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blueprint

Energy Efficiency Division

New Energy Standards in Effect June 1, 2001

On January 3, 2001, the *2001 AB 970 Residential and Nonresidential Energy Efficiency Standards* were adopted by the California Energy Commission at a public Business Meeting. This blueprint briefly summarizes the key changes made to the Standards, both Residential and Nonresidential. This publication is intended to be used solely for informative purposes; for complete information on design, construction and enforcement of building construction, please refer to the Standards. Copies of the Residential and Nonresidential Building Manual Supplements can be found on the California Energy Commission web site at:

http://www.energy.ca.gov/ab970_standards/documents/index.html

The Commission anticipates new Residential and Nonresidential Manuals will be available in August 2001. Until the new manuals are available, refer to the Manual Supplements (available at the Website address above), publication numbers 400-01-002S and 400-01-005S.

QUESTIONS and ANSWERS ABOUT THE NEW STANDARDS

When do the new *2001 AB 970 Residential and Nonresidential Energy Efficiency Standards* take effect?

The Effective date is **June 1, 2001** for all nonresidential buildings and those residential buildings that do not fall under the exception for the Multiple Orientation Alternative approach.

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QUESTIONS and ANSWERS

ABOUT THE NEW STANDARDS

The following is the actual code language.

"Effective Date: The effective date of the AB 970 Building Energy Efficiency Standards amendments shall be June 1, 2001.
Exception:
Building energy efficiency standards compliance documentation submitted prior to June 1, 2001, using the Multiple Orientation Alternative of Section 151(c), shall be used to determine compliance through December 31, 2001."

The following information is a clarification of the actual code language:

Existing subdivisions: Applications for permits for individual homes that are part of an existing Master Plan can be *submitted* through the end of December 2001 based on existing compliance documentation using the Multiple Orientation Alternative approach. Applications for permits for individual homes that are part of an existing Master Plan that are submitted after December 31, 2001 must use the 2001 AB970 Standards to determine compliance.

New subdivisions:

Before June 1, 2001: Applications for new subdivisions with Multiple Orientation Alternative approach compliance documentation *submitted* into plan check before June 1, 2001 can comply under existing Standards; applications for permits for individual homes using this Multiple Orientation Alternative compliance documentation must be *submitted* prior to December 31, 2001.

After June 1, 2001: Applications for new subdivisions *submitted* on or after June 1, 2001 must comply under AB 970 Amendments to Standards.

Recommended procedure for builders: The procedure that is recommended (by CBIA and the Commission) to builders for determining which standard to use for new subdivisions that will be submitted for master plan approval between now and June 1 is dependent upon when the majority of the homes will be built. For a small subdivision that will be completed or almost completed by the end of 2001, then it is reasonable to submit under the current (1998) Standards. If the subdivision will have a substantial number of starts constructed after 2001, then it is advisable to submit under the 2001 AB 970 Standards so that energy features do not change mid-construction.

Q Can builders still use building cavities or plenums, such as those under an air handler support platform, instead of ducts?

A

No. Although the Mandatory Measures remain pretty much the same as in the 1998 Standards, there have been some changes. One of the most noteworthy changes is to section 150(m), which has been modified as follows: "...Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, ductboard or flexible duct, shall not be used for conveying conditioned air. Building cavities and

support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross sectional area of the ducts."

Because return air is "conditioned air," "platform returns" complying with the 2001 AB 970 Standards must be fully ducted.

Section 150(m) also contains the requirement that "Joints and seams of duct systems and their components shall not be sealed with cloth backed rubber adhesive duct tapes unless such tape is used in combination with mastic and drawbands."

I heard that the Commission completely changed compliance methods and approaches and made duct sealing and testing, radiant barriers and thermostatic expansion valves mandatory. Is that true?

No. The compliance approaches and methods to achieve compliance with the Energy Budget remain essentially the same. General procedures associated with energy design, plan checking and inspection are unchanged. Builders must still comply with the Mandatory Measures and the Energy Budget.

To answer the question further, a short description of compliance approaches is needed to clarify what is "mandatory," and what is optional.

To comply with the Energy Budget, the builder may choose to use the Prescriptive Approach or the Performance Approach. The Prescriptive Approach requires the builder to construct strictly according to the requirements of Tables 1-Z1 through 1-Z16, the "Alternative Component Packages" (for Climate Zones 1 through 16).

The Prescriptive Approach is similar to a prescription one gets at the drugstore. When a pharmacist fills the prescription he cannot vary the ingredients. Similarly, when a builder chooses to use the prescriptive approach, he cannot trade-off elements of the requirements. For example, if the Prescriptive Package requires R-38 attic insulation, the builder must provide R-38 in all the attics. If the Package limits the amount of glazing (fenestration) to 16% of the floor area, then the builder can use no more than 16%. So, many building designs are unable to achieve compliance using the Prescriptive Packages due to these prescribed requirements.

When adopting new Standards, the Commission is required to determine that the requirements are cost effective. The Commission then applies these cost effective energy efficient devices and systems to modify Alternative Component Package D in each of the 16 California climate zones. The revised prescriptive packages result in a buildings that are more energy efficient than ones using the previous version of the Package.

Because of the nature of the Prescriptive Packages, most builders use the Performance approach to compy with the Standards. In each case, the design for the proposed building must be compared with the energy budget for that building, determined by modeling the energy use of the Package D features in the proposed building. The proposed design must show that no more energy will be used than the energy budget for the proposed building. The difference between the Prescriptive and Performance approach is that the builder may make trade-offs to

achieve compliance when using the Performance approach. The builder may, for instance, use a more efficient water heater, more efficient windows or design the duct system to ACCA Manual D in trade for having more glazing in the proposed house.

In the new 2001 AB 970 Standards, Prescriptive Packages A & B are eliminated. Prescriptive Package D has been modified to make new homes more energy efficient. The Commission determined, after much consultation with private sector energy efficiency experts, the California Building Officials (CALBO) and the California Building Industry Association (CBIA), that more energy efficient glazing, duct sealing, radiant barriers, and thermostatic expansion valves (TXVs) would be applied to the Base Case house.

Therefore, the builder who uses the Prescriptive Approach will be required to use those features listed above in order to achieve compliance. In Prescriptive Package D, there is an alternative to duct sealing and TXVs.

Using Package D for compliance, the builder may choose an alternative of more efficient glazing , and in some climate zones, more efficient air conditioning or heating equipment and more efficient glazing to avoid the special inspection required for duct sealing and TXV's. The Commission has also allowed for an alternative to the TXV but that alternative has yet to be determined (at the time this article went to print).

The builder who uses the Performance Approach has the option of using those systems and devices listed above. In order to achieve compliance, he may choose, as in the past, any of the available features to trade-off between the building envelope, space conditioning and water heating.

What is the difference under the new Standards? The builder must build a more energy efficient house. The state-wide difference in heating and cooling energy between the 1998 Standards and the 2001 Standards is about 12 percent. In climate zones where cooling loads are dominant, the difference approaches 23%.

What are the most significant changes to the Residential Standards?

The most significant changes to the residential portion of the Standards are:

Duct sealing is required in all climate zones when using Prescriptive Package D. HERS raters must use duct blasters to verify the the HVAC system has leakage less than 6 per cent of the fan flow. HERS raters are considered to be Special Inspectors by the Building Department. The HERS rater must demonstrate competence to the satisfaction of the Building Department.

Spectrally Selective glazing is required in Package D.

Radiant Barriers are required in Package D.

Thermostatic Expansion Valves (TXVs) are required for split-system central air-conditioners in specified climate zones when using Prescriptive Package D for compliance. TXVs are installed on the indoor unit next to the coil.
They help regulate the refrigerant flow so that the unit performs more efficiently. TXVs must be accessible and require field verification (visual

confirmation) by a certified Home Energy Rating System (HERS) rater. The Commission is working on an alternative to TXVs.
Compliance credit for interior shading (such as roller shades and mini-blinds) has been eliminated and designers may no longer move shading devices for compliance credit to different orientations when using the Multiple Orientation Alternative.
Compliance credit is available for "cool roofs" (roofs that reflect rather than absorb the sun's rays).

Prescriptive packages A and B have been deleted.

See Commission Publication 400-01-002S, the Residential Manual Supplement, for all changes to the Residential Energy Efficiency Standards.

NONRESIDENTIAL CHANGES

What are the most significant changes to the Nonresidential Standards?

The most significant changes effect glazing and lighting requirements. Additional changes will impact space conditioning, cool roofs and other aspects of the nonresidential energy code. The next blueprint issue will include more of the nonresidential topics.

Glazing: In many climate zones, nonresidential buildings that complied using single glazing under the 1998 Standards may need to have dual glazed, high performance windows to comply with the new 2001 Standards.

Section 143 - Prescriptive Requirements for Building Envelopes Tables 1-H and 1-I include new requirements for windows and skylights. U-factor and SHGC values are set lower: for vertical glazing, the values depend on the window-to-wall ratio, and for skylights the values depend on the type of skylight construction.

Climate zones have been regrouped to form groups with the same glazing and other prescriptive envelope requirements.

In Section 143(b), the overall heat gain tradeoff equation has been changed to add a cool roof alternative.

Lighting Systems and Controls

Section 130 (c) states that all permanently installed exterior luminaries attached to or powered by the electrical service in the building must either have a minimum efficacy value of 60 lumens/watt or be controlled by a motion sensor.

Section 131 says there are no longer exceptions for occupancy sensors or automatic time switches with manual override from the bi-level control requirement. Bi-level controls are required in all spaces larger than 100 ft^2 and having a lighting load greater than 0.8 Watts/ft^2. Buildings or separately metered spaces with less than 5000 ft^2 of conditioned space are no longer exempt from the automatic shutoff control requirement.

Section 146 requires portable lighting to be included when determining the actual lighting power. If no specific plans for spaces larger than 250 square feet are provided for portable lighting, the standards specify a value of 0.2 Watts/ft^2 to be used for determining the actual lighting power density. The actual lighting power for portable lighting may be used if sufficient supporting evidence is provided on the plans.

HELP CALIFORNIA CONQUER THE ENERGY CHALLENGE!

The energy challenge facing California and the West is real.

California continues to be threatened by electrical shortages and rolling blackouts. The State is attacking the problem in three ways.

First, the Governor and leaders of the California Legislature are working with utility companies, generators and consumer groups to develop long-term solutions for reliable and affordable electricity for Californians.

At the same time, we are working diligently to add as much new electrical generation to the system as quickly as we can, while still protecting California's environment. In September 2000 the Governor signed legislation that established 2 new stream-lined power plant licensing processes for summertime peaking units and for larger plants that meet environmental, and public health and safety issues in their applications. From April 1999 to April 2001, the Energy Commission has licensed 13 power plants that will add approximately 8,464 megawatts to the electricity supply system and six of these plants are under construction now.

You're our third key to success. The State plans to reduce the demand for energy by eight percent. To reduce the risk of power outages, the most important thing Californians can do is to reduce our demand for electricity by using energy more efficiently.

With nearly 35 million people in California, we are the sixth largest economy in the world. By reducing our electricity demand, we can help to avoid shortages, lower energy bills and reduce the stress on the power grid in the entire Western United States.

All you have to do is

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Training on 2001 AB 970 Energy Efficiency Standards

The California Energy Commission encourages you to contact the sponsoring agency in a timely manner to obtain more information on the listed classes. You may also call the Commission Hotline, (800) 772-3300 or (916) 654-5106. The listing provided here is based upon our most current information. Dates, topics and locations may be tentative and might vary from those shown below.

Date	Location	Class	Contact	Co-sponsor	Telephone/e-mail/fax
4-03-01	Irwindale	R	CTAC	SCE	626-812-7537
4-04-01	Ventura	R	CTAC	SCE	626-812-7537
4-07-01	San Jose	R&NR	Bob Adler	PG&E	408-277-4541 bob.adler@ci.sj.ca.us
4-10-01	San Diego	R&NR	Deborah Newell	SDG&E	858-636-5730 dnewell@sdge.com
4-11-01	San Diego	R&NR	Deborah Newell	SDG&E	858-636-5730
4-13-01	San Francisco	R&NR	PG&E	PG&E	800-244-9912
4-17-01	Irvine	R	CTAC	SCE	626-812-7537
4-18-01	Irvine	R	CTAC	SCE	626-812-7537
4-21-01	Bakersfield	R&NR	Russ Johnson	PG&E	661-326-3935
4-24-01	Tuolumne Co.	R	Pat Wiley or	PG&E	209-588-0191
			Greg Lamb		209-533-5633
4-27-01	Stanislaus Co.	R&NR	Joanne Nash	PG&E	209-668-5560
5-01-01	Fontana	R	CTAC	SCE	626-812-7537
5-02-01	Lancaster	R	CTAC	SCE	626-812-7537
5-02-01	Turlock	NR	Joanne Nash	PG&E	209-668-5560
5-04-01	Turlock	R	Joanne Nash	PG&E	209-668-5560
5-09-01	Redding	R&NR	Jim Wright	PG&E	530-225-4099
5-17-01	Benicia	R&NR	Harvey Higgs	PG&E	707-746-4230
5-22-01	Fontana	R	CTAC	SCE	626-812-7537
5-23-01	Romoland	R	CTAC	SCE	626-812-7537
5-31-01	Santa Cruz	R&NR	PG&E	PG&E	800-244-9912
6-06-01	Visalia	R&NR	Dennis Lehman or	PG&E	559-738-3495
			Gene Long		559-804-4765
6-07-01	San Luis Obispo	R&NR	PG&E	PG&E	800-244-9912
6-13-01	Corona	R&NR	Jim Miyao	SoCal Gas	714-634-5039 jmiyao@socalgas.com
6-14-01	Los Angeles Co	R&NR	Jim Miyao	SoCal Gas	714-634-5039
6-20-01	Palm Desert	R&NR	Jim Miyao	SoCal Gas	714-634-5039
6-26-01	Thousand Oaks	R&NR	Jim Miyao	SoCal Gas	714-634-5039
6-27-01	Santa Barbara	R&NR	Jim Miyao	SoCal Gas	714-634-5039

Note: Potential participants must register and confirm; date, times & exact location. Most classes are all day classes (9 AM to 3 PM). Some classes are Residential (R) or Nonresidential (NR) only. Space is limited. R.S.V.P as soon as possible. Fees may be required. Dates and locations subject to change. Instructors will be provided by the co-sponsoring Utility. Thanks also go to BIA & ICBO for partnering with SCE on this project. California Energy Commission staff will also be available at the training site.

Commission Contact: John Eash 916-653-7181 e-mail: jeash@energy.state.ca.us

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The inside story:

http://www.energy.ca.gov/ab970_standards/documents/index.html

For any questions or additional information relating to the new Standards contact the Energy Hotline at (800) 772-3300.

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