

# Proposal Summary



## CASE Report: Existing Buildings

Updated: Tuesday, May 9, 2023  
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### 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 May 22, 2023. The Statewide Utility Codes and Standards Enhancement (CASE) Team is seeking input and feedback. To provide your comments, email [info@title24stakeholders.com](mailto:info@title24stakeholders.com) by June 5, 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 one primary exception; all other exceptions were reviewed and reserved for the next code cycle.

#### 1. 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 a 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 system commissioning requirements for alterations or additions
  2. What potential non-compliance measures are common in CA?
  3. Do you have any resources, or can you provide reliable savings information to prescreen the non-compliance measures?
  4. Are there any technical difficulties in implementing current code new construction compliant technologies in existing buildings?
- **Market Readiness**
  1. Is system commissioning new to the market?
  2. 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. Do you know of any studies or data on improved health benefits of this measure (in terms of improved air quality, removed health hazards, increased productivity, enhanced thermal comfort, reduced water consumption etc)?
  2. Do you know of any resources on increased revenue (direct or indirect) due to enhanced performance?
- **Costs**
  1. What is the prevailing cost/sq.ft. for each type of existing building commissioning process?
  2. 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** – Are there studies or data on job creation, environment and social justice, or equity on improved health benefits of existing building commissioning?

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

**NOTE:** Nonresidential buildings include nonresidential spaces such as nonresidential function areas within 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.

For additions and alterations, the reference sections are applicable only to systems being added or altered. Commissioning of unaltered systems is not required.

#### **(a) Summary of Commissioning Requirements.**

Commissioning shall include completion of the following items:

1. Owner's or owner representative's project requirements;
2. Basis of design;
3. Design phase design review;
4. Commissioning measures shown in the construction documents;

5. Commissioning plan;
6. Functional performance testing;
7. Documentation and training; and
8. Commissioning report.

**(b) Owner's or Owner Representative's Project Requirements (OPR).**

The energy-related expectations and requirements of the [building](#) shall be documented before the design phase of the project begins. This documentation shall include the following:

1. New construction and additions:

- i1. Energy efficiency goals;
- ii2. Ventilation requirements;
- iii3. Project documentation requirements, including facility functions, hours of operation, and need for after-hours operation;
- iv4. Equipment and systems expectations; and
- v5. Building envelope performance expectations.

2. Alterations:

- i. Current energy performance of the system being altered;
- ii. Energy efficiency goals;
- iii. Ventilation requirements if HVAC systems is altered;
- iv. Current system requirements including altered system functions, SOO, set points, hours of operation, and need for after-hours operation;
- v. Equipment and systems expectations;
- vi. Building envelope performance expectations and efficiency improvement over current envelope performance;
- vii. Incompatible controls or control systems that do not support the newly installed system;
- viii. Status of sensors' locations and calibration and any required change without which the altered system will not perform as intended.

**(c) Basis of Design (BOD).**

A written explanation of how the design of the building systems and components meets the OPR shall be completed at the design phase of the building project, and updated as necessary during the design and construction phases. For alteration projects, the documentation shall include any changes to the

building's original BOD. The Basis of Design document shall cover the following systems and components:

1. Heating, ventilation, air conditioning (HVAC) systems and controls;
2. Indoor lighting system and controls;
3. Water heating systems and controls;
4. Any other building equipment or system listed in the OPR; and
5. Any building envelope component considered in the OPR.

**(d) Design Phase Design Review.**

1. **Design Reviewer Requirements.** The design reviewer shall be the signer of the Design Review Kickoff Certificate(s) of Compliance and Construction Document Design Review Checklist Certificate(s) of Compliance as specified in Part 1 Section 10-103(a)1.
2. **Design Review Kickoff.** During the schematic design phase of the building project, the owner or owner's representative, design team and design reviewer must meet to discuss the project scope, schedule and how the design reviewer will coordinate with the project team. The building owner or owner's representative shall include the Design Review Kickoff Certificate of Compliance form in the Certificate of Compliance documentation as specified in Part 1 Section 10-103.
3. **Construction Documents Design Review.** The Construction Document Design Review Checklist Certificate of Compliance shall list the items checked by the design reviewer during the construction document review. The completed form shall be returned to the owner and design team for review and sign-off. The building owner or owner's representative shall include this form in the Certificate of Compliance documentation as specified in Part 1 Section 10-103.

**(e) Commissioning measures shown in the construction documents.**

Complete descriptions of all measures or requirements necessary for commissioning shall be included in the construction documents (plans and specifications). Commissioning measures or requirements shall be clear, detailed and complete to clarify the commissioning process.

**(f) Commissioning Plan.**

Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned and shall be started during the design phase of the building project. The Commissioning Plan shall include the following:

1. General project information;
2. Commissioning goals;
3. Systems to be commissioned; and
4. Plans to test systems and components, which shall include:

- A. An explanation of the original design intent;
- B. Equipment and systems to be tested, including the extent of tests;
- C. Functions to be tested;
- D. Conditions under which the test shall be performed;
- E. Measurable criteria for acceptable performance;
- F. Commissioning team information; and
- G. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning requirements listed in Sections 120.8(g) through 120.8(i) shall be included.

**(g) Functional performance testing.**

Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the acceptance test requirements in Sections 120.5, 130.4 and 140.9, 160.3(d) and 160.5(e) Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made.

**EXCEPTION to Section 120.8(g):** Healthcare facilities.

**(h) Documentation and training.**

A Systems Manual and Systems Operations Training shall be completed.

1. **Systems manual.** Documentation of the operational aspects of the building shall be completed within the Systems Manual and delivered to the building owner or representative and facilities operator. The Systems Manual shall include the following:
  - A. Site information, including facility description, history and current requirements;
  - B. Site contact information;
  - C. Instructions for basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, and a site events log;
  - D. Description of major systems;
  - E. Site equipment inventory and maintenance notes; and
  - F. A copy of all special inspection verifications required by the enforcing agency or the Standards.
2. **Systems operations training.** The training of the appropriate maintenance staff for each equipment type or system shall be documented in the commissioning report. Training materials shall include the following:

- A. System and equipment overview (i.e., what the equipment is, what it does and with what other systems or equipment it interfaces);
- B. Review and demonstration of operation, servicing and preventive maintenance procedures;
- C. Review of the information in the Systems Manual; and
- D. Review of the record drawings on the systems and equipment

**(i) Commissioning report.**

A complete report of commissioning process activities undertaken through the design, construction and reporting recommendations for post-construction phases of the building project shall be completed and provided to the owner or owner's representative.

## **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**

**(a) Additions. Additions shall meet either Item 1 or 2 below.**

**1. Prescriptive approach.**

The envelope and lighting of the addition; any newly installed space-conditioning system, electrical power distribution system, or water-heating system; any addition to an outdoor lighting system; and any new sign installed in conjunction with an indoor or outdoor addition shall meet the applicable requirements of Sections 110.0 through ~~120.7, 120.9 through~~ 130.5, and 140.2 through 140.10.

**2. Performance approach.**

A. The envelope and indoor lighting in the conditioned space of the addition, and any newly installed space-conditioning system, electrical power distribution system, or water-heating system, shall meet the applicable requirements of Sections 110.0 through ~~120.7, 120.9 through~~ 130.5 and

(Item B not shown for clarity)

**(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.

(Items A through D not shown for clarity)

E. **Commissioning.** For nonresidential building alterations other than healthcare facilities, with conditioned space of 10,000 square feet or more, the altered components of the envelope, or space conditioning, lighting, electrical power distribution and water heating systems, and any newly installed equipment serving the alteration, shall meet the applicable requirements of Section 120.8.

**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

## **Standards**

TBD

## **Reference Appendices**

TBD