STATE OF CALIFORNIA

State Energy Resources Conservation and Development Commission

APP-TECH, Incorporated, Petition for Rulemaking to Amend Portions of the 2013 Building Energy Efficiency Standards, California Code of Regulations, Title 24, Part 6, and Associated Administrative Regulations in Part 1, Chapter 10	**Docket No. 15-MISC-01** **Order No. 15-0225-3**

CALIFORNIA ENERGY COMMISSION STAFF ANALYSIS RECOMMENDING DENIAL OF APP-TECH, INCORPORATED'S PETITION FOR AN EMERGENCY RULEMAKING

I. INTRODUCTION

APP-TECH, Incorporated, has petitioned for an emergency rulemaking proceeding to amend portions of the 2013 Building Energy Efficiency Standards, California Code of Regulations, title 24, part 6, and associated administrative regulations in part 1, chapter 10 (Standards). For the reasons explained below, Energy Commission staff recommends that the Commission deny the petition.

For additional information regarding this matter, please contact Ms. Taylor G. Rhodes, Attorney, at (916) 654-4636, or Taylor.Rhodes@energy.ca.gov. Interested persons have a right to obtain a copy of the petition and other related documents from the Energy Commission.[1]

II. PROCEDURAL HISTORY

The Energy Commission is statutorily directed to adopt cost-effective building design and construction standards that increase energy and water conservation and efficiency.[2] After a lengthy and complex public process, under the authority of section 25402 of the Public Resources Code, the Energy Commission adopted the 2013 update to the Building Energy Efficiency Standards, located in part 6 of title 24, and associated administrative regulations in part 1, chapter 10, of the California Code of Regulations ("Standards"). These regulations were subsequently approved by the Building Standards Commission, and became effective on July 1, 2014.

[1] Gov. Code § 11340.7.

[2] Pub. Res. Code § 25402.

On January 14, 2015, the Energy Commission received a petition from Mr. Patrick Splitt, President of APP-TECH, Incorporated, requesting an emergency rulemaking.[3] On January 15, 2015, Mr. Splitt submitted supplemental information that was referenced in the January 14th petition.[4] And, on January 20, 2015, Mr. Splitt requested that the Energy Commission replace the January 14th petition with a new version to correct an incorrect date in the header of the original petition (Petition).[5]

Energy Commission Attorney, Taylor Rhodes, discussed with Mr. Splitt via telephone on January 16, 2015, that section 1221 of the Standards requires the Energy Commission to make a determination, on the petition, at a Business Meeting, within thirty days of the date the petition was filed.[6] The next scheduled Business Meeting, after Mr. Splitt submitted the petition, is February 25, 2015, which is more than thirty days from the date the petition was filed. Mr. Splitt has agreed to extend the time, beyond the thirty days, until February 25, 2015, for the Energy Commission to consider the petition.

On January 20, 2015, the Executive Director certified APP-TECH, Incorporated's petition as complete and directed staff to schedule the petition to be heard at the next Commission business meeting. The Energy Commission sent APP-TECH, Incorporated, a courtesy electronic copy, and mailed a paper copy, of this certification on January 22, 2015.[7]

III. ENERGY COMMISSION STAFF ANALYSIS

In its petition to commence an emergency rulemaking, APP-TECH, Incorporated presents twenty-one requests for amendments to the Standards[8] and requests that the Energy Commission "immediately commence a concurrent Standard and Emergency Rulemaking Procedure."[9]

In considering the merits of the petition, Energy Commission staff analyzed the information submitted, gathered additional information, and reviewed the rulemaking record[10] of the Standards.

Upon completing its analysis, Energy Commission staff has determined that APP-TECH, Incorporated, relies on general assertions and has not submitted specific facts demonstrating that adopting the amendments is necessary for the immediate preservation of the public peace, health and safety, or general welfare.[11] Energy Commission staff has

[3] Docket number 15-MISC-01, document no. TN 74291. Note, all subsequent citations to a TN number are a document number.

[4] Docket number 15-MISC-01, TN 74295, TN 74293.

[5] Docket number 15-MISC-01, TN 74331. Please note that this is the version of the petition that the Energy Commission reviewed when making this determination.

[6] Cal. Code Regs., tit. 20, § 1221.

[7] Docket number 15-MISC-01, TN 74375.

[8] Docket number 15-MISC-01, TN 7433, pp. 3 – 15.

[9] Docket number 15-MISC-01, TN 74331, p. 1.

[10] Docket number 12-BSTD-01.

[11] Cal. Code of Regs., tit. 24, pt. 1, ch. 1, § 1-317.

found that, based on ongoing communications with the regulated community and through various education and outreach activities, many of the concerns APP-TECH, Incorporated asserts in its petition are being raised for the first time, and do not constitute an emergency.

Where Energy Commission staff believes that APP-TECH, Incorporated, raises valid concerns, Energy Commission staff has suggested, in the below analysis, the actions that it will endeavor to take to address the concerns. Where such alternative actions are noted below, Energy Commission staff believes that the recommended actions are more efficient and effective actions when compared to initiating a rulemaking. Energy Commission staff also invite APP-TECH, Incorporated, to participate in the rulemaking process to update the Standards for the next code cycle (the 2016 Standards are currently available for public comment).[12]

1. Section 120.7 of the Standards[13]

APP-TECH, Incorporated, asserts that mandatory performance method insulation requirements in section 120.7 of the Standards do not reduce building energy consumption and that the only effect that these requirements will have is to increase costs and reduce design flexibility.[14]

Energy Commission staff has determined that this requirement provides an appropriate baseline efficiency level for new construction; since insulation will often remain in place over the life of the building, the requirement has persistence. The mandatory requirements of this section are intended, in part, to support the long-term goal of zero net energy buildings by not allowing building envelope components to be traded away under the performance modeling compliance method. Building envelope efficiency provides a strong foundation that will minimize needs for onsite generation in order to attain long-term energy goals. The U-factor requirements of this section were identified to allow design flexibility when using either the prescriptive or the performance compliance methods.

Before beginning preparation of the proposed Standards for the 2013 update, the Commission updated and published a “Life-Cycle Methodology” and a “Time Dependent Valuation of Energy for Developing Building Efficiency Standards.”[15] The Life-Cycle Methodology uses a net-present-value approach to consider the time-dependent value of electricity and natural gas over the expected life of each proposed building energy efficiency measure (either 15 or 30 years, depending on the measure) in each of the

[12] For more information on how to participate in the 2016 Energy Standards rulemaking, please see http://www.energy.ca.gov/title24/participation.html.

[13] For clarity, Energy Commission staff will coordinate these heading captions to the headings that appear in the petition so that the same text appears.

[14] Petition, pp. 3 – 4.

[15] See http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/general_cec_documents/2011-01-14_LCC_Methodology_2013.pdf; http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/general_cec_documents/Title24_2013_TDV_Methodology_Report_23Feb2011.pdf.

sixteen designated California climate zones. Accepted discount rates are used to calculate the present worth of the future costs and benefits of each measure. The present value of the costs is compared against the present value of the benefits. For a measure to be adopted into the Standards, the present value of the savings (benefits) must outweigh the present value of the costs.

The following costs and savings were considered in the Life-Cycle Methodology for the 2013 Standards:

1. First cost of the measure, including labor and construction costs

2. Energy savings over the life of the measure

3. Operation and maintenance cost of the measure

4. Replacement costs of the measure

The Commission used a variety of techniques to obtain the first costs for a measure, including obtaining quotes from manufacturers, wholesalers, and distributors, reviewing published data from retailers' websites, and using the construction industry estimating resource RS Means Catalogue. The measure cost that is used in the life-cycle analysis is the "final" cost to the building owner, and includes all markups and profits that are expected to be applied to the product through the distribution chain.

The life-cycle costs were presented at public workshops held before the rulemaking proceeding, and were revised in response to public comment. The results of this research and discussions were presented in the Codes and Standards Enhancement Initiative (CASE) reports that were among the "documents relied upon" for the Standards.[16] For example, the "Nonresidential & High-Rise Residential Fenestration Requirements" CASE report lays out the cost basis for the fenestration improvements under the 2013 Standards.[17] These insulation requirements were shown to be cost-effective when their costs were compared to the time-dependent value of the energy they were shown to save.

APP-TECH, Incorporated has not presented any evidence or levied any criticism of these methodologies or costs, but merely asserts, without support, that the mandatory minimum insulation requirements in section 120.7 of the Standards do not reduce building energy consumption and that the only effect of these requirements is to increase costs and reduce design flexibility. As stated above, Energy Commission staff finds no evidence to support APP-TECH, Incorporated's assertion. Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[18]

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[16] See: http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/ISOR_Documents_Relied_Upon.pdf.

[17] See: http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/current/Reports/Nonresidential/Envelope/2013_CASE_NR_Fenestration_Reqs_Sept_2011.pdf.

[18] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (d), (f).

2. NR-ACM Reference Manual Section 5.5.7 of the Standards

APP-TECH, Incorporated, asserts in its petition that the Energy Commission public domain compliance software for commercial buildings (CBECC-Com) models vertical glazing in nonresidential retail building as "Fixed Window", and that fenestration types for skylights are restricted to "Glass, Curb Mounted".[19] As a consequence, the Standard Design can only be modeled based on the U-value for these types and not based on the other types shown in Table 140.3-B ("Operable Window", "Curtainwall", and "Storefront Glazed Doors" for vertical glazing, "Glass, Deck Mounted" and "Plastic, Curb Mounted" for skylights).

Staff agrees with the change requested by the petition and recommends that the Nonresidential ACM Reference Manual be revised to include these window and skylight types. When this revision is made to the Nonresidential ACM Reference Manual, the CBECC-Com software will also be revised during the next possible update cycle.

Energy Commission staff believes that there is not a present emergency for which an emergency rulemaking would be appropriate.[20] The Nonresidential ACM Reference Manual is approved by the Commission after the adoption of each Building Energy Efficiency Standards update, and is updated as necessary to resolve issues identified during the implementation of the performance compliance approach using the Energy Commission's public domain compliance software. Importantly, a rulemaking action is not required to make changes to the ACM Reference Manual or the CBECC-Com software, and it would not be appropriate to begin a rulemaking action, emergency or otherwise, in order to make the changes requested by the petition.

Based on the issues or conflicts identified by APP-TECH in its petition, Energy Commission staff recommends that the Nonresidential ACM Reference Manual be revised at the next possible business meeting, and that appropriate options be added to the CBECC-COM software to accommodate the stated choices when vertical fenestration and skylights are specified.

Therefore, for the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[21]

3. Section 150.0(q) of the Standards

APP-TECH, Incorporated, asserts that this requirement does not increase energy efficiency and reduces design flexibility.[22]

Mandatory minimums provide a baseline efficiency level for new construction, the changes are driven in part to support the long-term goal of zero net energy. The value of 0.58 or its

[19] Petition, p. 4.

[20] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

[21] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[22] Petition, p. 5.

weighted average was determined as the worst case, least-efficient, vinyl, double-pane operable fenestration products listed in the tables of section 110.6 of the Standards. The CASE studies have also demonstrated that the maximum U-factor allows flexibility in energy efficient designs. One can use the weighted average U-factor of all fenestration, including skylights, to place a window with a U-factor greater than 0.58.

APP-TECH, Incorporated, has not presented any evidence, but merely asserts, without support, that the requirements in section 150.0(q) of the Standards do not reduce building energy consumption and that the only effect of these requirements is to increase costs and reduce design flexibility. As stated above, Energy Commission staff finds no evidence to support APP-TECH, Incorporated's assertion.[23] Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[24] However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will seek to provide clarifications in the residential compliance manual for the 2016 Standards.[25]

4.1 Section 150.1(c)(3)(A), Exception 4, of the Standards

APP-TECH, Incorporated, states "[f]irst of all, the Tables should be 110.6-A and 110.6-B."[26] Energy Commission staff does not understand what APP-TECH, Incorporated's assertion is and invites it to provide further clarification. To clarify, the intent was to allow the usage of site-built fenestration to be used in residential construction. Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[27]

4.2 Section 150.1(c)(3)(A), Exception 4, of the Standards

APP-TECH, Incorporated, states "why does this exception only apply if ALL the windows are site-built?"[28]

The Standards require National Fenestration Rating Council (NFRC) ratings for manufactured windows and doors; the Exception identified in the Petition provides an alternative compliance path for non-rated site-built fenestration products being installed in residential dwellings. Although site-built fenestration products are rare in residential buildings, there must be a compliance path available for them, which this Exception provides; without this Exception, there will not be a compliance path for these fenestration products.

Staff recognizes that a residential building may have a combination of different fenestration products. This Exception only applies to non-rated site-built fenestration products. This

[23] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).
[24] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).
[25] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).
[26] Petition, p. 5.
[27] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).
[28] Petition, p. 5.

Exception does not prohibit a residential building to have other fenestration products in addition to non-rated site-built fenestration products.

Energy Commission staff finds no evidence to support APP-TECH, Incorporated's assertion. Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[29] However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will seek to provide clarifications in the residential compliance manual for the 2016 Standards.[30]

4.3 Section 150.1(c)(3)(A), Exception 4, of the Standards

APP-TECH, Incorporated, states that the current forms do not allow for differentiating between different glazing Product Types, as required by NA6.[31] NA6 provides coefficients for different fenestration types. These coefficients are listed in table NA6-5. These coefficients allow for the differentiating of various glazing product types.

Section I of form CFIR-NCB-01-E contains cells where the fenestration type can be provided. Equation NA6-1 is embedded in the form and calculates the total performance U-Factor, thus providing for differentiation of fenestration types. (See section I in the form for more information.)

Energy Commission staff finds no evidence to support APP-TECH, Incorporated's assertion. Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[32] However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will seek to provide clarifications in the residential compliance manual for the 2016 Standards.[33]

4.4 Section 150.1(c)(3)(A), Exception 4, of the Standards

APP-TECH, Incorporated, asks, "[c]an Performance modeling of a new building with single pane site-built windows use a Reference U-factor of 1.28?"[34] Yes: per section 110.6(a)(2) of the Standards, a builder can use the default values listed in Table 110.6-A when calculating U-Factor. One of the default values (or reference values) for U-Factor in this table is 1.28. Then, as specified in section 150.0 (q)(2) of the Standards, newly constructed residential buildings can use the weighted average U-factor of all fenestration, including skylights, to demonstrate compliance. The weighted average U-factor shall not exceed 0.58.

Energy Commission staff recommends that the Commission declines to grant the petition on this ground. However, in an effort to be responsive to APP-TECH, Incorporated's

[29] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[30] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

[31] Petition, p. 5.

[32] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[33] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

[34] Petition, p. 5.

concern, Energy Commission staff will seek to provide clarifications in the residential compliance manual for the 2016 Standards.[35]

4.5 Section 150.1(c)(3)(A), Exception 4, of the Standards

APP-TECH, Incorporated, asserts that "[i]t is not clear that the exceptions are correctly implemented when defining the reference building for a performance calculation."[36] Section 150.1(b) of the Standards contains the performance calculation runs. These calculations are used to determine the energy budget for the standard design building by applying the mandatory and prescriptive requirements of the proposed design building. The prescriptive exceptions are in place to facilitate prescriptive compliance which requires maximum U-factor and SHGC values.

Energy Commission staff finds no evidence to support APP-TECH, Incorporated's assertion. Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[37] However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will seek to provide clarifications in the residential compliance manual for the 2016 Standards.[38]

5. Section 150.2(b)(2)(B) of the Standards

APP-TECH, Incorporated, asks what the phrase "include tradeoffs between two or more altered components" means and asserts that the Energy Commission should delete it.[39] In this case altered components can be two altered windows; two or more altered components may include for example a window and a wall, or, two altered windows. By definition, when the performance path is used to do tradeoffs, there needs to be at least two altered components involved; the two altered components may include components of the same system (windows) or different systems (windows and walls). The rules used to demonstrate tradeoff between various altered components can be found in the 2013 Residential ACM Reference Manual.

Energy Commission staff finds no evidence to support APP-TECH, Incorporated's assertion that the Energy Commission should delete this phrase. Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[40] However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will seek to provide clarifications in a Blueprint issue for 2013 and in the language for the 2016 Standards.[41]

6. Section 141.0(b)(1) of the Standards

[35] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).
[36] Petition, p. 5.
[37] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).
[38] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).
[39] Petition, p. 6.
[40] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).
[41] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

APP-TECH, Incorporated, asserts that there is no valid reason to mandate minimum insulation values from an energy conservation viewpoint.[42]

The mandatory minimum insulation requirements are necessary to support the long-term goal of zero net energy buildings by not allowing building envelope components to be traded away under the performance modeling compliance method. Building envelope efficiency is an important, strong foundation that minimizes the need for onsite generation in order to attain long-term energy goals without changing the design of building.

APP-TECH, Incorporated, also asserts that section 141.0(b)1 of the Standards conflicts with section 120.7 of the Standards.

Energy Commission staff find no basis to change the Standards. A U-factor is different from a mandatory minimum insulation requirement because it is a measurement and is defined by section 100 in the Standards, as "the overall coefficient of thermal transmittance of a fenestration, wall, floor, or roof/ceiling, component, in Btu/(hr x ft^2 x °F), including air film resistance at both surfaces". U-factors in section 120.7 of the Standards allow design flexibility when using either the prescriptive or the performance methods. U-factors are irrelevant to the mandatory minimum insulation requirements in section 141.0(b)1 of the Standards.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on either of these grounds.[43] However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will seek to provide clarifications in the residential compliance manual for the 2016 Standards.[44]

7. <u>Section 141.0(b)(2)(B)(iii) of the Standards</u>

APP-TECH, Incorporated, refers to shake roofs on a Victorian building that is being converted to offices and asserts that the need to meet section 141.0(b)(2)(B)(iii) of the Standards would void a warranty.[45]

The Victorian home example in the petition comes with a shake roof, which is normally installed on a steep-sloped roof. Section 141.0(b)2Biii of the Standards describes the requirements for low-sloped roofs; these do not apply to steep-sloped roofs. Additionally, the requirements in this section were included in the 2008 Standards cycle and adopted based on stakeholder input. There has been no document submitted to the Energy Commission prior to this petition asserting the existence of such warranty issues.

APP-TECH, Incorporated, also asserts that there should be "an exception for roofs over insulated, or potentially insulated unconditioned attics".[46] The cool roof requirements to

[42] Petition, p. 6.

[43] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[44] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

[45] Petition, p. 7.

which the petition requests an exception are a prescriptive compliance option and can be traded-off by using the performance method if one does not want to install continuous insulation over an insulated roof deck.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on either of these grounds.[47] Petitioner already has the ability to comply with the noted requirement through the performance method, and the requirement would not appear to apply to the cited example in the first place. However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will seek to provide clarifications in the residential compliance manual for the 2016 Standards.[48]

8. Section 141.0(b)(2)(I) of the Standards

APP-TECH, Incorporated, asserts that the phrase "for each enclosed space," should be deleted where it occurs in this section.[49] Staff disagree. Section 141.0(b)(2)(I) of the Standards applies to alterations of existing buildings. The use of the term "enclosed space," as defined in section 100 of the Standards, is used here to help clarify that this section applies only to the enclosed space where the alterations to lighting system(s) is being completed.

APP-TECH, Incorporated, also asserts that Section 141.0(b)(2)(I)(v) of the Standards contradicts Section 140.6 and 140.6(a) of the Standards. Energy Commission staff disagrees. There is no contradiction as Section 140.6 and 140.6(a) specify only how actual lighting power and lighting power allowances are to be determined. Section 141.0(b)(2)(I)(v) very directly states that the lighting power allowances determined by Section 140.6 apply to any lighting alteration that increases the installed lighting power in the space in question. Section 141.0(b)(2)(I)(v) neither requires something at odds with Section 140.6 nor contains a requirement that could not be met while also meeting Section 140.6.

APP-TECH, Incorporated, states that the "entire permitted space needs to meet the Prescriptive lighting power density as a whole, not the lighting power density in each individual room." This is incorrect, in part: when calculating the lighting power, the regulations specify a need to determine the quantity of existing affected luminaries per enclosed space, and specify different lighting power allowances for different types of spaces (as shown in Table 140.6-C). For this reason, the lighting power allowance for each enclosed space is explicitly a factor in determining which requirements in Table 141.0-E and Table 141.0-F of Section 141.0(b) are applicable to the project.

However, Section 141.0(d) of the Standards specifies that "[a]ny addition, alteration, or repair may comply with the requirements of Title 24, Part 6 by meeting the applicable

[46] Petition, p. 7.

[47] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[48] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

[49] Petition, p. 7.

requirements for the entire building." Thus, there is an ability to comply using a whole-building or whole-permitted-space approach, though it is an alternative to the regulations specified by APP-TECH, Incorporated, in their petition. Thus, the entire permitted space may comply by using this option, though use of this option is not required.

Energy Commission staff finds that there is no contradiction. The Standards as written achieve their intended purpose, and provides a way to take a holistic compliance approach that would be consistent with the petitioner's request. Staff therefore also finds that there is no emergency created by the existing regulations.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on any of these grounds.[50]

9. Section 141.0(b)(2)(I)(iii)(b)(1) of the Standards

APP-TECH, Incorporated, asserts that "it should not matter if someone is repainting the walls, for instance, while the luminaire modification in place are being done." Section 141.0(b)(2)(I)(iii)(b)(1) of the Standards sets out the requirements for Luminaire Modification in-Place. Subsection 141.0(b)(2)(I)(iii)(b)(1) describes the two conditions that an alteration must meet in order to qualify as a Luminaire Modification in-Place: they "shall not be part of or the result of any general remodeling or renovation of the enclosed space in which they are located", and they "shall not cause, be the result of, or involve any changes to the panelboard or branch circuit wiring, including line voltage switches, relays, contactors, dimmers and other control devices providing power to the lighting system."

The key phrase is "shall not be part of or the result of any general remodeling or renovation". When lighting changes are a part of a remodeling or renovation project, or result from such a project, they are required to be treated as lighting system alterations given the presumed extensive nature of the changes.

Put another way, the "Luminaire Modification in-Place" regulatory language is for an alteration where the scope is limited to modifying luminaire(s) and does not involve adding or removing luminaires or modifying other parts of the lighting system such as controls. A remodel project that includes modifying luminaires is not considered a luminaire modification-in-place as it may include relocating luminaires and modifying lighting controls.

However, other alterations to the space that do not involve alterations to the luminaire or lighting system, such as repainting walls, are irrelevant to the determination of whether an alteration qualifies as a Luminaire Modification-in-Place. If the luminaires are modified and, separately, the room is repainted or refinished, the separate action of repainting the room would not be considered to include the modification to the luminaires, nor do the modifications to the luminaires result from the effort to repaint the room.

[50] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

Energy Commission staff finds that the Standards as written achieve their intended purpose, and although staff agree that the phrasing can be improved, staff finds that there is no emergency created by the existing regulations. Clarification of this language has been included in the rulemaking for the 2016 update to the Standards, and Petitioner is welcome to participate in this rulemaking and provide comments on the proposed revisions to this Section.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on any of these grounds.[51]

10. Section 141(b)(3)(B) of the Standards

APP-TECH, Incorporated, asserts that the Energy Commission should delete the sentence: "all components proposed for alteration must be verified" from the paragraph. APP-TECH, Incorporated, also asserts that all components proposed for alteration do not have to be third-party verified, only those components where compliance credit is being taken for improving existing conditions.[52]

Section 141(b)3B states: "When the third party verification option is specified, all components proposed for alteration must be verified." This refers to the two options presented in Table 141.0-D, allowing for a different standard design when third-party verification of existing conditions is performed. The intent of this sentence is to state is that all altered components for which credit is being taken are subject to third-party verification; the third-party verification requirement does not apply to those altered components for which credit is not being taken. Staff finds that the regulations as written function in the way the petition requests, and although staff agree that the phrasing can be improved, staff finds that there is no emergency created by the existing regulations.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on this ground.[53] However, in an effort to be responsive to APP-TECH, Incorporated's concern, Energy Commission staff will endeavor to clarify in a Blueprint issue for the 2013 Standards and to clarify the language for the 2016 Standards.[54]

11. Section 141.0-E of the Standards

APP-TECH, Incorporated, asserts that "[l]ighting power should be based on total permitted space, not each enclosed space". Staff disagrees. Table 141.0-E lays out the control requirements when there are luminaire alterations and the applicable control depends on the number of affected luminaires and the resulting lighting power. As noted above, when calculating the lighting power, the regulations specify a need to determine the quantity of existing affected luminaries per enclosed space. This is a factor in determining which

[51] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[52] Petition, p. 8.

[53] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[54] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

requirements in Table 141.0-E and Table 141.0-F of Section 141.0(b) of the Standards are applicable to a project. These tables are explicit in stating that the requirements apply to each enclosed space.

Table 141.0-E does not prohibit the use of the complete building method, area category method, or tailored method, if qualified according to Section 140.6 and per the definitions in Section 100.1. However, after the lighting power allotment is set for each room, lighting controls are classified using the area category method in accordance with Table 141.0-E. This requirement is necessary to prevent abuse, for example by completing a whole-building project that locates all of its allowed lighting in one half of the building, followed by a project specific to the unlit half of the building that then installs up to the LPD for that space (resulting in a building that far exceeds its LPD requirements when taken as a whole).

APP-TECH, Incorporated, also asserts that "[t]able 141.0-E should only be used to specify lighting control requirements for enclosed spaces, not allowed power density." The petition does not identify why this table should be limited to specifying the control requirements and should not state the LPD requirements that apply to lighting alterations. Stating these requirements here reinforces their applicability and makes the table more useful as a reference; staff fail to see the harm that including this specification here represents, and noting that the requirement as stated in Section 141.0(b)(2)(I)(v)(i) of the Standards would apply even with the matching statement in the table removed.

Staff find that the Standards as written achieve their intended purpose. Staff therefore also finds that there is no emergency created by the existing regulations. Staff notes that Table 141.0-E is proposed to be rewritten in the 2016 regulations to improve its clarity, and Staff welcomes any comments on the proposed update to the Standards.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on any of these grounds.[55]

12. Section 150.(j)(1)(A) of the Standards

APP-TECH, Incorporated, asserts that "installing storage water heaters with an energy factor less than the federal minimum is illegal, why specify insulation requirements for these units?"[56] APP-TECH, Incorporated, also asks "why does a water heater with exactly the minimum allowed energy factor require an R-12 blanket, while any water heater even slightly more efficient requires no blanket of any kind?"[57] Finally APP-TECH, Incorporated, asks why the blanket has to be R-12 and states that all references to R-12 blankets should be deleted.[58]

[55] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[56] Petition, p. 8 - 9.

[57] *Ibid*.

[58] Petition, p. 9.

Staff agree with the Petition's assertion, but do not believe it constitutes an emergency. This is legacy language concerning water heater blankets that needs to be deleted. The original intent of this language was to require storage gas water heaters to have a minimum combined insulation level of R-16. Energy Commission staff will work to update the Residential Compliance Manual and publish a Blueprint Newsletter to clarify that any water heater that has an internal insulation of R-16 will meet this requirement. Secondly, since one may not install a less-than-federal-minimum-efficiency water heater, the impact of the language should be minimal and does not constitute an emergency. This section is already proposed to be deleted in the 2016 language.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[59]

13. Section 150.0(j)(2)(A)(B)&(C) of the Standards

APP-TECH, Incorporated, asserts that the required insulation thickness is not practical for many residential installations and there is no consideration of residential applications when the Life-cycle cost analysis was done for these original specifications.[60] Section 150.0(j)2 of the Standards refers to table 120.3-A for insulation thickness requirements. The insulation thickness requirements were copied from Tables 6.8.3-1 and 6.8.3-2 in ASHRAE 90.1-2013, with the exception of a 1.5 inch requirement for pipe diameter between 1 and 1.5 inches. This additional thickness requirement beyond ASHRAE 90.1 was supported by the CASE report in the 2013 Rulemaking Documents Relied Upon, item 46 CASE Study "Water and Space Heating ACM Improvement", October 2011. Also, the mandatory pipe insulation requirements for residential dwelling units were found to be cost-effective for both copper pipes and PEX pipes in the 2013 Rulemaking Documents Relied Upon, item 28 CASE Study "Single Family Water Heating Distribution System Improvements", September 2011. Within these supporting documents, the Energy Commission determined these requirements to be cost-effective in both residential and nonresidential applications in the life-cycle cost analysis.

The petition specifically asserts that "[t]he required insulation thickness is not practical for many residential installations, especially where PEX tubing is being utilized", but does not explain why or in what way the required insulation thickness is impractical. Traditional pipes, such as copper or PVC, are routinely insulated when installed. PEX tubing is noted to be incompatible with some adhesives that could otherwise be used to attach insulation to piping, though this is the only limitation that could be identified by staff; insulation installed with a PEX-compatible adhesive or without using an adhesive would remain viable options. PEX is also flexible, which may require use of a flexible or custom-fitted insulation product, both of which are commercially available. Without more information on the way in which petitioner claims that the required thickness is impractical, staff can only respond that the required thickness was found to be both feasible and cost-effective at the time the regulations were adopted (as discussed above).

[59] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd.(a), (b), (f).

[60] Petition, p. 9.

APP-TECH, Incorporated, asserts that most modern pre-insulated underground piping systems cannot meet the requirements of Part B, site-built installations would not be able to cost-effectively comply, and asks what is meant by "non-crushable."[61] Energy Commission staff believe that APP-TECH, Incorporated, is incorrect. The language in section 150.0(j)2B of the Standards applies to the protective casing of the insulation pipe, not the actual water pipe. Additionally, the plain meaning of non-crushable is a rigid casing that protects the insulation from compression. As stated above, pipe insulation was found to be cost-effective in previous CASE studies.

APP-TECH, Incorporated, also asks why the amount of pipe insulation for hydronic heating systems should depend on the pressure in the pipe.[62] Section 150(j)2C of the Standards says "Piping for steam and hydronic heating systems **or** hot water systems with pressure above 15 psig (103 kPA) shall meet the requirements in TABLE 120.3A" To clarify, the pressure limit does not apply to hydronic systems.

Currently hydronic systems are modeled in the performance approach described in the Residential Alternative Calculation Method (ACM) Reference Manual. APP-TECH, Incorporated's concern about hydronic systems would be more appropriately addressed by updating the Residential ACM Reference Manual, a process that does not require a rulemaking. Staff worked successfully with Mr. Splitt previously during the implementation of hydronic system modeling in the 2013 CBECC-Res software and, if needed, would anticipate being able to do so again.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[63]

14. Reference JA 2

APP-TECH, Incorporated, asserts that "using zip codes to define Climate Zones is adding unnecessary complexity for building departments" and that the climate zone boundaries should be put "back to where they used to be."[64] The original climate zone boundaries did not move when ZIP codes are used to define climate zones. The climate zone boundaries are described in the CEC publication "California Climate Zone Descriptions for New Buildings" which contains detailed survey definitions of the 16 climate zones. Previously, the climate zones were listed by cities in JA2. As stated in the Final Statement of Reasons for the 2013 Title 24 Part 6 Rulemaking, CEC changed the climate zone listings to be specified by ZIP codes to allow more precise applications of the climate-specific requirements in the Standards, prevent splitting of zip codes by climate zone boundaries, and facilitate an ability to determine the climate zone of a building from its address.

[61] Petition, p. 9 - 10.

[62] Petition, p. 9 - 10.

[63] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a), (b), (f).

[64] Petition, p. 10.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[65]

15. Section 110.2(a)3 of the Standards

APP-TECH, Incorporated, asserts that the Energy Commission should delete "or both space heating and water heating" from section 110.2(a)3 of the Standards, which requires equipment that perform dual functions to comply with the efficiency requirement for each function.[66] APP-TECH, Incorporated, mentions that there is no federal requirement to test for all possible uses of the equipment, only the primary listed use as determined by the manufacturer.[67]

Federal appliance regulations and the building energy efficiency standards are two different sources of law. Federal law grants states the authority to adopt minimum equipment efficiencies that have been adopted by ASHRAE. ASHRAE 90.1 section 6.4.1.1 requires equipment with dual functions to meet the minimum energy efficiency for each function. The 2013 Building Energy Efficiency Standards adopted the minimum equipment efficiencies found in ASHRAE 90.1 section 6.4.1.1 through adoption of Section 110.2(a)3 of the Standards.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[68]

16. Section 10-103(a)(5) of the Standards

APP-TECH, Incorporated, asserts that there is no way to require Nonresidential Certificates of Verification to be completed and registered.[69] Staff notes that section 10-104(a)5 of the Standards describes the rules for registering Certificates of Verification for all residential measures for which compliance requires HERS field verification, as well as Nonresidential Measures that are described in Reference Appendix NA1 and NA2. The systems described in NA1 and NA2 are residential type single zone systems that are installed in small commercial buildings and behave very much like residential packaged units. Electronic forms are available for these systems and they can be uploaded into a residential HERS providers data registry. Other nonresidential systems not described in NA1 and NA2 are not required to be uploaded into a data registry at this time.

APP-TECH, Incorporated, asserts that the registries are not performing at this time and questions whether the Energy Commissions monitors the performance of the registries.[70] Energy Commission staff does monitor the performance of the registries on a weekly basis. Energy Commission staff has been working with CalCERTS on their Conditions of

[65] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[66] Petition, p. 10 – 11.

[67] *Ibid*.

[68] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[69] Petition, p. 11.

[70] Petition, p. 12.

Certification related to their registry and has determined that CalCERTS has met the Conditions of Certification.

APP-TECH, Incorporated, also questions whether HERS Raters will know that these tests are required, since "PREF-1 [sic] forms do not need to be registered."[71] If HERS verification is identified in the compliance software then it is reported on the PERF-1 form. When flagged it is the responsibility of the installing contractor to contact a HERS Rater to perform these tests. The enforcement of this process falls to the enforcement agency: Nonresidential Certificates of Verification are required to be posted or made available to the Enforcement Agency at final inspection.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[72]

17. Section 120.3 of the Standards

APP-TECH, Incorporated, asserts that "requiring pipe insulation to be at least 1" thick is not practical in many instances" especially in "high rise residential buildings utilizing PEX tubing for DHW and hydronic space conditioning distribution systems" and that requiring insulation this thick is not cost-effective.[73] APP-TECH, Incorporated, asserts that the Energy Commission should revise these insulation requirements to adhere to industry standards. These assertions are made without explanation or support.

As discussed for residential piping, pipes are routinely insulated when installed. PEX tubing is noted to be incompatible with some adhesives that could otherwise be used to attach insulation to piping, though this is the only limitation that could be identified by staff; insulation installed with a PEX-compatible adhesive or without using an adhesive would remain viable options. PEX is also flexible, which may require use of a flexible or custom-fitted insulation product, both of which are commercially available. Without more information on the way in which petitioner claims that the required thickness is impractical or not cost-effective, staff can only respond that the required thickness was found to be both feasible and cost-effective at the time the regulations were adopted.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[74]

18. Section 120.8 of the Standards

APP-TECH, Incorporated, questions how much energy is saved by the design phase design review and what qualifies a licensed professional engineer to be the design reviewer.[75] APP-TECH, Incorporated, also claims that design phase design review will

[71] Petition, p. 12.

[72] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[73] Petition, p. 12.

[74] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (f).

[75] Petition, p. 12 - 13.

only incur additional cost.[76] CASE Initiative determined that design phase design review is cost-effective, will save energy and focuses on areas of the design that could be overlooked.

The design review is not intended to investigate the accuracy of the entire code compliance report. However, the review would include confirming that elements having significant effects on total building energy use are in compliance with mandatory and prescriptive or performance requirements. Given that a licensed professional engineer, either mechanical or electrical, is ultimately responsible for the HVAC or lighting system it is appropriate for a licensed professional engineer to be the design reviewer.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[77]

19. Section 130.2(b) of the Standards

APP-TECH, Incorporated, asserts that section 130.2(b) of the Standards, especially the requirement to determine zonal lumens, conflicts with the BUG requirements in the Cal Green Code.[78] The proposed action is to delete Section 130.2(b) of the Standards and replace them with the Green Code BUG requirements, but some exceptions should remain, such as for additions or alterations, which is not covered in the Green Code.[79] The petition also states that the Commission should coordinate with these with the Cal Green Code to eliminate conflicts.[80]

The BUG requirements (short for “backlight, uplight and glare”) apply to outdoor lighting applications. Title 24 Part 6 has a mandatory requirement on uplight and glare but not on backlight. CalGreen has mandatory requirements for backlight, uplight, and glare. Staff acknowledges that the mandatory CALGreen requirements thus go farther than the Part 6 requirements, creating a mismatch between sections, and that the CALGreen language in Table 5.106.8 references ratings found in IES TM-15-11 while Table 130.2-B in Title 24 Part 6 states explicit numeric limits (noting that the numeric limits in Part 6 match the rating thresholds in IES TM-15-11, making the requirements effectively identical).

Staff agrees with APP-TECH, Incorporated, that it would be preferable to have these regulations aligned, either by having them both state identical requirements or by having the requirements stated in only one place (as the petition recommends). Staff plan to coordinate with the California Department of Housing and Community Development (HCD) to resolve this issue in the 2016 rulemaking. The Energy Commission also finds that there is no emergency. While there is a misalignment of the regulatory language, the requirements are not in conflict between Part 6 and Part 11 and the misalignment does not create an emergency. This change can safely be made in the 2016 rulemaking.

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[76] *Ibid*.

[77] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (f).

[78] Petition, p. 13.

[79] *Ibid*.

[80] *Ibid*.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[81]

20. Mini-Split Heat Pumps

APP-TECH, Incorporated, asks why mini-split heat pumps are treated differently in the compliance software than conventional split systems heat pumps and why is there a requirement to model ducts in an attic, when most of these systems will never use ducts.

Mini-split heat pumps are treated differently than conventional split system heat pumps because they are different products. For example, a conventional split system will have a fixed speed compressor while a mini-split system will have a variable speed compressor. Additionally, mini-splits have no ducts, which is the least efficient component of an HVAC system. Mini-split systems are typically rated with a high Seasonal Energy Efficiency Ratio (SEER) and Energy Efficiency Ratio (EER). However there are no field installation or test protocol to ensure the installed equipment can realize these efficiencies. Field installation, testing and verification protocols have been developed for conventional split system heat pumps. These protocols are designed to overcome known variables, such as duct leakage, adequate refrigerant charge and proper airflow in order to optimize each installation to closely match the HVAC system rated efficiency.

There are many unknowns regarding how mini-split systems perform, and there is a well-established history of treating systems with significant unknowns in this manner (i.e., by modeling such systems as minimally compliant within the compliance software). For example, wood heaters and buildings with no cooling system are also assumed to have a minimally complying ducted HVAC system. This has been standard practice since the 1980s. Thus, mini-split heat pumps are simulated as a minimum efficiency ducted heat pump resulting in no credit and no penalty. There is no duct testing reported on the compliance documentation, as this is a hypothetical modeling assumption.

Energy Commission staff recommend revisions to the CBECC-Res modeling capabilities, which does not require a rulemaking proceeding to accomplish. Energy Commission staff has been working with mini-split and multi-split air conditioner and heat pump manufacturers and the Energy Commission's HVAC consultants to develop field installation and test protocols as well as performance data through monitoring installed systems. The data gathered by monitoring installed systems will help develop a rule set that can be incorporated into the CBECC-Res software. The rule set will account for overall system performance, including distribution efficiency for how to model ductless systems.

For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[82]

[81] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

[82] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (a).

21. Live/Work Spaces

APP-TECH, Incorporated, asserts that live/work buildings must comply entirely with nonresidential compliance methods, not residential.[83] APP-TECH, Incorporated, asserts that, to account for the 24-7 occupancy, the Energy Commission should develop a new occupancy type and schedules, and also that lighting should be "library, reading areas" for all areas designated as residential, except for kitchens.[84]

Section 100.0(f) of the Standards requires buildings designed and constructed for more than one type of occupancy type to meet the provisions of Part 6 applicable to that occupancy. This would include ventilation and lighting requirements for each occupancy type. For the reasons stated above, Energy Commission staff recommends that the Commission declines to grant the petition on these grounds.[85]

IV. CONCLUSION

The 2013 Building Energy Efficiency Standards fulfill the Energy Commission's statutory mandate to adopt cost-effective energy and water efficiency standards for buildings and establish sound energy policy.[86] In the rulemaking package, Energy Commission determined that the 2013 Standards met this statutory mandate. The 2013 Standards are a foundational element in implementing California's energy policies, including having a reliable, economic, and environmentally-sound energy supply, and zero net energy new residential buildings by 2020 and nonresidential buildings by 2030.[87] These Standards protect consumers from unnecessary energy costs, conserve natural resources, minimize environmental degradation, and ensure a safe, reliable, and affordable energy supply. Their importance is brought into even greater relief by the onset of climate change. The evidence presented does not change these conclusions; indeed, independent inquiry affirms them.

APP-TECH, Incorporated's petition is generally unsupported, lacks evidence, and many of its suggestions are simply conclusory, sometime incoherent, statements or questions. There are no specific facts showing that an emergency rulemaking is necessary for the immediate preservation of the public peace, health and safety, or general welfare. To the contrary, the Energy Commission finds that there is no present emergency. And, in fact, there are more efficient and comprehensive actions, as an alternative to a rulemaking, that Energy Commission staff has identified and will endeavor to take to address APP-TECH, Incorporated's credible assertions. Therefore, Energy Commission staff recommends that the Commission deny the petition.

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[83] Petition, p. 14.

[84] *Ibid*.

[85] Cal. Code Regs., tit. 24, pt. 1, ch. 1, § 1-323, subd. (b), (f).

[86] See Cal. Code Regs., tit. 24, part 1, § 1-324(e).

[87] Pub. Res. Code §§ 25001, 25300(a)-(b); see also Notice of Proposed Action, pp. 4-5, citing 2008 Energy Action Plan; 2007 California Energy Commission Integrated Energy Policy Report; 2008 California Public Utilities Commission Long-Term Energy Efficiency Strategic Plan.

Date: February 25, 2015

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of an Order duly and regularly adopted at a meeting of the California Energy Commission held on February 25, 2015.

AYE:
NAY:
ABSENT:
ABSTAIN:

_____

Harriet Kallemeyn,
Secretariat