An open letter to California's Building Standards Commission and Housing & Community Development:

Please provide EV Charging Access for All in the 2022 CALGreen Code

(Letter follows logos)

September 2021


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THE CLIMATE MOBILIZATION
Sonoma County
MENLO SPARK
Green Novato
PROJECT
ECOS
ENVIRONMENTAL COUNCIL OF SACRAMENTO
350ContraCosta
The Climate Reality Project
SILICON VALLEY CHAPTER
Venice Action
Santa Cruz
Climate Action Network
Charge Across Town™
350BayArea
Rotary
Club of Novato
VENICE RESISTANCE
cool the earth
The Climate Reality Project
SAN FERNANDO VALLEY, CA CHAPTER
MOTHERS OUT FRONT
California
The Climate Reality Project
ORANGE COUNTY, CA CHAPTER
The Climate Reality Project
BAY AREA CHAPTER
WE ARE INDIVISIBLE
TOGETHER OUR VOICES MATTER
SWEEP
SOUTHWEST ENERGY EFFICIENCY PROJECT
MOTHERS OUT FRONT
Silicon Valley
LET'S GREEN CA!
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Redwood Energy
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San Mateo County Chapter
SIERRA CLUB
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CARBON FREE PALO ALTO
ATMOS
SAN DIEGO GREEN BUILDING COUNCIL
SacEV.org

BUILDING STANDARDS COMMISSION
2525 Natomas Park Drive, Suite 130 Sacramento, California 95833-2936
Via Email: cbsc@dgs.ca.gov

September 27, 2021

RE: CALGreen New Construction, Electric Vehicle Infrastructure -- Recommendations from the *EV Charging Access for All* Coalition

Dear Building Standards Commissioners and Staff,

We are a broad statewide coalition of 90 organizations, companies, and individuals, advocating for better and more equitable access to Electric Vehicle (EV) charging infrastructure in California. Recognizing that over half of California's greenhouse gas emissions come from transportation[1], the state has set a clear path to electrify California's light duty vehicle fleet[2]. California's built environment, however, fails to provide sufficient or equitable access to the EV charging infrastructure required to make this necessary transition. Since November of 2020, we have been involved in the CALGreen stakeholder engagement process, and from the beginning our mandate has been to ensure that *every new multi-family housing unit with parking has access to some level of residential EV-ready charging.*

While we appreciate that some incremental improvements have been made in the residential code, the non-residential proposal actually represents a step backward from earlier Building Standards Commission (BSC) proposals in this code cycle. Further, as a whole, the current CALGreen proposal continues to perpetuate structural inequities, and fails to support the Governor's Executive Order for 100% EV sales by 2035. Specific, critical, easy-to-implement recommendations for this cycle are below, followed by our rationale. See Appendix I for a justification of Emergency action and a list of recommended "First Principles" for designing EV infrastructure policy; Appendix II provides an expert-reviewed cost-benefit analysis of the current proposal; and Appendix III outlines our suggestions for developing equitable EV infrastructure policy in the next interim code cycle.

[1] https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2019/ghg_inventory_trends_00-19.pdf
[2] From SB 1275 to Executive Orders B-48-18 and N-79-20.

Recommendations for Emergency Amendments to the 2022 CALGreen Code Cycle

Recognizing the limitations on staff at this point in the code-making cycle, **we strongly recommend the following five "emergency" amendments to the current proposed code, in this order of priority:**

1) **Increase the residential EV Ready percentage from 25% to 85%**
2) **Increase the number of EV spaces to 20% EV Ready and 30% EV Capable for *all* Non-Residential sites**
3) **Return missing ALMS language to Non-Residential CALGreen**
4) **Include prominent signage at all EV Capable/EV Ready parking spaces**
5) **Include missing retrofit language in Non-Residential CALGreen**

We also recommend the following lower-priority amendments:

6) **Define DCFC in Non-Residential CALGreen**
7) **Remove unwarranted exceptions in both Residential and Non-Residential**

Rationale

1. **Increase the residential EV Ready percentage from 25% to 85%**

Increasing the residential EV Ready percentage to 85% along with the currently proposed 10% EV Capable and 5% installed charger in this code update cycle is the critical step to achieving universal home charging access. Ubiquitous home charging will be necessary to ensure equity and compliance with Governor Newsom's Executive Order N-79-20. See *Appendix I - Urgency and First Principles,* for further explanation.

2. **Increase the number of EV spaces to 20% EV Ready and 30% EV Capable for *all* non-residential sites**

This is required to help provide cost-effective charging access to employees of small and large businesses who reside in multi-family buildings that lack residential charging infrastructure. Our recommendation for this code cycle is to simply conform to the non-residential EV reach codes developed in 2018-20 by Community Choice energy companies Peninsula Clean Energy (PCE) and Silicon Valley Clean Energy (SVCE)[3], which have since been adopted by 20 California cities. See *Appendix III: Recommendations for the Upcoming 2024 Interim Code Cycle* for details.

[3] PCE/SVCE based their code in part on reach codes developed and implemented by the cities of San Francisco, Fremont and Oakland in 2017, and Palo Alto in 2013.

3. Missing and Unclear ALMS Language in Non-Residential CALGreen

The current proposal to include Automatic Load Management Systems (ALMS) is insufficient, ambiguous, and unclear; language presented at the March 30, 2021 workshop on Non-residential CALGreen is conspicuously absent from this proposal[4]. As currently written, the proposed code would allow builders to bring *less* total power (and ultimately serve *fewer* EV spaces) than the earlier proposal. ***We strongly recommend reinstating the earlier language and providing more clarity*** *-- especially since the rationale given in BSC's ISOR states that ALMS "incentivizes the installation of more chargers than the minimum required by the code."*[5]

4. EV Ready Definition and Signage Requirements

We want to thank HCD for updating the definition of EV Ready in this code cycle for Residential CALGreen, by removing the option to install blind junction boxes. We also thank HCD for including EV Ready signage requirements. BSC should align the Non-Residential CALGreen code section 5.106.5.3.1 with these requirements (for prominent, visible signage at all EV Ready and EV Capable spaces) in compliance with Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s).

5. Missing Retrofit Language in Non-Residential CALGreen

We are also alarmed to see no mention of retrofits in the recent CALGreen proposal for non-residential EV infrastructure. We support the recommendations for cost-effective trigger points to require EV infrastructure in existing buildings that are laid out in CARB's report, *EV Charging Infrastructure: Nonresidential Building Standards*[6]. These trigger points include: adding new parking, repaving existing parking, and building alterations where electrical service is upgraded. **At a minimum, non-residential CALGreen should use the same language as residential CALGreen (4.106.4.2.3) to mandate trigger points for retrofitting existing buildings.**

6. DC Fast Charging - Missing Definition in Non-Residential CALGreen

The Non-Residential code is missing a definition of DC Fast Charging. We recommend including a definition that requires a minimum of 100kW.

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[4] "ALMS shall not be used to reduce the minimum required load capacity to EV capable spaces without EVSE equipment installed or to the minimum required EV charging spaces with EVSE required by Table 5.106.5.3.1." https://docs.google.com/document/d/128VS3B4SMWzpjcAj40dFm2reGn0ORdhJ/edit

[5] See *BSC-03-21-ISOR-PT11-45day,* page 5

[6] https://ww2.arb.ca.gov/sites/default/files/2020-09/CARB_Technical_Analysis_EV_Charging_Nonresidential_CALGreen_2019_2020_Intervening_Code.pdf page 18.

7. Unwarranted Exceptions

We recommend removing the following exception from both Residential and Non-Residential CALGreen:

> *1.1 (Residential) and 1b (Non-Residential): "Where there is no local utility power supply or the local utility is unable to supply adequate power."*

It seems highly unlikely that a utility wouldn't be able to deliver the power required by CALGreen. We therefore fail to understand the rationale for this exception (which is not noted in either the ISOR or the CAM).

We also recommend removing the following exception from Non-Residential CALGreen:

> *5.106.5.3 Section 2: "Parking spaces accessible only by automated mechanical car parking systems are not required to comply with this code section."*

We do not find HCD's rationale (*"since not all parking lifts are suitable for supporting EV charging"*) compelling. These systems are not exempted in municipal reach codes[7], and should not be included as exceptions in CALGreen.

Take Emergency Action

We recognize that some of these recommendations may seem beyond the agencies' typical 'incremental' approach. However, the California Department of Housing and Community Development (HCD) has a history of enforcing "emergency amendments" to CALGreen[8]; and the current California mega-fires and drought, exacerbated by the rapidly accelerating climate crisis, clearly justify similar emergency action. Please see *Appendix I: Urgency and First Principles* for more detail.

Thank you for considering these comments. We are happy to answer any questions as HCD and BSC continue to strengthen the code during this cycle. We also look forward to working with both agencies during the next interim code cycle to further improve access to EV charging in California's built environment.

Sincerely,

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[7] https://peninsulareachcodes.org/wp-content/uploads/2021/06/EV_R-Code-July-2021.docx The exemption for mechanical parking systems was removed in February 2021

[8] *"During the 2015–2016 fiscal year, HCD proposed emergency amendments to the 2013 CALGreen."* - https://www.hcd.ca.gov/building-standards/calgreen/docs/2020-calgreen-report-to-legislature.pdf

Organizations

350 Bay Area, Laura Neish, Executive Director
350 Conejo / San Fernando Valley, Alan Weiner, Chapter Lead
350 Contra Costa, Lisa Jackson, Representative for 350 Contra Costa Leadership Team
350 Petaluma, Annie Stuart, Steering committee member
350 Silicon Valley, Nicole Kemeny, President
350 Sonoma, Christine Hoex, Steering Committee member & EV Driver
Acterra, Lauren Weston, Executive Director
Adopt A Charger, Kitty Adams Hoksbergen, Executive Director
Beyond Efficiency Inc, Dan Johnson, Architect
CA Interfaith Power & Light, Liore Milgrom-Gartner, Northern CA Director
Carbon Free Palo Alto, Bruce Hodge, Founder
Center for Biological Diversity, John Fleming, Ph.D., Senior Scientist
Center for Community Energy, Jose Torre-Bueno, Executive Director
Change Begins With ME (Indivisible), Tama Becker-Varano, Activist and EV Driver since 2018
Charge Across Town, Maureen Blanc, Organizer
Citizens' Climate Lobby - San Mateo County chapter, Ellyn Dooley, Climate activist
Clean Coalition, Craig Lewis, Executive Director
CleanEarth4Kids.org, Suzanne Hume, Educational Director and Founder
Climate Health Now, Cynthia Mahoney
Climate Reality Project Orange County (OC), Tristan Miller, Vice Chair
Climate Reality Project Sacramento Chapter, Kaveena Mathi, Co-chair
Climate Reality Project: Silicon Valley, Karen Warner Nelson, Chair
Climate Reality San Francisco Bay Area Chapter, Harriet Harvey-Horn and Teron McGrew, Co-Chairs
Coalition for Clean Air, Christopher Chavez, Deputy Policy Director
Coltura, Janelle Landon, Co-Executive Director
Cool the Earth, Annika Osborn, Community Outreach and Program Director
DRAWDOWN Bay Area, Leslie Alden, Executive Director
Elected Officials to Protect America, Dominic Frongillo, Executive Director
Electric Auto Association, Guy Hall, Director and Policy Committee Chair
Electric Auto Association - Silicon Valley Chapter, Jerry Pohorsky, President
Environment California, Laura Deehan, State Director
Environmental Council of Sacramento, Ralph Propper, President
Green Novato, Kevin Morrison, Founder
GreenLatinos, Andrea Marpillero-Colomina, Clean Transportation Advocate
Indivisible California Green Team , Jennifer Tanner, Leader
Indivisible California StateStrong, Lori Saltveit, Indivisible California StateStrong Lead

Indivisible East Bay, Lawrence Baskett, Former CA Sci/Tech Policy Fellow
Indivisible Ross Valley, Sue Saunders, Founder
Indivisible Sonoma County, Tom Benthin, Advisory Council Member
Indivisible South Bay LA, Doug Bender, Retired Engineer
Labor Management Cooperation Committee of IBEW Local 11 & NECA L.A., Joseph Sullivan, Director of Energy Solutions
Labor Network for Sustainability, Veronica Wilson, California Organizer
Let's Green CA!, Heidi Harmon, Senior Public Affairs Director
Marin/Sonoma EV Squad, David Moller, Professional Engineer
Menlo Spark, Diane Bailey, Executive Director
Mothers Out Front California, Alicia Nichols Gonzalez, California Organizing Manager
Mothers Out Front Capital Region Team, Adelita Serena, Climate Justice Organizer
Mothers Out Front San Francisco, Kathie Piccagli, EV Driver since 2016
Mothers Out Front Silicon Valley, Susan Butler-Graham, Team Coordinator
Mothers Out Front Fresno, LaTisha Harris, Community Organizer
North County Climate Change Alliance, Marian Sedio, Climate Activist
Plug In America, Marc Geller, Vice President
Project Green Home, Dr. Kate Kramer, Co-Founder, EV Driver since 2007
Rotary Club of Novato, Ronald W. Harness, Energy Consultant & Import Manager
Sacramento Electric Vehicles, Guy Hall, Board Director
San Diego Green Building Council, Colleen FitzSimons, Executive Director
San Fernando Valley Climate Reality, Diana Weynand, Chapter Chair
Santa Cruz Climate Action Network, Pauline Seales, Organizer
Sierra Club California, Daniel Barad, Policy Advocate
Sierra Club SF Bay Chapter, David McCoard, Co-Chair Energy and Climate Committee
Silicon Valley Electric Auto Association, Sybil Cramer, Secretary, EAASV
Sonoma County Climate Mobilization, Pete Gang, Retired architect
Southwest Energy Efficiency Project (SWEEP), Matt Frommer, Senior Transportation Associate
Sustainable San Mateo County, Christine Kohl-Zaugg, Executive Director
Sustainable Silicon Valley, Jennifer Thompson, Executive Director
The Climate Reality Project California State Coalition, Antonina Markoff, Coordinator
The Climate Reality Project San Diego Chapter, Cherry Robinson Psy.D, CoChair
Union of Concerned Scientists, Sam Houston, Senior Analyst
Unitarian Universalist Church of Palo Alto, Green Sanctuary, Bill Hilton, Co-Chair, EV Driver since 2016
Vegetarians In New Energy Sources, Maynard S. Clark, Founder and Director
Venice Action, Jed Pauker, Co-Founder
Venice Resistance, Jed Pauker, Leader

Companies

Atmos Financial, Ravi Mikkelsen, Co-founder
BeniSol, LLC, Sven Thesen, Founder, CEO & EV Driver since 2007
Orange Charger, Nicholas Johnson, CEO
Redwood Energy, Sean Armstrong, Managing Principal

Individuals

Alan Solomon
Alice Sung, Architect/Climate Justice Advocate /Future EV Driver
Bret Andersen, Member, Carbon Free Palo Alto
Bruce Naegel, Retired Engineer / Sustainability Volunteer
Dwight MacCurdy, SacEV Advisor, SMUD Retiree
Elena Engel, 350 Bay Area
Jeffrey Perrone, User Experience (UX) Designer
Josephine Gaillard, Environmental Quality Commissioner, Menlo Park, EV Driver since 2018
Kate Harrison, Councilmember, City of Berkeley
Leane Eberhart, Architect
Linda Hutchins-Knowles, EV driver since 2012, Co-founder of Mothers Out Front Silicon Valley
Mary Dateo, EV Driver since 2014
Nick Ratto, Retired Clinical Pharmacist
Paul Wermer, PhD, Chemistry
Rebecca Lucky
Sudhanshu Jain, City of Santa Clara Councilmember
Vanessa Warheit, EV driver since 2013

Appendix I: Urgency and First Principles

The Urgency of Now: CALGreen Code Requires Emergency Amending

Over a million acres of California are on fire, with over 50,000 residents evacuated; simultaneously, of the state's ten largest reservoirs, all are well below average. Ninety-nine percent of the western US is in drought, and, in a first, the federal government has declared an official water shortage for Lake Mead. Simultaneously, catastrophic floods have killed dozens of people and left millions without power in the wake of Hurricane Ida. These are stark warnings of the onrushing catastrophe which the recent IPCC report lays out: *"Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO2 and other greenhouse gas emissions occur in the coming decades."*[9] ***It is clear that California faces an existential anthropogenic climate crisis threat, and we call on the Commission to rise to meet this all-hands-on-deck moment.***

First Principles for EV Infrastructure in New Construction

As Housing and Community Development (HCD) and the Building Standards Commission (BSC) move forward in the upcoming interim code cycle, we encourage both organizations to adopt these "first principles" for EV infrastructure:

1. Equity

If California hopes to meet our ambitious but necessary climate targets, it will require everyone to participate. Longstanding systems of oppression have no place in a just transition to a clean energy economy. Lack of access to charging precludes EV adoption by millions of California residents; broad access requires power for *every new home with parking* -- be it a single family home, apartment or condominium. Where incremental steps are required, **lower power with ubiquitous access is preferable to creating "haves" and "have-nots" with partial access.**

Charging at home through one's own electrical panel and electricity meter is the least expensive, most convenient, and most reliable way to fuel an EV. Since 2015, CALGreen has provided residential EV charging access to 100% of new single-family homes, but to only a small percentage of multi-family homes. Residents of multi-family homes statistically have lower incomes and are disproportionately people of color; denying them the same access to affordable, convenient EV charging is unfair, and holds back mass EV adoption.

[9] See https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

Figure 1 compares the household savings from EV driving for single family dwellings and multifamily dwellings, as a result of CALGreen code implementation.

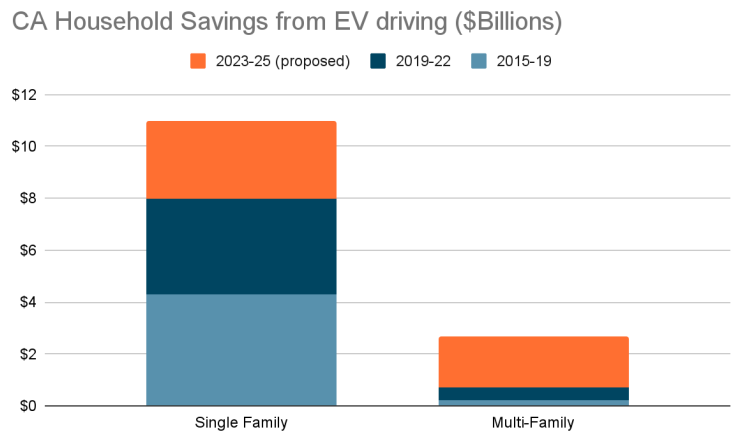

Fig. 1 - Current and historical CALGreen code provides most household cost savings to single-family homeowners

We urge the Commission to adopt **equitable building codes which acknowledge that parking access and decision-making power for multi-family residents is different than it is for single family homeowners.**

2. Low cost at all stages for all stakeholders

Mass EV adoption requires prioritizing infrastructure that ensures low costs to land developers, building owners and EV drivers, without compromising the other first principles. California faces a giant and expensive problem of retrofitting our existing parking infrastructure, particularly in multi-family housing. **Since *the least expensive way to install EV infrastructure is during new construction*, the code must stop adding to the state's retrofit burden by adding to the stock of buildings that are unprepared for EVs, particularly in Disadvantaged Communities[10].**

Making EVs affordable for all Californians requires both *affordable electric cars* and *access to affordable electricity* for charging. The Building Standards Commission needs to work with CARB, HCD, the CPUC, and the Energy Commission to incentivize and/or mandate access to *low-cost electricity* for multi-family housing (MFH) residents, and particularly those in low-income and disadvantaged communities.

[10] "Disadvantaged Communities" as defined by CalEnviroScreen:https://oehha.ca.gov/calenviroscreen/sb535

Simply installing DC Fast Charging stations in low-income communities is not equitable, as the price of electricity for commercial EV charging is not regulated and the price of electricity from those charging stations often equals or exceeds the cost of gasoline. Under the proposed BSC code structure, wealthy homeowners -- who are disproportionately white -- will continue to enjoy convenient access to at-home charging at the lowest utility rates; meanwhile tenants of multi-family housing will continue to pay higher prices -- or, more likely, to simply continue driving gas cars.

3. Dwell time

Efficient and low cost solutions require consideration of how long EVs are parked in certain locations. Long dwell times -- such as at home overnight, and at the workplace -- allow low-powered access to meet the state's goals, and drivers' needs, with less impact on the electrical grid and lower cost to all.

4. Direct control over charging access

To address the pernicious 'split incentive' problem for EV charging in multi-family housing[11], buildings should be designed, whenever possible, with a direct connection from the electrified parking space to the housing unit's electrical panel and meter. This will also help to ensure access to lowest cost utility rates (see point 2 above), and eliminate the cost and headache for property managers and HOA's of having to manage charging centrally.

5. Signage and True Access

Signage indicating the potential for EV charging is a simple, easy to implement, and very low cost strategy for increasing EV adoption and meeting the state's EV targets. For EV Ready spaces, signage provides a highly effective means of educating the public about the types of EV charging, and the increased visibility helps potential drivers to overcome one of the biggest barriers to adoption: range anxiety. Signage for EV Capable spaces also alerts drivers to the existing potential for EV charging, thereby increasing the likelihood of fully implementing potential EV infrastructure (and achieving a return on this investment). We encourage BSC, DSA, and HCD to work with CalTrans to update Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Marking) to appropriately address the signage needs for EV Capable and assigned residential EV Ready spaces.

Note that in multi-family housing, all charging access should be "EV Ready" and not "EV Capable". Hidden in the walls, EV Capable is not true access: it requires significant effort and

[11]Split incentives are defined as "a circumstance in which the flow of investments and benefits are not properly rationed among the parties to a transaction, impairing investment decisions." See: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4819331/

financial outlays to render operational -- barriers which are often insurmountable for multi-family residents. This position has been spelled out in prior comment letters from our coalition.[12]

6. Ensure High-Road Jobs

Building out California's EV infrastructure provides an opportunity to create local, high-road careers which pay family sustaining wages and benefits. Engaging a trained workforce will ensure the highest level of safety, quality and reliability.

[12] See our letter to HCD of Feb. 19, 2021: https://docs.google.com/document/d/1Y0-GFH1xt3NPxcizWRQLueNb0TWKTu6bjV8cf3BhBGs/edit

Appendix II: Cost-Benefit Analysis

This paper compares two proposed CALGreen 2022 mandatory residential Electric Vehicle (EV) infrastructure codes within the context of an economic and environmental cost-benefit analysis. The two codes are the August 12, 2021 proposal by California's Housing Community Development (HCD) and the low-power level 2 (LPL2) approach first presented to HCD and other agencies in February, 2021 by the *EV Charging Access for All* coalition. The economic and environmental analysis considers the projected 150,000 new multi-family dwellings (MFDs) that will be regulated by the 2023-2025 code, within the 2025 to 2045 time frame.

The analysis finds that the LPL2 proposal results in greater economic benefits both for residents of multi-family housing and for California as a whole. It also yields greater emissions reductions at significantly lower cost. As summarized in Figure 1, the LPL2 approach is superior in all metrics except in initial construction costs, where the HCD proposal provides modest savings. In comparing costs and savings, it is critical to understand that spending an additional $28 million on initial construction costs will save approximately $1.4 billion in avoided costs -- including internal combustion vehicle expenses such as gasoline and oil changes, and avoided health costs resulting from the emission reductions over the 2025-2045 time period. Note that these avoided costs do not include the additional costs of potential utility retrofits required to provide full access.

Figure 1. LPL2 vs. HCD Proposals

LPL2	***HCD***	***Metric (for 150,000 MFD)***
4	5	Societal Payback, Years
38%	31%	Societal Internal Rate of Return
100%	40%-73%	% MFD units served[13]
$205	$178	Initial Construction Costs, $M
4,058	2,588	Direct MFD Residents Savings, $M
8.4	5.5	Avoided CO_2 Emissions, Million Tons
24	35	Emission Reduction Cost, $/Ton
$0	$700 - $1,700	Avoided Utility Retrofit Costs[14], $M

To view the full analysis click here.

[13] Percentages are based on CARB's estimate of 1.8 parking spaces per MFD unit.
[14] PG&E Electric Vehicle Charge Network Quarterly Report, First Quarter, 2021

Appendix III: Recommendations for the Upcoming 2024 Interim Code Cycle

Residential CALGreen - Recommendations

In the upcoming interim code cycle, for apartments and condominiums, we strongly recommend providing access to at least one low-power Level 2 (LPL2) space -- providing an average floor of 3.3kW, and terminating at either a receptacle or EVSE connector -- for every new housing unit with parking. This approach ensures affordability for builders, while taking advantage of long dwell times at home to supply sufficient power for the vast majority of use cases.

Fiscal and Environmental Impacts of LPL2 Approach

Appendix II presents an expert-reviewed comparison of the current residential CALGreen proposal with our recommended approach for low-power Level 2 (LPL2) access. The analysis shows clear benefits of the LPL2 approach over the current CALGreen proposal for multi-family housing, as illustrated in Figures 1 and 2 below.

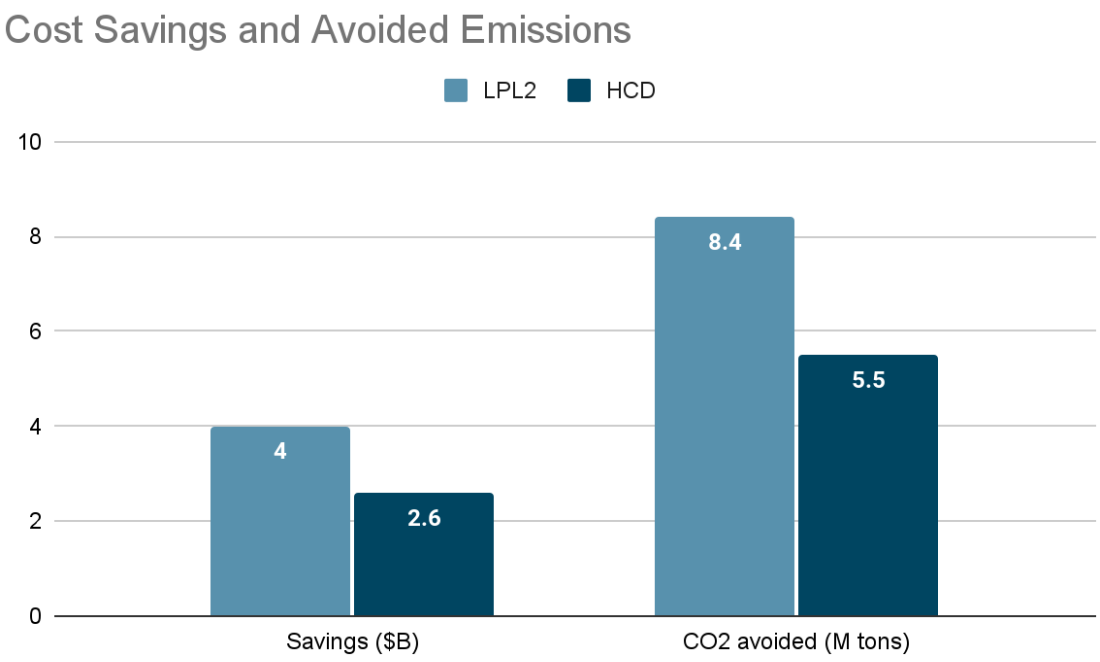

Fig. 1 - The Low-Power Level 2 approach for Multi-Family Housing provides more cost savings and avoided emissions

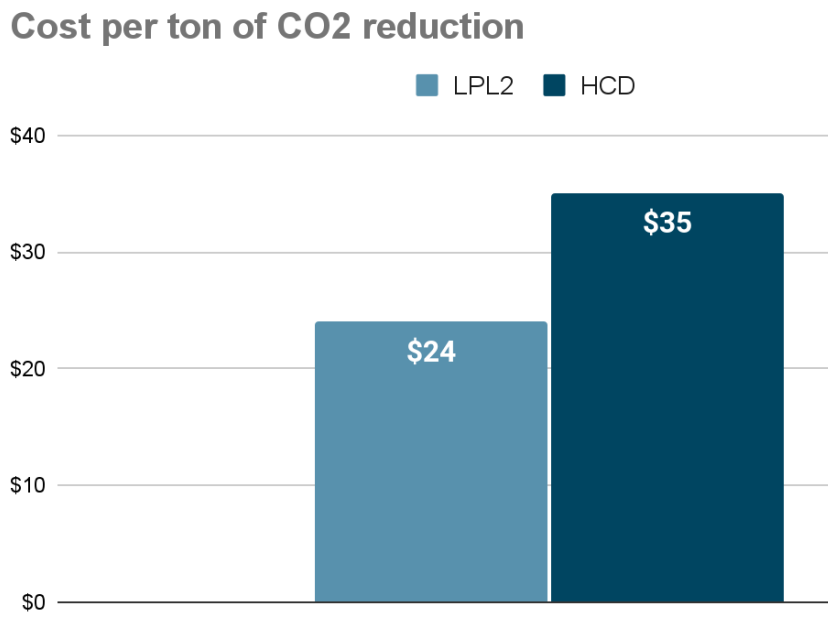

Fig. 2 - The Low-Power Level 2 approach for Multi-Family Housing costs less per ton of reduced CO2 emissions

Non-Residential CALGreen - Recommendations

EV Workplace Charging

Recognizing that many Californians live in older housing and multi-family housing units without access to EV charging, we also urge BSC to increase its ambition for *non-residential* EV charging access, and to focus in particular on providing workplace charging for employees. Using dwell-time as a first principle, low-power workplace EV charging is perfectly suited for the average daily round trip commute of 30-35 miles/day. Level 1 charging over a typical 8-9 hour work shift provides sufficient battery replenishment for the average commuter to drive to work and back home. Since three to four Level 1 EV Ready circuits require about the same electrical capacity as one Level 2 (40A branch) circuit, a level 1 charging strategy is a more affordable way to provide many more workplace charging circuits, and will drive much faster EV adoption than the currently-proposed 20% Level 2 charging strategy.

Similarly, LPL2 charging (on a 20A branch circuit) will enable twice the number of EV Ready circuits with the same electrical capacity as Level 2 on a 40A branch circuit, and therefore is a better EV Workplace charging strategy. EV workplace charging programs with Level 1 and LPL2 charging can also be implemented by employers with very low-cost fee structures and mechanisms.

Employers have learned that sharing power across more parking spaces is preferable to sharing fewer, higher-powered charging spaces. Sharing spaces disrupts business and commerce by effectively requiring employees to move their vehicles in and out of charging spots during the workday.[15] Low-powered charging strategies that provide sufficient spaces to enable long dwell times avoid this disruption.

Recommended Workplace Approach: PCE/SVCE Reach Codes

We continue to recommend that Non-Residential CALGreen adopt the EV reach code developed in 2018-20 by Community Choice energy companies Peninsula Clean Energy (PCE) and Silicon Valley Clean Energy (SVCE)[16]. This code, in part or whole, has already been adopted by twenty municipalities across California. Key benefits include:

Ubiquity of Application. The PCE/SVCE reach code applies to *all* non-residential buildings, regardless of size. By limiting CALGreen's EV requirements to non-residential buildings over 10/25 spaces, the state is effectively curtailing the ability of small businesses to supply EV charging to their employees and customers.

Flexibility for Builders. The reach code supports builders by redefining *EV Capable* to mean ”some assembly required”: there is panel capacity and raceway, but only through “pinch points” such as walls, between floors, or when trenching is necessary to reach the parking space. The reach code also requires signage at the parking space to indicate that the space is either EV Capable or EV Ready. (See *Appendix I: Urgency and First Principles* for more on the benefits of signage).

Appropriateness of Access. Importantly, the reach code splits nonresidential code into office and commercial[17] building types, in recognition that these two types of use-case tend to result in different parking dwell times. (For instance, an office building is likely to have the majority of its spaces in use by employees for 8-9 hours/day; while the majority of spaces in a commercial retail center are likely to be used for only an hour at a time by customers.) The minimum required percentages therefore differ, as illustrated in Figure 3 below:

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[15] For example: an office worker must step out of a meeting to move their vehicle or structure their meetings around breaks to move their car; a labor and delivery hospital nurse is faced with asking an expectant mother to wait while she moves her car or risking a financial penalty; a restaurant waiter has to use their break to move their vehicle; a university student must choose between fines or missing part of class; all of these are unnecessary barriers to adoption.

[16] PCE/SVCE based their code in part on reach codes developed and implemented by the cities of San Francisco, Fremont and Oakland in 2017, and Palo Alto in 2013.

[17] Commercial includes retail establishments

	BUILDING TYPE:	
	Office	Commercial/Retail
EVSE:	10% L2	6% L2
EV Ready	10% L1	10%[18] L1 *OR* for >100 spaces, one 80kW DC Fast Charger per 100 spaces
EV Capable	30% L1 or L2	N/A
Note, these percentages are additive.		

Fig. 3 - PCE/SVCE Reach Code requirements for EV charging

Notably, the reach codes (developed in 2019) require 20% of spaces to be LPL2 EV Ready, and 30% to be EV Capable, which is our recommendation for the current code cycle. For the next interim code cycle, we recommend adopting an approach that gives access to power for EV charging to 100% of employees in new non-residential construction.

Workforce development - recommendations and benefits

Finally, as California builds back from the COVID pandemic, and with federal support for improved EV infrastructure likely coming in the 2022 budget, building out California's EV infrastructure offers opportunities for creating good-paying, high-road jobs with benefits. We encourage BSC, HCD, and CARB to require that installation of electric vehicle infrastructure be performed by a contractor with the appropriate license classification, as determined by the Contractors' State License Board; and to require at least one electrician on each crew, at any given time, to hold an Electric Vehicle Infrastructure Training Program certification. We also recommend requiring at least 25 percent of the total electricians working on an electric vehicle infrastructure project to hold Electric Vehicle Infrastructure Training Program certification. This policy is consistent with the Public Utilities Code section 740.20.

[18] PCE/ SVCE reach code proposes 6%, however recent data collected for pandemic protocols has revealed that 10% is more appropriate to accommodate employee charging.