

Comment Received From: CA Statewide Utility Codes and Standards Enhancement Team

Submitted On: 6/27/2024

Docket Number: 24-BSTD-02

Statewide CASE Team Comments on 2025 CALGreen Rulemaking Express Terms

Additional submitted attachment is included below.

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June 27, 2024

Commissioner McAllister and Building Standards Office staff,

Thank you for the opportunity to participate in the update to California's 2025 voluntary energy efficiency standards located in CALGreen (Title 24, Part 11), section A4.2 and A5.2. The Statewide Utility Codes and Standards Enhancement (CASE) Team and utility Compliance Improvement (CI) Team appreciate the California Energy Commission (CEC) providing an opportunity for stakeholders to engage in the rulemaking process.

The utility-sponsored Statewide Reach Codes Program encourages and supports cities interested in adopting CALGreen and reach codes. Since most buildings in the state are existing, older vintage buildings with massive potential for saving energy and reducing greenhouse gas (GHG) emissions, the Statewide CASE Team is highly motivated to improve coordination between Title 24, Part 6 and Part 11 and increase adoption and enforcement of statewide standards for existing buildings.

CI Team subject matter experts work closely with the CASE proposal authors to address compliance and enforcement goals in Title 24, Part 11. The CI Team's goal is to reduce roadblocks for industry professionals in the compliance supply chain. Through the IOUs' sponsorship, the CI Team focuses on bridging the gaps between development and implementation of the energy code.

Recommended Revisions

Recommended revisions and justifications are provided in the table below. These revisions include suggested language to improve the clarity and enforceability for both the pool and lighting requirements. Highlights include:

- The comments on the lighting section explain some of the challenges with the current section using terms and metrics that will be difficult for local jurisdictions to enforce. They also point out the potential confusion regarding what type of

luminaires are required to meet the requirements by referring users back and forth between Title 24, Part 6 and Title 24, Part 11 for the exceptions.

- The proposed code changes to the pool section address the potential of solar and electric heat pump technology to drive increases in efficiency and significant greenhouse gas (GHG) emission reductions. The suggested changes would further clarify needed exceptions where the circumstances of existing buildings preclude the use of solar pool heating systems. Comments include other suggested changes to help bring the CALGreen proposal in line with recent changes found in the 15-Day Language of the Title 24 Part 6 Solar Pool Heating Measure.

Our comments are noted in the table below; where noted in the table, see the Appendix in this document for additional mark-up language and/or explanation.

Thank you for considering these comments, which we believe will help improve user's experience with CALGreen. The Statewide CASE Team is prepared to offer our assistance to CEC staff to resolve concerns or outstanding issues that will improve clarity and enforceability, leading to sustained energy savings and reduced greenhouse gas emissions.

CALGreen | Summary of CASE Team Comments to Express Terms

Remark #	Section(s)	Name of Reviewer	Concise Summary of Issue or Discrepancy	Does the issue or discrepancy from previous column conflict with 2025 Title 24, Part 6 language?	Does the issue increase or decrease savings?	Recommended Change / Language Mark-ups	Justification for recommended change
1	A4.204.1.1V	Alea German	The current language in A4.204.1.1V does not allow any exceptions for attics with existing levels of higher insulation or where there are safety or accessibility concerns. The CASE Team suggests including this exception to allow for flexibility.	Yes	Yes	<u>V. Vented attics shall have insulation installed to achieve a U-factor of 0.020 or insulation installed at the ceiling level shall result in an insulated thermal resistance of R-49 or greater for the insulation alone; and</u> <u>Exception 1 to Section A4.204.1.1V: In Climate Zones 1, 3, and 6, dwelling units with at least R-19 existing insulation installed at the ceiling level, and in all other climate zones dwelling units with at least R-38 existing insulation installed at the ceiling level.</u> <u>Exception 2 to Section A4.204.1.1V: Dwelling units where the alteration would directly cause the disturbance of asbestos.</u> <u>Exception 3 to Section A4.204.1.1V: Dwelling units with knob and tube wiring located in the vented attic.</u> <u>Exception 4 to Section A4.204.1.1V: Where the accessible space in the attic is not large enough to accommodate the required R-value, the entire accessible space shall be filled with insulation provided such installation does not violate Section 806.3 of Title 24, Part 2.5.</u>	This change is recommended to align with the requirements in Part 6 and also align with the approach in A4.204.1.1VI to apply the exceptions in Part 6 Section 150.2(b)1J for both air sealing and attic insulation.
2	A4.204.1.1VI	Alea German	A4.204.1.1VI references Section 150.2(b)1Jii which only requires air sealing in select CZs. Propose to include the requirements directly in Part 11 language rather than by reference.	Yes	Yes	<u>VI. Air seal all accessible areas of the ceiling plane between the attic and the conditioned space including all joints, penetrations and other openings that are potential sources of air leakage by caulking, gasketing, weather-stripping or otherwise sealing to limit infiltration and exfiltration in accordance with the requirements in Title 24, Part 6 Section 150.2(b)1Jii.</u> <u>Exception 1 to Section A4.204.1.1VI: Dwelling units with at least R-19 existing insulation installed at the ceiling level.</u> <u>Exception 2 to Section A4.204.1.1VI: Dwelling units with atmospherically vented space heating or water heating combustion appliances located inside the pressure boundary of the dwelling unit.</u>	Repeating the language in Part 11 makes it easier for people to reference the applicable code requirements in one place. This change also provides clarity that the requirements apply in all CZs.
3	A4.204.1.1	Farhad Farahman	Missing words/improper grammar	No	No	<u>a. A heat pump as shall be the primary heating source and sized according to the system selection requirements specified by Title 24, Part 6 of Section 150.0(h)5. Supplemental heating may be provided by an existing gas furnace or existing electric resistance heating; or</u> <u>b. An air conditioner that shall-meets the following requirements:</u>	Grammar clean up will make the code language clearer.
4	Exception 1 to Section A4.204.1.1:	Farhad Farahmand / Alea German	Suggest rephrasing to make clear that the even when a new AC would require a service upgrade, it doesn't exempt the additional requirements of b.I - b.VI.	No	Yes	<u>Exception 1 to Section A4.204.1.1: Where the capacity of the existing main electrical service panel is insufficient to supplyservice the additional electrical capacity of a heat pump and where the existing main electrical service panel is sufficient to supply relative to a new or replace-ment air conditioner, as calculated according to the requirements of California Electrical Code Article 220.83 or 220.87. Documentation of electrical load calculations in accordance with Article 220 must be submitted to the enforcement agency prior to permitting for both the heat pump and proposed air conditioner.</u>	Current language excuses some replacements based on assumption that the heat pump is the only trigger for service panel upgrade. In some cases, air conditioner replacement may trigger a panel upgrade. In these cases, the heat pump exception should not apply.

5	A4.204	Luke Morton	This section indicates that this section only applies to Alterations. This would apparently exclude additions, and we question whether or not that is the intent. Furthermore, we observe that this measure would only to apply to alterations that "increases the building's conditioned area, volume or size" per Section 301.1.1 of CALGreen. Municipalities should be aware of this and consider their own amendments to CALGreen in their local ordinances if they intend this measure to apply to all AC alterations.	No	Yes	We recommend that additions that trigger CALGreen code requirements be explicitly included in voluntary measure.	We believe that the intent of the measure was to include additions, but current language doesn't support that scope. Including additions would substantially increase the number of projects captured by this measure with corresponding increase in savings.
6	Section A4.203.1.1 and Table A4.203.1.1	Luke Morton	No cost-effectiveness report has been submitted supporting these compliance margins. We note that such cost-effectiveness would need to be demonstrated by the municipality to support the adoption of a local ordinance energy code. Presumably, the Commission has done their own internal analysis to support these particular margins and encourage that analysis to be published to aid in Reach Code development.	No	No	None	Providing a cost-effectiveness analysis would help local jurisdictions as they draft energy ordinances, especially as they consider adoption of the LSC margins in the CALGreen measure (as opposed to a different margin calculated through a separate, and perhaps redundant analysis).
7	Section A4.203.1.2.5 High Performance Vertical fenestration	Luke Morton	We note that for mild climate zones-- specifically Climate Zones 1, 3, 5, and 16 as well as others depending on site specific factors, the Prescriptive Solar Heat Gain target of 0.23 is often deleterious to energy efficiency when using Performance path. Furthermore, we note that CZ's 2, 6, 7 were also deemed by the CEC in separate studies to have minimal mechanical cooling in new construction, which indicates that this measure may not produce positive savings in those Climate Zones as well.	Yes	Yes	We recommend that CZ's 1,3,5 and 16 be removed from this measure, consistent with Table 150.1-A, and recommend reporting of further analysis on CZ's 2,6, and 7 to demonstrate the prudence for inclusion in this measure.	Results from performance modeling of projects in heating dominated and mild climate zones generally shows negative savings when low SHGC windows are used.
8	Section A4.203.1.4.1 Outdoor Lighting	Luke Morton	Measure includes the following language: Outdoor building-mounted luminaires intended solely to illuminate any surface including walls and signs. The use of the word 'intended' makes this measure difficult to enforce as intent is not readily verifiable by code enforcement. Also-- measure uses the word 'should', which is not mandatory language.	No	Yes	We recommend 'shall' be used instead of 'should', and to include all applicable T24 P6 code sections such as multifamily, or make it clear these requirements do not apply to those building types.	The current language uses terms that are difficult to enforce, which may render the measure inapplicable and/or irrelevant, and reduce the savings this requirement is designed to achieve.
10	A4.202.1	Sean Steffensen	New terms are added for Long-term system cost (LSC), On-site recovered energy, and solar pool heating system. Existing text says the terms are defined in chapter 2. No proposed changes to chapter 2 are shown in 45-day language. A check of current CALGreen chapter 2 has no definitions for these terms.	Yes	No	Add definitions to chapter 2. Use definitions that are consistent with definitions from T24 Part 6	Definitions for new terms will provide clarification for CALGreen users.
11	A4.202.1	Sean Steffensen	The section strikes out energy design rating (EDR), Energy design rating, Energy Efficiency, Energy design rating, solar electric generation and demand flexibility, Energy Design rating total, Time dependent valuation (TDV) energy. Do the definitions for these terms need to be struck from chapter 2?	Yes	No	Remove unused definitions from chapter 2	Unused terms should be removed as they are not necessary.
12	A4.203.1	Sean Steffensen	New term "Long-Term System Cost (LSC)" as shown in section A4.202.1 is not consistent in replacing the terms related to Energy Design Rating (EDR). The proposal needs to be reviewed to remove EDR, EDR1, EDR2... an example is A4.203.1.3	Yes	No	A4.203.1.3 Consultation with local electric service provider. Local jurisdictions considering adoption of reduced EDR LSC targets based on using solar photovoltaic (PV) systems larger than required by the <i>California Energy Code</i> shall consult with the local electric service provider to ensure that PV system sizing required to comply with the EDR LSC targets will be acceptable to the local electric service provider. The local jurisdiction shall not require onsite PV systems that are larger than the local electric service provider will allow to be interconnected.	Use consistent terms for consistency with existing and proposed regulations.

13	A4.204.1	Sean Steffensen	Amend this section so that the requirements for both the heater sizing and the newly proposed heat pump pool heater control requirements are mandatory.	Yes	No	<u>A4.204.1 Energy Efficiency. Alterations to existing residential buildings shall comply with Sections A4.204.1.1 and A4.204.1.2, and A4.204.1.3</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement.
14	A4.204.1.2	Sean Steffensen	The CASE Team offered comments in TN 256484 to docket 24-BTSD-01 for the 2025 T24 BEES code change proposal for pool and spa heating measure. The comments suggest that the CEC can clarify the heat pump pool heater control requirements by creating a separate section 110.4(d) heat pump pool heater control requirements section. The language in section A4.204.1.2 should be updated to reflect any change CEC makes to section 110.4(c) for consistency.	Yes	No	<u>2. A heat pump pool heater as the primary heating system that meets the sizing requirements of Reference Joint Appendix JA16.3. The control for the heat pump pool heater shall meet the requirements specified in section 110.2(b). The backup-supplementary heater can be of any energy source; or</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement.
15	A4.204.1.2 Exception 2	Sean Steffensen	Offer exception similar to the pool heating exceptions proposed for T24 Part 6	Yes	No	<u>Exception 2 to A4.204.1.2: A pool or spa that is heated solely by a solar pool heating system without any backup supplementary heater.</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement.
16	A4.204.1.2 Exception 3	Sean Steffensen	Offer exception similar to the pool heating exceptions proposed for T24 Part 6	Yes	No	<u>Exception 3 to A4.204.1.2: Heating systems which are used exclusively for permanent spa applications in existing buildings with gas availability.</u>	This exception is needed to provide an exception consistent with Part 6.
17	A4.204.1.2 Exception 4	Sean Steffensen	Offer exception where there is not sufficient roof area nearby to meet the solar pool heating system sizing requirements.	No	No	<u>Exception 4 to A4.204.1.2: Heating systems which are used for pools or permanent spa applications where the available qualifying roof area is less than 65 percent of the combination of surface areas of the pool and spa. The qualifying roof area shall have no less than 70 percent annual solar access. Annual solar access is determined by dividing the total annual solar insolation, accounting for shading obstructions, by the total annual solar insolation if the same areas were unshaded by obstructions. Only roof areas located within 250 feet of the pool or permanent spa shall be consider for inclusion as qualifying roof area.</u>	This exception is needed to provide an exception consistent with Part 6.
18	A4.204.1.3	Sean Steffensen	The CASE Team offered comments in TN 256484 to docket 24-BTSD-01 for the 2025 T24 BEES code change proposal for pool and spa heating measure. The comments suggest that the CEC can clarify the heat pump pool heater control requirements by creating a separate section 110.4(d) heat pump pool heater control requirements section. A new section of language should be added to the language in section A4.204.1.3 should be updated to reflect any change CEC makes to section 110.4(d) for consistency.	Yes	No	<u>A4.204.1.3 Controls for Heat Pump Pool Heaters. Controls for heat pump pool heaters with supplementary heating. Heat pump pool heaters with supplementary heaters shall have controls: 1. That prevent supplementary heater operation when the heating load can be met by the heat pump pool heater alone; and 2. In which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement.
19	A5.202.1	Sean Steffensen	New terms are added for Long-term system cost (LSC), On-site recovered energy, and solar pool heating system. Existing text says the terms are defined in chapter 2. No proposed changes to chapter 2 are shown in 45-day language. A check of current CALGreen chapter 2 has no definitions for these terms.	Yes	No	Add definitions to chapter 2. Use definitions that are consistent with definitions from T24 Part 6	Definitions for new terms are needed for clarity.
20	A5.202.1	Sean Steffensen	The section strikes out Time dependent valuation (TDV) energy. Consider removing the definitions for these terms in chapter 2.	Yes	No	Remove unused definitions from chapter 2	Unused terms should be removed as not necessary.
21	A5.204.1	Sean Steffensen	Amend this section so that the requirements for both the heater sizing and the newly proposed heat pump pool heater control requirements are mandatory.	No	No	<u>Energy Efficiency. Alterations to existing nonresidential buildings shall comply with Section A5.204.1.1 and A5.204.1.2.</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement.

22	A5.204.1.1	Sean Steffensen	The CASE Team offered comments in TN 256484 to docket 24-BTSD-01 for the 2025 T24 BEES code change proposal for pool and spa heating measure. The comments suggest that the CEC can clarify the heat pump pool heater control requirements by creating a separate section 110.4(d) heat pump pool heater control requirements section. The language in section A5.204.1.1 should be updated to reflect any change CEC makes to section 110.4(c) for consistency.	Yes	No	<u>A heat pump pool heater as the primary heating system that meets the sizing requirements of Reference Joint Appendix JA16.3. The control for the heat pump pool heater shall meet the requirements specified in section 110.2(b). The backup-supplementary heater can be of any energy source; or</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement.
23	A5.204.1.1 Exception 2	Sean Steffensen	Offer exception similar to the pool heating exceptions proposed for T24 Part 6	Yes	No	<u>Exception 2 to A5.204.1.1: A pool or spa that is heated solely by a solar pool heating system without any backup supplementary heater.</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement.
24	A5.204.1.1 Exception 3	Sean Steffensen	Offer exception similar to the pool heating exceptions proposed for T24 Part 6	Yes	No	<u>Exception 3 to A5.204.1.1: Heating systems which are used exclusively for permanent spa applications in existing buildings with gas availability.</u>	This exception is needed to provide an exception consistent with Part 6.
25	A5.204.1.1 Exception 4	Sean Steffensen	Offer exception where there is not sufficient roof area nearby to meet the solar pool heating system sizing requirements.	No	No	<u>Exception 4 to A5.204.1.1: Heating systems which are used for pools or permanent spa applications where the available qualifying roof area is less than 65 percent of the combination of surface areas of the pool and spa. The qualifying roof area shall have no less than 70 percent annual solar access. Annual solar access is determined by dividing the total annual solar insolation, accounting for shading obstructions, by the total annual solar insolation if the same areas were unshaded by obstructions. Only roof areas located within 250 feet of the pool or permanent spa shall be consider for inclusion as qualifying roof area.</u>	This exception is needed to provide an exception consistent with Part 6.
26	A5.205.1.2	Sean Steffensen	The CASE Team offered comments in TN 256484 to docket 24-BTSD-01 for the 2025 T24 BEES code change proposal for pool and spa heating measure. The comments suggest that the CEC can clarify the heat pump pool heater control requirements by creating a separate section 110.4(d) heat pump pool heater control requirements section. A new section of language should be added to the language in section A4.204.1.3 should be updated to reflect any change CEC makes to section 110.4(d) for consistency.	Yes	No	<u>A4.205.1.2 Controls for Heat Pump Pool Heaters. Controls for heat pump pool heaters with supplementary heating. Heat pump pool heaters with supplementary heaters shall have controls: 1. That prevent supplementary heater operation when the heating load can be met by the heat pump pool heater alone; and 2. In which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating, and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.</u>	The change is needed to provide clarity to the heat pump pool heater controls requirement
27	A4.203.1.4.1	Yao-Jung Wen	The requirements use terms and metrics that are not enforceable. The exceptions are specified in a circular and very convoluted way, and introduce conflict between the main requirements and exceptions regarding what types of luminaires are excepted.	Yes	No	See Appendix for code language recommendations	See Appendix for justification.
28	A5.203.1.1.2	Yao-Jung Wen	The requirements use terms and metrics that are not enforceable. The exceptions are specified in a circular and very convoluted way, and introduce conflict between the main requirements and exceptions regarding what types of luminaires are excepted. The indentation of the exception "Luminaires that qualify as exceptions in Sections 130.2(b) of Title 24, Part 6." is confusing and inappropriate. It's not clear whether it is an exception to the color temperature requirement or an exception to the entire A5.203.1.1.1.	Yes	No	See Appendix for code language recommendations	See Appendix for justification.
29	Exceptions to Section A5.203.1.1.1	Yao-Jung Wen	There is a typographical error regarding Table 140.7-B.	No	No	The color temperature requirement is not applicable to the applications identified in the exceptions to Section 140.7(a) of Title 24, Part 6, nor to the applications identified as "specific applications" in Section 140.7(b)2 and Table 140.7- <u>B</u> of Title 24, Part 6.	The requirements should reference the correct table.

Appendix: Additional Mark-up Language

The appendix provides code language markups for remarks that did not fit into the previous tables.

Remarks #27 and #28 Sections A4.203.1.4, A5.203.1.1.1.2, and A5.203.1.1.1.3

The current proposed requirements for residential (A4.203.1.4) and nonresidential (A5.203.1.1.1.2 and A5.203.1.1.1.3) outdoor lighting can be clarified to reduce confusion with a few updates. For example, all luminaires have some spill light so “confining light to the surface” requires subjective judgment on what is confined. Similarly, “mounted and oriented to avoid glare onto adjacent rights-of-way or property” would also be subjective unless there was a definition of lighting intensity relative to the surrounding luminance.

The proposed requirements also specify exceptions by referring back and forth between Title 24, Part 6 and Part 11, which may cause confusion. For instance, the exceptions to Section A4.203.1.4 refer to exceptions to 160.5(c)1 in Part 6, but those exceptions to 160.5(c)1 then reference exceptions to Section 170.2(e)6A in Part 6, and exceptions to Section 5.106.8 in Part 11. The exceptions in Section 5.106.8 then refer back to exceptions to Section 130.2(b) in Part 6. A similar instance of references between Part 6 and Part 11 appears with exceptions to Section A5.203.1.1.1.2.

Additionally, certain luminaire types, including signs and façade lighting, are explicitly mentioned in the proposed requirements but are potentially exempted in referenced exceptions. In other words, there is potential for confusion as the proposed language is seemingly including requirements for luminaire types that are explicitly already exempted.

We reviewed ASHRAE 189.1 and the International Green Construction Code (IgCC), and found that the requirements for reducing lighting pollution in ASHRAE 189.1 Section 5.3.6 / IgCC Section 501.3.6 closely align with the intent of the proposed CALGreen requirements but provide enforceable language with specific metrics. These specific metrics are the BUG (backlight, uplight, glare) ratings as contained in the Illuminating Engineering Society measurement standard IES TM-15-20 “*Technical Memorandum: Luminaire Classification System for Outdoor Luminaires.*” These BUG ratings are based on the measured zonal lumens for various solid angles that represent different levels of light trespass, glare and sky glow relative to various surrounding amounts of light as represented by the lighting zones in various model codes including that in Section 10-114 of the California Administrative Code. The manufacturers of many commercial luminaires publish the BUG ratings of their products and thus a light pollution standard based on the BUG rating of luminaires can be enforced relatively

easily during plan check. **We encourage the Energy Commission to adopt the language and metrics from ASHRAE 189.1 as published in the IgCC, which will improve the proposed requirements in CALGreen and harmonize the requirements with ASHRAE and ICC standards.**

ASHRAE 189.1 and IgCC are standards for buildings except low-rise residential buildings. However, the requirements are equally applicable to most residential buildings. The same language and metrics in ASHRAE 189.1/IgCC can be adopted in CALGreen A4.203.1.4 by expanding the requirements to all low-rise residential buildings except single-family buildings.

The relevant sections of ASHRAE 189.1/IgCC (section 501.3.6 (5.3.6) [JO] Reduction of light pollution. through the TABLE 501.3.6.1 (501.3.6.1) MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE BUG RATINGS) is accessible through the [ICC webpage](https://codes.iccsafe.org/content/IGCC2021P2/chapter-5-site-sustainability#IGCC2021P2_Ch05_Sec501.3.6) at https://codes.iccsafe.org/content/IGCC2021P2/chapter-5-site-sustainability#IGCC2021P2_Ch05_Sec501.3.6