. 2

[7] https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M496/K876/496876103.PDF

D. 20-08-045 also authorized SCE to offer a DCFC Program. In response, SCE submitted a Tier 3 Advice Letter (AL 4433-E) on March 4, 2021, providing updated budget, port, and site counts. On March 31, 2023, SCE submitted a supplemental advice letter AL 4433-E-A. In the original AL 4433-E, SCE discussed how customers may have limited interest in the site-host ownership option. However, in AL 4433-E-A, SCE stated that it reassessed the efficacy of offering a DCFC site-host ownership option and, upon launching the DCFC Program, would target the majority of the DCFC Program's projects to use this site-host ownership option. Moreover, in the supplemental advice letter, SCE provided estimated site and port counts and information regarding project cost-effectiveness in the section "The Number of Ports and Sites SCE will target through the DCFC component of the Make-Ready Expansion program."[8] Specifically, SCE stated, "due to the costly nature of infrastructure upgrades associated with higher-powered DCFC stations versus L2, it is likely that sites with 4 or more DCFC ports will be significantly more cost effective per port than 2-port sites where the cost is spread over fewer ports. It is likely that the program will install an estimated 50-60 sites as there will be fewer 2 port sites accepted into the program due to cost constraints and some participants may choose to install a greater number of ports, therefore reducing site counts." Moreover, SCE communicated that it does not anticipate installing many more than 205 ports "due to limited funding and increased cost since SCE submitted the initial AL 4433-E on March 4, 2021." The CPUC approved AL 4433-E (as amended by AL 4433-E-A) with an effective November 2, 2023. According to the DCFC Program Guide, approximately $14 million has been allocated to the Program, comprising approximately $8.5 million for charging infrastructure and $5.5 million for charging station rebates.[9] SCE began accepting applications to the DCFC Program in April 2024.

2.4.1 CHARGING STATION REQUIREMENTS

In August 2022, the CPUC adopted EVSE communication protocols via D.22-08-024 as minimum qualification requirements for all EVSE installed via ratepayer funding or through an investor-owned utility- (IOU-) administered program. Per this decision, all EVSE deployed by July 1, 2023, must be capable of the following:[10]

- All alternating current (AC-) conductive EVSE for light-duty use cases must have an SAE J1772 connector.
- All direct current (DC-) conductive EVSE deployed for light-duty use cases must be equipped with a CCS connector.
- For all EVSE, communications and controls between a network service provider and the EVSE shall be capable of operating on OCA OCPP 1.6 or later.
- All EVSE must be International Organization for Standardization (ISO) 15118 ready and equipped with onboard hardware that enables high-level communications with the vehicle using ISO 15118. An ISO 15118-ready charger is capable of, at minimum, (1) a powerline carrier-based high-level communications as specified in ISO 15118-3; (2) secure management and storage of keys and certificates; (3) Transport Layer Security (TLS) version 1.2, with additional support for TLS 1.3 or subsequent versions recommended to prepare for future updates to the ISO 15118 standards; (4) receiving remote updates to activate or enable ISO 15118 use cases; (5) connection to a backend network; and (6) selecting the appropriate communication protocol used by the vehicle.

The CRLD Program cannot accept any customer Proof of Procurement documents for equipment procured on or after July 1, 2023, that is not ISO 15118-compliant. Any equipment procured by customers prior to July 1, 2023, does not need to be ISO 15118 compliant and is exempt from the D.22-08-024 minimum equipment qualifications for the CRLD Program.

[8] D. 20-08-045 directs SCE "to build at least 205 ports" with a minimum of 2 ports per site.
[9] DCFC Program Guide, p.3
[10] CPUC Vehicle-Grid Integration (VGI) Policy, Pilots, and Technology Enablement

2.5 IMPLEMENTATION TIMELINE

The CRLD Program launched in July 2021 with a robust customer engagement effort. This effort included SCE account managers directly contacting customers about the CRLD Program, customer training sessions to introduce the CRLD Program to potential applicants, distributing marketing materials to SCE customers, and more. SCE also held mandatory live virtual training sessions for trade professionals who wanted to join the CRLD Program's Trade Professional Network and submit applications on behalf of customers.

From launch through 2023, the CRLD Program has received consistently high market demand. This market demand remained high even after SCE sunset the charging station rebate offering in 2022 because the infrastructure coverage substantially reduces construction costs and is not typically covered by other EV charger incentive mechanisms in the market. In response to this high demand, SCE created an application waitlist for the Make Ready Expansion Program in September 2022. Since January 2023, to ensure the CRLD Program meets its DAC port installation targets, SCE has only accepted applications from sites in DACs onto the Make Ready waitlist for the CIR, CSMR, and Turnkey Program offerings. Note that the SSR Program offering, which is a component of Make Ready, did not have an application waitlist in 2023 and accepted both DAC and non-DAC applications.

2.6 MILESTONES

From launch through 2023, the CRLD Program has received consistently high market demand. In response to this high demand, SCE created an application waitlist for the Make Ready Expansion Program in September 2022. Since January 2023, SCE has only accepted applications from sites in DACs onto the Make Ready Program's CIR, CSMR, and Turnkey waitlists to ensure the Program meets its DAC port installation targets. As a result, SCE received far fewer applications in 2023 than in 2021–2022 (Table 2). The SSR Program, introduced in 2023, was the CRLD Program offering that received the highest number of applications in 2023. Note that the SSR, which is a component of Make Ready, did not have an application waitlist in 2023.

Table 2 summarizes program participation by CRLD Program offering and overall. The PY2023-specific counts only include applications submitted in PY2023, while cumulative counts include all program participation. Total applications include the count of almost all applications that enter the pipeline, excluding applications that have not been formally submitted by the customer. The total applications count also includes active applications in the pipeline and rejected, withdrawn, or voided applications. Notably, applications can be withdrawn before passing the initial application stage; therefore, the total application count may not include all withdrawn applications. A site is completed when it reaches a certain threshold in the application process. This threshold differs across the different program options since the structure of the application pipeline differs. Only the NCR Program offering recorded the completed sites for applications submitted in PY2023. This does not mean that all the other CRLD Program offerings failed to complete sites in PY2023 but rather that none of the programs had an application both submitted and completed in PY2023.

Additionally, Table 2 summarizes the ports associated with those applications. The number of requested ports reflects the number of ports associated with the total number of applications submitted. In contrast, the number of ports in active applications reflects only the number of ports in applications still active in the program.

Table 2. Program Participation for Program Year 2023 & Cumulative

Program Option	Total Applications[a]		Active Applications		Number of Applications Rejected / Withdrawn / Voided		Number of Completed Sites[b]		Number of Requested Ports		Number of Ports in Active Applications	
	PY 2023	Cumulative	PY 2023	Cumulative	PY 2023	Cumulative	PY 2023	Cumulative	PY 2023	Cumulative	PY 2023	Cumulative
Make Ready: CIR	43	1,933	14	367	36	1,804	0	68	667	37,353	391	8,354
Make Ready: CSMR	72	1,061	51	340	23	898	0	17	2,213	26,195	1,878	10,449
Make Ready: Turnkey	4	62	2	29	2	33	0	2	40	1,079	14	437
Make Ready: SSR[c]	139	139	120	120	20	20	0	0	520	520	449	449
NCR	49	96	44	87	33	106	2	10	2,427	4,493	1,971	3,712
Totals	**307**	**3,291**	**231**	**943**	**114**	**2,861**	**2**	**97**	**5,867**	**69,640**	**4,703**	**23,401**

a Active + Rejected applications does not equal the total because the total count excludes the applications in Task 1 or voided in Task 2.

b There were 79 sites with application dates in 2022 that were installed in 2023. For reporting purposes, we assigned "program year" based on application dates and, as such, these sites are included in the "Cumulative" column.

c The SSR Program was added in 2023, so the PY2023 and Cumulative counts are the same.

Table 3 shows CRLD Program participation across CRLD Program offerings, DACs, and MUDs cumulatively (i.e., from the CRLD Program launch through the end of 2023). A key component of the CRLD Program's diversity and inclusion efforts is to ensure a level of participation from DACs and MUDs. Please note that some MUDs are in DACs; therefore, these categories are not mutually exclusive.

Table 3. SCE CRLD Applications, Completed Sites, and Number of Ports – Cumulative

Program Option	Total Applications			Active Applications			Number of Applications Rejected/ Withdrawn / Voided			Number of Completed Sites			Total Ports			Active Ports		
	DAC	MUD	Non-DAC/ MUD	DAC	MUD	Non-DAC/ MUD	DAC	MUD	Non-DAC/ MUD	DAC	MUD	Non-DAC /MUD	DAC	MUD	Non-DAC/ MUD	DAC	MUD	Non-DAC/ MUD
Make Ready: CIR	613	567	806	181	74	118	500	614	757	32	6	30	12,894	10,919	14,847	4,240	1,242	2,980
Make Ready: CSMR	255	655	296	141	238	62	136	534	284	4	12	5	8,521	17,542	5,326	5,707	7,529	1,297
Make Ready: Turnkey	62	62	0	29	29	0	33	33	0	2	2	0	1,079	1,079	0	437	437	0
Make Ready: SSR	50	48	44	43	40	40	7	8	5	0	0	0	187	181	160	159	154	144
NCR	23	96	0	23	87	0	0	106	0	5	10	0	812	4,493	0	812	3,712	0
Totals	1,003	1,428	1,146	417	468	220	676	1,295	1,046	43	30	35	23,493	34,214	20,333	11,355	13,074	4,421

Note: Some sites are qualified as DACs and MUDs; therefore, they are reported in columns for both market segments.

Table 4 displays the percentage of ports committed in 2023 that are in DACs and/or MUDs. Committed ports are those for which a customer has signed a CRLD Program agreement and for which SCE has reserved funds. The counts of committed ports include applications where the customer withdrew from the CRLD Program after signing the program agreement. At the end of 2022, the share of committed ports under the Make Ready offerings within DACs (40%) was trending below the target for the program cycle (see Table 1). As such, in 2023, SCE only accepted applications for the Make Ready Program's CIR, CSMR, and Turnkey waitlists from sites located in a DAC and prioritized projects in DACs. As a result, 83% of the Make Ready Program's committed ports in 2023 were in DACs. This has meant that 47% of all Make Ready ports committed from the CRLD Program launch through the end of 2023 are located in DACs, as shown in Table 5, putting SCE on track to meet the Program's cumulative 50% DAC target by the end of 2026.

Moreover, at the end of 2022, only 4% of the NCR Program's committed ports were in DACs. SCE made a marked improvement on this front in 2023, committing 29% of the NCR Program offering's ports in DACs. This has brought the total cumulative NCR ports committed in DACs up to 22%, indicating that SCE is working towards meeting the NCR Program offering's cumulative 50% DAC target by the end of the CRLD Program cycle.

Table 4. Pipeline Charging Ports in DACs and MUDs (committed ports) – 2023

Program Option	2023 Committed Ports	
	DACs	MUDs
Make Ready: CIR & CSMR & SSR (N=654 ports)	83%	18%
CIR & CSMR (N=592 ports)	86%	18%
SSR (N=62 ports)	61%	13%
Make Ready: Turnkey (N=0 ports)	N/A	N/A
NCR (N=1,971 ports)	29%	100%

Table 5. Pipeline Charging Ports in DACs and MUDs (committed ports) – Cumulative

Program Option	Cumulative Committed Ports	
	DACs	MUDs
Make Ready: CIR & CSMR & SSR (N=13,398 ports)	47%	36%
CIR & CSMR (N=13,336 ports)	47%	36%
SSR (N=62 ports)	61%	13%
Make Ready: Turnkey (N=346 ports)	100%	100%
NCR (N=3,712 ports)	22%	100%

Table 6 displays the cumulative counts of completed sites and installed ports by Program option from the launch of the CRLD Program in 2021 through 2023.

Table 6. Completed Sites & Port Installations - Cumulative

Program Option	Completed Sites	Installed Ports
Make Ready: CIR	68	1,126
Make Ready: CSMR	17	266
Make Ready: Turnkey	2	18
NCR	10	158

Note: The SSR Program was added in 2023 and did not have any completed installations in that year.

3. MARKETING, OUTREACH, AND EDUCATION EFFORTS

In light of the high demand for the CRLD Program, which has persisted since its launch in 2021, SCE ceased its digital mass marketing efforts in 2023. Instead, as part of their efforts to increase projects in DACs and MUD, staff prioritized one-on-one engagement between SCE account managers and customers. In addition to better supporting key program goals, this approach also allowed SCE account managers and program staff to provide more assistance to customers navigating the application process. Program staff noted that this outreach approach successfully produced applications that met the CRLD Program's needs while avoiding the high volume of unqualified applications typically generated by mass marketing approaches.

In 2023, a key aspect of the one-on-one engagement effort was the strategic re-engagement of property developers who had previously participated in and experienced success with the CLRD Program. This approach leveraged CRLD Program staff's existing relationships with satisfied participants while building on these customers' comfort with the CLRD Program to foster broader EV charger adoption across multiple projects by the same developer.

Moreover, in 2023, CRLD Program staff continued attending conferences and events that target MUDs to engage MUD building developers (e.g., the "GlobeSt. Multifamily" conference) for the NCR Program. Staff stated that these events facilitated one-on-one conversations with potential participants, allowing them to clarify aspects of the NCR Program and build customer trust. SCE highlighted that their presence at these events directly contributed to successful customer applications.

Since the launch of the CRLD Program, staff have observed market-wide knowledge gaps among customers and other market actors about the complexities of EV infrastructure projects. Staff noted that these knowledge gaps often result in unrealistic expectations of project costs, timelines, technical feasibilities, and regulatory constraints. Staff also attributed the submissions of CSMR site plans that did not comply with SCE's requirements or permitting standards, in part, to this lack of market knowledge. SCE has found significant inconsistencies in technical knowledge among trade professionals. Some lack a sufficient understanding of the CSMR site planning and design process and withdraw during the application process upon realizing the true cost and scope of work required based on SCE's feedback on the CSMR site plan.

In 2023, SCE sought to address this knowledge gap directly through the CRLD Program's stakeholder educational initiatives. Program staff understood that building a broader understanding of the technical and regulatory intricacies of installing charging infrastructure, along with CRLD-specific requirements, is key to setting realistic stakeholder expectations and facilitating smoother project execution. Educational efforts in 2023 included the following:

- The development and publication of the "Customer Side Make Ready – Detailed Site Design Guide" on the SCE Charge Ready website.[11] This document provides customers and trade professionals with a detailed explanation of the requirements for the CSMR site design process.
- Continuing to create periodic educational webinars to assist customers and trade professionals with the CRLD Program's technical and documentation requirements. For example, in 2023, a "How to Collect Your Rebate" webinar was held to educate trade professionals on the CRLD Program's compliance and documentation requirements to streamline rebate documentation submission and minimize project delays.
- Direct engagement with stakeholders during site assessments to ensure they clearly understand project scopes and constraints. For example, during a site assessment, SCE staff may suggest site plan improvements to make projects more cost-effective or compliant with applicable regulations.

[11] SCE Customer Side Make Ready – Detailed Site Design Guide

4. PROGRAM METRICS

This section presents the requirements for customers to qualify for the CRLD Program, the location of committed ports by industry sector, and metrics that demonstrate the performance of the CRLD Program.

4.1 PARTICIPANT SELECTION CRITERIA

As noted in SCE's First Annual Charge Ready 2 Report, applications must meet several eligibility criteria to qualify for the CRLD Program:

- Be a non-residential SCE customer;
- Own, manage, lease, or be the customer of record of the property in SCE's service area where chargers are installed;
- Obtain consent to install chargers from the property owner if the applicant is not the property owner;
- Enroll in an applicable TOU rate plan and DR Program;
- Select, purchase, and install SCE-approved charging equipment (note that all charging stations are required to be networked);
- Operate and maintain chargers for a minimum of ten years;
- For the ten-year duration, provide data related to charging equipment usage to SCE (including prices charged to EV drivers using the charging stations);
- Provide a property easement for SCE's infrastructure; and
- Agree to additional CRLD Program terms and conditions.

Participants must submit their applications for the CRLD Program through an online application portal. Applicants provide their name, site address, requested port count, a proposed site layout, and other relevant information for a potential Charge Ready project. Each submission requires applicants to include at least four L1 or L2 charging ports. Applicants are removed from consideration if they do not meet the basic eligibility requirements. SCE account managers conduct individual customer consultations for each site to review the eligibility requirements, CRLD Program requirements, proposed site layout and port count, and electrification plans. SCE recommends that applicants review the APL early and discuss the potential equipment options and pricing with vendors before they sign an official CRLD Program agreement.

SCE also performs initial cost analysis, including potential construction costs and desktop and on-site site assessments to review the project feasibility. SCE evaluates each application using several criteria and decides whether to approve it for inclusion in the CRLD Program. The critical information includes overall costs for the site, average per port costs, CRLD Program objectives such as DAC and MUD goals, overall site viability, availability of charging in the region, and the level of remaining CRLD Program funds. SCE will also assess the applicant's ability to meet timing requirements for charging station procurement and installation, as well as post-installation CRLD Program terms.

4.2 PARTICIPATION PROCESS AND TIMELINE

Table 7 outlines the stages of CIR and CSMR projects. Customers submit applications to the CRLD Program that include a high-level site plan and equipment layout. SCE's eMobility team conducts an initial screening to ensure the customer qualifies for the CRLD Program and that the application is complete. Following this, SCE conducts a consultation review to confirm application details, followed by a site assessment. As part of the site assessment, SCE's Transportation Electrification Project Management (TEPM) project manager uses Google Earth and internal mapping systems to

identify existing infrastructure in the area that could potentially serve as a power source for the site. After this desktop review, if there are no initial issues with the site identified, an on-site assessment is typically required to confirm site conditions. The remaining steps include the customer signing an agreement to reserve funds, proof that the customer has ordered the charging infrastructure equipment, final site design and permitting, and site construction. The CRLD Program conducts on-site inspections of all infrastructure and charging stations for proper installation specifications to ensure safety. The final stage is the payout of the incentive payment if the customer qualifies for one.

Table 7. High-Level Descriptions of CIR and CSMR Project Stages

Project Stage	Description
1. Customer Application Submission	Customer creates and submits an application. While the customer is creating the application, it is not active until the customer officially submits it. Then, it enters into the eMobility Application Screening.
2. eMobility Application Screening	SCE reviews the application for completeness. SCE determines the DAC status of the application. When the application is in this stage, it is considered active.
3. Customer Engagement Division (CED) Customer Consultation Review	The customer conducts a consultation review with their assigned account manager to discuss the program and verify that the information they submitted in the application is still accurate. Customers may change their applications, including charging station location and port count requested.
4. TEPM Site Assessment	The field project manager completes a desktop review. The field project manager completes a site assessment if the desktop review does not disqualify the applicant; some sites are sent back to Task 3 for rejection or updating based on the desktop review.
5. TEPM Conceptual Design	The eMobility project management team reviews the application to see if it meets program cost thresholds. This stage involves the most site rejections due to the cost limitations of the CRLD program.
6. Awaiting Customer Approval of Conceptual Design (CIR Only)	The customer reviews the conceptual design. If accepted, the customer moves to the next stage or requests updates. The customer has 10 days to accept the conceptual design.
7. Agreement Preparation	The eMobility project management team prepares and sends the program agreement.
8A. Awaiting Customer Agreement	SCE sends the program agreement to the customer. The customer has 30 days to accept the agreement.
9A. Funds Reserved	The customer signs the program agreement and reserves funds for their site's construction.
8B. Waiting Proof of Procurement	A notice is sent to the customer to provide their proof of procurement for charging stations from SCE's APL. The customer has 45 days to provide a purchase order/receipt.
9B. CSMR Customer Site Plan Submission	CSMR Program customers must submit their site plan for the beyond-the-meter work they will complete.
10. TEPM Project Design	The project goes through the final design review.
11. Awaiting Customer Design Acceptance	The customer accepts the final design.
12. Project Requirements	After the final design is complete, SCE requests necessary permits and sends easements to the property owner (who has 30 days to sign and return the easement).
13. Construction	Construction
14. Pending Installation and Incentive Request	The customer submits a request for incentive payment with supporting documentation, including purchase and installation invoice and any permitting and inspection documentation; the customer installs charging stations.
15. Incentive Site Review	SCE completes site inspection.
16. Incentive Review	SCE reviews the incentive request for completeness.
17. Incentive Payment	SCE issues payment for the incentive (if applicable).

Table 8 and Table 9 outline the stages of NCR and SSR projects, respectively.

Table 8. High-Level Descriptions of the NCR Project Stages

Project Stage	Description
1. Project Submission	The customer creates and submits an application; SCE does not consider an application submitted until it reaches Reservation Review.
2. Reservation Review	SCE reviews the application for completeness; SCE confirms the DAC status of the application.
3. Pending Installation and Incentive Request	The customer submits a request for incentive payment with supporting documentation, including purchase and installation invoices and any permitting and inspection documentation.
4. Incentive Site Review	SCE reviews requests for incentives for completeness and determines if a site inspection is required.
5. Incentive QA Review	SCE completes site inspection and determines if the installation has met all program requirements. If all program requirements are met, the applicant moves forward for payment.
6. Incentive Payment Approval	SCE issues rebate payments to the customer.

Table 9. High-Level Descriptions of the SSR Project Stages

Project Stage	Description
1. Customer Application Submission	The customer completes and submits the online application, which is accessed through the online CRLD Program enrollment portal. The application must include a Site Plan with the preferred location(s) of the charging equipment. This is the project submission phase, also called the project funding request.
2. SCE Screens Application	SCE receives and screens applications to determine initial eligibility for SSR Program participation. The customer must respond to any application-related inquiries from SCE.
3. SCE Infrastructure Assessment & Site Evaluation	SCE performs a site evaluation to collect information needed to evaluate the project further and develop a conceptual infrastructure design for customers seeking the installation of new meter service & make-ready infrastructure.
4. SCE Reservation of Funds	SCE reserves project funds once program application criteria are met and the participant has executed the program agreement.
5. Existing Service Assessment	The customer must evaluate existing service capacity and organize any necessary upgrades to support EV charger installation.
6. Complete Site Design & Purchase EV Chargers (Existing Service Connection Participants)	The customer completes site design and performs any required upgrades to support EV charger installation and purchases EV chargers listed on SCE's APL. The customer must also submit a copy of the purchase order, paid invoice, or sales receipt for charging equipment to SCE. The customer must also submit a verification of panel inspection from the local AHJ.
7. Make-Ready Design & Build (New Service Connection Participants)	Customers seeking to install new meter service & make-ready infrastructure complete additional steps. These involve the customer completing a detailed make-ready infrastructure design, providing approval for SCE's utility-side infrastructure design, granting an easement to SCE, securing relevant permits, and managing the construction of the customer-side infrastructure. SCE simultaneously completes any necessary utility-side infrastructure work and energizes the new site once the participant has completed construction and received all necessary AHJ approvals.
8. Install Charging Equipment	The customer installs the EV charging equipment.
9. Incentive Request Submission	The customer initiates an incentive request through the enrollment portal and must submit the associated documentation. The required documents include the final equipment purchase invoice, final invoices for charger installation, verification of any applicable final inspections/permits, and a completed Charging Equipment Registration form.
10. Incentive QA Review & Equipment Installation Verification	SCE reviews the incentive request and associated documentation for completeness. If complete, SCE verifies that the new service account is activated (if applicable) and performs a final installation verification.

Project Stage	Description
11. Incentive Payment	Following a final review of all required documentation and a site visit (if applicable), SCE initiates the rebate payment to the customer.

Figure 2 presents the distribution of active CIR, CSMR, and Turnkey Program applications that have been submitted to the CRLD Program and are moving through the review process.

Figure 2. Active CIR, CSMR, & Turnkey Applications by Application Stage (Program Launch through 2023)

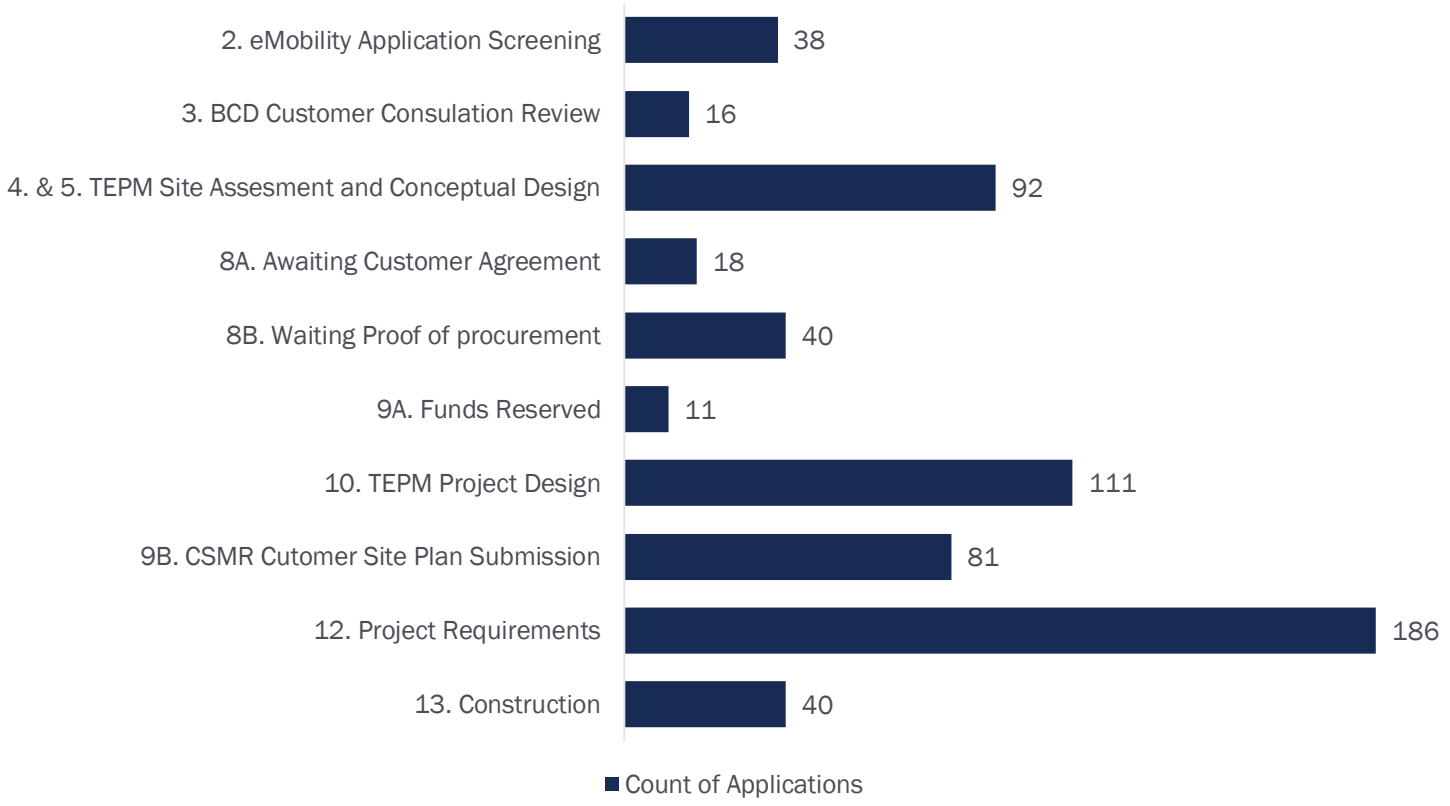


Figure 3 presents the distribution of active NCR applications that have been submitted to the CRLD Program and are moving through the review process. This figure shows that, at the end of 2023, all 77 active NCR applications that have not been completed are in the "Pending Installation and Incentive Request" application stage.

Figure 3. Active NCR Applications by Application Stage (Program Launch through 2023)

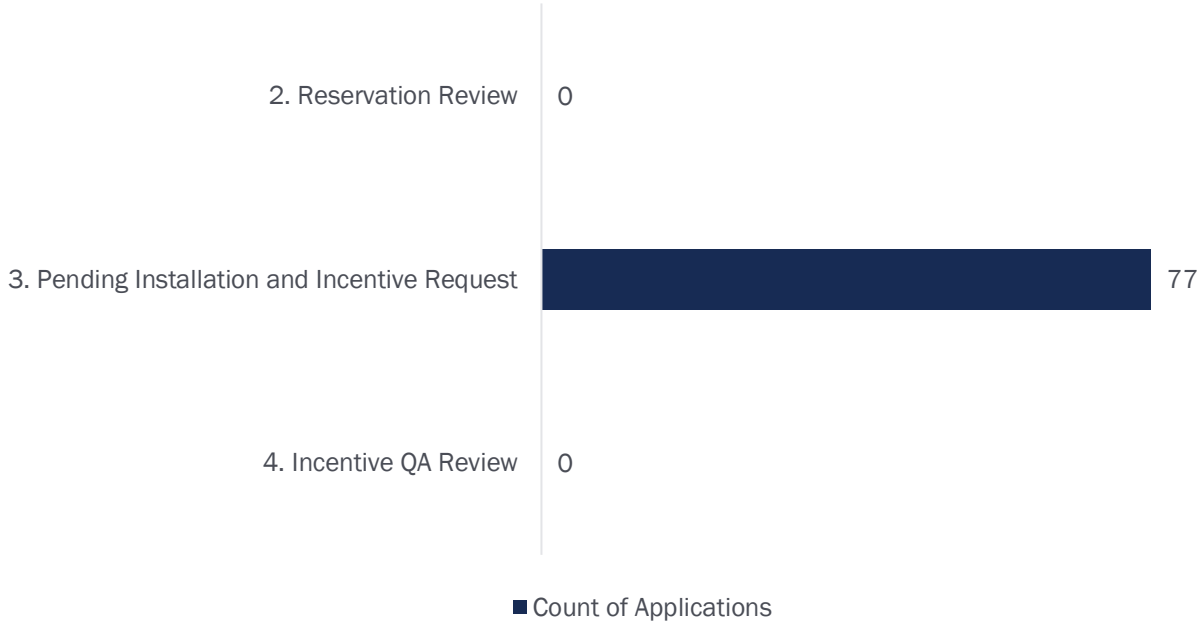
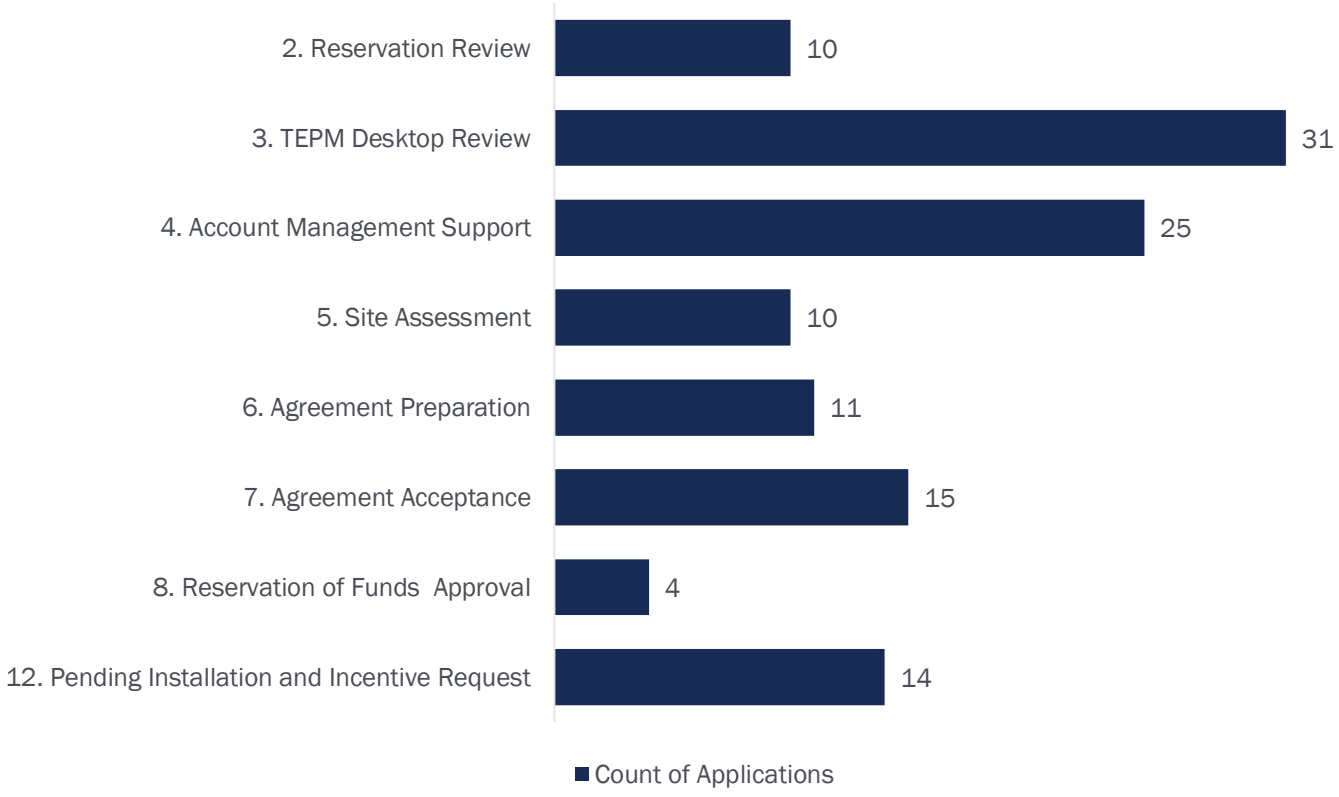


Figure 4 presents the distribution of active SSR applications that have been submitted to the CRLD Program and are moving through the review process.

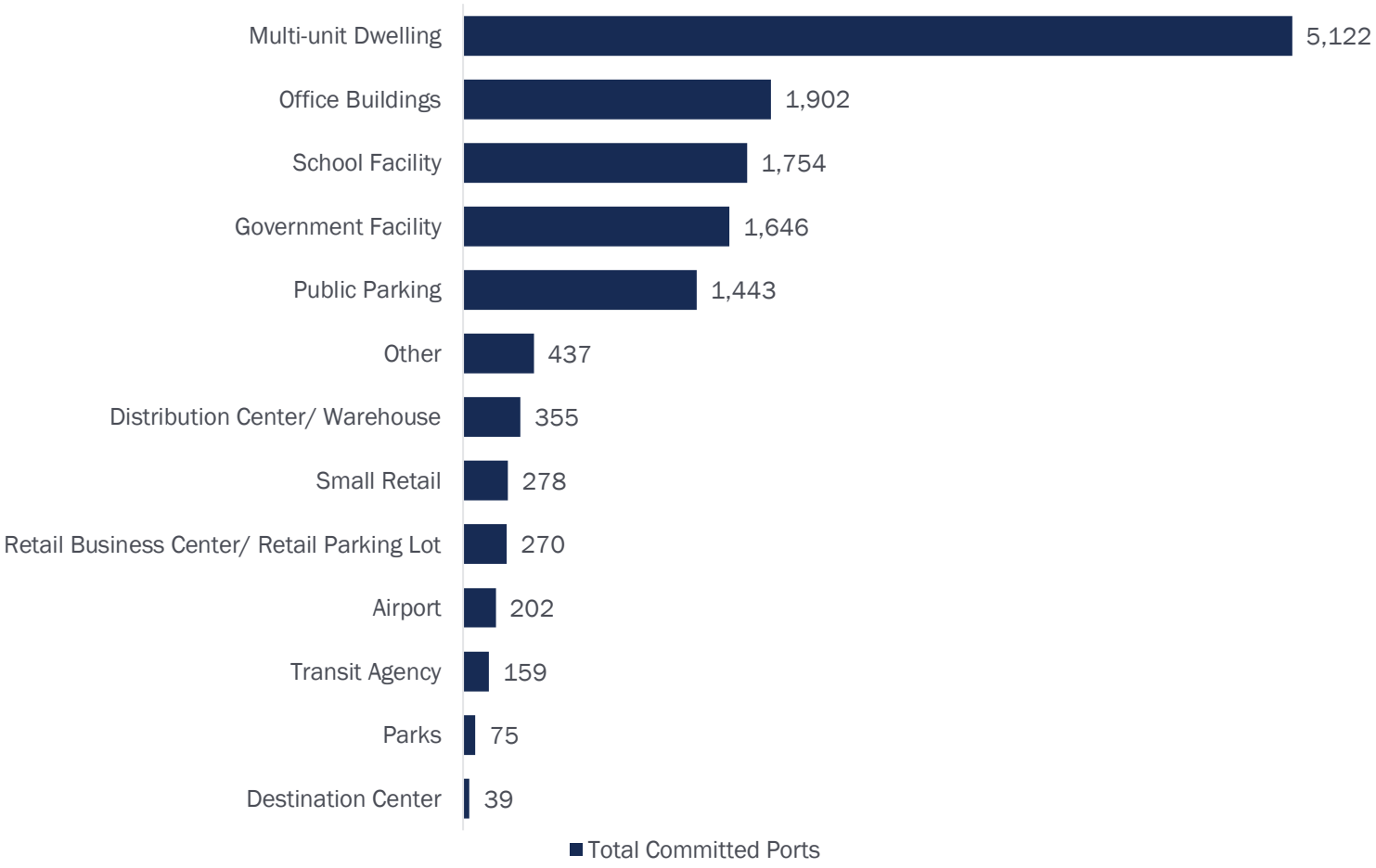
Figure 4. Active SSR Applications by Application Stage (Program Launch through 2023)



4.3 PARTICIPANT MARKET SEGMENT

Figure 5 shows the breakdown of committed ports that have applied through the Make Ready Expansion and Turnkey Program options. The three largest segments that committed ports through 2023 include MUDs, office buildings, public parking areas, and school facilities. Note that only MUD customers are eligible to apply for a new construction rebate, and, as such, we did not include ports committed through the NCR Program in the figure below.

Figure 5. Industry Breakdown of Committed Ports (N=13,682)



4.4 LOAD MANAGEMENT & GRID INTEGRATION

In this subsection, we illustrate charging patterns and how they differ between market sectors, times of day, weekday versus weekend, and between those in DACs compared with all projects (i.e., both DAC and non-DAC). Figure 6 shows total energy consumption, maximum daily demand, and the number of unique active applications over time.[12] As expected, as total applications increased, and more chargers became operational, total consumption increased. However, increased charging station usage may also contribute to this upward trend. For example, the number of applications remained constant from October to November 2023, while total usage over that same period gradually increased, keeping with the broader trend.

Additionally, the size of participating sites varies dramatically, affecting the total consumption across the CRLD Program. In July 2023, a single site with 40 ports became active, and, as a result, there was a large increase in usage

[12] The count of unique active applications is the count of applications in which AMI data is available, it does not reflect the total number of completed applications.

around that same period. November 30, 2023, marked the highest level of consumption over 2023, with 4,409 kilowatt hours (kWh) consumed across 46 active applications.

Figure 6. Program-to-Date Total Applications and Usage Over Time

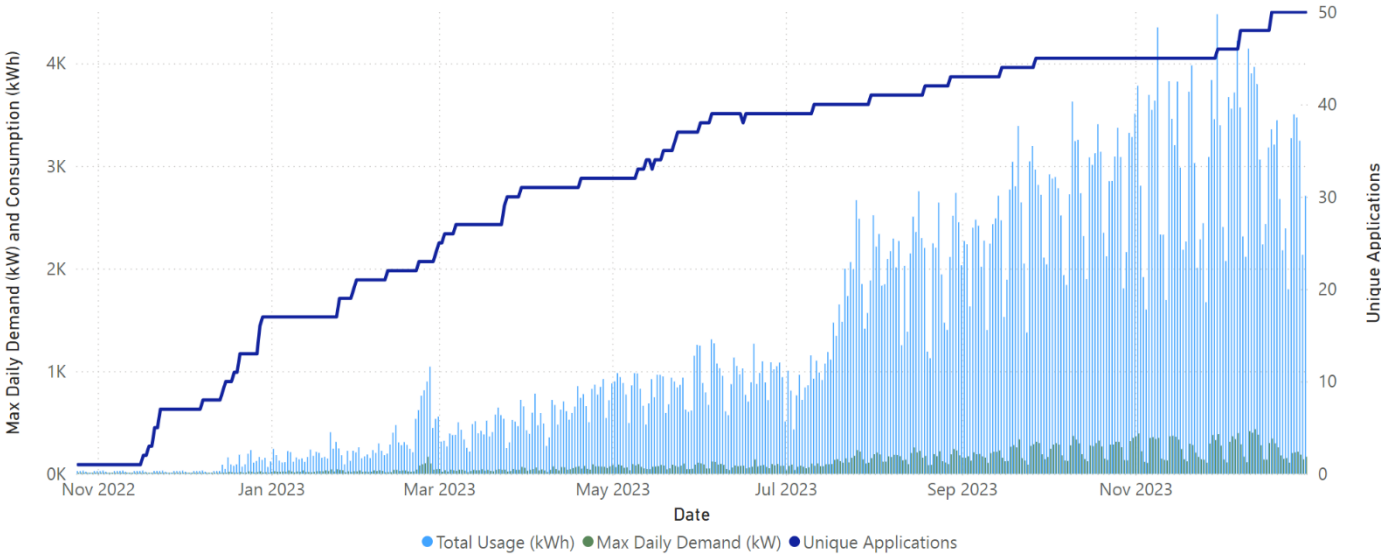


Figure 7 shows the increasing consumption due to an increase in the number of applications across DAC sites. Due to the smaller number of DAC applications compared to all applications shown in Figure 6, a single site can greatly influence the total and maximum usage. For example, the surge in total DAC consumption in February and March 2023 was caused by a spike in consumption at a single DAC site.

Figure 7. Program-to-Date Total Applications and Usage Over Time (DAC)

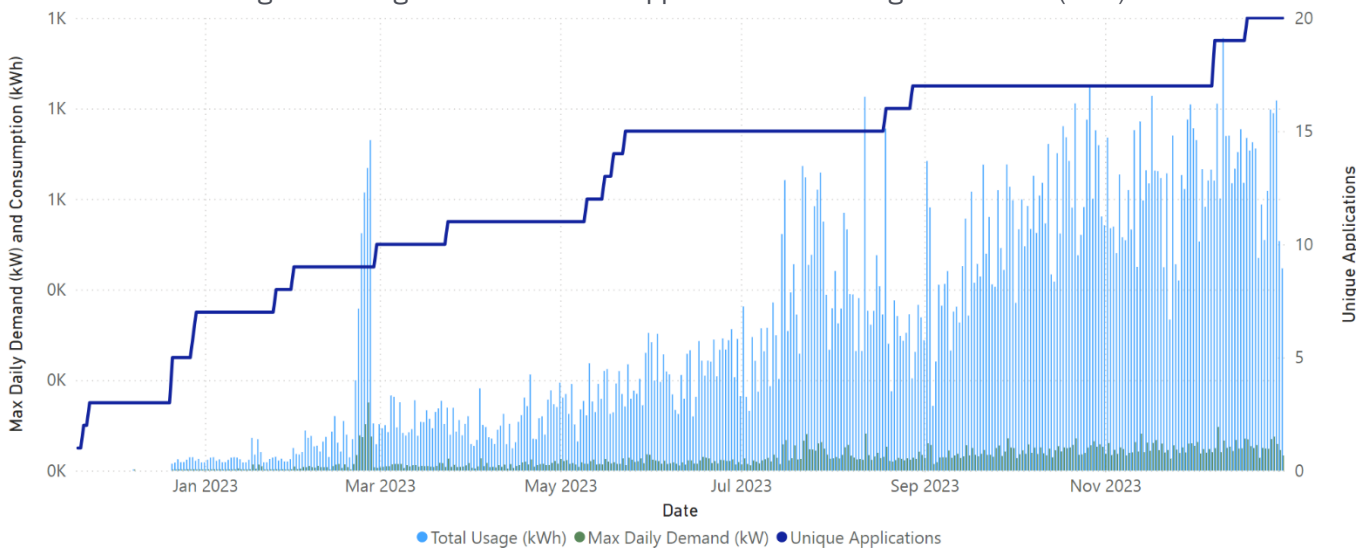


Table 10 shows the number of active applications (i.e., representing projects actively moving through the application process or are in service) and average hourly consumption in DAC and non-DAC. Non-DAC active applications have a disproportionately higher percentage of total usage with respect to the number of applications, representing 60% of the total applications and nearly 80% of the total usage. Active DAC sites represent 40% of the total applications but only 21% of the total usage. DAC sites have an average demand that is less than half that of non-DAC sites. The following section explores these differences in charging patterns in more detail.

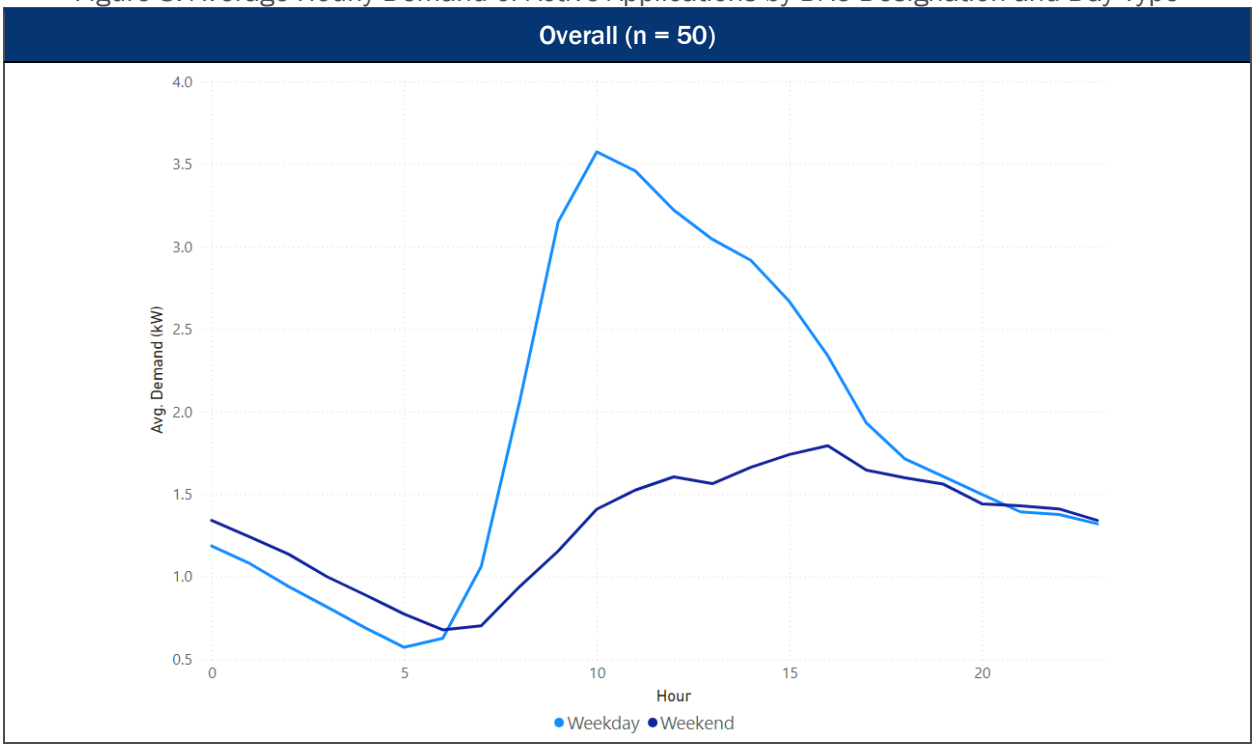
Table 10. Average kWh and Percent Total Usage: DAC vs. Non-DAC

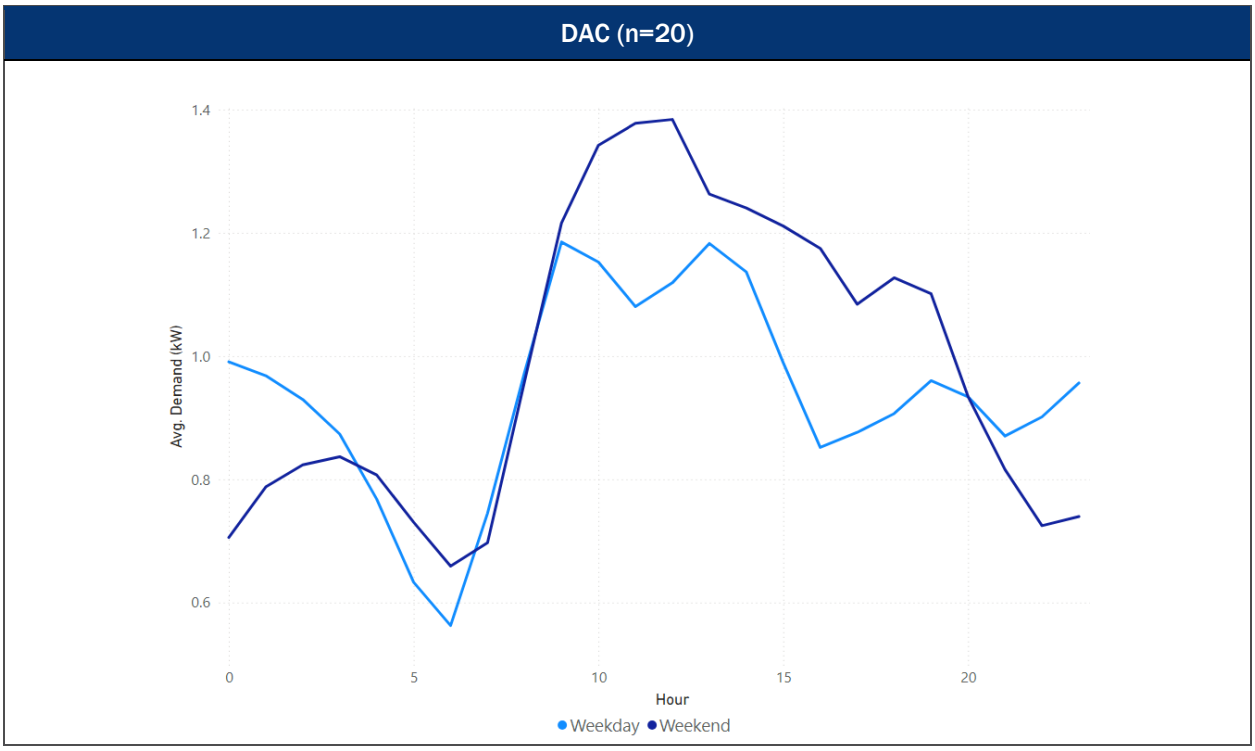
Group	Unique Active Applications	Average kW	% Total Usage (555,954 kWh)
DAC	20	0.95	21%
NON-DAC	30	2.15	79%
Total	**50**	**1.69**	**100%**

4.4.1 CHARGING PATTERNS

Figure 8 provides average hourly load shapes by day type and DAC designation. Overall, average weekday charging is highest in the mid-morning hours, peaking around 10:00 a.m. and then decreasing later in the day with a relatively low overnight charging load. The weekend charging load is lower than the weekday charging load and peaks in the afternoon, around 4:00 p.m. Weekend charging load has a slightly higher overnight and early morning load than weekdays. Applications in DACs have similar average hourly load shapes between weekdays and weekends and more overnight load than non-DAC communities, on average. These differences are likely driven by different distributions of market sectors (explored in more detail below) and the relatively low application counts, which lead to individual applications driving overall trends.

Figure 8. Average Hourly Demand of Active Applications by DAC Designation and Day Type





Note: There are no significant differences between program-to-date trends and 2023.

Active applications in DACs and non-DACs have different market sector mixes, which may contribute to the differences in day type consumption between these two categories of sites. Table 11 presents the breakdown of applications for projects located in DACs and non-DACs by market sector, both by number of applications and by total usage (kWh) contribution. A higher share of DAC applications are located in office buildings (40%) than non-DAC applications (33%). However, office building projects represent over 50% of non-DAC application usage and only about 25% of DAC total usage. The variation in market sectors of the applications in DAC and non-DAC may contribute to the differences in load shapes since different market sectors tend to have different average load shapes.

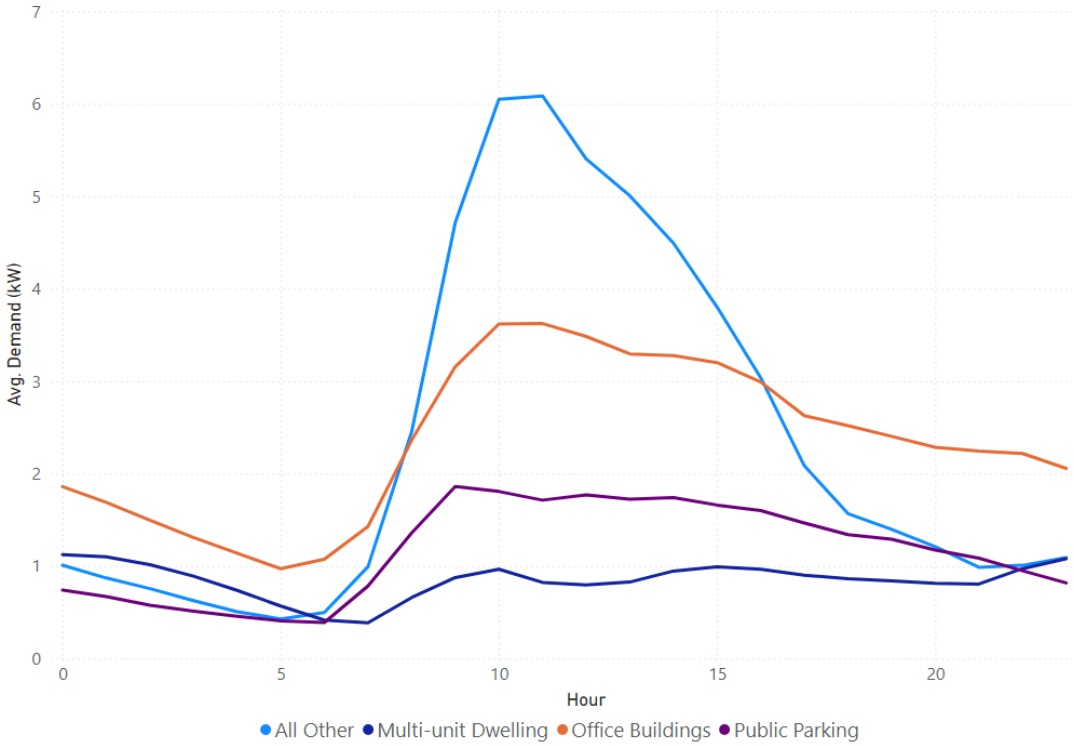
Table 11. DAC and Non-DAC Percent Applications and Total Usage by Market Sector

Market Sector	Number of Unique Applications		Total Usage (kWh)	
	Non-DAC (n=30)	DAC (n=20)	Non-DAC (436,474 kWh)	DAC (119,479 kWh)
Office Buildings	33%	40%	52%	26%
Public Parking	30%	20%	17%	39%
MUD	27%	15%	10%	7%
All Other*	10%	25%	21%	28%

Note: The following market sectors have been classified as other due to low counts: Distribution Centers/Warehouses, Government Facilities, Retail Business Centers/Retail Parking Lots, Other.

Figure 9 illustrates the 24-hour load shapes by each market sector. Charging across all sectors occurs most often during the daytime, peaking during the mid-morning hours. Office buildings and "Other" (Distribution Centers/Warehouses, Government Facilities, Retail Business Centers/Retail Parking Lots, and Other) peak around 10:00 a.m., and then average demand decreases over the course of the day. The remaining sectors follow the same pattern, but the peak is less prominent.

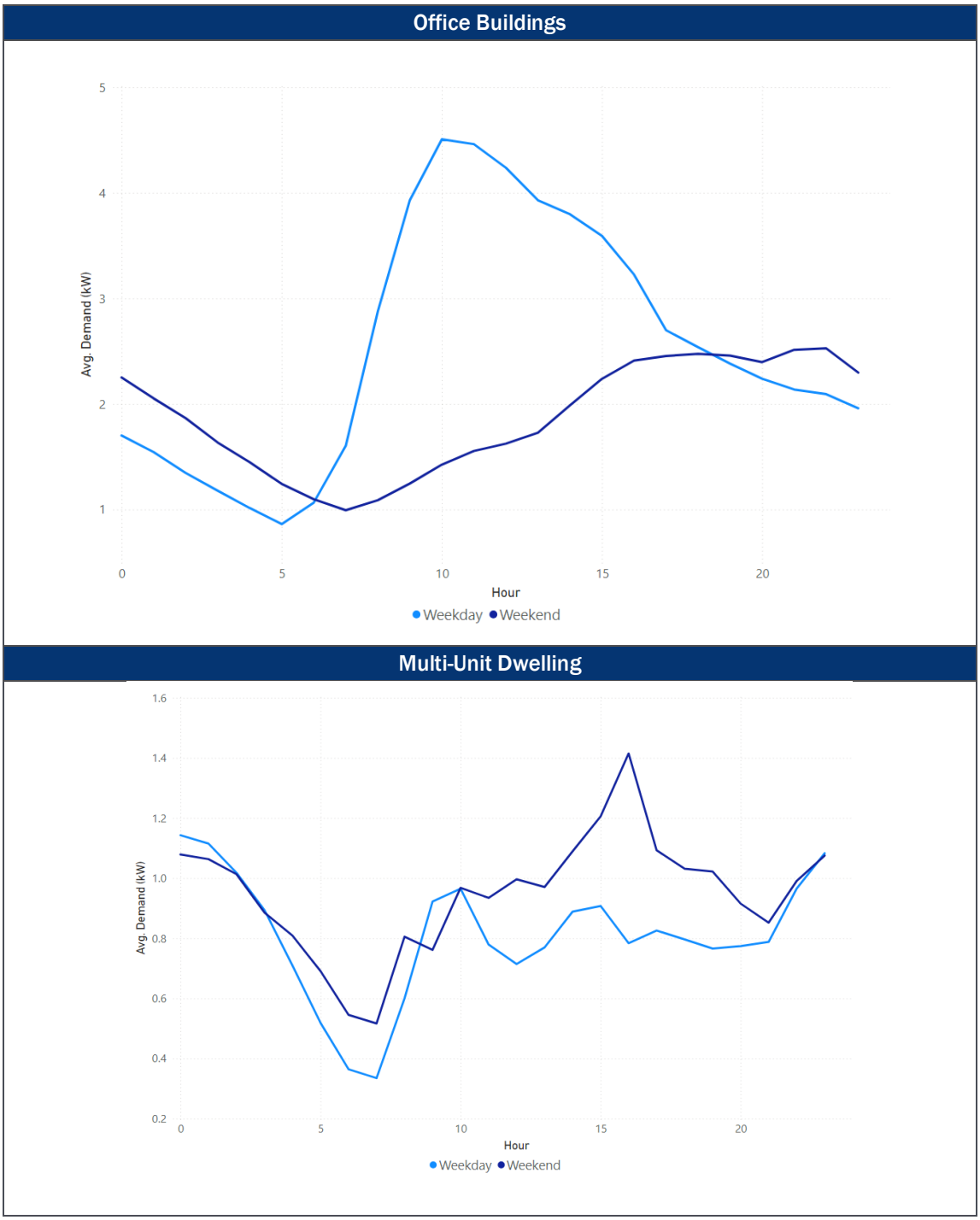
Figure 9. Average Hourly Demand of Active Applications by Market Sector

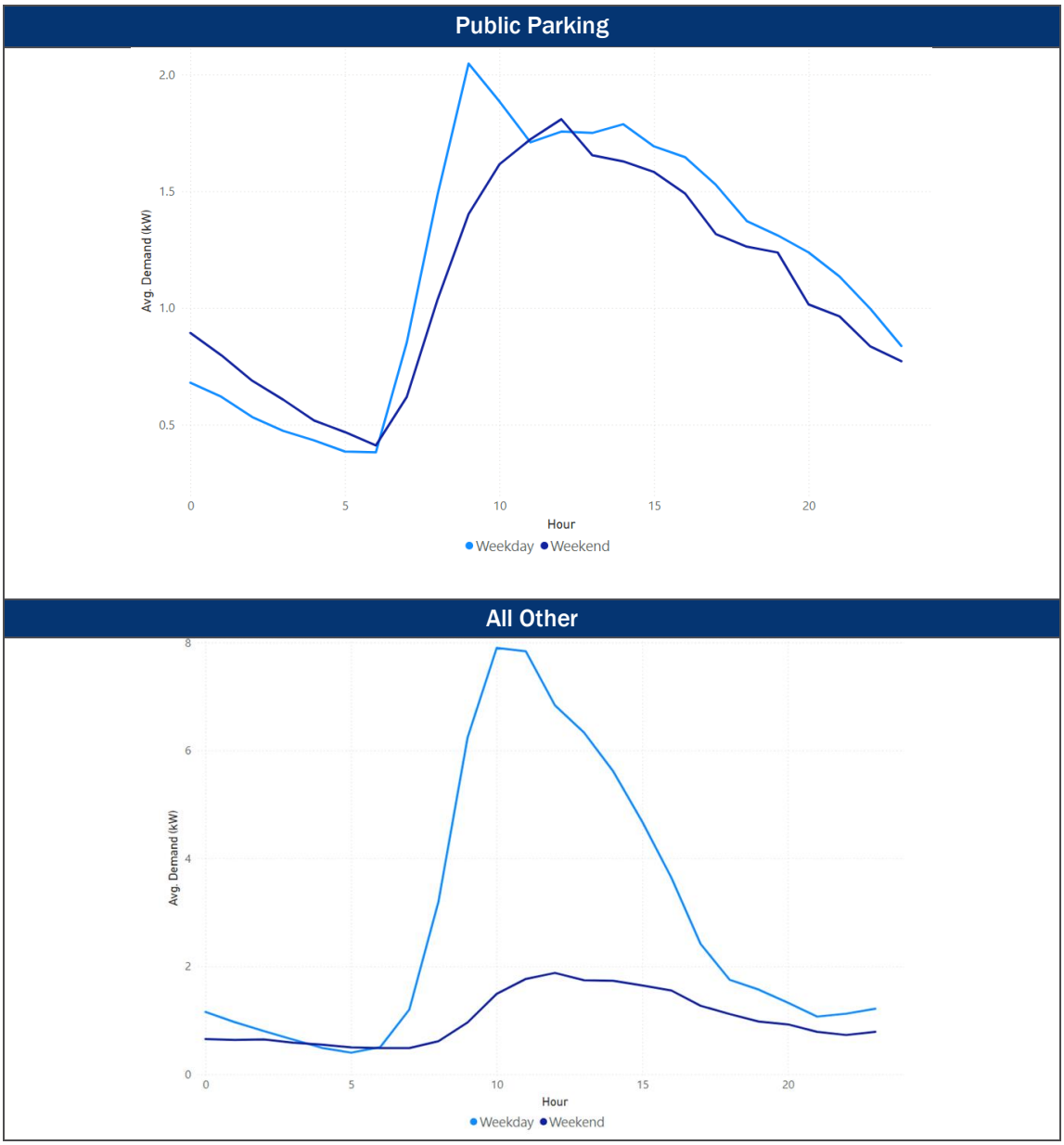


Note: The following market sectors have been classified as "all other" due to low counts: Distribution Centers/Warehouses, Government Facilities, and Retail Business Centers/Retail Parking Lots.

Figure 10 compares charging patterns on weekdays versus weekends across the different market sectors. Unsurprisingly, office buildings have very different average load shapes on weekdays and weekends. On weekdays, office buildings peak mid-morning, when most people arrive at work. On the weekend, however, the load is more evenly distributed, and overnight charging is higher than on weekdays. "All other" market segments follow a similar trend to office buildings. MUDs and public parking have more similar consumption across day types. MUDs show signs of overnight charging overall and on weekdays, but the occurrence is most prevalent on weekends.

Figure 10. Weekday vs. Weekend Advanced Metering Infrastructure (AMI) Load Shapes by Market Sector





4.4.2 PEAK PERIODS

Table 12 illustrates the on-peak charging consumption for each market sector. Charging is broken down by on-peak (weekdays, 4:00 p.m.–9:00 p.m.) and off-peak (weekdays, 9:00 p.m.–4:00 p.m. and weekends). Overall, across all market sectors, 16% of total charging was conducted on-peak.

Public parking applications recorded a greater share of charging on-peak (18%) than any other market sector. Office buildings recorded the second-highest percentage of on-peak usage (17%). In comparison, MUDs and other market sectors recorded only 14% of charging on-peak.

Table 12. Total and On-Peak Usage Across Market Sectors

Market Sector	Unique Applications	Total Usage (kWh)	Total On-Peak Usage (kWh)	% On-Peak Usage
Office Buildings	18	257,155	42,531	17%
Public Parking	13	119,527	21,648	18%
MUD	11	52,900	7,284	14%
All Other	8	126,371	17,154	14%
Total	**50**	**555,954**	**88,617**	**16%**

4.4.3 MAXIMUM DEMAND

Table 13 and Table 14 present summaries of the grid impacts in 2023 by market sector, DAC designation, and overall. Including all 50 active applications, the maximum demand of 433.81 kW occurred on December 13, 2023, at 11:00 a.m. This demand was driven by non-DAC sites, accounting for over 90%. DAC sites recorded their maximum demand at the end of February, which aligns with the spike seen in total consumption. Office buildings and other market segments recorded maximum demand in the mid-morning, public parking sites recorded a maximum demand in the afternoon, and MUDs in the early morning. Since the maximum demand is cumulative across all active sites, most maximums occur later in 2023 when more sites are active. The only exception was public parking, where the maximum occurred in February.

Table 13. Maximum Demand by DAC Status

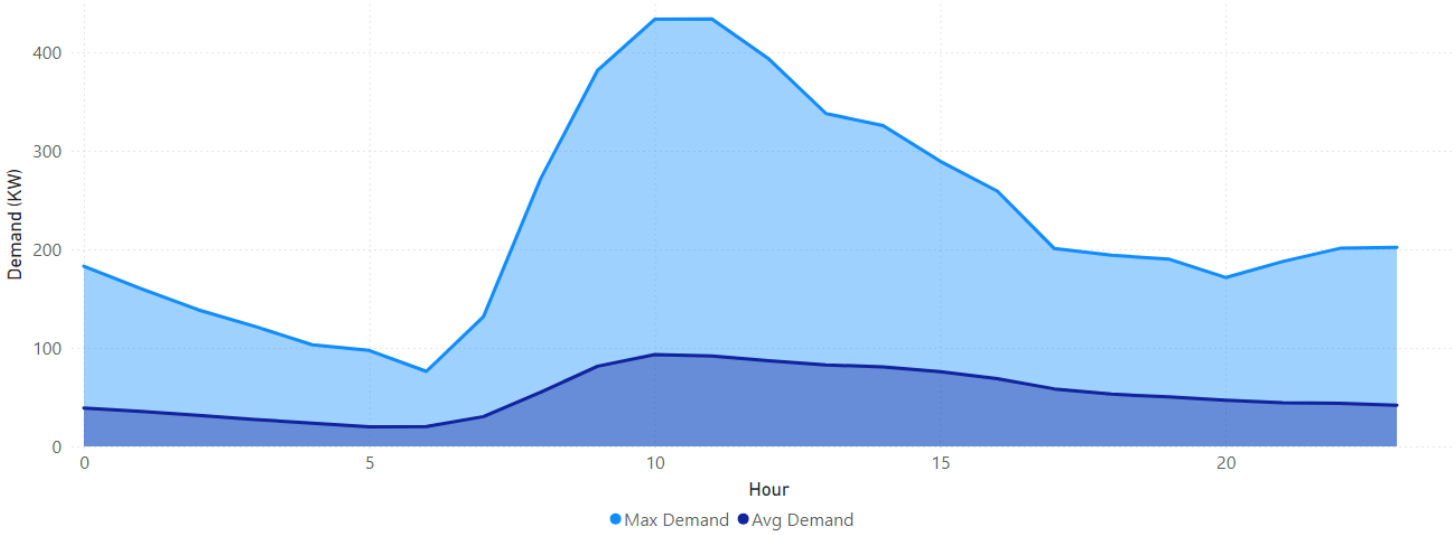
DAC Status	Unique Applications	Max Demand (kW)	Date of Max Demand	Hour of Max Demand
DAC	20	150.37	February 25, 2023	6:00 p.m.
Non-DAC	30	397.84	December 13, 2023	11:00 a.m.
Overall	**50**	**433.81**	**December 13, 2023**	**11:00 a.m.**

Table 14. Maximum Demand by Market Sector

Market Sector	Unique Applications	Max Demand (kW)	Date of Max Demand	Hour of Max Demand
Office Buildings	18	210.39	November 30, 2023	10:00 a.m.
Public Parking	13	143.37	February 25, 2023	6:00 p.m.
MUD	11	40.86	November 2, 2023	2:00 a.m.
All Other	8	188.2	October 10, 2023	11:00 a.m.
Overall	**50**	**433.81**	**December 13, 2023**	**11:00 a.m.**

As seen in Figure 11, the maximum demand per hour is significantly higher than the average demand per hour, although the load shapes are relatively similar. The peak average demand of all sites occurred at 10:00 a.m. with a demand of ~93.22 kW, while the peak maximum demand peaked at 11:00 a.m. and was 433.81 kW. Despite overnight charging recording relatively low average demand, most hours have recorded a maximum demand higher than 100 kW.

Figure 11. Overall Max Demand and Average Demand



4.5 ENVIRONMENTAL BENEFITS

Opinion Dynamics estimated GHG emissions, in metric tons of carbon dioxide equivalents (MT CO_2e), pursuant to the California Air Resources Board's (CARB) Low Carbon Fuel Standard (LCFS) regulation guidance.[13] The reported GHG emission reductions in Table 15 are the direct reductions from the CRLD Program overall and are calculated using Equation 1. The total avoided emissions for the 2022–2023 CRLD Program years is 574 MT CO_2e.

Table 15. Environmental Benefits

Year	Total Consumption (kWh)	Avoided GHG Emissions (MT CO_2e)
2022	3,115	3
2023	552,839	571
Total	**555,954**	**574**

Equation 1. Calculation of carbon credits using LCFS fuel pathways[14]

$$MT\ CO_2e = \left(CI_{gasoline} - \left(\frac{CI_{electricity}}{EER}\right)\right) \times E_{electricity} \times EER \times C$$

The carbon intensity (CI) of a fuel represents the lifecycle mass of CO_2e released per unit of fuel energy, measured in grams of CO_2e per megajoule (gCO_2e/MJ). The CI of gasoline is 100.82, as reported in the LCFS Certified Fuel Pathway Table.[15] A CI of 55.94 gCO_2e /MJ was applied based on SCE's 2022 Sustainability Report, which quantified the CO_2e emission rate of delivered electricity in 2022.[16] This rate of delivered electricity carbon intensity was applied to the 2022 and 2023 program years as a conservative assumption, based on SCE's continued reduction of their delivered electricity CO_2e emission rate dating back to the Charge Ready pilot in 2017. As a result, there are potentially additional CO_2e savings not captured in this analysis, assuming that SCE's delivered electricity emission rate continued to decline in 2023.

[13] California Code of Regulations Title 17, Section 95480-95490

[14] California Code of Regulations Title 17, Section 95486.1.(a) General Calculation of Credits and Deficits Using Fuel Pathways.

[15] Opinion Dynamics applied the statewide CARBOB (Current Certified FPC: CBO000L00072019) carbon intensity "based on the average crude oil supplied to California refineries and average California refinery efficiencies."

[16] Based on SCE's *2022 Sustainability Report* citing 444 lbs CO_2e/MWh of delivered electricity.

The Energy Economy Ratio (EER) is a dimensionless adjustment factor that accounts for the difference in the efficiency of a fuel, in this case electricity, used in a vehicle's powertrain compared to a reference fuel, gasoline. The LCFS guidelines stipulate using a 3.4 EER value for electricity displacing gasoline as a fuel in a light-duty vehicle.[17]

The total electricity delivered ($E_{electricity}$) to participating EVSE was 556 megawatt hours (MWh) over the 2022 and 2023 calendar years. Table 15 provides a breakdown by year. This equates to 2,001,434 MJ of delivered electricity, using an energy density of 3.6 MJ/kWh.[18] The C term is a constant for converting gCO_2e to MT CO_2e and is equal to 1x10-6 MT CO_2e/gCO_2e.

4.6 PLANNED PROGRAM METRICS FOR FUTURE ANNUAL REPORTS

As the CRLD Program matures, future annual reports will include more metrics related to EV adoption, job creation, diversity and inclusion efforts, and project costs (average and aggregated).

[17] California Code of Regulations Title 17, Section 95486.1.(a) Table 5. EER Values for Fuels Used in Light- and Medium-Duty, and Heavy-Duty Applications.

[18] California Code of Regulations Title 17, Section 95486.(b) Table 4. Energy Densities and Conversion Factors for LCFS Fuels and Blendstocks.

5. LESSONS LEARNED

In this section, we detailed lessons learned from different evaluation activities, including:

- In-depth interviews with 16 site-hosts representing projects that have been in operation for at least six months;
- In-depth interviews with CRLD Program staff representing a range of program functions; and
- Program tracking data (i.e., application data) and AMI charging data from all participating sites requested from SCE.

In the following subsections, we describe customers' self-reported experiences with the CRLD Program and participating charging providers, some successes and challenges from 2023, and key findings.

5.1 CUSTOMER EXPERIENCE

Between December 2023 and February 2024, Opinion Dynamics interviewed 16 CRLD site hosts. Collectively, these 16 SCE customers had EV charging infrastructure commissioned across 27 sites in 2022 and 2023. Each of these customers' charging stations had been operational for at least six months at the time of their interview. The key interview findings regarding customer experience and program satisfaction are outlined below.

Participating site hosts described the enrollment process as straightforward, clear, and easy to navigate. Six interviewees recalled using the application instructions on SCE's website to guide them through the process, noting that the instructions included helpful links and descriptions that allowed them to handle the necessary paperwork for their enrollment without any confusion. Only one interviewee mentioned experiencing challenges uploading and downloading enrollment forms through the customer portal.

Participants faced difficulties communicating with and acquiring EV charging equipment from vendors. One site host reported needing the involvement of a charging vendor's senior leader to locate an unfulfilled equipment order after months of poor communication with the vendor's customer service team. This interviewee noted that if they had not ordered the equipment months in advance, the delay would have prevented them from complying with the CRLD Program's requirements. Another site host experienced issues with an order to replace a defective part for a charging station. These findings are consistent with those from the CRLD Program staff interviews: SCE is aware that large charging station vendors can cause project delays, either by being slow to respond or entirely unresponsive to customers' requests for quotations.

Customers' limited understanding of permitting and other regulatory requirements affected their experiences with the CRLD Program. Four site hosts reported being unaware of their local permit requirements and associated costs for operating chargers—nominal fees they learned were necessary to avoid violation tickets on their new charging stations. None of these site hosts learned about these non-energy costs from SCE. Instead, all of them were informed about these costs by site inspectors and had to submit documentation and payments to have the violation tickets removed from their equipment. One site host mentioned raising their charging fees to capture these non-energy costs as part of their charger operation costs. Interviews with CRLD Program staff revealed that SCE is aware that customers' lack of knowledge of such requirements negatively impacts their experiences, as they may not anticipate the regulatory impact on the expansion of EV charging infrastructure.

Moreover, CRLD Program staff outlined several challenges in managing customer expectations and site-specific demands. They highlighted the complexities of meeting programmatic requirements and customer expectations within the constraints of existing infrastructure and regulatory requirements. For example, staff dealt with instances where the customer's charger location preferences conflicted with technical and regulatory feasibilities. Initially, after the CRLD Program launch, SCE was relatively accommodating to customers' specific requests, which staff attribute to their underestimation of the market's demand for the CRLD Program. However, after realizing the true extent of demand for

the CRLD Program and dealing with budgetary pressures, staff have become increasingly prescriptive in project planning and execution.

5.2 SUCCESSES & CHALLENGES

CRLD Program staff interviews revealed the following implementation challenges and successes in 2023.

2023 CHALLENGES

- **Supply Chain Challenges:** The foremost challenge faced by the CRLD Program staff in 2023 was the pervasive shortage of switchgear and other electrical equipment. Staff explained that this resulted from an increased nationwide demand for such equipment and supply chain disruptions. These shortages significantly affected SCE's ability to execute projects within planned timelines, with some projects being paused outright for this reason.
- **Customer-Side Delays:**
  - Customer-side delays in signing CRLD Program agreements and approving project plans can extend project timelines significantly. Program staff observed slow approval processes across customer segments, including MUDs, local governments, and large universities. Homeowners Association (HOA) project approval processes, for example, can be lengthy and complex due to the need for board approval and community voting. Additionally, CRLD staff noted that city council approval timelines can delay project execution in local government sites. Program staff also explained that the absence of authority-wielding stakeholders (i.e., customer-side decision-makers) at site assessments exacerbates these delays. Site assessments provide SCE staff with the opportunity to explain the technical and regulatory constraints underpinning project elements to the customer. However, there are instances where decision-makers—who were not present at the site assessments—take issue with those project elements and either object to them or try to revise them downstream. CRLD Program staff are taking steps to encourage the presence of customer-side decision-makers at site assessments as they consider this critical to streamlining the customer approval process and mitigating later-stage project planning issues.
  - Submissions of improper or inadequate CSMR site plans cause project delays. Program staff frequently encounter site designs submitted by customers or trade professionals (on behalf of customers) that do not comply with SCE's requirements or fail to meet permitting standards. These submissions necessitate revision processes, which extend project timelines. Program staff attribute the submission of low-quality CSMR site plans to customers' unwillingness to invest in full engineering surveys and to educational shortfalls in the market. This challenge has motivated SCE to create and deliver additional educational resources.
  - Customers may cause project delays due to slow charging station vendor selection or charger station purchasing processes. Program staff explained that timelines for customers' charging station vendor selection are often extended due to internal board approval requirements or the need to complete RFP processes.
  - Poor customer communication can also lead to project delays. CRLD Program staff noted that some customers may become unresponsive in the middle of a project, which hinders project completion.
- **Regulatory Challenges:**
  - CRLD Program staff continued to face permitting-related delays in 2023. Extended permitting timelines have been driven by many different factors, including post-COVID pandemic staffing reductions at AHJs and a shift from in-person to remote interactions. Staff also mentioned that permitting is more difficult in certain customer segments than others. Some AHJs enforce extremely stringent standards, while in densely built-up areas it is difficult to obtain approval for infrastructure expansion. Notably, increased permitting requirements at government and state agencies, such as the Division of the State Architect (DSA), contributed to project

delays in 2023. Staff noted that the current average permitting window is about three months. However, this can vary significantly—from four weeks to longer than nine months. Despite legislation designed to expedite permitting processes for EV infrastructure projects, CRLD Program staff observed minimal improvements in permitting timelines due to limited adherence to such mandates across jurisdictions. To overcome this, SCE's public affairs team has been proactively working with AHJs to encourage adherence to the state's permit streamlining requirements and prescribed approval timeframes. SCE has also worked to provide advance notice to some AHJs about large forthcoming project permit submittals to raise awareness and help them prepare for the review process. However, due to the overriding impact of switchgear delays in 2023, CRLD Program staff are unable to isolate the impact of these strategies on project timelines.

  - Regulatory requirements can complicate project planning and execution. Specifically, staff noted that adding ADA-compliant parking spaces, especially in sloped areas, can pose significant project planning and cost challenges.
  - Customers' lack of awareness of regulatory challenges can negatively impact their experience with the CRLD Program. CRLD Program staff have observed generally low awareness of regulatory and permitting requirements across all customer segments. Staff finds this lack of awareness adversely affects customer experiences as they may not understand or anticipate the regulatory impact on project planning and timelines.

- **Market Education Gaps:** CRLD Program staff have observed a market-wide lack of knowledge about the complexities of EV infrastructure expansion projects. Specifically, customers and trade professionals often fail to grasp the CRLD Program's technical and documentation requirements. Staff noted that many customers mistakenly equate the CRLD Program with simpler energy efficiency programs, not fully appreciating the scope and challenges of the civil work involved in installing EV charging infrastructure. Furthermore, SCE staff also found inconsistencies in trade professionals' knowledge of the CRLD Program. Some trade professionals lack a sufficient understanding of the CSMR site planning and design process and drop out during the application process upon realizing the true cost and extent of work required based on SCE's CSMR site plan feedback. This gap in understanding has necessitated the development of additional resources and support for customers and trade professionals.

- **Inconsistencies in Trade Professional Work Quality**: Program staff observed inconsistencies in the quality of work completed by trade professionals, which are attributed to differences in resources and experience levels. Smaller, less established firms often lack the resources and connections (for example, to third-party engineering firms) of larger, more established companies, affecting their ability to deliver consistent quality in product delivery, project timelines, and communication. Despite a broad registration of around 300 trade professionals, a select group of around 12 play a pivotal role in the CRLD Program, with about five among these accounting for the majority of project contributions. SCE has implemented an oversight policy to address these issues, including a "three strikes" policy that mandates additional training for trade professionals who fail to meet established standards.

- **Charging Station Vendor-Side Delays:** CRLD Program staff have received complaints from customers that some large charging station vendors are either slow to respond or entirely unresponsive to customers' requests for price quotations.

- **Budgetary Constraints:** Program staff noted that inflated equipment and commodity prices have impacted the cost-effectiveness of completing work across various site types. This situation has created budgetary pressures for SCE, hindering the completion of additional projects. In 2023, these constraints drove the CRLD Program staff's decision to pivot towards completing projects at sites where the customer is pursuing the installation of 20 or more charging ports.

- **Customer Expectation, Request, and Requirement Management Challenges:** CRLD Program staff outlined several challenges associated with managing customer expectations and site-specific demands. Staff highlighted the complexities of meeting programmatic requirements and customer expectations within the constraints of existing infrastructure and regulatory requirements. For example, staff have dealt with instances where customers' charger location preferences were not feasible from a technical or regulatory perspective. Some additional examples of such challenges include the following:
  - Challenges arise when dealing with property developers that intend to build and then sell properties. The CRLD Program's stipulation that chargers must be owned and operated by the site host for at least ten years complicates these transactions because of the added layer of paperwork required to transition the property to the purchasing entity. This deters potential program participation in this customer segment.
  - Program requirements related to charging station vendor selection and charging station usage can pose challenges for customers seeking cost-effective solutions. Customer concerns include the costs associated with networking fees and the complexity of potentially operating as a utility when considering charging back customers for usage. Despite the benefits of these charging station requirements, some of the associated restrictions and commitments have led some customers to drop out of the CRLD Program.

2023 PROGRAM SUCCESSES

- **On-Track to Meeting the Make Ready Expansion Program's DAC Participation Targets:** CRLD Program staff's intentional focus on prioritizing applications from and executing projects in DACs has put SCE on track to meet the Make Ready Expansion Program's target for 50% of CIR, CSMR, and SSR port installations to be in DACs by the end of 2026. In 2023, 83% of committed Make Ready CIR, CSMR, and SSR ports were in DACs, raising the cumulative percentage of Make Ready CIR, CSMR, and SSR ports committed in DACs to 47%, compared to 40% at the end of 2022. Staff also noted their success in completing projects at sites that may serve end-users who reside in DACs—such as community colleges—even if the site is not located in a DAC. Moreover, starting in 2024, CRLD Program staff plan to allocate additional marketing funds to expand their DAC outreach efforts.

- **Effective Customer Engagement Strategies:**
  - CRLD Program staff's prioritization of one-on-one engagement between account managers and customers successfully garners customer interest, ensuring the submission of applications that align with the CRLD Program's key goals and capacity and helping navigate customers through the application process. Account managers are encouraged to listen to customer needs and recommend CRLD Program offerings that correspond with those needs. Account managers personally guide customers through the application process, often using email templates and presentations developed over the past few years to articulate the various CRLD Program offerings. This approach also aims to avoid the high volume of unqualified applications that mass marketing may generate by ensuring applications meet the specific current focus and capacity of the CRLD Program.
  - CRLD Program staff have strategically re-engaged with property developers who had previously participated in and experienced success with the CRLD Program to encourage repeat applications. This approach capitalizes on existing customer relationships to foster broader EV charger adoption across multiple projects by the same developer.
  - CRLD Program staff sought to proactively recruit MUD participants by attending multifamily real estate development conferences, such as the "GlobeSt. Multifamily" conference. Staff highlighted that these events offer opportunities for one-on-one conversations with customers, which can provide clarity about the CRLD Program and help build trust with potential applicants. Staff noted that SCE's presence at these events has directly contributed to successful customer applications.

- **Stakeholder Education Initiatives:** CRLD Program staff consider efforts to educate customers and trade professionals about CRLD Program requirements, technical feasibilities, and regulatory standards as key to setting realistic stakeholder expectations and facilitating smoother project execution. In 2023, these educational initiatives included the following:
  - The development and publication of the "Customer Side Make Ready – Detailed Site Design Guide" on the SCE Charge Ready website.
  - Periodic educational webinars to assist customers and trade professionals with the CRLD Program's technical aspects and documentation requirements. For example, in 2023, a "How to Collect Your Rebate" webinar was held to educate trade professionals on the CRLD Program's compliance and documentation requirements to streamline rebate documentation submission and minimize project delays.
  - Direct engagement with stakeholders during site assessments to ensure they have a clear understanding of project scopes and constraints. For example, during a site assessment, SCE staff may suggest site plan improvements to make projects more cost-effective or compliant with applicable regulations.
- **Trade Professional Collaboration:** CRLD Program staff have observed that engaging and retaining trade professionals enhances project planning and execution as they become more knowledgeable about the CRLD Program and increasingly efficient in its execution over time. Most notably, SCE staff have found that applications submitted by CRLD-experienced trade professionals (on behalf of customers) tend to move through the application and planning process quicker because they are comfortable with the process and understand site plan requirements. CED is primarily credited with effectively managing SCE's relationships with trade professionals.

- **Adaptive Strategies to Overcome Supply Chain Issues:** CRLD Program staff proactively addressed switchgear supply issues by onboarding additional suppliers and standardizing switchgear specifications. This approach aims to streamline project execution and reduce future bottlenecks, starting in June 2024.

- **Enhanced Project Management Efficiency:** Project management staff were reorganized into specialized groups for light-duty and medium/heavy-duty projects. Within the light-duty group, responsibilities were further divided by project type (i.e., CIR vs. CSMR). SCE intended this restructuring to enable greater staff expertise in handling the specific challenges inherent to different project types, as well as to reduce management inefficiencies. CRLD Program staff noted that this restructuring has improved process efficiency and customer service.

5.3 KEY FINDINGS

- **The CRLD Program has facilitated the commitment of 17,456 electric charging ports in SCE service territory from the start of the program in 2021 through 2023.** This has translated into an estimated total avoided emissions from installed ports of 574 metric tons of carbon dioxide equivalents (MT CO_2e) over the two-and-a-half-year period. The largest share of committed ports under the Make Ready Program[19] are associated with multi-unit dwellings (5,122 or 37% of total committed ports). Additionally, nearly half of ports committed through the Make Ready Program (48%), nearly a quarter of those committed through the NCR Program (22%), and nearly two thirds of those committed through the SSR Program will be located in DACs.

- **Due to high demand, CRLD Program staff were able to focus on supporting cost-effective projects that aligned with goals for installing charging infrastructure in DACs and MUD sites.** In 2023, very high market demand and limited funds motivated staff to prioritize projects aligned with the CRLD Program's key goals and capacity. The criteria CRLD Program staff used to guide their site selection included: (1) sites where the customer seeks to install 20+ charging ports (to maximize project cost-effectiveness), (2) sites located in DACs, (3) sites with long-dwell parking (which is suitable for L2 chargers), and (4) sites that are generally friendly to ADA-compliance requirements (to

[19] There are over 3,000 additional committed ports associated with MUDs that will be installed through the NCR and SSR programs, both of which are focused on primarily serving MUD customers.

minimize the need for SCE to make significant accessibility improvements). Simultaneously, SCE became increasingly judicious in its customer outreach, ceasing its digital marketing efforts and instead driving engagement through one-on-one interactions between account managers and customers.

- **There are significant inconsistencies in trade professionals' quality of work and technical knowledge.** Despite a broad registration of about 300 trade professionals, a select group of about 12 play a major role in the CRLD Program, with about 5 accounting for the majority of project contributions. Staff find that applications submitted by these relatively experienced trade professionals tend to flow through the project planning process quickly because they are comfortable with the CRLD Program and understand the CSMR site plan requirements. However, other trade professionals often have insufficient technical knowledge relevant to the CRLD Program—specifically about the CSMR site design planning process. There have been instances where trade professionals have dropped out during the application process when they realized the true cost and scope of work required, based on SCE's feedback on the CSMR site plan. To remedy this knowledge gap, SCE actively educates trade professionals about the CRLD Program's requirements, technical components, and relevant regulatory standards. SCE has implemented an oversight policy to address these issues, including a "three strikes" policy that mandates additional training for trade professionals who fail to meet established standards.

- **There is a lack of knowledge about EV charging infrastructure expansion projects across all customer segments.** Specifically, customers often fail to grasp the CRLD Program's technical, documentation, and regulatory requirements. Staff noted that many customers mistakenly equate the CRLD Program with simpler energy efficiency programs, not fully appreciating the scope and challenges of the civil work involved in installing EV charging infrastructure. This knowledge gap results in customers making demands that are not technically feasible and submitting improper or inadequate site design plans. Customers' lack of awareness of regulatory challenges can negatively impact their experience with the CRLD Program, as they may not understand or anticipate the regulatory impact on project planning and timelines. This knowledge gap has necessitated the expansion of customer-oriented educational initiatives. For example, in 2023, SCE held periodic educational webinars and published the "Customer Side Make Ready – Detailed Site Design Guide" to set realistic customer expectations and ensure smoother project planning and execution.

- **External factors continue to drive project delays, and there is a need to mitigate and adapt to them proactively.**
  - In 2023, the CRLD Program staff's foremost challenge was project delays driven by the pervasive shortage of switchgear and other electrical equipment. To adapt to this, SCE ended its dependence on a single equipment supplier by identifying and onboarding two additional suppliers. Staff expect this decision to alleviate project execution constraints by June 2024, when the new suppliers will make their first deliveries.
  - Customers can cause significant delays due to slow project approval processes, poor communication, submissions of improper or inadequate site design plans, project demands that are technically infeasible, or slow vendor selection and charging station purchasing processes. To mitigate these delays, SCE attempts to educate the relevant stakeholders on the customers' side about the technical complexities of the CRLD Program. These educational initiatives include the webinars and site design guide mentioned above, as well as direct engagement with stakeholders during site assessments to ensure they clearly understand their projects' scopes and constraints. For example, during a site assessment, SCE staff may suggest site plan improvements to make projects more cost-effective or compliant with applicable regulations.
  - The CRLD Program continued to face permitting-related delays in 2023, driven in part by post-COVID pandemic staffing reductions at Authorities Having Jurisdictions (AHJs) and a shift from in-person to remote interactions. Additionally, increased permitting requirements at government and state agencies, such as the Division of the State Architect (DSA), further contributed to project delays. Despite laws enacted to expedite permitting processes for EV infrastructure projects, CRLD Program staff observed minimal improvements in permitting timelines due to limited adherence to such mandates across jurisdictions. To overcome this, SCE's public affairs team has been proactively working with AHJs to encourage adherence to the state's permit

streamlining requirements and prescribed approval timeframes as well as provided advance notice to some AHJs of large forthcoming project permit submittals to raise awareness and help them prepare for review. However, due to the overriding impact of switchgear delays in 2023, CRLD Program staff are unable to isolate the impact of these strategies on project timelines.

- Charging station vendors can cause project delays by either being slow to respond or entirely unresponsive to customers' requests for quotations, an issue about which CRLD Program staff have received customer complaints. Staff need to accommodate for these delays during project planning and execution.

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