

Date of Hearing: June 28, 2023

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY

Eduardo Garcia, Chair

SB 837 (Archuleta) – As Amended April 26, 2023

SENATE VOTE: 38-0

SUBJECT: Energy: building energy standards: sealed and unvented attics

SUMMARY: Requires the California Energy Commission (CEC) to consider revising the definition of “conditioned space, indirectly” to include sealed and unvented attics as part of the pending cycle of building code review.

EXISTING LAW:

- 1) Establishes the CEC’s authority to create regulations for building efficiency standards. Existing law requires the CEC to create cost-effective regulations for lighting, insulation, climate control systems, and other building design and construction standards that increase energy and water efficiency for new residential and new nonresidential buildings. Local governments may not issue permits for construction and installation projects that fail to comply with the CEC’s certified efficiency standards. (Public Resources Code § 25402(a-b))
- 2) Allows specified state agencies, including the CEC, to propose changes to building standards or regulations related to the implementation or enforcement of building standards. Requires the agencies to submit building standards to the California Building Standards Commission (CBSC) for adoption and approval prior to codification. (Health and Safety Code § 18929)
- 3) Requires the CEC to carry out studies, technical assessments, research projects, and data collection directed to reducing wasteful, inefficient, unnecessary, or uneconomic uses of energy, including, but not limited to, improved building design and insulation. (Public Resources Code § 25401)
- 4) Requires the CEC’s building efficiency standards to be cost-effective when taken in their entirety and amortized over the economic life of the structure compared with historic practice. It also requires the CEC to determine the lifecycle cost of complying with a building standard. (Public Resources Code § 25402(b)(3))
- 5) Requires the CEC to adopt a plan by January 1, 2019, to promote compliance with Part 6 of Title 24 of the California Code of Regulations in the installation of central air conditioning and heat pumps. The CEC must consult with the Contractors’ State License Board (CSLB), local building officials, and other stakeholders to create the plan. It also authorizes the CEC to create regulations to increase compliance with permitting and inspection requirements for central air conditioning and heat pumps, based on the plan. (Public Resources Code § 25402.12)

FISCAL EFFECT: Unknown. Pursuant to Senate Rule 28.8, this bill did not receive a hearing in the Senate Committee on Appropriations due to a determination that any state costs of the bill are not significant.

BACKGROUND:

Energy Codes – Existing law establishes the CEC’s authority to adopt cost-effective building and appliance standards to promote the conservation of energy and water. Title 20 of the California Code of Regulations includes the CEC’s appliance standards and Title 24 includes the CEC’s Building Energy Efficiency Standards, which are also known as the energy codes. Existing law also sets cost-effectiveness requirements for the energy codes and requires the CEC to consider the cost of housing as part of cost-effectiveness determinations. While the CEC establishes the energy codes, enforcement of these standards rests with local building officials.

Under existing law, the CEC adopts new building energy efficiency standards every three years, and standards become effective one year after their adoption. The CEC has started developing the 2025 building energy efficiency standards. According to the CEC, the updated standards will be proposed for adoption in 2024, and they will become effective on January 1, 2026. The CEC adopts three different types of codes: mandatory, performance, and prescriptive standards. While mandatory standards are required for all new construction in the state, performance standards may vary by geographic location, building type, and the energy budget for the building. The prescriptive standards provide an alternative to the performance standards, by offering a set of packages that provide a checklist-like compliance approach. Builders must build to the mandatory standards, but have more flexibility in how to meet the performance or prescriptive standards.¹

Yes or No to Air Flow? Historically, California’s building codes have favored vented attics, in which the attic has an outside opening to allow moisture and temperature to transfer between the attic space and the surrounding environment. For vented attics, insulation is installed in the floor of the attic to insulate the building’s conditioned space below the attic from the largely ambient temperature of the attic space. Allowing for ventilation in attics enables warm air and moisture to escape the building, preventing mold and moisture damage. However, attics may also contain the building’s heating, ventilation, and air conditioning (HVAC) equipment, including ducts. Leaks of conditioned air from these ducts installed in a vented attic may be released to the outdoors, leading to energy inefficiencies.

In high-heat weather conditions, the air temperature in vented attics can increase dramatically and further reduce the energy efficiency of HVAC systems beyond potential leakage from ducts. Building owners may compensate for the loss of performance from HVAC systems in vented attics by using the HVAC for longer periods of time at cooler thermostat levels to reach the desired indoor conditioned temperature. The U.S. Department of Energy has cited the energy losses from HVAC systems in vented attics as 20% or more, resulting “in a significant energy loss when ducts are in unconditioned space.”² However, a 2019 study by the Lawrence Berkeley

¹ CEC, pg iv, 2022 Building Energy Efficiency Standards for Residential and Non-residential Buildings – Title 24, Part 6, and Associated Administrative Regulations in Part 1, August 2022.

² U.S. Department of Energy; “Unvented, Conditioned Attics”; January 2013.

National Laboratory concluded that these energy inefficiencies can vary substantially by geographic location and season.³

Unlike vented attics, unvented attics do not have any designed openings and therefore do not readily allow air exchange with the surrounding environment. In unvented attics, insulation (often a spray foam, rather than conventional fiberglass) is installed throughout the attic walls and ceilings.⁴ The reduced air flow in unvented attics can reduce leakage from HVAC ducts and, if the unvented attic maintains a relatively stable temperature similar to an air-conditioned space, help maintain the energy efficiency of the HVAC system. However, an unvented attic may still leak air to the outside if not properly sealed or may not have access to conditioned air from the rest of the building, limiting its effectiveness for insulating ducts that might be in the attic. Given this uncertainty as to whether an unvented attic is functioning as conditioned space in practice, the CEC neither classifies unvented attics as indirectly conditioned space in the energy code nor assumes that unvented attics provide the same energy efficiency benefit for HVAC ducts as would a conditioned space.

Unvented attics may cause excessive moisture accumulation, unless additional moisture-reduction measures are taken, leading to mold growth and potentially compromising indoor air quality.⁵ Moreover, the spray foam insulation often employed in unvented attics can cost substantially more than the conventional fiberglass insulation regularly installed in vented attics.⁶ Additionally, the manner in which unvented attics are insulated can more rapidly degrade roofing materials, reducing the average lifespan of shingles and other materials. This would necessitate an expensive roof replacement significantly sooner than would otherwise be required.⁷

COMMENTS:

- 1) *Author's Statement.* According to the author, "California's Energy Code encourages builders to construct energy-efficient buildings, while giving them flexibility to choose which design techniques and technologies best suit their work. SB 837 is a simple bill that adds another tool to this arsenal, a tool that is recognized by the International Residential Code, utilized in other jurisdictions, and proven to have significant energy savings."
- 2) *Space Oddities.* This bill would require the CEC to consider changes to its definition of an indirectly conditioned space⁸ to include unvented and sealed attics. Many builders in

³ Pg. 259; CEC; "Sealed and Insulated Attic Hygrothermal Performance in New California Homes Using Vapor and Air Permeable Insulation – Field Study and Simulations"; April 2019.

⁴ Pg. 307, CEC, 2022 Building Energy Efficiency Standards for Residential and Non-residential Buildings – Title 24, Part 6, and Associated Administrative Regulations in Part 1, August 2022.

⁵ CEC; "Sealed and Insulated Attic Hygrothermal Performance in New California Homes Using Vapor and Air Permeable Insulation – Field Study and Simulations"; April 2019.

⁶ Lawrence Berkeley National Laboratory; "A Literature Review of Sealed and Insulated Attics – Thermal, Moisture and Energy Performance"; 2016.

⁷ Lawrence Berkeley National Laboratory; "A Literature Review of Sealed and Insulated Attics – Thermal, Moisture and Energy Performance"; 2016.

⁸ "Conditioned Space, Indirectly, is enclosed space that (1) is not directly conditioned space; and (2) either (a) has a thermal transmittance area product (UA) to directly conditioned space exceeding that to the outdoors or to unconditioned space and does not have fixed vents or openings to the outdoors or to unconditioned space, or (b) is a space through which air from directly conditioned spaces is transferred at a rate exceeding three air changes per

California use CBECC-Res—a free software developed by the CEC for demonstrating compliance with the California Residential Building Energy Efficiency Standards—to evaluate the energy efficiency of buildings.⁹ Air circulation ducts located in a building’s conditioned space can make the building more energy efficient, which is reflected in how the building is rated by CBECC-Res.

Unvented attics are currently not classified as conditioned space in the energy codes. The author and sponsor claim that this lack of classification causes the CBECC-Res software to underrepresent the energy efficiency benefits of unvented attics, as ducts situated in unvented attics are treated as being located in unconditioned space. However, given the lingering potential for air leakage to the outside and uncertainty regarding the flow of conditioned air into the attic, whether the definition of indirectly conditioned space would more aptly reflect an unvented attic, for the purposes of maintaining HVAC efficiency, is unclear. Currently, there is neither consensus on what leakage rate an attic must meet to be considered sealed nor an accepted testing method to verify that the attic is functionally sealed. Additionally, the CEC already provides a performance approach credit for unvented attics through the CBECC-Res software, which counts toward the total energy budget of the building.

- 3) *For Your Consideration.* This bill would require the CEC to consider adopting standards to include unvented attics in the definition of an indirectly conditioned space as part of the next building code cycle development. Whether this bill would substantively affect the review, and potential revision, of the energy codes by the CEC is unclear. However, this bill is clear in that it does not mandate that the CEC adopt specific standards or redefine certain terms. The language is permissive that the CEC “shall consider revising the definition.” Should the CEC choose to reclassify unvented and sealed attics, the CEC’s multi-tiered authority (mandatory, performance and prescriptive standards) affords it considerable flexibility to determine whether, and to what extent, any additional changes to standards should be made.

- 4) *Prior Legislation*

SB 795 (Stern, 2023) would require the CEC to establish online systems to track sales of HVAC equipment and track compliance documents for building energy efficiency standards. Status: In the Assembly, pending referral.

SB 1164 (Stern, 2022) was substantially similar to SB 795 and would have required the CEC to create a compliance testing registry. Status: Held in the Assembly Appropriations Committee.

AB 660 (Levine, 2019) would have required the CEC to consider establishing additional cool roof requirements as part of building code development cycles occurring over 12 years. Status: the bill was subsequently amended into a different subject matter and held in the Senate Appropriations Committee.

hour. CEC, Pg. 64, 2022 Building Energy Efficiency Standards for Residential and Non-residential Buildings – Title 24, Part 6, and Associated Administrative Regulations in Part 1, August 2022.

⁹ CEC; “2022 Energy Code Compliance Software”; <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency-1>

REGISTERED SUPPORT / OPPOSITION:

Support

California Building Industry Association
California Building Officials
California Business Properties Association
Huntsman Corporation
The Institute for The Building Envelope

Opposition

Asphalt Roofing Manufacturers Association
North American Insulation Manufacturers Association
Western States Roofing Contractors Association

Analysis Prepared by: Samuel Mahanes / U. & E. / (916) 319-2083