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California Energy Commission
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NINE-POINT-CRITERIA ANALYSIS

ADOPTED BUILDING STANDARDS OF THE CALIFORNIA ENERGY COMMISSION:

CALIFORNIA CODE OF REGULATIONS, TITLE 24, PARTS 1 and 6 (CALIFORNIA ENERGY CODE)

CALIFORNIA ENERGY COMMISSION DOCKET NUMBER 15-BSTD-01: 2016 BUILDING ENERGY EFFICIENCY STANDARDS

DECEMBER 4, 2015

Building standards submitted to the California Building Standards Commission (CBSC) for approval are required, by Health and Safety Code section 18930, subdivision (a), to be accompanied by an analysis which will, to the satisfaction of the CBSC, justify their approval. This document is the required analysis for the California Energy Commission's proposed updates to its energy and water efficiency standards in Part 1, Chapter 10, and Part 6 of Title 24, which were adopted by the Energy Commission on June 10, 2015 and November 12, 2015. The 9-Point Criteria Analysis for the Energy Commission's amendments to the voluntary standards in Part 11 (the Green Building Code) is being submitted as part of a separate rulemaking package.

Summary of the Adopted Standards

The California Energy Commission adopted deletions, additions, and amendments to its energy and water efficiency standards for buildings. These standards apply to residential, nonresidential, high-rise residential, and hotel and motel buildings. The standards are in Part 6 (also known as the California Energy Code) and associated administrative regulations in Part 1, Chapter 10, of Title 24 of the California Code of Regulations.

The Energy Commission adopted these standards under the authority established by the Warren-Alquist State Energy Resources Conservation and Development Act, in the following sections of the Public Resources Code: 25218, subdivision (e), 25402, 25402.1, 25402.4, 25402.5, 25402.8, 25910, and 25943. The standards were also adopted under the authority in the Building Standards Law, in Health and Safety Code sections 18930.5 and 18941.5.

The standards implement, interpret and make specific the Warren-Alquist Act, in the

following sections of the Public Resources Code: 25402, subdivisions (a)-(c), 25402.1, 25402.4, 25402.5, 25402.5.4, 25402.8, 25910, and 25943. The standards also implement and interpret the Building Standards Law, in Health and Safety Code sections 18930.5 and 18941.5.

Prior to the start of the formal rulemaking, the Energy Commission filed with the CBSC on January 27, 2015, the following:

- A Notice of Proposed Action (NOPA), which described the proceeding, summarized the proposed Standards, and explained how interested persons could participate;
- An Economic and Fiscal Analysis (Form 399);
- An Initial Statement of Reasons (ISOR), which presented the rationales for the Standards;
- Proposed Express Terms (45-Day Language) of the 2016 Standards; and
- The Initial Study and Proposed Negative Declaration for the 2016 Standards.

The CBSC subsequently submitted the necessary materials to the Office of Administrative Law on February 4, 2015. On that same date, the Energy Commission published the above referenced documents on the Energy Commission website. OAL published the NOPA in the California Regulatory Notice Register on February 13, 2015, beginning the formal rulemaking phase, and at that time the Commission began to receive comments on the proposed Standards.

In response to the comments, on May 26, 2015, the Energy Commission published revisions to the 45-Day Language. Those revisions, called 15-Day Language, were also made available for public comments. The Energy Commission adopted the proposed 2016 Building Energy Efficiency Standards, with the exception of the Nonresidential Lighting Alteration provisions in Sections 141.0(b)2I, J, K, and L, at a June 10, 2015 public hearing.

In response to the comments, on July 10, 2015, and again on October 27, 2015, the Energy Commission published two further revisions to the prior 15-Day Language relating to the Nonresidential Lighting Alteration provisions in Sections 141.0(b)2I, J, K, and L. Those revisions, called Proposed 15-Day Language for Section 141.0(b)2, Nonresidential Lighting Alteration Provisions and Revised 15-Day Language for Section 141.0(b)2, Nonresidential Lighting Alteration Provisions (respectively), were also made available for public comments.

The Energy Commission adopted the proposed Nonresidential Lighting Alteration Provisions for Sections 141.0(b)2I, J, K, and L, at a November 12, 2015 public hearing.

The 2016 Standards, inclusive of all adopted changes, will go into effect on January 1, 2017, if they are approved by the California Building Standards Commission.

1) The proposed building standards do not conflict with, overlap, or duplicate other building standards.

There is no overlap or duplication with other regulations because the Energy Commission is the only state agency authorized to set efficiency standards for buildings, and for the same reason there should be no conflict with other building standards (i.e., no situation in which it is impossible to comply with both an Energy Commission standard and another building standard). For example, considering the lighting energy efficiency standards and the electrical code:

- There are no conflicts between the Energy Code and the Electrical Code on lighting requirements. The Electrical Code requires illumination to be provided for all working spaces, whereas the Energy Code has requirements on the allowable maximum amount of lighting power to be used for the building space and also how the lighting system shall be controlled and switched.
- There are no conflicts between the Energy Code and Electrical Code on receptacle requirements. The Electrical Code contains requirement of the whereabouts of receptacles whereas the Energy Code contains the requirements for controlled receptacles for spaces including private offices, open office areas, reception lobbies, conference rooms, kitchenette in office spaces, copy rooms, hotel and motel guest rooms.
- There are no conflicts between the Energy Code and Building Code on egress lighting requirements. Other parts of the Building Code contains means of egress requirement and the Energy Code contains exception for means of egress for lighting area controls and shut-OFF controls.

Additionally, Article 1, Section 10-101(b), of the Standards explicitly states that nothing in them lessens any necessary qualifications or responsibilities of licensed or registered building professionals or other designers or builders, or the duties of enforcement agencies that exist under state or local law.

2) The proposed building standards are within the parameters established by enabling legislation and are not expressly within the exclusive jurisdiction of another agency.

The California Energy Commission has statutory authority under Public Resources Code sections 25213, 25402, 25402.1, 25402.4, 25402.5, 25402.8, and 25910 to promulgate and update energy- and water-efficiency standards for residential and nonresidential buildings, including both newly constructed buildings and additions and alterations to existing buildings. The Energy Commission is the only state agency with the authority to set efficiency standards for buildings. Nothing in the record shows otherwise. No commenter suggested otherwise.

3) The public interest requires the adoption of the building standards.

The Building Standards Law states that the "public interest includes, but is not limited to, health and safety, resource efficiency, fire safety, seismic safety, building and building system performance, and consistency with environmental, public health, and accessibility statutes and regulations." (Health & Safety Code, § 18930, subd. (a)(3).) The 2016 Standards are in the public interest, increase resource efficiency, building and building system performance, and are consistent with environmental, public health, and accessibility statutes and regulations.

When the Legislature created the Energy Commission over forty years ago, it stated that the California economy, and indeed the well-being of all California citizens, depends on an adequate, reasonably-priced, and environmentally-sound supply of energy.[1] The Legislature also stated that growth in electricity demand has strained the reliability of California's electricity system, created potential environmental stresses, and contributed to a substantial rise in electricity prices.[2] Finally, the Legislature recognized that improvements in energy efficiency are among the most cost-effective and environmentally-friendly methods to help bring demand and supply into balance.[3] These facts remain as true today as they were then, and they make clear that adoption of the 2016 Energy Standards is required for the public interest.

The 2016 Standards will continue to improve upon the existing Standards and continue to address policy directives that influenced the past Standards updates. These policy directives include:

- The 2003 Energy Action Plan (EAP) which established a "loading order" of energy resources and strategies to address the State's growing energy demands (through conservation and energy efficiency to minimize energy demand first, followed by electricity generation from renewable energy resources and distributed generation).[4]

- The Climate Action Initiative (Executive Order S-3-05, June 2005) which sets greenhouse gas (GHG) emission reduction targets for California, as follows: by 2020, reduce GHG emissions to 1990 levels, and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

- The Global Warming Solutions Act of 2006, (Assembly Bill 32, Núñez, Stats. 2006, Ch. 488) codified the 2020 GHG emission reduction target into law. AB 32 requires the Air Resources Board (ARB) to report and verify statewide greenhouse gas emissions. The Act further requires that the ARB, in coordination with other State agencies, achieve the maximum technologically

[1] Pub. Resources Code, § 25001; see also § 25300, subd. (a).
[2] See Pub. Resources Code, § 25002.
[3] See Pub. Resources Code, §§ 25001, subds. (a) & (b), 25007.
[4] http://www.energy.ca.gov/energy_action_plan/2003-05-08_ACTION_PLAN.PDF.

feasible and cost–effective GHG emission reductions, setting the stage for the State's transition to a sustainable, clean-energy future. Improving the energy efficiency of buildings is the single most important activity to reduce greenhouse gas emissions in the electricity and natural gas sectors. Thus expanding and strengthening building standards is a key recommendation of the Climate Change Proposed Scoping Plan.[5] Proposed strategies include zero-net-energy buildings, more stringent building codes and appliance-efficiency standards, broader standards for new types of appliances and for water efficiency, improved compliance and enforcement of existing standards, and voluntary efficiency and green building targets beyond mandatory codes.

- The Energy Commission's 2011 Integrated Energy Policy Report (IEPR) includes many greenhouse gas emission reduction and energy-efficiency strategy recommendations.[6] Energy efficiency is identified as the first strategy for accomplishing significant greenhouse gas reduction targets because it is a fast and inexpensive solution. The 2011 IEPR reiterated the statewide goal that new building standards achieve zero net energy levels by 2020 for residences and by 2030 for commercial buildings.

- The California Public Utility Commission's (CPUC) California Long Term Energy Efficiency Strategic Plan, endorses the Energy Commission's zero-net-energy goals for all newly-constructed homes by 2020, and 2030 for all newly-constructed commercial buildings.[7] The Investor Owned Utilities (IOUs) authored the plan under the direction of the CPUC, and these utilities are now developing public goods incentive programs for the 2013-2015 program period that support the implementation of this strategic plan.

- Governor Brown's Clean Energy Jobs Plan establishes the priorities of his Administration to aggressively pursue clean energy jobs in California through renewable energy and energy efficiency, extending the success of programs established in his first Administration and the ensuing 30 years, which have triggered innovation and creativity in the market. The Clean Energy Jobs Plan calls for the development of 12,000 megawatts of localized, renewable electric generation by 2020, new energy efficiency standards for buildings to achieve dramatic energy savings, creating a path for making newly constructed residential and commercial buildings "zero net energy" through high levels of energy efficiency combined with onsite renewable electric generation, stronger appliance standards for lighting, consumer electronics and other products, in conjunction with increased public education and enforcement efforts so the gains promised by the efficiency standards are in fact realized.[8]

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[5] http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf
[6] http://www.energy.ca.gov/2011publications/CEC-100-2011-001/CEC-100-2011-001-CMF.pdf
[7] http://www.cpuc.ca.gov/NR/rdonlyres/A54B59C2-D571-440D-9477-3363726F573A/0/CAEnergyEfficiencyStrategicPlan_Jan2011.pdf
[8] http://gov.ca.gov/docs/Clean_Energy_Plan.pdf

- The Air Resource Board, Energy Commission, CPUC, the California Environmental Protection Agency (CalEPA) and the Independent System Operator collaborated in 2008 to develop California's Clean Energy Future Vision, accompanied by an implementation plan[9] and roadmap.[10] California's Clean Energy Future underscored the need to continue investing in energy efficiency and clean technologies to maintain California's leadership as the most energy efficient and forward-thinking state in the nation. The document integrates energy efficiency with the monumental effort required to attain California's renewable energy and other environmental objectives. California's Clean Energy Future re-confirmed energy efficiency as California's top priority electric generation resource, and identified renewable energy as the electric generation supply-side resource of choice. The document identified the major two goals for energy efficiency as: 1) achieving zero net energy in newly constructed residential and commercial buildings, and 2) decreasing energy consumption by 30 to 70 percent in existing residential and commercial buildings. The Building Energy Efficiency Standards play a major role in achieving these goals.

- Executive Order B-18-12, April 25, 2012[11] and its accompanying Green Building Action Plan[12] which set more stringent energy efficiency, renewable on-site generation, and greenhouse gas emission and water consumption reduction requirements for State agencies and State buildings as follows:

  - State agencies, departments, and other entities under direct executive authority take actions to reduce entity-wide greenhouse gas emissions by at least 10% by 2015 and 20% by 2020, as measured against a 2010 baseline.

  - New State buildings and major renovations beginning design after 2025 must be constructed as Zero Net Energy facilities with an interim target for 50% of new facilities beginning design after 2020 to be Zero Net Energy.

  - State agencies shall take measures toward achieving Zero Net Energy for 50% of the square footage of existing state-owned building area by 2025.

  - State agencies continue taking measures to reduce grid-based energy purchases for State-owned buildings by at least 20% by 2018, as compared to a 2003 baseline, and reduce other non-building, grid-based retail energy purchases by 20% by 2018, as compared to a 2003 baseline.

  - Proposed new or major renovation of State buildings larger than 10,000 square feet use clean, on-site power generation, such as solar photovoltaic,

[9] http://www.cacleanenergyfuture.org/documents/CCEFImplementationPlan.pdf
[10] http://www.cacleanenergyfuture.org/documents/CCEFRoadmap.pdf
[11] http://gov.ca.gov/news.php?id=17508
[12] http://gov.ca.gov/docs/Green_Building_Action_Plan_B.18.12.pdf

solar thermal and wind power generation, and clean back-up power supplies, if economically feasible.

- New and existing State buildings incorporate building commissioning to facilitate improved and efficient building operation.

- State agencies identify and pursue opportunities to provide electric vehicle charging stations, and accommodate future charging infrastructure demand, at employee parking facilities in new and existing buildings.

- State agencies reduce overall water use at the facilities they operate by 10% by 2015 and by 20% by 2020, as measured against a 2010 baseline.

All of these enactments and policy statements demonstrate that the energy efficiency advances that will be produced by the 2016 Standards are crucial to the state's energy reliability and economic and environmental health.

The public interest in the adoption and approval of the 2016 Standards is also demonstrated by their cost-effectiveness, which is discussed in detail in section 5 below.

No comment in the Energy Commission's rulemaking proceeding asserted that the public interest does not require adoption of the proposed 2016 Building Energy Efficiency Standards as a whole. Some comments opposed, or recommend changes in, specific provisions of the proposed Standards, for various reasons. Those comments, and the Commission's responses to them, are thoroughly discussed in the Comments & Responses section of the Final Statement of Reasons for the rulemaking, which is being submitted to the Building Standards Commission as part of the entire package that includes this 9-Point-Criteria Analysis.

4) The proposed building standards are not unreasonable, arbitrary, unfair, or capricious, in whole or in part.

The record of the Energy Commission's rulemaking proceeding demonstrates that the 2016 Building Energy Efficiency Standards are not unreasonable, arbitrary, unfair, or capricious, in whole or in part. As was just discussed in section 3 of this Analysis, the Building Energy Efficiency Standards respond to the mandates of the Warren-Alquist Act, the Global Warming Solutions Act of 2006, California's Energy Action Plan 2008 Update, the California Energy Efficiency Long-Term Strategic Plan, the 2011 Integrated Energy Policy Report, the California's Clean Energy Futures Initiative, and Governor Brown's Clean Energy Jobs Plan.

The express terms of the 2016 Standards and the process through which the language was adopted (including the voluminous comments, both supporting the Standards and suggesting edits which were incorporated into the final proposal), show that this criterion was met. Some comments suggested additional measures or revisions to existing

language, or challenged, or proposed modifications to, various provisions of the proposed measures. The Energy Commission analyzed such comments fully and either accepted the changes proposed by the comments or determined that the comments were invalid. For a complete discussion of the comments, see the Comments & Responses section of the Final Statement of Reasons for the rulemaking, which is submitted to the Building Standards Commission as part of the entire rulemaking package.

5) The cost to the public is reasonable, based on the overall benefit to be derived from the building standards.

The record overwhelmingly demonstrates that the 2016 Building Energy Efficiency Standards are cost-effective, as found by the Energy Commission when it adopted the Standards. The added construction costs that the Standards will impose are reasonable based on the economic, environmental, and other benefits that will be derived from the Standards and that will substantially outweigh the costs. In other words, although building owners and operators will see increases in the costs of purchasing buildings, the savings in natural gas and electricity costs will drastically outweigh such initial costs.

In addition, the Standards will require changes in some construction practices, including in the post-construction testing of building components. This in turn may require the retraining of employees, but any costs attributable to such changes and retraining will be short-term in nature, and are expected costs associated with continual improvements in construction practices, employee skills, and building codes generally, as new protocols and technologies become mainstream. The Energy Commission provides ongoing training in the Standards in conjunction with Investor Owned Utilities and professional organizations, such as the California Association of Building Energy Consultants, to encourage this reduction in costs. Moreover, the changes will increase employment and profit opportunities for segments of the construction industry involved with the production of advanced energy efficiency technologies implemented by the Standards, and those responsible for conducting post-construction testing.

The 2016 Standards will reduce the energy use of typical new buildings by around 25 percent compared to buildings constructed under the current standards. In 2017, buildings constructed and retrofitted pursuant to the 2016 Standards are projected to:

- Have a statewide cost of an additional $1 billion to build or retrofit;
- Have a state savings of over $4 billion in initial, maintenance and energy costs over 30 years;
- Have decreased water consumption of approximately 106.2 million gallons (roughly 326 acre-feet) per year;

- Reduce statewide annual electricity consumption by about 281 gigawatt-hours per year (GWh/yr), and natural gas consumption by 16 million therms per year;

- Result in a net reduction in the emission of nitric oxides (NOx) by roughly 508 tons per year, sulfur oxides (SOx) by 13 tons/year, carbon monoxide (CO) by 41 tons/year and particulate matter less than 2.5 microns in diameter (PM2.5) by 13.75 tons per year; and

- Reduce statewide carbon dioxide equivalent (CO2e) emissions by 160 thousand metric tons per year.

To further illustrate the anticipated savings, in the residential context, the 25.6 percent natural gas and 11.7% electricity efficiency improvements in the 2016 Standards will provide a 3.5:1 return on a typical homeowner's investment. If factored into a 30-year mortgage, the standards will add approximately $14.50 per month to the cost of the average home (assuming call costs are first costs and the full costs are financed at 5% for 30 years), but will save approximately $20.5 on monthly heating, cooling, and lighting bills (net present savings, nominal savings will be higher). On average, the 2016 Standards will increase the cost of constructing a new residential building by $2,700 but will return more than $7,400 in energy savings over 30 years.

The Energy Commission estimates average increases in construction costs of about $2,700 for new single family residential buildings and about $33,650 for a 15,000 square foot commercial building. These are less than 1.5 percent of typical construction costs for typical buildings and these increases will be more than recouped by the energy cost savings. Furthermore, the construction cost increases are likely higher than will be realized because they do not fully account for volume pricing or anticipated reductions in costs once new energy-efficiency technologies are provided to a mass market.

There was, as one might expect, a fair amount of discussion about the cost-effectiveness of various provisions of the Standards during the Energy Commission's rulemaking proceeding. The Energy Commission's assessments of the applicable comments are discussed in the Final Response to Comments accompanying the Final Statement of Reasons.

6) The proposed building standards are not unnecessarily ambiguous or vague, in whole or in part.

Throughout the one-and-a-half-year rulemaking process, the Energy Commission made many changes to proposed draft language of new measures to ensure their clarity, as well as proposed changes to existing regulations to improve their clarity. Any proposals suggesting clarity improvements that were rejected by the Commission are discussed in the Final Response to Comments section of the FSOR. There were no comments on the 15-Day Language asserting unnecessary ambiguity or vagueness.

7) The applicable national specifications, published standards, and model codes have been incorporated into the proposed Building Standards as required by the State Building Standards Law, where appropriate.

There are no federal laws applicable to nonfederal buildings in their entirety, so nothing in this realm could have been incorporated into the 2016 Standards. However, the adopted Standards do incorporate (as previous editions of the Standards have for decades incorporated) federal energy standards for particular appliances that may be installed in buildings.

In addition, the Energy Commission included model and national codes and specifications in the 2016 Standards wherever appropriate. For example, the Standards require heating and cooling systems to meet minimum efficiency requirements for space conditioning equipment that are as or more stringent than the minimum efficiency requirements in ASHRAE 90.1-2013.

Some of the comments received during the rulemaking proceeding addressed the incorporation into the proposed Standards of various specifications, standards, and codes. The Commission either accepted the recommendations or had sound rationales to reject them, as is fully explained in the Comments & Responses section of the accompanying FSOR.

8) The format of the proposed building standards is consistent with that adopted by the Building Standards Commission.

The 2016 Standards continue to use the format of the other building standards in the State Building Code. Nothing in the record suggests otherwise.

9) The proposed building standards, if they promote fire and panic safety, as determined by the State Fire Marshal, have the written approval of the State Fire Marshal.

The Energy Commission obtained the approval of the State Fire Marshal for the 2016 Standards. The State Fire Marshall has determined that the proposed 2016 Building Energy Efficiency Standards do not promote fire or panic safety. This document is included in the record (see document #75653).