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**Comments on Proposed Fenestration Requirements in CASE
Multifamily Restructuring Proposal for the 2022 Energy Code**

Additional submitted attachment is included below.

California Energy Commission Docket 19-BSTD-03 2022 Energy Code Pre-Rulemaking

December 18, 2020

Comments on Proposed Fenestration Requirements in CASE Multifamily Restructuring Proposal for the 2022 Energy Code

Thank you for the opportunity to submit comments on the proposed changes to the 2022 Energy Code as set out in the Final CASE Report on Multifamily Restructuring issued in November 2020. Per the November 20, 2020 request for comments, I am writing to provide some feedback related to the proposed fenestration requirements.

Issues Associated with the Creation of Three Fenestration Categories for Fenestration in All Multifamily Buildings

The most important issue related to fenestration in the CASE Study is the proposal to divide fenestration products into three categories – “Curtainwall/Storefront”, “NAFS-2008 Performance Class AW” and “All Other Fenestration.” Simplifying the performance requirements and establishing the same requirements (such as U-factor and SHGC) for fenestration no matter the height of the building is a laudable objective in theory and would bring fenestration in high-rise buildings in line with how fenestration in both single family and multi-family low-rise buildings has been regulated in California.

However, the proposal in the Final CASE Report only gets partway to this objective before detouring and carving out two categories that amount to exceptions with weaker requirements – specifically Class AW windows and Curtainwall/Storefront. (The draft CASE proposal did not separate out Class AW for special treatment, but the final version does.) This change of direction is unfortunate. Since the choice of fenestration is ultimately up to the designer, it would be preferable to see the choice of less efficient fenestration be offset by other efficiency improvements rather than simply setting weaker, more favorable requirements for some types of products and more stringent requirements for others.

As support for the proposal to carve out the Class AW exception, the Report references a similar approach taken in Washington state (see page 65 of the Report). While one state may have adopted this approach, it should also be noted that the vast majority of other states adopt either the IECC or ASHRAE 90.1, neither of which contain such an approach (there is no special category in either code for either Class AW or Curtainwall/Storefront). In my view, carving out an exception or category with weaker requirements (such as those for Class AW) risks unintended negative consequences and counterproductive results including reducing efficiency and using more energy, making compliance more complicated and uncertain, and supporting the use of less efficient products.

Clear Requirements Are Needed for Verification, Certification and Labeling of Eligibility for the Performance Class AW Category

If a weaker exception or different category is to be established for Class AW, at a minimum, the category should be very carefully and narrowly limited. Weaker requirements should only be available in circumstances where the less efficient product is truly necessary to meet design requirements, and product eligibility for the category should be required to be clearly certified and labeled to provide reasonable assurance that the product actually meets the exception (without specific certification and labeling requirements, products that do not meet Class AW standards could be wrongly identified as Class AW). For example, to qualify as “Class AW”, the product should be explicitly required in the Standards to be labeled and certified “Class AW” through a certification program operated by an independent and reputable/recognized certification agency in accordance with the applicable standard (similar to the concept the California code uses when requiring NFRC certification and labeling). Moreover, the exception should only apply in cases where the use of a “Class AW” window is clearly required to meet building code performance specifications and/or the architect/engineer specifically requires the use of a “Class AW” window (if a more efficient window can be used, then there should not be an exception granted for a less efficient window).

Although the Report suggests that some form of Class AW certification would be required (see pages 38, 69-70, 92), I do not see any explicit proposed code language in this regard. I suggest explicit language with these requirements be inserted in the footnotes to Tables 170.2-A and 180.2-A and/or be placed in the applicable section(s) of the code. The language could read as follows:

To be considered as Class AW for purposes of this code, the fenestration product must: (1) meet all of the requirements for Class AW in accordance with the applicable NAFS standard; (2) be labeled and certified as meeting such standard by a reputable independent certification agency; and (3) be specified as Class AW by the architect/engineer or be required to be Class AW in order to meet the specifications of the building code.

Other Considerations as to Class AW

In addition, consideration should be given to limiting the use of any special narrow exception or category permitting reduced efficiency (such as Class AW) exclusively to the prescriptive compliance path. Under the performance compliance path, there is simply no reason to carve out a special exception since any underperformance by these products can be offset by other efficiency improvements. In other words, the performance path baseline could reflect the U-factor and SHGC requirements for All Other Windows, regardless of the type of windows actually installed.

Finally, as a general rule, the prescriptive values required for these exception products should be set as close to the standard product prescriptive values for All Other Windows as reasonably feasible to reduce the negative energy impact.

Additional Recommendations on Other Issues

Aside from the Class AW issue, let me offer some specific additional recommendations that would further improve upon the fenestration proposals in the Draft Report:

- (1) **Consider combining the categories of Curtainwall/Storefront and All Other Fenestration and establishing one blended set of prescriptive requirements.** Under the proposal in the Draft Report, Curtainwall and Storefront fenestration would be permitted to have a U-factor 27% to 37% higher (0.38 or 0.41 instead of 0.30) and an SHGC more than 13% higher (0.26 instead of 0.23) than other vertical fenestration. These are significant increases in U-factor that could be reduced or eliminated by combining Curtainwall/Storefront with “All Other” fenestration into a single blended category to be met on an area weighted average basis. As noted earlier, there is not a separate Curtainwall/Storefront category in the most recent version of the IECC or ASHRAE 90.1; instead it is combined in the same category with all other fixed vertical fenestration for high rise multifamily and nonresidential buildings. If necessary, the blended fenestration prescriptive U-factor requirement could be increased a bit to make everything fit better into one category (perhaps using a 0.32 or 0.34 U-factor instead of 0.30 (only 7% to 13% higher) and keeping 0.23 SHGC for all).

Adopting this recommendation would simplify the requirements and result in the same level of efficiency no matter what glazing choice is made, rather than favoring Curtainwall/Storefront products and supporting reduced overall building performance by setting weaker requirements for these products. If Curtainwall/Storefront is to remain a separate category, consideration should be given to further tightening the requirements to reduce the gap between curtainwall and other vertical fenestration and the category should be narrowly and specifically defined to ensure that other products are not allowed to take advantage of weaker requirements created for Curtainwall/Storefront.

- (2) **Consider tightening or, preferably, eliminating the site-built exception (EXCEPTION 4 to Section 170.2(a)3Aii) that permits use of default values from the Appendix NA6 instead of requiring NFRC-certified actual performance values.** This Exception is a broad open-ended invitation for site-built fenestration products in all multifamily buildings to avoid requirements for NFRC rating and labeling of performance values (or limited default values) by permitting use of values from the Nonresidential Reference Appendix NA6 instead. I recommend that the language allowing the use of NA6 be deleted or at least severely limited.

It should be noted that the Nonresidential High Performance Envelope CASE Report already recommends completely eliminating the more limited site-built exception in the nonresidential requirements that currently allows NA6 for vertical fenestration for up to 200 square feet of glazing. By contrast, this exception as proposed for multifamily is currently unlimited – it should at least be limited consistent with nonresidential fenestration requirements (the exception should at least be limited to no more than 200 square feet of glazing in buildings above 3 stories).

- (3) **Consider Using SHGC instead of RSHGC for multifamily buildings.** The Report proposes to specify RSHGC instead of SHGC values for compliance for all multifamily buildings. This approach introduces unnecessary complexity, is confusing, and will make compliance and enforcement more difficult. The straightforward approach of simply reading the SHGC values from the NFRC or default label to determine compliance would be a better option. Using the RSHGC of each fenestration product for compliance could result in numerous measurements and calculations for, at best, no additional efficiency or energy savings (since the benefit of the overhang is offset by a higher SHGC) and at worst, less efficiency (where the overhang would have been installed anyway or where the projection calculations are inaccurate). This may be particularly problematic for builders of low-rise multifamily housing who may never have had to deal with the complication of RSHGC calculations in the past.

It is simply not necessary to offer credit for overhangs/external shading in the prescriptive requirements for residential buildings (they are often just a decorative design feature) through an RSHGC calculation. Even with an overhang, the lower SHGC of the window provides additional benefits, comes at little or no additional cost and should be encouraged. Those who want to design the building for such shading and to take credit for such a design should be directed to more accurate performance-based compliance.

- (4) **Consider eliminating: (a) the exception from RSHGC and/or VT requirements when 150 sq. ft. or less of existing fenestration is replaced (see EXCEPTION 1 to Section 180.2(b)1Ci) and (b) the exception from U-factor, RSHGC and/or VT requirements when 50 square feet of new fenestration area is added (see EXCEPTION 1 to Section 180.2(b)1Cii).** These exceptions unnecessarily exempt many small projects adding new windows and many larger replacement window projects from the requirements for efficient windows. There is no good reason for these exceptions, which can be expected to result in substantially higher energy use, higher peak demand, larger HVAC systems and less comfortable homes. Since windows last for many years, it is important to fully capture improved efficiency when windows are replaced and/or new windows are added. The square footage limits may also provide an unintended incentive to replace fewer windows at one time.

The first exception exempts replacement of fenestration up to 150 square feet from meeting the RSHGC and VT requirements. This exception should be eliminated or at

least sharply reduced. At a minimum, I would suggest reducing the exception down to no more than 50 square feet.

The second exception exempts alterations that will add fenestration area up to 50 square feet (the proposal reduces the current 75 sq. ft. to 50 sq. ft.). While a 50 square foot limit to the exception is a slight improvement, eliminating this exception would seem to be the better course.

- (5) **Consider eliminating the RSHGC exception (EXCEPTION 1 to Section 170.2(a)3Aiii) that permits up to an excessive 0.56 RSHGC value, more than double the standard prescriptive level, in certain situations.** The basis for this exception is unclear. Perhaps this provision is a legacy provision that predates current widespread, cost-effective availability of low solar gain glass and has been overlooked. I am not aware of any good reason why the standard SHGC requirements should not apply in the cases set forth in this exception. There is no apparent need for such an RSHGC exception for multifamily buildings, regardless of overhang restrictions or first story display perimeters. Please consider eliminating this exception.

Thank you for your time and consideration of my comments.

Respectfully submitted,

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