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CEC-57 (Revised 1/19)

**INITIAL STATEMENT OF REASONS****PROPOSED REVISIONS TO THE CALIFORNIA  
BUILDING ENERGY EFFICIENCY STANDARDS****2022 CALIFORNIA ADMINISTRATIVE CODE  
2022 BUILDING ENERGY EFFICIENCY STANDARDS  
CALIFORNIA CODE OF REGULATIONS, TITLE 24,  
PART 1, CHAPTER 10, and PART 6  
(2022 CALIFORNIA ENERGY CODE)**

**California Energy Commission**

**Docket No. 21-BSTD-01**

**INTRODUCTION**

Notice is hereby given that the California Energy Commission (CEC) proposes to adopt changes to the California Energy Code contained in the California Code of Regulations (CCR), Title 24, Part 6 (also known as the California Energy Code), and associated administrative regulations in Chapter 10 of Part 1, after considering all recommendations, comments, and objections regarding the proposed action. A description of the proposed standards is provided in the Informative Digest below.

The Warren-Alquist Act (California Pub. Res. Code Sections 25001 et seq.) establishes the California Energy Commission (CEC or Energy Commission) as California's primary energy policy and planning agency. Public Resource Code Sections 25213, 25402, 25402.1, 25402.4, 25402.5, 25402.8, 25910, 25942, and 25943 mandate and/or authorize that the CEC adopt rules and regulations, as necessary, to reduce the inefficient consumption of energy and water in newly constructed buildings and certain additions and alterations to existing buildings. One of the ways the CEC satisfies this requirement is through the California Energy Code (California Code of Regulations, Title 24, Part 6) found in the California Building Standards Code. The Energy Code includes all the energy efficiency requirements applicable to newly constructed buildings and additions and alterations to existing buildings. As a part of the California Building Standards Code, the Energy Code follows the same three-year update cycle.

The proposed standards are significant to the state of California in that they support state clean energy goals, policies, and mandates. The amendments will increase the deployment of on-site renewable energy generation, reduce carbon emissions from new buildings (building decarbonization), reduce growth in energy demand, increase energy demand flexibility, and ensure that California buildings are as energy efficient as is found to be technically feasible and cost-effective.

Therefore, the CEC proposes the following amendments to the Energy Code:

- Revise the prescriptive compliance path available for building projects to include only heat pump technology in specific circumstances;
- Revise the “standard design” used for the modeling-based performance compliance path available for building projects to establish the performance baseline based on heat pump technologies in specific circumstances;
- Improve existing residential energy efficiency standards for solar photovoltaic systems, including battery storage, and associated compliance options;
- Add new prescriptive solar photovoltaic and battery requirements for the following newly constructed nonresidential building types: high-rise multifamily, hotel-motel, tenant-space, office, medical office or clinic, restaurant, grocery store, retail store, school, and theater/auditorium/convention center buildings;
- Add new requirements that mixed fuel buildings be electric ready, meaning that electrical connections and other features needed to allow use of non-combustion equipment options are installed at the time of initial construction;
- Establish new energy efficiency standards for lighting, envelope, and space conditioning systems serving controlled environment horticulture spaces;
- Improve energy efficiency standards for commercial and industrial process loads, including, computer room air conditioning, refrigerated areas, fan systems, compressed air systems, and steam traps;
- Improve nonresidential and multifamily efficiency standards for building envelopes (e.g., exterior walls, windows, roofs, and floors), fan and duct systems, HVAC controls, boilers and service water heating systems, indoor and outdoor lighting systems, and grid integration equipment such as demand responsive controls;
- Improve minimum standards for residential kitchen ventilation;
- Update and enhance requirements relating to duct sealing and ventilation; and
- Make numerous minor revisions to existing provisions to improve the clarity of the regulations.

The CEC proposes to adopt these amendments for publication in 2022 with an effective date of January 1, 2023.

## **STATEMENT OF SPECIFIC PURPOSE, PROBLEM, RATIONALE and BENEFITS**

Government Code Section 11346.2(b)(1) requires “a statement of the specific purpose of each adoption, amendment, or repeal, the problem the agency intends to address, and the rationale for the determination by the agency that each adoption, amendment, or repeal is 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.”

The problem that the CEC seeks to address in adopting building energy efficiency standards is enumerated in its enabling statute. The legislative findings in the Warren-Alquist Act includes, in part, the following:

**§ 25000.1(a)** The Legislature further finds and declares that, in addition to their other ratepayer protection objectives, a principal goal of electric and natural gas utilities' resource planning and investment shall be to minimize the cost to society of the reliable energy services that are provided by natural gas and electricity, and to improve the environment and to encourage the diversity of energy sources through improvements in energy efficiency and development of renewable energy resources, such as wind, solar, and geothermal energy.

**§ 25001.** The Legislature hereby finds and declares that electrical energy is essential to the health, safety and welfare of the people of this state and to the state economy, and that it is the responsibility of state government to ensure that a reliable supply of electrical energy is maintained at a level consistent with the need for such energy for protection of public health and safety, for promotion of the general welfare, and for environmental quality protection.

**§ 25002.** The Legislature further finds and declares that the present rapid rate of growth in demand for electric energy is in part due to wasteful, uneconomic, inefficient, and unnecessary uses of power and a continuation of this trend will result in serious depletion or irreversible commitment of energy, land and water resources, and potential threats to the state's environmental quality.

**§ 25007.** It is further the policy of the state and the intent of the Legislature to employ a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption, prudently conserve energy resources, and assure statewide environmental, public safety, and land use goals.

**§ 25008.** It is further the policy of the state and the intent of the Legislature to promote all feasible means of energy and water conservation and all feasible uses of alternative energy and water supply sources.

While the specific purposes of individual amendments are described below, the overall purpose of the adoption of new amendments to the Energy Code is “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain

electrical grid reliability” consistent with the express statutory authority and direction in §25402, which benefits the state by slowing demand growth, reducing depletion of resources, improving reliability, minimizing costs, and mitigating threats to the state’s environmental quality – that is, by directly addressing the problems the legislature observed when creating the CEC. Based on the evidence in the record, the CEC has determined that the proposed changes are necessary to provide these benefits by establishing or improving standards for building energy efficiency and improving the likelihood of successful deployment of building design and construction measures that directly cause or indirectly enable improved efficiency during occupancy and operation.

Evidence in the record further shows the proposed efficiency standards to be technically feasible for buildings in California, cost effective where they are proposed to be required, and will save significant energy on an annual statewide basis.

### **Part 1, Chapter 10 Proposed Changes**

**Section:** 10-102, 10-103(a)4B

**Specific Purpose:**

The purpose of the changes to these sections is to exclude Certificates of Acceptance recorded by an acceptance test technician certification provider from requiring additional submittal to separate data registries.

**Necessity:**

These changes are reasonably necessary to prevent unnecessary duplication of data transmittal, processing and recordkeeping ahead of provision to the State of California.

**Section:** 10-103(a)4C

**Specific Purpose:**

The specific purpose of the changes to this section is to remove reference to registration or the use of data registries as it relates to Certificates of Acceptance.

**Necessity:**

These changes are necessary to ensure that the code is agnostic with respect to the various methods of generating or transmitting documentation of compliance with Energy Code requirements; the more general requirement that documentation be “made available” serves to adequately cover electronic means of doing so without implying differential treatment of specific methods.

**Section:** 10-103(b)4

**Specific Purpose:**

The purpose of the changes to this section is to broaden its application to include central building systems serving multiple separate dwellings, in part by distinguishing between whole-dwelling ventilation systems and local exhaust systems or equipment.

**Necessity:**

These changes are necessary to align the provisions of this section to the merging of low-rise and high-rise multifamily buildings into a single category consistent with the proposed migration of multifamily provisions into a separate, dedicated series of

chapters in the Energy Code, and to account for the different approaches to dwelling unit ventilation that can apply at different building scales.

**Section:** 10-103(d)

**Specific Purpose:**

The purpose of the changes to this section is to remove reference to a data registry in a provision applying to Certificates of Acceptance, which apply to nonresidential buildings and are not currently (nor have been previously) required to be registered. Because there is no registry available to contain or provide these documents, mentioning use of a registry here is meaningless.

**Necessity:**

These changes are necessary to remove an inapplicable option from the list of ways in which a Certificate of Acceptance can be made available.

**Section:** 10-103.1(c)3H

**Specific Purpose:**

The purpose of the addition of this section is to provide express criteria for electronic storage, within a database system, of compliance forms prepared and collected by Acceptance Test Technicians.

**Necessity:**

These additions are necessary to apply principles of electronic data storage, maintenance, and accessibility similar to what is expected for residential HERS entities to nonresidential ATTCP entities.

**Section:** 10-103.1(c)3I

**Specific Purpose:**

The purpose of the addition of this section is to add specifications for recording, maintaining, and providing building acceptance data collected by Acceptance Test Technician Certification Providers to the Energy Commission.

**Necessity:**

These changes are reasonably necessary to ensure compatibility and successful provision of collected compliance data to the State of California at such time as a document repository for this information is deployed.

**Section:** 10-103.2(c)3H

**Specific Purpose:**

The purpose of the addition of this section is to provide express criteria for electronic storage, within a database system, of compliance forms prepared and collected by Acceptance Test Technicians.

**Necessity:**

These additions are necessary to apply principles of electronic data storage, maintenance, and accessibility similar to what is expected for residential HERS entities to nonresidential ATTCP entities.

**Section: 10-103.2(c)3I**

**Specific Purpose:**

The purpose of the addition of this section is to add specifications for recording, maintaining, and providing building acceptance data collected by Acceptance Test Technician Certification Providers to the Energy Commission.

**Necessity:**

These changes are reasonably necessary to ensure compatibility and successful provision of collected compliance data to the State of California at such time as a document repository for this information is deployed.

**Section: 10-109(i)1B**

**Specific Purpose:**

The purpose of the addition of subsections (ii) through (v) to this section (and the consequential renumbering of existing language as subsection (i)) is to add criteria to the approval of nonresidential data registries that require use of CEC published data formatting and validation guidelines (“schema”) and ensure state access to data collected pursuant to building standards code compliance.

**Necessity:**

These changes are necessary to ensure consistency in application of Energy Code requirements across potentially differing data gathering and validation systems, and to safeguard treatment and availability of data submitted to such systems pursuant to required demonstrations to the State of California of compliance with the California Building Standards Code.

**Section: 10-109(k)**

**Specific Purpose:**

The specific purpose of the changes to this section is to extend this section to also apply to the proposed new solar photovoltaic requirements for nonresidential buildings added in Section 140.10, and to allow the Energy Commission to consider other factors in addition to those expressly listed.

**Necessity:**

These changes are necessary to ensure equivalent treatment of solar photovoltaic systems required for both residential and nonresidential buildings under this section, and to avoid unnecessarily limiting consideration of the effects of implementation of public agency rules upon the cost effectiveness of solar photovoltaic systems.

**Section: 10-114 (d)**

**Specific Purpose:**

The specific purpose is to delete the requirements for a local jurisdiction to notify the Commission of any adopted changes by the local jurisdiction to the state default lighting zone designations by providing the materials about the public process and about the area with the adopted changes in lighting zone designations.

**Necessity:**

These changes are necessary to avoid what could be deemed as a duplication of efforts in keeping and providing materials related to lighting zone designations of the local

areas which are under the local jurisdictions, which could result in unnecessary cost and resources. Public members can reach out to the local jurisdictions for land use information and lighting zone designations deemed to be related to land use.

**Section: 10-114 (e)**

**Specific Purpose:**

The specific purpose is to delete the provisions for the Commission to disallow changes to the state default lighting zone designations adopted by local jurisdictions.

**Necessity:**

These changes are necessary to avoid what could be deemed as a duplication of lighting zone designation efforts by the Commission and a local jurisdiction in adopting any changes to the state default lighting zones by a local jurisdiction, which could result in unnecessary cost and resources.

There are already procedures and the criteria is specific and clear in Other parts of Section 10-114 already specify procedures and criteria that a local jurisdiction is required to go through, including a public process to allow public members to participate in the review of the proposed change and to comment on proposed changes to the state default lighting zones for a local area that are deemed appropriate and necessary.

**Section: Table 10-114-A**

**Specific Purpose:**

The specific purpose is to revise default rural lighting zone classifications as lighting zone 1 and to add urban clusters as the default classification for lighting zone 2. Building types deemed appropriate for lighting zones 1, 2 and 3 are added to Table 10-114-A. These changes align, where feasible, to the outdoor lighting zone default classification with the Illuminating Engineering Society/International Dark-sky Association (IES/IDA) Outdoor Lighting Model Ordinance lighting zone classification.

**Necessity:**

These changes are necessary to maintain, where feasible, consistency of the Energy Code and the document, Model Outdoor Lighting Ordinance (2011) published by the International Dark-Sky Association (IDA) and the Illuminating Engineering Society (IES).

**Section: 10-115**

**Specific Purpose:**

The specific purpose of changes to this section is to clarify existing provisions relating to community solar programs and to incorporate lessons learned following implementation of current requirements. This includes:

- Clarifying that Commission approval is required for community shared solar systems in subsection (a);
- Removing language in subsection (a)3 that was determined to be unnecessarily specific and potentially confusing and modified terminology to improve clarity;
- Adding language in subsection (a)4 that guarantees the ability of the building owner to opt out of the program in favor of procuring and installing on-site equipment;
- Adding language in subsection (a)5 that clarifies additional requirements, including handling of Renewable Energy Credits, and provides allowance for



timing differences between development of building projects and development of community resources intended to serve those buildings;

- Adding a new subsection (a)6 to specify the contextual nearness intended by the term “community”;
- Adding a new subsection (a)7 to specify a maximum size for a community-scale system;
- Adding a new subsection (a)8 that guarantees the ability of the building purchaser to opt out of the program in favor of procuring and installing on-site equipment;
- Adding language in former subsection (a)6, now (a)9, specifying an annual reporting requirement as a part of accountability and recordkeeping;
- Adding language in subsection (b) specifying that applications from public agencies must be locally adopted through a public process prior to submission for approval; and
- Removing subsection (c) as unneeded and replacing it with language specifying when re-approval is required for approved programs and delegating consideration of reapproval applications to the Executive Director.

**Necessity:**

These changes are necessary to ensure and enhance the viability of community-scale projects as an alternative to on-site installation of renewable energy and energy storage systems, preserve an intended distinction between a “community” program and other types of programs, and incorporate feedback received and lessons learned during consideration of community solar applications submitted under existing requirements.

## **Part 6 Proposed Changes**

**Section:** 100.0(e) and **Subsections**, Exception 1 to 100.0(f) and Table 100.0-A

**Specific Purpose:**

The specific purpose of the changes to these Sections, their subsections and associated Table are to relocate provisions describing the application of the Energy Code and, in doing so, to reflect changes occurring later in the document that relocate provisions applicable to multifamily buildings (inclusive of low-rise and high-rise multifamily buildings) into their own subsections. These edits include removing references to “high-rise residential” where no longer applicable, replacing low-rise residential” with “single-family”, and updating references to include the new Sections of the Energy Code relating to multifamily buildings (Sections 160, 170, and 180 inclusive) consistent with the relocation.

**Necessity:**

These changes are necessary to ensure that the language in the Scope of the Energy Code correctly refers to and parallels the newly separated sections for multifamily buildings.

**Section:** 100.1(b) – Newly Added Definitions

**Specific Purpose:**

The specific purpose of the added definitions to the Definitions section is to provide clear and specific definitions for technical terms used within other updates to Part 6, aligned with the use of the term where it is proposed to occur later in the Energy Code. This includes added definitions for new industry standards documents that are incorporated by reference into later portions of the Energy Code. The newly added definitions are:

- AIR CURTAIN UNIT
- ALTERNATING CURRENT-OUTPUT UNINTERRUPTIBLE POWER SUPPLY (AC-OUTPUT UPS)
- AMCA
- ANSI/ASABE S640
- ANSI Z9.5
- ANSI/NEMA WD 6
- ANSI C82.6
- ANSI/CTA-2045-A
- ANSI/ASHRAE 84
- ANSI/AMCA 208
- ANSI/AMCA 210
- AHAM
- AHAM HRH-2
- AHAM RKRH-CPPG
- AHRI 430

- AHRI 440
- AHRI 920
- AHRI 1060
- AHRI 1360
- 
- ASCE 7-16
- ANSI/ASHRAE STANDARD 154
- ASTM D2202
- ASTM D6083
- ASTM E1680
- ASTM E3087
- AZIMUTH
- BOILER SYSTEM
- CARBON DIOXIDE ENRICHMENT
- CEILING FAN
- Central Fan Ventilation Cooling System, or CFVCS
- CIRCULATING FAN
- COMMON LIVING AREAS
- COMMON SERVICE AREAS
- COMMON USE AREAS
- CONTROLLED ENVIRONMENT HORTICULTURE (CEH) SPACE
- DEDICATED OUTDOOR AIR SYSTEM (DOAS)
- DESICCANT DEHUMIDIFICATION SYSTEM
- DRAIN WATER HEAT RECOVERY (DWHR)
- DUCT WALL PENETRATIONS
- DWELLING UNIT, ATTACHED
- DWELLING UNIT, JUNIOR ACCESSORY, OR JADU
- DX-DEDICATED OUTDOOR AIR SYSTEM UNITS (DX-DOAS)
- ECONOMIZER, PUMPED REFRIGERANT
- ENERGY STORAGE SYSTEM (ESS)
- ESS READY INTERCONNECTION EQUIPMENT
- ESS READY PANELBOARD
- ENTHALPY RECOVERY RATIO (ERR)
- FAN ARRAYS
- FAN, EMBEDDED
- FAN ENERGY INDEX (FEI)
- FAN ELECTRICAL INPUT POWER (FAN kW<sub>design</sub>)
- FAN NAMEPLATE ELECTRICAL INPUT POWER (kW)
- FAN SYSTEM
- FAN SYSTEM, COMPLEX
- FAN SYSTEM, EXHAUST
- FAN SYSTEM, MULTI-ZONE VARIABLE AIR VOLUME (VAV)
- FAN SYSTEM, RELIEF
- FAN SYSTEM, RETURN

- FAN SYSTEM, SUPPLY-ONLY
- FAN SYSTEM, SINGLE-CABINET
- FAN SYSTEM, TRANSFER
- FAN SYSTEM AIRFLOW (cfm)
- FAN SYSTEM DESIGN CONDITIONS
- FAN SYSTEM ELECTRICAL INPUT POWER (Fan kW<sub>design,system</sub>)
- HEAT PUMP WATER HEATER (HPWH)
- SINGLE-PASS HEAT PUMP WATER HEATER
- MULTI-PASS HEAT PUMP WATER HEATER
- HORTICULTURAL LIGHTING
- INTEGRATED SEASONAL COEFFICIENT OF PERFORMANCE (ISCOP)
- INTEGRATED SEASONAL MOISTURE REMOVAL EFFICIENCY (ISMRE)
- IES LS-1-20
- INDOOR GROWING
- INFORMATION TECHNOLOGY EQUIPMENT (ITE)
- INTEGRATED HVAC SYSTEM
- ISO 5801
- ITE DESIGN LOAD
- LIGHTING definitions:
  - Astronomical Time-Switch Control
  - Automatic Daylight Control
  - Automatic Scheduling Control
  - Automatic Time Switch Control
  - Captive-Key Override
  - Countdown Timer Switch
  - Daylight Continuous Dimming Controls
  - Dimmer
  - Dimmer, Continuous
  - Dimmer, Forward Phase Cut
  - Dimmer, Stepped
  - Lighting Control, Self-Contained
  - Lighting Control System
  - LED Driver
  - Multilevel Astronomical Time Switch
  - Multilevel Lighting Control
  - Multiscene Programmable Control
  - NEMA LSD 57
  - NEMA SSL 7A
  - Occupant Sensing Controls
  - Motion Sensing Control
  - Occupant Sensing Control
  - Partial-ON Occupant or Motion Sensing Control
  - Partial-OFF Occupant or Motion Sensing Control
  - Vacancy Setting Control
  - Photo Control

- Security Cameras
- Shut-off Controls
- Tunable Lighting
- Dim-to-warm
- Tunable white
- Color tunable
- MULTIFAMILY BUILDING
- MUSEUM BUILDING
- PHOTOSYNTHETIC PHOTON EFFICACY (PPE)
- PHOTOSYNTHETIC PHOTON FLUX (PPF)
- ROOF RECOVER
- ROOF REPLACEMENT
- SEAL CLASS A
- SENSIBLE ENERGY RECOVERY RATIO
- STAND-ALONE DEHUMIDIFIER
- TRANSIENT
- UL 1741
- UL 1973
- UL 9540
- UNIFORM ENERGY FACTOR (UEF)
- ZONAL

**Necessity:**

These changes are necessary to ensure that provisions in subsequent sections are clear and unambiguous, and that non-technical readers are able to find and understand the technical meaning of specific terms relating to building design and construction.

**Section:** 100.1(b) – Deleted Definitions

**Specific Purpose:**

The specific purpose of the deleted definitions in the Definitions section is to provide clear and specific definitions for technical terms used within other updates to Part 6, aligned with the use of the term where it is proposed to occur later in the Energy Code, and to delete obsolete terms, removing unnecessary complexity. The deleted definitions are:

- ANSI C82.6 2015
- ANSI/IES RP-16-17
- AHRI 320
- AHRI 325
- DUAL-GLAZED GREENHOUSE WINDOWS
- ENERGY FACTOR (EF)
- DECORATIVE LUMINAIRES
- TUNING
- LIGHTING CONTROLS (long list of definitions)

- Astronomical Time Switch Control
- Automatic Daylight Control
- Automatic Multilevel Daylight Control
- Automatic Scheduling Control
- Automatic Time Switch Control
- Captive Key Override
- Countdown Timer Switch
- Dimmer
- Dimmer, Full Range
- Dimmer, Stepped
- Dimmer, Forward Phase Cut
- Lighting Control, Self Contained
- Lighting Control System
- Multilevel Astronomical Time Switch
- Multilevel Lighting Control
- Multiscene Programmable Control
- NEMA SSL 7A
- Occupant Sensing Controls
- Motion Sensor
- Occupant Sensor
- Partial ON Occupant or Motion Sensor
- Partial OFF Occupant or Motion Sensor
- Vacancy Sensor
- Part Night Outdoor Lighting Control
- Photo Control
- Shut off Controls
- DEDICATED RAMPS
- OVERHANG PROJECTION
- OVERHANG RISE

**Necessity:**

These changes are necessary to ensure that provisions in subsequent sections are clear and unambiguous, and that non-technical readers are able to find and understand the technical meaning of specific terms relating to building design and construction.

**Section:** 100.1(b) – Amended Definitions to publication dates of industry standards documents

**Specific Purpose:**

The specific purpose of changes that amend the publication date of industry standards documents already defined within this Section are to ensure definitions relating to industry test standards refer to or otherwise specify the most current available versions of such standards. This includes amendments that update the names of referenced industry standards documents consistent with their current published titles.

**Necessity:**

The changes to update the referenced versions of industry publications are necessary to ensure alignment of the Energy Code with industry standards upon which it relies, and prevents situations where use of obsolete versions of such standards would be required for compliance with the Energy Code as written.

**Section:** 100.1(b) – ANSI/IES LS-1-20, Lighting Science: Nomenclature and Definitions for Illuminating Engineering (was ANSI/IES RP-16-17)

**Specific Purpose:**

The specific purpose of the change is to update the reference document title and numbering to the most recent version of the document as issued by the Illuminating Engineering Society.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – ANSI/IES LM-79-19, Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products (was IES LM-79)

**Specific Purpose:**

The specific purpose of the change is to update the reference document title and numbering to the most recent version of the document as issued by the Illuminating Engineering Society.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – ANSI/IES TM-15-20, Technical Memorandum: Luminaire Classification System for Outdoor Luminaires (was IES TM-15-11)

**Specific Purpose:**

The specific purpose of the change is to update the reference document title and numbering to the most recent version of the document as issued by the Illuminating Engineering Society.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building

Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section: 100.1(b) – Accent Lighting**

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20, and to include examples of accent lighting.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section: 100.1(b) – Color Rendering Index (CRI)**

**Specific Purpose:**

The specific purpose of the change is to update the definition to align with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section: 100.1(b) – Correlated Color Temperature (CCT)**

**Specific Purpose:**

The specific purpose of the change is to update the definition to align with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.



**Section:** 100.1(b) – Colored light source

**Specific Purpose:**

The specific purpose of the change is to revise the reference measurement methods and the reference calculation method for colored light sources.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Compact Fluorescent Lamp

**Specific Purpose:**

The specific purpose of the change is to update the definition to align with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Decorative (Lighting/Luminaires)

**Specific Purpose:**

The specific purpose of the change is to update the definition to include examples in the definition for decorative lighting/luminaires.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Display Lighting, Floor (was Display Lighting and Floor)

**Specific Purpose:**

The specific purpose of the change is to revise the definitions to combine both definitions for display lighting and floor as one definition for ‘Display Lighting, Floor’.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building

Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Display Lighting, Wall

**Specific Purpose:**

The specific purpose of the change is to revise the definitions to combine both definitions for display lighting and wall as one definition for ‘Display Lighting, Wall’.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Display Lighting, Window

**Specific Purpose:**

The specific purpose of the change is to revise the definitions to combine both definitions for display lighting and window as one definition for ‘Display Lighting, Window’.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Display Lighting, Case

**Specific Purpose:**

The specific purpose of the change is to revise the definitions to combine both definitions for display lighting and case as one definition for ‘Display Lighting, Case’.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Fenestration Products

**Specific Purpose:**

The specific purpose of the change is to revise the definitions to provide clarification that glazing used for greenhouses is also considered a fenestration product

**Necessity:**

This change is necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Illumination

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Inseparable Solid State Lighting (SSL) Luminaire

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20, and to add examples to the definition for inseparable solid state lighting luminaires.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Light

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Lighting

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Light Emitting Diode (LED)

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – LED Driver

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly

to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – LED Light Engine

**Specific Purpose:**

The specific purpose of the change is to update the definition to align with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Luminous Maintenance (was Lumen Maintenance)

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the definition of the ENERGY STAR Program Product Specification for Luminaires (Light Fixtures) Version 2.2.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Mechanical Cooling (Excluding ERV/HRV)

**Specific Purpose:**

The specific purpose of the change is to clarify that systems solely using energy recovery ventilation (ERV) or heat recovery ventilation (HRV) are not considered to be mechanical cooling.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Mechanical Heating (Excluding Solar/Heat Recovery)

**Specific Purpose:**

The specific purpose of the change is to clarify that systems using only solar energy or heat recovery as the heat source are not considered as mechanically heating systems.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Space-Conditioning System

**Specific Purpose:**

The specific purpose of the change is to clarify that only mechanical heating and cooling systems qualify as sources for a space-conditioning system.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Ornamental Lighting/Luminaires (was Ornamental Lighting; Luminaires)

**Specific Purpose:**

The specific purpose of the change is to combine both definitions for ornamental lighting and luminaires as one definition for “Ornamental Lighting/Luminaires”. The other change is to separate out the sub-definition for decorative luminaires as an independent and separate definition for “Decorative Lighting/Luminaires”.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Pendant Luminaire (Suspended Luminaire) (was Pendant (Suspended))

**Specific Purpose:**

The specific purpose of the change is to add luminaire to the name of the definition.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Single Zone System

**Specific Purpose:**

The specific purpose of the change is to clarify that a single zone system needs to be controlled by a single thermostat in each thermal zone.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Task Lighting

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Track Lighting

**Specific Purpose:**

The specific purpose of the change is to update the definition to align, where feasible, with the nomenclature and definitions for Illuminating Engineering of the reference document, ANSI/IES LS-1-20.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly

to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Barber, Beauty Salon, Spa Area (was Beauty Salon Area)

**Specific Purpose:**

The specific purpose of the change is to update the name of the nonresidential function areas to include barber and spa areas for the nonresidential function area definition.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Storage, Commercial and Industrial Area (was Commercial and Industrial Storage Area)

**Specific Purpose:**

The specific purpose of the change is to reorder the name of the nonresidential function areas with “Storage” as the preceding term for the nonresidential function area definition.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Manufacturing, Commercial and Industrial Area (was Commercial and Industrial Manufacturing Area)

**Specific Purpose:**

The specific purpose of the change is to reorder the name of the nonresidential function areas with “Manufacturing” as the preceding term for the nonresidential function area definition.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.



**Section:** 100.1(b) – Lobby, Main Entry (was Main Entry Lobby)

**Specific Purpose:**

The specific purpose of the change is to reorder the name of the nonresidential function areas with “Lobby” as the preceding term for the nonresidential function area definition.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Parking Zone and Ramps (was Parking Zone and Dedicated Ramps)

**Specific Purpose:**

The specific purpose of the change is to revise the definitions to combine both definitions for parking zone and dedicated ramps as one definition for “Parking Zone and Ramps”.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Daylight Adaptation Zone

**Specific Purpose:**

The specific purpose of the change is to clarify adjacent areas of a parking garage are applicable to the nonresidential function area definition of daylight adaptation zone.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Laboratory, Scientific Area (was Scientific Laboratory Area)

**Specific Purpose:**

The specific purpose of the change is to reorder the name of the nonresidential function areas with “Laboratory” as the preceding term for the nonresidential function area definition.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly

to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 100.1(b) – Occupant Sensing Controls (was Occupant sensor)

**Specific Purpose:**

The specific purpose of the change is to update the definitions (including Motion Sensor; Occupant Sensor; Partial-ON Occupant or Motion Sensor; Partial-OFF Occupant or Motion Sensor; Vacancy Sensor) with a change of phrase from “sensor” to “sensing control” to the terms of definition. These changes are to align with the use of the term in Section 130.1(c) of Automatic Shutoff Controls, and the revised terms more accurately reflects of their characters as lighting controls.

**Necessity:**

These changes are necessary to ensure that the terms used within the regulations will have clear and unambiguous meaning to readers, including the public, and particularly to the persons and organizations affected by these regulations. Additionally, these new terms ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1.

**Section:** 110.2(e)

**Specific Purpose:**

The specific purpose of the proposed change is to remove the word “circuit” where used in reference to cooling towers as unneeded, and to state “open and closed cooling towers” in the Exception to Section 110.2(e) for consistency. Existing language defines the terms “open cooling tower” and “closed-circuit cooling tower”; the purpose in changing these terms is to standardize around one method of phrasing for consistency across terms (i.e., either including the word “circuit” for both open and closed systems, or discarding it for both). The proposed change opts to discard the word “circuit” for simplicity.

**Necessity:**

The change to remove the word “circuit” in this context is necessary to improve the overall consistency of associated codes and standards. This change does not have any substantive effect.

**Section:** Tables 110.2-A through K

**Specific Purpose:**

The specific purpose of the changes to these tables is to update minimum standards to accurately reflect updated federal appliance standards applicable to associated equipment, and to identify the test standard applicable to closed-circuit cooling towers consistent with the other entries in these tables.

**Necessity:**

These changes are necessary to correctly state the standards applicable to the listed

equipment and ensure that the Energy Code does not conflict with federal appliance laws.

**Section:** 110.6 Authority and Reference Citation

**Specific Purpose:**

The specific purpose of the change is to add the Authority and Reference citations to reflect the statutory provisions utilized by the CEC in the preceding section. This is not a substantive change in requirements.

**Necessity:**

These changes are necessary to provide the public with the CEC's statutory authority for adopting these regulations and to provide notice of the sections that are being implemented, interpreted or made specific by the regulations.

**Section:** Exceptions 1 & 2 to Section 110.6(a)2

**Specific Purpose:**

The specific purpose of the changes to Exceptions 1 and 2 to Section 110.6(a)2 is to remove vertical site-built fenestration from the exceptions to the mandatory fenestration U-factor requirement.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402 by increasing the rate of compliance with National Fenestration Rating Council (NFRC certification) and reducing/eliminating the amount of uncertified fenestration products being installed in California.

**Section:** Exceptions 1 & 2 to Section 110.6(a)3

**Specific Purpose:**

The specific purpose of the changes to Exceptions 1 and 2 to Section 110.6(a)3 is to remove vertical site-built fenestration from the exceptions to the mandatory fenestration solar heat gain coefficient (SHGC) requirement.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402 by increasing the rate of compliance with National Fenestration Rating Council (NFRC certification) and reducing/eliminating the amount of uncertified fenestration products being installed in California.

**Section:** Exceptions 1 & 2 to Section 110.6(a)4

**Specific Purpose:**

The specific purpose of the changes to Exceptions 1 and 2 to Section 110.6(a)4 is to remove vertical site-built fenestration from the exceptions to the mandatory fenestration Visible Transmittance (VT) requirement.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402 by increasing the rate of compliance with National Fenestration Rating Council (NFRC certification) and reducing/eliminating the amount of uncertified fenestration products being installed in California.

**Section:** 110.6(a)6

**Specific Purpose:**

The specific purpose of the change to Section 110.6(a)6 is to remove multifamily “low-rise residential” from the scope of this requirement, and to clarify that the requirement now only applies to single family buildings.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. For the 2022 Energy Standards, the low-rise and high-rise multifamily requirements are being relocated to a new multifamily specific section of the code: Sections 160, 170, and 180.

**Section:** Exception to Section 110.8(d)1

**Specific Purpose:**

The specific purpose of the changes to Exception to Section 110.8(d)1 is to correct the section reference to the California Building Code, Title 24, Part 2, Section 1202.2, and to add a section reference to the California Building Code, Title 24, Part 2.5, Section 806.

**Necessity:**

These changes are necessary to ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as direct by California Government Code, Sections 11349 and 11349.1.

**Section:** 110.8(i)4B

**Specific Purpose:**

The specific purpose of the changes to this section is to add reference to ASTM D6083 to the list of potentially applicable ASTM standards.

**Necessity:**

These changes are necessary to include this standard consistent with its re-adoption by ASTM, and avoid unnecessarily limiting the available industry standards that may be applied.

**Section:** Section 110.9(b)

**Specific Purpose:**

The specific purpose of the change to Section 110.9(b)1Ai is to remove redundant phrasing: the phrase “each connected load” occurs twice in the same sentence with the same meaning.

The specific purpose of the changes to subsection (b)5 is to delete part-night outdoor lighting controls and its functionality requirements. The criteria of this Section define what a control installed to meet “part-night” requirements is required to do, however the underlying requirements to install “part-night” controls (distinct from other outdoor lighting controls) were removed in the 2019 update to the Energy Code. As a result, the definition of the term “part-night outdoor lighting control” as well as the more detailed minimum criteria in this section no longer serve a regulatory purpose, and are redundant with requirements in Section 130.2 applicable to the more general category of outdoor automatic scheduling controls. This section is now reserved in order to prevent changes in subsequent section numbering.

**Necessity:**

The changes are necessary to remove unused or redundant terms and thereby ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16. This change is understood not to have a substantive regulatory effect.

**Section:** 110.10(a)3

**Specific Purpose:**

The specific purpose of the change to this Section is to duplicate the phrase “which do not have a photovoltaic system installed” from Sections 110.10(a)1 and 110.10(a) for consistency.

**Necessity:**

This change is necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 110.10(a)4

**Specific Purpose:**

The specific purpose of the changes to this section is to replace “healthcare facilities” with “I-2 and I-2.1” in order to specify the occupancy types instead of the phrase “healthcare facilities.” In addition, the changes duplicates the phrase “which do not have a photovoltaic system installed” from Sections 110.10(a)1 and 110.10(a)2 for consistency.

**Necessity:**

These changes are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 110.10(b)2

**Specific Purpose:**

The specific purpose of the changes to this section is to replace the term “orientation” with the phrase “azimuth range,” which provides more information to allow for complying with requirements and provides consistency with the heading of the subsection. Also, orientation consists of Azimuth and tilt where the requirement of this subsection only deals with Azimuth.

**Necessity:**

These changes are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16, as well as to increase energy efficiency via clarifying requirements, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** 110.12, 110.12(a)

**Specific Purpose:**

The specific purpose to the changes in these sections is to more clearly state the scope of application of the overall section and to more clearly state the communication requirements applicable to demand responsive controls. The term “hard-wiring” in particular was observed to be a common source of confusion and is adequately covered by “other bi-directional communication pathway”. These changes are understood to be non-substantive.

**Necessity:**

The change to the scoping language that begins section 110.12 is necessary to preclude unintended readings of the application of this section beyond what was intended at its adoption. The change to the communication provisions in 110.12(a) are necessary to merge and more simply state the contents of subsection 3, to remove the express statement of “hard-wiring” and to instead expressly state CTA-2045 as an additional protocol that may be used consistent with reference to this protocol in other sections of the Energy Code.

**Section: 110.12(c)**

**Specific Purpose:**

The specific purpose of the changes to this Section are to change a floor area threshold to an equivalent wattage threshold, and to more clearly state that the requirement of this section applies to general lighting to which multi-level lighting requirements in Section 130.1 also apply.

**Necessity:**

The change to clarify the scope of application of the requirement is necessary to prevent alternate readings that would apply this section's requirements to lighting that is not required to have the multi-level controls needed for its operation, which would either necessitate installation of additional multilevel controls beyond what was considered in prior rulemaking proceedings or render the addition of the demand responsive controls moot due to the absence of an ability for the lighting to be partially reduced.

The change to replace the square footage threshold with an equivalent wattage threshold is necessary to more transparently link the requirement to its threshold: demand responsive controls are only required where there is a sufficient load to make them cost effective to install, and while 10,000 square feet can be presumed to require a sufficient amount of lighting to represent such a load, there is not a reason to have an indirect threshold (square footage as a proxy for load) when a direct threshold (load itself) can instead be used.

**Section: 110.12(e)**

**Specific Purpose:**

The specific purpose of the addition of Section 110.12(e) is to add specific requirements for the behavior of demand responsive controlled receptacles.

**Necessity:**

This change is necessary to explicitly describe the behavior expected for demand responsive controlled receptacles, in order to support the addition of requirements to install such receptacles in Section 130.5.

**Section: 120.0**

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency

within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.1(a)**

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.1(b)**

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.1(c)**

**Specific Purpose:**

The specific purpose of the changes to this section is to more completely reference its subsections and to clarify their interaction. This change is not a substantive change, though substantive changes have been made to subsections (c)1 and (c)3 (described below)

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.



**Section:** 120.1(c)1

**Specific Purpose:**

The specific purpose of the changes to this section is to clarify the requirements for air filters by use of language consistent with language previously in 120.1(b)1A instead of referencing said language, to clarify the expected locations of air filters within space conditioning systems, and to require sealing around filters.

**Necessity:**

These change to copy existing language formerly located in Section 120.1(b) is necessary to maintain the readability of the Energy Code given that the referenced language is being relocated from the immediately preceding section to one occurring much later in the regulations. The change to specify the locations of the filters is necessary to ensure that components benefit from filtration of dust and particles that can impede performance: dust will act as an insulator and reduce thermal efficiency if allowed to deposit on such components. The change to require sealing or gasketing is necessary to ensure that air does not bypass the filters and in doing so defeat the purpose of their installation.

**Section:** 120.1(c)3

**Specific Purpose:**

The specific purpose of the change to this section is to better align its provisions with Section 1000.4 of the California Building Code and remove potential conflict between code requirements.

**Necessity:**

These changes are necessary to prevent the requirements of this section from inadvertently precluding the use of options expressly allowed by the California Building Code, and conversely preventing these additional allowances from being applied more broadly than allowed by the California Building Code.

**Section:** 120.1(d)3

**Specific Purpose:** The specific purpose of the changes to this section is to clarify the type of system addressed in these requirements.

**Necessity:**

The clarifying changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.1(d)5

**Specific Purpose:**

The specific purpose of the changes to this section are to remove reliance on reference to a later section by instead directly stating where these controls are required, and to clarify the expected interaction between ventilation devices and occupancy sensors installed to also provide lighting control functions. In particular, occupancy sensing controls may delay reporting “unoccupied” for up to 20 minutes to prevent false or

temporary readings from overly affecting controlled equipment behavior, and the intent of this language is to provide an *additional* five minutes from receipt of that signal for ventilation equipment to be staged up or down as appropriate.

**Necessity:**

These changes are necessary to provide a needed level of additional detail and ensure the requirements are neither vague nor ambiguous, as well as to ensure that ventilation equipment is not required to change speeds at a rate that would be potentially harmful to the equipment or require active braking or similar added costs.

**Section: 120.1(f)**

**Specific Purpose:**

The specific purpose of the changes to this section are to clarify that the term airflow rates refers to design airflow rates, clarify that these rates are minimum rates that the system must be capable of achieving (and in so doing preclude an unintended alternate reading that these were the sole and specific rates the equipment was allowed to be operated at), and clarify that the requirement in subsection 3 to “measured ... rates” was a reference to required testing.

**Necessity:**

These changes are necessary to prevent unintended and overly stringent alternate readings of this section’s requirements, and to remove ambiguity relating to when, or by whom, airflow would be measured to comply with subsection 3.

**Section: 120.1(g)**

**Specific Purpose:**

The specific purpose of the changes to this Section are to include additional language from ASHRAE 62.1 that describes each air class, and to add a note to make the source of the language more transparent. For context, ASHRAE 62.1 is incorporated by reference into the Energy Code.

**Necessity:**

These changes are necessary to allow the requirements of this section to be read and understood without needing to additionally access or read ASHRAE 62.1.

**Section: 120.1(h)**

**Specific Purpose:**

The specific purpose of the addition of this section is to directly state that ventilation-only systems are still required to comply with Section 120.1(f). While Section 120.1(f) states that it applies to “all mechanical ventilation *and* space-conditioning systems”, questions regarding application of requirements to systems that do not provide heat or cooling arise commonly enough that a separate, direct statement in a dedicated section was found to be needed.

**Necessity:**

This change is necessary to ensure that application of ventilation requirements to ventilation systems is not misunderstood.

**Section:** Table 120.1-A

**Specific Purpose:**

The specific purpose of the changes to this table is to clarify that the outdoor air rate is the total outdoor airflow rate and that the DCV ventilation rates are minimum values.

**Necessity:**

The clarifying changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.2(c)

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.2(c)2

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** Section 120.2(e)3

**Specific Purpose:**

The specific purpose is to revise functionality requirements for the occupant sensor zone controls to align with the ventilation requirements of Section 120.1 and the occupant sensor ventilation controls devices requirements of Section 120.1(d)5, and to clarify and simplify language regarding occupancy sensing zone controls.

**Necessity:**

These changes are necessary to ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code Sections 11349 and 11349.1. Occupant sensing controls can be applicable to both space-conditioning systems and lighting systems, and applicable space-conditioning systems with occupant sensing zone controls need to meet the specified functionality requirements before, after and during occupied-standby mode. In addition, the clarifying changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.2(i)****Specific Purpose:**

The specific purpose of the changes to this Section is to expand Economizer and Economizer Fault Detection (FDD) and Diagnostic requirements to include mechanical cooling capacities greater than 33,000 Btu/hr.

**Necessity:**

The proposed expansion of design standards for economizers and FDD are necessary to reduce and prevent wasteful, uneconomic, inefficient, and unnecessary consumption of energy by buildings, consistent with the statutory direction in Public Resources Code Section 25402. Economizers are an effective way to capture free cooling.

**Section: 120.2(j)****Specific Purpose:**

The specific purpose of the changes to this section are to directly reference Sections 110.12(a) and (b) rather than requiring an unnecessary extra step of travelling to Section 120.2(h). This is not a substantive change: Section 120.2(h) only refers readers to Sections 110.12(a) and (b).

**Necessity:**

This change is necessary to remove an unneeded step in locating applicable provisions relating to demand responsive behavior.

**Section: 120.3****Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency

within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.4**

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings and to include a reference to the newly added section 120.4(g). This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.4(b)**

**Specific Purpose:**

The specific purpose of the changes to this Section is to specify Seal Class A construction for all ductwork and plenums with pressure class ratings for factory-fabricated and field-fabricated duct systems while allowing some flexibility for ducts in condition spaces that are in view.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. Duct leakage wastes energy causing longer run times for HVAC systems trying to meet demand load.

**Section: 120.4(b)1D and (b)2D**

**Specific Purpose:**

The specific purpose of the change to this section is to add reference to the specific level of sealing required by the California Mechanical Code and the underlying ASHRAE 90.1 standard, as context for the prohibition on use of certain types of duct tapes.

**Necessity:**

This change is necessary to allow this section to be read and understood without relying on knowledge of CMC or ASHRAE 90.1 requirements, and to prevent it from being misunderstood as being more permissive than the CMC or allowing the CMC to be ignored if the prohibition on tapes is followed.

**Section:** 120.4(g)**Specific Purpose:**

The specific purpose of the change to these Sections: (See also sections 140.4(l), 141.0(b), 120.5(a), NA 1.1, NA 2.1, and NA7)

- Make the prescriptive Section 140.4(l) a mandatory requirement by moving this language to Section 120.4(g), and updating references to Section 140.4(l) present in Section 120.5(a) to refer to this new location.
- Include California Mechanical Code Section 603.10.1 duct testing for systems that do not fall under 120.4(g)1 which took effect January 1, 2020.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. Duct leakage testing was introduced in 2001 in Part 6 and have not been updated since introduction. The prescriptive requirement being moved to a mandatory requirement is necessary to be consistent with recent California Mechanical Code changes as well as duct leakage testing.

**Section:** 120.5**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.5(a)**Specific Purpose:**

Duct sealing requirements in Sections 140.4(l) have been moved to Sections 120.4(g) as a mandatory requirement (see 120.4(g)). The specific purpose of the change to this section is to refer to sections 120.4(g) and 141.0(b)2D. The addition of sections 120.4(g)1 and 141.0(b)2D clarify the requirements for which NA7.5.3 is required. (See also sections 140.4(l), 141.0(b), 120.4(g), NA 1.1, NA 2.1, and NA7)

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. Duct

leakage testing was introduced in 2001 in Part 6 and have not been updated since introduction. The prescriptive requirement being moved to a mandatory requirement is necessary to be consistent with recent California Mechanical Code changes as well as duct leakage testing.

**Section:** 120.5 Authority and Reference Citation

**Specific Purpose:**

The specific purpose of the changes to the Authority and Reference citations is to correct the statement for this section to match those of the preceding and following sections. This is not a substantive change in requirements.

**Necessity:**

These changes are necessary to correct an inadvertent error in the citations for this section: the contents of this section are not different in character such that they would be adopted under differing statutory authority, or based on reference to differing supporting statutes.

**Section:** 120.6

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 1 to 120.6(a)4A, EXCEPTION 1 to Section 120.6(a)4B, EXCEPTION 120.6(a)4C

**Specific Purpose:**

This purpose of this non-substantive change is to provide the reader with a reminder about the meaning of “quick chilling/freezing of products” for clarity, consistent with similar language in other sections.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.6(a)4E

**Specific Purpose:**

The specific purpose of the changes to this section is to improve phrasing to account for systems that may include mixed equipment or may make use of equipment in ways not relating to heat rejection.

**Necessity:**

These changes are necessary to ensure that the language accurately represents the intended scope of application of the 70 degree Fahrenheit setpoint requirement and that this requirement applies where it has been demonstrated to be technically feasible and cost effective. Including these systems in the scope of the requirement will reduce overall energy consumption consistent with the statutory directives in Public Resources Code section 25402.

**Section:** EXCEPTION to Section 120.6(a)4

**Specific Purpose:**

The specific purpose of the changes to this section is to exempt transcritical CO<sub>2</sub> systems from the all of 120.6(a)4 due to new requirements for transcritical CO<sub>2</sub> systems in section 120.6(a)8.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.6(a)5A, B, EXCEPTION to Section 120.6(a)5B, C, and D

**Specific Purpose:**

The specific purpose of the changes to subsection 5 is to establish minimum efficiency requirements for transcritical CO<sub>2</sub> refrigeration system compressors located in refrigerated warehouses, consistent with existing regulations applying to traditional refrigeration equipment installed in this context. Transcritical CO<sub>2</sub> systems are gaining popularity as the industry moves away from refrigerants with high global warming potential, and an absence of performance standards for this equipment potentially allows inefficient versions of this equipment and wasteful system designs to become commonplace. Other changes are to renumber existing sections to reflect new additions.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.



**Section:** EXCEPTION 2 to 120.6(a)5C

**Specific Purpose:**

This purpose of this non-substantive change is to provide the reader with a reminder about the meaning of “quick chilling/freezing of products” for clarity, consistent with similar language in other sections.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:**120.6(a)7

**Specific Purpose:**

The specific purpose of the changes to subsections 7 is to establish minimum efficiency requirements for transcritical CO2 refrigeration system compressors located in refrigerated warehouses, consistent with existing regulations of acceptance testing applying to traditional refrigeration equipment installed in this context. Transcritical CO2 systems are gaining popularity as the industry moves away from refrigerants with high global warming potential, and an absence of performance standards for this equipment potentially allows inefficient versions of this equipment and wasteful system designs to become commonplace. Other changes are to renumber existing sections to reflect new additions.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** 120.6(a)8, and Table 120.6-C

**Specific Purpose:**

The specific purpose of the changes to subsection 8 is to establish minimum efficiency requirements for transcritical CO2 refrigeration system compressors located in refrigerated warehouses, consistent with existing regulations applying to traditional refrigeration equipment installed in this context. Transcritical CO2 systems are gaining popularity as the industry moves away from refrigerants with high global warming potential, and an absence of performance standards for this equipment potentially allows inefficient versions of this equipment and wasteful system designs to become commonplace.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section: 120.6(a)9**

**Specific Purpose:**

The specific purpose of the addition of this section is to require automatic door closers for compliance with Section 120.6(a)6 when doors designed for the passage of people are between refrigerated and nonrefrigerated areas.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(b)**

**Specific Purpose:**

The specific purpose of the change to expressly state beverage stores in addition to food stores is to improve clarity. Applicable definitions of “food” include beverages, and “food stores” is inclusive of beverage stores in the language as it exists currently, making this inclusion more explicit prevents misreading or misunderstanding of the application of these requirements.

**Necessity:**

This change is necessary to ensure clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: EXCEPTION 2 to 120.6(b)2B**

**Specific Purpose:**

The specific purpose of this change is to allow transcritical CO<sub>2</sub> refrigeration systems be excluded from liquid subcooling requirement.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(b)2C**

**Specific Purpose:**

The specific purpose of this addition is to establish minimum efficiency requirements for transcritical CO<sub>2</sub> refrigeration system compressors.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION to Section 120.6(b)2C

**Specific Purpose:**

The specific purpose of this change is to allow compressors with a differently designed saturated suction temperature to operate at its appropriate minimum condensing temperature.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION 3 120.6(b)4A

**Specific Purpose:**

The specific purpose of this change is to exclude stores with total heat of rejection of at most 500,000 Btu/h from the refrigeration heat recovery requirement.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(b)5A

**Specific Purpose:**

The specific purpose of this addition of this section is to prohibit air-cooled gas coolers in Climate Zones 10 through 15.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(b)5B

**Specific Purpose:**

The specific purpose of this addition of this section is to establish a maximum design dry bulb temperature for transcritical CO<sub>2</sub> gas coolers.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(b)5C

**Specific Purpose:**

The specific purpose of this addition of Section 120.6(b)5 is to establish a maximum design dry bulb temperature for adiabatic gas coolers.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(b)5D

**Specific Purpose:**

The specific purpose of this addition of this section is to establish requirements for gas cooler fans.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(b)5E

**Specific Purpose:**

The specific purpose of this addition of this section is to specify a gas cooler pressure requirement.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(b)5F

**Specific Purpose:**

The specific purpose of this addition of this addition is to establish a gas cooler pressure setpoint.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(b)5G

**Specific Purpose:**

The specific purpose of this addition of this section is to establish a minimum condensing temperature setpoint for different gas cooler systems.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION to 120.6(b)5G

**Specific Purpose:**

The specific purpose of this addition is to allow transcritical CO<sub>2</sub> system with a design intermediate suction temperature of at least 30 degree Fahrenheit to meet a more appropriate condensing temperature setpoint for its ideal operation.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** Table 120.6-E

**Specific Purpose:**

The specific purpose of the addition of this table is to clearly list out minimum efficiencies and rating conditions for different types of condensers as applicable in the transcritical CO<sub>2</sub> fan-powered gas coolers.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(d)3 and 120.6(d)4

**Specific Purpose:**

The specific purpose of the changes in the old subsections 120.6(d)3 and 120.6(d)4 is to reduce the excess oxygen concentration requirement to 3 percent for process boilers with input capacity of 5 million BTU per hour to 10 million BTU per hour. Subsequently subsection (d)3 is combined with 120.6(d)4.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** EXCEPTION to 120.6(d)3

**Specific Purpose:**

The specific purpose of the new exception is to exempt from the excess oxygen concentration requirement in 120.6(d)3 if the process boiler has a combustion efficiency of 90 percent or higher.

**Necessity:**

This change is necessary to account for systems with tightly controlled combustion environments (including oxygen concentrations) where compliance with blanket minimum standards has a potential to decrease rather than improve combustion efficiency.

**Section:** EXCEPTION 1 to 120.6(e), 120.6(e)3 and EXCEPTION 2 to 120.6(e).

**Specific Purpose:** The EXCEPTION 1 to Section 120.6(e) was moved to subsection 120.6(e)1, which will require alterations with centrifugal compressors to be subject to the rest of the existing and newly added subsections. EXCEPTION 2 to 120.6(2) has been renumbered and non-substantive language was revised for clarity.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION 1, 2, 3, and 4. to Section 120.6(e)1

**Specific Purpose:** The purpose of the changes to this section are to revise, expand and update energy efficiency standards for compressed air systems, per the contents of the code change proposal included in the Documents Relied Upon. These changes include revising and adding exceptions for alterations where code requirements would not allow cost effectiveness while tightening the requirements for exclusion. EXCEPTION 2 has been renumbered to 3.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** 120.6(e)2

**Specific Purpose:** The purpose of the changes to this section are to revise, expand and update energy efficiency standards controls for compressed air systems, per the contents of the code change proposal included in the Documents Relied Upon.

**Necessity:** This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:**120.6(e)3

**Specific Purpose:** The purpose of the addition to this section are to expand energy efficiency standards for compressed air systems to include monitoring, per the contents of the code change proposal included in the Documents Relied Upon.

**Necessity:** This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:**120.6(e)4

**Specific Purpose:** The purpose of the addition to this section are to expand energy efficiency standards for compressed air systems to include leak testing of compressed air piping per the contents of the code change proposal included in the Documents Relied Upon.

**Necessity:** This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:**120.6(e)5

**Specific Purpose:** The purpose of the addition to this section are to expand energy efficiency standards for compressed air systems to include pipe sizing requirements per the contents of the code change proposal included in the Documents Relied Upon.

**Necessity:** This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:**120.6(e)6

**Specific Purpose:** The purpose of the revision to this section are to renumber and clean up existing code language.

**Necessity:** This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.6(h)1A

**Specific Purpose:**

The specific purpose of the addition of this Section is to set efficiency requirements for stand-alone dehumidifiers used for indoor growing spaces.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(h)1B**

**Specific Purpose:**

The specific purpose of the addition of this Section is to set efficiency requirements for integrated HVAC system used as dehumidifier for indoor growing spaces.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(h)1C**

**Specific Purpose:**

The specific purpose of the addition of this Section is to set efficiency requirements for chilled water system used as dehumidifier for indoor growing spaces.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(h)1D**

**Specific Purpose:**

The specific purpose of the addition of this Section is to set efficiency requirements for solid and liquid desiccant dehumidification systems for indoor growing spaces.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(h)2A**

**Specific Purpose:**

The specific purpose of the addition of this Section is to add new horticultural lighting efficiency requirements for indoor growing lighting systems.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(h)2B**

**Specific Purpose:**

The specific purpose of the addition of this Section is to add time switch lighting control requirements for indoor growing lighting systems.

**Necessity:**

This addition is necessary to ensure consistency between the Energy Code and the other Part of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.



**Section: 120.6(h)2C**

**Specific Purpose:**

The specific purpose of the addition of this Section is to add multilevel lighting control requirements for indoor growing lighting systems.

**Necessity:**

This addition is necessary to ensure consistency between the Energy Code and the other Part of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.

**Section: 120.6(h)3**

**Specific Purpose:**

The specific purpose of the addition of this Section is to require an electrical power distribution system to be capable of allowing a measuring device to monitor the electrical energy usage of aggregate horticultural lighting load in the electrical power distribution systems used for indoor growing spaces.

**Necessity:**

This addition is necessary to ensure that the 40kW aggregated horticultural lighting load requirement in subsection 120.6(h)3 can be determined. This change is necessary to ensure consistency between the Energy Code and the other Part of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.

**Section: 120.6(h)4A**

**Specific Purpose:**

The specific purpose of the addition of this Section is to provide clarifying details that opaque wall and opaque roof assemblies in conditioned greenhouses must meet requirements in Section 120.7.

**Necessity:**

This addition is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.6(h)4B**

**Specific Purpose:**

The specific purpose of the addition of this Section is to require specific U-factors for fenestration products installed in conditioned greenhouses.

**Necessity:**

This addition is necessary to provide practical compliance path for conditioned greenhouses and to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 120.6(h)5**

**Specific Purpose:**

The specific purpose of the addition of this Section is to clarify that space conditionings systems for conditioned greenhouses must meet existing applicable requirements in California Code of Regulations, Title 24 Part 6.

**Necessity:**

This addition is necessary to ensure consistency between the Energy Code and the other Part of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.

**Section: 120.6(h)6**

**Specific Purpose:**

The specific purpose of the addition of this Section is to add new photosynthetic photon efficacy requirements for horticultural lighting systems in greenhouse growing lighting systems.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section: 120.6(h)6B**

**Specific Purpose:**

The specific purpose of the addition of this Section is to add time switch lighting control requirements for greenhouse growing lighting systems.

**Necessity:**

This addition is necessary to ensure consistency between the Energy Code and the other Part of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.

**Section: 120.6(h)6C**

**Specific Purpose:**

The specific purpose of the addition of this Section is to add multilevel lighting control requirements for greenhouse growing lighting systems.

**Necessity:**

This addition is necessary to ensure consistency between the Energy Code and the other Part of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.

**Section:** 120.6(i)

**Specific Purpose:**

The specific purpose of the addition of this section is to add minimum efficiency standards for steam traps, per the associated code change proposal included in the Documents Relied Upon. Steam traps serving systems of sufficient size are required to include fault detection and diagnostic sensors, strainers, and be subject to acceptance testing.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** 120.6(j),

**Specific Purpose:**

The specific purpose of the addition of this section is to relocate minimum efficiency standards for computer room ventilation from Section 140.9 to this section, and in so doing make the requirements mandatory rather than prescriptive. Computer rooms shall have controls that prevent space heating or conditioning systems from trying to heat and cool at once, shall not use nonadiabatic humidification, and if sufficiently large shall have load-following fan behavior – these requirements are unchanged from existing provisions save for now being required for both the prescriptive and performance compliance approaches. (See also Section 140.9(a)2,3, and 5)

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** 120.7

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.7(a)3

**Specific Purpose:**

The specific purpose of the change to this section is to remove the word “continuous” as unneeded and potentially a source of confusion. The specification of “continuous” implies the existence of a “noncontinuous roof”, and it is not clear what would constitute a “noncontinuous roof” or what distinction is intended by “continuous”: roofs by their nature must serve to isolate the indoor environment from the outdoor, and do so while also having a variety of necessary penetrations. The removal of this word is understood to be a non-substantive change.

**Necessity:**

This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 120.8

**Specific Purpose:**

The specific purpose of the changes in this Section are to be more consistent in the use of the word “and” in lists of items, and to clarify a necessary link between the Owner’s Project Requirements and the Basis of Design: it was not intended that the Basis of Design omit materials in the Owner’s Project Requirements.

**Necessity:**

These changes are necessary in order to ensure that the Basis of Design fulfills all of its obligations to the Owner’s Project Requirements, and otherwise improve clarity and consistency of lists by removing unneeded, redundant “and”.

**Section:** 120.9

**Specific Purpose:**

The purpose of the changes to this section are to make edits consistent with the changes proposed for Section 120.6(d), including removing the term “excess” in favor of the term “stack-gas” and marginally increasing the threshold of the available exception.

**Necessity:**

These changes are necessary to maintain consistency with Section 120.6(d), and to improve the stringency of the exception for consistency with anticipated performance of contemporary equipment.

**Section:** 120.10 and 141.0(b)1D

**Specific Purpose:**

The specific purpose of this new section is to add new mandatory requirements of Fan Energy Index (abbreviated FEI) for fan and fan arrays for new construction and for additions and alterations when a new fan system is installed. Fan Energy Index is an analysis of fan power draw that accounts for more aspects of overall fan system design (i.e., more of the context into which a fan is installed) than the watts-per-CFM of a given fan taken in isolation. (See

<https://www.amca.org/assets/resources/public/documents/Introducing%20the%20Fan%20Energy%20Index%20Metric.pdf> for a useful description of the metric provided at a layperson level.) The use of this approach is intended to both provide additional flexibility in achieving efficient performance on a holistic basis, as well as prevent designs that create avoidable inefficiencies that are invisible under an approach that looks exclusively at rated fan performance values.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. Fan Energy Index encourages designers to specify fans that are closer to the fan's peak efficiency.

**Section:** 130.0, 130.0(a) and 130.0(b)

**Specific Purpose:**

The specific purpose of the changes to this section is to remove high-rise residential buildings and high-rise residential dwellings from the scoping requirements of Section 130.0 because high-rise residential buildings and dwellings are being moved to new chapters of the proposed Energy Code.

**Necessity:**

These changes were necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. The requirements for high-rise residential buildings and high-rise residential dwellings are specified in new chapters of the proposed Energy Code.

**Section:** 130.0(c)

**Specific Purpose:**

The specific purpose of the changes to Section 130.0(c)2 is to update the luminaire classification and luminaire power determination for luminaires with line voltage lamp holders and to revise the requirement to be based on the luminaire maximum rated wattage of Section 130.0(c)1 and to delete the 50 watts per socket threshold for recessed luminaires with line-voltage medium screw base socket.

The specific purpose of the changes to Section 130.0(c)6 is to delete redundant wording, which are non-substantive grammatical changes necessary to effectively communicate the requirements in a precise and clear manner.

**Necessity:**

The changes to Sections 130.0(c)1 and (c)2 are necessary to reflect the common occurrence that luminaires with line voltage lamp holders can be lamped with LED lamps which are of lower wattage than 50 watts. The changes to Section 130.0(c)6 are necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

## **Section 130.1**

### **Specific Purpose:**

The specific purpose of the change to this section is to remove high-rise residential buildings and high-rise residential dwellings from the scoping requirements of Section 130.1.

### **Necessity:**

This change was necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. The requirements for high-rise residential buildings and high-rise residential dwellings are specified in new chapters of the proposed Energy Code.

There are also non-substantive grammatical changes and subdivision heading changes necessary to effectively communicate the requirements and standards in a precise and clear manner.

### **Section: 130.1(a)**

#### **Specific Purpose:**

The specific purpose of the changes is to clarify the exception, as permitted in this Section 130.1(a), of indoor lighting that are continuously illuminated for the means of egress illumination to be up to the same amount as permitted in Section 130.1(c).

#### **Necessity:**

These changes are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

### **Section: 130.1(b)**

#### **Specific Purpose:**

The specific purpose of the changes are to relocate certain exceptions to this subsection's multilevel lighting control requirements from Table 130.1-A to the text body of Section 130.1(b).

The multilevel lighting control requirements for these areas as specified in the exceptions are not new requirements as they have been in existing Table 130.1-A as footnotes.

#### **Necessity:**

These changes are necessary to allow the requirement to be readily noticeable in text body of the section and can enhance the readability of the code.

These changes are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 2 to Section 130.1(c)

**Specific Purpose:**

The specific purpose of the change is to relocate this EXCEPTION 2 from the end of Section 130.1(c) to be below EXCEPTION 1.

**Necessity:**

This change is necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION to 130.1(c)1C

**Specific Purpose:**

The specific purpose of the non-substantive grammatical changes to the EXCEPTION to Section 130.1(c)1C is to effectively communicate the requirements in a precise and clear manner.

**Necessity:**

This change is necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 130.1(c)1E

**Specific Purpose:**

This is a non-substantive change to remove language that is duplicative with Section 130.1(a). Because all indoor lighting controls already require compliance with Section 130.1(a), which requires manual on switches, it is not necessary to duplicate that requirement in 130.1(c).

**Necessity:**

This change is necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 6 to 130.1(c)1

**Specific Purpose:**

The specific purpose of this addition is to exempt lighting in stairways designated for egress from shut-off energy saving requirements of Section 130.1(c)1.

**Necessity:**

This addition is necessary to ensure consistency of the Energy Code and the California Fire Marshall Code. Egress lighting is considered emergency lighting, and thus falls under the California Fire Marshall jurisdiction.

**Section:** 130.1(c)5

**Specific Purpose:**

The specific purposes of the changes to subsection 130.1(c)5 are to establish mandatory occupant sensing control requirements for multipurpose rooms, classrooms, conference rooms, restrooms, and offices that are 250 square feet or smaller and to make a non-substantive change by replacing the phrase ‘sensor’ with ‘sensing controls’.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402. The multizone occupancy sensing controls requirements for offices greater than 250 square feet will provide the benefit of granular controls of the controlled zones during occupied and non-occupied mode.

**Section:** 130.1(c)6

**Specific Purpose:**

The specific purpose of replacing “areas where full or partial” off with “partial” off is to remove redundancy in the code language. This is a non-substantive change. Another specific purpose is to add the mandatory requirements for partial OFF occupancy sensing controls for aisle ways, open area in warehouses, library book stack aisles, corridors and stairwells, and office spaces greater than 250 square feet.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402. These changes are also necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 130.1(c)6A

**Specific Purpose:**

The specific purpose of the change in this section is to specify the partial OFF occupant sensing control requirements in warehouses.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** 130.1(c)6C

**Specific Purpose:**

The specific purpose of this change is to rephrase the requirements for lighting installed in corridors and stairwells. This is a non-substantive change.

**Necessity:**

This change is necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.



**Section:** 130.1(c)6D

**Specific Purpose:**

The specific purpose of this addition is to establish requirements for partial OFF occupancy sensing controls in offices greater than 250 square feet.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** 130.1(c)6Di

**Specific Purpose:**

The specific purpose of this addition is to provide configuration details for partial OFF occupancy sensing controls in offices greater than 250 square feet to meet Energy Code compliance.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** 130.1(c)6Dii

**Specific Purpose:**

The specific purpose of this addition is to specify the time window for partial OFF occupancy sensing controls to reduce its lighting power in offices greater than 250 square feet to meet Energy Code compliance.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** 130.1(c)6Diii

**Specific Purpose:**

The specific purpose of this addition is to specify the time window for partial OFF occupancy sensing controls to shut off lighting in all zones of offices greater than 250 square feet to meet Energy Code compliance.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** 130.1(c)6Div

**Specific Purpose:**

The specific purpose of this addition is to specify when lighting will be allowed to fully turn on within each control zone in offices greater than 250 square feet to meet Energy Code compliance.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** EXCEPTION to Section 130.1(c)6D

**Specific Purpose:**

The specific purpose of this addition is to allow under-shelf and furniture-mounted task lighting controls to be exempted from the partial OFF occupancy sensing controls for different zones in office spaces greater than 250 square feet.

**Necessity:**

This change is necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 130.1(c)7

**Specific Purpose:**

The specific purpose of replacing “areas where full or partial” off with “partial” off is to remove redundancy in the code language. This is a non-substantive change. Another specific purpose is to add the mandatory requirements for partial OFF occupancy sensing controls for specified stairwells and common area corridors, parking garages, parking areas, and loading and unloading areas.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402. These changes are also necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 130.1(c)7A

**Specific Purpose:**

The specific purpose of the change to this section is to remove high-rise residential buildings and high-rise residential dwellings from the scoping requirements of Section 130.1(c)7A.

**Necessity:**

These changes are necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. The requirements for high-rise residential buildings and high-rise residential dwellings are specified in new chapters of the proposed Energy Code.

**Section: 130.1(c)8**

**Specific Purpose:**

The specific purpose of the changes to this section is to rephrase and reorganize the control requirements for hotel motel guest rooms.

**Necessity:**

These changes are necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 130.1(d)**

**Specific Purpose:**

The specific purpose of the change is to add secondary sidelit daylit zones to the mandatory automatic daylighting control requirements.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section: 130.1(d)1**

**Specific Purpose:**

The specific purpose of the changes is to specify that secondary sidelit daylit zones in parking garages to be shown on plan sets.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section: 130.1(d)2**

**Specific Purpose:**

The specific purpose of the changes is to rephrase “luminaires” as “general lighting” for clarity. This is a non-substantive change. Another specific purpose of the changes is to explicitly describe how general lighting in overlapping primary and secondary sidelit daylit zones must be controlled.

**Necessity:**

These changes are necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. These changes are also necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section: 130.1(d)3C**

**Specific Purpose:**

One specific purpose of the changes is to rephrase the daylight requirement in areas other than parking garages to improve clarity and understanding. This is a non-

substantive change. Another specific purpose of the changes is to increase the minimum of controlled lighting power reduction from 65 to 90 percent.

**Necessity:**

These changes are necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. These changes are also necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** 130.1(d)3D

**Specific Purpose:**

The specific purpose of the changes is to clarify that the combination of primary and secondary sidelit daylit zones must be reduced to 100 percent when daylight illuminance is greater than 150 percent of the design illuminance. This is a non-substantive change.

**Necessity:**

This change is necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 130.1(d)4

**Specific Purpose:**

Because a minimum of one photosensor is now required for all daylit zones, it is no longer necessary to include conditional language specifying requirements when a photosensor is located within the daylit zone. This change requires that all photosensors be located such that they are not accessible to unauthorized personnel, rather than at least one in a daylit zone.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

**Section:** EXCEPTION 3 to 130.1(d)

**Specific Purpose:**

The specific purpose of the changes is to rephrase the EXCEPTION for rooms with total general lighting power in skylit daylit zone and primary sidelit daylit zone of less than 120 watts.

**Necessity:**

This change is necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 4 to 130.1(d)

**Specific Purpose:**

The specific purpose of the changes is to exempt from the automatic daylighting control requirements rooms with total general lighting power in secondary sidelit daylit zone less than 120 watts.

**Necessity:**

This change is necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 5 to 130.1(d)

**Specific Purpose:**

The specific purpose of the changes is to exempt from the automatic daylighting control requirements in sidelit daylit zones rooms with total installed general lighting power in primary and secondary sidelit daylit zones less than 240 watts.

**Necessity:**

This change is necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 6 to 130.1(d)

**Specific Purpose:**

The specific purpose of the changes is to exempt from the automatic daylighting control requirements in daylit zones parking garage areas with total installed general lighting power in primary and secondary sidelit daylit zones less than 60 watts.

**Necessity:**

This change is necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 8 to 130.1(d)

**Specific Purpose:**

The specific purpose of the changes is to remove dedicated ramps in parking garages from being exempted from automatic daylighting control requirements.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Section 25213 and 25402.

Section: 130.1(f):

**Specific Purpose:**

The specific purpose of this change is to clarify that Sections 130.1(a) through 130.1(e) are required.

**Necessity:**

This change is necessary to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 130.1(f)9

**Specific Purpose:**

The specific purpose of the change is to add new occupant sensing control requirements for space conditioning systems as specified in Table 120.1-A.

**Necessity:**

Occupant sensing controls can be applicable to both space-conditioning systems and lighting systems, and applicable space-conditioning systems with occupant sensing zone controls needs to meet the specified functionality requirements. These changes are necessary to ensure and improve general clarify and internal consistency of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** Table 130.1-A

**Specific Purpose:**

The specific purpose is to make editorial changes in re-ordering the light source technologies so that the LED lighting luminaire types are arranged to the top portion of the table and HID lighting technology types are arranged to the bottom part of the table. The other change is to combine some luminaire types with common character into the same category in order to improve the readability and ease-of-use of the Table.

**Necessity:**

These changes are necessary to ensure and improve general clarity of the Energy Code, as directed by California Government Code Section 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 130.2, 130.2(b), and EXCEPTION 6 to 130.2(b)

**Specific Purpose:**

The specific purpose of the change to this section is to remove high-rise residential buildings and high-rise residential dwellings from the scoping requirements of Section 130.2 and provide non-substantive grammatical changes for clarity.

**Necessity:**

These changes are necessary for the changes to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. The requirements for high-rise residential buildings and high-rise residential dwellings are specified in new chapters of the proposed Energy Code. There are also non-substantive grammatical changes and editorial changes necessary to effectively communicate the requirements and standards in a precise and clear manner.

**Section:** EXCEPTION 2 to 130.2(b)

**Specific Purpose:**

The specific purpose of this change is to exempt outdoor public art lighting from the luminaire shielding requirements.

**Necessity:**

This change is necessary to clarify that “public art” as part of public monuments and statues and to ensure clarity and internal consistency within the Energy Code, as

directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 6 to 130.2(b)

**Specific Purpose:**

The specific purpose of this change is to exempt utility-maintained roadways, sidewalks, and bikeways from the luminaire shielding requirements.

**Necessity:**

This change is necessary to clarify that “utility-maintained” is part of the public right of way and to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 130.2(c)3A

**Specific Purpose:**

The specific purpose of the changes to this section is to relocate the motion sensing control requirements from the bottom of the subsection to the top. This is a non-substantive change for clarity.

**Necessity:** These changes are necessary for the changes to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 4 to Section 130.2(c)3

**Specific Purpose:**

The specific purpose of the change to this section is to allow luminaires with a maximum rated wattage of 78 watts to not install motion sensing controls.

**Necessity:**

This change is necessary to ensure energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** 130.3

**Specific Purpose:**

The specific purpose of the change to this section is to remove high-rise residential buildings and high-rise residential dwellings from the scoping requirements of Section 130.3.

**Necessity:**

These changes are necessary for the changes to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. The requirements for high-rise residential buildings and high-rise residential dwellings are specified in new chapters of the proposed Energy Code.

**Section:** 130.4

**Specific Purpose:**

The specific purpose of the change to this section is to remove high-rise residential buildings and high-rise residential dwellings from the scoping requirements of Section 130.4.

**Necessity:**

These changes are necessary for the changes to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. The requirements for high-rise residential buildings and high-rise residential dwellings are specified in new chapters of the proposed Energy Code. There are also non-substantive grammatical changes and editorial changes necessary to effectively communicate the requirements and standards in a precise and clear manner.

**Section: 130.4(a)****Specific Purpose:**

The specific purpose of the changes is to edit the wordings to clarify how the lighting control acceptance requirements can be met by testing in accordance with Reference Nonresidential Appendix Section NA7.6 and NA7.8. Another specific purpose of the changes to institutional tuning power adjustment factor is to move its references to the requirement from Section NA7, which contains installation requirements, to Section NA7.6, which contains lighting control acceptance test procedures.

**Necessity:**

The changes are necessary to state clearly without ambiguity the lighting controls as specified by the sections in Title 24 Part 6 shall be tested in accordance with the section in Reference Nonresidential Appendix NA7.6 or NA7.8. Reference Nonresidential Appendix Section NA7.6 and NA7.8 contains details of lighting control acceptance test procedures to be performed in order to meet requirements of lighting control acceptance of Section 130.4(a). The changes are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section: 130.4(b)****Specific Purpose:**

The specific purpose of the changes to this section are to remove outdated references to track lighting integral current limiters and supplementary overcurrent protection panels. Requirements relating to these two devices were removed as a part of the 2019 update to the Energy Code, and this language was inadvertently left in place. This is not a substantive change in requirements.

**Necessity:** These changes are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.



**Section: 130.5**

**Specific Purpose:**

The specific purpose of the change to this section is to remove high-rise residential buildings and high-rise residential dwellings from the scoping requirements of Section 130.5.

**Necessity:**

These changes are necessary to ensure internal consistency within the Energy Code as the requirements for high-rise residential buildings and high-rise residential dwellings are specified in new chapters of the proposed Energy Code.

**Section: 130.5(d)**

**Specific Purpose:**

The specific purpose of the changes is to revise occupancy sensing controls as occupant sensing controls.

**Necessity:**

The changes are necessary to maintain consistency in using the same terminology, occupant sensing controls for controls requirements in the Energy Code.

The changes are necessary to ensure and improve general clarify and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section: 130.5(e)**

**Specific Purpose:**

The specific purpose of the changes to this section is to expressly state that “demand responsive controls and equipment” includes demand responsive controls associated with controlled receptacles. This change clarifies the existing scope of the requirement and is not a substantive change in requirements.

**Necessity:**

These changes are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section: 140.0**

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.1

**Specific Purpose:**

The specific purpose of the changes to this section are to include mention of the solar and battery storage systems now required by Section 140.10, as well as the now applicable community solar and battery storage system provisions specified in Part 1 Section 10-115.

**Necessity:**

These changes are necessary to correctly list and avoid conflict with the newly added section as well as with existing community solar and battery storage provisions that allow for Energy Code compliance with these system requirements to be satisfied by off-site systems meeting specified criteria.

**Section:** 140.3(a)1Aib1

**Specific Purpose:**

The specific purpose of the change to Section 140.3(a)1Aib1 is to modify the current steep-sloped cool roof requirement (i.e., aged solar reflectance & thermal emittance) of 0.20/0.75 to only apply to Climate Zones 1 & 3.

**Necessity:**

This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.3(a)1Aib2

**Specific Purpose:**

The specific purpose of the addition of Section 140.3(a)1Aib2 is to add a new, more stringent, steep-sloped cool roof requirement (i.e., aged solar reflectance & thermal emittance) of 0.25/0.80 for Climate Zones 2 & 4-16.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** 140.3(a)1Aii

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these

provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.3(a)1B

**Specific Purpose:**

The specific purpose of the change to this section is to remove the word “continuous” as unneeded and potentially a source of confusion. The specification of “continuous” implies the existence of a “*non*continuous roof”, and it is not clear what would constitute a “noncontinuous roof” or what distinction is intended by “continuous”: roofs by their nature must serve to isolate the indoor environment from the outdoor, and do so while also having a variety of necessary penetrations. The removal of this word is understood to be a non-substantive change.

**Necessity:**

This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** Table 140.3

**Specific Purpose:**

The specific purpose of the changes to Table 140.3 is to remove the table header row to aid in ADA accessibility, and to modify column 3 to clarify the requirements of this column only applies to Climate Zones 6-8.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION to 140.3(a)5

**Specific Purpose:**

The specific purpose of this addition is to include exceptions related to conditioned greenhouses subject to the standards for controlled environment horticulture spaces added to 120.6(h).

**Necessity:**

The change to add exceptions for conditioned greenhouses is necessary to ensure these process spaces are not inadvertently held to requirements applicable to standards for non-process spaces in nonresidential buildings (in addition to the standards in 120.6(h)). These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** EXCEPTION 1 to and 140.3(a)6

**Specific Purpose:**

The specific purpose of this addition is to add an exception that applies a separate exterior window U-factor to school buildings meeting specified criteria, and to provide a credit for vertical fenestration shading provided by exterior horizontal slats when calculating the relative solar heat gain coefficient (RSHGC) using Equation 140.3A.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. Climate Zones 1 and 16 are very cold climates relative to other California climate zones, and buildings below 25,000 square feet have a low enough surface area to volume ratio to make the improvement to exterior thermal performance cost effective as an energy saving measure.

The change to include horizontal slats in calculating RSHGC is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. Horizontal slats have grown in popularity over recent years, and when they are installed on the exterior of a building, they reduce the solar heat gain through the fenestration. Adding exterior horizontal slat to the RSHGC equation would allow designers added flexibility for compliance.

**Section:** 140.3(a)7

**Specific Purpose:**

The purpose of the change in this section is to expand the allowance for glass doors to include doors with a smaller portion of glass (one-quarter instead of one-half).

**Necessity:**

This change is necessary to prevent U-factor requirements from prohibiting use of doors with specific percentages of glass. The intent is that an appropriate U-factor be applied based on the design of the door, not that some fractions of glass be virtually prohibited by a too-tight standard.

**Section:** 140.3(a)9

**Specific Purpose:**

The purpose of the changes to this section are to add a requirement that air barriers be identified on construction documents (e.g., plans and blueprints) in support of the existing requirement that a continuous air barrier be included in the building, add a specific procedure for projects that elect to verify the installation of air barriers, add an exception for relocatable public school buildings (sometimes called portable classrooms or portables), and making non-substantive changes to enhance the readability of the section such as relocating Table 140.3-A.

**Necessity:**

The change to require identification of air barriers on construction documents is necessary to ensure a general understanding of which components of the building are serving as its air barrier and better guarantee that a complete barrier is present, to

specify a procedure for verifying the air barrier for projects that elect to request or require verification, and to exempt relocatable public school buildings given that adherence to air barrier performance requirements is potentially technically infeasible for a significant fraction of these buildings.

**Section:** Equation 140.3-A

**Specific Purpose:**

The specific purpose of the changes to Equation 140.3-A is to revise the relative solar heat gain coefficient (RSHGC) equation to provide credit for exterior horizontal slats, in addition to overhangs.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** Table 140.3-B

**Specific Purpose:**

The specific purpose of the changes made to Table 140.3-B are to:

- Increase the stringency of the metal-framed wall U-factor requirement equivalent to the addition of R-2 continuous insulation for all Climate Zones.
- Increase the stringency of the steep-sloped cool roof requirements (i.e., aged solar reflectance & thermal emittance) to 0.25/0.80 for Climate Zones 2 & 4-16.
- Revise fenestration requirements to be broken down by climate zone.
- Increase the stringency of the fixed window fenestration properties (i.e., U-factor, RSHGC, & VT) for Climate Zones 9 & 11-15.
- Increase the stringency of the curtainwall/storefront fenestration properties (i.e., U-factor, RSHGC, & VT) for Climate Zones 1 & 7.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402.

**Section:** Table 140.3-C

**Specific Purpose:**

The specific purpose of the changes to this section is to remove high-rise residential from the title and add a row reflecting the air barrier requirements present in Section 140.3(a)9, for consistency with this section's contents. This is not a substantive change in requirements: the requirement to include an air barrier is an existing requirement in Section 140.3(a)9.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** Table 140.3-D

**Specific Purpose:**

The specific purpose of the changes made to Table 140.3-D is to increase the stringency of the steep-sloped cool roof requirements (i.e., aged solar reflectance & thermal emittance) to 0.25/0.80.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** 140.3(d)2

**Specific Purpose:**

The specific purpose of the changes made to this Section are to update equation reference number from "Equation 140.3-E" to "Equation 140.3-C", and to relocate a height provision to a more appropriate subsection.

**Necessity:**

This is a non-substantive ordering change necessary to effectively communicate the requirements and standards in a precise and clear manner. This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.3(d)3

**Specific Purpose:**

The specific purpose of the change made to this Section is to update equation reference number from "Equation 140.3-E" to "Equation 140.3-C", and to remove redundant phrasing in subsection C.

**Necessity:**

This is a non-substantive ordering change necessary to effectively communicate the requirements and standards in a precise and clear manner. This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as

directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** Equation 140.3-C

**Specific Purpose:**

The specific purpose of the change made to Equation 140.3-C is to update equation reference number from “Equation 140.3-E” to “Equation 140.3-C”, and to include overhangs to create consistency within Section 140.3 overall.

**Necessity:**

The change to include overhangs in Equation 140.3-C is necessary to fill a gap in direction about appropriate parameters for window features. The change to equation numbering is a non-substantive ordering change necessary to effectively communicate the requirements and standards in a precise and clear manner. This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.4

**Specific Purpose:**

The purpose of the changes to the introductory sentence for this section is to add the word “prescriptive” for consistency with its title. This is not a substantive change.

**Necessity:**

These changes are necessary to create consistency between the section’s title and its contents.

**Section:** 140.4(a):

**Specific Purpose:**

The specific purpose of the changes to this section is to add new equipment selection requirements for retail, grocery, school, office, financial institution, and library building spaces to a new subsection, and add appropriate subsection numbering and titles to existing provisions as a part of this change.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402. These changes are also necessary to pursue the State’s goals relating to greenhouse gas emissions.

**Section:** 140.4(b)

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are

described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.4(c),

**Specific Purpose:**

The specific purpose of the change to this Section is to change the requirements for fan systems and to expand the requirements to  $\geq 1\text{kW}$  replacing the existing “Fan Power Limits” using look up tables, and to define the types of power allowances per fan system types and components. This will also apply to additions and alterations with additional power allowances. These changes include equations to determine compliance with the new Fan Power Budget, and tables that feed into those equations. (see also Table 140.4-A, Table 140.4B, Table 140.4-C, Table 140.4-D, Table 141.0-D, and Section 141.0(b)2C)

**Necessity:**

These changes are necessary to equalize stringency between small and large fan systems, account for air density and transmission efficiency, and ultimately increase energy savings. These changes provide a significantly more robust and comprehensive set of system design standards and improve the ability of the regulatory structure to accommodate varying ventilation strategies and components. Providing specific consideration of a far larger number of system components provides the benefit of preventing the regulations from inadvertently and unnecessarily impeding some otherwise efficient system designs and components, while also ensuring that a wider variety of circumstances are held to appropriately stringent efficiency standards.

**Section:** Equation 140.4-A

**Specific Purpose:**

The specific purpose of the addition of this equation is to change the requirements for fan systems using look up tables, and Equation 140.4-A to define the types of power allowances per fan system types and components. This will also apply to additions and alterations with additional power allowances. (see also Table 140.4-A, Table 140.4B, Table 140.4-C, Table 140.4-D, Table 141.0-D, and Section 141.0(b)2C)

**Necessity:**

These changes are necessary to equalize stringency between small and large fan systems, account for air density and transmission efficiency, and ultimately increase energy savings. These changes provide a significantly more robust and comprehensive set of system design standards and improve the ability of the regulatory structure to accommodate varying ventilation strategies and components. Providing specific consideration of a far larger number of system components provides the benefit of preventing the regulations from inadvertently and unnecessarily impeding some



otherwise efficient system designs and components, while also ensuring that a wider variety of circumstances are held to appropriately stringent efficiency standards.

**Section:** Table 140.4-A, Table 140.4-B, Table 140.4-C, Table 140.4-D

**Specific Purpose:**

The specific purpose of the changes to this Section is to change the requirements for fan systems and to expand the requirements to  $\geq 1\text{kW}$ , replacing the existing “Fan Power Limits” by using these four new lookup tables, which replace the prior Table 140.4-A, and by defining the types of power allowances per fan system types and components. These new requirements will apply to new construction and to additions and alterations, with additional power allowances. These new tables provide input values for Equation 140.4-A to determine the Fan Power Limit. (see also Section 140.4(c), Table 141.0-D, and Section 141.0(b))

**Necessity:**

These changes are necessary to equalize stringency between small and large fan systems, account for air density and transmission efficiency, and ultimately increase energy savings. These changes provide a significantly more robust and comprehensive set of system design standards and improve the ability of the regulatory structure to accommodate varying ventilation strategies and components. Providing specific consideration of a far larger number of system components provides the benefit of preventing the regulations from inadvertently and unnecessarily impeding some otherwise efficient system designs and components, while also ensuring that a wider variety of circumstances are held to appropriately stringent efficiency standards.

**Section:** 140.4(d)

**Specific Purpose:**

The specific purpose of the changes to this section is to simplify code language by removing the 20% of the peak primary airflow option.

**Necessity:**

This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This change aligns with the changes that have been made to ASHRAE 90.1 and has been supported by ASHRAE’s research project co-funded by the California Energy Commission PIER program.

**Section:** Table 140.4-F

**Specific Purpose:**

The specific purpose of the changes made to this Table is to revise the text to align with ASHRAE 90.1.

**Necessity:**

This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.4(e)

**Specific Purpose:**

The specific purpose of the changes to this Section is to expand Economizer requirements to include mechanical cooling capacities greater than 33,000 Btu/hr. The changes to exception 6 amends existing requirements of dedicated outdoor air systems to point towards new requirements in section 140.4(p). This exception excludes economizers requirements for specific dedicated outdoor air system types that are working in conjunction with cooling capacities less than 54,000 Btu/hr. (see also Sections 120.2(i)), and JA 6.3)

**Necessity:**

The proposed expansion of design standards for economizers are necessary to reduce and prevent wasteful, uneconomic, inefficient, and unnecessary consumption of energy by buildings, consistent with the statutory direction in Public Resources Code Section 25402. Economizers are an effective way to capture free cooling. This ensures economizing is provided on smaller systems where it is still shown to be cost effective.

**Section:** EXCEPTION 6 to 140.4(e)1

**Specific Purpose:** The changes to this exception now specify dedicated outdoor air systems that fulfill the new requirements of 140.4(p)1B and 140.4(p)2 through 140.4(p)6 that are working in conjunction with cooling capacities less than 54,000 Btu/hr.

**Necessity:** These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section: EXCEPTION 7 to 140.4(e)1**

**Specific Purpose:**

The purpose of adding the exception to this section is to reduce the threshold for system sizes where economizing is required, replace the exception for outdoor air systems with an exception for dedicated ventilation systems, to add an exception to account for controlled environment horticulture spaces where use of an economizer would compromise the ability to control the gas mix of indoor air, and to correct section numbering in subsection 2E.

**Necessity:**

These changes are necessary to clarify the situations related to horticulture that are intended to be excepted from economizing requirements.

**Section: EXCEPTION 5 to 140.4(g)**

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 140.4(k)8**

**Specific Purpose:**

The specific purpose of the new subsection 8, and the addition of Exceptions in subsection 8 is to add new requirements for high-capacity space heating gas boiler systems for climate zone 1 through 6, 9 through 14, and 16.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section: 140.4(l)**

**Specific Purpose:**

The specific purpose of the change to this section (see also sections 120.4(g), 120.4(a), 141.0(b), NA1.1, NA 2.1, and NA 7):

- Make the prescriptive Section 140.4(l) a mandatory requirement by moving this language to subsection 120.4(g).

- Update references to subsection 140.4(l) present in subsection 120.5(a) to refer to this new location.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. Duct leakage testing was introduced in 2001 in Part 6 and have not been updated since introduction. The prescriptive requirement being moved to a mandatory requirement is necessary to be consistent with recent California Mechanical Code changes as well as duct leakage testing.

**Section:** EXCEPTION 4 to 140.4(n)

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.4(p)

**Specific Purpose:**

The specific purposes of the changes made to this section are to:

- Add new prescriptive requirements for systems that utilize dedicated outdoor air systems (DOAS).
- Include exemptions for systems that would not be cost effective or that would inhibit occupant safety.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402. The current Building Energy Efficiency Standards currently do not have prescriptive requirements for DOAS while market share for DOAS have been increasing since 2012; their broadening adoption and market penetration now means that efficiency standards for this equipment have the potential to save a significant amount of energy on a statewide basis.

**Section:** 140.4(q), Table 140.4-G, Table 140.4-H

**Specific Purpose:**

The purpose of the changes made to this section and associated tables are to add new prescriptive requirements for exhaust air heat recovery. This includes providing exemptions matching those in ASHRAE 90.1 related to exhaust, and adding tables for determining energy recovery requirements based on climate zone and percent outdoor air.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402. There is currently no requirement to install heat recovery for exhaust systems, and the documents relied upon show that installing this equipment is technically feasible for buildings in California, cost effective to install, and capable of saving significant energy on an annual statewide basis.

**Section:** 140.5(a)

**Specific Purpose:**

The specific purpose of the changes to subsection 140.5(a), and the addition of subsections 140.5(a)1 and 140.5(a)2 is to separate the water heating requirement for schools from all other nonresidential occupancies. The new prescriptive requirement for schools requires heat pump water heating systems, and all other types of system shall comply through the performance compliance method as specified in Section 140.1.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402. These changes are also necessary to pursue the State's goals relating to greenhouse gas emissions.

**Section:** 140.5(b)

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings, to direct readers to this new location for multifamily requirements applicable to hotel/motel occupancies, and to replace language for clarity. This is not a substantive change in requirements.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 140.5(c)**

**Specific Purpose:**

The purpose of the changes to this section are to apply minimum thermal efficiency standards to gas water heating systems exceeding a specified size, in a way that excludes individual water heaters that are regulated as appliances and otherwise remains agnostic of the specific composition of equipment or other components included within the system.

**Necessity:**

These changes are reasonably necessary to apply a feasible and cost-effective efficiency standard to large water heater systems comprised of multiple components.

**Section: 140.6**

**Specific Purpose:**

The purpose of the changes to this section are to remove mention of secondary daylight zone provisions, consistent with the relocation of these provisions to mandatory sections.

**Necessity:**

These changes are reasonably necessary to accurately reflect the proposed content of Section 140.6 and its subsections.

**Section: 140.6(a)2**

**Specific Purpose:**

The specific purpose of the change to this subsection H, I and K is to amend the power adjustment factor (PAF) for daylight dimming plus OFF controls, for occupant sensing controls in office, and for demand responsive control.

**Necessity:**

The change is necessary to allow qualified daylight control system to provide “continuous dimming plus OFF control” for meeting the prescriptive power adjustment factor (PAF) requirement. The change is also necessary to add Secondary Sidelit Daylit Zone as a qualified daylit zone for the PAF requirement.

**Section: 140.6(a)3**

**Specific Purpose:**

The purpose of the changes to this section are to remove unneeded parenthetical language and to add reference to lighting requirements for controlled environment horticulture spaces consistent with their proposed addition to Section 120.6(h).

**Necessity:**

These changes are reasonably necessary to simplify language where possible, and to preclude any potential overlap in lighting requirements applicable to general spaces and lighting requirements applicable specifically to controlled environment horticulture spaces.

**Section: 140.6(a)4B****Specific Purpose:**

The specific purpose of the changes to subsection 140.6(a)4B is to add the term luminaire aperture to the qualifying luminaire descriptions of small aperture tunable-white and dim-to-warm luminaires lighting power adjustment. Another specific purpose of the changes to subsection 140.6(a)4B is to revise the lighting power adjustment values for these luminaires.

**Necessity:**

The changes to the qualifying luminaire descriptions and the lighting power adjustment of small aperture tunable-white and dim-to-warm luminaires are necessary to reflect the progress in lighting power efficiency of these luminaires. These changes are also necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section: 140.6(b)4****Specific Purpose:**

The specific purpose of the change is to amend the indoor lighting power allotments for using complete building method, area category method, and tailored method in Table 140.6-B, Table 140.6-C, Table 140.6-D, and Table 140.6-G.

The other changes in the subsection are to replace the term, "ornamental lighting", with the term, "decorative lighting" in the prescriptive section for indoor lighting as this is to align with the changes of both definitions in Section 100.1.

**Necessity:**

These changes are necessary to maintain, where feasible, consistency of the Energy Code, and the following documents of the American National Standards and the Illuminating Engineering Society (IES).

- Illuminating Engineering Society. 2012. "American National Standard Practice for Office Lighting." ANSI/IES RP-1-12, New York.
- Illuminating Engineering Society. 2013. "American National Standard Practice on Lighting for Educational Facilities." ANSI/IES RP-3-13.
- Illuminating Engineering Society. 2017. "Design Guide for Hospitality Lighting." IES DG- 25-17, New York.
- Illuminating Engineering Society. 2017. "Guide for Security Lighting for People, Property, and Critical Infrastructure." IES G-1-16.
- Illuminating Engineering Society. 2016. "Lighting and the Visual Environment for Seniors and the Low Vision Population." ANSI/IES RP-28-16 .
- Illuminating Engineering Society. 2017. "Lighting for Hospitals and Healthcare Facilities." ANSI/IES RP-29-16.
- Illuminating Engineering Society. 2013. "Recommended Practice for Library Lighting." IES RP-4-13.
- Illuminating Engineering Society. 2017. "Recommended Practice for Lighting Industrial Facilities." ANSI/IES RP-7-17.
- Illuminating Engineering Society. 2015. "Recommended Practice for Lighting Maintenance." IES RP-36-15.

- Illuminating Engineering Society. 2017. "Recommended Practice for Museum Lighting." ANSI/IES RP-30-17.
- Illuminating Engineering Society. 2018. "Recommended Practice for Retail Lighting." IES RP-2-17.
- Illuminating Engineering Society. 2015. "Sports and Recreational Area Lighting." IES RP-6-15.
- Illuminating Engineering Society. 2011. "The Lighting Handbook, 10th Edition."

Further, these changes are also necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. The non-substantive grammatical changes are necessary to effectively communicate the requirements and standards in a precise and clear manner.

**Section:** 140.6(c)2Gvii

**Specific Purpose:**

The specific purpose of the changes to subsection 140.6(c)2Gvii is to delete the specific lighting wattage amount for videoconferencing studio and instead to refer to Table 140.6-C for the lighting power allotment for videoconferencing studio.

**Necessity:**

These changes are necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section:** 140.6(c)3E and 140.6(c)3I

**Specific Purpose:**

The proposed change is to replace the term, "ornamental lighting", with the term, "decorative lighting" in the prescriptive section for indoor lighting and to align with the changes of both definitions in Section 100.1.

**Necessity:**

These changes are necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section:** 140.6(c)3Jiv

**Specific Purpose:**

The proposed change is to revise the additional allowed lighting power for valuable display case lighting to reflect the progress made in lighting power efficiency of LED lighting for the valuable display case lighting application.

**Necessity:**

These changes are necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.



**Section:** 140.6(d)

**Specific Purpose:**

The proposed change is to delete the secondary sidelit daylight zone requirements from this section and to move the requirements to Section 130.1(d).

**Necessity:**

These changes are necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section:** Table 140.6-A

**Specific Purpose:**

The proposed change is to revise Daylight Continuous Dimming plus OFF control to be the type of control qualified for the power adjustment factors (PAF) as specified in Table 140.6-A. This change to continuous dimming is based on the commonly availability of LED lighting in marketplace and the capability of LED lighting technology to be capable of continuous dimming.

**Necessity:**

These changes are necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section:** Table 140.6-B

**Specific Purpose:**

The proposed change is to update the allowed lighting power density values for most building types in the Complete Building Method Table.

The change is also to re-order the building types in an alphabetical order as this arrangement is widely acceptable and thereby would enhance readability of the table. Additionally, the change is to add Museum Building type and its allowed lighting power density to the whole building method.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the lighting power provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications.

These changes are also necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25103 and 25402.

These changes are also necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section:** Table 140.6-C

**Specific Purpose:**

The proposed change is to update the allowed lighting power density values for most building functional area types in the Area Category Method Table.

The change is a multitude of considerations that are to account for efficacy improvement of high CRI luminaries, for illuminance targets for general lighting and task

lighting, and lighting power level required for the building functional area type based on their specific lumen method model.

The changes are also to re-order the primary function areas in an alphabetical order as this arrangement is widely acceptable and thereby would enhance readability of the table.

Additionally, these changes are to replace the term, ornamental lighting, with decorative/display lighting for additional light power for various primary function area categories in Table 140.6-C.

Further, these changes are in conjunction with the clarification change to ornamental lighting that ornamental lighting are installed outdoor as defined in Sections 100.1 and 140.7, and decorative lighting and display are proposed as additional lighting power for the specified primary function areas.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the lighting power provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications.

It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

Further, these changes are also necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section:** Table 140.6-D

**Specific Purpose:**

The proposed changes are to adjust lighting power allowance values as follows:

- decrease the “floor and wall display” lighting power allowance of Tailored method. The changes are to account for the effect of an improved efficiency of luminaire products and lamp products used for the “floor and wall display” lighting.
- decrease the “very valuable display” lighting power allowance of Tailored method, in order to account for the effect of an improved efficiency of luminaire products used for the “very valuable display” lighting.
- decrease the tailored lighting “ornamental/special lighting” power allowance of the Tailored method, in order to replace the term “ornamental lighting” with the term “decorative lighting” in conjunction with clarifying changes to the meaning and appropriate use of these terms.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the lighting power provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. Further, these changes are also necessary to improve the code's compliance

with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section:** Table 140.6-G

**Specific Purpose:**

The proposed changes are to revise and to decrease the tailored method general lighting power allowance values in Table 140.6-G for Tailored method. The changes are to account for the effect of improved effectiveness and efficiency of light sources used for tailored method general lighting.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the lighting power provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section:** 140.7 Authority and Reference Citation

**Specific Purpose:**

The specific purpose of the change is to add the Authority and Reference citations to reflect the statutory provisions utilized by the CEC in the preceding section. This is not a substantive change in requirements.

**Necessity:**

These changes are necessary to provide the public with the CEC's statutory authority for adopting these regulations and to provide notice of the sections that are being implemented, interpreted or made specific by the regulations.

**Section:** 140.7

**Specific Purpose:**

The specific purpose of the change to this section is to amend outdoor lighting general hardscape lighting power allowances and additional outdoor lighting power allowances for specific application.

**Necessity:**

It was necessary for the changes to maintain, where feasible, consistency of the Energy Code and the following documents of the American National Standards and the Illuminating Engineering Society (IES).

- the Illuminating Engineering Society's (IES) recommended values for parking lot facilities in the document, RP-8-18 Chapter 17 addendum 1
- Illuminating Engineering Society. 2020. "Addendum 1 for ANSI/IES RP-8-18, Recommended Practice for Design and Maintenance of Roadway and Parking Facilities Lighting Chapter 17." [http://media.ies.org/docs/errata/ANSI-IES RP-8-18-Addendum-1\\_20200123.pdf](http://media.ies.org/docs/errata/ANSI-IES RP-8-18-Addendum-1_20200123.pdf).
- Illuminating Engineering Society and International Dark-Sky Association. 2011. "Model Lighting Ordinance." [https://www.darksky.org/wp-content/uploads/bsk-pdf-manager/16\\_MLO\\_FINAL\\_JUNE2011.PDF](https://www.darksky.org/wp-content/uploads/bsk-pdf-manager/16_MLO_FINAL_JUNE2011.PDF).

- Illuminating Engineering Society. 2011. "The Lighting Handbook, 10th Edition."

Following are specific changes within Section 140.7:

**Section:** Table 140.7-A

**Specific Purpose:**

The specific purpose of the changes is to revise the lighting power allowance values of general hardscape lighting. The concrete and asphalt surface distinction are removed and these LPAs are reduced to align with the lighting levels recommendations in the ANSI/IES documents of Illuminating Engineering Society (IES) for parking lots and general hardscape lighting applications.

**Necessity:**

These changes are necessary to align the general hardscape lighting power allowance provisions for outdoor lighting with "Addendum 1 for ANSI/IES RP-8-18, Recommended Practice for Design and Maintenance of Roadway and Parking Facilities Lighting Chapter 17". Further, these changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the lighting power provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section:** Table 140.7-B

**Specific Purpose:**

The specific purpose of the proposed changes is to add a new additional lighting allowance for security cameras. Another proposed change is to update the ornamental lighting 100-watt limit to 50 watts and to correct the reference to Section 130.0(c) for luminaire rated wattage determination.

**Necessity:**

The changes for the additional lighting allowance for security cameras are to address security concerns for general hardscape areas lighting applications. The changes for the ornamental lighting wattage limit are to align with the current LED luminaire light source baseline. Further, it is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section:** 140.8(b)

**Specific Purpose:**

The specific purpose of the change is to revise the phrasing for the alternate light sources subsection with what light sources a sign shall be equipped.

**Necessity:**

The changes are necessary to clarify one or more of the light sources are permitted to be equipped in a sign for meeting the prescriptive requirements for signs. The changes also are necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 140.9 Authority and Reference Citation

**Specific Purpose:**

The specific purpose of the change is to add the Authority and Reference citations to reflect the statutory provisions utilized by the CEC in the preceding section. This is not a substantive change in requirements.

**Necessity:**

These changes are necessary to provide the public with the CEC's statutory authority for adopting these regulations and to provide notice of the sections that are being implemented, interpreted or made specific by the regulations.

**Section:** 140.9(a)

**Specific Purpose:**

The specific purpose of the changes to this section are to remove unneeded language, and in doing so avoid the need to update reference to specific section numbers. The section already states that it applies to "space conditioning systems" so there is no need to additionally use the term "cooling system", nor is there any need to redundantly state that systems shall comply with this section by complying with its subsections. This is not a substantive change to requirements, though substantive changes have been made to this section's subsections 140.9(a)1A and 1B as described below.

**Necessity:**

These changes are necessary to ensure and improve general clarify and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1 and California Code of Regulations, Title 1, Section 16.

**Section:** 140.9(a)1A and 140.9(a)1B

**Specific Purpose:**

The specific purpose of the changes to this section are to increase the drybulb and wetbulb temperatures, and to specify a supply temperature range for computer room economizers. Non-substantive changes have been made to improve the clarity and consistency of the regulatory language. The updates to the exception are required to provide clarity by referencing the ITE design load.

**Necessity:**

The changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402. Increasing drybulb and wetbulb temperatures and specifying supply air temperature allows for more hours of economizing enhancing the benefits provided by the economizer.

**Section:** 140.9(a)1C

**Specific Purpose:**

The specific purpose of the changes made to this subsection is to include integrated pumped refrigerant economizers as an option for computer rooms, based on a showing that they are capable of providing an equivalent benefit to other allowed economizing

equipment. Existing exceptions relating to additions and alterations have been relocated to a more appropriate location in Section 141.1, and an existing Exception relating to parallel fan systems has been redrafted for clarity. In addition, an exception has been added to account for cases where other applicable laws would act to disallow inclusion of cooling towers. Note that struck provisions relating to fan control, reheat and humidification are in support of relocating requirements to 120.6(j), and are described in the entry for that section.

**Necessity:**

Integrated pumped refrigerant economizers are currently a compliance option usable as an alternative to water and air economizers for computer rooms; this change is necessary to integrate this allowable compliance option into the Energy Code and formalize the ability to use this equipment for this purpose, consistent with the demonstration required for approval of compliance options under Part 1 Section 10-109 and the materials identified in the Documents Relied Upon. The added exception relating to cooling towers is necessary to avoid conflict with applicable local laws not related to energy efficiency. The relocation of existing provisions and exceptions as well as the redrafting of the exception for parallel fan systems is necessary to enhance the clarity of the Energy Code and ensure consistent organizational structure.

**Section:** 140.9(a)2 and 140.9(a)3

**Specific Purpose:**

The specific purpose of the addition of this section is to relocate minimum efficiency standards for computer room ventilation from Section 140.9 to this section, and in so doing make the requirements mandatory rather than prescriptive. Computer rooms shall have controls that prevent space heating or conditioning systems from trying to heat and cool at once, shall not use nonadiabatic humidification, and if sufficiently large shall have load-following fan behavior – these requirements are unchanged from existing provisions save for now being required for both the prescriptive and performance compliance approaches. (see also Section 120.6(j))

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** Table 140.9-A

**Specific Purpose:**

The specific purpose of the addition of this Table is to explicitly list the minimum average efficiencies for alternating current-output uninterruptible power supplies.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402, and to ensure and improve the general clarity and internal consistency of the

Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** Table 140.9-B and Table 140.9-C

**Specific Purpose:**

The specific purpose of the changes to these tables is to update numbering consistent with the addition of a new table occurring earlier in Section 140.9.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 140.9(a)4

**Specific Purpose:**

The purpose of these additions is to add minimum efficiency requirements for alternating current-output uninterruptible power supply equipment serving computer rooms.

**Necessity:**

The addition of this code language is required to include minimum efficiency requirements for alternating current-output uninterruptible power supplies. Staff has additionally made non-substantive changes to improve the clarity and consistency of the regulatory language. These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402 et seq.

**Section:** EXCEPTION to 140.9(a)

**Specific Purpose:**

The purpose of the deletion of this exception is to include computer rooms located in healthcare facilities under the requirements of 140.9(a).

**Necessity:**

The removal of this code language is required to include minimum efficiency requirements for computer rooms located in healthcare facilities. These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402 et seq.

**Section:** 140.9(c)3

**Specific Purpose:**

The specific purpose of the changes made to this subsection are to:

- Include sonic anemometers as a type of anemometer that can be used to meet the requirements of this section.
- Remove the word “detectable” as nonspecific and potentially confusing.
- Require error logging for anemometers.
- Specify acceptable minimum sample frequencies and signal fail criteria.

**Necessity:**

This change is necessary to prevent required flow measurement equipment from being installed or configured in such a way as to impede its expected benefit, for example by not sampling flow rates sufficiently frequently or failing to report or log error states. The addition of sonic anemometers is necessary to avoid unnecessarily excluding an effective anemometer technology.

**Section:** 140.10(a)**Specific Purpose:**

The specific purpose of the changes to addition of 140.10(a), including Table 140.10-A, is to add new prescriptive requirements for solar photovoltaic systems for specific nonresidential space types and high-rise multifamily buildings, and establish the minimum required sizes of such systems based on anticipated electrical loads estimated to occur for different building uses.

The purpose of providing exceptions based on Solar Access Roof Area is to ensure that solar photovoltaic requirements do not exceed the roof area that is able to support installation of solar panels, or require panels to be installed on portions of the roof where they will not provide sufficient benefit (such as shaded areas).

The purpose of adding an exception when the required system size is less than four kilowatts of rated capacity is to ensure that solar photovoltaic systems are not required when the fixed costs of the installation would exceed the anticipated benefit provided by the system (i.e., the system will not become cost effective over its design life).

The purpose of adding an exception for snow loads is to exempt buildings from the PV requirement in cases where solar panels and associated mounting equipment are incapable of meeting the requirements of the American Society of Civil Engineers (ASCE), Standard 7-16, Chapter 7, Snow Loads. This avoids situations where panels would be expected to be damaged due to regular anticipated levels of snowfall where replacement costs would cause the system not to be cost effective.

The purpose of adding an exception based on availability of virtual net energy metering or community solar is to account for cases where direct wiring of panels to individual tenant spaces would be required to ensure tenants receive the benefits and associated bill savings of installed equipment. The increase in costs associated with this additional amount of wiring and installation labor was found to cause systems not to be cost effective for their respective tenants.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402. The proposed capacity factors are necessary to ensure that installed solar photovoltaic systems are cost effective based on the estimated energy demands of



associated spaces while limiting net hourly exports – the proposed factors are based on limiting hourly net exports to 20% or less of total annual generation. The proposed exceptions are necessary to prevent these requirements from applying in circumstances where it is reasonable to anticipate that systems will not provide a cost effective level of benefit due to the noted physical or technical factors (lack of available roof area, presence of shading, likelihood of damage due to snow loads, etc.).

**Section:** 140.10(b)

**Specific Purpose:**

The specific purpose of the changes to addition of 140.10(b), including Table 140.10-B, is to add new prescriptive requirements for battery storage systems for specific nonresidential space types and high-rise multifamily buildings, and establish the minimum required sizes of such systems based on anticipated electrical loads estimated to occur for different building uses.

The purpose of providing an exception based on the absence of a sufficiently large solar photovoltaic system, or for certain building types in climate zone 1, is to avoid requiring battery storage systems where they will not provide sufficient benefit in terms of capturing on-site generation, maximizing self-utilization, and minimizing both grid demands and grid exports.

The purpose of adding exceptions when the calculated size of the required battery storage system is below a specified value, or when the size of the applicable building space is below a specified value, is to ensure that battery storage systems are not required when the fixed costs of the installation would exceed the anticipated benefit provided by the system (i.e., the system will not become cost effective over its design life).

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402, and to enhance the benefits provided by on-site solar photovoltaic systems particularly as they relate to grid harmonization and resiliency. The proposed capacity factors are necessary to ensure that installed battery storage systems are cost effective based on the estimated energy demands of associated spaces while limiting net hourly exports – the proposed factors are based on limiting hourly net exports to 10% or less of total annual generation. The proposed exceptions are necessary to prevent these requirements from applying in circumstances where it is reasonable to anticipate that systems will not provide a cost-effective level of benefit due to the noted physical or technical factors (absence of on-site generation, insufficient load, etc.).

**Section: 141.0****Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 141.0 Notes****Specific Purpose:**

The purpose of the change to this section is to add a second note explaining that relocating a relocatable public-school building does not meet the definition of an alteration. For reference, the definition of “alteration” reads as follows:

*ALTERATION is any change to a building's water-heating system, space-conditioning system, lighting system, electrical power distribution system, or envelope that is not an addition. Alteration is also any change that is regulated by Part 6 to an outdoor lighting system that is not an addition. Alteration is also any change that is regulated by Part 6 to signs located either indoors or outdoors. Alteration is also any change that is regulated by Part 6 to a covered process that is not an addition.*

Relocating a public school building that is designed and intended to be relocated is not a change to any of its incorporated systems, nor is it a change to any attached exterior lighting or signage, and classroom instruction is not a commercial or industrial process. As this note is explanatory of existing requirements, its addition to this section is not considered to be substantive.

**Necessity:**

This change is necessary to provide clarification to the reader for a common circumstance, whose answer may otherwise not be immediately evident to persons in charge of locating or relocating portable public-school buildings.

**Section: 141.0(a)****Specific Purpose:**

The purpose of the addition of EXCEPTIONS 5 and 6 to this section is to prevent proposed standards applicable to large water heater systems in newly constructed buildings from applying to additions.

**Necessity:**

These changes are necessary to ensure that the requirements are not applied where they have not yet been determined to be feasible and cost effective, noting that existing

design and equipment can impose constraints that do not exist in the context of a newly constructed building.

**Section:** 141.0(b) and 141.0(b)1C2

**Specific Purpose:**

The specific purpose of the change made to Sections 141.0(b) and 141.0(b)1C2 is to remove multifamily “high rise residential” from the scope of this requirement.

**Necessity:**

This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. For the 2022 Energy Standards, the low-rise and high-rise multifamily requirements are being relocated to a new multifamily specific section of the code: Sections 160, 170, and 180.

**Section:** 141.0(b)1D

**Specific Purpose:**

The purpose of the addition of this section is to incorporate reference to new mandatory fan energy requirements and apply them to alteration projects that add new fan systems.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** Table 141.0-D

**Specific Purpose:**

The specific purpose of the change to this Section is to change the requirements for fan systems and to expand the requirements to  $\geq 1\text{kW}$  replacing the existing “Fan Power Limits” using look up tables, and to define the types of power allowances per fan system types and components. This will also apply to additions and alterations with additional power allowances. (see also Sections 140.4(c), Section 141.0(b)2C, Table 140.4-A, Table 140.4-B, Table 140.4-C, Table 140.4-D, and Table 141.0-D)

**Necessity:**

These changes are necessary to equalize stringency between small and large fan systems, account for air density and transmission efficiency, and ultimately increase energy savings. These changes provide a significantly more robust and comprehensive set of system design standards and improve the ability of the regulatory structure to accommodate varying ventilation strategies and components. Providing specific consideration of a far larger number of system components provides the benefit of preventing the regulations from inadvertently and unnecessarily impeding some otherwise efficient system designs and components, while also ensuring that a wider variety of circumstances are held to appropriately stringent efficiency standards.

**Section: 141.0(b)2I**

**Specific Purpose:**

The specific purpose of the change to this section is to revise the lighting type terminology to match the change of the terminology in the new construction section of the standards, clarify the requirements by adding an exception to subsection 141.0(b)2Lii and 141.0(b)2Liii for alterations with less than five existing luminaires, and make non-substantive grammatical changes and editorial changes necessary to effectively communicate the requirements and standards in a precise and clear manner. (see also Table 141.0-F)

**Necessity:**

The change is necessary to maintain consistency of the standards among the requirements and to ensure and improve clarity, and consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.

**Section: 141.0(b)2B**

**Specific Purpose:**

The specific purpose of the changes made to Section 141.0(b)2B are to add language to clarify that this requirement is only applicable to nonresidential and hotel/motel buildings as defined in Title 24, Part 2, Chapter 2.

**Necessity:**

This change is necessary to ensure and improve clarity, and consistency between the Energy Code and the other Parts of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1. For the 2022 Energy Standards, the low-rise and high-rise multifamily requirements are being relocated to a new multifamily specific section of the code: Sections 160, 170, and 180.

**Section: 141.0(b)2Bi, Table 141.0-B**

**Specific Purpose:**

The specific purpose of this change made to Section 141.0(b)2Bi is to modify the cool roof requirement so that altered roofs must comply with the prescriptive new construction cool roof requirements of 140.3(a)1A, and to update allowed tradeoff values in Table 141.0-B accordingly.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTIONS 1 through 3 to Section 141.0(b)2Bi

**Specific Purpose:**

The specific purpose of the change made to Exception 1 to Section 141.0(b)2Bi is to add language to clarify that this exception is only applicable to low-sloped roofs.

**Necessity:**

This change is necessary to ensure and improve general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 141.0(b)2Bii (old)

**Specific Purpose:**

The specific purpose of the change to Section 141.0(b)2Bii is to remove multifamily “high rise residential” from the scope of this requirement, and to clarify that the requirement now only applies to nonresidential and hotel/motel buildings.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. For the 2022 Energy Standards, the low-rise and high-rise multifamily requirements are being relocated to a new multifamily specific section of the code: Sections 160, 170, and 180.

**Section:** 141.0(b)2Bii (new)

**Specific Purpose:**

The specific purpose of the change to Section 141.0(b)2Bii is to use consistent terminology (i.e., roof recover, and roof replacement) with other parts of the California Building Code (CBC).

**Necessity:**

This change is necessary to ensure consistency between the Energy Code and the other Parts of the Building Standards Code, as direct by California Government Code, Sections 11349 and 11349.1.

**Section:** EXCEPTION 1 to Section 141.0(b)2Bii

**Specific Purpose:**

The specific purpose of the change to EXCEPTION 1 to Section 141.0(b)2Bii is to increase the stringency of the roof recover exception to require R-10 insulation above the roof deck.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION 2 to Section 141.0(b)2Bii

**Specific Purpose:**

The specific purpose of the change to EXCEPTION 2 to Section 141.0(b)2Bii is to increase the stringency of the roof replacement exception to require R-10 or the maximum allowable amount of insulation to be installed while preserving the base flashing.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION 3 to Section 141.0(b)2Bii

**Specific Purpose:**

This specific purpose of the change to EXCEPTION 3 to Section 141.0(b)2Bii is to provide clarifying details and to reorganize the text for better readability. The exception restates the provisions formerly in Section 141.0(b)2Biiid, changing only that it is now organized as an exception rather than an option. This is not a substantive change.

**Necessity:**

This is a non-substantive grammatical change necessary to effectively communicate the requirements and standards in a precise and clear manner. This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 141.0(b)2Biii (now ii)

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to high-rise residential (now labeled multifamily buildings), such that the requirements of this section and its subsections now only apply to nonresidential, hotel/motel buildings (as per the overall scope of the subchapter), and to more straightforwardly describe the conditions under which insulation requirements apply. In essence, the change swaps the term “exposed area” for “the area of the roof recover or roof replacement”, and expressly states that roof recoats (which do not create exposed areas, as the term was previously used) are not held to insulation requirements. In addition, the EXCEPTIONS to this Section were redrafted for clarity and to update R-7 thresholds to R-10 to retain equivalency with updated insulation requirements.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16, and in the case of updated R-value thresholds for exceptions, to maintain the equivalency between the exception thresholds and the otherwise applicable insulation requirements.

**Section:** 141.0(b)2D and 141.0(b)2E

**Specific Purpose:**

The purpose of the changes to these sections are to restructure and reorganize their requirements – these are not anticipated to be substantive changes.

**Necessity:**

These changes are reasonably necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 141.0(b)2L

**Specific Purpose:**

The purpose of the changes to this section are to clarify application, remove unintended alternate readings and move the threshold for limited numbers of luminaires into an exception.

**Necessity:**

These changes are reasonably necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 141.0(b)2N

**Specific Purpose:**

The purpose of the changes to this section is to prevent proposed standards applicable to large water heater systems in newly constructed buildings from applying to alterations.

**Necessity:**

These changes are necessary to ensure that the requirements are not applied where they have not yet been determined to be feasible and cost effective, noting that existing design and equipment can impose constraints that do not exist in the context of a newly constructed building.

**Section:** 141.0(b)2Piv

**Specific Purpose:**

The purpose of the addition of this Section is to require that new controlled receptacles be demand responsive.

**Necessity:**

This addition is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section: 141.0(b)2Q**

**Specific Purpose:**

The purpose of the addition of this Section is to apply a threshold for the application of air barrier requirements to alterations.

**Necessity:**

These changes are reasonably necessary to prevent air barrier requirements from applying to projects making only small or incidental changes to the building envelope where addition of an air barrier would be cost prohibitive.

**Section: 141.0(b)2R**

**Specific Purpose:**

The purpose of the addition of this Section is to expressly state that requirements for doors in newly constructed buildings apply to doors added to the building as part of an alteration project.

**Necessity:**

These changes are reasonably necessary to ensure that added doors possess a feasible and cost-effective thermal efficiency.

**Section: 141.0(b)3D**

**Specific Purpose:**

The purpose of the changes to this section are to add specificity to the requirements for modeling an alteration project using building modeling software, including via nonregulatory explanatory notes, and to expressly state that expansions of existing systems do not cause any existing, unaltered heating or cooling equipment from being considered an altered component (as the term is used at the start of 141.0(b)).

**Necessity:**

These changes are reasonably necessary to ensure accurate modeling of alteration projects using the performance approach to compliance as well as to prevent requirements applicable to alterations from inadvertently applying to unaltered components.

**Section: Table 141.0-C**

**Specific Purpose:**

The specific purpose of the changes to Table 141.0-C are to increase the stringency of the U-factor insulation trade off requirement to align with the new time-independent values (TDVs) as well as the revised insulation levels proposed for alterations.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.



**Section:** 141.0(b)2C

**Specific Purpose:**

The purpose of the changes to this section is to replace additional fan power credits based on pressure drop with more general and direct fan power allowances, and to associate the allowances with fan and system types rather than filtration types. In addition, new exceptions are provided that prevent newly proposed standards in Sections 140.4(a)2, 140.4(e), and 140.4(k)8 from applying to alterations.

**Necessity:**

These changes are necessary to align fan power allowances to updated filtration standards and make them agnostic regarding the source of pressure drop within a fan system, as well as to ensure that newly proposed standards applicable to new construction are not inadvertently applied to alterations where there is a risk that they may not be technically feasible or cost effective to apply.

**Section:** Table 141.0-D

**Specific Purpose:**

The purpose of this table is to replace additional fan power credits based on pressure drop with more general and direct fan power allowances, and to associate the allowances with fan and system types rather than filtration types.

**Necessity:**

These changes are necessary to align fan power allowances to updated filtration standards and make them agnostic regarding the source of pressure drop within a fan system, as well as to ensure that newly proposed standards applicable to new construction are not inadvertently applied to alterations where there is a risk that they may not be technically feasible or cost effective to apply.

**Section:** Table 141.0-E

**Specific Purpose:**

The specific purpose of the change made to Table 141.0-E is to include the roof/ceiling insulation requirements of 141.0(b)2Bii.

**Necessity:**

This change is necessary to achieve greater energy savings in California's existing nonresidential building stock, as directed by California Public Resources Code Section 25943.

**Section:** Table 141.0-F

**Specific Purpose:**

The specific purpose of the changes made to Table 141.0-F is to clarify applicability by replacing "and" with "or" and update section references consistent with changes made elsewhere in the Energy Code (e.g., moving the demand response provisions to Section 110.12). The added language also specifies that new occupancy sensing control requirement added to Section 130.1(c)6D are not intended to apply to alterations meeting specified requirements. In addition changes to this section also revises the lighting type terminology to match the change of the terminology in the new construction section of the standards, clarifies the requirements by adding an exception to

subsection 141.0(b)2Lii and 141.0(b)2Liii for alterations with less than five existing luminaires, and make non-substantive grammatical changes and editorial changes necessary to effectively communicate the requirements and standards in a precise and clear manner. (see also 141.0(b)2I)

**Necessity:**

These changes are necessary to improve the clarity of the table and ensure its consistency with changes proposed for other sections of the Energy Code.

**Section: 141.1**

**Specific Purpose:**

The purpose of the changes to this section are to add two new sections to cover alterations to computer room economizing and controlled environment horticulture spaces and apply requirements that are parallel to the requirements proposed to apply to newly constructed buildings.

Controlled environment horticulture spaces are proposed newly regulated process spaces, and the requirements in this section apply when a new ventilation, space conditioning, or humidification is added to a building with indoor growing, when alterations to horticultural lighting exceed a certain percent of total existing installed horticultural lighting, or when a conditioned greenhouse is added or an existing non-conditioned greenhouse is converted to a conditioned greenhouse (thereby meeting the definition of an “addition” under the Energy Code).

Computer room economizing requirements have been extensively updated in the proposed 2022 amendments, and new requirements for computer room uninterruptible power supplies have been added. The amendment here extends these updated requirements to “newly installed computer room cooling systems and uninterruptible power supply systems in additions/alterations”.

**Necessity:**

These changes are necessary to ensure that the proposed requirements applicable to newly constructed buildings are also applied to added or altered building spaces where they are shown to be feasible and cost effective to do so, and where they are able to save a significant amount of energy on a statewide basis.

**Section: 150.0**

**Specific Purpose:**

The specific purpose of the change to this section is to replace “low rise” with “single family”. This is a non-substantive change; multifamily requirements are being relocated into new Sections 160, 170, and 180. Any substantive changes made to multifamily requirements are described in the statements for those new Sections.

**Necessity:**

This change is necessary to be consistent with all the other references to single-family residential buildings to ensure clarity and internal consistency within the Energy Code,

as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 150.0(a)**

**Specific Purpose:**

The specific purpose of the changes made to Section 150.0(a)1 is to require a mandatory minimum level of insulation for roof decks equivalent to R-4 continuous above deck insulation. This is not a change to overall thermal performance requirements per se, but rather guarantees that a minimum fraction of required insulation is located at the roof deck for buildings where ducts and air handlers are located in the attic space. Other changes include renumbering to reflect the addition of a new 150.0(a)1 and other non-substantive changes to improve clarity.

**Necessity:**

Ensuring that attic areas housing ducting and air handling equipment are not thermal concentrators in climate zones with significant cooling loads reduces wasteful, uneconomic, inefficient, or unnecessary consumption of energy, and therefore this change is necessary to increase energy efficiency and conservation via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section: 150.0(j)1**

**Specific Purpose:**

The specific purpose of the changes to subsection 150.0(j)1 is to change the external wrap requirement to R-4. The alternative for internal insulation of R-16 is rewritten as an exception.

**Necessity:**

These changes are necessary to update the legacy external wrap requirement in relation to the federal minimum insulation requirement for unfired storage tank, which is now R-12.5. The alternative for R-16 internal insulation is written as an exception for clarity.

**Section: 150.0(j)2A**

**Specific Purpose:**

The specific purpose of the changes to subsection 150.0(j)2 is to delete pipe insulation requirements in subsections 150.0(j)2Ai, 150.0(j)2Aii, and 150.0(j)2Aiii.

**Necessity:**

These changes are necessary to align with the California Plumbing Code pipe insulation requirement. The changes will simplify the language and streamline compliance to the Building Standard.

**Section: 150.0(k)**

**Specific Purpose:**

The specific purpose of the changes to this section is to reorganize the residential lighting subsection by consolidating similar subject-area requirements together, where feasible, to the three existing subsections - about luminaires, indoor lighting controls and outdoor lighting, and both reordering and redrafting the language within each section to more logically organize and clearly state applicable requirements. With the exception of specific changes to subsections noted below, these are intended to be non-substantive amendments.

**Necessity:**

The changes are necessary to improve clarity of the requirements and thereby enhance code compliance and enforcement of the standards. There are also non-substantive grammatical changes and editorial changes necessary to effectively communicate the requirements and standards in a precise and clear manner.

Following are specific changes within Section 150.0(k):

**Section: 150.0(k)1A**

**Specific Purpose:**

The specific purpose of the proposed change is to relocate three existing subsections that effectively act as exceptions to luminaire installation requirements - specifically with regards to integrated device lighting, navigation lighting (including night lights, step lights and path lights), and cabinet lighting – to be stated as exceptions to this section. In addition, the criteria relating to cabinet lighting and navigation lighting has been simplified, and the list of integral device lighting has been expanded.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications without being unnecessarily intricate or cumbersome. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section: 150.0(k)1B****Specific Purpose:**

The specific purpose of the change is to reorganize and reorder the items of the lighting requirements and to arrange the screw-based luminaires requirement to this subsection of the Energy Code. The specific purpose of the change to this section is to amend the screw-based luminaire requirements by adding new categories of light sources as provisions – new generation of light source technologies for residential building lighting applications have been considered for their relevancy and physical characters. Dim-to-warm, tunable-white and color-tunable LED light sources, as well as Title-20 compliant LED lamps, are categories of light sources added.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section: 150.0(k)1C****Specific Purpose:**

The specific purpose of the proposed change is to delete the zero-clearance insulation contact (IC) specificity and instead to add to a new reference to California Electrical Code about meeting the clearance and installation requirements for installations of recessed luminaires in ceilings. Another proposed change is to add a provision for providing air-tightness installation per manufacturer's instructions to maintain airtightness. Another proposed change is to add an exception for recessed downlight luminaires marked for use in fire-rated installations and recessed luminaires installed in non-insulated ceilings.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. Further, it ensures requirements of the Energy Code be consistent with other Part of California Building Codes.

**Section: 150.0(k)2A**

**Specific Purpose:**

The specific purpose of the proposed change is to reorganize and reorder the items of the lighting requirements and to arrange the wall-mounted controls for lighting to this subsection of the Energy Code.

The changes are also to add an exception for energy management control system (EMCS) that it may provide the required manual on and off controls as required by Energy Code.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. Further, it ensures requirements of the Energy Code be consistent with other Part of California Building Codes.

**Section: 150.0(k)2D**

**Specific Purpose:**

The specific purpose of the proposed change is to reorganize and reorder the items of the lighting requirements and to arrange the energy management control system (EMCS) for lighting to this subsection of the Energy Code.

The proposed changes are also to add multi-scene programmable controller to the energy management control system (EMCS) requirement, and both the multi-scene programmable controller and the energy management control system are specified to be required with the lighting control functionality of Section 1510.0(k)2 in order to be installed for meeting the lighting control requirement of the Energy Code.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section: 150.0(k)2E**

**Specific Purpose:**

The specific purpose of the proposed change is to reorganize and reorder the items of the lighting requirements and to arrange the automatic off control requirement to this subsection of the Energy Code.

The proposed changes are also to specify the automatic off control requirement for the specified luminaire in bathrooms, garages, laundry rooms, utility rooms, and walk-in closets, and for the lighting internal to drawers and specified cabinetry.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure

energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section: 150.0(k)2F**

**Specific Purpose:**

The specific purpose of the proposed change is to reorganize and reorder the items of the lighting requirements and to arrange the dimming controls requirement to this subsection of the Energy Code.

The proposed changes are also to add the dimming control requirement for the lighting in habitable spaces including living rooms, dining rooms, kitchens, and bedroom. Further, the proposed changes are to add an exception for ceiling fans with remote-controlled integrated lighting and an exception for luminaires connected to a circuit with controlled lighting power below the specified wattage level.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section: Section 150.0(k)2G**

**Specific Purpose:**

The specific purpose of the proposed change is to reorganize and reorder the items of the lighting requirements and to arrange the independent controls requirement to this subsection of the Energy Code.

The changes are also to specify the independent control requirement for the lighting of exhaust fans and kitchen hoods and for undercabinet lighting, undershelf lighting, interior lighting of display cabinets and switched outlets.

**Necessity:**

These changes are necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions are sufficient for the industry practice of lighting design and applications. It is also necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section: 150.0(k)3A**

**Specific Purpose:**

The specific purpose of the changes is to move automatic time switch control from item 150.0(k)3Aii to item 150.0(k)3Aiii (for astronomical time clock control) of this subsection of the Energy Code.

**Necessity:**

These changes improve and ensure the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.0(k)6

**Specific Purpose:**

The specific purpose of the changes is to delete this item about the Interior Common Areas for Low-rise Multifamily Residential Buildings from this subsection of the Energy Code because they are being moved to new chapters of the proposed Energy Code.

**Necessity:**

These changes improve and ensure the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.0(m)1

**Specific Purpose:**

The purpose of the changes to this section are to align duct insulation requirements applicable to ducts in indoor spaces to minimum values needed to prevent condensation, to clarify the exception to this section's requirement, and to add a criteria expressly linking the exception to an absence of available space for insulation.

**Necessity:**

These changes are necessary to ensure that required R-values are not more stringent than needed to provide expected benefits, and to ensure that associated exceptions are not overly broad. Insulation has a reduced value when the associated ducts are transiting through conditioned spaces, as any heat or cooling "lost" via attenuation is still delivered into an indoor space. Insulation is still necessary to prevent condensation and to prevent distant rooms from being under-served and requiring more extreme thermostat settings (with associated additional energy use) to achieve temperatures matching those of rooms that are nearer to the source of heating or cooling.

**Section:** Table 150.0-A

**Specific Purpose:**

The specific purpose of the changes to the Table is to revise the headings of the column and to clarify the light sources in the left column are classified as high efficacy and the light sources in the right column are required to comply with Reference Joint Appendix JA8. The other specific purpose of the change to this section is to reorganize the light source types in the Table and also to add new categories of light sources. LED lighting technologies are listed to the upper top part of the Table. These proposed changes are to add the following to the left column of the Table as qualified as high efficacy and are not required to comply with Reference Joint Appendix JA8:

- qualified inseparable solid-state lighting (SSL) luminaires, qualified colored light sources,
- qualified dim-to-warm LED light sources, qualified tunable-white LED light sources,
- color-tunable LED light sources,
- qualified LED lamps compliant with Title 20,
- infrared light sources, and ultraviolet light sources.



These proposed changes are to add the following to the right column of the Table and these types of ceiling recessed downlight luminaires are exempted to meet Reference Joint Appendix JA8:

- color-tunable LED light sources;
- dim-to-warm LED light sources;
- tunable-white LED light sources.

**Necessity:**

New generation of light source technologies for residential building lighting applications have been considered for their relevancy and physical characters. These changes are also necessary to ensure energy efficiency of the Energy Code can be achieved with the provisions of the Energy Code and the provisions reflects and aligns, where feasible, with the development of lighting technologies and the products as available to the building sector marketplace. Further, the changes are necessary to ensure energy efficiency of the Energy Code with cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402.

**Section:** 150.0(m)11

**Specific Purpose:**

The specific purpose of the changes to this section is to improve the clarity and consistency of the regulatory language without making substantive changes to underlying requirements.

**Necessity:**

The changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.0(m)12

**Specific Purpose:**

The specific purpose of the changes to this section is to clarify that all outside air and recirculated air supplied to occupiable spaces must be filtered, and to add a requirement that filter racks or grilles be gasketed or sealed to prevent air from bypassing the filter.

**Necessity:**

These changes are necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of the Energy Code, consistent with State statutes and policies of protecting and enhancing the indoor environmental quality in buildings.

**Section: 150.0(n)1**

**Specific Purpose:**

The specific purpose of the changes to subsection 150.0(n)1 is to add requirements for designated space for future installations of heat pump water heaters, as well as additional plumbing and electrical requirements if the designated space is more than 3 feet away.

**Necessity:**

These changes are necessary to prepare the building for future installation of heat pump water heater to more cost-effectively allow compliance with State of California State clean energy goals, policies, and legislation.

**Section: 150.0(o)**

**Specific Purpose:**

The specific purpose of the changes to this section is to maintain, where feasible, consistency between the Energy Code and the most current versions of The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62.2, and to specify California-specific amendments to the ASHRAE 62.2 requirements.

**Necessity:**

These changes are necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of the Energy Code, consistent with State statutes and policies of protecting and enhancing the indoor environmental quality in buildings.

**Section: 150.0(o)1B**

**Specific Purpose:**

The specific purpose of the changes to this section is to clarify which Central Fan Integrated (CFI) ventilation system component configurations and airflow control configurations are allowed by the Energy Code, and which configurations are not allowed.

**Necessity:**

These changes are necessary to prohibit dysfunctional CFI system configurations, thereby ensuring public health and safety for occupants of dwelling units complying with the energy efficiency requirements of the Energy Code, consistent with State statutes and policies of protecting and enhancing the indoor environmental quality in buildings.

**Section:** 150.0(o)1C and 150.0(o)1D

**Specific Purpose:**

The specific purpose of the changes to these sections is to add section titles and, for 150.0(o)1C, remove redundant reference to ASHRAE 62.2 Sections 4.1.1 and 4.1.2 (as these are more visibly referenced in the titles of subsections i and iii). This is not a substantive change to requirements.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.0(o)1E

**Specific Purpose:**

The specific purpose of the changes to this section is to specify that balanced ventilation systems with heat recovery or energy recovery are required to have a fan efficacy less than or equal to 1.0 W/cfm, and to improve the overall clarity of section language.

**Necessity:**

Establishing a fan efficacy standard for HRV / ERV systems is necessary to increase energy efficiency via cost-effective building design standards, as directed mandated by California Public Resources Code Sections 25213 and 25402. Making additional changes to improve the clarity of section language is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.0(o)1F

**Specific Purpose:**

The specific purpose of the changes to this section is to clarify the design specification for ventilation airflow shall be shown on the building design plans, and to improve the overall clarity of section language.

**Necessity:**

These changes are necessary to ensure compliance with Energy Code requirements by requiring complete documentation on plans, and to improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.0(o)1G through K, and Tables 150.0-E, 150.0-F, 150.0-G, 150.0-H

**Specific Purpose:**

The specific purpose of the changes to this section is to make ASHRAE 62.2 Section 5 requirements for local ventilation exhaust explicit in 150.0(o)1 rather than adopted by reference, add use of a new capture efficiency rating metric as an alternative to minimum rated airflow performance, update new compliance targets for airflow and

capture efficiency for demand-controlled kitchen range hood ratings requirements based on cooking fuel type and dwelling unit floor area, prohibit atmospherically vented or solid fuel burning appliances inside the pressure boundary of dwelling units less than 1000 ft<sup>2</sup>, and clarify airflow measurement procedures required for ventilation systems.

**Necessity:**

These changes are necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of the Energy Code, consistent with State statutes and policies of protecting and enhancing the indoor environmental quality in buildings. The changes to fully incorporate ASHRAE 62.2 Section 5 requirements and to clarify airflow measurement procedures are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.0(o)2

**Specific Purpose:**

The specific purpose of the changes to this section is to add a proposed kitchen range hood verification alternative for minimum capture efficiency into the specifications for HERS verification, and to require that fan efficacy is subject to verification when less than or equal to 1.0 W/cfm.

**Necessity:**

These changes are necessary to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of the Energy Code, consistent with State statutes and policies of protecting and enhancing the indoor environmental quality in buildings.

**Section:** 150.0(q)

**Specific Purpose:**

The purpose of the changes to this section are to lower the maximum U-factor requirement from 0.58 to 0.45, consistent with materials in the Documents Relied Upon showing these values to be feasible and cost effective, as well as to add the word “area” for clarity.

**Necessity:**

These changes are necessary to achieve energy savings associated with improved thermal performance of window products.

**Section:** 150.0(s)

**Specific Purpose:**

The specific purpose of addition of subsection 150.0(s) is to add Energy Storage Systems (ESS) ready requirements to low-rise single-family buildings.

**Necessity:**

These changes are necessary to prepare the main electrical panel for future installation of battery storage system or back-up generator.

**Section:** 150.0(t)

**Specific Purpose:**

The specific purpose of addition of subsection 150.0(t) is to add heat pump space heater ready requirements to low-rise single-family buildings.

**Necessity:**

These changes are necessary to prepare the building for future installation of heat pump space heater.

**Section:** 150.0(u)

**Specific Purpose:**

The specific purpose of addition of subsection 150.0(u) is to add electric cooktop ready requirements to low-rise single-family buildings.

**Necessity:**

These changes are necessary to prepare the building for future installation of electric cooktop.

**Section:** 150.0(v)

**Specific Purpose:**

The specific purpose of addition of subsection 150.0(v) is to add electric clothes dryer ready requirements to low-rise single-family buildings.

**Necessity:**

These changes are necessary to prepare the building for future installation of electric clothes dryer.

**Section:** 150.1

**Specific Purpose:**

The specific purpose of the change to this section is to replace “low rise” with “single family” such that the requirements of this section and its subsections now do not apply to multi-family buildings. This is a non-substantive change; multifamily requirements are being relocated into new Sections 160, 170, and 180. Any substantive changes made to multifamily requirements are described in the statements for those new Sections.

**Necessity:**

This change is necessary to be consistent with all the other references to single-family residential buildings to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.1(a)

**Specific Purpose:**

The specific purpose of the change to this section is to remove reference to multifamily buildings, such that the requirements of this section and its subsections now only apply to single-family buildings. This is a non-substantive change: multifamily requirements are being relocated into new Sections 160, 170, and 180. (Any substantive changes

made to multifamily requirements are described in the statements for those new Sections.)

**Necessity:**

These changes are necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.1(b)3Bi

**Specific Purpose:**

The purpose of the changes to this section is to generalize the language of Bi to cover the full suite of energy performance statistics that potentially apply to heating and cooling equipment under state and federal law, and allow for repetitive language in section 150.1(b)3Bii and the entirety of section 150.1(b)3Biv to be deleted (as they are effectively merged into 150.1(b)3Bi).

**Necessity:**

These changes are necessary to accurately state the values that must be reported for differing types of heating and cooling equipment in order to verify compliance with minimum standards, in a manner that is clearer and more concise than existing language.

**Section:** 150.1(b)3Bii and 150.1(b)3Biv

**Specific Purpose:**

The specific purpose of the changes to this section is to delete language in section Bii and the entirety of section 150.1(b)3Biv consistent with the change to 150.1(b)3Bi and to incorporate reference to HERS procedures that are required for determining compliance with the variable capacity heat pump compliance option as adopted by the Energy Commission on November 13, 2019.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.1(c)7

**Specific Purpose:**

The specific purpose of changes to subsection 150.1(c)7 is to add new equipment selection requirements for heat pumps in climate zones 3, 4, 10, 13, and 14.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402. These changes are also necessary to pursue the State's goals relating to greenhouse gas emissions.

**Section:** 150.1(c)8Ai, 150.1(c)8Aii, and 150.1(c)8Aiii

**Specific Purpose:**

The specific purpose of changes of subsection 8 is to remove 3 prescriptive water heating options for gas water heaters

**Necessity:**

These changes are necessary to simplify code language and reduce redundancy. Gas water heaters can be used in the performance compliance method or if EXCEPTION 1 to Section 150.1(c)8 is met.

**Section:** 150.1(c)8A, 150.1(c)8B, and 150.1(c)8C

**Specific Purpose:**

The specific purpose of changes of subsection 150.1(c)8 is to simplify the existing electric water heating options and add a new option for electric water heater coupled with a solar water heating system.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section:** EXCEPTION 1 to Section 150.1(c)8

**Specific Purpose:**

The specific purpose of addition of EXCEOTION 1 is to allow gas instantaneous water heaters in climate zones 3, 4, 10, 13, and 14.

**Necessity:**

These changes are necessary to align with changes to heat pump space heaters in section 150.1(c)8 and to pursue the State's goals relating to greenhouse gas emissions.

**Section:** EXCEPTION 2 to Section 150.1(c)8

**Specific Purpose:**

The specific purpose of addition of EXCEPTION 2 is to allow electric instantaneous water heaters for newly constructed dwelling units with conditioned floor area of 500 square feet or less.

**Necessity:**

These changes are necessary to add flexibility for small dwellings that might not have the physical space to accommodate a storage water heater.

**Section:** 150.1(c)10

**Specific Purpose:**

The purpose of the changes to this section are to add a fan efficacy standard specific to small duct high velocity systems.

**Necessity:**

These changes are necessary to prevent these systems from being held to existing standards applicable to all air handling units that are not gas furnaces, which would

pose technical challenges to attain at the higher flow rates high-velocity systems are intended to operate at.

**Section:** EXCEPTION s 1 & 2 to Section 150.1(c)11

**Specific Purpose:**

The specific purpose of the change made to EXCEPTION s 1 and 2 to Section 150.1(c)11 is to maintain consistency in terminology used, by changing “solar reflectance” to “aged solar reflectance”.

**Necessity:**

This is a non-substantive grammatical change necessary to effectively communicate the requirements and standards in a precise and clear manner. This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.1(c)12 & EXCEPTION to 150.1(c)(12)

**Specific Purpose:**

The specific purpose of the changes to this section and its subsections is to improve grammar, punctuation, and capitalization, to reference a Home Ventilating Institute product directory in place of an Energy Commission product directory, and to add an exception for accessory dwelling units (ADUs).

**Necessity:**

These changes are necessary to prevent requiring whole house fans for small-volume dwellings where the presence of such fans would provide little to no added benefit, to ensure product criteria can be verified at a robust independent listing of such devices, and to otherwise ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.1(c)14

**Specific Purpose:**

The specific purpose of changes of subsection 14 is to add a definition for Solar Access Roof Area (SARA) and clarify the minimal photovoltaic (PV) requirements.

**Necessity:**

These changes are necessary to eliminate confusion and to clarify the direction for applicability of the PV requirement without changing the stringency of the current requirements.



**Section:** EXCEPTION 1, 2, 3, and 4 to Section 150.1(c)14

**Specific Purpose:**

The specific purpose of changes of EXCEPTIONS 1, 2, 3, and 4 is to remove and replace these exceptions.

**Necessity:**

The purpose of the deletion of these exceptions is to coordinate with the changes made to references to Solar Access Roof Area (SARA) in EXCEPTION 1. As a result of the definition of SARA, and the changes in EXCEPTION 1, these exceptions are no longer necessary.

**Section:** EXCEPTION 2 to Section 150.1(c)14

**Specific Purpose:**

The specific purpose of addition of EXCEPTION 2 is exempt buildings from the PV requirement if the PV system size specified by section 150.0(c)14 is less than 1.8 kWdc.

**Necessity:**

These changes are necessary to add flexibility for small dwellings where a small PV system might not be cost effective.

**Section:** EXCEPTION 3 to Section 150.1(c)14

**Specific Purpose:**

The specific purpose of addition of EXCEPTION 2 is exempt buildings from the PV requirement if the building is determined to not able to meet the requirements of the American Society of Civil Engineers (ASCE), Standard 7-16, Chapter 7, Snow Loads.

**Necessity:**

These changes are necessary to exempt building site where the design snow load exceeds the PV system rating and are unable to comply with the California Building Code and California Residential Code snow load structural requirements.

**Section:** 150.2

**Specific Purpose:**

The specific purpose of the change to this section is to replace “low rise” with “single family” such that the requirements of this section and its subsections now do not apply to multifamily buildings. This is a non-substantive change; multifamily requirements are being relocated into new Sections 160, 170, and 180. Any substantive changes made to multifamily requirements are described in the statements for those new Sections.

**Necessity:**

This change is necessary to be consistent with all the other references to single-family residential buildings to ensure clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** 150.2(a)

**Specific Purpose:**

The purpose of the changes to this section are to relocate the provisions in EXCEPTION 1 to a more appropriate location within the subsection dedicated to mechanical ventilation, and to clarify EXCEPTION 5 as well as update it for consistency with changes to later sections.

**Necessity:**

The changes to this section are necessary to improve the clarity and organization of its provisions.

**Section:** 150.2(a)1B

**Specific Purpose:**

The specific purpose of the changes made to Section 150.2(a)1B is to increase the stringency of the roof/ceiling insulation requirement to R-38 for Climate Zones 1, 2, 4, & 8-16, and to add language to provide an equivalent U-factor requirement for non-wood framed assemblies.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION 5 to 150.2(a)

**Specific Purpose:**

The specific purpose of the change to EXCEPTION 5 is to revise the trigger for duct requirements when ducts are extended to serve an addition.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by reducing the energy loss through ducts. The current exception can be used to bypass sealing and insulation requirements when ducts are extended to serve a new addition. This is a prime opportunity to save energy and is cost-effective.

**Section:** 150.2(a)1C, 150.2(a)2C, 150.2(b)1D, 150.2(b)1G, 150.2(b)1L, 150.2(b)1M, and 150.2(b)2A

**Specific Purpose:**

The specific purpose of the changes to this section is to:

- clarify the requirements for alterations to existing buildings for mechanical ventilation system components and mechanical ventilation airflow. The clarification is needed due to new requirements in 150.0(o) for range hood local exhaust systems, and due to the reconfiguration of previously adopted references to ASHRAE 62.2 requirements specified in 150.0(o) which now instead incorporate sections of ASHRAE 62.2 language directly into 150.0(o).

- clarify/specify that dwellings previously required to meet whole-building mechanical ventilation for indoor air quality shall also be required to meet the whole-dwelling unit mechanical ventilation airflow requirement when the dwelling's ventilation system undergoes alteration.
- provide exclusions from requirements for mechanical ventilation for the new junior accessory dwelling units (JADU).
- clarify the definition of "new or complete replacement ventilation systems" and require that these systems comply with the same requirements as are applicable to newly constructed ventilation systems.
- clarify that dwellings that were not required by a previous building permit to have a whole-dwelling unit ventilation system shall not be required to comply with the whole-dwelling unit ventilation airflow specified in 150.0(o).
- clarify that replacement ventilation fans must be rated according to ASHRAE 62.2 Sections 7.1 and 7.2.
- specify that for dwellings which were required by a previous building permit to comply with the ventilation system air filtration requirements in 150.0(m)12, any alterations to the air filtration device shall also comply with the air filtration requirements in 150.0(m)12.
- specify that for dwellings that were not required by a previous building permit to comply with the ventilation system air filtration requirements in 150.0(m)12, any alterations to the air filtration device shall not be required to comply with the air filtration requirements specified in Section 150.0(m)12
- clarify that altered local mechanical bathroom exhaust systems shall comply with the requirements in Section 150.0(o)1G
- specify that dwellings that were required by a previous building permit to comply with the kitchen local exhaust requirements in Section 150.0(o)1G shall meet or exceed the applicable airflow or capture efficiency requirements in Section 150.0(o)1G, otherwise dwellings that were required by a previous building permit to install a vented kitchen range hood or other kitchen exhaust fan, shall install a replacement fan that meets or exceeds the airflow required by the previous building permit, or 100 cfm, whichever is greater; otherwise dwellings that were not required to have a kitchen local ventilation exhaust system by a previous building permit are not be required to comply with the requirements of Section 150.0(o)1G.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16, as well as to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of the Energy Code, consistent with State statutes and policies of protecting and enhancing the indoor environmental quality in buildings.

**Section: 150.2(b)****Specific Purpose:**

The specific purpose of the change to this section is to replace “low rise” with “single family” such that the requirements of this section and its subsections now do not apply to multi-family buildings. This is a non-substantive change; multifamily requirements are being relocated into new Sections 160, 170, and 180. Any substantive changes made to multifamily requirements are described in the statements for those new Sections.

**Necessity:**

This change is necessary to relocate low-rise and high-rise multifamily requirements to a new multifamily specific section of the code. Consolidating these provisions into a dedicated group of sections ensures clarity and internal consistency within the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 150.2(b)1A****Specific Purpose:**

The specific purpose of the changes to this section is to add the word “Added” to its title for consistency with the section’s contents (its lone sentence begins, “Alterations that add vertical fenestration and skylight area shall ...”) and with the title of the immediately subsequent section (which is “Replacement Fenestration”). This is not a substantive change in requirements.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: 150.2(b)1D, 150.2(b)1E****Specific Purpose:**

The specific purpose of the changes to subsections 150.2(b)1D and 150.2(b)1E are to revise the trigger for duct requirements when ducts are altered or replaced and to increase stringency to duct leakage targets confirmed by field verification and diagnostic testing when existing ducts are extended, altered or replaced.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by reducing the energy loss through ducts. The duct leakage target of 15 percent was introduced in 2005 and has not changed since then. Data and feedback from stakeholders indicate that 10 percent duct leakage target is achievable and a good opportunity to achieve greater energy savings. This measure is cost-effective.

**Section:** TABLE 150.2-A

**Specific Purpose:**

The specific purpose of the change to this table is to increase stringency in duct insulation R-value by specifying which climate zones require R-6 and R-8 duct insulation for additions and alterations.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by reducing the energy loss through ducts. The change aligns the prescriptive duct insulation requirements with new construction and is cost-effective.

**Section:** 150.2(b)1C

**Specific Purpose:**

The specific purpose of the changes made to this section are to require entirely new or complete replacement duct systems to comply with the attic insulation requirements of 150.2(b)1J, provided the air handler and ducts are located within a ventilated attic.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. When a new duct system is installed in an existing attic the work is disruptive to the existing attic insulation. At a minimum existing insulation must be moved to access certain areas and later replaced. Worst case, the attic insulation is disrupted and not fixed, resulting in uneven insulation levels across the attic. If new registers are added as part of the scope of work, new penetrations in the ceiling plane may need to be properly air sealed.

**Section:** 150.2(b)1G

**Specific Purpose:**

The specific purpose of the change to subsection 150.2(b)1G is to add a new requirement for altered space heating systems that prohibits electric resistance heating, except under certain conditions.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by prohibiting electric resistance heating. This measure targets a cost-effective opportunity to remove old electric resistance equipment and replace it with new efficient heat pump systems.

**Section:** 150.2(b)1G, 150.2(b)1H

**Specific Purpose:**

The purpose of the changes to this section are to ensure that prescriptively installed equipment relies on heat pump technology where feasible, and does not require on-site combustion.

**Necessity:**

These changes are necessary to ensure that installed equipment is able to make use of on-site or grid-supplied renewable energy.

**Section:** 150.2(b)1li

**Specific Purpose:**

The specific purpose of the changes made to Section 150.2(B)1li are to:

- Remove multifamily “low-rise residential” from the scope of this requirement, and to clarify that the requirement now only applies to single family buildings.
- Increase the stringency of the steep-sloped cool roof requirement to encompass Climate Zones 4 & 8-16.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. For the 2022 Energy Standards, the low-rise and high-rise multifamily requirements are being relocated to a new multifamily specific section of the code: Sections 160, 170, and 180. This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section:** EXCEPTION 1 to Section 150.2(b)1li

**Specific Purpose:**

The specific purpose of the changes made to EXCEPTION 1 to Section 150.2(b)1li are to:

- Remove the exception for 1-inch of air space to create consistency in the requirements applying equally to all roofs regardless of product type.
- Remove the exception for products with a profile ratio of rise to width of 1 to 5 for 50 percent or greater of the width of the roofing product to create consistency in the requirements applying equally to all roofs regardless of product type.
- Remove the exception for existing ducts in the attic that are insulated and sealed according to 150.1(c)9 because this exception is no longer valid. Section 150.1(c)9 no longer references duct sealing requirements, only duct insulation requirements. Duct sealing requirements have been moved from Section 150.1 to Section 150.0 and are now mandatory for new homes in addition to the prescriptive requirements for cool roof.

- Provide an equivalent U-factor to the R-38 ceiling insulation exception for non-wood framed assemblies.
- Clarify that the exception for buildings with a radiant barrier in the attic only applies to radiant barriers that are not installed directly above space sheathing.
- Increase the stringency of the exception for buildings that do not have ducts in the attic to limit it to Climate Zones 2, 4, 9, 10, 12 & 14.
- Remove the Climate Zone limitation for the exception for buildings with R-2 or great continuous insulation.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402, and achieve greater energy savings in California’s existing residential building stock, as directed by California Public Resources Code Section 25943.

**Section:** EXCEPTION 2 to Section 150.2(b)1li

**Specific Purpose:**

The specific purpose of the change made to EXCEPTION 2 to Section 150.2(b)1li is to provide an exception for roof areas covered by building integrated photovoltaic panels or building integrated solar thermal panels in alignment with the prescriptive new construction requirements of Section 150.1(c)11.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This exception which currently exists for new construction should also apply to alterations.

**Section:** EXCEPTION 3 to Section 150.2(b)1li

**Specific Purpose:**

The specific purpose of the change made to Exception 3 to Section 150.2(b)1li is to provide an exception for roof constructions with a weight of at least 25 lb/ft<sup>2</sup> in alignment with the prescriptive new construction requirements of Section 150.1(c)11.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This exception which currently exists for new construction should also apply to alterations.

**Section:** 150.2(b)1liia

**Specific Purpose:**

The specific purpose of the changes made to Section 150.2(b)1liia are to: Increase the stringency of the low-sloped cool roof requirement in Climate Zones 4 & 6-15, and to maintain consistency in terminology used, by changing “solar reflectance” to

“aged solar reflectance”.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section EXCEPTION 1 to Section 150.2(b)1iii (old)**

**Specific Purpose:**

The specific purpose of the change made to Exception 1 to Section 150.2(b)1iii is to remove the exception for buildings with no ducts in the attic because buildings with low-sloped roofs do not have an attic space and the cost-effectiveness calculations conducted for the 2022 CASE Report are based on a building with ducts in conditioned space

**Necessity:**

This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: Table 150.2-B**

**Specific Purpose:**

The specific purpose of the changes made to Table 150.2-B are to increase the stringency of the U-factors for low-sloped cool roof insulation trade off to reflect the new roof insulation requirements of 150.2(b)1iiib.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402.

**Section: EXCEPTION 2 to Section 150.2(b)1iiia**

**Specific Purpose:**

The specific purpose of the change made to EXCEPTION 2 to Section 150.2(b)1iiia is to provide an exception for roof areas covered by building integrated photovoltaic panels or building integrated solar thermal panels in alignment with the prescriptive new construction requirements of Section 150.1(c)11.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This exception which currently exists for new construction should also apply to alterations.



**Section:** EXCEPTION 3 to Section 150.2(b)1liia

**Specific Purpose:**

The specific purpose of the change made to EXCEPTION 3 to Section 150.2(b)1liia is to provide an exception for roof constructions with a weight of at least 25 lb/ft<sup>2</sup> in alignment with the prescriptive new construction requirements of Section 150.1(c)11.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. This exception which currently exists for new construction should also apply to alterations.

**Section:** 150.2(b)1liib

**Specific Purpose:**

The specific purpose of the change made to Section 150.2(b)1liib is to require R-14 continuous insulation at the roof deck at time of roof replacement or recover in Climate Zones 1, 2, 4, & 8-16.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. When performing a roof replacement or recover, it represents an ideal time to add above deck insulation.

**Section:** 150.2(b)1Ji

**Specific Purpose:**

The specific purpose of the change made to Section 150.2(b)1Ji is to require R-49 ceiling insulation when an entirely new or complete replacement duct system is installed in Climate Zones 1-4, 6, & 8-16 in vented attics.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. When duct replacement work is completed, it represents an ideal time to address the attic as a system, including air sealing the ceiling plane and adding attic insulation.

**Section:** 150.2(b)1Jii

**Specific Purpose:**

The specific purpose of the change made to Section 150.2(b)1Jii is to require air sealing of the ceiling plane between the attic and conditioned space in accordance with Section 110.7 when an entirely new or complete replacement duct system is installed in Climate Zones 2, 4, & 8-16.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and

25402. When duct replacement work is completed, it represents an ideal time to address the attic as a system, including air sealing the ceiling plane and adding attic insulation.

**Section:** 150.2(b)1Jiii

**Specific Purpose:**

The specific purpose of the change made to Section 150.2(b)1Jiii is to require the insulating and/or retrofitting and insulating of all recessed downlight luminaires when an entirely new or complete replacement duct system is installed in Climate Zones 1-4, and 8-16.

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. When duct replacement work is complete, it represents an ideal time to address the attic as a system, including air sealing the ceiling plane and adding insulation.

**Section:** 150.2(b)1Jiv

**Specific Purpose:**

The specific purpose of the change made to Section 150.2(b)1Jiv is to require attic ventilation to be maintained when an entirely new or complete replacement duct system is installed.

**Necessity:**

This change is necessary to ensure consistency between the Energy Code and the other Part of the Building Standards Code, as directed by California Government Code, Sections 11349 and 11349.1.

**Sections:** 160.0 through 180.2 Authority and Reference Citation

**Specific Purpose:**

The specific purpose of the change is to add the Authority and Reference citations to reflect the statutory provisions utilized by the CEC in the preceding section. This is not a substantive change in requirements.

**Necessity:**

These changes are necessary to provide the public with the CEC's statutory authority for adopting these regulations and to provide notice of the sections that are being implemented, interpreted or made specific by the regulations.

**Sections:** 160.0 through 180.4 -

**Specific Purpose:**

The specific purpose of the additions of Sections 160.0 through 180.4 is to relocate requirements applicable to multifamily buildings to one area of the Energy Code, and merge requirements where cost effective and technically feasible. The mandatory requirements for multifamily buildings have been relocated to the newly created Subchapter 10, Sections 160.0 through 160.9. The performance and prescriptive

requirements for multifamily buildings have been relocated to the newly created Subchapter 11, Sections 170.0 through 170.2. The requirements for additions and alterations to multifamily buildings have been relocated to the newly created Subchapter 12, Sections 180.0 through 180.4.

The majority of this relocation is non-substantive, though note that substantive changes proposed for residential and/or nonresidential building standards in sections 120-150.2 are duplicated here where applicable, for consistency as well as for the reasons stated in the statements for changes made to those sections. Additional substantive changes have been made where feasible to create consistency across the former categories of low-rise and high-rise buildings, i.e. buildings with three or fewer habitable / residential stories and those with four or more (respectively). Specific changes requiring additional detail are described below.

**Necessity:**

This modification was reasonably necessary to facilitate navigation of the Energy Code when determining its applicability to multifamily buildings. All requirements applicable to multifamily buildings, whether dwelling units or common areas, have been removed from previous subsections of the Energy Code and reproduced within these sections, permitting a reader to understand the requirements applicable to a multifamily building project without needing to refer to other chapters or to hunt for relevant provisions amongst provisions applicable to nonresidential or single family buildings. Requirements for high-rise (greater than three habitable stories) and low-rise (less than four habitable stories) multifamily buildings have been grouped together, and differentiations between requirements based on number of floors have been streamlined where found to not be necessary for ensuring efficient building designs. Where there is a delineation between these two types of buildings, language was added to specify that the requirements apply to only one or the other based on the number of habitable stories, consistent with existing requirements. Otherwise, requirements apply regardless of the number of stories of the multifamily building (though criteria based on other relevant aspects of the building's design, such as use of metal versus wood framing or central versus decentralized water heating, may apply). This change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16, to remove use of number of floors as an imprecise proxy for other aspects of building design, to retain proposed updates intended to apply across building types, and to best position builders to be able to find, understand, and follow code requirements applicable to multifamily building projects.

**Section:** 160.2(b)2Bi

**Specific Purpose:**

The specific purpose of the change to subsection Bi is to add a new requirement for balanced ventilation systems that serve multifamily dwelling units for fan efficacy. Unitary heat or energy recovery ventilators must have a fan efficacy of less than or equal to 1.0 W/cfm.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. The fan efficacy requirement is intended to eliminate the least efficient heat or energy recovery ventilators from use.

**Section:** 160.2(b)2

**Specific Purpose:**

The specific purpose of the change to subsection D is to add a new requirement for multifamily central ventilation system duct sealing.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. This measure provides energy savings from reducing duct leakage and also result in indoor air quality benefits. Energy savings come from both reduced fan energy and reduction in heating and cooling loads. Tighter central ventilation ducts ensure that all dwelling units receive adequate ventilation airflow and that air does not leak from one dwelling unit to another.

**Section:** 160.9(a)

**Specific Purpose:**

The specific purpose of addition of subsection (a) is to add heat pump space heater ready requirements to multifamily buildings.

**Necessity:**

These changes are necessary to prepare the building for future installation of heat pump space heater.

**Section:** 160.9(b)

**Specific Purpose:**

The specific purpose of addition of subsection (b) is to add electric cooktop ready requirements to multifamily buildings.

**Necessity:**

These changes are necessary to prepare the building for future installation of electric cooktop. The documents relied upon for this rulemaking show the proposed efficiency standards to be technically feasible for buildings in California and cost effective as compared to future modification and retrofit of electrical circuit to an existing building.

**Section:** 160.9(c)

**Specific Purpose:**

The specific purpose of addition of subsection 160.9(c) is to add electric clothes dryer ready requirements to multifamily buildings.

**Necessity:**

These changes are necessary to prepare the building for future installation of electric clothes dryer. The documents relied upon for this rulemaking show the proposed efficiency standards to be technically feasible for buildings in California and cost effective as compared to future modification and retrofit of electrical circuit to an existing building.

**Section:** 170.2(a)1Biv – Envelope Requirements, Buildings Without Attics

**Specific Purpose:**

The specific purpose of the addition of this language was to provide a new prescriptive compliance option for multifamily buildings without an attic.

**Necessity:**

This addition was necessary to create an option for compliance for multifamily buildings without an attic. This option includes specific attic insulation and roofing product requirements, which vary depending on climate zone.

**Section:** 170.2(a)3i

**Specific Purpose:**

The specific purpose of the modification to this language is to apply both the 20 percent of conditioned floor area fenestration limitation and the 40% window-to-wall ratio fenestration area limitation to multifamily buildings.

**Necessity:**

This modification was necessary to ensure that the minimum efficiency requirements for fenestration area in low-rise high-rise residential buildings were applied to all multifamily buildings. This ensures that the negative impacts of excessive glazing in these buildings is appropriately captured and recognizes the benefits of applying both low-rise and high-rise residential limits to all multifamily buildings.

**Section:** Table 170.2-A

**Specific Purpose:**

The specific purpose of the changes to the prescriptive requirements for walls of multifamily buildings is to separate insulation requirements based on the fire rating requirements for those walls.

**Necessity:**

This modification was necessary to recognize the insulation challenges of walls when the California Fire Code requires high fire ratings. As fire rating requirements increase, materials used to satisfy both fire rating and insulation level requirements increase in cost and decrease in cost effectiveness and product availability. Assembly insulation and u-factor requirements will vary depending on the wall's fire rating requirement.

**Section:** Table 170.2-A

**Specific Purpose:**

The specific purpose of the changes to the prescriptive requirements for fenestration of multifamily buildings is to create separate requirements based on the fenestration product assembly type.

**Necessity:**

This modification was necessary to recognize the energy efficiency challenges of fenestration products when they must meet higher durability, wind and water penetration, load deflection, and forced entry requirements, as described in the North American Fenestration Standard (NAFS 2017). As these values increase for fenestration products, their ability to achieve high-efficiency requirements decreases. This change creates a Performance Class Architectural Window (AW) classification. This classification of window will have lower efficiency requirements because of cost-effective and technical feasibility challenges.

**Section:** 170.2(c)3A

**Specific Purpose:**

The specific purpose of the new subsection 170.2(c)3A is to add new equipment selection requirements for single zone heating systems in multifamily buildings.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402. These changes are also necessary to pursue the State's goals relating to greenhouse gas emissions.

**Section:** 170.2(d)2

**Specific Purpose:**

The specific purpose of the new subsection 170.2(d)2 is to add a new prescriptive option for heat pump water heating systems serving multiple dwelling units.

**Necessity:**

This change is necessary to add flexibility to the prescriptive options without changing the stringency of the current requirements.

**Section:** 170.2(d)3A

**Specific Purpose:**

The specific purpose of the new subsection 170.2(d)3A is to add a 90 percent thermal efficiency requirement in climate zones 1 through 9, for gas water heating systems serving multiple dwelling units above 1 million BTU per hour.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402.

**Section: 170.2(e)1**

**Specific Purpose:**

The specific purpose of the change is to relocate the prescriptive lighting requirements for common use areas in multifamily buildings.

**Necessity:**

These changes are necessary to improve the code's compliance with the clarify and consistency criteria of California Government Code Section 11340 et seq. and Chapter 1, Article 2 of the California Code of Regulations.

**Section: 170.2(c)**

**Specific Purpose:**

The specific purpose of the change to subsection 170.2(c)3Bv is to add new prescriptive requirements for balanced ventilation systems requiring minimum sensible heat recovery efficiencies and fan efficacies for heat or energy recovery ventilators.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402. The sensible heat recovery signifies how much sensible energy in the outgoing airstream is transferred to the incoming airstream. The measure would provide cost-effective energy savings through preheating or precooling ventilation air.

**Section: 180.1**

**Specific Purpose:**

The specific purpose of the change to EXCEPTION 5 is to revise the trigger for duct requirements when ducts are extended to serve an addition in multifamily dwelling units. The trigger is revised from 40 feet to any length of ducts extended.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by reducing the energy loss through ducts. The current exception can currently be used to bypass sealing and insulation requirements when ducts are extended to serve a new addition. This is a prime opportunity to save energy and is cost-effective.

**Section: 180.1(a)2, 180.1 (b)3; 180.2(b)2, 180.2(b)5**

**Specific Purpose:**

The specific purpose of the changes to this section is to:

- incorporate the requirements for multifamily dwelling units into this new multifamily section that were previously located in Sections 150.0(m)12, 150.0(o), and 120.1.
- clarify the requirements for alterations to existing buildings for mechanical ventilation system components and mechanical ventilation airflow. The

clarification is needed due to new requirements in Section 150.0(o) for range hood local exhaust systems, and due to the reconfiguration of previously adopted references to ASHRAE 62.2 requirements specified in Section 150.0(o) which now instead incorporate sections of ASHRAE 62.2 language directly into Section 150.0(o).

- clarify/specify that dwellings previously required to meet whole-building mechanical ventilation for indoor air quality shall also be required to meet the whole-dwelling unit mechanical ventilation airflow requirement when the dwelling's ventilation system undergoes alteration.
- provide exclusions from requirements for mechanical ventilation for the new junior accessory dwelling units (JADU).
- clarify the definition of "new or complete replacement ventilation systems" and require that these systems comply with the same requirements as are applicable to newly constructed ventilation systems.
- clarify that dwellings that were not required by a previous building permit to have a whole-dwelling unit ventilation system shall not be required to comply with the whole-dwelling unit ventilation airflow specified in Section 150.0(o).
- clarify that replacement ventilation fans must be rated according to ASHRAE 62.2 sections 7.1 and 7.2.
- specify that for dwellings which were required by a previous building permit to comply with the ventilation system air filtration requirements in Section 150.0(m)12, any alterations to the air filtration device shall also comply with the air filtration requirements in Section 150.0(m)12.
- specify that for dwellings that were not required by a previous building permit to comply with the ventilation system air filtration requirements in 150.0(m)12, any alterations to the air filtration device shall not be required to comply with the air filtration requirements specified in Section 150.0(m)12
- clarify that altered local mechanical bathroom exhaust systems shall comply with the requirements in Section 150.0(o)1G
- specify that dwellings that were required by a previous building permit to comply with the kitchen local exhaust requirements in Section 150.0(o)1G shall meet or exceed the applicable airflow or capture efficiency requirements in Section 150.0(o)1G, otherwise dwellings that were required by a previous building permit to install a vented kitchen range hood or other kitchen exhaust fan, shall install a replacement fan that meets or exceeds the airflow required by the previous building permit, or 100 cfm, whichever is greater; otherwise dwellings that were not required to have a kitchen local ventilation exhaust system by a previous building permit are not be required to comply with the requirements of Section 150.0(o)1G.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16, as well as



to ensure public health and safety for occupants of dwelling units complying with the energy efficiency requirements of the Energy Code, consistent with State statutes and policies of protecting and enhancing the indoor environmental quality in buildings.

**Section:** 180.2(b)

**Specific Purpose:**

The specific purpose of the change to subsection 180.2(b)2Aii is to revise the trigger for duct requirements when ducts are altered or replaced in multifamily dwelling units. The trigger is revised from 40 feet to 25 feet of altered or replaced ducts.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by reducing the energy loss through ducts. This is a prime opportunity to save energy and is cost-effective when ducts are altered or replaced. The 25 feet was determined by the typical length of ducts in one package.

**Section:** TABLE 180.2-B

**Specific Purpose:**

The specific purpose of the change to this table is to increase stringency in duct insulation R-value by specifying which climate zones require R-6 and R-8 duct insulation in multifamily dwelling units.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by reducing the energy loss through ducts. The change aligns the prescriptive duct insulation requirements with new construction and is cost-effective.

**Section:** 180.2(b)2Av

**Specific Purpose:**

The specific purpose of the change to subsection 180.2(b)2Av is to add a new requirement for altered space heating systems that prohibits electric resistance heating in multifamily dwelling units, except under certain conditions.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code Sections 25213 and 25402 by prohibiting electric resistance heating. This measure targets a cost-effective opportunity to remove old electric resistance equipment and replace it with new efficient heat pump systems.

**Section:** JA1-A

**Specific Purpose:**

The specific purpose of the changes to this section are to update titles and editions or versions of documents incorporated by reference, consistent with changes to such

references occurring throughout the Express Terms, to remove documents that are no longer incorporated by reference, and to update availability information.

**Necessity:**

These changes are necessary to ensure that this Appendix accurately describes the documents incorporated by reference into the main body of the Energy Code and to maintain the currency of contact information for various publishers and other sources.

**Section: JA1-B**

**Specific Purpose:**

The Index that was part of the code template is not part of the Adopted Energy Code. A 2022 Index will be created at a later date to assist searches of the adopted 2022 Energy Code.

**Necessity:** This was deleted from the template because it is not part of the Adoption package.

**Section: JA1 – new definitions**

**Specific Purpose:**

The specific purpose of changes that add new definitions to the Definitions section is to provide clear and specific definitions for technical terms used within other updates to Part 6, aligned with the use of the term where it is proposed to occur later in the Energy Code. This includes added definitions for new industry standards documents that are incorporated by reference into later portions of the Energy Code.

**Necessity:**

These changes are necessary to ensure that provisions in subsequent sections are clear and unambiguous, and that non-technical readers are able to find and understand the technical meaning of specific terms relating to building design and construction.

**Section: JA1 – amended definitions of industry standards documents**

**Specific Purpose:**

The specific purpose of changes that amend the publication date of industry standards documents already defined within this Section are to ensure definitions relating to industry test standards refer to or otherwise specify the most current available versions of such standards. This includes amendments that update the names of referenced industry standards documents consistent with their current published titles.

**Necessity:**

The changes to update the referenced versions of industry publications are necessary to ensure alignment of the Energy Code with industry standards upon which it relies, and prevent situations where use of obsolete versions of such standards would be required for compliance with the Energy Code as written.

**Section: JA1 – other amended definitions**

**Specific Purpose:**

The specific purpose of changes that amend existing definitions within the Definitions

section is to maintain consistency with terms defined in Section 100.1 and otherwise add references or improve clarity to ensure consistency with the Energy Code.

**Necessity:**

These changes are necessary to ensure that provisions in subsequent sections are clear and unambiguous, and that non-technical readers are able to find and understand the technical meaning of specific terms relating to building design and construction.

**Section: JA2**

**Specific Purpose:**

The purpose of the changes to this section are to update the description of data fields and formats consistent with updates made to the weather files used by the Energy Commission's modeling software, and to update JA2.1.1 to rely on the Energy Commission's published climate zone mapping tool rather than on previously published Excel files.

**Necessity:**

These changes are necessary to ensure that the content of the Appendix accurately describes the more accurate and contemporary weather files now used within the Energy Commission's modeling software, and to update the method of climate zone determination to rely on the newer and more advanced tool developed and published by the Energy Commission.

**Section: JA3**

**Specific Purpose:**

The purpose of the changes to this section are to update the description of time-dependent valuation (TDV) figures consistent with updates made to the TDV calculations performed by the Energy Commission's modeling software.

**Necessity:**

These changes are necessary to ensure that the content of the Appendix accurately describes the more accurate and contemporary TDV calculations now used within the Energy Commission's modeling software.

**Section: JA4.1.1**

**Specific Purpose:**

The specific purpose of the change made to Appendix JA4.1.1 is to clarify that insulation installed in California must be certified in accordance with Section 110.8(a) of the Energy Standards.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** JA4.1.7

**Specific Purpose:**

The purpose of the changes to this section are to state the location and means of accessing certified documentation, rather than stating only that the documentation must be obtained.

**Necessity:**

These changes are reasonably necessary to ensure readers are instructed as to where and how to obtain necessary documentation, rather than only stating that documentation must be obtained, so as to ensure that the means of compliance is readily understandable for the reader.

**Section:** JA4.2, Table 4.2.1

**Specific Purpose:**

The specific purpose of the changes made to Table 4.2.2 is to provide columns for R-17, R-20, and R-23 continuous insulation, and to remove one occurrence of the term “low-rise”.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code, Sections 25213 and 25402. As part of the nonresidential roof alterations proposal, R-17 and R-23 are now prescriptive requirements and therefore should be included in the prescriptive tables. R-20 was added to aid in design flexibility. Removal of the term “low-rise” with respect to residential construction is reasonably necessary to recognize that four and five story wood-framed construction is becoming increasingly common, and in so doing ensuring that the paragraph remains accurate.

**Section:** JA 6.3

**Specific Purpose:**

The specific purpose of the changes to these Sections are to expand Economizer and Economizer Fault Detection (FDD) and Diagnostic requirements to include mechanical cooling capacities greater than 33,000 Btu/hr. The specific change is to reference the new threshold of 33,000Btu/hr in FDD Certification Submittal Requirements.

**Necessity:**

The proposed expansion of design standards for economizers and FDD are necessary to reduce and prevent wasteful, uneconomic, inefficient, and unnecessary consumption of energy by buildings, consistent with the statutory direction in Public Resources Code Section 25402. Economizers are an effective way to capture free cooling.

**Section: JA7****Specific Purpose:**

The purpose of the changes to this section are to add specifications relating to use of an Application Programming Interface (API), improve phrasing and consistency of statements referring the reader to the Data Registry Requirements Manual for additional information, and ensure consistency via use of CEC-developed schemas.

**Necessity:**

These changes are reasonably necessary to create consistent processes that allow for greater automation of data submittal and processing.

**Section: JA7.2****Specific Purpose:**

The specific purpose of the changes to this Appendix is to add a definition for External Digital Data Source (EDDS) Provider, and to clarify the distinction between an EDDS service and the organization that administers the EDDS (including correcting one use of the word “shall” to its intended “may”). Additional changes to specific subsections are described below.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: JA7.4.8****Specific Purpose:**

The purpose of the addition of this section is to obligate Registration Providers to allow CEC staff access to documents that they are required to maintain, and to specify procedures and subsequent actions to be taken if access is not provided.

**Necessity:**

These changes are reasonably necessary to provide CEC with the means to engage in oversight, compliance and enforcement with regards to Registration Providers.

**Section: JA7.7.1.2.2, JA7.8.2.6****Specific Purpose:**

The specific purpose of the changes to this section is to clarify the distinction between EDDS services and EDDS providers.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** JA7.8.4.1 and JA7.8.4.2

**Specific Purpose:**

The purpose of the changes to this section are to improve phrasing and more clearly state the actions and roles specified in the existing language: the revised language makes it clear that the action is taken by the Executive Director of the CEC, but may be initiated based on a request (petition) submitted by any party (as opposed to the prior language which could be read that any party may directly act to deactivate a data registry). The revised language also clarifies that both errors and violations are grounds for action (as opposed to an unintended reading that errors were actionable but intentional violations were not).

**Necessity:**

These changes are reasonably necessary to ensure actions relating to review and oversight of Registration Providers are undertaken by appropriately authorized persons within the CEC, even when requests for action are received from outside parties, and to ensure that both errors and outright violations are clearly specified to be grounds for further action.

**Section:** JA7.8.5

**Specific Purpose:**

The purpose of the changes to this section are to clarify that help screens for data registries do not need to be separately or additionally published in order to satisfy the requirements of this section.

**Necessity:**

These changes are reasonably necessary to prevent unneeded physical reproduction or duplication of help screens and text done in pursuit of demonstrating compliance with this section's requirements.

**Section:** JA8

**Specific Purpose:**

The purpose of the changes to this section are to add the word "luminous" where needed for clarity, clarify that "drivers" refers to LED drivers, replace the phrase "participating in" with the more accurate and specific phrase "accredited to", and update the year associated with the specified marking requirement to 2022 for consistency with the overall update to the Energy Code. These are not substantive changes.

**Necessity:**

These changes are necessary to enhance the clarity of the section and ensure that marking requirements are kept consistent with the published editions of the Energy Code.

**Section: JA9****Specific Purpose:**

The purpose of the changes to this section are to remove an unneeded Table of Contents given that the section, in its entirety, is less than two pages long.

**Necessity:**

These changes are necessary to ensure that navigation aids such as tables of contents are not included where they would be counterproductive or otherwise without benefit.

**Section: JA11****Specific Purpose:**

The purpose of the changes to this section are to more clearly delineate the requirements applicable to prescriptive versus performance-based requirements, to add language relating to low-sloped roofs and alternate orientations of equipment on steep-sloped roofs, to include building owners and managers consistent with the proposed addition of nonresidential prescriptive photovoltaic system requirements to the Energy Code, and to simplify the language relating to solar assessment tools in part by incorporating the “alternative methods” provisions directly into the criteria for certification and by removing unneeded specificity of details inherent in requiring that weighted average solar access be determined (i.e., determining this value necessarily requires locating and measuring the entire proposed area of the array.) Additional non-substantive changes are also provided to enhance clarity and update section references.

**Necessity:**

These changes are necessary to clarify and expressly state that issues of facing / azimuth of solar panels are only applicable when installed on a sloped roof, to acknowledge the building modeling software’s ability to model a complete range of panel orientations (including non-ideal orientations), to align language within the appendix with the proposed addition of nonresidential prescriptive solar photovoltaic requirements to the Energy Code, and to ensure that the provisions of this appendix are clear, unambiguous and not more prescriptive than needed to ensure compliance with the Energy Code. The prescriptive standards for orientation and shading are necessary to ensure that in-situ system performance of prescriptive systems matches equivalent systems meeting performance-based standards – in particular, the 98% solar access requirement is based on a threshold below which performance-based systems would need to add capacity to achieve energy generation requirements.

**Section: JA12****Specific Purpose:**

The purpose of the changes to this section are to create a prescriptive compliance path for battery storage systems based on the existing performance criteria, to clarify that the existing control provisions are intended for systems paired with on-site solar photovoltaic systems, to add specifications applicable to battery storage systems installed without on-site solar equipment, and to specify that greenhouse gas emissions

benefits can qualify as an alternative control strategy for approval by the Executive Director.

**Necessity:**

These changes are necessary to apply JA12 to building projects irrespective of whether they are following a prescriptive or performance-based compliance path; because battery storage systems are proposed to be prescriptively required for some nonresidential buildings, a set of prescriptive standards paralleling the performance standards is needed to support this change. Similarly, clarifying that the existing control specifications were designed around an assumption of a paired solar photovoltaic system made it necessary to provide specifications for “standalone” battery storage systems to ensure equivalent treatment of such systems and eliminate risks of confusion or misapplication of provisions. Battery storage systems promote energy efficiency and conservation, pursuant to the directive of Sections 25213 and 25402, and including greenhouse gas benefits as a potential method of compliance is necessary to promote state policies regarding climate change, given that one of the stated goals of transitioning to renewable energy sources is to reduce greenhouse gas emissions and associated impacts on climate and the environment.

**Section: JA13**

**Specific Purpose:**

The specific purpose of adding this appendix is to support updates to the Standard language relating to installation of a heat pump water heater with demand management capability.

**Necessity:**

This appendix is necessary to describe in specific detail the qualification and certification requirements for Heat Pump Water Heater Demand Management Systems.

**Section: JA14**

**Specific Purpose:**

The specific purpose of adding this appendix is to support updates to the Standard language relating to installation of a central heat pump water heaters.

**Necessity:**

This appendix is necessary to describe in specific detail the qualification and certification requirements for Central Heat Pump Water Heating Systems.



**Section: NA1.1****Specific Purpose:**

The specific purpose of the changes to this section is to update the reference to the Standards where the duct leakage requirements are located, and update Table NA1-1 to include references to verifications for kitchen range hoods located in NA2.2.4.1.4, and HRV/ERV systems located in NA2.2.4.1.5.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: NA1.5****Specific Purpose:**

The specific purpose of the changes to this section is to remove an out of place sentence at the beginning of the section – this section is not specific to duct testing, and it is not appropriate to have language specific to duct testing or its documentation within this section.

**Necessity:**

These changes are necessary to prevent confusion or cause the misapplication of requirements to perform testing and document results.

**Section: NA1.7.6 (d)****Specific Purpose:**

The specific purpose of the changes to this section is to replace the word “the” with “a” for consistency with the immediately subsequent sections.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: NA1.9****Specific Purpose:**

The specific purpose of the changes to this section is to clarify the alternative procedure that must be followed when an acceptance test technician (ATT) performs field verifications in nonresidential occupancies that were specified to be performed by HERS Raters, and to clarify that the alternative procedure is applicable to all HERS procedures specified in NA2.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: NA2.1****Specific Purpose:**

The specific purpose of the change to this section (see also Sections 120.4(g), 120.5(a), 140.4(l), 141(b), NA1.1, NA7):

- Update reference in NA2.1 to reference Section 120.4(g) instead of Section 140.4(l).

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. Duct leakage testing was introduced in 2001 in Part 6 and have not been updated since introduction. The prescriptive requirement being moved to a mandatory requirement is necessary to be consistent with recent California Mechanical Code changes as well as duct leakage testing.

**Section: NA2, NA2.1.1****Specific Purpose:**

The purpose of the changes to these sections are to add HERS to the section title, consistent with its contents, and update references to sections of the Energy Code that are proposed to be amended. These are not substantive changes.

**Necessity:**

These changes are necessary to maintain the accuracy of references to other Energy Code sections and to ensure that section titles are fully reflective of their contents.

**Section: NA2.1.4.1****Specific Purpose:**

The purpose of the changes to this section are to provide specific air handler airflow values for multi-split systems and small duct high velocity systems, instead of holding these systems to airflow rates applicable to packaged systems with a single indoor unit.

**Necessity:**

These changes are necessary to permit systems to operate at lower target values where appropriate, avoiding unnecessary energy use, as well as to maintain consistency with updates to CFM target values specified in the Energy Code.

**Section: NA2.1.4.2, Table NA2.1-1****Specific Purpose:**

The purpose of the changes to this section and table are to remove a column that redundantly states a standards value applied by the Energy Code.

**Necessity:**

These changes are necessary to ensure that material within the Appendices is not duplicative of material in the Energy Code, and to avoid a situation where the Energy Code values may be amended without also causing these values to be amended.

**Section:** NA2.2.1, Table NA2.2-1

**Specific Purpose:**

The purpose of the changes to this section are to improve consistency in phrasing, remove unneeded reference to ASHRAE 62.2, and add two rows to the table consistent with the addition of specified procedures to NA2.2.4 (described below).

**Necessity:**

These changes are reasonably necessary to better direct readers as to the location and contents of the subsections to which it refers, and to avoid implying that review of ASHRAE 62.2 is necessary for understanding the content or specifications of NA2 or its subsections.

**Section:** NA2.2.4

**Specific Purpose:**

The specific purpose of the changes to this section is to add Heat Recovery Efficiency as a new verification metric for HRV and ERV system types in Section NA2.2.4.1.5, incorporate into the NA2.2.4.1.4 kitchen range hood verification the specification for use of capture efficiency as an alternative for compliance in addition to airflow rate, clarify the specification of existing HERS verification procedures for verification of IAQ ventilation systems, and clarify that compliance with the kitchen local mechanical exhaust vented range hood protocol may be determined by use of ratings published in CEC-approved directories and the AHAM directory in addition to the HVI directory.

**Necessity:**

These changes are necessary to achieve greater energy savings in California's existing residential and nonresidential building stock, as directed by California Public Resources Code Section 25943 and, for the clarifying changes, to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** NA2.4

**Specific Purpose:**

The purpose of the addition of this section is to describe a field verification and diagnostic test procedure for testing whole building air leakage. The Energy Code does not require performance of this test.

**Necessity:**

These changes are necessary to establish a consistent formula for determining whole building air leakage for persons interested in incorporating such testing into their building projects, and for enabling future consideration of compliance credit or other measures based on the results of such testing.

**Section: NA2.5****Specific Purpose:**

The purpose of the addition of this section is to specify a procedure for verifying that an air barrier has been installed, noting that verification of air barrier installation is not required for compliance with minimum efficiency requirements but may be electively performed in projects.

**Necessity:**

These changes are reasonably necessary to ensure that a consistent verification method exists for this building component for cases where it would provide value.

**Section: NA6****Specific Purpose:**

The specific purpose of the changes made to Appendix NA6.1 and NA6.5 are to clarify that the scope of this requirement applies to non-rated site-built skylights and alterations to vertical fenestration (i.e., repairs or replacement of glass), and to remove the 200 square foot exception for nonresidential compliance.

**Necessity:**

These changes are necessary to increase energy efficiency via cost-effective building design standards, as directed by California Public Resources Code Sections 25213 and 25402 by increasing the rate of compliance with National Fenestration Rating Council (NFRC certification) and reducing/eliminating the amount of uncertified fenestration products being installed in California, as well as to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Section 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: NA6****Specific Purpose:**

The purpose of the changes to this section are to update acceptance testing procedures and define new procedures where necessary to support the Energy Code.

**Necessity:**

These changes are necessary to ensure that acceptance testing procedures are kept current with regards to industry standards and best practices, and to provide defined testing protocols for new types of systems and equipment proposed to be regulated by the Energy Code.

**Section: NA7****Specific Purpose:**

The specific purpose of the change to this section (see also sections 120.4(g), 120.5(a), 140.4(l), 141(b), NA 1.1, NA 2.1):

- Include new functional testing for duct leakage in NA7
- Include California Mechanical Code Language for duct leakage testing in NA7f

- Include eligible criteria of whom can perform testing NA7

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16. Duct leakage testing was introduced in 2001 in Part 6 and have not been updated since introduction. The prescriptive requirement being moved to a mandatory requirement is necessary to be consistent with recent California Mechanical Code changes as well as duct leakage testing.

**Section: NA7.4.5**

**Specific Purpose:**

The specific purpose of the changes made to Appendix NA7.4.5 are to clarify that these procedures apply to all interior and exterior horizontal slats, not just those being installed for compliance with the Power Adjustment Factors (PAF) requirement.

**Necessity:**

These changes are necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code, Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: NA7.5.4**

**Specific Purpose:**

The specific purpose of the changes made to this section are to include appropriate acceptance testing of heat recovery bypassing HRV/ERV or DOAS systems (see also Sections 140.4(e), and 140.4(p)).

**Necessity:**

This change is necessary to increase energy efficiency via cost-effective building design standards, as mandated by California Public Resources Code, Sections 25213 and 25402. The current Building Energy Efficiency Standards currently does not have prescriptive requirements for DOAS while market share for DOAS have been increasing since 2012; their broadening adoption and market penetration now means that efficiency standards for this equipment have the potential to save a significant amount of energy on a statewide basis.

**Section:** Table RA2-1

**Specific Purpose:**

The specific purpose of the changes to this section is to add references and descriptions to the table for the new HERS procedures for variable capacity heat pumps, kitchen local exhaust, heat recovery and energy recovery ventilation systems, and multifamily dwelling unit enclosure leakage.

**Necessity:**

The change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** Table RA3.1-1

**Specific Purpose:**

The specific purpose of the changes to this section is to add references and descriptions to the table for the new HERS procedures for variable capacity heat pumps, kitchen local exhaust, heat recovery and energy recovery ventilation systems, and multifamily dwelling unit enclosure leakage.

**Necessity:**

The change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** RA3.1.3.4.7

**Specific Purpose:**

The purpose of the addition of this Section is to specify that verification will include a quick visual inspection to ensure that all dwelling spaces are receiving ventilation.

**Necessity:**

These changes are reasonably necessary to prevent a situation where an absence of visible equipment or ducting may cause a dwelling to pass verification (based on having nothing to verify) despite receiving inadequate ventilation.

**Section:** RA3.1.3.4.8

**Specific Purpose:**

The purpose of the addition of this Section is to specify verification that ductless systems are entirely within conditioned spaces.

**Necessity:**

These changes are reasonably necessary to allow said systems to qualify for credit available for ducted systems located entirely within conditioned spaces.

**Sections:** RA3.1.4.1.7, RA3.1.4.1.8

**Specific Purpose:**

The specific purpose of the changes to these sections is to include within RA3 these HERS procedures for determining compliance with the variable capacity heat pump compliance option that was adopted by the Energy Commission on November 13, 2019.

**Necessity:**

The change is necessary to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** RA3.1.4.2

**Specific Purpose:**

The specific purpose of the changes to this section is to include an alternative calculation method for nominal air handler airflow for multiple split systems, and to clarify the language that specifies use or the default and nominal air handler airflow calculations used as part of the calculation used for determining duct leakage field test compliance results.

**Necessity:**

These changes are necessary to enable field verification of multiple-split system indoor unit airflow and duct leakage compliance target values in order to achieve greater energy savings in California's existing residential building stock, as directed by California Public Resources Code Section 25943, and for the clarifying changes to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** RA3.1.4.3

**Specific Purpose:**

The purpose of the changes to this section are to specify that for central systems leakage measurement shall be based on leakage present when installed dampers are closed, and not based on artificial or temporary sealing of duct branches.

**Necessity:**

These changes are reasonably necessary to ensure that leakage testing results are accurate to the conditions that will exist during occupancy.

**Section:** RA3.1.4.7; RA3.1.4.8, RA3.3.3.4.1, RA3.4.4.3, 3.4.5, 3.4.6

**Specific Purpose:**

The specific purpose of the changes to these sections is to:

- provide specification for a HERS field verification procedure for determining compliance with air filter sizing according to a face velocity specification;
- provide specification for HERS field verification of compliance with air filter minimum clean filter pressure drop requirement;

- provide specification for calculating airflow compliance values for HERS field tests of indoor units of multiple-split air conditioners and heat pumps;
- provide specification for verification of variable capacity heat pump performance compliance option eligibility;
- provide specification for HERS field verification of wall-mounted thermostats;
- provide specification for HERS field verification of non-continuous indoor unit fan operation; and
- include within RA3 these HERS procedures that are required for determining compliance with the variable capacity heat pump compliance option as adopted by the Energy Commission on November 13, 2019.

**Necessity:**

These changes are necessary to provide procedures for HERS raters that cover all system configurations allowed by the Energy Code, and to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section:** RA3.5.6.1.1, RA3.5.6.1.2, and RA3.5.6.1.5

**Specific Purpose:**

The purpose of the changes to this section are to state the location and means of accessing certified documentation, rather than stating only that the documentation must be obtained.

**Necessity:**

These changes are reasonably necessary to ensure readers are instructed as to where and how to obtain necessary documentation, rather than only stating that documentation must be obtained, so as to ensure that the means of compliance is readily understandable for the reader.

**Section:** RA3.5.6.3

**Specific Purpose:**

The purpose of the changes to this section are to simplify phrasing by referring to underlying standards requirements, and in so doing to identify the most current version of said standards.

**Necessity:**

These changes are reasonably necessary to ensure the consistency of requirements with the industry standards from which they originated.

**Section:** RA3.7

**Specific Purpose:**

The specific purpose of the changes to this section is to incorporate into the RA3.7.4.3 kitchen range hood verification the specification for use of capture efficiency as an alternative for compliance in addition to airflow rate; include verification procedures for HRV/ERV equipment and add Heat Recovery Efficiency as a new verification metric for



HRV and ERV system types; clarify the specification of existing HERS verification procedures including where measurements are expected to occur; and clarify that compliance with the kitchen local mechanical exhaust vented range hood protocol may be determined by use of ratings published in CEC-approved directories and the AHAM directory in addition to the HVI directory.

**Necessity:**

These changes are necessary to achieve greater energy savings in California's existing residential and nonresidential building stock, as directed by California Public Resources Code Section 25943, as well as to ensure and improve the general clarity and internal consistency of the Energy Code, as directed by California Government Code Sections 11349 and 11349.1, and California Code of Regulations, Title 1, Section 16.

**Section: RA3.8**

**Specific Purpose:**

The purpose of the changes to this section are to update referenced RESNET procedures to their most current version, ensure consistency of section language with the most current RESNET requirements, and improve the phrasing, organization, and flow of specifications.

**Necessity:**

These changes are reasonably necessary to maintain consistency with RESNET and ensure section language clearly communicates specifications and requirements.

**Section: RA3.9.4.1.1**

**Specific Purpose:**

The specific purpose of the changes to this section is to delete a verification protocol that used blower door airflow and pressure matching of dwelling unit with respect to outdoors, and to add a verification protocol that uses a fan flowmeter and pressure matching of the dwelling unit with respect to the attic to measure flow through the whole house fan (WHF) grille. The blower door protocol was reevaluated by field researchers who determined the protocol yields results that are inconsistent with those of procedures using measurement of flow through the WHF grille.

**Necessity:**

These changes are necessary to ensure the protocols specified for use for measuring WHF airflow provide equivalent results, and in doing so achieve greater energy savings in California's existing residential and nonresidential building stock, as directed by California Public Resources Code Section 25943.

**Section: RA4.4**

**Specific Purpose:**

The purpose of the changes to this section are to remove obsolete language referring to differences in pipe insulation requirements between the Energy Code and the Plumbing Code that are proposed to be resolved via amendment to the Energy Code, and to remove unneeded phrasing in three subsections. These are not substantive changes.

**Necessity:**

These changes are necessary to ensure that unneeded language is removed from the Appendices where it occurs.

**TECHNICAL, THEORETICAL, AND EMPIRICAL STUDIES, REPORTS, OR SIMILAR DOCUMENTS RELIED UPON**

The CEC relied on input from various stakeholders, subject matter experts, and interested parties that provided information, feedback, and subject matter expertise, including but not limited to:

The groups and organizations that participated include:

California Building Standards Commission, California Independently Owned Utilities, California Business Properties Association, California Building Industry Association, Home Ventilating Institute, Air Conditioning, Heating and Refrigeration Institute, Sheet Metal and Air Conditioning Contractors National Association, National Electrical Manufacturing Association, American Society of Heating, Refrigerating and Air Conditioning Engineers, California Department of Consumer Affairs Illuminating Engineering Society, and Building Owners and Managers Association.

The CEC relied upon the following documents:

<b>Document Number (if applicable)</b>	<b>Report Title</b>
	<b><i>Code Change Proposals</i></b>
	Integrated Pumped Refrigerant Economizer for Computer Rooms
	Demand Management – Controlled Receptacles
2022-MF-AEP-F	All-Electric Multifamily Compliance Pathway
2022-MF-DHW-F	Multifamily Domestic Hot Water Distribution
2022-MF-ENV-D	Multifamily High Performance Thermal Envelope
2022-MF-IAQ-D	Multifamily Indoor Air Quality
	Market Analysis in Support of Single-family and Updated Multifamily
2022-MF-RESTRUC-D	Multifamily Restructuring
2022-SF-EAA-D	Residential Energy Savings and Process Improvements for Additions and Alterations
2022-SF-HVAC1-D	Enhanced Air-to-Water Heat Pump Compliance Options
2022-SF-GRID-INT-F	Single Family Grid Integration

2022-SF-HVAC3-D	Variable Capacity HVAC Compliance Software Revisions
2022-NR-HVAC3-F	High Efficiency Boilers and Service Water Heating
2022-NR-COV-PROC4-F	Controlled Environment Horticulture
2022-NR-COV-PROC1-F	Pipe Sizing, Monitoring, and Leak Testing for Compressed Air Systems
2022-NR-HVAC1-F	Nonresidential Computer Room Efficiency
2022-NR-LIGHT1-F	Nonresidential Daylighting
2022-NR-DWHR-F	Nonresidential Drain Water Heat Recovery
2022-NR-GRID-INT-F	Nonresidential Grid Integration
2022-NR-HVAC2-F	Air Distribution: High Performance Ducts and Fan Systems
2022-NR-LIGHT2-F	Nonresidential Indoor Lighting
2022-NR-ENV1-F	Nonresidential High-Performance Envelope
2022-NR-HVAC4-D	Nonresidential HVAC Controls
2022-NR-ENV2-F	Reduced Infiltration
2022-NR-LIGHT3-F	Nonresidential Outdoor Lighting Sources
2022-NR-COV-PROC2-F	Refrigeration System Opportunities
2022-NR-COV-PROC3-F	Steam Trap Monitoring
	<b><i>Additional Documents Relied Upon</i></b>
	Brett Singer comment in response to UCLA paper on Gas combustion in buildings
	Technical Memo on Updated Analysis from NO2 and PM25 Cooking Simulation
	Simulations of short-term exposure to NO2 and PM2.5 to inform capture efficiency standards
	Effective Kitchen Ventilation for Healthy Zero Net Energy Homes with Natural Gas
	Development of a standard capture efficiency test method for residential kitchen ventilation
HVI 920	Product Performance Certification Procedure (updated as of February 28, 2020)

The listed documents have been filed in this proceeding's docket, number 21-BSTD-01, and are available to the public unless subject to copyright or other restrictions. <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency>

In addition, all documents, including those protected by copyright, are available at the California Energy Commission, located at 1516 9<sup>th</sup> Street, in Sacramento, California.

## **STATEMENT OF JUSTIFICATION FOR PRESCRIPTIVE STANDARDS**

The proposed changes to mandatory requirements have, where possible, avoided mandating use of specific technologies or equipment, or prescribing the performance of specific actions or procedures. The requirements are generally performance-based efficiency metrics. However, the Standards include both a prescriptive option, allowing

builders to comply by using methods known to be efficient, and a performance option, allowing builders complete freedom in their designs provided the building achieves the same overall efficiency as an equivalent building using the prescriptive option.

### **CONSIDERATION OF REASONABLE ALTERNATIVES, INCLUDING THOSE THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS**

No reasonable alternatives to the proposed regulations have been proposed that would lessen any adverse impact on small businesses or that would be less burdensome and equally effective in achieving the purposes of the regulation in a manner that achieves the purposes of the statute being implemented.

During the initial, informal stage of the rulemaking process, the Commission conducted an extensive pre-rulemaking public process where it considered many suggestions from numerous stakeholders about (1) alternatives that could improve the feasibility of the Commission's preliminary versions of the proposed regulations or could reduce their adverse impacts; (2) the technical and cost-effectiveness analyses of those preliminary proposals; and (3) the language in those proposals. Based on the comments received, the Commission developed Preliminary Draft Standards and held comprehensive and numerous pre-rulemaking public workshops to obtain public comment on those; in turn, many more comments were received and, in response to them, the Commission has produced the proposed regulations.

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

The CEC has made an initial determination that the proposed regulations are unlikely to have a statewide adverse economic impact directly affecting business, including the ability of California businesses to compete with businesses in other states.

California's Energy Code is part of the California Building Standards Code and therefore, impact nearly all newly constructed buildings, as well as to specific additions and alterations to nearly all existing buildings. Therefore, the Energy Code may eventually impact all business in the state that own buildings. However, California's Energy Code applies to buildings built in the state of California. Therefore, no California construction businesses should be at a disadvantage versus businesses in other states when all builders and manufacturers must meet the same standards to build or sell building products in California.

While there are initial up-front costs imposed by the Energy Code, there are long-term savings that typically repay those costs by a significantly positive ratio. Past changes to the Energy Code continue to generate benefits even as the latest version of Energy Code increases initial costs. More simply, the Energy Code helps create long-term economic growth and stability by increasing the disposable income of Californians and California businesses in the longer term. These long-term benefits far outweigh the initial upfront costs and, therefore, California businesses are not disadvantaged in competing with businesses from other states by these regulations. California has aggressively pursued environmental and energy regulations for well over a decade

now, while simultaneously out-performing the overall United States growth in per-capita personal income.

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

The CEC 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.**

The evidence in the record indicates that employment impacts based on the implementation of the 2022 Energy Code may result in an estimated 781 jobs created and 6,868 jobs eliminated. California businesses producing energy efficient products and technology that meet or exceed the proposed Standards are likely to expand their sales of those products and technologies due to the implementation of these proposed Standards. Construction related jobs and occupations and companies that provide energy efficient products and services will likely benefit from increased demand for those products and services likely creating jobs. Any jobs eliminated may be the result of a single measure that will reduce indoor nonresidential lighting power requirements. This estimate is based on an analysis by Evergreen Economics. Therefore, the CEC concludes that it is likely the proposal may both create and eliminate jobs within California.

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

California's Energy Code is part of the California Building Standards Code and therefore, impact nearly all newly constructed buildings, as well as to specific additions and alterations to nearly all existing buildings. Therefore, the Energy Code may eventually impact all business and individuals in the state that own buildings. However, while the increased energy efficiency in California's buildings may have short term initial costs, there are long-term benefits from reduced utility costs. California's Energy Code applies to buildings built in the state of California. As such, no California construction businesses should be at a disadvantage when all builders and manufacturers must meet the same standards to build or sell building products in California. More broadly, while there are initial up-front costs imposed by the Energy Code, there are long-term savings that typically repay those costs by a significantly positive ratio. The Energy Code helps create long-term economic growth and stability by increasing the disposable income of Californians and California businesses in the longer term making it possible that new businesses may be created to provide compliance services and to supply energy efficient products. Therefore, based on the evidence in the record, the CEC concludes that it is likely the proposal will create new businesses and unlikely the proposal will eliminate existing businesses within the State of California.

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

California businesses producing energy efficient products and technology that meet or exceed the proposed Standards are likely to expand their sales of those products and technologies due to the implementation of these proposed Standards. Therefore, the CEC concludes that it is likely that Businesses currently doing business in California to provide energy-efficient products and services are likely to be expanded.

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

The benefits of this proposed action are costs savings to California residents and businesses, lower statewide energy use, and lower statewide greenhouse gas emissions.

The proposed regulations will not affect the health and welfare of California residents, worker safety, or the state's environment.

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

Due to the complexity of the analysis, refer to the Economic and Fiscal Impact Statement (STD. 399) for the estimated cost of compliance, estimated potential benefits, and related assumptions used for building standards found on the CEC website at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency>

**DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS**

These proposed regulations do not duplicate or conflict with any federal regulations contained in the Code of Federal Regulations.

**FOR FURTHER INFORMATION**

Please direct general inquiries concerning aspects of the rulemaking process including requests for copies of the proposed text (express terms), the initial statement of reasons (ISOR), any modified version of the regulations, the substance of the proposed regulations, or any other information upon which the rulemaking is based to:

Corrine Fishman  
Regulations Manager, Efficiency Division  
(916) 654-4287  
[corrine.fishman@energy.ca.gov](mailto:corrine.fishman@energy.ca.gov)

Specific questions regarding the substantive and/or technical aspects of the proposed changes to the building standards should be addressed to:

Primary Contact:

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Senior Civil Engineer  
California Energy Commission  
Building Standards Office, Efficiency Division  
(916) 931-9765  
[Payam.bozorgchami@energy.ca.gov](mailto:Payam.bozorgchami@energy.ca.gov)

Back up Contact:

Peter Strait, Supervisor  
California Energy Commission  
Building Standards Office, Efficiency Division  
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