



2013 Energy Standards Overview for Envelope

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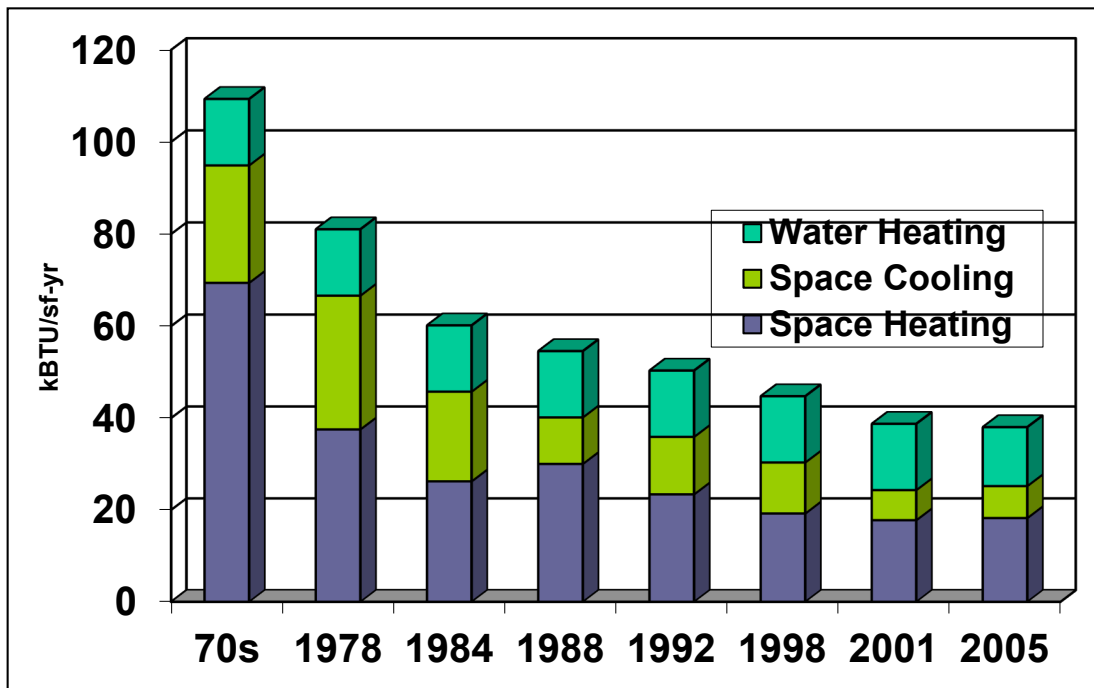


A Little CEC History

- Section 25402 of the Public Resources Code (known as the **Warren Alquist Act**)
- The act created the Energy Commission in 1974 and gave it authority to develop and maintain Building Energy Efficiency Standards
- Requires the Standards and new requirements to be cost effective over the economic life of the structure
- Requires the Energy Commission to update the Standards periodically (about every 3 years)



Historical Impact of Energy Standards



- Achieved over \$65 billion in savings to ratepayers since mid-70s
- Californians pay 20% less on residential electricity bills than the average U.S. household
- Energy savings avoided the need to build nearly 30 large (500 MW) power plants since the mid-70s



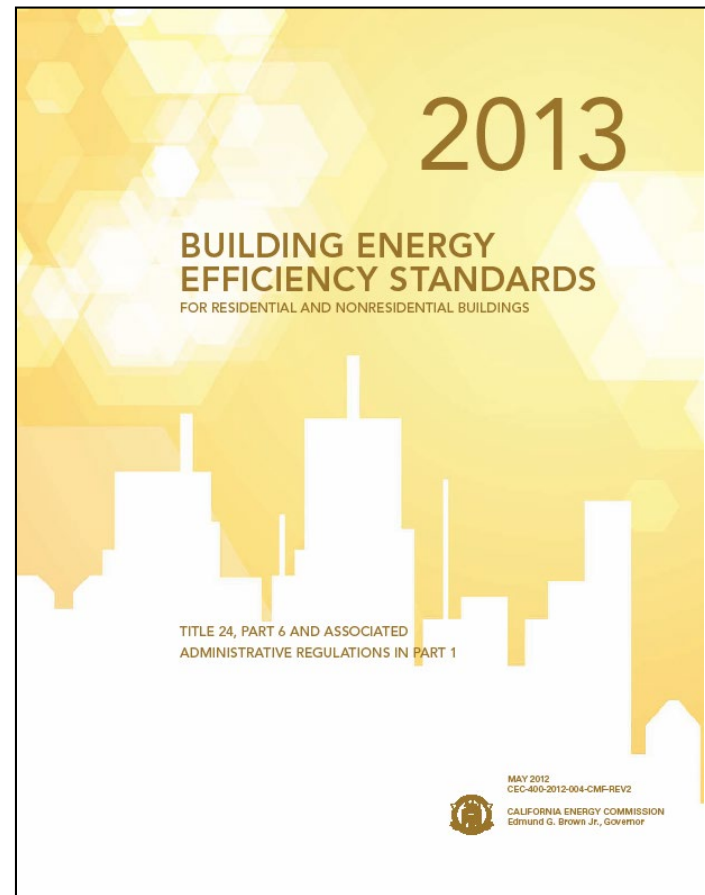
What the future holds

- AB 32 – Reduce carbon footprint
- CPUC/CEC Strategic Plan:
 - Net-zero energy use for residential buildings by 2020
 - Net-zero energy use for nonresidential buildings by 2030
- Energy Standards will “evolve/expand” and become more stringent to reach these goals



2013 Building Energy Efficiency Standards

- **Effective on July 1, 2014**
 - Building permit applications submitted on or after this date
- **Larger projects in plan review may be affected:**
 - Need to resubmit if permits pulled on/after effective date





Residential Envelope Energy Standards Mandatory Measures



Solar Ready

- New Mandatory measures in §110.10
- Applicable to subdivisions ≥ 10 homes and all low-rise multi-family buildings
- Requirements for:
 - Solar zone (location and area)
 - Orientation and Shading
 - Interconnection pathways
 - Structural Design Loads
 - Main electrical service panel



Insulation

2008 – §150(a), (c), (d)

- Ceiling insulation
 - Minimum R-19 required
- Wall Insulation
 - Minimum R-13 required
- Raised floor insulation
 - Minimum R-13 Required
- Weighted avg. permitted to meet equivalent U-factor

2013 – §150.0(a), (c), (d)

- Ceiling insulation
 - Minimum R-30 required
- Wall insulation
 - Minimum R-13 req. in 2 X 4
 - Minimum R-19 req. in 2 X 6
- Raised floor insulation
 - Minimum R-19 required



Fenestration

- New mandatory measure in §150.0(q)
- Windows and skylights must have a U-factor of 0.58 or less
 - Can calculate weighted average U-factor to meet requirement
- EXCEPTION:
 - Up to 10 ft² of fenestration or 0.5% of the CFA, whichever is greater, may be exempt from the maximum U-factor requirement of 0.58



*Residential Envelope Energy
Standards
Prescriptive Measures
(New construction)*



Insulation

2008 – §151(f)1

- Package D requirements:
 - Cavity insulation reqs. only for framed assembly types
 - R-value
 - Below grade wall insulation req. only in Cl. Zn. 13

2013 – §150.1(c)1

- Package A requirements:
 - Must meet R-value or U-factor
 - Cavity and continuous insulation requirements for walls
 - 2 X 6 walls must meet U-factor req.
 - Below grade insulation required in ALL Cl. Zns. (interior or exterior)



Radiant Barrier

2008 – §151(f)2

- Required in Climate Zones 2, 4, and 8 through 15
- Specified in “Special Features” section on CF-1R
- Verified on CF-6R-ENV-01 form
- Must be installed under roof deck and on gable ends and walls

2013 – §150.1(c)2

- Required in Climate Zones 2 through 15
- Specified in Section F of the CF1R
- Verified separately on CF2R-ENV-04-E form
 - Including free ventilation area requirements



Fenestration

2008 – §151(f)3, 4

- Package D requirements:
 - 0.40 U-factor in all Cl. Zns.
 - 0.40/0.35 SHGC in Cl. Zns. 2 and 4 through 15
 - 20% maximum glazing area
 - 5% west facing glazing area in Cl. Zns. 2, 4, and 6 through 15

2013 – §150.1(c)3, 4

- Package A requirements:
 - 0.32 U-factor in all Cl. Zns.
 - 0.25 SHGC in Cl. Zns. 2, 4, and 6 through 16
 - 5% west facing glazing area in Cl. Zns. 2, 4, and 6 through 16



Cool Roofs

2008 – §151(f)12

- Package D requirements:
 - Steep-sloped roofs $< 5 \text{ lb/ft}^2$:
 - 0.20 SR and 0.75 TE, or 16 SRI in Cl. Zns. 10 – 15
 - Steep-sloped roofs $\geq 5 \text{ lb/ft}^2$:
 - 0.15 SR and 0.75 TE, or 10 SRI in ALL Cl. Zns.
 - Low-sloped roofs:
 - 0.55 SR and 0.75 TE, or 64 SRI in Cl. Zns. 13 and 15

2013 – §150.1(c)11

- Package A requirements:
 - Density criteria removed
 - Steep-sloped roofs:
 - 0.20 SR and 0.75 TE, or 16 SRI in Cl. Zns. 10 - 15
 - Low-sloped roofs:
 - 0.63 SR and 0.75 TE, or 75 SRI in Cl. Zns. 13 and 15



*Residential Envelope Energy
Standards
Prescriptive Measures
(Additions)*



Additions – Prescriptive

2008 – §152(a)

- Meet Package D reqs.
 - Some envelope alternatives and exceptions for:
 - Additions < 100 ft²
 - Additions < 1,000 ft²
 - Table 8-2 in Manual
- CF-1R or CF-1R-ADD form req. at Plan Review
- CF-6Rs req. at Final

2013 – §150.2(a)

- Meet Package A reqs.
 - Env. alternatives/exception for:
 - Additions ≤ 400 ft²
 - Additions > 400 ft² and ≤ 700 ft²
 - Additions > 700 ft²
 - Tables 9-3A – C in Manual
- Can exempt additions < 300 ft² from CF1R and CF2R forms if HERS not req.



*Residential Envelope Energy
Standards
Prescriptive Measures
(Alterations)*



Fenestration

2008 – §152(b)1A, B

- Package D requirements:
 - Replacement fen. must meet U-Factor and SHGC reqs.
 - Added fen. must meet efficiency and area reqs.
 - Exception: when fen. added $\leq 50 \text{ ft}^2$
- CF-1R-ALT required
- CF-6R-ENV-01 required

2013 – §150.2(b)1A, B

- Package A requirements:
 - Replacement fen. must meet efficiency reqs.
 - Exceptions for vertical glazing and skylights
 - Added fen. must meet efficiency and area reqs.
 - Exceptions for vertical glazing and skylights
- Can exempt from CF1R and CF2R forms



Re-roofs

2008 – §152(b)1H

- When more than 50% or 1,000 ft² replaced (whichever is less), must be cool roof
 - Steep-sloped roofs: same reqs. as prescriptive (new const.)
 - Numerous alternatives
 - Low-sloped roofs: same reqs. as prescriptive (new const.)
 - Exempt if no ducts in attic

2013 – §150.2(b)1H

- When more than 50% replaced, must be cool roof
 - Steep-sloped roofs: same reqs. as prescriptive (new const.)
 - Alternatives revised/added
 - Low-sloped roofs: same reqs. as prescriptive (new const.)
 - New roof deck alternative in TABLE 150.2-A



Nonresidential Envelope Energy Standards Mandatory Measures



Solar Ready

- **New Mandatory measures in §110.10**
- **Applicable to hotel/motel and high-rise multi-family buildings ≤ 10 stories; and all other nonres. buildings ≤ 3 stories**
- **Requirements for:**
 - Solar zone (location and area)
 - Orientation and Shading
 - Interconnection pathways
 - Structural Design Loads
 - Main electrical service panel



Insulation

- **New mandatory insulation reqs. in §120.7**
- **Maximum U-factor for roofs/ceilings**
 - Incl. metal buildings and wood framed
- **Maximum U-factor for walls**
 - Incl. metal buildings and framed, light and heavy mass, wood framed, and spandrel panels and glass curtain walls
- **Maximum U-factor for floors and soffits**
 - Incl. raised mass floors

** Can req. a note block on structural/architectural plans*



*Nonresidential Envelope
Energy Standards
Prescriptive Measures
(New construction)*



Cool Roofs, Fenestration, etc.

2008 – §143(a)

- Cool roof reqs. dependent on:
 - Slope
 - Climate zone
 - Density (lb/ft²)
- Windows/skylights must meet U-factor and SHGC reqs.
- Req. in TABLE 143-A through 143-C

2013 – §140.3(a)

- Cool roofs:
 - Density criteria removed
 - Solar reflectance trade-off in TABLE 140.3
- Windows/skylights
 - Must meet min. VT reqs.
- New air barrier reqs.
 - Approved materials in TABLE 140.3-A
- Req. in TABLE 140.3-B through 140.3-D



*Nonresidential Envelope
Energy Standards
Prescriptive Measures
(Alterations)*



Re-roofs

2008 – §149(b)1B

- When more than 50% or 2,000 ft² replaced (whichever is less), must be cool roof
 - Same as prescriptive reqs. for both low-sloped and steep-sloped roofs (new const.)
 - Roof insulation alternative in TABLE 149-A

2013 – §141.0(b)2B

- Same threshold criteria
 - Same efficiency reqs. as prescriptive reqs. for new construction
 - Remember that density criteria was removed
- Solar reflectance trade-off in TABLE 141.0-B



For more information

- **2013 Standards Website at:**
 - <http://www.energy.ca.gov/title24/2013standards/index.html>
- **Training**
 - <http://www.energy.ca.gov/title24/training/>
- **List servers and Newsletter (*Blueprint*)**
 - <http://www.energy.ca.gov/efficiency/listservers.html>
- **Ace Web Toolkit**
 - <http://www.energycodeace.com/content/home/>



2016 Standards

- **Want to help forge the next set of Standards?**
 - <http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/>
- **Where do I submit comments?**
 - http://www.energy.ca.gov/dockets/docket_redesign.php?docketNo=14-BSTD-01.html