



State of the Energy Code

2025 and Beyond

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November 21, 2024



Overview of Presentation

2025 Energy Code

- Important Upcoming Dates
- 2025 Code Benefits
- Metrics and Highlights
- 2025 Compliance Software
- Links to Resources

Contact Information

- Seniors & Standards Development
- Standards Tools & Support



2025 Energy Code



Important Upcoming Dates



2025 Energy Code

- **Sept. 11, 2024** – CEC adoption
- **Nov. 2024*** – ACM & Comp. Manual Workshop
- **Dec. 2024** – CBSC approval
- **June 2025** – Comp. Manuals/Docs, ACM & Software appvd.
- **Jan. 1, 2026** – Effective Date



2025 Energy Code Benefits

Energy cost savings: \$4.8B

Avoided GHG Emissions: 4.1M MT CO₂e

Benefit to Cost Ratio: 7

Electricity Savings: 392 GWh/yr

Natural Gas Savings: 23 MM Therms/yr

Water Savings: 68+ MM gallons/yr

Heat pumps:

Leads to installation of over 500k heat pumps over 3 years

PV/Battery:

Saves on average 300 GWh/year; reduces power demand on average 0.88MW/year. Minimizes grid exports.

Electric-ready:

Sets up owners of newly constructed commercial kitchens to use cleaner electric equipment when they are ready



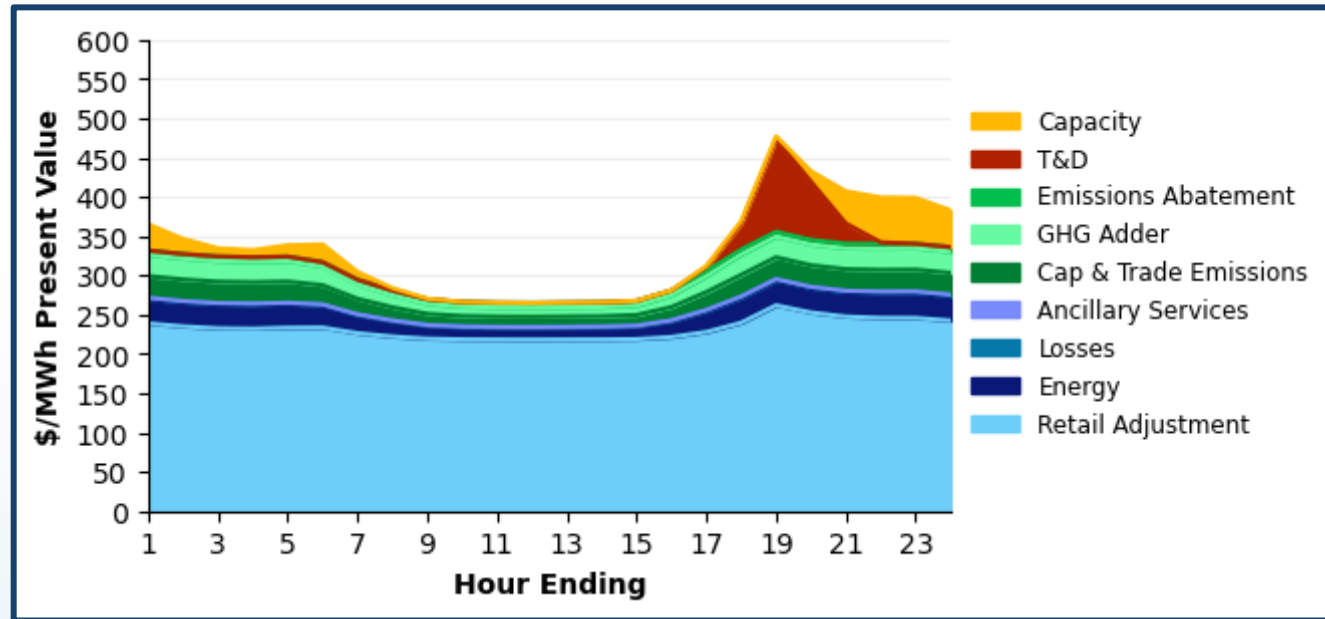
2025 Energy Code Metrics



Long-Term System Cost

Long-term System Cost (LSC) Hourly factors are used to convert predicted site energy use to long-term dollar costs to CA's energy system.

Since the *time* that energy is used is as important as the *amount* of energy used, these factors are generated on an hourly basis for a representative year and created for each of CA's diverse climate zones.



Sample LSC shape by component, average day, levelized 30-year residential, for Climate Zone 12.

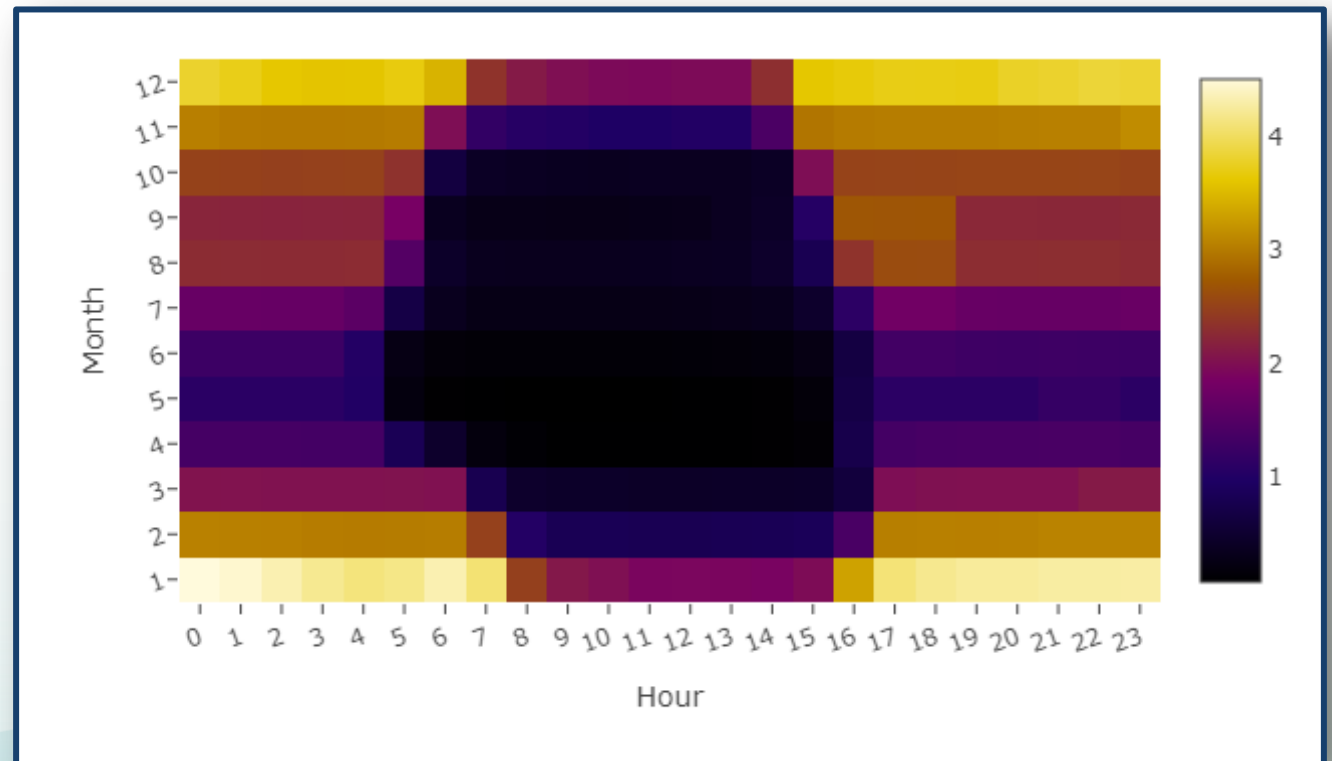


Source Energy Metric

Long run marginal source energy is defined as the source energy of fossil fuels following the long-term effects of any associated changes in resource procurement.

Source Energy focuses specifically on the amount of fossil fuels that are combusted in association with demand-side energy consumption and assists in aligning our standards with the CA's environmental goals.

5-Month Average of electricity long run marginal source energy for 2025 Energy Code





Peak Cooling

- What is peak cooling?
 - Mechanical cooling load between 4pm-9pm
- What purpose does it serve?
 - New 2025 LSC producing a winter peak
 - Done to preserve the envelope - tradeoffs could lead to 4x increase in mechanical cooling site energy use.
- Where did we land for 2025?
 - CZs 4 & 8-15 – **120% or less** of the peak cooling of Standard Design

2025 Peak Cooling Energy Calculation Update



2025 Energy Code Highlights





2025 Energy Code Highlights - Heat Pumps (HPs)

Standard design:

- Single-family: HPs for water, space heating
- Low-rise multifamily: HP Water Heater for individual dwelling units

Existing commercial buildings:

- New or replacement rooftop packaged units < 65,000 Btu/hr

HP control requirements (ASHRAE Guideline 36)

Prescriptive multi-zone space-conditioning system type requirements for medium-sized offices and schools



Source: CEC



2025 Energy Code Highlights - Electric-Ready Requirements



Source: CEC

- Commercial kitchens
- Central water heating systems (multifamily)
- Updated requirements for heat pump water heaters serving individual dwellings



2025 Energy Code Highlights - Solar Energy & Battery Storage

Updated requirements for multifamily, nonresidential, while minimizing grid exports

Added requirements for:

- Event and exhibit buildings
- Religious worship buildings
- Sports and recreation buildings



Source: Joseph Schell



2025 Energy Code Highlights - Field Verification & Diagnostic Testing



Source: Lawrence Andersen

- Moves Home Energy Ratings System (HERS) program to Title 24
- Establishes “Energy Code Compliance” (ECC the new term over HERS) program
- Reestablishes focus on consumer protection
- Advances conflict of interest protections
- Clarifies Field Verification and Diagnostic Testing community responsibilities



Other 2025 Energy Code Measures

- Requirements for more efficient pool and spa heating systems
- Streamlined lighting requirements
- Improved multifamily indoor air quality



Source: Natalia Knezevic



2025 Energy Code Information



Where to find 2025 information?

- **Link to 2025 Energy Code webpage:**
<https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>
 - Proposed Regulatory Language
- **Link to 2025 Energy Code docket (24-BSTD-01):**
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=24-BSTD-01>
 - Complete rulemaking record – including public comments and technical reports
- **Link to 2025 compliance software:**
<https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-energy-code-compliance-software>
 - Research versions



How to Participate in 2028

- CEC encourages public participation in its proceedings
- Public workshops & comment periods – stay tuned!
- Propose measure(s) – 2025 Measure Proposal Template
- Public Advisor's Office assists the public with participating in CEC proceedings – assistance, interpreting services, reasonable modifications and accommodations

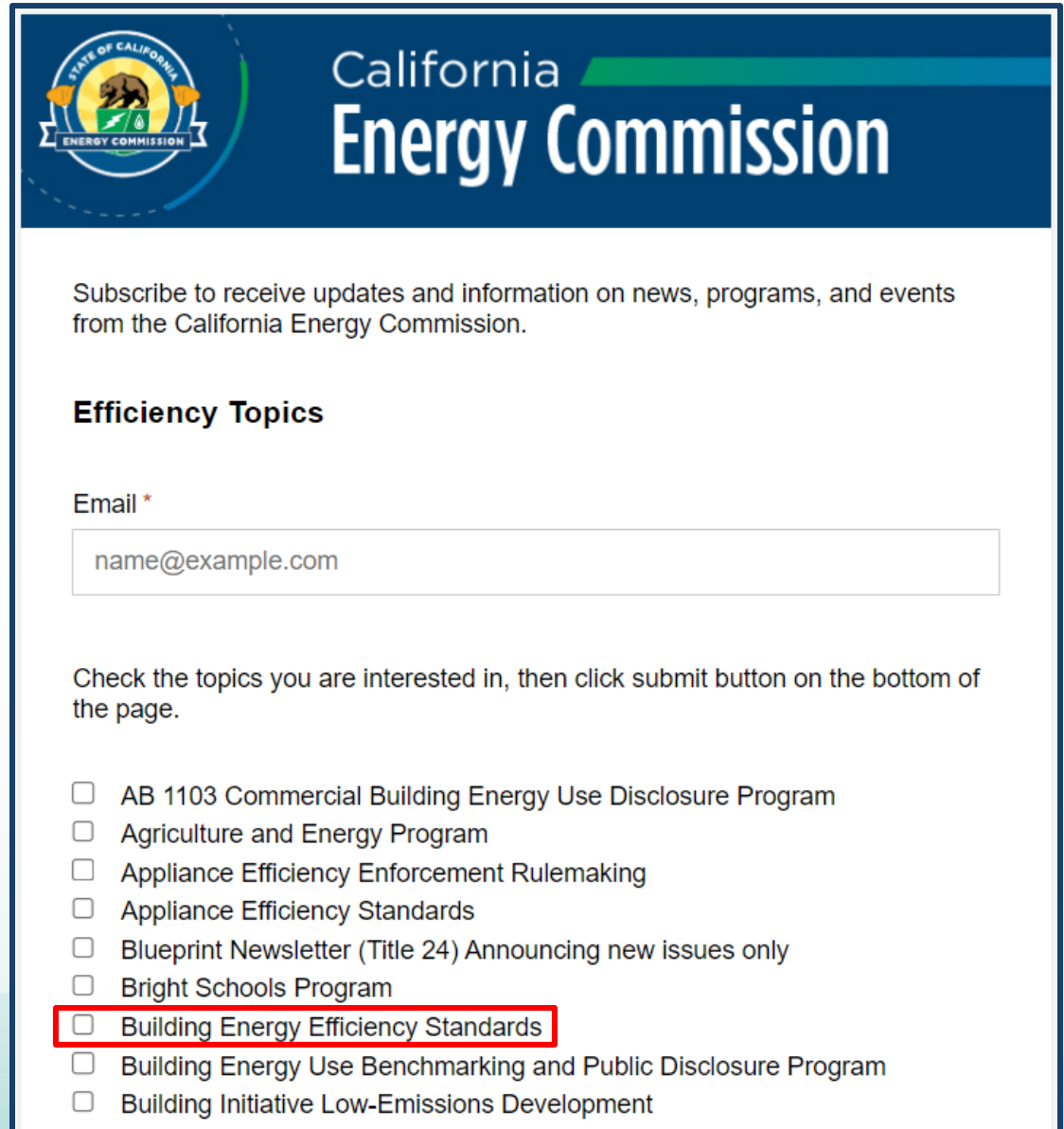


How to Stay Informed

Please subscribe to the
“Building Energy Efficiency
Standards” listserv:

[https://public.govdelivery.com/
accounts/CNRA/signup/31895](https://public.govdelivery.com/accounts/CNRA/signup/31895)

- Notices
- Proposed Language
- Rulemaking Documents
- Workshops

A screenshot of the California Energy Commission's subscription form. The header features the California Energy Commission logo and the text "California Energy Commission". Below the header, there is a text box with the instruction: "Subscribe to receive updates and information on news, programs, and events from the California Energy Commission." Underneath is a section titled "Efficiency Topics" with a list of checkboxes. The checkbox for "Building Energy Efficiency Standards" is highlighted with a red box. Below the list is an "Email *" field with a text input box containing "name@example.com". At the bottom, there is a note: "Check the topics you are interested in, then click submit button on the bottom of the page." The list of topics includes: AB 1103 Commercial Building Energy Use Disclosure Program, Agriculture and Energy Program, Appliance Efficiency Enforcement Rulemaking, Appliance Efficiency Standards, Blueprint Newsletter (Title 24) Announcing new issues only, Bright Schools Program, Building Energy Efficiency Standards (highlighted), Building Energy Use Benchmarking and Public Disclosure Program, and Building Initiative Low-Emissions Development.

California
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Introducing the Part 6 Restructured Standards

Payam Bozorgchami, CEC
Sally Blair, NORESCO

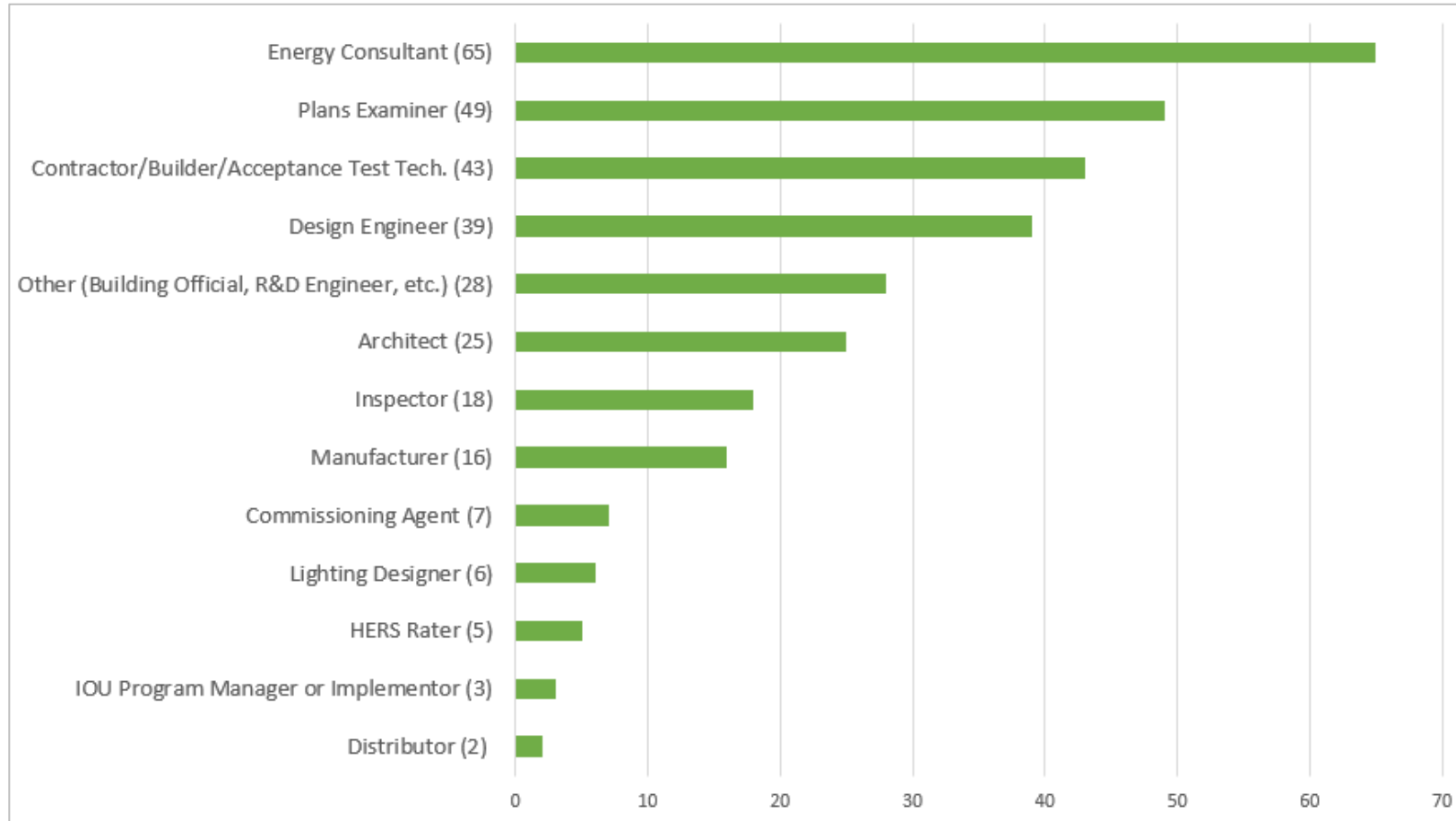
November 21, 2024
CalBEM Symposium

AGENDA

- Background- Why & How?
- Restructured Standard Intro- When & Where?
- Features included in Restructured Standard
 - ✓ Reorganize by building system
 - ✓ Renumber sections
 - ✓ Hyperlinks
 - ✓ Index
 - ✓ Italicize defined terms
- Questions and comments

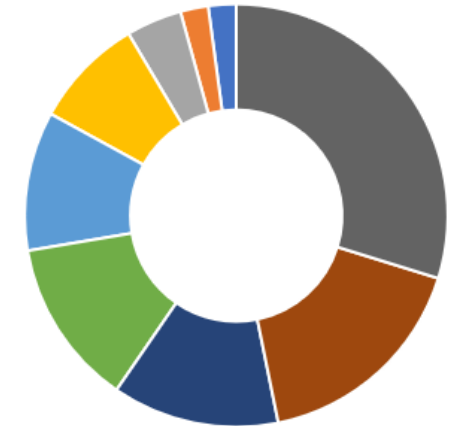


Roles That Participated in Public Input Last Fall



MS Excel generated based on CEC Survey Fall 2023

SURVEY
(306 total)



Energy Consultant (14)
Designer (8)
Contractor/ ATT (6)
Plans Examiner (6)
Other (BO, R&D Eng., etc.) (5)
Manufacturer (4)
Commissioning Agent (2)
HERS Rater (1)
Inspector (1)

FOCUS GROUPS & INTERVIEWS
(47 total)

Survey Says...

Chapters, sections, and sub-sections are consistently identified and have the full address. (i.e., Chapter 10 sections start with 10 and the identifier for sub-section 1025.2.4.2 tells you that it is in Chapter 10, Section 25, Sub-Section 2, etc.).

Building code sections are organized logically consistent with the order you design the buildings.

CBC includes a reference standards chapter rather than RS included in the definitions chapter.

They are all about the same in terms of ease of use.

Indexes are provided in the CBC and other Parts of Title 24.

Common practice is appendices in the code are optional requirements that can be adopted by an AHJ. Part 6 uses an appendix for its reference standards. I recommend making this a regular chapter.

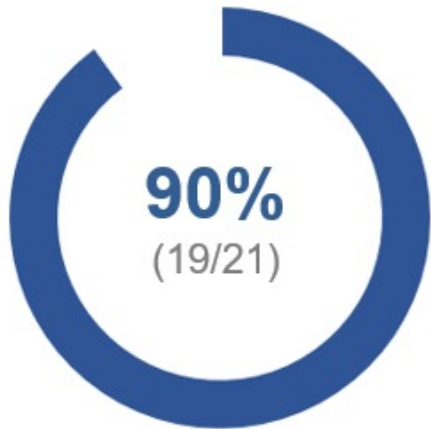
My familiarity with the Energy Code over the years has made referencing the code quick and easy.

ASHRAE 90-1 has separate sections for envelope, lighting, HVAC, etc. where all the relevant requirements are included.

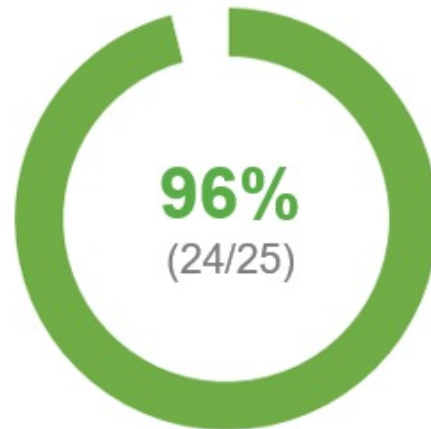


Focus Group Poll Results

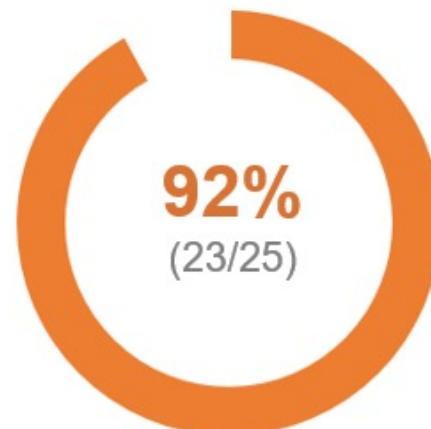
90% support renumbering to follow CBC/CRC



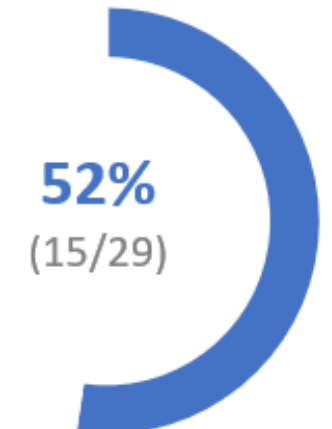
96% support tables after relevant code language



92% want hyperlinks within Standards & Ref. Appendices



52% want requirements to be repeated if they are the same



MS Excel generated based on Fall 2023 focus groups

Rank the options for Standards organization in order of preference (1) being your first choice and (3) being your last choice:

Points Based on Borda Count Ranking

By System Type	63	< 1 st Place overall
By Building Type	50	< 2 nd Place overall
Current Organization	34	< 3 rd Place overall

Ranking is calculated with a points system, also called "Borda Count", where the item ranked first will get 3 points, the item ranked second will get 2 points and the item ranked third gets 1 point.



Restructured Standards developed based on adopted 2025 Standards





Implement Over 2025 & 2028 Code Cycles

SUBCHAPTER 3 – ENVELOPE

SECTION 300— MANDATORY REQUIREMENTS FOR ALL OCCUPANCIES

300.1 [§110.6] Mandatory requirements for fenestration products and exterior doors.

300.1.1 [§110.6(a)] Certification of fenestration products and exterior doors other than field-fabricated. Any fenestration product and exterior door, other than field-fabricated fenestration products and field-fabricated exterior doors, may be installed only if the manufacturer has certified to the Commission, or if an independent certifying organization approved by the Commission has certified, that the product complies with all of the applicable requirements of this subsection.

300.1.1.1 [§110.6(a)1] Air leakage. Manufactured fenestration products and exterior doors shall have air infiltration rates not exceeding 0.3 cfm/ft² of window area, 0.3 cfm/ft² of door area for residential doors, 0.3 cfm/ft² of door area for nonresidential single doors (swinging and sliding), and 1.0 cfm/ft² for nonresidential double doors (swinging), when tested according to NFRC-400 or ASTM E283 at a pressure differential of 75 pascals (or 1.57 pounds/ft²), incorporated herein by reference.

Notes to Section 300.1.1.1 [§110.6(a)1]: Pet doors must meet 0.3 cfm/ft² when tested according to ASTM E283 at 75 pascals (or 1.57 pounds per square foot). AAMA/WDMA/CSA 101/I.S.2/A440-2011 specification is equivalent to ASTM E283 at a pressure differential of 75 pascals (or 1.57 pounds per square foot) and satisfies the air leakage certification requirements of this section.

Exception to Section 300.1.1.1 [§110.6(a)1]: Field-fabricated fenestration and field-fabricated exterior doors.

300.1.1.2 [§110.6(a)2] U-factor. The fenestration product and exterior door's U-factor shall be rated in accordance with NFRC 100, or use the applicable default U-factor set forth in Table 300.1.1-A [Table 110.6-A].

Language adapted from Title 24, Part 6 Standards

EXAMPLE RESTRUCTURED STANDARD FOR 2025 STANDARDS

AGENDA

- Background- Why & How?
- Restructured Standard Intro- When & Where?
- Features included in Restructured Standard
 - ✓ Reorganize by building system
 - ✓ Renumber sections
 - ✓ Hyperlinks
 - ✓ Index
 - ✓ Italicize defined terms
- Questions and comments



Current vs. Reorganized Standards

Chapter	Section	Subject.	Title
1	100.0-100.2	(a)(b)(c) 1.2.3. A.B.C. i.ii.iii a.b.c.	General Provisions All building types
2	110.0-110.12		Mandatory All building types
3	120.0-120.10		Mandatory Nonresidential, Covered Process
4	130.0-130.5		Mandatory Lighting & Electrical Nonresidential, Covered Process
5	140.0-140.10		Prescriptive and Performance Nonresidential, Covered Process
6	141.0-141.1		Additions, Alterations and Repairs Nonresidential, Covered Process
7	150.0		Mandatory Single-family
8	150.1		Prescriptive and Performance Single-family
9	150.2		Additions, Alterations and Repairs Single-family
10	160.0-160.9		Mandatory Multifamily
11	170.0-170.2		Prescriptive and Performance Multifamily
12	180.0-180.4		Additions, Alterations and Repairs Multifamily

CURRENT

Chapter	Section	Subject.	Title
1	100-102	1.2.3... 1.2.3... 1.2.3... 1.2.3... 1.2.3...	General Provisions All building types
2	200		Definitions All building types
3	300-303		Envelope All building types, Nonresidential, Single-family, Multifamily
4	400-403		HVAC and Ventilation All building types, Nonresidential, Single-family, Multifamily
5	500-503		Plumbing All building types, Nonresidential, Single-family, Multifamily
6	600-603		Electrical and Lighting All building types, Nonresidential, Single-family, Multifamily
7	700-703		Renewables and Storage All building types, Nonresidential, Single-family, Multifamily
8	800-803		Pool and Spa All building types, Nonresidential, Single-family, Multifamily
9	900-911		Process Systems and Equipment Covered Process
10	1000-10001		Design Review and Commissioning Nonresidential

REORGANIZED



Building System Chapter Structure

Existing 2022 §

Chapter 3 - ENVELOPE

Section 300 – MANDATORY REQUIREMENTS FOR ALL OCCUPANCIES (NEW CONSTRUCTION, ADDITIONS AND ALTERATIONS)

- 110.60 300.1 - Mandatory Requirements for Fenestration Products and Exterior Doors
- 110.70 300.2 - Mandatory Requirements to Limit Air Leakage
- 110.80 300.3 - Mandatory Requirements for Insulation, Roofing Products and Radiant Barriers

Section 301 - NONRESIDENTIAL AND HOTEL/MOTEL OCCUPANCIES

- 120.00 301.1 - General
- 120.70 301.2 - Mandatory (New Construction, Additions, and Alterations)
- 140.30 301.3 - Prescriptive (New Construction)
- 301.4 - Performance (New Construction)
- 141.0(a) & (b) 301.5 - Additions, Alterations, and Repairs to Existing Buildings

Section 302 - SINGLE-FAMILY OCCUPANCIES

- 150.0 302.1 - General
- 150.0 302.2 - Mandatory (New Construction, Additions and Alterations)
- 150.1(c) 302.3 - Prescriptive (New Construction)
- 302.4 - Performance (New Construction)
- 150.2(a) & (b) 302.5 - Additions, Alterations, and Repairs to Existing Buildings

Section 303 - MULTIFAMILY OCCUPANCIES

- 160.0 & 170.0 303.1 -General
- 303.2 - Mandatory (New Construction, Additions and Alterations)
- 160.1 *Reference applicable sections in NR and SF that are duplicative*
- 303.3 - Prescriptive (New Construction)
- 170.2(a) & (b) *Reference applicable sections in NR and SF that are duplicative*
- 303.4 - Performance (New Construction)
- 303.5 - Additions, Alterations, and Repairs to Existing Buildings
- 180.1(a) & (b) & 180.2(a) & (b) *Reference applicable sections in NR and SF that are duplicative*



Include Adopted 2025 Code Section Numbers

SUBCHAPTER 3 – ENVELOPE

SECTION 300— MANDATORY REQUIREMENTS FOR ALL OCCUPANCIES

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Hyperlinks to Help with Quick Navigation

SUBCHAPTER 3 – ENVELOPE

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.....

300.1.1.5 [§110.6(a)5] Labeling. Fenestration products and exterior doors shall:

- Have a temporary label for manufactured fenestration products and exterior doors or a label certificate when the Component Modeling Approach (CMA) is used and for site-built fenestration meeting the requirements of [Section 10-111\(a\)1](#). The temporary label shall not be removed before inspection by the enforcement agency; and
- Have a permanent label or label certificate when the Component Modeling Approach (CMA) is used and for site-built fenestration meeting the requirements of [Section 10-111\(a\)2](#) if the product is rated using NFRC procedures.

300.1.1.6 [§110.6(a)6] Fenestration acceptance requirements. Before an occupancy permit is granted site-built fenestration products in other than single-family buildings shall be certified as meeting the Acceptance Requirements for Code Compliance, as specified in the [Reference Nonresidential Appendix NA7](#) to ensure that site-built fenestration meets Standards requirements, including a matching label certificate for product(s) installed and be readily accessible at the project location. A certificate of acceptance certifying that the fenestration product meets the acceptance requirements shall be completed, signed and submitted to the enforcement agency.



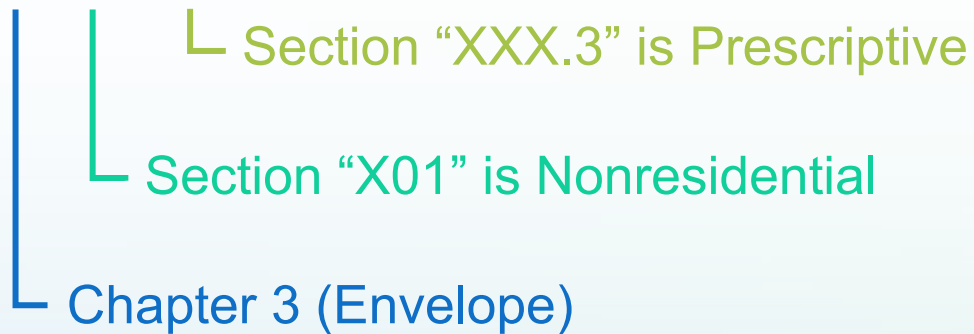
Including the Index

A

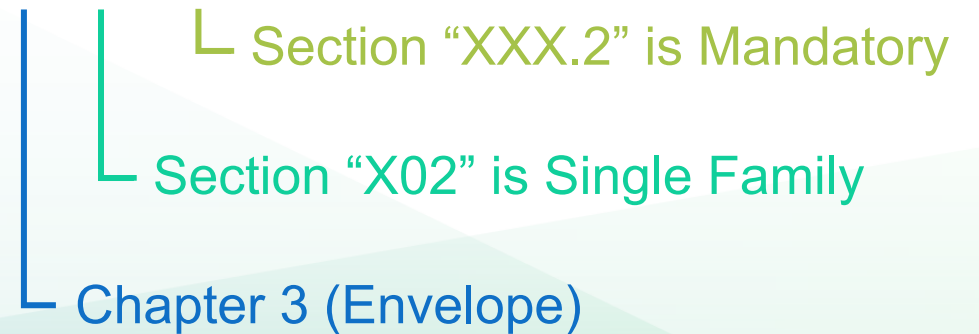
- ABOVE GRADE WALL**301.3.1.9 **[\$140.3(a)9]**, 302.2.3 **[\$150.0(c)]**, 303.2.2 **[\$160.1(b)]**
- ACCENT LUMINAIRE** 200.1 **[\$100.1]**, 601.3.1.3 **[\$140.6(c)2G]**, 603.3.2 **[\$170.2(e)4]**
- ACCENT, DISPLAY AND FEATURE** ...601.3.1.2 **[\$140.6(b)4]**

Language adapted from Title 24, Part 6 Standards Index

3 01 .3.1.9



3 02 .2.3





Italicize Defined Terms

SUBCHAPTER 3 – ENVELOPE

SECTION 300— MANDATORY REQUIREMENTS FOR ALL OCCUPANCIES

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QUESTIONS OR COMMENTS

Payam Bozorgchami, CEC
Sally Blair, NORESCO

TABLE 100-A [TABLE 100.0-A] APPLICATION OF STANDARDS NONRESIDENTIAL AND HOTEL/MOTEL¹

Application	Mandatory	Prescriptive	Performance	Additions/ Alterations
General	100 (Scope) 101 (Systems & Equipment) 102 (Compliance Approaches)	100 (Scope) 101 (Systems & Equipment) 102 (Compliance Approaches)	100 (Scope) 101 (Systems & Equipment) 102 (Compliance Approaches)	100 (Scope) 101 (Systems & Equipment) 102 (Compliance Approaches)
Definitions	200 (Definitions)	200 (Definitions)	200 (Definitions)	200 (Definitions)
Envelope (conditioned)	300 (Mandatory for all) 301.1 (General) 301.2 (Mandatory)	301.3 (Prescriptive Newly Constructed)	301.4 (Performance)	300 (Mandatory for all) 301.1 (General) 301.5 (Additions/Alterations)
Envelope (unconditioned, including process spaces)	N.A.	301.3.2 (Daylighting for Large Enclosed Spaces)	N.A.	301.5 (Additions/Alterations)
HVAC (conditioned)	400 (Mandatory for all) 401.1 (General) 401.2 (Mandatory)	401.3 (Prescriptive Newly Constructed)	401.4 (Performance)	400 (Mandatory for all) 401.1 (General) 401.5 (Additions/Alterations)

Scan QR Code to see Table 100-A [Table 100.0-A]

