

**CALIFORNIA ENERGY COMMISSION** 1516 Ninth Street Sacramento, California 95814Main website: [www.energy.ca.gov](http://www.energy.ca.gov)

## **INITIAL STATEMENT OF REASONS**

### **FOR PROPOSED BUILDING STANDARDS OF THE CALIFORNIA ENERGY COMMISSION**

#### **REGARDING THE CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 1 and PART 6 (CALIFORNIA ENERGY CODE) and TITLE 24, PART 11 (CALIFORNIA GREEN BUILDING STANDARDS)**

#### **2013 BUILDING ENERGY EFFICIENCY STANDARDS DOCKET NUMBER 12-BSTD-1**

### **I. Introduction**

This Initial Statement of Reasons ("ISOR") describes the purposes, rationales, and necessity of the California Energy Commission's proposed amendments to its energy efficiency standards for buildings, which would go into effect on January 1, 2014, if adopted by the Energy Commission and approved by the California Building Standards Commission.<sup>1</sup> This ISOR fulfills the requirements of California's Administrative Procedure Act (see Government Code section 11340 et seq.).

The Energy Commission welcomes comments on the ISOR and on the proposed building standards that the ISOR describes. Please see the accompanying Notice of Proposed Action ("NOPA"), also dated February 7, 2012, for instructions on how to submit comments electronically, on paper, and orally at Energy Commission hearings.

#### **A. A Brief History of the Energy Commission's Building Standards**

In 1975 the Department of Housing and Community Development adopted the state's first energy conservation standards for buildings, under the State Housing Law authority, which required basic levels of insulation. Also in that year the Energy Commission began operations, under the Warren-Alquist Act (Public Resources Code section 25000 et seq.) That Act gives specific directives to the Energy Commission regarding what the standards are to address, what criteria are to be met in developing standards, and what implementation tools, aids, and technical assistance are to be provided. (Public Resources Code sections 25402(a)-(b), 25402.1, -25402.8.) The most important requirement is that the standards save building owners more

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<sup>1</sup> The ISOR refers to the proposed standards in various ways, e.g., "2013 Building Energy Efficiency Standards," "proposed standards," and "2013 Standards"; in addition, it uses "amendments" or "proposed regulations" as a shorthand reference for new provisions, revisions to existing provisions, and deletions of existing provisions, in the Parts 1, 6, and 11 of Title 24 of the California Code of Regulations.

money in reduced bills for electricity and natural gas than any additional construction costs that the standards impose. The building standards must also meet the requirements of the Administrative Procedure Act (e.g., that they carry out the purpose of the enabling statute, that they are clear, and that they have been adopted in an open public process in which alternatives are thoroughly considered) and the California Environmental Quality Act (“CEQA”, Public Resources Code section 21000 et seq.), which requires that state agency actions not cause undue environmental harm. These requirements help ensure that the Standards promote the State’s goal to have a reliable, economic, and environmentally-sound energy supply (see, e.g., Public Resources Code sections 25001, 25300(a)-(b)).

In 1976 the Commission adopted its first building standards, which addressed space heating and cooling, water heating, and windows, in addition to insulation. Since then the Commission has updated the standards in conjunction with the Building Standards Commission’s publication of all the State’s building codes, usually every three years. The updates incorporate the most advanced developments in energy conservation (e.g., new lighting technologies, new types of roofs that reflect unneeded heat) to ensure that new construction in California will be as energy-efficient as possible, consistent with the requirement that the standards be cost-effective for consumers. Today, the Standards contain energy efficiency – and, as recently required by statute, water efficiency requirements for newly constructed buildings, additions to existing buildings, alterations to existing buildings, and, in the case of nonresidential buildings, repairs to existing buildings.

The Energy Commission’s building energy efficiency standards are contained in two parts of Title 24 of the California Code of Regulations. Administrative regulations, such as how the standards’ requirements are integrated with local governments’ building permit processes, are in Part 1 of Title 24, and the substantive requirements for building construction are in Part 6 of Title 24. In addition, voluntary, or “reach” guidelines for sustainable building practices that are more protective of the environment than the minimum standards are in Part 11 of Title 24, the California Green Building Standards. The Energy Commission is responsible for the Energy Chapters (separate chapters are published for residential and nonresidential buildings) of the California Green Building Standards.

## **B. How the Standards Work**

The standards are divided into several sections, some of which apply to all buildings and all types of construction, and some of which apply only to specified subsets.

The first division in the standards is between administrative regulations in Part 1 of Title 24, and substantive regulations in Part 6 of Title 24. The former describe procedural requirements, such as what information must be on building permit applications; the latter describe how buildings must be constructed. (In addition, there are voluntary, or “reach,” Green Building Standards in Part 11, which are described further below.)

The substantive, how-buildings-must-be-constructed regulations in Part 6 are further subdivided. In general, each building must (1) comply with various mandatory requirements, *and* (2) meet an energy goal. In turn, meeting the energy goal can be accomplished *either* (a) by demonstrating, under the “performance” compliance approach, that the building will consume no more energy that is set forth in an “energy budget”, which is established on an energy-use-per-square-foot basis; *or* (b) by installing a package of specified measures (e.g., R-30 ceiling insulation, high-performance windows) in the “prescriptive” compliance approach. The energy budget and the prescriptive requirements vary among different building types (which are nonresidential (e.g., retail, office), low-rise residential, high-rise residential, and hotel/motel) and among 16 different “climate zones” within the state. There are also differences between construction of brand-new buildings, on the one hand, and additions, alternations, and repairs to existing buildings, on the other hand. The (1) mandatory, (2)(a) energy budget, and (2)(b) prescriptive provisions, and the different types of buildings and construction, appear in Part 6 as follows:

that go on inside the building, as opposed to energy use to make the building itself habitable), such as commercial refrigeration, data centers, kitchen exhaust systems, and compressed air systems, are included in the nonresidential Standards. The 2013 Standards also include expanded criteria for pre-occupancy acceptance testing of HVAC, water, and lighting systems in both residential and nonresidential buildings, as well as new requirements for code compliance data to be collected in a Commission-managed repository.

Furthermore, enabling residential and small commercial buildings to respond to critical electricity peak demand events by reducing air conditioning loads is a new aspect of the 2013 Standards. Capabilities to enable remote utility communication of critical events and automatic demand response to reduce critical peak air conditioning loads are proposed as requirements for all thermostats controlling “unitary” heating and air conditioning systems. Facilitating future solar electric and solar thermal system installations is another new element of the 2013 Standards.

Finally, the 2013 Standards also include updates to the energy efficiency divisions of the California Green Building Standards. (These voluntary guidelines contained in Title 24, Part 11, of the California Code of Regulations, go beyond the mandatory standards in Part 6. They were developed and adopted in response to policy directives from the Governor. See *CALGreen, The 2010 California Green Building Standards Code Are you ready?*, pp. 2-3, available at: <http://www.documents.dgs.ca.gov/bsc/CALGreen/The-CALGreen-Story.pdf>.) A set of prerequisites has been established for the residential “Reach Standards”, which include efficiency measures that should be installed in any housing project striving to meet advanced levels of energy efficiency. The residential Reach Standards have also been updated to require additional energy efficiency or on-site renewable electricity generation to meet a specific threshold of expected electricity use. Both the residential and nonresidential Reach Standards include guidelines for building additions and alterations as well as for new construction.

## **II. Description of the Proposed Regulations and of The Reasons for Their Adoption**

### **A. The Purpose, Rationale, and Necessity of the Proposed Amendments in General**

The Legislature has found that

electrical energy is essential to the health, safety and welfare of the people of this state and to the state economy, and that it is the responsibility of state government to ensure that a reliable supply of electrical energy is maintained at a level consistent with the need for such energy for protection of public health and safety, for promotion of the general welfare, and for environmental quality protection.

[T]he present rapid rate of growth in demand [for electric energy] is in part due to wasteful, uneconomic, inefficient, and unnecessary uses of power and a continuation of this trend will result in serious depletion or irreversible commitment of energy, land and water resources, and potential threats to the state's environmental quality.

(Pub. Resources Code, §§ 25001, 25002.) Accordingly,

It is further the policy of the state and the intent of the Legislature to employ a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption, prudently conserve energy resources, and assure statewide environmental, public safety, and land use goals.

(Pub. Resources Code, § 25007.)

The performance compliance approach for alterations is modified to address the projects that include both additions and alterations. Based on stakeholder comments, the Energy Commission made changes to the performance compliance approach for additions and alterations to make it more consistent with the prescriptive compliance approach, and to make the performance compliance approach easier to implement.

### **3. The Green Building Standards (TITLE 24, PART 11)**

The existing text in the energy efficiency divisions of the Part 11 voluntary appendices have been entirely replaced by proposed language that includes a performance standard and a limited number of prerequisites. The residential and nonresidential performance standards each include two levels (specified as “Tier I” and “Tier II”) of advanced energy efficiency compared to the requirements in Title 24, Part 6. The prerequisites are mandatory measures for every building meeting the advanced levels of energy efficiency specified in these voluntary performance standards. The proposed language introduces new requirements in the voluntary performance standards for additions and alteration projects. These changes improve the clarity and organization of the performance-based advanced energy efficiency standards and will be easier for local jurisdictions to adopt these voluntary measures as mandatory requirements in local building codes. This will minimize the energy use of buildings and make significant strides toward the state’s zero net energy building goals.

### **III. DOCUMENTS REFERENCED IN THE ENERGY EFFICIENCY REGULATIONS**

All of these documents are in the record of the Energy Commission’s rulemaking proceeding on the proposed standards and are available to the public.

#### **ALTERNATIVE CALCULATION METHOD (ACM) APPROVAL MANUALS FOR THE 2013 BUILDING ENERGY EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS**

The Residential and Nonresidential Alternative Calculation Method (ACM) Approval Manuals are adopted by regulation to support the Standards in Part 6. The ACM Approval Manuals contain requirements that developers of computer software must meet for the Energy Commission to approve their software for showing compliance with the Standards.

The ACM Approval Manuals are extensively revised to improve their clarity and organization. The ACM Approval Manuals include the information needed by the computer software vendors to understand how their software will be tested, what compliance reports need to be generated by the software, how compliance software programs are certified and decertified by the Energy Commission and what needs to be included in the application package provided to the Energy Commission for software certification. The detailed descriptions of the algorithms and modeling procedures used by the Energy Commission in the reference methods that are the basis of comparison in the compliance software certification processes are now documented in new ACM Reference Manuals. Each building energy simulation test that is included in the compliance software certification process is also described in the ACM Reference Manuals. The Residential and Nonresidential ACM Reference Manuals are not adopted by regulation, under the authority of Public Resources Code section 25402.1, subd. (e). Rather, they are developed after the adoption of the Standards and approved by the Energy Commission for use as reference material for compliance software vendors and other interested parties. These ACM Reference Manuals act as guidance documents for the performance compliance approach, similar to the way that the Energy Commission’s Residential and Nonresidential Compliance Manuals are guidance documents for the prescriptive compliance approach.

The proposed regulations separate the certification rules for compliance software from the detailed explanations of the modeling assumptions used in the reference method used as the

January 4, 2012

- Keith A. Temple, P.E., Proposed Improvements to Residential HVAC Diagnostic Test Protocols, CEC Contract 400-09-001, Work Authorization # 6, Subtask 2.1A, E Task Report
- Keith A. Temple, P.E., Subcooling Dependence on Condenser Airflow for Unitary Air Conditioning Systems with TxV Expansion Device, CEC Contract 400-09-001, Work Authorization # 6, Subtask 2.1B Task Report, June 9, 2011
- Keith A. Temple, P.E., Efficiency and Subcooling Variation with Refrigerant Charge for Unitary Air Conditioning Systems with TxV Expansion Device, CEC Contract 400-09-001, Work Authorization # 6, Subtask 2.1B Task Report, June 9, 2011
- Keith A. Temple, P.E., Review of Requirements and Recommendations for Charge Indicator Display (CID), CEC Contract 400-09-001, Work Authorization # 6, Subtask 2.1C Task Report, June 30, 2011
- Keith A. Temple, P.E., Comments and Recommendations for Saturation Temperature Measurement Sensors (STMS), CEC Contract 400-09-001, Work Authorization # 6, Subtask 2.1D Task Report, August 22, 2011
- Keith A. Temple, P.E., Comments and Recommendations for Mini-Split Air Conditioner and Heat Pump Systems, CEC Contract 400-09-001, Work Authorization # 6, Subtask 2.2 Task Report, September 27, 2011
- Keith A. Temple, P.E., Supplemental Data for Weigh-In Charge Method, CEC Contract 400-09-001, Work Authorization # 6, Subtask 2.3 Task Report, December 5, 2011
- Lennox HPXA19 Outdoor Unit Installation Instructions, August 16, 2010
- CASE Initiative “Residential Refrigerant Charge Testing and Related Issues, December 2011
- E-Mail Exchange between Jeff Miller (CEC) and Keith Temple , Updated Draft CASE Report on Refrigerant Charge, December 30, 2011
- E-Mail Exchange between Jeff Miller (CEC) and Glen Friedman (Taylor Engineering), RE: Draft 2013 Appendix NA2 – Non-Residential Air Distribution Systems Leakage Testing, January 26, 2012

#### **PART 11 – VOLUNTARY APPENDIXES, ENERGY CHAPTERS**

- “What Do Consumers Want from their Hot Water Systems?”, Gary Klein, High Performance Hot Water Systems, Technical Series, Third Quarter 200
- CASE Initiative “Solar Water Heating – Residential and Specialty Commercial”, October 2011

#### **V. CONSIDERATION OF REASONABLE ALTERNATIVES, INCLUDING THOSE THAT WOULD LESSEN ANY ADVERSE IMPACT ON SMALL BUSINESS**

For more than thirty-five years, legislative enactments and state energy policies have directed the Energy Commission to adopt cost-effective building standards to improve energy efficiency and

In response to comments from the solar industry, the home building industry, and building officials, the preliminary draft's mandatory requirements for solar-ready buildings was substantially modified. The revised requirements for solar-ready buildings allow greater flexibility in potential locations for future solar equipment. The revised requirements also provide additional exceptions for building sites that may not have adequate solar access.

In response to comments from building officials and the home builder industry, the preliminary draft's proposal to limit the length of hot water piping from the water heater to plumbing fixtures was modified, so that the requirements are easier to comply with and easier to verify during building inspections.

In response to comments from an electronic air filter manufacturer, the original proposal for a maximum air filter pressure drop requirement was eliminated, to allow more flexibility in system designs.

In response to comments from the HERS field verification and diagnostic testing industry, installation of Saturation Pressure Measurement Sensors (SPMS – sensing devices that measure the saturation pressure of the refrigerant used in space conditioning systems) was changed from a prescriptive requirement in the preliminary proposal, to an alternative in the proposed regulation that uses digital gages (mechanical devices that measure liquid pressure) in the space conditioning system refrigerant verification tests. This provides more flexibility to HERS raters when they complete the refrigerant charge verification procedures.

In response to HVAC industry comments expressing concern with the preliminary draft's protocol requiring that tests to verifying the proper amount of refrigerant within space conditioning systems be performed at outdoor temperatures of less than the manufacturer's recommended minimum temperature, the proposed regulations make this protocol available for use on a case-by-case basis, contingent upon a manufacturer's approval of the use of the protocol for its equipment.

In response to comments from commercial refrigeration system designers, supermarket engineers, and the U.S. Environmental Protection Agency, the preliminary draft's proposal that the *voluntary Green Building Standards* (Title 24, Part 11) limit CO<sub>2</sub> emissions from specified refrigeration systems (by requiring secondary CO<sub>2</sub> systems, which use CO<sub>2</sub> for refrigerant rather than other typical refrigerants that have high greenhouse gas emission characteristics) was rejected. These commenters urged the Commission to develop a comprehensive performance compliance approach to meet refrigeration system efficiency requirements, rather than specifying prescriptive requirements (such as for secondary CO<sub>2</sub> systems) that limit design flexibility and product choice. The Energy Commission plans to propose such an approach for the 2017 Standards update.

## **VI. FACTS, EVIDENCE, DOCUMENTS, TESTIMONY, OR OTHER EVIDENCE OF NO SIGNIFICANT ADVERSE IMPACT ON BUSINESS**

The discussion in the immediately preceding Section V., on the consideration of alternatives, demonstrates that the Commission has already made extensive changes in preliminary versions of the proposed regulations in order to reduce impacts on businesses, especially small businesses. (See Gov. Code, § 11346.2, subd. (b)(6).) Of course, the proposed regulations will still increase the costs of construction – but those costs will generally be passed on to the people who purchase and own buildings. Furthermore, as is required by law, the people who ultimately pay the increased costs of construction – building purchasers and owners -- will save substantially *more* money on their energy bills. For owners and operators of commercial buildings, those savings will translate directly into increased profits (or expanded business operations, which in turn will create more jobs). In addition, businesses that provide energy efficiency products and services associated with the Standards' requirements will have sales and