

Proposal Summary



CASE Report: Existing Buildings

Updated: Wednesday, February 22, 2023

Prepared by: Maureen Guttman, Energy Solutions

Introduction

The document summarizes proposed revisions to the California Energy Code (Title 24, Part 6) that will be discussed during a utility-sponsored stakeholder meeting on February 24, 2023. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email info@title24stakeholders.com by March 10, 2023.

Measure Description

Increasing efficiency for new construction is important but the number of existing buildings dwarfs new construction; to meet statewide emissions reduction goals, the efficiency of existing buildings must be improved. The Statewide CASE Team recognizes this and aims to address existing buildings as part of the 2025 code cycle. Different exceptions have been added throughout the code over multiple code cycles for various reasons. Some of those exceptions are no longer appropriate and simply limit possible energy savings. This proposal addresses two of the main exceptions; all other exceptions were reviewed and reserved for the next code cycle.

This proposal addresses two provisions that impact the energy performance of existing buildings by examining exceptions that currently apply to alterations and or additions.

1. Mandatory requirement for mass walls:

This proposal would remove the exception for mass wall mandatory U_{max} and include a new mandatory U-factor for light and heavy mass wall opaque envelope assemblies in alterations. Requirements for alteration of opaque assemblies currently address roof/ceiling and walls but explicitly exempt mass walls.

Based on the modeling outcomes, some building types may be excluded. To justify the feasibility, an energy simulation for all California climate zones will be completed. The exact U-factor values for each assembly will be based on the simulation analytics. The proposal introduces the 2022 New Construction mandatory U_{max} as the mandatory U_{max} for altered mass walls.

2. Mandatory Commissioning requirement for additions and alterations

Aligning with requirements in ASHRAE 90.1, this proposal would impose a commissioning requirement for both additions and alterations. Whole building commissioning for new construction is already identified in the code; this measure would expand this requirement to existing buildings, but only system-wide commissioning for mechanical, plumbing and electrical systems, and envelope when more than 50% of the roof or wall assembly is altered.

The CASE team will conduct building simulations similar to what was done in the 2013 code Commissioning [CASE report](#) but not limited to design review. A set of non-compliance measures will be selected based on the literature survey and stakeholders' feedback and survey. These non-compliance measures will be considered for certain set of prototype buildings based on the prototype building size, and systems. The final system commissioning requirement will be selected based on the outcome of the cost-effectiveness results.

Data Needs/Stakeholder Information Requests

The Statewide CASE Team would appreciate information and data from stakeholders on the following topics:

- **Technical Feasibility**

1. Are there issues with adding the maximum U-factor requirement to mass walls?
2. Are there issues with adding system commissioning requirements for alterations or additions
3. What potential non-compliance measures are common in CA?
4. Do you have any resources, or can you provide reliable savings information to prescreen the non-compliance measures?
5. Are there any technical difficulties in implementing current code new Construction compliant technologies in existing buildings?

- **Market Readiness**

1. How common is it to retrofit the existing mass wall? Under what conditions are they retrofitted/replaced?
2. Are there issues with improved U-factors for the mass walls? What is the normal procedure to reduce heat loss/heat gain through the mass walls?
3. Is there is a standard practice to compare the impact of thermal mass and instantaneous heat gain?

4. What is the common practice for reducing the mass wall U-factor (such as replacing the solid masonry wall with no insulation with hollow concrete walls, adding insulation to the interior side, or adding insulation to the exterior)?
 5. Is system commissioning new to the market?
 6. How can we leverage the existing building commissioning process (such as retro-commissioning, re-commissioning, monitor-based commissioning, ongoing commissioning) to this proposal?
- **Non-energy Benefits**
 1. Any studies or data on improved health benefits of these two measures (in terms of improved air quality, removed health hazards, increased productivity, enhanced thermal comfort, reduced water consumption etc)?
 2. Any resources on increased revenue (direct or indirect) due to enhanced performance?
 - **Costs**
 1. For mass walls, what is the ball park incremental cost to add insulation in a renovation?
 2. For commissioning, what is the prevailing cost/sq.ft. for each type of existing building commissioning process?
 3. What are the key factors that impact the commissioning cost (building size, system type, capacity and size, controls, interaction between the systems, replacement of existing outdated technologies, training the facility personnel, hiring Cx agents, project management costs)
 - **Economic Impacts** – For all measures: Are there studies or data on job creation, environment and social justice, or equity on improved health benefits of these two measures?

Data may be provided anonymously. To participate or provide information, please email Maureen Guttman, mguttman@energy-solution.com Alamelu Brooks, abrooks@energy-solution.com directly and cc info@title24stakeholders.com.

Draft Code Language

The proposed changes to the Standards and Reference Appendices are provided below. Changes to the 2022 documents are marked with red underlining (new language) and ~~strikethroughs~~ (deletions). Expected sections or tables of the proposed code (but not specific changes at this time) are highlighted in **yellow**.

SECTION 120.8 - NONRESIDENTIAL BUILDING COMMISSIONING

Nonresidential buildings other than healthcare facilities, with conditioned space of 10,000 square feet or more, shall comply with the applicable requirements of Sections 120.8(a) through 120.8(i) in the building design and construction processes. All building systems and components covered by Sections 110.0, 120.0, 130.0, and 140.0 shall be included in the scope of the commissioning requirements in this Section, excluding those related solely to covered processes.

Nonresidential buildings other than healthcare facilities, with conditioned space of less than 10,000 square feet, shall comply with the design review requirements specified in Sections 120.8(d) and shall include any measures or requirements necessary for completing this review in the construction documents in a manner consistent with Section 120.8(e).

Healthcare facilities shall instead comply with the applicable requirements of Chapter 7 of the California Administrative Code (Title 24, Part 1).

Nonresidential building additions and alterations other than healthcare facilities, with conditioned space of 10,000 square feet or more, shall comply with the applicable requirements of Sections 120.8. The new subsections 120.8 (j) and 120.8(k) are under development.

Additions to building systems and components covered by Sections 110.0, 120.0, 130.0, and 140.0 shall be included in the scope of the commissioning requirements in this Section,

Alterations to building systems and components covered by Sections 110.0, 120.0, 130.0, and 141.0 shall be included in the scope of the commissioning requirements in this Section,

EXCEPTIONS. Systems and components related to:

1. Covered processes

2, Building envelope alterations of less than 50% of the building envelope assembly area

3. Solar readiness

Healthcare facilities shall instead comply with the applicable requirements of Chapter 7 of the California Administrative Code (Title 24, Part 1).

NOTE: Nonresidential buildings include nonresidential spaces such as nonresidential function areas within mixed use hotel/motel and high-rise residential buildings. The requirements of Section 120.8 apply based on the square footage of the nonresidential spaces.

The commissioning described in this Section is in addition to any commissioning required by Title 24, Part 11, Section 5.410.2, 5.410.4, and subsections.

SECTION 141.0 – ADDITIONS, ALTERATIONS AND REPAIRS TO EXISTING NONRESIDENTIAL, AND HOTEL/MOTEL BUILDINGS, TO EXISTING OUTDOOR LIGHTING, AND TO INTERNALLY AND EXTERNALLY ILLUMINATED SIGNS

(b) Alterations.

Alterations to components of existing nonresidential, hotel/motel, or relocatable public school buildings, including alterations made in conjunction with a change in building occupancy to a nonresidential, high-rise residential, or hotel/motel occupancy shall meet item 1, and either Item 2 or 3 below:

1. Mandatory Requirements.

Altered components in a nonresidential, or hotel/motel building shall meet the minimum requirements in this Section.

- A. **Roof/Ceiling Insulation.** The opaque portions of the roof/ceiling that separate conditioned spaces from unconditioned spaces or ambient air shall meet the requirements of Section 141.0(b)2Biii.
 - B. **Wall Insulation.** For the altered opaque portion of walls separating conditioned spaces from unconditioned spaces or ambient air shall meet the applicable requirements of Items 1 through 4 below:
 1. **Metal Building.** A minimum of R-13 insulation between framing members, or the area-weighted average U-factor of the wall assembly shall not exceed U-0.113.
 2. **Metal Framed.** A minimum of R-13 insulation between framing members, or the area-weighted average U-factor of the wall assembly shall not exceed U-0.217.
 3. **Wood Framed and Others.** A minimum of R-11 insulation between framing members, or the area-weighted average U-factor of the wall assembly shall not exceed U-0.110.
 4. **Spandrel Panels and Glass Curtain Walls.** A minimum of R-4, or the area-weighted average U-factor of the wall assembly shall not exceed U-0.280.
 5. **Light Mass Walls.** The area-weighted average U-factor of the wall assembly shall not exceed U-0.44.
 6. **Heavy Mass Walls.** The area-weighted average U-factor of the wall assembly shall not exceed U-0.69.
- ~~EXCEPTION to Section 141.0(b)1B: Light and heavy mass walls.~~

Standards

TBD

Reference Appendices

TBD