SENATE COMMITTEE ON ENERGY, UTILITIES AND COMMUNICATIONS
Senator Ben Hueso, Chair
2019 - 2020 Regular

Bill No:	AB 660	**Hearing Date:**	7/2/2019
Author:	Levine		
Version:	6/24/2019 As Amended		
Urgency:	No	**Fiscal:**	Yes
Consultant:	Sarah Smith		

SUBJECT: Building energy efficiency standards: solar reflectance of roofs

DIGEST: This bill requires the California Energy Commission (CEC) to consider establishing additional cool roof requirements as part of building energy efficiency standards established over the next 12 years.

ANALYSIS:

Existing law:

1) Requires the CEC to establish building design and construction standards that increase the efficiency in the use of energy and water for new residential and new nonresidential buildings. The CEC must periodically update the standards. Six months after the CEC certifies an energy conservation manual, cities, counties, and state agencies are prohibited from issuing a building permit for a building that does not comply with the current standards created by the CEC. The CEC must demonstrate that any water efficiency standards are necessary to save energy. (Public Resources Code §25402(a)(1))

2) 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. When determining cost-effectiveness, the CEC must consider the value of the water or energy saved, impact on product efficacy for the consumer, and the life-cycle cost of complying with the standard. The CEC must consider other relevant factors, including, but not limited to the standards' cost on house costs, the total statewide costs and benefits of the standard over its lifetime, economic impacts on California businesses, and alternative approaches and their associated costs. (Public Resources Code §25402(b)(3))

This bill:

1) Requires the CEC to consider amendments to the roof replacement building standards for existing low-rise residential buildings to increase the minimum solar reflectance of roods and expand the number of climate zones in which cool roofs are required based on the following schedule:
   a) 2025 building standards: from .25 to .30 minimum aged solar reflectance
   b) 2031 building standards: from .35 to .45 minimum aged solar reflectance.

2) Requires the CEC to consider these amendments in each of the four triennial building code cycles occurring after January 1, 2020.

3) Requires the CEC to evaluate whether there is an adequate supply of available compliant cool roof products and whether the change will be cost effective over the life of the roof replacement.

Background

What are heat islands and cool roofs? Heat islands occur in geographic locations where human activity raises the temperature of the location above the temperature of the surrounding area. Multiple factors contribute to the development of heat islands, including dark roof and pavement surfaces that absorb heat and reflect very little sunlight. Heat islands contribute to increased energy consumption in homes due to increased use of air conditioning systems.

Cool roofs are one strategy for addressing heat islands. These roofing products have a higher reflectance rating and absorb less heat than traditional roofing products. Cool roofs can be made from number of materials; however, cool roofs with higher aged reflectance ratings are generally made from clay tiles and metal. While cool roofs can provide energy savings, cool roof requirements can pose challenges for homeowners. As cool roofs age, their reflectance rating can decrease. To ensure that cool roofs continue to effectively reflect light and limit heat absorption, homeowners may need to clean the roof. Cool roofs with higher aged reflectance ratings are generally made of products that may create structural problems for some buildings; as a result, buildings may need additional assessment and re-engineering of the structure supporting the roof. Not all roofing contractors have experience installing cool roofs with higher aged reflectance ratings.

A cool roof is only one of several measures a property owner can take to reduce heat transfer into a building and increase energy savings. Other mechanisms exist to reduce energy consumption associated with a lack of solar reflectance on roofs. For example, enhanced insulation can be installed and heating, ventilation, and air

conditioning (HVAC) systems and ducts can be upgraded. To the extent that a homeowner has already taken these measures, the energy savings achieved through a cool roof alone may not result in long-term savings to the homeowner.

Current status of cool roof standards. This bill requires the CEC to consider adopting specific cool roof standards in future cycles of its building energy efficiency standards. Under existing law, the CEC adopts building energy efficiency standards every three years. This bill specifies two cycles (2025 and 2031) for which the CEC must consider adopting cool roof standards that would increase the minimum aged reflectance of cool roofs and expand the climate zones in which homeowners must install cool roofs when re-roofing. Existing law provides the CEC with the authority to consider cool roof standards and it requires the CEC to ensure that building energy efficiency standards are cost-effective when taken in their entirety and amortized over the life of the structure. Under existing law, the CEC must consider several factors when determining whether a standard is cost-effective, including the value of energy saved from the measure, impact on the product's efficacy for the consumer, and the life-cycle cost of complying with the standard (e.g. maintenance, repair, and replacement). The CEC must also consider housing cost trends and the impact of the standard on housing costs.

Under existing law, the CEC already has the authority to consider cool roof requirements and has adopted cool roof standards. The CEC has adopted a cool roof standard of .20 minimum aged solar reflectance for steep slope residential buildings in climate zones 10 through 15, which cover almost all of California's inland counties. The CEC has also adopted a .63 minimum aged solar reflectance standard for low slope roofs in climate zones 13 and 15, which cover portions of the Central Valley, Imperial County, Riverside County, San Diego County, and San Bernardino County. The CEC specifies a number of exemptions that limit the degree to which cool roofs are required for homes covered by these climate zones. For example, cool roofs are not required when homeowners re-roofs a steep slope home if the homeowner installs a higher rated ceiling insulation.

While this bill does not specify that it requires the CEC to consider amendments to the cool roof standards that are specific to steep slope residential buildings, the bill's aim of increasing the minimum aged solar reflectance standard from .20 to .45 implies that the bill is intended to address the standard for steep slope buildings.

What products would be compliant under this bill? The CEC identifies compliant products through a directory maintained by the Cool Roof Rating Council. According to the CEC, 80 percent of the steep-sloped re-roofing market is

asphaltic shingles and 178 of these products are in the Cool Roof Rating Council directory. Based on information from the CEC, the following table identifies the number of steep slope cool roof asphalt shingle products with aged reflectance levels of .20 and above currently listed in the council's directory.

Minimum Aged Solar Reflectance Level	Number of Compliant Products
.20	60
.25	30
.30	6 (premium priced asphalt product)
.32	4 (premium priced asphalt product)
.35	3 (premium priced asphalt product)
.38	0

Only two types of products meet the .45 minimum aged solar reflectance level that this bill establishes as the upper end of standards that the CEC must consider in the 2031 building standards. These two products are premium clay tiles and metal standing seam roofs. Switching an existing home's roof from asphalt shingle to clay tiles would likely require an assessment to determine if additional construction would be required to re-engineer the roof's supporting structure to ensure that the home can support the weight of a clay tile roof. As a result, any prescriptive building standard establishing a cool roof requirement that would shift a home to clay tile shingles would likely require a case-by-case evaluation of whether the home requires additional construction to bear the load of the clay roof.

A scarcity of compliant materials may also limit the degree to which contractors are familiar with higher rated cool roof installations. Limited access to materials and labor can increase construction costs. Unlike a number of building energy codes, roofing standards do not apply solely to new construction; these standards apply at the time of re-roofing. As a result, cost considerations are especially important because the consumer is generally not re-constructing the supporting structure for the roof when re-roofing.

Need for amendments. As currently written, this bill would require the CEC to consider adopting cool roof building standards for which there may very limited compliant products sold in California. While this consideration is not a mandate to adopt the standard, it is unclear how the CEC could evaluate the performance of a product for which so few products exist on the market. The lack of product availability could also limit the availability of labor that has experience installing compliant cool roofs in California. A scarcity of products and labor may limit the

cost-effectiveness of a cool roof standard adopted under this bill. This bill requires the CEC to assess whether an adequate supply of available compliant cool roof products exists and whether the change will be cost effective over the life of the roof replacement. However, an assessment based solely on the cost of the roof is not consistent with existing requirements for building standards to be cost-effective in their entirety and amortized over the economic life of the structure. Additionally, this bill requires the CEC to consider amendments to the cool roof requirements in four of the building energy efficiency standard cycles while only specifying two cycles in which the CEC must consider specific amendments. *The author and the committee may wish to amend this bill to clarify the cycles in which the CEC must consider specific changes to the cool roof requirements, ensure that any standards adopted pursuant to this bill must comply with existing cost-effectiveness requirements, and provide the CEC with the flexibility to determine that sufficient compliant materials and labor exists to in climate zones where it would consider amendments to cool roof requirements.*

Prior/Related Legislation

AB 296 (Skinner, Chapter 667, Statutes of 2012) required the California Environmental Protection Agency to develop an Urban Heat Island Index and required the Department of Transportation to develop standards for sustainable or cool pavements. The bill also required the California Building Standards Commission to consider incorporating the cool pavement standard as a strategy in the California Green Building Standards Code.

FISCAL EFFECT: Appropriation: No Fiscal Com.: Yes Local: No

SUPPORT:

Natural Resources Defense Council

OPPOSITION:

Asphalt Roofing Manufacturers Association
Atlas Roofing Corporation
Boral Roofing LLC
Building Products of Canada Corp
CertainTeed Corporation
Eagle Roofing Products
Fontana Paper Mills
GAF Materials LLC
IKO

Madera Roofing, Inc.
Malarkey Roofing Products
Maruhachi Ceramics of America, Inc.
Mid States Asphalt
North American Insulation Manufacturers Association
Owens Corning Roofing and Asphalt, LLC
PABCO Roofing Products
Pacific Coast Building Products, Inc.
Roofing Contractors Association of California
Safer Building Solutions
SonRay Solar
Specialty Granules
Tarco
Tile Roofing Industry Alliance
Union Roofing Contractors Association
Western States Roofing Contractors Association

ARGUMENTS IN SUPPORT: According to the author:

> AB 660 directs the CEC to increase the solar reflectance requirement for steep roofs on existing nonresidential and residential buildings across California by 2030. Energy efficient roofs are also known as cool roofs. These roofs are designed to reflect more sunlight and absorb less heat than a standard roof. The current reflectance standard hasn't been increased in more than 10 years. Peer-reviewed research by scientists at Lawrence Berkeley National Laboratory shows that it can be cost-effectively increased over the next 11 years. The typical service life of a roof is about 20 years, so we can make most of the roofs in California cool within two decades just by choosing cool products when roofs come due for replacement.

ARGUMENTS IN OPPOSITION: Opponents argue that an insufficient amount of compliant materials exist in California to ensure that this bill can be effectively implemented. Opponents also claim that this bill will result in significantly higher housing costs without a commensurate amount of energy savings. In opposition, the Union Roofing Contractors Association states the following: "In the short-run, this code change translates to a drastic reduction in available product and palette for residential roofs and residential materials. This means increased costs to homeowners and challenges for those who sell and install roofs in California…"

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