



September 24, 2021

Building Standards Commission and Department of Housing and Community Development
45-Day Comment Period

Submitted online via <https://www.dgs.ca.gov/BSC/Rulemaking/Public-Comment-Form>

Re: Comments on Proposed CALGreen Changes from Coalition of Public Agencies

These comments are submitted by a coalition of public agencies, including Peninsula Clean Energy, East Bay Community Energy, Redwood Coast Energy Authority, MCE (formerly Marin Clean Energy), and Clean Power Alliance (“Joint Agencies”), representing millions of Californians. The Joint Agencies appreciate the opportunity to provide comments to the 2022 CALGreen triennial update. The new code cycle will likely be the basis of thousands of new residential units, providing a critical opportunity to enable low-cost and broadly accessible electric vehicle (“EV”) charging infrastructure to residents. For the benefit of California residents, the economy, and reducing climate impacts, the State should adopt a code which equitably maximizes access to charging while avoiding excessive construction costs.

The comments detail shortcomings in the latest proposal by the Department of Housing and Community Development for EV charging requirements in new multi-family residential properties (Part 11, Chapter 4) and provides alternative proposals that provide wider access to charging, while containing costs, for further consideration.

In summary, we find the current CALGreen proposal to be overly complicated and complex for developers and local policymakers and confusing and inequitable to residents because of the wide range of access to charging that is provided. Our alternative proposals meet the goals of maximizing access to charging immediately, contain costs and electrical capacity costs in particular, and simplify the codes.

Context

The State is taking significant steps to support the electrification of transportation, including Governor Newsom’s recent [Executive Order](#) (“EO”), calling for 100% of new vehicle sales to be zero-emission within 15 years. Advancing electrification holds significant benefits. A recent [report](#) from Next 10 outlined that by 2030 the use of EVs can increase the Gross State Product

by approximately \$80B - \$140B, grow real income between \$310B - \$360B, and create 394,000 new jobs statewide.

As the State begins to implement the Governor's EO, we must ensure that new market parameters avoid further disenfranchising low-income communities. Prior code cycles have been helpful in beginning to establish some additional electrical capacity to accommodate limited EV charging. However, the benefits of the added infrastructure are dependent on access to that electrical capacity, and in California approximately 31% of residents live in multifamily housing with little or no access to EV charging infrastructure. We believe greater consideration should be given to the equity impacts of the proposed 2022 Code updates and how more widespread EV adoption can be achieved by residents of multifamily housing.

Issues with the Current 2022 Code Proposal from HCD

The latest proposal from HCD, while significantly expanding access to EV charging, introduces a complex composition of charging options that still falls short of maximizing access and ensuring equity while controlling costs. By failing to provide charging access to everyone during new construction, the code punts the burden of expanding charging access down the road when retrofits are significantly more expensive and prohibitive, as explained further in these comments.

The latest proposal introduces a mix of charging options, consisting of 5% of parking spaces to be EVSE installed, 10% of parking spaces to be EV Capable, and 25% of parking spaces to be Low Power EV Ready. In a hypothetical example of an MUD with 100 residential units and 150 parking spaces, this would require 275 kilowatts of power, distributed across 40% of spaces, as follows:

1. 8 EVSE installed x 40 amps per EVSE = 50 kW
2. 15 EV Capable x 40 amps each = 100 kW
3. 38 Low Power Level 2 EV Ready X 20 amps each = 125 kW

As outlined further in the comments below, the same amount of power can be used to provide access to **all** residents through Level 2 charging with power management and Level 1 charging.

The HCD proposal requires that the 5% of parking spaces with installed EVSE be made available to all residents in shared parking. This requirement may push developers to install more shared parking than they otherwise would have, driving up overall construction costs. A more cost-effective solution is to provide charging to all residents at their assigned parking space as detailed in the options below.

Finally, as parking is often a significant space premium for multi-family housing, some jurisdictions may permit smaller parking space dimensions to minimize the overall parking footprint. As such, we encourage HCD to revisit whether the charging stations dimension requirements in 4.106.4.2.2.2 are necessary for multi-family housing in future code cycles

2022 Code Recommendations

Balancing the need for increased access without unreasonable construction costs can be met by calibrating the energy capacity provided based on actual driver needs. With this in mind, we encourage the consideration the following two options for the 2022 CALGreen code for multifamily dwellings:

Option 1 (preferred): EV charging access to all residents with a parking space

Mandatory Measures

1. Elimination of prescribed 5% EVSE installed, 10% EV Capable, and 25% Low Power Level 2 EV Ready.
2. Instead, provide one (1) EV Ready parking space for every residential unit with a parking space, defined as:
 - a. Conduit and wire from the panel, terminating at an outlet or electrical receptacle to the space with the option for circuit sharing, and
 - b. A minimum of 1.9 kilowatt (“kW”) of electrical capacity dedicated to EV charging
3. Label every parking space with conduit as “Electric Vehicle Ready”
4. Explicitly encourage the use of a) advanced load management systems for Level 2 charging, and b) Level 1 charging
5. Allow EV Ready spaces to be defined as having an outlet but not prescribing EV Supply Equipment (“EVSE”)

In the previously mentioned hypothetical of an MUD with 100 residential units and 150 parking spaces, the current CALGreen proposal calls for minimum of 275 kW of power that reaches 40% of spaces. In the Option 1 proposal, a developer could install a Level 1 receptacle or power-managed Level 2 EVSE with 1.9 kW of power minimum at every residential unit with a parking space (100 spaces), yielding an electrical need for 190 kW, **while immediately providing charging access to everyone** at their assigned parking space. In fact, the developer could provide this level of charging to everyone at their assigned parking spaces and provide another 12 full-power (6.6 kW) EVSE, for residents with higher than average charge needs, without exceeding the 275 kW of power already prescribed for in the CALGreen proposal.

Voluntary Measures

1. For voluntary tiers 1 and 2, encourage higher levels of EV ready, up to 100% of total parking spaces provided, through load managed Level 2 and Level 1 charging that provides a minimum of 1.9 kW of electrical capacity to each EV ready parking space.

Option 2: EV charging access to 50% of total parking spaces.

Mandatory Measures

1. Elimination of prescribed 5% EVSE installed, 10% EV Capable, and 25% Low Power Level 2 EV Ready.
2. Instead, provide one (1) EV Ready parking space for 50% of parking spaces, defined as:
 - a. Conduit and wire from the panel, terminating at an outlet or electrical receptacle at the space with the option for circuit sharing,
 - b. Location of EVSE or EV Ready outlet in between parking spaces so as to be accessible by other parking space when possible, and
 - c. A minimum of 1.9 kilowatt (“kW”) of electrical capacity dedicated to EV charging
3. Label every parking space with conduit as “Electric Vehicle Ready”
4. Explicitly encourage the use of a) advanced load management systems for Level 2 charging, and b) Level 1 charging
5. Allow EV Ready spaces to be defined as having an outlet but not prescribing EV Supply Equipment (“EVSE”)

Voluntary Measures

1. For voluntary tiers 1 and 2, encourage higher levels of EV readiness, up to 100% of total parking spaces provided, through load managed Level 2 and Level 1 charging that provides a minimum of 1.9 kW of electrical capacity to each EV ready parking space

For both options, we strongly encourage flexible power management.

Rationale

Driver Need: The current paradigm in CALGreen of providing a minimum of 40 amps to each EVSE and EV capable space doesn’t reflect actual charging behavior and is a hindrance to the future expansion of EVSE in multifamily dwellings. The average daily distance travelled in California is 24 miles¹. This data point is exemplified with San Francisco Bay Area vehicle miles travelled (“VMT”) averaging [21 - 31 miles](#) per day (as of 2015) and Los Angeles County VMT averaging [22 miles](#) per day (as of 2017). 40-amp charging (e.g. Level 2) provides roughly [12-25 miles of range](#) per hour of charging. Therefore, an EV that plugs in at a multifamily dwelling will charge for about 1-3 hours at this rate and then sit for the rest of the evening, showing how the current CALGreen requirements are oversized for this long-dwell parking use case.

The actual charging need for overnight parking cases such as multi-family residential is now shown in multiple reports. It is exemplified in a recent [study](#) by the Center for Sustainable Energy, Energetics, and Forth Mobility, which found that while vehicles at MUDs are parked for

¹ From 2018 California Public Road Data. The report indicates that 347 billion miles are travelled each year, divided by 39.5 million Californians, divided by 365 days yields roughly 24 miles per day. <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/california-public-road-data/prd-2018-a11y.pdf>

an average of 12 hours, they are only charging for a small fraction of that time, about 3.5 hours. Further, a ClearResult study ([summary](#) and [study](#)) found that a **1.65 kW overnight charge meets the daily needs of 94% of drivers** across multiple California counties.

Level 1 charging defined here a dedicated 120V, 20-amp circuit, providing up to 16 amps and 1.9 kW of electricity to the vehicle², provides 40-70+ miles of range per 10-hour overnight charge, more than enough to meet the daily charging needs of a majority of drivers. Given the high proportion of plug-in hybrids with more limited battery capacity, a 40-70+ mile overnight charge represents the upper limit of charging need and for EVs with higher range capacity, periodic topping off at direct current fast chargers (“DCFC”) becomes a viable complement, when needed.

Current Usage of Low-Power Charging: The use of low-power charging for driving needs is not hypothetical. It is in fact in widespread use now for EV charging. A [report](#) by the California Air Resources Board shows that *over half* of all EV drivers are using Level 1 charging (either a standard outlet or Level 1 EVSE) to charge their vehicle. These data points are confirmed by internal research with EV drivers in Peninsula Clean Energy’s service territory. While energy management systems are a newer method of providing EV charging, investor-owned utilities (“IOU”) that manage the transmission and distribution system in CCA service areas, have shown widespread usage of this technology. For example, through Pacific Gas and Electric’s (“PG&E”) EV Charge Network program, PG&E utilized this type of load management at multifamily dwellings to reduce the average power needs per vehicle by 50%³. Additionally, load management systems are authorized in the National Electric Code (Section 625.42) and can receive Underwriters Laboratories certification (UL 916) to ensure safety.

Hinders Adoption: The current requirements of providing EV charging to 5-40% of spaces also hinders the widespread growth of EV adoption by providing charging access to too narrow a share of the residents in a multifamily dwelling. Most multifamily parking spaces are assigned, deeded, or otherwise incapable or inconvenient of being switched among tenants. Therefore, when only 40% of parking spaces are provided with charging access, EV adoption potential is dramatically limited, given that only the users of those parking spaces will be able to charge. Potential EV drivers not assigned to one of the Power EV Ready spaces will have to compete for the limited number of shared EVSE. If they are assigned to an EV Capable space, they will be required to convert that space to EV Ready or otherwise compete for an open EVSE in a shared space.

Equity: This is also a significant equity issue in that the current CALGreen requirement rewards early adopters of EVs, which will be assigned to the limited number of Low Power EV Ready or EV Capable spaces first and are more likely to be higher-income earners. These early adopters will also be used to utilizing the limited number of shared EVSE, creating friction when more

² Tesla and Nissan vehicles are capable of charging up to 16 amps on a 120V circuit. Other vehicles typically charge up to 12 amps on a 120V circuit.

³ As noted in Appendix D of this [report](#), though we believe that power management can be enhanced to further reduce average power needs, yielding capacity for additional ports than what has been demonstrated by the IOU in this example

demand comes as residents adopt EVs over time. Later potential EV consumers, especially lower-income residents will largely be shut out of the opportunity to access charging for an EV barring extreme government incentives. The incremental expansion for one more EV space in the future to accommodate the demand from more EV drivers will be prohibitively expensive due to electrical capacity requirements. The typical cost of adding additional electrical capacity to the first non-EV-capable spot is likely to be \$25,000 to \$50,000 or more. This will severely delay access to Californians most in need of the fuel-cost savings benefits that EVs provide.

Flexibility: Redefining the prescribed 40-amp minimum power level per electrified parking space to a 1.8 kW minimum electrical capacity to each electrified parking space provides multifamily housing developers flexibility on how EVSE can be accessible to all residents. Developers can choose from load-managed Level 2 charging in a variety of configurations and/or Level 1 charging to meet the 1.8 kW minimum in a method that makes most sense based on the property, housing type, etc. This flexibility is critical in deploying EVSE at scale while also avoiding unnecessarily burdensome electrical capacity upgrades.

Cost Effectiveness: More cost-effective charging solutions are needed to provide wider access to charging for new construction, such as Level 1 charging and energy management systems, to ensure all residents have access to the benefits of EVs. Providing charging access to all residents in a multifamily dwelling is vastly more cost-efficient during new construction than retrofits under CALGreen's current requirements. An Energy Solutions [study](#) found that the incremental cost of adding power-managed Level 2 charging access to 25% of parking spaces and Level 1 charging access to 75% of parking spaces was under \$1,500 per unit. Furthermore, adding this level of charging in a future retrofit would cost 3 times as much as installing during new construction.

Load Management: Energy management systems, which balance power so as not to exceed electrical constraints, can be a useful tool in expanding EV charging access in a cost-effective manner. The current CALGreen requirement of a 40-amp minimum to each EV-capable and EVSE installed space can be expanded to more ports with energy management while also meeting the daily needs for EV drivers. For instance, a single 40-amp connected port can provide roughly [7.2 kW](#) of output. An energy management system could allow 4 ports to be connected on the same circuit, share power equally among the 4 vehicles when fully utilized, and still provide each vehicle with a minimum of 1.8 kW, which meets the daily charging needs of the average driver, as demonstrated in the Level 1 charging example above.

Moreover, advanced load management systems have been explicitly identified as an important strategy in other state initiatives and should similarly be reflected in this upcoming 2022 CALGreen update. For instance, the DRIVE OIR Vehicle-Grid Integration Working Group's [final policy recommendations database](#) includes several recommendations to include load management systems, including "2.04 Enable customer to elect [behind the meter] load balancing option to avoid primary or secondary upgrades...", "2.17 ... elect certified behind the meter load management technologies to avoid primary and/or secondary upgrades...", and "9.01 Optimize CALGreen codes for VGI and require more PEV-ready parking spaces and

expand to existing buildings.” Also, the CPUC's Proposed Decision [R.18-12-006](#) recommends the use of load management systems in future transportation electrification programs.

Local Codes: This approach in new construction policy is also already gaining adoption with local building “reach code” enhancements. For example, Peninsula Clean Energy and Silicon Valley Clean Energy’s [EV reach code](#) calls for 100% charging access (25% level 2 EV-capable and 75% Level 1 EV-capable). These codes (or local variants) have been adopted in a growing number of agencies in San Mateo and Santa Clara counties.

Conclusion

To help meet the state’s goals in accelerating EV adoption, the public agencies listed in this letter strongly encourage CALGreen to provide these updates in the 2022 code update. Specifically, expand and simplify the current proposal that comprises 5% EVSE installed, 10% EV Capable, and 25% Low Power EV Ready requirements in multifamily housing to the options proposed in this comment: either provide every residential unit that has a parking space or provide 50% of total spaces with access to a minimum of 1.9 kW to use for EV charging. We also encourage voluntary tiers to seek to provide charging access to 100% of parking spaces through Level 1 charging and/or energy management systems to help provide the critical infrastructure needed now to allow for the universal adoption of EVs over time.

Ensuring an equitable path towards 2035 is a goal shared by all our organizations, and we hope CALGreen will support this effort and consider more flexible and accessible updates. Thank you for the opportunity to provide comments. Should you have questions or would like to discuss in greater detail, please don’t hesitate to let us know.

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