CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

# Comments on CALGreen Electric Vehicle Proposals for the 2024 Code Adoption Cycle

CALIFORNIA STATEWIDE UTILITY CODES AND STANDARDS TEAM

July 1, 2024

Dear Building Standards Commission (BSC) and Department of Housing and Community Development (HCD) staff:

The California Statewide Utility Codes and Standards Team appreciates the opportunity to participate in the 2024 Code Adoption Cycle for Title 24, Part 11 (CALGreen), and to provide comments on proposed code changes leading up to the publication of the 2025 California Building Standards Code, Title 24. The Statewide Utility Codes and Standards Team actively supports code-setting bodies in developing and revising building energy codes and standards. The program's objective is to achieve significant energy savings and assist in meeting other energy-related state policy goals through the development of reasonable, responsible, and cost-effective code changes. This program is funded by California utility customers and administered by Pacific Gas and Electric (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Edison (SCE) under the auspices of the California Public Utilities Commission. The Statewide Utility Codes and Standards Team is coordinating with electric vehicle program experts within each respective utility.

The California Statewide Utility Codes and Standards Team offers the following comments:

## 1. We support efforts to improve electric vehicle charging provisions throughout CALGreen.

We appreciate BSC's and HCD's efforts to improve the electric vehicle (EV) charging provisions throughout CALGreen. Many of these changes will create lasting benefits to users and building owners while supporting an increase in the number of chargers available to meet growing demand in line with California's clean transportation goals. We specifically support the following proposed code changes:

a. BSC Item 3-1: Increasing quantities of charging infrastructure for Office & Retail
    i. Additional EV charging access in these settings will increase beneficial consumption during greener-grid daytime periods and add options for EV owners without access to home charging.

b. BSC Item 4-2: EV Charger Connectors
    i. We support the mixture of 480/277 Volt and 208/240 Volt J3400 connectors. By utilizing 277 V, 480 V commercial buildings can avoid costly step-down transformers and reduce the charging current by 33% for the same power when compared to 208 V. This lower current reduces energy losses in the conductors by more than 50%[1].
c. BSC Item 4-3: Raceway Capacity Requirements
    i. Thank you for leveraging the community's contributions during the prior workshops to address this topic. We support the new language requiring raceways to support future upgrades to dedicated 40-ampere branch circuits. Enabling this path aligns with our strategy to support upgrades to enable future bidirectional power transfer.
d. HCD Item 2: EV Charging for Multifamily Dwellings
    i. We applaud HCD and the efforts from the wider community in support of 1:1 EV charging coverage for multifamily unit parking spaces. This aligns with our shared strategy to reduce barriers to multifamily charging.
    ii. We support HCD's allowance of ALMS technology for EV Charger-equipped spaces. This will allow owners to share limited building electrical capacity across more charging spaces.
e. HCD Item 3: EV Charging for Hotels/Motels
    i. We support HCD's allowance of ALMS technology for EV Charger-equipped spaces. This will allow owners to share limited building electrical capacity across more charging spaces and allow customer-friendly peak shaving during demand-charge mitigation periods.
f. HCD Item 4: EV Charging for Additions and Alterations
    i. We support HCD's 100% coverage of EV Charging Spaces for added or altered parking spaces. This aligns with our shared strategy to reduce barriers to multifamily charging.

## 2. We recommend specific changes to the 45-day language to further support improvements and increases in EV infrastructure.

[1] https://www.sae.org/blog/j3400-NACS-standard-rodney-mcgee

### We recommend HCD make 40-ampere Raceway Capacity Requirements mandatory instead of voluntary.

We recommend HCD adopt the 40-ampere Raceway Capacity Requirements as mandatory measures instead of as voluntary Tier 1 measures for both multifamily and hotel/motel buildings (HCD Item 2 and HCD Item 3). Having raceway capacity available now to support future upgrades to 40-ampere branch circuits will minimize the cost of future upgrades needed to support bidirectional power transfer, which will be a critical component of managing charging in a way that can minimize grid impacts from increased transportation electrification.

### We recommend HCD eliminate the new Exception for Level 1 Projects at Hotels and Motels.

We recommend HCD narrow the new exception for Level 1 Projects to be available only for multifamily buildings. Currently, the exception also applies to Hotels and Motels, but customers using EV chargers at these facilities are highly likely to arrive from longer journeys with low battery levels, have short overnight stays, and have potentially long journeys the next day. These customers should have access to Level 2 EV chargers as the proposed code changes require, and exceptions to that requirement should be limited. We suggest revising the exception as follows:

> Section 4.106.4.3: "**Exception:** Where work requiring a permit is being performed for the installation of 120-volt electrical receptacle(s) for level 1 EV charging in multifamily buildings."

### We recommend improving language clarity to assist in code compliance improvement.

We recommend making minor changes to various sections to improve clarity in the regulatory text. That clarity will support code compliance by making it easier to understand the code and avoiding confusion in applying it.

First, we recommend clarifying the acronym EVCS throughout the text, as EVCS can refer either to "EV Capable Space" and "EV Charging Space." Choosing one term that can be considered "EVCS" will avoid confusion with whether a capable space or actual charger is required.

Second, we recommend making BSC table 5.106.5.3.1 easier to use by adding a column that provides the math for the reader instead of making the reader do the subtraction themselves. This will reduce the burden in complying with the code and avoid any errors in calculation or a misunderstanding of the intent.

Third, we recommend specifying what voltage would be supplied in section 5.106.5.3.2.2 where the charging connector would have a different voltage than the

service. Specifically, we recommend making the following change: “When using Level 2 SAE J3400 SAE connectors, supplied ~~by~~ with 277 V from a 480 V 3-phase service…”

Finally, in HCD Item 4: EV Charging for Additions and Alterations, the language “have access to” may be better as “be equipped with.” This would use consistent terminology as other sections and avoid an implication that something different is intended by the wording of this item. We propose the following language:

> “When existing parking facilities are altered or new parking spaces are added to existing parking facilities, and the work requires a building permit, each parking space added or altered shall ~~have access to~~ be equipped with either a low power Level 2 EV charging receptacle or Level 2 EV charger, unless determined as infeasible by the project builder or designer and subject to concurrence of the local enforcing agency.”

## 3. We recommend certain actions during the compliance stage to improve compliance or gather data to support future code changes.

We recommend that BSC and HCD work with local governments to collect information on the use of the “infeasibility” exception. This exception will reduce the otherwise expected amount of EV charging required by the code. Without visibility into how often these exceptions are invoked and how many opportunities to install EVSE or EV Spaces are foregone, it is difficult to understand whether there are any underlying issues that can be addressed through future code changes, improvements in technology, outreach, or new programs.

We encourage HCD to collect statewide data on each exception circumstance, to track the quantity of EV Spaces not installed due to each exception, and to publish that data to increase visibility into underlying issues with expanding EV charging infrastructure. This will allow the state and local governments to identify solutions to reduce barriers that make EV charging infrastructure infeasible to install and may inform future updates to the code.

We would like to offer supporting resources to help HCD convene meetings with local governments and contractors to understand the process and possible options for collecting these data, to develop a data collection process, and to analyze the data around these exceptions to inform future code cycles.

## 4. We believe several key areas require additional research to support code changes in the intervening code cycle or next triennial update to increase the EV charging network to support California’s goals.

We have made comments and provided feedback throughout this proceeding on a few key issues, including on advancing improved connectors, eliminating allowances for receptacles, developing adapter signage, installing 40-ampere conductors for raceways, requiring projects Level 2 readiness for projects that are allowed to install Level 1 charging, and requiring EVSE for parking lifts. Our understanding from these discussions and from the rulemaking documents is that the agencies believe further research is needed to support code changes containing these recommendations.

The California Statewide Utility Codes and Standards Team is committed to supporting further research and analysis on these issues to share with BSC and HCD when proposing future code changes. Specifically, we look to addressing the following issues.

### Supporting the SAE-standardized "J3400 Universal AC Socket-Outlet."

We recommend revisiting the requirements for EV Charger Connectors as connector standards advance to create inclusive language that supports the SAE-standardized "J3400 Universal AC Socket-Outlet"[2] in the next revision to the code. We believe this new EVSE outlet approach offers the following:

- It avoids potentially unsafe adapters.
- It enables the deployment of EVSE at more spaces, increasing opportunities for customer-friendly automated variable power load management that could support building demand-charge management as well as grid services.
- It reduces safety issues with fixed cord damage between charging sessions (e.g., cords left in puddles or run over by vehicles).
- It eliminates cord replacement costs from typical wear-and-tear or loss due to vandalism.
- It allows the charging customer to choose their "EV Cable Assembly" length and configuration to match their vehicle's needs.

We will continue to provide the agencies with updates on the status of these connector standards as they are finalized and provide recommendations on the suitability of these connector standards for incorporation into intervening or future code cycles.

### Limiting the use of receptacles as an option for EV Spaces.

Receptacles have been instrumental in providing broad access to simple and cost-effective EV charging. However, as EVSEs have decreased in cost and are able to support important features such as load management and V2G capability, an EVSE

[2] https://www.sae.org/blog/j3400-NACS-standard-rodney-mcgee

provides more overall value to the consumer, building owner, and grid operator per dollar of investment than receptacles.

Bidirectional charging is a cornerstone strategy to meet customers' growing needs for EV charging and increased electrification. Bidirectional charging can reduce the impacts of increased load to grid assets, create a more efficient grid at a lower cost to customers, and unlock a potential source of grid-services revenue for EV owners. Please note that all current and forecasted bidirectional charging solutions require a hardwired connection and operate at 240 volts (for residential single phase) or higher (for commercial 3 phase solutions) and thus would not be compatible with a 120-volt service nor with a receptacle-based solution. Given the additional equipment that currently is required to support bidirectional charging, it is extremely unlikely that solutions that allow for receptacle use will exist at any point in the future.

Receptacles cannot offer customer-friendly automated variable power load management that could support building demand management. Unmanaged receptacles demand more upstream capacity than ALMS-managed EVSE, increasing project costs.

For non-residential applications in particular, adding session control and energy metering to EV charging receptacles may not be less expensive than networked EVSE. Moreover, commercially deployed receptacles may have a wider variety of users, increasing the wear on these safety-critical devices. While industrial-grade receptacles can safely support thousands of cycles, these are very expensive or don't exist for the 30A and 50A NEMA variants, so businesses are not likely to install these higher quality receptacles. Finally, commercial electricity tariffs have demand charges. Receptacles don't offer customer-friendly automated variable power load management that could support building demand-charge management.

Research on this topic early in the next cycle would support important changes to require EVSE instead of allowing for receptacles. Specifically, we are willing to support engagement with manufacturer groups on receptacle lifecycle safety issues and mitigation approaches. We can also consider refinements to our project cost and operating cost models to better compare the capital and life-cycle costs of unmanaged receptacles, managed receptacles, and ALMS-equipped low-power EVSE to the customer.

### Development of a signage standard for using a J1772-to-J3400 adapter.

We recommend BSC begin work to develop a signage standard to alert charging customers with legacy J1772/240V vehicles that may use a J1772-to-J3400 adapter. As needed, we can explore investing resources on this topic during the research phase

early in the next cycle and continue engaging with SAE to understand if labeling is in process with the J3400 task force or other standards body.

### Amending the exception involving Level 1 charging to require Level 2 Readiness.

We support the Level 1 exceptions in 4.106.4.3. However, 120-volt charging sessions take nearly three times longer to complete, causing higher energy costs from the additional energy required to keep vehicle modules powered on for this longer duration. With this in mind, we recommend a requirement that these Level 1 projects provide a dedicated branch circuit for each charging space and size the breaker panels with twice the panel space to enable a future upgrade to a two-pole 208/240-volt branch circuit for each EV charging space. Projects allowed by this exception should also be required to install 40-Ampere Raceway Capacity. We recognize that these types of requirements may need further cost and feasibility research to verify the cost-effectiveness of using dedicated branch circuits and upsizing the breaker panels at the time of first construction compared with future upgrades or changes. Therefore, we recommend further research on this issue to support a recommendation that best optimizes the cost of first installation, the cost of an upgraded EVSE, and the charging cost in terms of energy use and grid impact.

In conclusion, we would like to reiterate our support for BSC and HCD in making updates to support future EV charging infrastructure. We thank BSC and HCD staff for the opportunity to be involved in this process.

If you have any **questions, please do not hesitate to reach out to the following contacts:**

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**Sincerely,**

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