

Date of Hearing: April 2, 2025

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY

Cottie Petrie-Norris, Chair

AB 368 (Ward) – As Introduced February 3, 2025

SUBJECT: Energy: building standards: passive house standards

SUMMARY: Requires the California Energy Commission (CEC) to evaluate the passive house energy efficiency standards, and, if appropriate, adopt those standards, or any elements that align with the state's existing requirements, as an alternative compliance pathway for the building efficiency standards.

EXISTING LAW:

- 1) Requires the CEC to adopt and update Building Energy Efficiency Standards (Energy Code) for most residential and non-residential buildings in the state of California every three years. (Public Resources Code § 25402)
- 2) Requires the CEC to adopt the building energy efficiency standards that are cost-effective when taken in their entirety and when amortized over the economic life of the structure. The CEC shall also consider other relevant factors, as required by Sections 11346.5 and 11357 of the Government Code, including, but not limited to, the impact on housing costs, the total statewide costs and benefits of the standard over its lifetime, economic impact on California businesses, and alternative approaches and their associated costs. (Public Resources Code § 25402(c))
- 3) Requires each utility to maintain records of the energy usage data of all buildings to which they provide service for at least the most recent 12 complete calendar months, and to deliver or otherwise provide that aggregated energy usage data for each covered building, as defined, to the owner, as specified. (Public Resources Code § 25402.10)
- 4) Requires the CEC to assess the potential for the state to reduce GHG emissions from the state's residential and commercial building stock by at least 40% below 1990 levels by January 1, 2030. (Public Resources Code § 25403)
- 5) Requires the CEC to develop and implement a comprehensive program to achieve greater energy savings in California's existing residential and nonresidential building stock. (Public Resources Code § 25943)
- 6) Requires the CEC to develop, and publish on the commission's internet website, guidance and best practices to help building owners, the construction industry, and local governments overcome barriers to electrification of buildings. (Public Resources Code § 25233.5)
- 7) Establishes a charge on electricity and natural gas consumption to fund cost-effective energy efficiency and conservation activities. (Public Utilities Code §§381 and 890)

- 8) Require the California Air Resources Board (CARB) to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030. (Health & Safety Code § 38566)

FISCAL EFFECT: Unknown. This bill is keyed fiscal and will be referred to the Committee on Appropriations for its review.

CUSTOMER COST IMPACTS: This measure directs the CEC to consider adopting Passive House energy efficiency standards as an alternative option within California’s building codes. While implementing these standards could involve higher upfront construction costs, the investments in some cases could be offset by long-term energy consumption savings, resulting in overall cost benefits for consumers.

BACKGROUND:

California Energy Code – Adopted in 1976 and updated every three years by the CEC, the building energy efficiency standards for residential and non-residential buildings, otherwise known as the Energy Code or Title 24, Part 6, entails energy and water efficiency standards for newly constructed buildings, additions to existing buildings, and alterations to existing buildings. These standards are updated to ensure that builders use the most energy-efficient technologies and construction, save energy, increase electricity supply reliability, increase indoor comfort, and help preserve the environment.¹ Homes and businesses use nearly 70% of California’s electricity and are responsible for nearly 25% of the state’s greenhouse gas (GHG) emissions.² The standards vary by building type and climate zone, as outlined in the California Code of Regulations.

Components of the California Energy Code – The Energy Code is conceptually divided into three basic sets:³

- i) **Mandatory Measures:** These are baseline requirements that apply to all buildings, regardless of location, building type, or compliance approach. They cover elements such as insulation, lighting, HVAC efficiency, and air sealing.
- ii) **Performance Standards:** Public Resources Code emphasizes the importance of building design and construction flexibility by requiring the CEC to establish performance standards, in the form of an “energy budget” which refers to energy consumption per square foot of floor space.⁴ These standards vary by building type and climate zone (California has 16 distinct climate zones). This approach provides flexibility, allowing builders and designers to meet energy efficiency targets using a combination of strategies suited to local conditions.

¹ Title 24 Express, “What is 24?” <https://www.title24express.com/what-is-title-24/>

² California Energy Commission, “2025 California Energy Code”; Fact Sheet.

³ California Energy Commission, “2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings: For the 2022 Building Energy Efficiency Standards Title 24, Part 6, and Associated Administrative Regulations in Part 1”; Accessed March 25, 2027; <https://www.energy.ca.gov/publications/2022/2022-building-energy-efficiency-standards-residential-and-nonresidential>

⁴ Pg.4, “2022 BUILDING ENERGY EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS”; August 2022

- iii) **Prescriptive Standards:** These are more structured requirements that outline specific predefined measures (e.g., U-factor windows, Seer 15 HVAC) that if followed exactly, will be deemed compliant.

Cost Effectiveness Factor. The CEC strives to balance environmental sustainability and cost concerns to provide California residents with energy that minimizes environmental impact while remaining affordable. Cost-effectiveness is calculated by determining the energy savings associated with implementing a more efficient building standard. The energy code is not applicable to all buildings in the state. State historical buildings, federal buildings, and some industrial or agricultural buildings may be exempt from certain provisions of the energy code. A building may also be exempted if implementing the provisions of the energy code leads to substantial cost increases. According to the CEC, efficiency standards for buildings and appliances together have saved Californians more than \$100 billion in avoided energy costs over the last 50 years.⁵

2019 Energy Code, “2019 Building Energy Efficiency Standards” – In May of 2018, the CEC adopted the 2019 Building Energy Efficiency Standards which were the first standards in the nation to require solar PV systems for new construction. These standards also include improved thermal building envelope standards (i.e., insulating the interior), residential and nonresidential ventilation requirements, and nonresidential lighting requirements. For residential buildings, according to the CEC, the standards will result in about 53% less energy use than under the 2016 standards. The CEC further estimated that the new standards will reduce GHG emissions by 700,000 metric tons over three years. As eluded earlier, statute requires that the CEC standards must be “cost-effective.” The CEC estimated that based on a 30-year mortgage, the 2019 standards will add about \$40 per month in costs and result in about \$80 per month in reduced energy costs. Should the CEC calculations for “cost-effectiveness” not hold for particular buildings – given differing rates, system costs, interconnection fees, or other factors in utility service territories – the PV requirements would not apply. The CEC also established a few outright exemptions to the new solar requirement. Primarily, homes that are shaded by trees, hills, other structures, etc. are not required to install solar. Additionally, homeowners in areas with community solar programs are also exempt from the requirement.

2022 Energy Code, “2022 Building Energy Efficiency Standards” – In August of 2021, the CEC adopted the 2022 Energy Code standards for newly constructed residential and commercial buildings, as well as additions and alterations to existing buildings with a focus on four primary areas:⁶

- Requiring solar PV and battery storage systems for newly constructed nonresidential and high-rise multifamily buildings.⁷
- Requiring the use of electric heat pumps for space heating and water heating.
- Establishing electric-ready requirements for all buildings, including single-family homes.

⁵ California Energy Commission, “Fact Sheet; “2025 California Energy Code”

⁶ Pg. iv, CEC; “2022 Building Energy Efficiency Standards for Residential and Nonresidential Buildings,” August 2022

⁷ High-rise multifamily buildings are multifamily buildings that have four or more habitable stories

- Reinforcing and strengthening ventilation standards to improve the quality of indoor air quality.

Concurrently, section 10-109(k) of the 2022 Energy Code permits the CEC to determine that the solar PV and/or battery storage system requirements of Section 140.10, applicable to non-residential buildings, and Section 170.2, applicable to multi-family homes with more than three habitable stories, shall not apply if the CEC finds that its cost-effectiveness conclusions regarding solar PV and battery storage requirements are unreasonable for such buildings.

2025 Energy Code, “2025 Building Energy Efficiency Standards”— In September of 2024, the CEC adopted the 2025 Energy Code standards to expand the use of heat pumps for space conditioning and water heating in newly constructed single-family, multifamily, and select nonresidential buildings. These standards also allow for flexibility in taking alternative but equally efficient approaches such as:⁸

- Updating ventilation requirements in multifamily buildings to improve indoor air quality.
- Updating photovoltaic and battery energy storage system standards for high-rise multifamily and nonresidential buildings to achieve cost effective installations
- Using heat pumps for both space heating and water heating, for homes hence expanding on the single heat pump requirements in the 2022 update.

Process and Timelines. The Energy Code standards are updated with extensive input from stakeholders such as the public, technical staff, and experts. The standards must be technologically feasible and cost-effective over the life of the building. The standards are usually discussed in public workshops and in online comments before being revised. Once approved, there is a one-year implementation period during which the CEC provides guidance, training, and technical assistance to help builders, code officials, and technicians prepare for the updates before they take effect.⁹

What are Passive House Standards? While there is no standardized definition of passive house standards, the Passive House Institute US states that “Passive building comprises a set of design principles used to attain a quantifiable and rigorous level of energy efficiency within a specific quantifiable comfort level”¹⁰ Originally developed in Germany, they comprise a set of rigorous energy efficiency guidelines designed to create ultra-low-energy buildings that require minimal heating and cooling with a focus on airtight construction, superior insulation, and energy-efficient ventilation. The key principles of Passive House Design include:¹¹

1. Superinsulation

- High levels of insulation in walls, roofs, and floors to minimize heat loss reducing the need for active heating and cooling systems

⁸ CEC, “2025 California Energy Code Fact Sheet”

⁹ Ibid

¹⁰ About Passive House – What is a Passive House, Passive house Institute, https://passivehouse.com/02_informations/01_whatisapassivehouse/01_whatisapassivehouse.htm#:~:text=Yet%2C%20a%20Passive%20House%20is%20more%20than,over%2075%%20compared%20to%20average%20new%20builds.

¹¹ Passive House Requirements, Passive House Institute, https://passiv.de/en/02_informations/02_passive-house-requirements/02_passive-house-requirements.htm?utm_source=chatgpt.com, 2024.

2. Airtight Construction
 - Ensuring the building envelope is extremely airtight to prevent heat loss
3. High-Performance Windows & Doors
 - Typically, triple-pane windows are used to maximize solar heat gain in winter while minimizing overheating in summer.
4. Thermal Bridge-Free Design
 - Avoiding materials and design features that allow heat to bypass insulation thus enhancing overall energy efficiency.
5. Heat Recovery Ventilation (HRV) or Energy Recovery Ventilation (ERV)
 - Ensuring a constant supply of fresh air without significant heat loss hence maintaining indoor air quality while saving energy

CEC Considerations. The California Energy Commission (CEC) recognizes the benefits of Passive House standards and has taken steps to explore their integration into the state's building energy efficiency regulations.¹² A measure titled "Single Family Passive House Prescriptive Pathway" was developed to assess whether homes certified under Passive House standards could meet or exceed the prescriptive requirements of the 2022 California Energy Code. This measure aimed to identify any barriers to implementation and determine the enforceability of such standards within the state's regulatory framework. While recognizing the potential benefits of Passive House principles, the CEC has identified several concerns regarding their integration as follows:¹³

1. *Energy Modeling and Compliance Verification:* Modeling Differences: Passive House utilizes specific energy modeling tools, such as the Passive House Planning Package (PHPP), which differ from the compliance software used for Title 24. This discrepancy raises challenges in verifying compliance and ensuring consistency between the two standards.
2. *Climate Zone Adaptation:* Diverse Climate Considerations: California encompasses 16 distinct climate zones, each with unique environmental conditions. Passive House standards, originally developed in Europe, may require adaptation to effectively address the diverse climatic conditions present across California.
3. *Cost Implications:* Economic Considerations: Implementing Passive House standards may involve higher upfront construction costs due to the use of specialized materials and construction techniques. Evaluating the cost-effectiveness and financial impact on builders and homeowners is a concern for widespread adoption given California's high electric rates.

¹² Phase I – Summary of the Existing Literature: Grid Benefits of Passive Homes, Memorandum, Opinion Dynamics, November 17, 2021, <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/building-decarb/passive-house-phase-i-report.pdf>

¹³ Rick Winch et al, Barriers to Incorporating Passive House Concepts in Residential New Construction, Opinion Dynamics, December 11, 2019.

COMMENTS:

- 1) *Author's statement.* According to the author, "AB 368 directs the California Energy Commission to evaluate and adopt certified Passive House (PH) standards as an alternative compliance pathway within Title 24, making it easier and more cost-effective to build high-performance, energy-efficient buildings. PH designs significantly reduce energy consumption and enhance resilience to climate change by utilizing airtight construction, superior insulation, and advanced ventilation systems. By streamlining certification and removing costly barriers, AB 368 will accelerate building decarbonization, improve indoor air quality, and support California's climate goals."
- 2) *Cost.Cost.Cost.* Maintaining the cost-effectiveness of California's Energy Code is paramount to its long-term success. Since the 1970s, California's Energy Code has been designed to advance technically feasible building practices while maintaining cost-effectiveness in order to protect residents from rising and volatile energy costs. As such, the committee *As such, the committee recommends that the CEC evaluate the use of Passive House energy models currently required for Passive House certification in their analysis, and the cost effectiveness of Passive House construction compared to existing Title 24 construction. Subsequently, the CEC shall provide a one-time report documenting its findings and recommendations to the Legislature no later than December 31, 2026.*

- 3) *Prior Legislation*

AB 1279 (Muratsuchi) established the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045. Status: Chapter 337, Statutes of 2022.

SB 68 (Becker) directed the CEC to gather and develop guidance and best practices to overcome barriers to the electrification of buildings and installation of electric vehicle charging equipment. This project implements the requirements of that bill to help commercial and residential building owners, the construction industry, and local governments. Status: Chapter 720, Statutes of 2021.

AB 3232 (Friedman) requires the CEC, by January 1, 2021, to assess the potential for the state to reduce GHG emissions from the state's residential and commercial building stock by 40% below 1990 levels by January 1, 2030. Status: Chapter 373, Statutes of 2018.

SB 1477 (Stern) requires the CEC to develop a statewide market transformation initiative to transform the state's market for low-emission space and water heating equipment for new and existing residential and nonresidential buildings and to develop an incentive program to fund near-zero emission technology for new residential and commercial buildings. Status: Chapter 378, Statutes of 2018.

SB 32 (Pavley) requires the CARB to ensure that statewide GHG emissions are reduced to 40% below the 1990 levels by 2030. Status: Chapter 249, Statutes of 2016.

AB 32 (Núñez) requires CARB to develop a Scoping Plan that describes the state's approach to reducing GHGs to achieve the goal of reducing emissions to 1990 levels by 2020. Status: Chapter 488, Statutes of 2006.

- 4) This bill is double-referred; upon passage in this Committee, this bill will be referred to the Assembly Committee on Natural Resources.

REGISTERED SUPPORT / OPPOSITION:**Support**

350 Conejo / San Fernando Valley
350 Humboldt
350 Ventura County Climate Hub
475 High Performance Building Supply
Abundant Housing LA
Active San Gabriel Valley
Alpen High Performance Products, INC.
Altadena Energy and Solar
Ban Sup
Best Techs Contracting Design Build Remodel, INC.
Building Doctors INC.
California Environmental Voters (formerly Clcv)
California Yimby
Carmel Building and Design
Casa Nova Studio
Clean Coalition
Climate Action California
Climate Center; the
Climate Reality Project - Silicon Valley Chapter
Climate Reality Project, Orange County
Climate Reality Project, San Fernando Valley
Community Environmental Council
Construction Progress
Eden: Environmental Ministry, All Saints Church
Elders Climate Action Social Chapter
Enersign US
Essential Habitat Architecture
Facts: Families Advocating for Chemical & Toxics Safety
Hayward Construction
Hayward Score
Home Energy Services
Home Green Homes
Indivisible Altadena
Making Housing and Community Happen
Markoff Fullerton Architects
Mothers Out Front Silicon Valley
Norcal Elder Climate Action
Not/not Architecture and Construction
Nrdc
Oulipo Architecture Studio
Page & Turnbull, INC.
Page and Turnbull

Paravant Architects
Passive House California
Phius
Resilient Palisades
Revision West
Rockwool
Rockwool North America
Santa Cruz Climate Action Network
Sidco Homes INC
Small Planet Supply
Socal 350 Climate Action
Susan Diana Harris Interiors
Sustainable Mill Valley
The Climate Center
The Passive House Network
Town of Portola Valley
U.S. Green Building Council, California
Urban Environmentalists, Los Angeles
Vector Green Power, LLC
Wythe Windows

Opposition

None file.

Analysis Prepared by: Lina V. Malova / U. & E. / (916) 319-2083