California Energy Commission
SUPPLEMENTAL STAFF REPORT

SUPPLEMENTAL INITIAL STUDY/PROPOSED NEGATIVE DECLARATION FOR THE 2013 BUILDING ENERGY EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS

CALIFORNIA
ENERGY COMMISSION
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ABSTRACT

Public Resources Code Sections 25402 requires the California Energy Commission to adopt, implement, and periodically update energy efficiency standards for both residential and nonresidential buildings to ensure that building construction, system design, and installation achieve energy efficiency while achieving other statutory expectations to maintain outdoor and indoor environmental quality.

The proposed 2013 Building Energy Efficiency Standards (Title 24, Parts 6, 1, and 11) will encourage future solar electric and thermal systems, improve residential building envelopes, improve lighting and lighting controls, add building commissioning, add requirements for process loads (most notably data centers), expand acceptance testing and data collection, and establish reach codes for "green buildings."

The Energy Commission rulemaking proceeding began on February 7, 2012, with the release of the Proposed 2013 Building Energy Efficiency Standards (45-day language) and the Initial Study/Proposed Negative Declaration (March 26, 2012) for public comment.

The following changes to the 45-day language were proposed by the Lead Commissioner for Energy Efficiency and Energy Commission staff. These changes will have no effect on or will reduce the potential environmental impacts as stated in the Initial Study, while continuing to save high levels of electricity and natural gas.

- The reduction of wall insulation requirements in some climate zones;
- The elimination of roof deck insulation requirements in some climate zones;
- The elimination of quality insulation installation requirements for residential buildings in some climate zones;
- The added energy budget credit for on-site renewable energy generation;
- The elimination of upgradeable setback thermostats as a mandatory requirement for residential buildings; and
- The addition of several exceptions for the solar-ready requirements.

Therefore, Energy Commission staff recommends the adoption of a Negative Declaration for the 2013 Building Energy Efficiency Standards.

Keywords: 45-day language, upgradeable thermostat, solar-ready, wall insulation, on-site renewable energy credit

Loyer, Joseph M., 2012. *Supplemental Initial Study/Proposed Negative Declaration for the 2013 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*. California Energy Commission, High Performance Buildings and Standards Development Office. CEC-400-2012-002-SP

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EXECUTIVE SUMMARY

Public Resources Code Section 25402 requires the California Energy Commission to adopt, implement, and periodically update energy efficiency standards for both residential and nonresidential buildings to ensure that building construction, system design, and installation achieve energy efficiency while achieving other statutory expectations to maintain outdoor and indoor environmental quality.

The proposed 2013 Building Energy Efficiency Standards (Title 24, Parts 6, 1, and 11) will encourage future solar electric and thermal systems, improve residential building envelopes, improve lighting and lighting controls, add building commissioning, add requirements for process loads (most notably data centers), expand acceptance testing and data collection, and establish reach codes for "green buildings."

The Energy Commission rulemaking proceeding began on February 7, 2012, with the release of the *Proposed 2013 Building Energy Efficiency Standards* (45-day language) and the *Initial Study/Proposed Negative Declaration* (March 26, 2012) for public comment.

The following changes to the 45-day language were proposed by the Lead Commissioner for Energy Efficiency and Energy Commission staff. These changes will have no effect on or will reduce the potential environmental impacts as stated in the Initial Study, while continuing to save high levels of electricity and natural gas.

- Sections 150.0 (c), 150.1 (c)(1)(B)(i) and (ii) set the insulation requirements for walls in residential buildings. The prescriptive requirement for walls has been reduced from R19 plus R-4 rigid exterior insulation to R15 plus R-4 rigid exterior insulation in some climate zones. When 2x6 stud wood frame construction is used in buildings, the mandatory requirement for those walls is R-19 insulation.
    - Since the new language allows for less insulation, there will be a decrease in the use of raw materials used for insulation. Thus, there will be no additional environmental impact.
- Section 150.1 (c)(1) required the use of roof deck insulation as a prescriptive measure for residential buildings in some climate zones.
    - This change will reduce the use of insulation material, reducing an environmental impact that was already determined to be less than significant in the Initial Study. Thus, there will be no additional impact.
- Section 150.1(c)(1)(C) required that insulation for residential buildings comply with the Quality Insulation Installation (QII) as a prescriptive requirement for climate zones 1 through 5 and 11 through 16. This requirement has been eliminated.

- As this requirement used no material to implement, there will continue to be no impact.

- Section 150.1 (b)(2) specified how the energy budget for a proposed building design is to be calculated. The addition to the 45-day language allows the estimated energy use of the proposed building to be reduced if on-site solar electric generation is installed (i.e., provides an energy budget compliance credit), according to methods established by the Energy Commission in the *Residential ACM Reference Manual.* This will have the effect of reducing other energy efficiency measures in the building, such as building envelope, lighting control, HVAC and domestic hot water improvements.

    - While material use will increase for solar panel installations, material use will also decrease from the reduction of energy efficiency measures, such as insulation, lighting fixtures and controls, efficient HVAC systems, mechanical ventilation, domestic hot water, or overall building envelope performance improvement. The use of on-site renewable energy may result in a small increase in raw materials being used in the construction of a building. However, the Initial Study clearly demonstrated that small changes in raw material uses would cause environmental impacts that are less than significant.

- Section 110.2 (c) in the 45-day language required that unitary heating and cooling systems (including heat pumps) be controlled by upgradable setback thermostats. The language for residential buildings now calls for the use of setback thermostats instead, which was the original requirement from the 2008 Building Energy Efficiency Standards.

    - The amounts of raw materials used to create the two types of devices are not significantly different. Thus, there will be no additional impact.

- Several exceptions have been provided to the solar-ready requirements (Section 110.10) for residential buildings. The exceptions will allow the square footage requirements of the designated rooftop solar zone to be reduced from 250 square feet to 150 square feet or eliminate the requirement altogether. The exceptions typically require a combination of efficiency measures such as: the appropriate use of occupant-controlled smart thermostats (OCST), indoor and outdoor high-efficacy lighting and required controls, bathroom lighting controlled by a vacancy sensor, domestic solar hot water installation as well as a full exception for an actual installation of a photovoltaic system.

    - If the builder decides to comply using these exceptions, the use of raw materials may increase. However, it is likely that the difference in raw material use will be small because the required efficiency measures would result in very little additional raw material use compared to the measures that would otherwise be used. The Initial Study clearly demonstrated that small changes in raw material uses would cause environmental impacts that are less than significant.

In the Initial Study, Energy Commission staff estimated that the implementation of the 2013 Building Energy Efficiency Standards would reduce statewide annual electricity consumption by approximately 470 gigawatt-hours per year, electrical peak demand by 150 megawatts, and natural gas consumption by 12 million therms per year. The proposed changes to the 45-day language of the 2013 Building Energy Efficiency Standards will reduce these benefits. However, these estimated benefits were not mitigation under the California Environmental Quality Act (CEQA), and thus do not need to be updated at this time. Even with the proposed changes to the 45-day language, the proposed 2013 Building Energy Efficiency Standards will save a significant amount of electricity and natural gas.

Energy Commission staff analyzed the environmental impacts of the proposed 2013 Building Energy Efficiency Standards for residential and nonresidential buildings. In addition to outdoor air emissions, other issues addressed in the Initial Study include water savings (both onsite and at California power plants), indoor air pollution and changes in materials use, including the use of mercury, lead, copper, steel, plastic silicon, gold, aluminum, fiberglass, titanium, glass, and wood. Energy Commission staff believes that the potential environmental impacts associated with the implementation of the 2013 Building Energy Efficiency Standards are less than significant. The proposed changes to the 45-day language of the 2013 Building Energy Efficiency Standards will have either no effect on or will reduce the potential environmental impacts as stated in the Initial Study. Therefore, Energy Commission staff recommends the adoption of a Negative Declaration for the 2013 Building Energy Efficiency Standards.

Supplemental Staff Assessment

As a result of the comments received during the public comment period, the Lead Commissioner for Energy Efficiency and Energy Commission staff recommended changes to the 45-day language. Staff has considered the changes for the purposes of updating the recommended findings in Initial Study/Proposed Negative Declaration.

Summary of Changes and Potential Impacts

Sections 150.0 (c), 150.1 (c)(1)(B)(i) and (ii) set the insulation requirements for walls in residential buildings. The insulation requirements in the 45-day language may have encouraged some builders to use 2x6 studs as opposed to 2x4 studs in wood frame construction, but this was a prescriptive requirement meaning that the builder had many options to demonstrate compliance without resorting to 2x6 studs. The basic insulating requirement for walls has been reduced from R19 to R15. The mandatory residential code section 150.0 (c) continues the wall insulation requirements for 2x4 wood frame construction (set to R-13) and adds a new requirement for 2x6 construction (set to R-19). Section 150.1 (c)(1)(B)(i) specifies the prescriptive requirements for 2x4 construction and sets the insulation requirements to R13+5 or R15+4, both are equivalent to a U-Factor of 0.65 (the +5 and +4 refer to the insulating value of the exterior sheathing). Section 150.1 (c)(1)(B)(ii) specifies the prescriptive requirements for 2x6 construction, and requires the same U-factor as 2x4 construction with R-15 +4 insulation.

While less insulation will result in lower energy savings, the energy savings will still be strongly improved compared to the 2008 Standards. Because the new language allows less insulation material to be used, there will be a decrease in the use of fiberglass and other insulation materials. Thus, there will be a reduction in the environmental impact, which was determined to be less than significant in the Initial Study.

Section 150.1 (c)(1) required the use of roof deck insulation as a prescriptive measure for residential buildings in specific climate zones. The Energy Commission staff expects that this trade off will result in a slightly lower consumption of raw materials. Thus, there will be no additional impact.

Section 150.1(c)(1)(C) required that insulation for residential buildings comply with the Quality Insulation Installation (QII) requirements for climate zones 1 through 5 and 11 through 16. This requirement has been eliminated. As this requirement requires no material to implement, there will be no impact.

Section 150.1 (b)(2) specified how the energy budget for a proposed building design is to be calculated. The addition to the 45-day language allows the estimated energy use of the proposed building to be reduced if on-site solar electric generation is installed (i.e., provides an energy budget compliance credit), according to methods established by the Energy Commission in the *Residential ACM Reference Manual*. While this would reduce the building's energy efficiency performance, it may promote the market choice for solar electric panel installations. The builder is not obligated to make use of this compliance credit, thus its impacts on a statewide basis are indeterminable.

Additionally, since it is possible to trade any aspect of the building energy efficiency measures for solar power, it is not possible to determine exactly what materials may or may not be used in the construction of the building. While material use will increase for solar panel installations, material use will decrease due to the use of reduced energy efficiency measures, such as less insulation, less lighting fixtures and controls, less efficient HVAC systems, or lower performing windows. Therefore, it is likely that allowing the installation of onsite solar electric systems to reduce the building energy budget will result in environmental impacts that are less than significant.

Section 110.2 (c) in the 45-day language required that unitary heating and cooling systems (including heat pumps) be controlled by upgradable setback thermostats. The language now calls for the use of setback thermostats instead, which was the original requirement from the 2008 Standards. The elimination of the upgradable setback thermostat mandatory requirement in residential buildings will reduce electricity savings, but the materials used to manufacture upgradable setback thermostats are not significantly different than the setback thermostats that have been required in the Standards for decades. Therefore, the elimination of upgradable setback thermostats will have no potential environmental impacts.

The solar-ready requirements (Section 110.10) for residential buildings have several exceptions that will either reduce the square footage requirements of the designated rooftop solar zone from 250 square feet to 150 square feet or eliminate the requirement altogether. The exceptions typically require a combination of elements such as the appropriate use of OCST, indoor and outdoor high-efficacy lighting and required controls, bathroom lighting controlled by a vacancy sensor, domestic solar hot water installation, as well as a full exception for an actual installation of a photovoltaic system. A builder can make use of these exceptions as an option. However, the builder can instead choose to dedicate 250 square feet on the roof of the residential building to a future solar installation. Thus, the potential impacts from the statewide implementation of these exceptions are speculative.

The potential impacts from the application of the requirements of these exceptions are very small as discussed above. It is reasonable to conclude that these exceptions will have an environmental impact that is less than significant.

Conclusions

The Energy Commission has analyzed the environmental impacts of the proposed 2013 Building Energy Efficiency Standards for residential and nonresidential buildings and the proposed changes to the 45-day language. Air emissions, water savings (both onsite and at California power plants), indoor air pollution, and increased materials use were considered. The Initial Study concludes that the potential environmental impacts associated with the implementation of the 2013 Building Energy Efficiency Standards are less than significant. The Supplemental Initial Study concludes that the changes to the 45-day language will continue to save high amounts of energy (both electricity and natural gas), and will represent potential environmental impacts that are less than significant. Therefore, a negative declaration for the 2013 Building Energy Efficiency Standards should be adopted.