



TITLE 24, PART 6

2025 CODE CYCLE

Existing Buildings Commissioning

Codes and Standards Enhancement (CASE) Proposal
Nonresidential Existing Buildings



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May 22, 2023

Utility Sponsored Stakeholder Meeting – Round 2



A STATEWIDE UTILITY PROGRAM

Agenda

Overview of Code Change Proposal

Summary of Stakeholder Feedback

Cost-effectiveness, Energy Savings and Statewide Impacts

Data Gaps and Additional Feedback Requested

Next Steps





Code Change Proposal

- Code Change Proposal
- Code Change Language

Proposal Summary – Mandatory Commissioning

This measure would consider removing or revising the exceptions for additions and alterations.

Building Type	Construction Type	Type of Change	Section(s) of Code Updated
Nonresidential	Additions and Alterations	Mandatory	<ul style="list-style-type: none"> Section 141.0(a)1 & 2: Revise the reference section numbers to include 120.8. Section 141.0(b)E New Section: Add a mandatory commissioning requirement for building alterations with conditioned space of 10,000 square feet or more. Section 120.8 Modify new provisions to address existing building commissioning requirements for additions and alterations projects.

Note Enclosed parking garages, grocery, horticulture facilities, healthcare facilities, manufacturing facilities, parking garages, refrigerated warehouses, and vehicle service facilities **are not** included in the existing building CASE report

Poll Request – ROUND 2 SLIDE

- **Measure Name:** Commissioning
- **Type of Poll:** Free Response
- **Question:** In general, what are your thoughts on mandatory commissioning for additions and alteration work?
- **Answers: Placement:** After “Proposal Summary”
- **Broadcast results to attendees as they respond:** (Y)
- **Make poll public during presentation:** (Y)

Draft Code Change Language – Additions

Section 141.0(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)

Draft Code Change Language - Alterations

Section 141.0(b) Alterations. Alterations to components of existing nonresidential buildings, including alterations made in conjunction with a change in building 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

Draft Code Language – Section 120.8

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. ... 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. (no change)

(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.

Draft Code Language – Section 120.8 continued

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: **(No further changes)**

Poll Request – ROUND 2 SLIDE

- **Measure Name:** Commissioning
- **Type of Poll:** yes/no/maybe
- **Question:** Do you think that commissioning requirements for additions and alterations should be in a separate section from 120.8?
- **Answers:**
- **Placement:** After “Draft Code Change Language – Section 120.8 continued”
- **Broadcast results to attendees as they respond:** (Y)
- **Make poll public during presentation:** (Y)



Summary of Stakeholder Feedback

- Measure Evolution
- Summary of Feedback Received
- Potential Barriers and Solutions

Evolution of the Measure

Proposal Summary – Mass Wall Exception

- This measure would consider removing the exceptions for additions and alterations.

Building Type	Construction Type	Section(s) of Code	Software Updates Required
Nonresidential	Alterations	1.B - Wall Insulation Light and heavy mass	Minimum

Note Enclosed parking garages, grocery, horticulture facilities, manufacturing facilities, garages, refrigerated warehouses, and vehicle service facilities **are not** included in building CAS.

Presented at Utility Sponsored Stakeholder Meeting on Nonresidential Existing Buildings

Summary of Feedback Received

- **The benefits of commissioning include:**
 - Fewer callbacks during the warranty period
 - Equipment and resource longevity
 - Better indoor environmental quality and occupant comfort
 - Improved operational performance

- **The commissioning section of the standard could increase energy savings if:**
 - The commissioning agent (CxA) identifies which tests must be done;
 - The CxA agent witnesses some of the acceptance test to make sure they're done correctly;
 - The CxA reviews all the acceptance test documentation to make sure the docs were filled out accurately and that all tests were passed

Poll Request – ROUND 2 SLIDE

- **Measure Name:** Commissioning
- **Type of Poll:** multiple choice
- **Question:** The CxA should review, record, and flag the Certificate of Acceptance forms completed by ATTs. Do you agree?
- **Answers:** Yes, no, Add to the issue log to be addressed
- **Placement:** After “Summary of Feedback Received”
- **Broadcast results to attendees as they respond:** (Y)
- **Make poll public during presentation:** (Y)

Barriers and Solutions

Currently, there are very few requests for commissioning of additions and alterations.

Poll Request – ROUND 2 SLIDE

- **Measure Name: Commissioning**
- **Type of Poll:** free response
- **Question: What recommendations can you make to improve commissioning demand and enforcement?**
- **Answers: Placement:** After “Barriers and Solutions”
- **Broadcast results to attendees as they respond:** (Y)
- **Make poll public during presentation:** (Y)

Barriers and Solutions

Lack of training and certification requirements for commissioning agents reduces the perceived value of commissioning.

Poll Request – ROUND 2 SLIDE

- **Measure Name: Commissioning**
- **Type of Poll:** Yes, No, Don't Know, Need More Information
- **Question: Should California adopt training and certification requirements for commissioning providers?**
- **Answers: Placement:** After “Barriers and Solutions”
- **Broadcast results to attendees as they respond:** (Y)
- **Make poll public during presentation:** (Y)

Cost Effectiveness and Energy Savings

Methodology and Assumptions

- Energy Savings Methodology and Results
- Cost Impacts Methodology and Results
 - Incremental costs
 - Energy cost savings



Preliminary Energy Savings Estimates Per Sq Ft – Chillers, Office Large Prototype

Annual Electricity Savings (kWh/yr)	-0.003 - 0.016
Annual Natural Gas Savings (kBtu/yr)	-0.021 - 0.023
Peak Demand Reduction (kW)	-0.003 - 0.001
Annual Life Cycle Energy Cost Savings (\$2026 PV)	-0.014 - 0.047
Annual Source Energy Savings (kBTU/yr)	-0.019 - 0.021

Key Assumptions:

- Ranges are across all climate zones
- Analysis based on:
 - Right-sized code compliant design
 - VS
 - Non-compliant at 125% of required design

Preliminary Energy Savings Estimates Per Sq Ft – Windows, Office Large Prototype

Annual Electricity Savings (kWh/yr)	0.031 - 0.106
Annual Natural Gas Savings (kBtu/yr)	0.147 - 0.565
Peak Demand Reduction (kW)	0.001 - 0.007
Annual Life Cycle Energy Cost Savings (\$2026 PV)	0.421 - 0.642
Annual Source Energy Savings (kBTU/yr)	0.132 - 0.509

Key Assumptions:

- Ranges are across all climate zones
- Analysis based on:
 - Code-compliant design
VS
 - Non-compliant design

Incremental Per Square Foot Cost

Over 30 Year Period of Analysis

Incremental First Cost	
Equipment	\$0.00
Installation	\$0.00
Commissioning	\$0.10
Other	\$0.00
Total	\$0.10

\$0.10/square foot for a single system being commissioned

Key Assumptions:

- Whole building retro-Cx is approx. \$0.25 - \$1.50/sf
- Pre-design data collection by Owner
- Cost assumed to be the same for all CZs

Poll Request – ROUND 2 SLIDE

- **Measure Name:** Commissioning
- **Type of Poll:** multiple choice
- **Question:** What is the approximate cost/square foot for commissioning a single system in an addition or alteration?
- **Answers:** \$0.05 - \$0.10/sf; \$0.11-\$0.25/sf; \$0.26-\$0.50/sf; \$0.51-\$1.00/sf; More
- **Placement:** After “Incremental Cost”
- **Broadcast results to attendees as they respond:** (Y)
- **Make poll public during presentation:** (Y)

Cost Effectiveness

Commissioning – Chillers, Alterations

Climate Zone	Benefits <i>Life Cycle Energy Cost Savings + Other PV Savings (2026 PV\$)</i>	Costs <i>Total Incremental PV Costs (2026 PV\$)</i>	Benefit-to-Cost Ratio
1	0.00	0.05	-0.05
2	0.00	0.05	0.05
3	0.00	0.05	-0.01
4	0.00	0.05	0.09
5	-0.01	0.05	-0.15
6	-0.01	0.05	-0.28
7	0.02	0.05	0.34
8	0.01	0.05	0.15
9	0.02	0.05	0.38
10	-0.01	0.05	-0.16
11	0.03	0.05	0.59
12	0.01	0.05	0.26
13	0.05	0.05	0.93
14	0.00	0.05	0.07
15	0.10	0.05	2.04
16	-0.01	0.05	-0.24
Total	0.01	0.05	0.17

Cost Effectiveness

Commissioning – Windows, Alterations

Climate Zone	Benefits <i>Life Cycle Energy Cost Savings + Other PV Savings (2026 PV\$)</i>	Costs <i>Total Incremental PV Costs (2026 PV\$)</i>	Benefit-to-Cost Ratio
1	0.42	0.10	4.33
2	0.51	0.10	5.23
3	0.59	0.10	6.05
4	0.54	0.10	5.52
5	0.64	0.10	6.61
6	0.53	0.10	5.49
7	0.50	0.10	5.16
8	0.43	0.10	4.38
9	0.49	0.10	5.05
10	0.53	0.10	5.42
11	0.62	0.10	6.42
12	0.58	0.10	5.97
13	0.54	0.10	5.58
14	0.59	0.10	6.05
15	0.62	0.10	6.40
16	0.57	0.10	5.88
Total	0.51	0.10	5.30

Statewide Impacts

Methodology and Assumptions

- Statewide Energy Impacts
Methodology and Results



Statewide Energy Impacts – Existing Building Cx

Category	Metric	Windows	Chillers
Statewide Impacts During First Year	Electricity Savings (GWh)	1.74	0.10
	Peak Electrical Demand Reduction (MW)	0.05	-0.01
	Natural Gas Savings (Million Therms)	0.06	0.00
	Source Energy Savings (Million kBtu)	5.53	-0.15
	Life Cycle Electricity Savings (Million kBtu)	8.42	0.35
	Life Cycle Gas Savings (Million kBtu)	3.53	-0.10
	Total Life Cycle Energy Savings (Million kBtu)	11.96	0.26
	Avoided GHG Emissions (Metric Tons CO ₂ e)	420.84	-12.04
	Monetary Value of Avoided GHG Emissions (\$2026)	51,825	-1,482

2026 Construction Forecast

Construction Forecast Building Type		Windows – Existing Floorspace Impacted (%)	Chillers - Existing Floorspace Impacted (%)
Nonresidential	Large Office	2%	3%
	Medium Office	2%*	3%*
	Small Office	2%*	3%*
	Large Retail	2%*	3%*
	Medium Retail	2%*	3%*
	Strip Mall	2%*	3%*
	Mixed-use Retail	2%*	3%*
	Large School	2%*	3%*
	Small School	2%*	3%*
	Non-refrigerated Warehouse	2%*	3%*
	Hotel	2%*	3%*
	Assembly	2%*	3%*
	Hospital	0%	0%
	Laboratory	2%*	3%*
	Restaurant	2%*	3%*

Do these estimates look reasonable?

*Energy modeling will be conducted for the Final CASE Report. Impacted floorspace would remain the same for all building types.

Poll Request – ROUND 2 SLIDE

- **Measure Name: Commissioning**
- **Type of Poll: Yes, No, Partly, Don't Know**
- **Question: Do the estimated percentages of impacted floor area look reasonable?**
- **Answers: Placement: After “2026 Construction Forecast”**
- **Broadcast results to attendees as they respond: (Y)**
- **Make poll public during presentation: (Y)**



Data Gaps and Additional Feedback Requested

- Additional Data Needs
- Feedback Requested

Poll Request – ROUND 2 SLIDE

- **Measure Name: Commissioning**
- **Type of Poll: Free Response**
- **Question: What are the most top 5 areas of noncompliance identified on commissioning issue logs?**
- **Answers: Placement: After “Data Gaps”**
- **Broadcast results to attendees as they respond: (Y)**
- **Make poll public during presentation: (Y)**



Discussion and Next Steps

We want to hear from you!

- Provide **any last comments or feedback** on this presentation now verbally or over the GoTo Webinar Questions Pane
- More information on pre-rulemaking for the 2025 Energy Code at <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

Comments on this measure are due by **June 5, 2023.**

Please send comments to info@title24stakeholders.com and copy CASE Authors (see contact info on following slide).

Thank You

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