

**INITIAL STATEMENT OF REASONS  
FOR PROPOSED BUILDING STANDARDS  
OF THE DIVISION OF THE STATE ARCHITECT  
REGARDING THE 2022 CALIFORNIA GREEN BUILDING STANDARDS  
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 11  
(DSA-SS 01/22)**

The Administrative Procedure Act (APA) requires that an Initial Statement of Reasons be available to the public upon request when rulemaking action is being undertaken. The following information required by the APA pertains to this particular rulemaking action:

**STATEMENT OF SPECIFIC PURPOSE, PROBLEM, RATIONALE AND BENEFITS**

Government Code Section 11346.2(b)(1) requires a statement of specific purpose of each adoption, amendment, or repeal and the problem the agency intends to address and the rationale for the determination by the agency that each adoption, amendment, or repeal is reasonably necessary to carry out the purpose and address the problem for which it is proposed. The statement shall enumerate the benefits anticipated from the regulatory action, including the benefits or goals provided in the authorizing statute.

**General Carbon Reduction (Decarbonization) statement for Items 3 and 5-10**

The California Building Standards Commission, pursuant to their authority for green building standards for nonresidential occupancies for which no other state agency has authority (BSC-CG), and the Division of the State Architect (DSA) propose to add new mandatory and voluntary green building standards to further support the reduction of greenhouse gas emissions when buildings 50,000 square feet and greater are renovated or newly constructed. The purpose, need, and benefit of these regulations is a first step to address the impact of building materials on carbon emissions. To maximize flexibility, three alternative pathways are provided:

1. Building Reuse: When an existing building 50,000 square feet or greater undergoes and alteration or addition, 45 percent of the buildings structural elements and enclosure must be maintained.
2. Whole Building Life Cycle Assessment: a cradle-to-grave life cycle assessment shall be conducted on new buildings 50,000 square feet and greater, that demonstrates a 10 percent reduction in Global Warming Potential (GWP).
3. Product GWP compliance-prescriptive path: building materials installed in new buildings 50,000 square feet or greater shall comply with prescriptive product GWP's. A weighted average exception is provided for concrete. Product GWP and requirements for Type III Environmental Product Declaration shall be included in the construction documents.

**Background:** When the California Green Building Standards Code (CALGreen) was first published in 2008 it included several greenhouse gas (GHG) and embodied carbon reduction topics such as building reuse, material sources and their recycled content, and life cycle assessment. The purpose of CALGreen is to improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in the following categories:

1. Planning and design
2. Energy efficiency

3. Water efficiency and conservation
4. Material conservation and resource efficiency
5. Environmental quality

In response to enacted Legislation and Executive Orders since 2008, many other CALGreen sections have been updated such as stormwater pollution prevention, bicycle parking, parking for clean air vehicles, electric vehicle charging, light pollution reduction, indoor and outdoor potable water use reduction, construction waste management, building commissioning, recycled water use, and indoor pollutant control, and indoor and outdoor air quality. However, the forementioned carbon reduction topics have had less attention in recent years.

**Petition:** The American Institute of Architects California (AIACA), submitted a petition in 2019 requesting that California adopt the Zero Code, a reach code to supplement the California Energy Code. The petition requested the Zero Code be included as a voluntary path to decarbonization in the CALGreen Code, allowing local jurisdictions to adopt it as a means forward for building decarbonization. The Zero Code integrates cost-effective energy efficiency standards with on-site and/or off-site renewable energy, resulting in Zero-Net-Carbon (ZNC) buildings. Because of the energy component, CBSC forwarded the petition to the California Energy Commission who denied the petition.

BSC-CG and DSA continued conversations with the AIACA and other sustainable and design professional organizations, such as the Carbon Leadership Forum, RMI, New Building Institute, California Construction and Industrial Material Association, various representatives from the concrete industries, and the U.S. Green Building Council to find a path forward to include carbon reduction practices in CALGreen. According to these organizations and other research identified in the technical documents relied upon section of this ISOR, “In the building industry, embodied carbon refers to the greenhouse gas emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building materials. In contrast, operational carbon refers to the greenhouse gas emissions due to building energy consumption. Of those emissions, building operations are responsible for 27 percent annually, while building materials and construction (typically referred to as embodied carbon) are responsible for an additional 20 percent. Architecture 2030 data indicates that for the 2020-2040 period, the gigatons of CO<sub>2</sub> emitted will be 57 percent from embodied carbon, and 43 percent from operational [energy use] carbon.

According to the [2021 Integrated Energy Policy Report](#) Volume I-Building Decarbonization, produced by the California Energy Commission, “In new building projects, on average, up to 50 percent of total GHG emissions, considered over a 30-year building life, are from the embodied carbon associated with the initial construction, and nearly 70 percent of that is from just six materials—concrete and steel (by far the most significant), flat glass, insulation, masonry, and wood products. There are, however, significant variations in estimations of the contribution of embodied carbon to the lifetime emissions from a building that warrant further analysis and contextualization for California.”

To achieve California’s decarbonization objectives, mandated by California law will require significant reductions in both operational and embodied carbon.

**CCRC workgroup:** CBSC, DSA and HCD conducted four [pre-cycle workshops](#) (April 4, May 19, June 30, September 8, 2022) which resulted in the creation of a CALGreen Carbon Reduction Collaborative (CCRC), development of a CCRC charter and open discussions about potential amendments to CALGreen to better align CALGreen with current California climate action laws and executive orders. The state agencies asked the participants to look at the existing CALGreen Code and provide non-energy related suggestions, but within the scope of title 24 and the CALGreen Code that could advance sustainable construction. State agencies with green building subject matter expertise provided overviews of their authority and responsibility for air quality, energy efficiency, sustainable pavement, and carbon reduction efforts. Interested parties and individuals from the product manufacturing industry also provided presentations describing built examples of current and emerging best practices in building decarbonization which address both operational and embodied carbon reduction practices. These projects were documented using tools whereby some design professionals are currently including whole building life cycle assessment (WBLCA) and environmental product declarations (EPD). Workshop meeting materials can be found at (<https://www.dgs.ca.gov/BSC/Rulemaking/2022-Intervening-Cycle/2022-Pre-/cycle>).

To make the most meaningful impact, building characteristics data from the Commercial Buildings Energy Consumption Survey (CBECS) was analyzed and compared the number of all new buildings in the U.S. built in 2018 by size and by floorspace. A targeted analysis reflects 6% of all buildings are greater than 50,000 sf and account for 48,469,000 sf, which is 50% of the total building floorspace. Targeting buildings over 50,000 sf has the potential to reduce the impact of embodied carbon by 50% while only targeting 6% of buildings. This shows the greatest reduction potential with the lowest number of buildings being targeted. This documentation is available upon request.

During the public CCRC workshops, other issues related to building decarbonization were described by participants. These included recommended changes to construction waste management, building reuse, life cycle assessment, global warming potential product declarations, cool and sustainable pavements to mitigate heat island effect, mitigation for extreme heat impacts that result from already locked in climate deterioration, and options for reducing the carbon impacts of high use, high impact materials such as cement and concrete. These recommendations and subsequent coordination resulted in the express terms draft regulations in Items 3 and 5-10. Specific rationale for each code change is noted below in the item numbers.

### **Executive Orders, Legislation and State Agency reports:**

California law has established many climate action objectives, the rationale behind them, and assessment and management frameworks which taken together, mandate rapid and wide-ranging building sector decarbonization. Citations that follow are examples that broadly support the actions being proposed in this regulatory proposal.

[Assembly Bill 32](#) (Nunez, Chapter 488, Statutes of 2006) known as the California Global Solutions Act requires California to reduce GHG emissions to 1990 levels by 2022. AB 32 also requires the California Air Resources Board (CARB) to develop a Scoping Plan to achieve carbon neutrality. [Senate Bill 32](#) (Pavely, Chapter 249, Statutes of 2016) enhanced the statewide greenhouse gas emissions reduction to 40 percent below the 1990 level by 2030. CARB's May 10, 2022 draft [2022 Scoping Plan Update](#) states the plan will "...assess progress towards achieving the Senate Bill 322030 target and lay out a path to achieve carbon neutrality no later than 2045. The 2022 Scoping Plan Update focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology,

energy deployment, natural and working lands, and others, and is designed to meet the State's long-term climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities. The 2022 Scoping Plan Appendix F Building Decarbonization, acknowledges that as decarbonized buildings use less operational energy, addressing building materials and methods of construction lifecycle emissions becomes important. Therefore, reducing embodied carbon associated with building materials becomes increasingly important to address. Embodied carbon of buildings—referring to GHG emissions from extracting and manufacturing building materials—contributes at least 11 percent of all energy-related emissions annually worldwide. Studies may underestimate embodied carbon; a full life-cycle emissions assessment would include transportation and disposal of building materials. Embodied carbon can be reduced through cost-effective management practices including the optimal use of building materials with high-recycled or low-carbon products.”

[Senate Bill 1389](#) (Bowen, Chapter 568, Statutes of 2002) requires the California Energy Commission to, *[C]onduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The Energy Commission shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety.*” (**Pub. Res. Code § 25301(a)**). The 2021 Integrated Energy Policy Report (IEPR) provides information and policy recommendations on advancing a clean, reliable, and affordable energy system for all Californians. [The 2021 Integrated Energy Policy Report](#) Volume I-Building Decarbonization includes discussions about Embodied Carbon in building materials and the need for changes in CALGreen to address low-carbon design and construction criteria.

<https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2022-integrated-energy-policy-report-update>

[Assembly Bill 262](#) (Bonta, Chapter 816, Statutes of 2017) According to the Department of General Service's (DGS) [Legislative Reports \(ca.gov\)](#) “The BCCA was introduced as Assembly Bill (AB) 262 (Bonta, Chapter 816, Statutes of 2017). It addressed the greenhouse gases associated with the production of construction products used in California state public works projects. According to the author, the bill was meant to “level the playing field” and benefit those manufacturers who have made a conscious effort to lower greenhouse gas emissions in the production of materials. The bill was signed into law by Governor Edmund G. Brown Jr. on October 15, 2017. The BCCA was subsequently amended by AB 1817 (Ting, Chapter 37, Statutes of 2018) and AB 137 (Ting, Chapter 77, Statutes of 2021).

The BCCA targets carbon emissions associated with the manufacturing of structural steel, concrete reinforcing steel, flat glass, and mineral wool board insulation. State agencies that award contracts (“awarding authorities”) are responsible for ensuring that these materials, when used in public works projects, do not have a GWP [global warming potential] that exceeds the limit set by DGS. The document used to establish the GWP limit (and ultimately determine compliance) is the EPD [environmental product declaration].”

[Assembly Bill 2446](#) (Holden, Chapter 352, Statutes of 2022) requires State Air Resources Board, by July 1, 2025, to develop, in consultation with specified stakeholders, a framework for measuring and then reducing the average carbon intensity of the materials used in the construction of new buildings, including those for residential uses. The Legislative intent recognizes that in recent years, building decarbonization has become a

growing priority for the state. As a result, the State Air Resources Board and State Energy Resources Conservation and Development Commission may include building decarbonization in future updates to the Scoping Plan and Integrated Energy Policy Report. The California Energy Code, Part 6 of Title 24, address energy and water efficiency requirements for the operation of newly constructed buildings, additions to existing buildings, and alterations to existing buildings. However, those standards do not address the construction phase of buildings, or the broader lifecycle impacts beyond direct energy and water inputs during the operation or use phase of the building.

[Senate Bill 27](#) (Skinner, 2021) requires the California Natural Resources Agency (CNRA) is to create a Carbon Sequestration and Climate Resiliency Project Registry. The Registry is intended to facilitate funding of nature-based and direct air capture projects that deliver on California’s climate goals.

[Senate Bill 596](#) (Becker, Chapter 246 of the Statutes of 2021) established the intent of the Legislature that attaining net-zero or net-negative emissions of greenhouse gases from the cement and concrete sector become a pillar of the state’s strategy for achieving carbon neutrality and develop a comprehensive strategy for the state’s cement sector to achieve net zero-emissions of greenhouse gases used within the state as soon as possible, but no later than December 31, 2045.

[Executive Order B-55-18](#), ordered a statewide goal to achieve carbon neutrality as soon as possible, but no later than 2045, and achieve and maintain net negative emissions thereafter.

[Letter from the Office of the Governor to Chair of the California Air Resources Board July 22, 2022](#). “California is in the midst of a climate crisis. Drought, wildfire, and extreme heat have become everyday realities. We are compelled to do more... Buildings are a large source of carbon pollution, and decarbonization of California’s buildings must be accelerated to achieve our climate targets.”

## ITEM 1

### Chapter 2 Definitions, Section 202 Definitions

**Rationale:** DSA-SS proposes to add new definitions that are needed for the advancement of new regulations. These new definitions help to clarify new regulations. DSA is also proposing to revise Electric Vehicle Charging Station to more fully align with industry standard definitions.

### BUY CLEAN CALIFORNIA ACT.

**Rationale:** . [Assembly Bill 262](#) (Bonita, Chapter 816, Statutes of 2017) [leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\\_id=201720180AB262](http://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB262) requires the Department of General Services to establish, and publish in the State Contracting Manual, a maximum acceptable global warming potential for each category of eligible materials per the law. The maximum acceptable global warming potential (GWP) limit are established by the Department of General Services (DGS), in consultation with the California Air Resources Board (CARB). The BCCA targets carbon emissions associated with the production of structural steel (hot-rolled sections, hollow structural sections, and plate), concrete reinforcing steel, flat glass, and mineral wool board insulation. When used in public works projects, these eligible materials must have a GWP that does not exceed the limit set by DGS. The proposed CCRC regulations rely on the work conducted by DGS and references the Buy Clean California GWP limits.

### CRADLE-TO-GATE.

**Rationale:** The proposed definition aligns with industry standard terminology and is necessary because it is used in the proposed Environmental Declaration definition. It's provided to minimize confusion with the term Cradle-to-grave. Cradle-to-gate refers to the carbon impact of a building product from the moment it's produced to the moment it installed in a structure.

#### **CRADLE-TO-GRAVE.**

**Rationale:** The proposed definition aligns with industry standard terminology and is used in the proposed CCRC regulations. Cradle-to-grave covers the entire lifecycle of a product. It is a full analysis of a building product from the raw materials to the disposal of the product in an attempt to determine its full carbon footprint.

#### **ELECTRIC VEHICLE CHARGING STATION (EVCS) [DSA-SS].**

**Rationale:** DSA is proposing to adopt this definition. Feedback received during the EVCS workgroup suggested that definitions related to EV charging should align with industry standards. After multiple targeted workgroup sessions with Building Standards Commission, Housing and Community Development and California Air Resources Board the definition was revised and simplified to align with industry standards and regulations under the authority of DSA, HCD and BSC.

#### **ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). [DSA-SS].**

**Rationale:** DSA is proposing to amend the definition for Electric vehicle supply equipment (EVSE). The amendment is to add "personnel protection system," to the definition which aligns with the current 2022 California Electrical Code definition of the same term. The amendment is needed to maintain consistency between the California codes.

#### **TYPE III ENVIRONMENTAL PRODUCT DECLARATION (EPD).**

##### **PRODUCT-SPECIFIC EPD.**

##### **FACTORY-SPECIFIC EPD.**

##### **INDUSTRY-WIDE EPD (IW-EPD).**

#### **LEVEL 1 ELECTRIC VEHICLE (EV) CHARGING RECEPTACLE. [DSA-SS].**

**Rationale:** DSA is proposing to adopt a definition for level 1 electric vehicle (EV) charging receptacle. The definition is needed since DSA is proposing EV regulations that allow the use of level 1 charging to comply with EV capable spaces for the new power allocation compliance method.

#### **LEVEL 2 ELECTRIC VEHICLE SUPPLY EQUIPMENT . [DSA-SS].**

**Rationale:** DSA is proposing to adopt the definition for Level 2 Electric Vehicle Supply Equipment. This amendment will align with HCDs definition already codified during the 2021 Triennial Code Adoption Cycle. This definition is needed since DSA is proposing EV regulations that allow the use of level 2 charging to create EVCS This definition is also needed that allows for the use of level 2 charging for the proposed power allocation method.

#### **LOW POWER LEVEL 2 ELECTRIC VEHICLE (EV) CHARGING RECEPTACLE. [DSA-SS].**

**Rationale:** DSA is proposing to adopt and amend an existing definition for Low power level 2 electric vehicle (EV) charging receptacle. This term was previously adopted by HCD in CALGreen. This definition is being amended to simplify it by removing superfluous information regarding the EV driver. The definition is needed since DSA is proposing EV regulations that allow the use of low power level 2 charging to comply with EV capable spaces for the new power allocation compliance method.

## REFERENCE STUDY PERIOD.

**Rationale:** DSA-SS proposes to add the new definitions listed above to support the three carbon reduction compliance paths listed below. Feedback during the three CCRC meetings also promoted the recycle sections to be looked at.

**CAC Recommendation:**

Approve.

**Agency Response:**

Accept, however, the deconstruction definition is withdrawn due to further study conducted on Section 5.408.1 in Item 6 below.

## ITEM 2

### Chapter 3 Green Building , Section 301.4 Mandatory Measures for Public Schools and Community Colleges

**Rationale:** This section indicates what part of CALGreen code is required to be met for public schools. DSA has added two new code sections 301.4.2.5 and 301.4.2.6 to direct the user the applicable requirements related to EV parking and/or shade trees for alterations and additions to existing parking facilities and alterations and additions to existing buildings. This proposed change is needed because the new added scoping sections reference new proposed code language for alterations and additions to existing parking facilities and existing buildings.

Referenced Section 5.506.3 in the scoping Section 301.4.2.6 directs the code user to the Carbon dioxide (CO<sub>2</sub>) monitoring in classrooms requirements which are being proposed for alterations and additions to existing classrooms.

CO<sub>2</sub> monitors are needed in K-12 public school classrooms so that teachers can identify indoor air quality concerns related to carbon dioxide levels that may compromise student and teacher health. An indoor air quality report issued by UC Davis in 2019 found that many classrooms have very high carbon dioxide levels, and school reopening concerns related to the COVID-19 pandemic have placed an increased focus and urgency to improve classroom indoor air quality. Improving indoor air quality in classrooms has shown to reduce absenteeism, reduce COVID-19 exposure, and maintain an improved environment for academic success This proposal aims to provide a mechanism to identify and address indoor air quality concerns with the requirement for carbon dioxide monitors in classrooms. Currently only new classrooms require CO<sub>2</sub> monitors; this proposal will require CO<sub>2</sub> monitors be installed in existing classrooms when additions or alterations are made to an existing building. By expanding the requirement to alterations and additions, monitoring of CO<sub>2</sub> levels in all schools will be realized more quickly. The expanded application will also address what would be an equity issue in that often, new construction only occurs in newer more affluent regions. Older, schools and school districts that undergo less new construction would be left with not only with older facilities without monitoring, but in many cases those older facilities have drastically poorer air quality. The CO<sub>2</sub> monitors required are not costly and would add little to the overall construction cost of even small alterations.

**CAC Recommendation:**

Approve.

## Approve Agency Response:

Accept.

### ITEM 3

#### Chapter 5 NONRESIDENTIAL MANDATORY MEASURES, DIVISION 5.1-PLANNING AND DESIGN, SECTION 5.105 DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES

**5.105 Deconstruction and Reuse of Existing Structures, (Reserved)** This section was previously reserved for future use and this code cycle DSA is proposing to add new mandatory regulations for the reuse of existing structures. This regulation does not require that an existing building be reused; it requires if a building is being reused, a minimum 45 percent of the existing building primary structural elements shall be maintained. Studies have shown building reuse almost always offers environmental savings over demolition and new construction, when comparing buildings of equivalent size and function. According to [The Greenest Building: Quantifying the Environmental Value of Building Reuse \(PDF\)](#), “It can take between 10 to 80 years for a new energy efficient building to overcome, through efficient operations, the climate change impacts created by its construction. The study finds that the majority of building types in different climates will take between 20-30 years to compensate for the initial carbon impacts from construction.”

According to the AIACA, “Reusing a building – including interior renovations and energy upgrades – has a much lower embodied carbon footprint than new construction – typically 50 to 75 percent lower, depending on the extent of the renovation. But reuse without improving efficiency is not enough, we also need to reduce current operating emissions by implementing efficiency upgrades, electrification, and cleaner sources of electricity.

Reusing and improving existing buildings also has a societal benefit – it can help rebuild existing neighborhood and financial equity, create local jobs, strengthen community control, and increase neighborhood resilience. Investment in communities that have been subjected to historic discrimination and economic redlining has the potential to bring sustainable and equitable climate solutions that also have meaningful economic outcomes to the most impacted communities. To make this potential a reality, decisions must be made by and benefits accrued to those impacted or affected by the improvements.”

#### [What can you can do right now: Reuse and Retrofit Existing Buildings:](#)

Further, the U.S. Environmental Protection Agency EPA created the [Waste Reduction Model \(WARM\)](#) “to provide high-level estimates of potential greenhouse gas (GHG) emissions reductions, energy savings, and economic impacts from several different waste management practices. WARM estimates these impacts from baseline and alternative waste management practices—source reduction, recycling, anaerobic digestion, combustion, composting and landfilling.”

The Figure 1 test scenario inserted several common building materials that could be reused rather than demolished and send to a landfill. The figure estimates that material reuse (also called source reduction which is the waste reduction from not creating a material in the first place) can have significant equivalent carbon emissions savings compared to recycling or landfilling materials during demolition and construction activities.

Figure 1. Savings from Materials Reuse Compared to Landfilling in Metric Tons of Carbon Dioxide Equivalents

<b>Material</b>	<b>Basecase Scenario: Landfill 100 Tons  (MTCO<sub>2</sub>E)</b>	<b>Alternative Scenario: Reuse / Source Reduce 100 Tons  (MTCO<sub>2</sub>E)</b>	<b>Change due to Reuse/Recycling:  (MTCO<sub>2</sub>E)</b>
Asphalt Concrete	2.0	-11.1	-13.1
Asphalt Shingles	2.0	-19.0	-21.0
Carpet	2.0	-368.3	-370.3
Dimensional Lumber	-92.3	-213.3	-120.9
Fiberglass Insulation	2.0	-37.7	-39.8
Medium-density Fiberboard	-85.4	-241.4	-156.0
Structural Steel	2.0	-166.8	-168.8

Source: US EPA WASTE Reduction Model (WARM), version 15, <http://www.epa.gov/WARM>

**CAC Recommendation:**

Further Study. Suggestion to add exception for Historical Code.

**Agency Response:**

Disagree. Exception for Historical Code reference to be considered in future code cycle.

**5.105.1.1 Scope.** The scoping section includes alterations, combined altered floor area of 50,000 square feet or greater, and additions to existing buildings 50,000 square feet or greater to comply with four options: reuse 45 percent of the building, whole building life cycle assessment, product GWP compliance-weighted average path, product GWP compliance prescriptive path. An exception is included to clarify that when an addition exceeds twice the area of the original, the addition is to be considered a new building and thus not able to comply with the Building Reuse path. For more information about the compliance paths, see items 7 and 8 below.

**CAC Recommendation: Further Study.**

Suggestion to add the word “altered” to floor area.

**Agency Response:**

Accept the CAC recommendation and have added the word “altered” to floor area.

**5.105.2 Reuse of existing building.** When an addition or alteration to an existing building occurs a minimum 45 percent of the building primary structural elements such as foundations, columns, beams, walls, floors, and lateral elements shall be maintained. Portions of a building deemed structurally unsound or hazardous, and hazardous material shall not be included in the calculation.

**5.105.2.1 Verification of compliance.** To ensure design professionals and to assist with enforcement, a verification section is included that requires the construction documents

demonstrate compliance. A sample worksheet WS-3 is added to CALGreen Chapter 8 that can be included in the construction documents.

**5.105.3 Deconstruction (Reserved).** This section is added as a place holder for future use to address the deconstruction portion of the main section.

**CAC Recommendation:**

Further Study.

**Agency Response:**

Disagree with the CAC recommendations for Sections 5.105.2, 5.105. 2.1, and 5.105.3. The recommendation has been done for entire Item 3 and these code sections were not affected by further study.

**ITEM 4**

**Chapter 5 Non-residential Mandatory Measures, Division 5.1 Planning and Design, Section 5.106 Site Development**

**Rationale:** DSA proposes to relocate existing co-adopted sections 5.106.5.3 and related sub-sections of CALGreen into a new school specific Section 5.105.5.6 and related sub-sections. DSA currently adopts the non-residential section of CALGreen for EV charging requirements. Non-residential occupancies have a varied amount of parking facility types, whereas DSA has only one. Creating a public school and community college section allows DSA to better enact school specific EV regulations. Additionally existing language has been changed and new code sections have been created for added clarity. Due to the nature of smaller distributed school parking facilities, it is necessary to include EV charging in parking facilities with ten to twenty-five spaces. DSA did not receive any opposition to this change during our outreach.

During our outreach for this code cycle, we found that school needs were not being met by allowing only Level 2 and DCFC charging to achieve compliance. DSA has proposed an alternative compliance method in new code Section 5.106.5.6.3 and related new Table 5.106.5.6.3 for flexibility and additional ease of use. This alternative power method allows compliance to be met with varying combinations of charger types. This gives school districts the ability to customize charging to meet the needs of individual campuses.

DSA has proposed requirements to add EV chargers to addition and/or alteration projects in new code Sections 5.106.5.6.4 and related new sub-sections. DSA has been tasked to promote the reduction of GHG emissions, by adding these requirements when a service upgrade happens to the electrical panel serving a parking area, when additional spaces are added to parking, or when new solar panels are added to existing parking new chargers are required to be added.

**CAC Recommendation:**

Approve for the various code sections in Item 4 with exception of Section 5.106.5.6.2.

Further study for Section 5.106.5.6.2. Suggestion to review and consider adding language that “at least one Level 2 EVSE shall be provided”.

**Agency Response:**

Accept for various code sections in Item 4 with exception of Section 5.106.5.6.2.

Disagree with Section 5.106.5.6.2. Schools are inherently different than most other nonresidential parking facilities. A majority of school parking is typically closed to the public, and most cars will be parked for long periods of time. Through outreach DSA found that schools overwhelmingly need flexibility in how they install EV chargers. While DSA understands the concern, DSA asserts that not requiring specific types of charging will grant schools the ability to choose the options that best fit both their campus infrastructure and population needs. DSA received no opposition comments from the public on this item.

#### **ITEM 5**

#### **Chapter 5 NONRESIDENTIAL MANDATORY MEASURES, DIVISION 5.4- MATERIAL CONSERVATION AND RESOURCE EFFICIENCY, SECTION 5.401 GENERAL, SECTION 5.402 DEFINITIONS**

**Rationale:5.401.1 Scope.** Amendments are proposed to the existing scoping section to include greenhouse gas (GHG) emission reduction and provide clarity.

**5.402 Definitions.** The appropriate new defined terms are added to the list for consistency in the code. However, the terms definitions are in Chapter 2.

**CAC Recommendation:**

Approve.

**Agency Response:**

Accept.

#### **ITEM 6**

Withdrawn.

**CAC Recommendation:**

Further Study.

**Agency Response:**

Withdrawn.

#### **ITEM 7**

#### **Chapter 5 NONRESIDENTIAL MANDATORY MEASURES, DIVISION 5.4- MATERIAL CONSERVATION AND RESOURCE EFFICIENCY, SECTION 5.409 LIFE CYCLE ASSESSMENT**

**Rationale: Section 5.409 Life cycle assessment.** This was a section previously reserved for future use and this code cycle BSC-CG and DSA are proposing to add new mandatory regulations for whole building life cycle assessment (WBLCA). WBLCA is one compliance path. Section 5.409.2 below contains a product GWP compliance path, giving the design professionals options.

**5.409.1 Scope.** The new scoping section requires a newly constructed building 50,000 square feet or greater to comply with any of the two carbon reduction paths; Section 5.409.2 Whole building life-cycle assessment (WBLCA), 5.409.3 Product GWP compliance path. Alterations to existing buildings where the combined floor area is 50,000 square feet or greater, may comply with the two paths listed above or 5.105.2 Reuse of existing buildings.

**5.409.2 Whole-building life-cycle assessment.** This section requires a cradle-to-grave WBLCA be performed in accordance with ISO 14040 and 14044 reference standards, excluding the operating energy, and demonstrate a 10 percent reduction in global warming potential (GWP). Projects must exclude operating energy analysis in the WBLCA because energy efficiency savings over a building's lifecycle are captured by the California Energy Code (Title 24, Part 6). ISO 14044 is the foremost standard that address the assessment of the environmental aspects of a building for all life cycle stages. WB LCA modeling programs use ISO 14040 as the trusted source to compare products and projects across all four phases of LCA. Excluding operational energy from the calculation eliminates teams' ability to trade operational energy savings for embodied carbon. Further, other sections of Title 24 address requirements for operational energy.

**5.409.2.1 Building components.** This section clarifies which building components are included in the whole building life cycle analysis. The scope is limited to primary and secondary structural elements.

**5.409.2.2 Reference study period.** This subsection specifies that 60 years is the assumed building lifespan and study period for the WBLCA assessment.

**5.409.2.3 Verification of compliance.** This subsection specifies that the GWP analysis shall be included in the construction documents. Including the GWP analysis in the project documents will make verification of compliance simpler and allow building owners to review the environmental impacts of their project material choices, leading to greater awareness of embodied carbon impacts throughout the design and construction industry. Designers must include the product selection considerations as identified from the WBLCA to ensure that the modeled products are included in the final building. Since the code specifies the requirements that WBLCA software must comply, the reporting will be consistent when the code is followed.

**NOTES:** The notes include software options for performing the GWP analysis. Some are free of charge, others for fee.

**CAC Recommendation:**

Approve.

**Agency Response:**

Accept.

**ITEM 8**

**Chapter 5 NONRESIDENTIAL MANDATORY MEASURES, DIVISION 5.4- MATERIAL CONSERVATION AND RESOURCE EFFICIENCY, SECTION 5.409 LIFE CYCLE ASSESSMENT**

**Rationale: 5.409.3 Product GWP compliance-prescriptive path and 5.409.3.1.** The new section offers an additional compliance path, utilizing specific product categories and maximum acceptable GWP values listed in Table 5.409.3. This approach provides project teams a prescriptive option to purchase lower carbon materials based on product purchasing and procurement during construction. The target materials are based on the Buy Clean California Act (BCCA) and represents 175 percent BCCA GWP values, except for concrete products which are not included in BCCA. The Concrete ready mixed and lightweight ready-mixed values are based on 175 percent of the National Ready Mix Concrete Association (NRMCA) 2021 version 3 Pacific Southwest regional benchmark

values. Concrete high-early strength concrete is not included in the benchmark values it should be calculated at 130 percent of the ready-mixed values in the table.

Concrete, being a unique regional product, is allowed a weighted average calculation for all concrete mixes used on a project. Project teams can choose for each mix to comply the GWP value in the table, or they can use the calculation provided to illustrate that, collectively, the concrete mixes do not exceed the allowed GWP value. This approach was considered after the California Construction and Industrial Material Associate, California Nevada Cement Association, National Ready Mixed Concrete Association, and American Concrete Institute (referred to below as the Concrete Industry) provided the recommendation to use an average approach.

**5.409.3.1, Exception and Equation.** During the CCRC meetings the concrete/cement industry provided feedback that various regions in California may not be able to comply with prescriptive maximum acceptable GWP value in Table 5.409.3, so the exception allows concrete to be considered one product category, rather than several, and calculate a weighted average maximum GWP equation. The weighted average approach also allows more flexibility by allowing projects the ability to trade-off concrete mixes in situations where certain applications may fall outside the prescriptive limits but that are necessary for the project. In order to alleviate the immediate impacts on the concrete industry in creating plant-specific EPDs, an allowance for this exception was added to allow for use of the currently available Industry wide EPDs.

**5.409.3.2 Verification of compliance.** This subsection specifies that calculations to demonstrate compliance and PDF copies or links to Type III EPDs referenced in the calculations shall be included in the construction documents. Also, any updated EPD that were subsisted after the construction permit was issued shall be provided to the owner at the close of construction. Updated EPDs may be submitted to the enforcement agency, if requested. Including the GWP analysis in the project documents will make verification of compliance simpler and allow building owners to review the environmental impacts of their project material choices, leading to greater awareness of embodied carbon impacts throughout the design and construction industry.

**NOTES:** Sample worksheets intended to assist with compliance are provided in Chapter 8. BSC will make every effort to provide electronic versions that can be used by design professional and local enforcement entities.

**Table 5.409.3 Product GWP limits,** is based on the Buy Clean California Act (BCCA) and represents 175 percent BCCA GWP values, except for concrete products which are not included in BCCA. The Concrete values are based on Industry-Wide Environmental Product Declaration (IW-EPD) regional concrete values and represents 130 percent of the ready-mix concrete GWP values. The Concrete ready mixed and lightweight ready-mixed values are based on 175 percent of the National Ready Mix Concrete Association (NRMCA) 2021 version 3 Pacific Southwest regional benchmark values. Concrete high-early strength concrete is not included in the benchmark values. It should be calculated at 130 percent of the ready-mixed values in the table.

**CAC Recommendation:**

Approve.

**Agency Response:**

Accept.

## ITEM 9

### Chapter 6 REFERENCED ORGANIZATIONS AND STANDARDS, AND MATERIALS, SECTION 601.1 GENERAL

**Rationale:** **ACI AMERICAN CONCRETE INSTITUTE**, ACI CT-21 is added to the reference standards table since these standards are used in the amended Section A5.405.5.2.1.1 Mix design equation.

**EN EUROPEAN STANDARD**, EN 1504 AND EN 15978-2011 are added to the reference standards table since these standards are referenced in the new CCRC regulations.

**ISO INTERNATIONAL ORGANIZATION FOR STANDARDIZATION**, ISO 14040, 14044-2006, ISAO 21930-2017, ISO 21931-2017 are added to the reference standards table since these standards are referenced in the new CCRC regulations and are nationally recognized.

**CAC Recommendation:**

Approve.

**Agency Response:**

Accept.

## ITEM 10

### Chapter 8 COMPLIANCE FORMS, WORKSHEETS AND REFERENCE MATERIALS

**WORKSHEET (WS-3) Building reuse** is added to the Chapter 8 to support Section 5.105.1 Verification of compliance for building reuse. Use of the worksheet is not mandatory; however, it is provided to assist in showing compliance. The worksheet includes the area of the existing building, area of aggregate addition if applicable, and various options for calculating structural and nonstructural elements to show a reuse of 45 percent minimum primary structural elements (foundations; columns, beams, walls, and floors; and lateral elements) and existing building enclosure (roof framing, wall framing and exterior finishes).

**CAC Recommendation:**

Approve for Worksheets WS-3.

**Agency Response:**

Accept recommendation for WS-3. DSA withdrew the proposals for Worksheets WS-4 and WS-5 post CAC meeting. DSA withdrew the proposals for Worksheets WS-6 and WS-7 during the CAC meeting.

### TECHNICAL, THEORETICAL, AND EMPIRICAL STUDY, REPORT, OR SIMILAR DOCUMENTS

Government Code Section 11346.2(b)(3) requires an identification of each technical, theoretical, and empirical study, report, or similar document, if any, upon which the agency relies in proposing the regulation(s).

#### **Decarbonization Regulations Item Numbers 3 and 5-10:**

California Air Resources Board (CARB) Draft 2022 Scoping Plan Update, Achieving Carbon Neutrality by 2045

California Air Resources Board (CARB) [2008 Final Scoping Plan \(May 2009 version\)](#)

California Air Resource Board (CARB) [Climate Change Draft Scoping Plan, Appendices June 2009 Discussion Draft](#)

California Energy Commission (CEC) [2021 Integrated Energy Policy Report](#) Volume I- Building Decarbonization

American Institute of Architects, Architecture 2030, <https://architecture2030.org/embodied-carbon-actions/>

Carbon Leadership Forum, Understanding Embodied Carbon, [1 - Embodied Carbon 101 - Carbon Leadership Forum](#)

U.S. Environmental Protection Agency [Waste Reduction Model \(WARM\)](#) EPA created the Waste Reduction Model (WARM) to provide high-level estimates of potential greenhouse gas (GHG) emissions reductions, energy savings, and economic impacts from several different waste management practices. WARM estimates these impacts from baseline and alternative waste management practices—source reduction, recycling, anaerobic digestion, combustion, composting and landfilling.

Natural Trust for Historic Preservation, The Greenest Building: Quantifying the Environmental Value of Building Reuse  
<https://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=5119e24d-ae4c-3402-7c8e-38a11a4fca12&forceDialog=0>

2018 Commercial Buildings Energy Consumption Survey Data on building size and area indicates that this 50,000 sq ft threshold will apply to about 15 percent of buildings, but influence about 50 percent of square footage. [Energy Information Administration \(EIA\)- Commercial Buildings Energy Consumption Survey \(CBECS\) Data](#)

[What you can do right now: Reuse and Retrofit Existing Buildings \(PDF\)](#)

[U.S. Energy Information Administration, 2018 Commercial Building Energy Consumption Survey \(PDF\)](#),

[CALTRANS Greenhouse Gas Emissions and Mitigation Report August 2020](#)

*A Comprehensive Literature Review of Using Recycled Concrete Aggregates in Concrete Pavement* Report Number: CP2C-2019-105 (Sept. 2019)

U.S. Department of Transportation Federal Highway Administration [Sustainable Pavements Program](#)

National Concrete Pavement Technology Center – [Concrete Recycling](#)

[Concrete Pavement Recycling Series: Quantifying the Sustainable Benefits of Concrete Pavement Recycling \(PDF\)](#)

[Concrete Pavement Recycling Series: Concrete Pavement Recycling and the Use of Recycled Concrete Aggregate \(RCA\) in concrete Paving Mixtures \(PDF\)](#)

*Environmental Impacts of Recycled Plastic Concrete*, a report for Caltrans by Climate Earth

#### **Electric Vehicle Charging Regulations Item 4:**

- Staff referenced [CEC's AB 2127 Report](#), to estimate the number of charging stations that would be required to support 5 million ZEVs by 2030.

- Staff used the [Energy Information Administration's 2012 and 2018 Commercial Building Energy Consumption Survey \(CBECS\)](#).
- Staff reviewed a third-party website and reached out to electric vehicle supply providers (EVSPs) to collect cost information on Level 2 chargers and the cost of purchasing a DCFC. Staff also reviewed an [International Council on Clean Transportation \(ICCT\) report](#) that included an average cost to purchase a DCFC (charger and pedestal).<sup>1</sup>
- Staff reviewed the 2021 National Construction Cost Estimator to estimate the costs of installing an EV Capable space, an EV Ready space, and Level 2 EVSE.<sup>2</sup>
- Staff reviewed [CARB Technical Analysis: EV Charging Infrastructure Nonresidential CALGreen 2019/2020 Intervening Code Cycle](#).

Staff reviewed [Department of General Services' Ten-Year Sequencing Plan](#)

**C02 Regulations Item Number 2:** There are three technical, theoretical and empirical studies, reports or similar documents used as the basis for the proposed Item 2 to the 2022 California Green Building Standards (CALGreen) Code. These are:

- Wanyu R. Chan, et al., Ventilation Rates in California classrooms: Why many recent HVAC retrofits are not delivering sufficient ventilation, Volume 167 (2020), Western Cooling Efficiency Center-UC Davis, Lawrence Berkeley National Laboratory-Berkeley, CA
- S. Petersen, et al., The effect of increased classroom ventilation rate indicated by reduced CO2 concentration on the performance of schoolwork by children (April 2015), INDOOR AIR 2016, by Department of Engineering, Aarhus University, Denmark
- Mark J. Mendell, et al., Association of classroom ventilation with reduced illness absence: a prospective study in California elementary schools, (May 2013), by Indoor Environment Group, Lawrence Berkeley National Laboratory, Berkeley, CA

## STATEMENT OF JUSTIFICATION FOR PRESCRIPTIVE STANDARDS

Government Code Section 11346.2(b)(1) requires a statement of the reasons why an agency believes any mandates for specific technologies or equipment, or prescriptive standards are required.

**DSA Statement:** The proposed amendments to California Green Building Standards (CALGreen) Code regulations do not mandate any specific technologies or equipment and do not require any prescriptive standards.

## CONSIDERATION OF REASONABLE ALTERNATIVES

Government Code Section 11346.2(b)(4)(A) requires a description of reasonable alternatives to the regulation and the agency's reasons for rejecting those alternatives. In the case of a regulation that would mandate the use of specific technologies or equipment or prescribe specific action or procedures, the imposition of performance standards shall be considered as an alternate. It is not the intent of this paragraph to require the agency to artificially construct alternatives or describe unreasonable alternatives.

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1 Nicholas, 2019. Estimating Charging Infrastructure Costs across U.S. Metropolitan Areas.

2 2021 National Construction Cost Estimator, 67th Edition, Edited by Richard Pray, Craftsman Book Company, October 2020.

**DECARBONIZATION regulations Item 3 and 5-10:** The American Institute of Architects California (AIACA), submitted a petition in 2019 requesting that California adopt the Zero Code, a reach code to supplement the California Energy Code. The Zero Code integrates cost-effective energy efficiency standards with on-site and/or off-site renewable energy, resulting in Zero-Net-Carbon (ZNC) buildings. Due to the energy component, CBSC forwarded the petition to the California Energy Commission because CBSC does not have authority to promulgate regulations pertaining to energy, but the California Energy Commission denied the petition. Subsequently, CBSC entered into discussions with stakeholders to ascertain how the goals of the petitioners and stakeholders could be integrated into CALGreen, for which CBSC has broad authority pursuant to Health and Safety Code Section 18930.5.

**Electric Vehicle Charging Regulations Item 4:** No reasonable alternatives were identified.

**C02 Regulations Item 2:** No reasonable alternatives were identified.

### **REASONABLE ALTERNATIVES THE AGENCY HAS IDENTIFIED THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS**

Government Code Section 11346.2(b)(4)(B) requires a description of any reasonable alternatives that have been identified or that have otherwise been identified and brought to the attention of the agency that would lessen any adverse impact on small business.

**Decarbonization Regulations Item 3 and 5-10:** DSA in collaboration with CBSC has determined that no reasonable alternative considered by DSA or that has otherwise been identified and brought to the attention of DSA would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected small businesses than the proposed action. In addition, no reasonable alternative considered by CBSC or that has otherwise been identified and brought to the attention of CBSC would be more cost-effective to affected small businesses and equally effective in implementing the statutory policy or other provisions of law.

**Electric Vehicle Charging Regulations Item 4:** No reasonable alternatives were identified or that have otherwise been identified and brought to the attention of the agency that would lessen any adverse impact on small business.

**C02 Regulations Item 2:** No reasonable alternatives were identified or that have otherwise been identified and brought to the attention of the agency that would lessen any adverse impact on small business.

### **FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS**

Government Code Section 11346.2(b)(5)(A) requires the facts, evidence, documents, testimony, or other evidence on which the agency relies to support an initial determination that the action will not have a significant adverse economic impact on business.

**Decarbonization regulations Item 3 and 5-10:** An analysis provided by RMI, Energy Solutions, and AIACA (available upon request) indicate that compliance with the LCA option would be an average of \$15,000.00 per project. This would approximate \$375,000 statewide annually, noting that this calculation assumes all projects subject to this regulation will choose the LCA compliance path, which is unlikely. The LCA compliance path is the costliest of the three options.

A second compliance path, the product GWP compliance-prescriptive path, may or may not impose a marginal cost to the project owner which cannot be determined. This compliance path imposes a cost on manufacturers of concrete, steel, flat glass, mineral wood board insulation, and mineral wood board to obtain an EPD for their products. An analysis provided by California Construction and Industrial Materials Association (CalCIMA) (available upon request) indicated that it would cost approximately \$1.5 million for concrete mixing plants in California that do not currently have EPDs to obtain EPDs. However, it is unlikely that all concrete mixing plants, nor all other affected product manufacturers in California, will seek to obtain EPDs at once in the following year. Data was not provided by the glazing, steel, or mineral wood board industries.

A third compliance option with this regulation is a building reuse method. With this third option, when a building 50,000 square feet or greater undergoes an alteration or addition, 45 percent of the buildings structural elements and enclosure must be maintained. Cost data for this compliance method are unknown as numerous variables exist that cannot be forecasted such as the condition of an existing building, design decisions, and the cost to purchase various buildings across the state. However, there is a possibility that exercising this option may save a project owner money when compared to the other two compliance options.

**Electric Vehicle Charging Regulations Item 4:** DSA-SS did not identify any facts, evidence, documents, testimony, or other substantiation to make an initial determination of significant adverse economic impact on businesses. DSA-SS has determined that this regulatory action would not have a significant adverse economic impact on California business enterprises and individuals, including the ability of California businesses to compete with businesses in other states.

**C02 Regulations Item 2:** DSA-SS did not identify any facts, evidence, documents, testimony, or other substantiation to make an initial determination of significant adverse economic impact on businesses. DSA-SS has determined that this regulatory action would not have a significant adverse economic impact on California business enterprises and individuals, including the ability of California businesses to compete with businesses in other states.

## **ASSESSMENT OF EFFECT OF REGULATIONS UPON JOBS AND BUSINESS EXPANSION, ELIMINATION OR CREATION**

Government Code Sections 11346.3(b)(1) and 11346.5(a)(10)

**Decarbonization regulations Item 3 and 5-10:** DSA SS/CC and BSC/CG has assessed whether and to what extent this proposal will affect the following:

**A. The creation or elimination of jobs within the State of California.**

This regulation may cause jobs to be created for the analysis of whole building LCA and EPDs. This regulation will not affect the elimination of jobs within the State of California.

**B. The creation of new businesses or the elimination of existing businesses within the State of California.**

This regulation may cause the creation of businesses that that provide whole building lifecycle analysis or creation and analysis of EPDs. This regulation will not affect the elimination of jobs within the State of California.

**C. The expansion of businesses currently doing business within the State of California.**

This regulation may cause the expansion of businesses doing business within the State of California that provide whole building lifecycle analysis or creation and analysis of EPDs or employ such analysts in-house.

**D. The benefits of the regulation to the health and welfare of California residents, worker safety, and the state's environment.**

These regulations will further support the reduction of greenhouse gas emissions, and provide increased protection of public health and safety, worker safety and the environment.

**Electric Vehicle Charging Regulations Item 4 and CO2 Regulations Item 2:** DSA SS/CC has assessed whether and to what extent this proposal will affect the following:

**E. The creation or elimination of jobs within the State of California.**

**DSA Statement:** These regulations may cause some jobs to be created for the installation, maintaining and manufacturing of Electric Vehicle Supply Equipment and Carbon Dioxide Monitoring Equipment. No jobs are expected to be eliminated within the State of California.

**F. The creation of new businesses or the elimination of existing businesses within the State of California.**

**DSA Statement:** These regulations may cause the creation of businesses that expand into the EV and CO2 Monitor market. These regulations will not affect the elimination of jobs within the State of California.

**G. The expansion of businesses currently doing business within the State of California.**

**DSA Statement:** These regulations may promote the expansion of businesses currently involved with Electric Vehicle and CO2 Monitoring manufacturing, installation, maintenance, and technology development within the State of California.

**H. The benefits of the regulation to the health and welfare of California residents, worker safety, and the state's environment.**

**DSA Statement:** These regulations will increase the sustainability of California's natural resources by reducing fuel use, GHG emissions, criteria pollutants, and fossil fuel dependence. Additionally, updating and clarifying the minimum requirements in the California Green Building Standards (CALGreen) Code will provide increased protection of public health and safety, worker safety, and the environment.

**ESTIMATED COST OF COMPLIANCE, ESTIMATED POTENTIAL BENEFITS, AND RELATED ASSUMPTIONS USED FOR BUILDING STANDARDS**

Government Code Section 11346.2(b)(5)(B)(i) states if a proposed regulation is a building standard, the initial statement of reasons shall include the estimated cost of compliance, the estimated potential benefits, and the related assumptions used to determine the estimates.

**Decarbonization Regulations Item 3 and 5-10:** An analysis provided by RMI and Energy Solutions (available upon request) and AIACA (available upon request) indicate that compliance with the LCA option may range from \$8,238,617 to \$11,500,000 statewide

annually, or 0.1 percent to 2.5 percent of total construction costs, noting that this calculation assumes all buildings subject to this regulation will choose the LCA compliance path, which is unlikely. The LCA compliance path is also the costliest of the three options.

A second compliance path, the product GWP compliance-prescriptive path, may or may not impose a marginal cost to the project owner which cannot be determined. This compliance path imposes a cost on manufacturers of concrete, steel, flat glass, mineral wood board insulation, and mineral wood board to obtain an EPD for their products. An analysis provided by California Construction and Industrial Materials Association (CalCIMA) (available upon request) indicated that it would cost approximately \$1.5 million for concrete mixing plants in California that do not currently have EPDs to obtain EPDs. However, it is unlikely that all concrete mixing plants, nor all other affected product manufacturers in California, will seek to obtain EPDs at once in the following year. Data was not provided by the glazing, steel, or mineral wood board industries.

A third compliance option with this regulation is a building reuse method. With this third option, when a building 50,000 square feet or greater undergoes an alteration or addition, 45 percent of the buildings structural elements and enclosure must be maintained. Cost data for this compliance method are unknown as numerous variables exist that cannot be forecasted such as the condition of an existing building, design decisions, and the cost to purchase various buildings across the state. However, there is a possibility that exercising this option may save a project owner money when compared to the other two compliance options.

The benefits of this regulation include reduced greenhouse gas emissions, construction waste management, building reuse, life cycle assessment, the use of global warming potential product declarations, mitigation for extreme heat impacts that result from already locked in climate deterioration, and options for reducing the carbon impacts of high use, high impact materials such as cement and concrete, as well as worker safety, health and welfare of California residents, and an improvement in the State's environment.

**Electric Vehicle Charging Regulations Item 4:** DSA Statement: The estimated costs to comply with the proposed requirement for electric vehicle infrastructure and supply equipment is \$7,766 for elementary schools, \$15,531 for middle schools, \$58,24300 for high schools, and \$97,072 for community colleges. The potential benefit is alignment of Governor Newsom's environmental goals for a reduction in greenhouse gas emissions and the opportunity for students and faculty to have access to charging if charging is not available at their place of residence. The assumptions for costs are based on the average annual construction of new campuses in the state.

**C02 Regulations Item 2:** DSA Statement: The estimated costs to comply with the proposed requirement for the installation of carbon dioxide monitors in existing classrooms is approximately \$500 per monitor, based on the projected costs made available to the UC Davis study from several undisclosed private companies using the parameters currently required in the CALGreen codes. The actual costs for alterations or additions made to an existing building is dependent on the number of classrooms in the building. The potential benefit is an optimal environment for learning, reduction in absenteeism, and increased academic success for students and faculty.

## **DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS**

Government Code Section 11346.2(b)(6) requires a department, board, or commission within the Environmental Protection Agency, the Resources Agency, or the Office of the

State Fire Marshal to describe its efforts, in connection with a proposed rulemaking action, to avoid unnecessary duplication or conflicts with federal regulations contained in the Code of Federal Regulations addressing the same issues. These agencies may adopt regulations different from these federal regulations upon a finding of one or more of the following justifications: (A) The differing state regulations are authorized by law and/or (B) The cost of differing state regulations is justified by the benefit to human health, public safety, public welfare, or the environment.

**DSA Statement:** There are no proposed California Green Building Standards (CALGreen) Code regulations that duplicate or conflict with federal regulations.