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Introduction

This *2025 Nonresidential Compliance Manual* is designed to help building owners, architects, engineers, designers, energy consultants, builders, enforcement agencies, contractors and installers, and manufacturers comply with and enforce California's Building Energy Efficiency Standards (Energy Code) for nonresidential buildings. The manual is a reference and instructional guide for anyone involved in the design and construction of energy-efficient nonresidential buildings.

Fourteen chapters make up the manual:

Chapter 1 introduces the Energy Code and discusses the application and scope of the standards for nonresidential buildings.

Chapter 2 analyzes the compliance and enforcement process, including design and preparation of compliance documentation through acceptance testing.

Chapter 3 details the building envelope.

Chapter 4 discusses heating, ventilation, and air-conditioning (HVAC) systems and water heating systems.

Chapter 5 discusses indoor lighting.

Chapter 6 discusses outdoor lighting.

Chapter 7 discusses sign lighting for indoor and outdoor applications.

Chapter 8 details electrical power distribution.

Chapter 9 examines photovoltaics, battery energy storage systems, and shared solar electric systems or community-shared battery system compliance options and solar-ready requirements for nonresidential buildings.

Chapter 10 details covered process requirements.

Chapter 11 is reserved, previously described multifamily building requirements.

Chapter 12 outlines to the performance approach for compliance.

Chapter 13 discusses commissioning requirements.

Chapter 14 discusses acceptance test requirements.

Related Documents

This compliance manual supplements four other related documents that are available from the California Energy Commission. These are:

- The *2025 Building Energy Efficiency Standards, Title 24, Part 6* (Energy Code). This compliance manual supplements, explains, and clarifies California's energy efficiency standards for buildings; it does not replace them. Readers should have a copy of the Energy Code to refer to while reading this manual, as well as a copy of the *2025 Reference Appendices*.

- 2025 Reference Appendices — The reference appendices have three main subsections: Reference Joint Appendices, Reference Residential Appendices, and Reference Nonresidential Appendices.
- The *2025 Reference Joint Appendices* contain information common to single-family residential, nonresidential, and multifamily buildings including, but not limited to, definitions, climate zone information, weather data, assembly properties, qualification requirements for high-efficacy light sources, compliance documentation registration procedures, qualification requirements for photovoltaic systems, and qualification requirements for battery storage systems.
- The *2025 Reference Residential Appendices* contain information for single-family residential and low-rise multifamily buildings. The Reference Residential Appendices contain Energy Code Compliance (ECC) field verification and diagnostic testing procedures for HVAC equipment, air distribution ducts, and quality insulation installation.
- The *2025 Reference Nonresidential Appendices* contain information for nonresidential and high-rise multifamily buildings. The Reference Nonresidential Appendices contain ECC field verification and diagnostic testing procedures for HVAC equipment and air distribution ducts, acceptance testing procedures, and luminaire power default values.
- *The 2025 Nonresidential and Multifamily Alternative Calculation Method Reference Manual* lays out the technical rules for implementing the 2025 performance compliance path in software programs.

Material from related documents is referenced but not repeated in this compliance manual. If you are using the electronic version of this compliance manual, there are hyperlinks throughout the manual that will take you directly to the document that is referenced.

The Technical Chapters

Please refer to Chapter 1.3 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Why California Needs the Energy Code

Please refer to Chapter 1.4 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Electricity Reliability and Demand

Please refer to Chapter 1.4.1 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Comfort

Please refer to Chapter 1.4.2 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Economics

Please refer to Chapter 1.4.3 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Environment

Please refer to Chapter 1.4.4 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Greenhouse Gas Emissions and Global Warming

Please refer to Chapter 1.4.5 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Building Decarbonization

California has nearly 14 million homes and 7.5 million square feet of commercial buildings. These buildings produce a quarter of the state's greenhouse gas (GHG) emissions, making homes and businesses a major factor in climate change. Reducing these emissions, also referred to as building decarbonization, is a key part of California's climate strategy. Of the many tools in the state's building decarbonization toolbox, the decarbonizing co-benefits of the California Energy Code stand out as a proven solution of significance.

What's New for 2025

Envelope

- Reduced the prescriptive U-factor requirement equivalent to an additional R-2 continuous insulation for:
    - All roof/ceiling assemblies in all climate zones.
    - Metal building walls in all climate zones.
    - Wood-framed and other walls in all climate zones.
- Mass light walls in all climate zones.
    - Mass heavy walls in Climate Zones 1 and 11–16.
- Added a mandatory vestibule requirement at public entrances for buildings of Occupancy Types A, B, E, I, and M. Multiple exceptions are included.
- Added a mandatory area-weighted U-factor requirement for exterior vertical fenestration assemblies.
- Added a mandatory U-factor requirement for exterior vertical fenestration alterations.

Lighting

- Revision to the requirements for daylight responsive controls (Section 130.1[d])
- Improvements to code language in specifying requirements throughout for conciseness and clarity

Mechanical

- Updates to mandatory cooling tower controls requirements (Section 110.2(e))
- New mandatory pool heating source and sizing requirements (Section 110.4(c))
- New mandatory requirements limiting the temperature of supply hot water for hydronic space heating (Section 120.2(l))
- Revision to the prescriptive axial fan open circuit cooling tower fan efficiency requirements (Section 140.4(h))
- New prescriptive requirements for the use of ASHRAE Guideline 36 (Section 140.4(r))
- New prescriptive requirements for simultaneous mechanical heat recovery (Section 140.4(s))

Covered Processes

- Updated mandatory requirements for controlled environmental horticulture systems (Section 120.6(h)) for lighting efficiency
- New mandatory requirements for evaporator specific efficiencies for refrigeration (Section 120.6(b)). Updated efficiencies are in Table 120.6-A-2.
- New mandatory requirements for electric readiness for commercial kitchens (Section 120.6(k))
- New mandatory requirements for process pipe insulation for pipes that carry heated or chilled fluids used in process unrelated to space conditioning or water heating (Section 120.3(a)). Updated pipe insulation thickness requirements can be found in Tables 120.3-A1 and 120.3-A2.
- Updated prescriptive requirements for laboratory and factory exhaust systems (Section 140.9(c))

Mandatory Requirements and Compliance Approaches

Mandatory Requirements

Please refer to Chapter 1.6.1 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Prescriptive Approach

The prescriptive approach (composed of requirements described in Chapters 3, 4, 5, 6, 7, and 10) requires each component of the proposed building to meet a prescribed minimum efficiency. The approach offers little flexibility but is easy to use. If the design fails to meet even one requirement, then the system does not comply with the prescriptive approach. In this case, the performance approach provides more flexibility to the building designer for choosing alternative energy efficiency features.

- Building envelope. The prescriptive envelope requirements are the required thermal performance levels for each building component (walls, roofs, and floors). These requirements are described in Chapter 3. The only flexibility is if portions of an envelope component do not meet a requirement, a weighted average of the component can be used to demonstrate compliance. The stringency of the envelope requirements varies according to climate zone and occupancy type.
- Mechanical. The prescriptive mechanical requirements are described in Chapter 4. The prescriptive approach specifies equipment, features, and design procedures but does not mandate the installation of a particular HVAC system.
- Indoor lighting. The prescriptive lighting power requirements are determined by one of two methods: the complete building method or the area category method. These approaches are described in Chapter 5. The allowed lighting varies according to the requirements of the building occupancy or task requirements.
- Outdoor lighting. Outdoor lighting standards are described in Chapter 6, setting power limits for various applications such as parking lots, pedestrian areas, sales canopies, building entrances, building façades, and signs. The Energy Code also set minimum requirements for cutoff luminaires and controls. Detailed information on the outdoor lighting power allowance calculations is in Chapter 6.

Performance Approach

The performance approach (Chapter 12) allows greater flexibility than the prescriptive approach. It is based on an energy simulation model of the building.

The performance approach requires an approved computer compliance program that models a proposed building, determines the allowed energy budget, calculates the energy use of the building, and determines when it complies. Design options such as window orientation, shading, thermal mass, zonal control, and building configuration are all considered in the performance approach. In addition to flexibility, it helps find the most cost-effective solution for compliance.

The performance approach may be used for:

- Envelope or mechanical compliance alone.
- Envelope and mechanical compliance.
- Envelope and indoor lighting compliance.
- Envelope, mechanical, and indoor lighting compliance.

Indoor lighting compliance must be combined with envelope compliance. The performance approach does not apply to outdoor lighting, sign lighting, exempt process load, some covered process loads (for example, refrigerated warehouses), or solar-ready applications.

Long-term System Cost (LSC) and Hourly Source Energy (HSE) are the "currency" for the performance approach. LSC considers the systemwide benefits associated with the type of energy (electricity, gas, or propane) and the time when it is saved or used. The LSC method helps the state account for the long-term benefits of policies needed to meet its climate actions goals, such as 100 percent renewable and zero-carbon generation, proliferation of electric transportation, and drastic reductions in fossil fuel combustion occurring in buildings. Appendix JA3 of the Reference Appendices has more information on LSC. Like LSC, HSE considers the type of energy (electricity, gas, or propane) but is based on the amount of long-term depletable energy resources used to meet the energy demand of the building in each hour. HSE values are similar to the long-term hourly utility greenhouse gas emissions and an effective metric for encouraging building decarbonization.

See Chapter 12 if the performance approach will be used for additions and alterations.

Compliance Options

Please refer to Chapter 1.6.3.1 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Scope and Application

The Energy Code applies to nonresidential and residential buildings. This manual addresses the requirements for nonresidential buildings, including hotels and motels. The Single-Family Residential Compliance Manual discusses the requirements for single-family residential buildings. The Multifamily Compliance Manual discusses the requirements for low-rise and high-rise multifamily residential buildings.

Building Types Covered

The nonresidential standards apply to all California Building Code (CBC) occupancies of Groups A, B, E, F, H, I, L, M, S, and U. If buildings are directly or indirectly conditioned, they must

meet all mechanical, envelope, indoor, and outdoor lighting requirements of the standards. Buildings that are not directly or indirectly conditioned must meet only the indoor and outdoor lighting requirements.

The standards also do not apply to buildings that fall outside the jurisdiction of the CBC, such as mobile structures. If outdoor lighting is associated with a Group L occupancy, it is exempt. If the outdoor lighting is part of any other occupancy groups listed, it must comply.

Historical Buildings

Please refer to Chapter 1.7.2 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Multifamily Buildings

The Multifamily Compliance Manual provides information for multifamily buildings.

Scope of Standard Requirements

Please refer to Chapter 1.7.4 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Speculative Buildings

Known Occupancy

Please refer to Chapter 1.7.5.1 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Unknown Occupancy

Please refer to Chapter 1.7.5.2 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Mixed- and Multiple-Use Buildings

Mixed Residential and Nonresidential Occupancies

Please refer to Chapter 1.7.6.1 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Multiple Nonresidential Occupancies

Please refer to Chapter 1.7.6.2 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Hotels and Motels

This chapter discusses the similarities and differences among the requirements for a hotel/motel and other nonresidential buildings.

Hotels or motels are unique in that the design incorporates a wide variety of occupancies and functions into one structure. The occupancies range from nonresidential occupancies to hotel/motel guest rooms. Design functions that affect guests range from the arrival experience created through the architectural features of the main lobby to the thermal comfort of the guest rooms. Other functions that designs must address include restaurants, kitchens, laundry, storage, assembly, outdoor lighting, and sign lighting. These structures can range from simple guest rooms with a small office to a structure encompassing a small city (Section 100.1 "HOTEL/MOTEL").

The 2025 Energy Code expanded on the definition of "Hotel/Motel" to include:

- A building of Occupancy Group R-1.
- Vacation timeshare properties and hotel or motel buildings of Occupancy Group R-2.

- The following types of Occupancy Group R-3:
    - Congregate residences for transient use.
    - Boarding houses of more than six guests.
    - Alcohol or drug abuse recovery homes of more than six guests.

Like other occupancies, compliance is submitted for the features covered in the permit application only. The nonresidential areas must meet the envelope, mechanical, indoor lighting, outdoor lighting, and sign lighting portions of the nonresidential Energy Code. The guest room portions of hotels/motels must meet the envelope, mechanical, and lighting provisions applicable only to hotel/motel guest rooms. Each portion of the building individually complies with the provisions applicable to that occupancy.

Since hotel/motels are treated as a mixture of occupancies covered by the Energy Code, the concepts at the beginning of each chapter apply to hotels/motels as they would any other nonresidential occupancy.

Mandatory Requirements

Please refer to Chapter 1.7.8.1 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Prescriptive Compliance

Please refer to Chapter 1.7.8.2 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Performance Compliance

Please refer to Chapter 1.7.8.3 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Live-Work Spaces

Live-work buildings combine residential and nonresidential uses within individual units. In general, the residential requirements apply since these buildings operate and are conditioned 24 hours per day. Lighting in designated workspaces is required to show compliance with the nonresidential lighting standards (Section 140.6).

Unconditioned Space

Please refer to Chapter 1.7.10 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Newly Conditioned Space

Please refer to Chapter 1.7.11 of the *2022 Nonresidential and Multifamily Compliance Manual.*

New Construction in Existing Buildings

Please refer to Chapter 1.7.12 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Alterations to Existing Conditioned Spaces

Please refer to Chapter 1.7.13 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Additions

Please refer to Chapter 1.7.14 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Change of Occupancy

Please refer to Chapter 1.7.15 of the *2022 Nonresidential and Multifamily Compliance Manual.*

Repairs

Please refer to Chapter 1.7.16 of the *2022 Nonresidential and Multifamily Compliance Manual.*

About the Energy Code

History

Reference: Section 25402 of the Public Resources Code

The Legislature adopted the Warren-Alquist Act (the Act), which created the Energy Resources Conservation and Development Commission (California Energy Commission, or CEC) in 1975 to deal with energy-related issues and charged the CEC with adopting and maintaining energy efficiency standards for new buildings. The first standards were adopted in 1978 in the aftermath of the Organization of Petroleum Exporting Countries (OPEC) oil embargo of 1973.

The Act requires that the Energy Code be cost-effective "when taken in their entirety and amortized over the economic life of the structure."

The CEC is required to update the standards periodically. One hundred eighty (180) days after the approval of the standards, manuals must be published to support the Energy Code. The Energy Code (Part 6) goes into effect along with the other parts of the California Building Standards Code (Title 24) on the statutorily required triennial update cycle. The Act directs local building permit jurisdictions to not approve permits until the building satisfies the requirements of the standards.

The first-generation standards for nonresidential buildings took effect in 1978. Second-generation standards took effect for offices, and retail and wholesale stores, in 1984 and 1985, respectively.

The next major revision occurred in 1992 when the requirements were simplified and consolidated for all building types. Major changes were made to lighting, building envelope, fenestration, and HVAC and mechanical requirements. Structural changes made in 1992 led the way for national standards in other states.

The standards went through minor revisions in 1995. In 1998, lighting power limits were reduced significantly because electronic ballasts and T-8 lamps were cost-effective and becoming commonplace in nonresidential buildings.

The California electricity crisis of 2000 resulted in rolling blackouts throughout much of the state. This crisis produced escalating energy prices at the wholesale market and, in some areas, in the retail market. The Legislature responded with Assembly Bill 970 (Ducheny, Chapter 329, Statutes of 2000), which required the CEC to update the Energy Code through an emergency rulemaking. This rulemaking was achieved within the 120 days required by the Legislature. The 2001 Standards (or the AB 970 Standards) took effect in mid-2001. The 2001 Energy Code included requirements for high-performance windows throughout California, more stringent lighting requirements, and other changes.

The Public Resources Code was amended in 2002 through Senate Bill 5X (Machado, Chapter 852, Statutes of 2008) to expand the authority of the CEC to develop and maintain standards for outdoor lighting and signs. The Energy Code covered in this manual builds on the rich

history of Nonresidential Energy Code in California and the leadership and direction provided by the California Legislature over the years.

The 2008 Energy Code was expanded to include refrigerated warehouses and steep-sloped roofs.

The 2013 Energy Code reflected many significant changes and expanded the scope. Some changes included fault detection and diagnostic devices, economizer damper leakage and assembly criteria, air handler fan control for HVAC systems, updates to the low-sloped cool roofs requirements for nonresidential buildings, and, for the first time, set minimum mandatory requirements for insulation in nonresidential buildings. Expanding the scope of the standards included newly regulated covered processes such as parking garage ventilation, process boiler systems, compressed air systems, commercial refrigeration, laboratory exhaust, data center (computer room) HVAC, and commercial kitchens.

The 2016 Energy Code was current with ASHRAE 90.1 national consensus standards. Changes were made to HVAC controls, indoor and outdoor lighting, advanced building control systems, and covered processes, including new requirements for elevators, escalators, and moving walkways.

The 2019 Energy Code updated the indoor and outdoor lighting requirements to assume the use of LED lighting, updated indoor air quality requirements, and expanded to include requirements for healthcare facilities for the first time.

The 2022 Energy Code included a number of lighting, HVAC, and covered process updates. Lighting power densities were updated based on light-emitting diode technologies, while lighting control requirements were further clarified. Economizer requirements and HVAC controls were expanded to further reduce energy associated with space conditioning. Additional covered process requirements for steam systems and compressed air systems were also included.

For a detailed list of the changes to the 2025 Energy Code, see What's New for 2025.

Example 1-1

Question

Does a LEED-certified building still need to meet the 2025 Energy Code?

Answer

Yes.

California Climate Zones

Please refer to Chapter 1.8.2 of the *2022 Nonresidential and Multifamily Compliance Manual.*