



2013 Building Energy Efficiency Standards

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Standards Development and High
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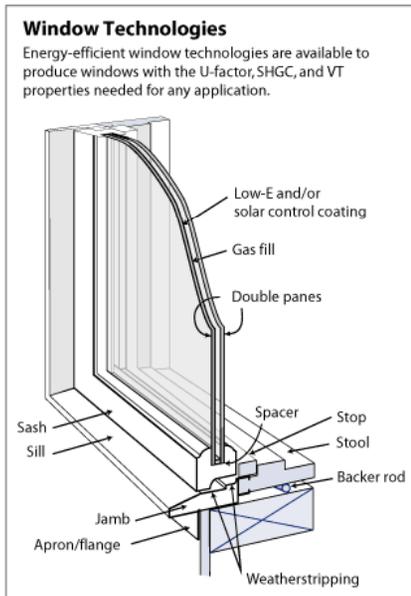
Efficiency and Renewable Energy
Division

May 31, 2012

Building Energy Efficiency Standards

■ Benefits to California:

- Improves Productivity (Lowers Energy Use per GDP)
- Reduces the Need for Future Power Plants
 - Reduces air pollution
 - Reduces greenhouse gas emissions
 - Preserves land, water, and wildlife habitat
- Improves Energy System Reliability
 - Reduces coincident statewide peak electricity demands
- Creates Green Jobs
 - Quality construction, proper equipment installations, field verifications
 - Spurs technology innovation and market adoption

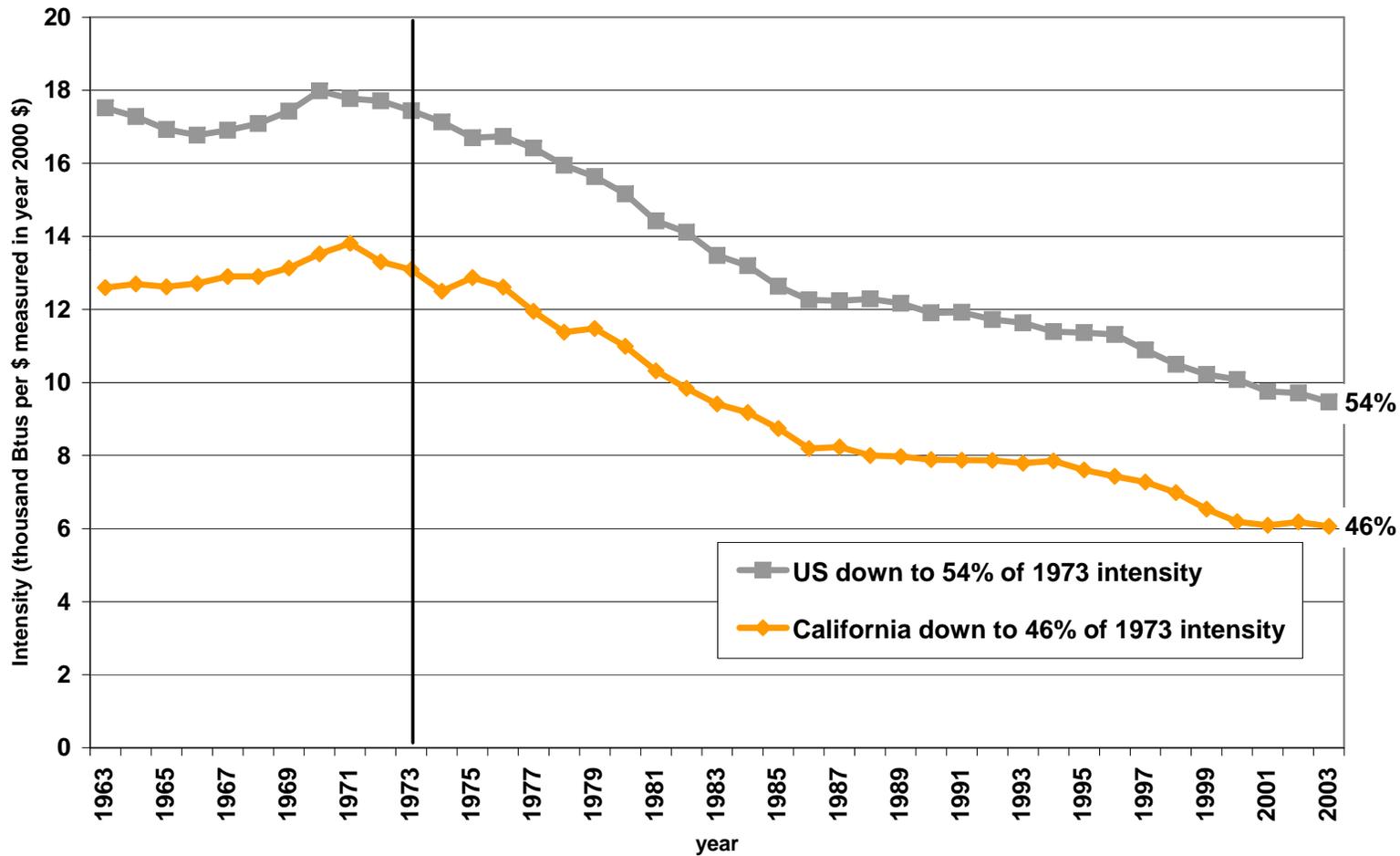


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Efficiency Standards Increase Productivity

Energy Intensity -- California and the United States



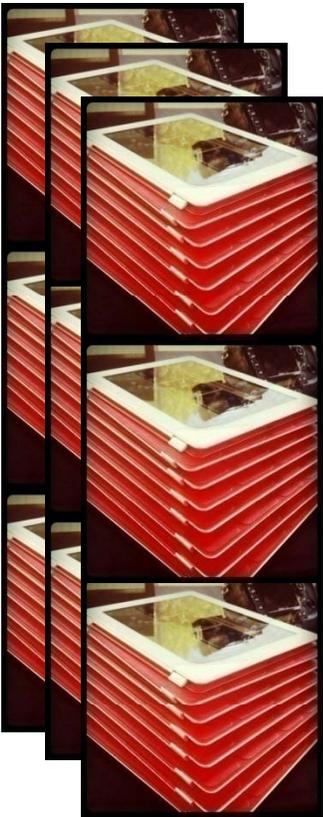
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Benefits of the 2013 Standards Update

After 30 years of construction, **EVERY YEAR**
California will save energy and emissions
equivalent to:

40 Million
IPADs



1.7 Million Homes



6 Power Plants



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Building Energy Efficiency Standards

■ Benefits to the Consumer

- Reduced Energy Bills
- Comfort, Indoor Air Quality
- Reduced Construction Defects
- Increased Property Value

For the 2013 Residential Standards:

When financed through a mortgage, the incremental first costs are **PAID BACK** with energy savings in less than 2 years

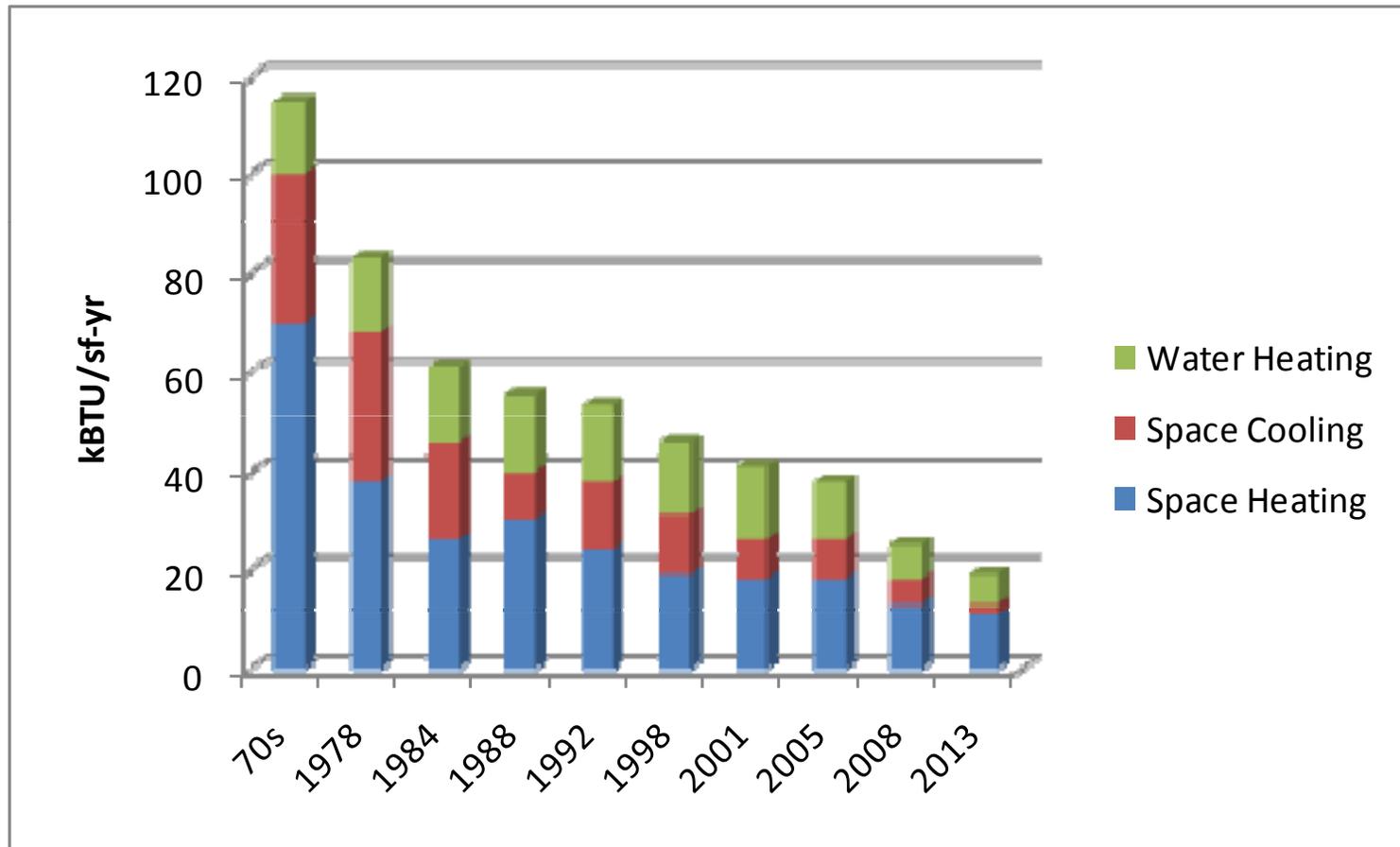
On average:

Home values **INCREASE \$20** for every \$1 reduction in energy bills



Standards Reduce Home Energy Use

Typical energy use for each Standards update
Northern CA Inland Climate



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Legislative Mandate

Scope of Standards Development

- Building Design & Construction Standards
 - Projects that require a building permit
 - Newly constructed buildings
 - Existing building additions, alterations, & nonresidential repairs
- Residential and Nonresidential Building Occupancies
- Building Systems & Components:
 - Heating, Cooling & Ventilation
 - Indoor Lighting
 - Water Heating
 - Outdoor Lighting & Signs
 - Some Process Energy Systems
- Building Life Cycle Cost-Effectiveness
 - Net Present Value of energy savings, construction costs, & maintenance costs over life of the building

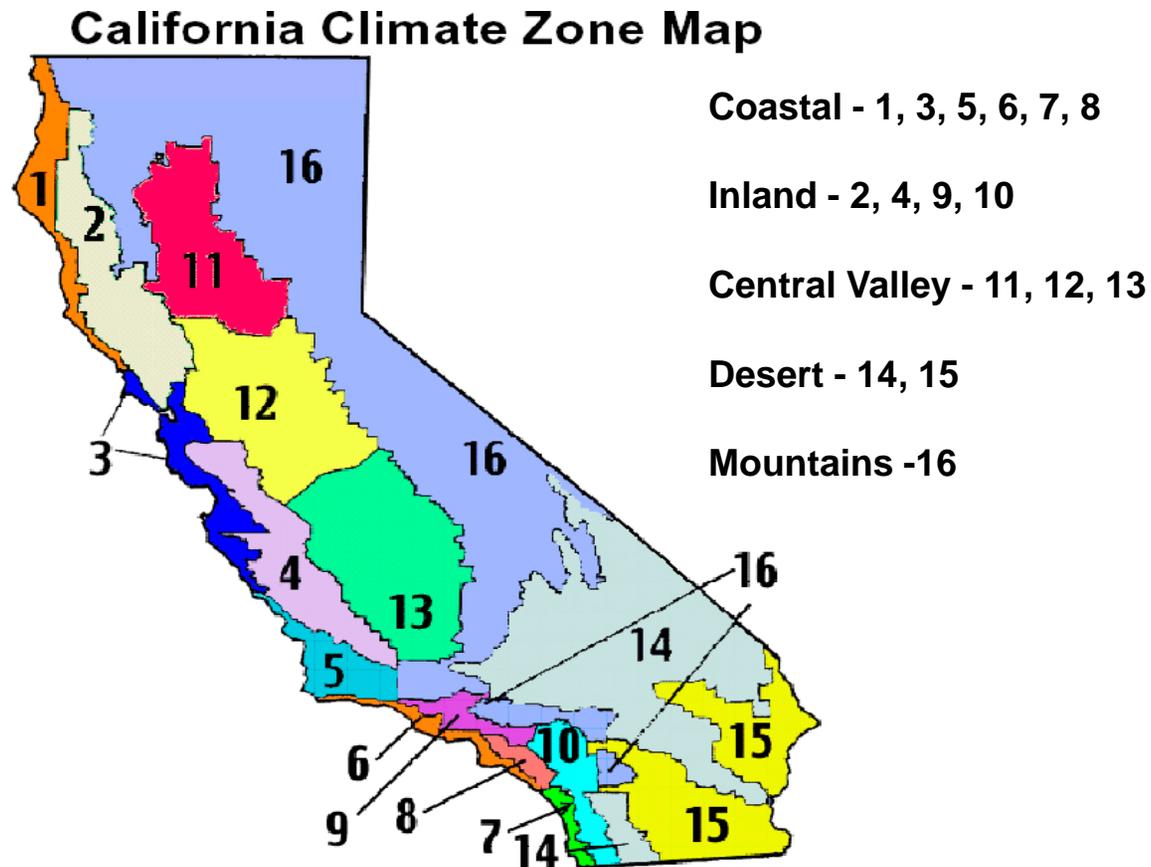
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CA Standards for CA Climates

■ Focus on CA Climate Diversity

- Standards set expectations for climate-specific designs
- CA weather data captures statewide coincident peak demand climate conditions



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Policy Drivers for the 2013 Standards

■ Zero Net Energy Buildings

- Newly constructed homes to be ZNE by 2020
- Newly constructed commercial buildings to be ZNE by 2030

■ Energy Efficiency 1st in the Loading Order

■ Reduce Greenhouse Gas Emissions

- 2006 AB32 California Global Warming Solutions Act
- 2007 Integrated Energy Policy Report
- 2008 Energy Action Plan
- 2008 AB32 Scoping Plan
- 2008 CA Long Term Energy Efficiency Strategic Plan
- 2010 Governor Brown's Clean Energy Jobs Plan
- 2010 Clean Energy Future Initiative
- 2012 Governor Brown's Executive Order

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2013 Standards: A Collaborative Effort

■ Collaboration with Investor-Owned Utilities

- PGC-funded statewide Codes and Standards program
- 70 Codes & Standards Enhancement (CASE) studies by PG&E, SCE, Sempra
- Over 50 Stakeholder meetings to discuss opportunities & issues with industry

■ Collaboration with PIER

- Efficiency standards are principal market connections for RD&D
- Weather data updates; Residential HVAC & water heating; Nonresidential lighting controls, ventilation, improved acceptance tests, HVAC economizers, & Compliance Software

■ Public Processes

- 15 workshops
- Over 280 docketed comments

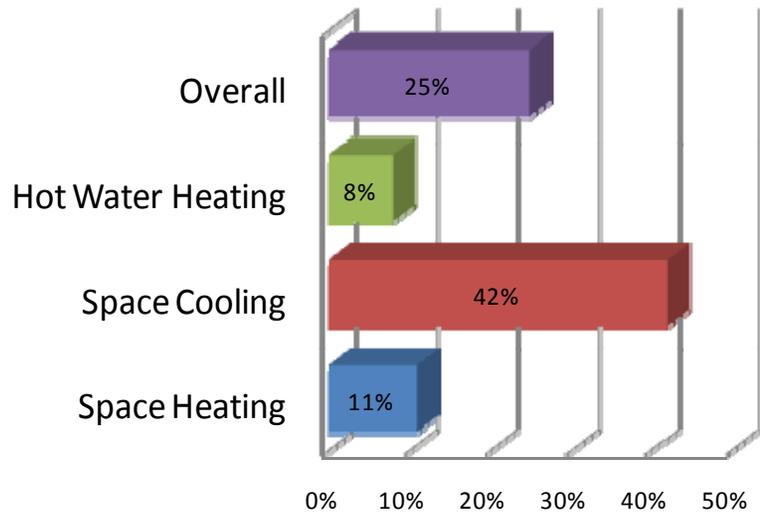
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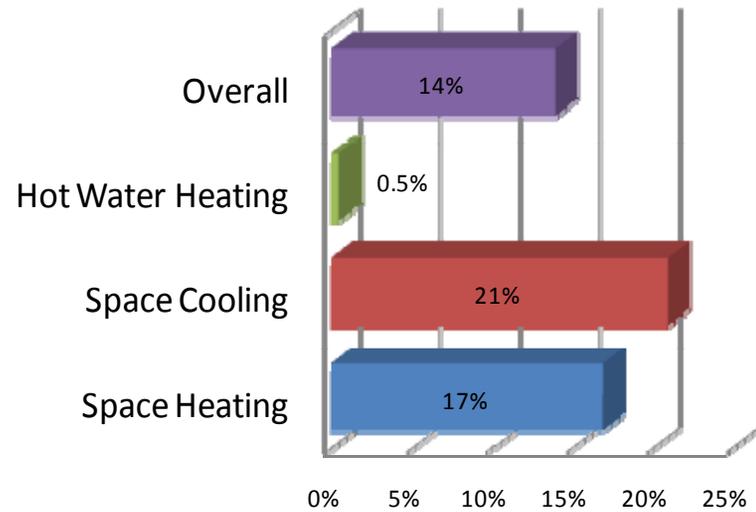
2013 Standards: Residential Energy Savings

- 23.6 GWh/yr; 1.1 Mtherms/yr; 35 MW
- Single Family: 25% better than current Standards
- Multi-Family: 14% better than current Standards

Single Family Savings by End Use



Multi-Family Savings by End Use



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2013 Standards: Residential Envelope

- Better windows U-factor and SHGC
- More wall insulation in all climate zones



Wall Insulation



Residential
Windows

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2013 Standards: Residential HVAC

- Mandatory HVAC and air distribution system installation testing
- Ventilative cooling (e.g. whole house fans), where appropriate

Reduces
construction
defects

Improves affordable
comfort



Residential HVAC Ducts



Whole House Fan

2013 Standards: Existing Residential Bldgs.

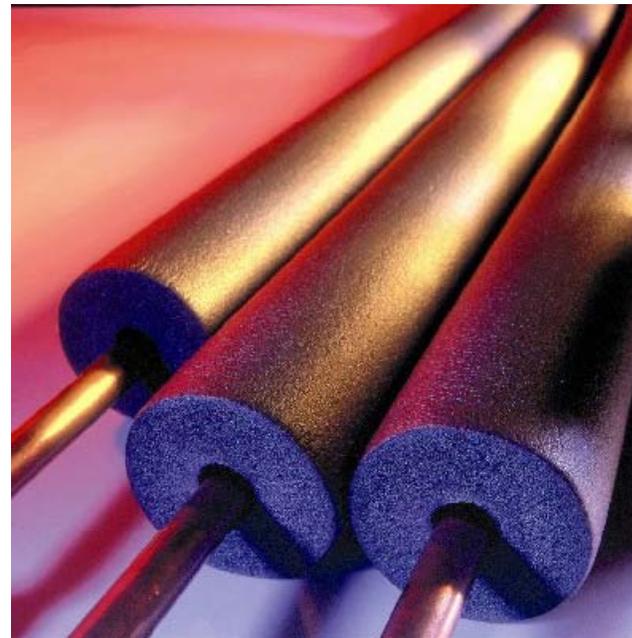
- Simplified rules for additions and alterations
 - Simple forms option for small additions and alterations that do not include HERS measures
 - Both prescriptive and performance paths have been simplified
 - Covers alterations to existing homes, additions, and existing plus additions plus alterations



2013 Standards : Residential Update

■ Hot Water:

- Improves hot water system performance, saving energy and water:
 - Hot water pipe insulation on large pipe sizes
 - Demand-controlled recirculation systems
 - Credit for compact plumbing designs
 - Enables future high-efficiency water heater installations



HW Pipe Insulation

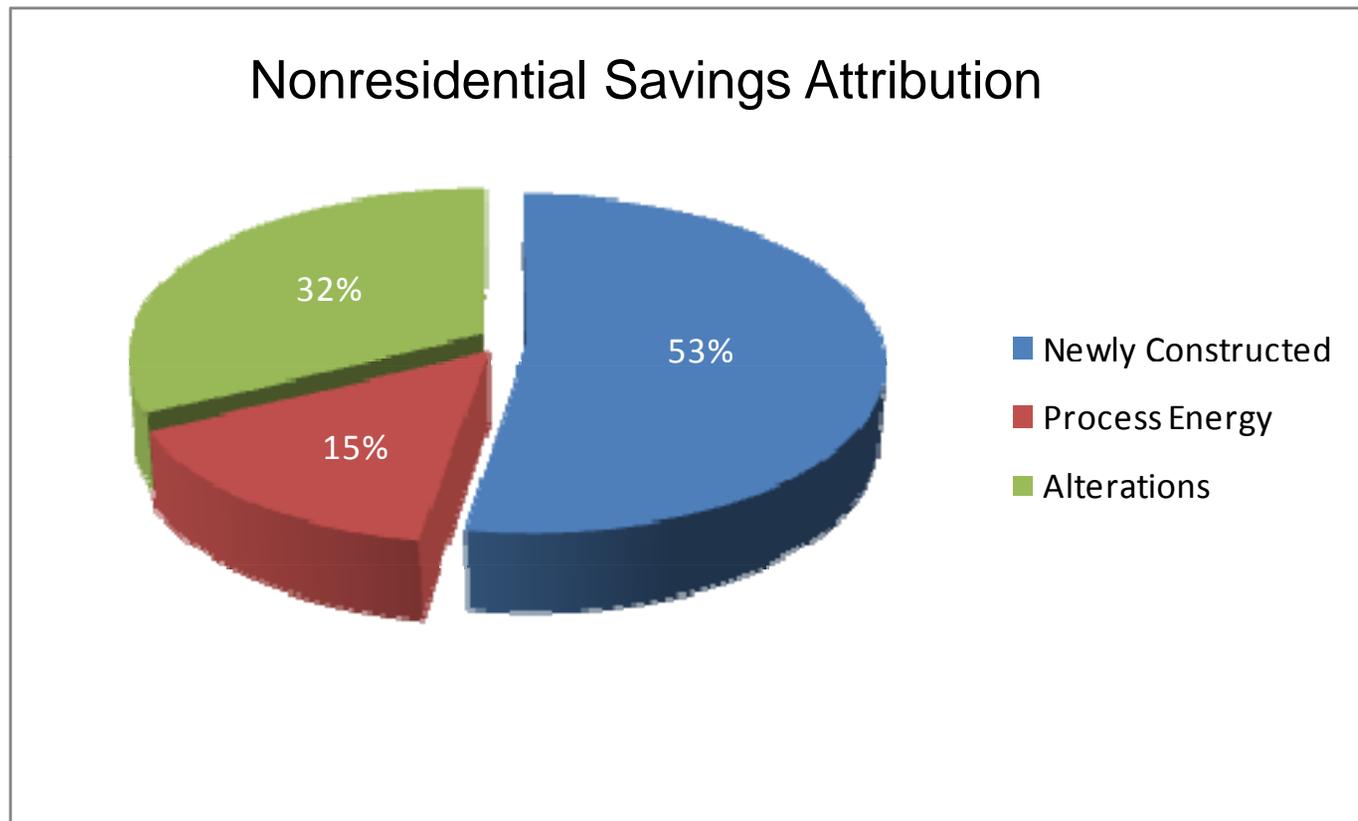
2013 Standards : Residential Solar Ready

- Provides an area on roof that is penetration and shade free
- Ensures that future solar not precluded by original construction
- Exceptions:
 - Installing solar electric system or domestic SWH system
 - Sites with significant shading
 - Reduced solar zone area with demand response thermostat
 - No solar zone with high efficacy lighting and DR thermostat
- Credit when solar electric installed in climate zones 9-15



2013 Standards: Nonresidential Energy Savings

- 30% more energy efficiency compared to current Standards
- 372 GWh/yr; 6.7 Mtherms/yr; 84 MW



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2013 Standards : Nonresidential Lighting

- Multi-level lighting controls



2013 Standards : Nonresidential Lighting

- Lighting Alterations in Existing Buildings



Retrofits >> # newly constructed bldgs.

Alterations occur every 8-15 years

~ 40 million in energy savings per year



2013 Standards : Nonresidential Envelope

- Daylighting:
 - More comprehensive daylighting controls
 - Visual Transmittance requirements for windows
 - Increased skylight requirements
- Higher cool roof reflectance
- Envelope Sealing



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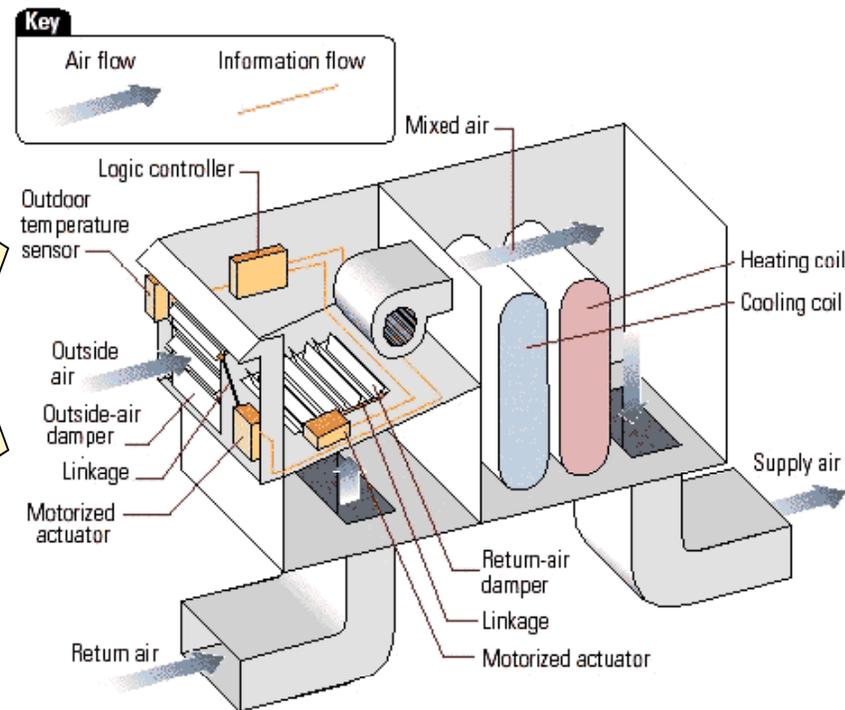
2013 Standards: Nonresidential HVAC

- HVAC economizers & speed controls on more and smaller equipment
- Increased chiller efficiencies
- More options for occupancy-based shut-off controls

More HVAC equipment will use outside air for cooling

HVAC equipment can adjust speed to meet variable needs

Reduces energy used to heat/cool unoccupied spaces



HVAC schematic detailing the ECONOMIZER

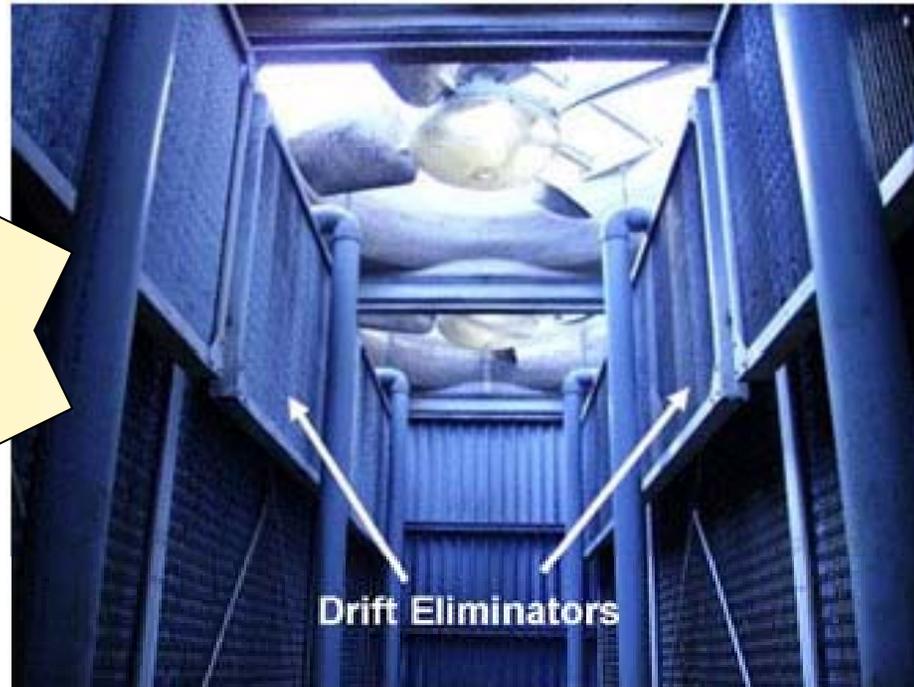


2013 Standards: Nonresidential HVAC

- Cooling Tower Water Efficiency
 - Controls that maximize water use
 - Overflow alarms
 - Efficient drift eliminators
 - Make-up water flow meters

Saves 33 million gallons
of water per year

Equivalent to 600,000
clothes wash loads



2013 Standards : Nonresidential Demand Response

■ Occupant Controlled Smart Thermostat

- Setback thermostat plus communications and demand response capable
- Communications and DR can be built-in or thermostat can be upgradeable with modular components
- Communications can be turned on/off by occupant
- Optional enrollment in DR services and programs enabled
- Occupant always has full control of settings



2013 Standards : Process Energy Systems

- Process Energy Systems
 - Updates to Refrigerated Warehouse requirements
 - **NEW** Supermarket Refrigeration efficiency requirements



Infiltration Barriers



Condensers

ANNUAL SAVINGS:
20 GWh
1.9 million therms
Over \$60 million



Evaporators



2013 Standards : Process Energy Systems

- Process Energy Systems
 - NEW Data Center cooling
 - NEW Commercial Kitchen exhaust
 - NEW Process Boilers
 - NEW Compressed Air Systems
 - NEW Laboratory exhaust
 - NEW Parking Garage ventilation



Data Centers



Kitchen Exhaust Hoods



Boilers



2013 Standards : Nonresidential Solar Ready

- Provides an area on roof that is penetration and shade free
- Ensures that future solar not precluded by original construction
- High-rise multifamily, hotel/motel buildings 10 stories or fewer
- Other nonresidential buildings 3 stories or fewer
- Exceptions:
 - Installing solar electric system or domestic SWH system
 - Sites with significant shading



2013 Standards : Proposed for Adoption

- As noticed on Tuesday, May 29th:
 - Staff is withdrawing the recommendation to adopt Part 11 Voluntary Reach Energy Efficiency Standards at this time
 - Staff is withdrawing the recommendation to adopt new requirements for Showers
 - Staff is withdrawing the recommendation to adopt new requirements limiting the length of 1" HW piping for residential water heating systems
- Staff developed errata for the 15-Day Language
- Staff recommends adoption of the 15-Day Language, with errata

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2013 Standards: Initial Study / Negative Declaration

Public Resources Code section 21000 et seq.	Staff independently created an Initial Study/Negative Declaration and Supplemental Report which concluded that the potential environmental impacts associated with the 2013 Standards are less than significant.
Title 14 § 15073(a)	The IS/ND was released for public and state agency comment on March 26, 2012, ending 48 days later on May 15, 2012.
Title 14 § 15073(d)	The IS/ND was submitted to the Statewide Clearinghouse at the Office of Planning and Research and distributed to nine state agencies.
Title 14 § 15072(a), 15072(b)(1), 15072(b).	A Notice of Intent was published in six newspapers throughout California and mailed to all 58 County Clerks as well as about 10,000 individuals.
Title 14 § 15074(b)	There were no comments received from any state agencies or the public.
Title 14 § 15070(a), PRC § 21082.1	Therefore, there is no substantial evidence, in light of the whole record, that adopting the proposed 2013 Standards will have a significant effect on the environment.

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2013 Standards

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