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Conflict Between High-Performance Attic Requirements and California Residential Code (CRC)

August 14, 2026

California Energy Commission
Building Standards Branch
715 P Street
Sacramento, CA 95814

Subject: 2028 Building Energy Efficiency Standards Pre-Rulemaking, High-Performance Attic Requirements and Conflict with California Residential Code Section R806.3

Dear Energy Commission Staff and Commissioners,

I appreciate the opportunity to provide comments during the 2028 Building Energy Efficiency Standards pre-rulemaking process. I respectfully request that the California Energy Commission address a longstanding conflict between the prescriptive High-Performance Attic (HPA) provisions contained in the California Energy Code and the attic ventilation requirements of California Residential Code (CRC) Section R806.3.

This issue has existed since the development and adoption of the High-Performance Attic measure and has created the potential for inconsistent interpretation and enforcement among Authorities Having Jurisdiction (AHJs), designers, HERS Raters, energy consultants, and builders throughout California.

Over the past several years, I have discussed this issue with California Energy Commission staff, building department CBOs, and technical representatives from the International Code Council (ICC). These discussions have provided additional information regarding the intent of CRC Section R806.3 and have also resulted in the Commission reviewing the original CASE documentation and technical research supporting the HPA measure.

In addition to creating a conflict between two California Title 24 codes, this issue raises an important question regarding the statutory cost-effectiveness requirements applicable to California's Building Energy Efficiency Standards under the Warren-Alquist State Energy Resources Conservation and Development Act.

I respectfully request that the Commission use the 2028 rulemaking process to resolve the conflict, confirm the cost-effectiveness of the actual assembly required for compliance, and provide a clear and consistent path for designing and enforcing HPA assemblies throughout California.

Background

The California Energy Code Prescriptive High-Performance Attic package allows air-permeable insulation to be installed below the roof deck while maintaining contact with the roof deck in a vented attic assembly.

The original 2016 HPA CASE Report, Residential Ducts in Conditioned Space / High Performance Attics, specifically describes the proposed HPA package as requiring R-13 below-deck insulation in addition to R-38 ceiling insulation. The report also states that HPA is intended to be a vented attic strategy.

However, CRC Section R806.3 requires a minimum 1-inch space between insulation and the roof sheathing where eave or cornice vents are installed. The ICC interpretation of this provision is that the clearance is not limited to the immediate area surrounding the vent opening.

The ICC commentary states:

"The 1-inch (25 mm) clearance must be maintained not only at the vent but throughout the attic and rafter spaces."

This interpretation was subsequently confirmed in a formal written response from ICC Senior Technical Staff member regarding the intent of Section R806.3:

"The intent of Section R806.3 is to require sufficient space to allow for the movement of air within a naturally ventilated attic space. It should be noted that if the insulation is installed in direct contact with the underside of the roof sheathing, the attic would not be a naturally ventilated attic. Rather, it would be an unvented attic and would be required to comply with Section R806.5."

Based on this interpretation, at least one Building Department in California requires a continuous 1-inch air space between air-permeable insulation and the roof sheathing for naturally ventilated attic assemblies.

This creates a direct conflict with the way the HPA prescriptive assembly has historically been presented and understood under the Energy Code.

History of the Issue

I initially brought this issue to the attention of the California Energy Commission in 2022 after a Chief Building Official for a rural county questioned whether CRC Section R806.3 conflicted with the Energy Code requirements allowing insulation to be installed directly against the underside of the roof deck.

The initial question was whether the 1-inch requirement in CRC Section R806.3 was intended to apply only at the location of the eave or cornice vent or whether the requirement extended throughout the attic.

The issue was subsequently brought back to the California Energy Commission. During 2025, Commission staff conducted additional research into the original CASE reports and supporting building science research.

Following lengthy discussions with Commission staff, the Commission identified the need to provide additional guidance and to reconsider the organization of the HPA provisions for the 2028 Energy Code. Commission staff proposed aligning the organization of the Energy Code provisions with the California Residential Code by separately addressing vented attics, unvented attics, and unvented enclosed rafter assemblies.

This was an important step toward resolving the issue. However, the underlying conflict between the prescriptive HPA assembly and CRC Section R806.3 remains and should be addressed through the 2028 rulemaking process.

The 2016 HPA CASE Report

The 2016 CASE Report is particularly important because it establishes the technical and economic basis upon which the HPA measure was proposed and later adopted as code.

The report describes HPA as a package intended to minimize the temperature difference between the attic space and conditioned air transported through ducts located in the attic. The proposed package included roof deck insulation, increased ceiling insulation, duct insulation, and reduced duct leakage.

For the HPA package analyzed for cost-effectiveness, the CASE Team specifically modeled:

- R-13 insulation below the roof deck
- R-38 ceiling insulation
- R-8 duct insulation
- 5% duct leakage

The report's cost-effectiveness analysis was based on this specific package.

Notably, the CASE Report does not identify a continuous 1-inch air space between the air-permeable below-deck insulation and the roof sheathing as an incremental construction cost or as a separate component of the HPA assembly.

This distinction is important. The Commission's original cost-effectiveness analysis was performed using a defined construction assembly and specific incremental construction costs. If

CRC Section R806.3 requires the actual constructed assembly to include a continuous 1-inch air space between air-permeable insulation and the roof sheathing, then the assembly being required by some AHJs is not identical to the assembly described and costed in the CASE analysis.

The CASE Report also specifically states that the HPA package was intended to be a vented attic. It explains that there were concerns about maintaining attic ventilation when both below-deck and ceiling insulation were installed, and Appendix G was developed to address those concerns.

Appendix G proposes the use of vent baffles and insulation stops to maintain unobstructed ventilation channels at the eaves. The report's Figure 15, "Venting Details for Modified Conventional Vented Attic," illustrates the proposed approach. The report also identifies gable-end ventilation and above-deck insulation as alternative approaches.

The CASE Report therefore demonstrates that the HPA proposal was carefully evaluated as a vented attic strategy. However, the ventilation solution evaluated by the CASE Team focused on maintaining attic ventilation at the eaves and preventing the ceiling insulation from blocking the ventilation path. It does not appear to have evaluated the additional requirement, now being enforced by some jurisdictions, to maintain a continuous 1-inch space between air-permeable insulation and the underside of the roof sheathing throughout the attic.

Cost-Effectiveness and the Warren-Alquist Act

The Warren-Alquist Act requires the Energy Commission to adopt building energy efficiency standards that are cost-effective when taken in their entirety and amortized over the economic life of the structure compared with historic practice. The Energy Commission itself has described this requirement as applying to the standards as a whole, rather than requiring every individual measure to demonstrate an independent payback.

The 2016 HPA CASE Report followed this life-cycle cost methodology. It evaluated energy savings, incremental construction costs, present value of energy cost savings, and lifecycle costs over a 30-year residential analysis period. The report states that a benefit-to-cost ratio greater than 1.0 indicates that the discounted energy cost savings exceed the incremental cost of the measure.

The HPA results were not uniformly far above the cost-effectiveness threshold. For example, the reported benefit-to-cost ratio was 1.0 in Climate Zone 4, 1.2 in Climate Zone 8, and 1.9 in Climate Zone 16, while the ratios were substantially higher in several other climate zones.

This is particularly important because the cost-effectiveness analysis was based on the specific HPA package and associated incremental construction costs identified in the CASE Report.

The CASE Report identifies the cost of the below-deck insulation and insulation netting, but it does not identify an incremental cost for maintaining a continuous 1-inch air space between the insulation and roof sheathing.

This letter does not assert that the HPA measure is no longer cost-effective. Rather, it raises a more specific concern: if the California Residential Code requires a different construction assembly than the assembly evaluated in the HPA CASE analysis, the Commission should confirm that the actual assembly required for compliance remains consistent with the cost-effectiveness determination supporting the measure.

This is especially important where the original benefit-to-cost ratio was close to the statutory cost-effectiveness threshold.

If a continuous 1-inch air space is required throughout the attic, the actual construction may require additional framing, insulation support, netting, baffles, labor, coordination, and potentially additional attic volume or design modifications. The Commission should determine whether those costs and any associated changes in thermal performance were included in the original analysis.

The Commission should also consider whether requiring a continuous air space changes the thermal performance of the assembly sufficiently to affect the energy savings upon which the original cost-effectiveness analysis was based.

Practical Consequences

The current conflict creates several significant problems.

First, a project can comply with the prescriptive Energy Code HPA provisions while simultaneously failing to comply with the California Residential Code as interpreted by ICC and enforced by some California building departments.

Second, enforcement can vary among jurisdictions, creating uncertainty for builders, designers, HERS Raters, energy consultants, and building officials.

Third, the conflict creates uncertainty regarding the actual construction assembly upon which Energy Code compliance is based.

Fourth, local building officials are placed in the difficult position of enforcing two California codes that appear to prescribe different requirements for the same roof assembly.

Finally, the conflict undermines the transparency of the original cost-effectiveness determination because the assembly currently required by some AHJs may differ from the assembly used to establish the incremental costs and energy savings supporting the HPA measure.

Recommendations for the 2028 Energy Code

I respectfully recommend that the Commission take the following actions during the 2028 rulemaking process:

1. Reorganize the roof insulation provisions to align with the organization of the California Residential Code by separately addressing vented attics, unvented attics, and unvented enclosed rafter assemblies.
2. Explicitly state that a vented HPA assembly must comply with the applicable California Residential Code ventilation requirements.
3. Clarify whether air-permeable insulation installed below the roof deck in a vented HPA assembly is permitted to contact the underside of the roof sheathing.
4. If the Commission determines that CRC Section R806.3 requires a continuous 1-inch air space between air-permeable insulation and the roof sheathing, revise the HPA prescriptive requirements to clearly incorporate that requirement.
5. Review the 2016 HPA CASE cost-effectiveness analysis to determine whether the construction cost and energy performance assumptions remain applicable when the required 1-inch air space is incorporated into the assembly.
6. If necessary, update the cost-effectiveness analysis using the actual construction assembly required under the California Residential Code.
7. Evaluate whether the thermal impact of the 1-inch air space should be incorporated into CBECC compliance software and other third-party compliance tools.
8. Update the Residential Compliance Manual, Blueprint guidance, compliance forms, and other educational materials to provide a single, consistent interpretation and construction detail.
9. Coordinate with the Department of Housing and Community Development so that the Energy Code and California Residential Code provide compatible requirements for vented HPA assemblies.

Respectfully submitted,

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