

Date of Hearing: April 8, 2026

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY

Cottie Petrie-Norris, Chair

AB 2200 (Hart) – As Introduced February 19, 2026

SUBJECT: Controlled environment horticulture space: thermal curtains

SUMMARY: Exempts greenhouse facilities from the California Energy Code's double-paned glazing requirement, allowing single-paned windows paired with thermal curtains or equivalent technologies to qualify as code-compliant. Additionally, directs the Building Standards Commission to codify permanent standards for this alternative approach in the next triennial code update.

EXISTING LAW:

- 1) Authorizes the California Building Standards Commission (CBSC) to approve and adopt building standards. Every three years, CBSC undertakes building standards rulemaking to revise and update the California Building Standards Code. (Title 24 of the California Code of Regulations)
- 2) Requires proposed building standards that are submitted to CBSC for consideration to be accompanied by an analysis completed by the appropriate state agency that justifies approval based on the following criteria: a) the building standard does not conflict with, overlap, or duplicate other building standards; b) the proposed standard is within the parameters of the agency's jurisdiction; c) the public interest requires the adoption of the building standard; d) the standard is not unreasonable, arbitrary, unfair, or capricious; e) the cost to the public is reasonable, based on the overall benefit to be derived from the building standard; f) the standard is not unnecessarily ambiguous or vague; and g) the applicable national specifications, published standards, and model codes have been appropriately incorporated into the standard. (Health and Safety Code § 18930)
- 3) Requires the California Energy Commission (CEC) to regulate lighting, insulation, climate, and other building design and construction standards that increase efficiency in the use of energy and water; energy and water conservation design standards; and standards for minimum levels of operating efficiency for energy- and water-efficient appliances. 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, 25402.1)
- 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 any building standard adopted by the CEC to be submitted to the CBSC for approval. (Public Resources Code § 25402.2)

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

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 and final adoption and approval rests with the CBSC as part of the larger California Building Standards Code.

Under existing law, the CEC adopts new building energy efficiency standards every three years, and standards become effective one year after their adoption. The 2025 Energy Codes went into effect January 1, 2026, and the CEC is already in development on their 2028 Energy Codes. The CEC adopts three different types of code: 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

Greenhouses in the Energy Codes – The 2022 Energy Codes established a requirement for Controlled Environment Horticulture spaces, of which greenhouses are a subset, making double-paned glazing the mandatory minimum compliance for conditioned greenhouses with nonopaque envelopes (i.e., see-through walls or roofs).² According to the CEC, the International Energy Conservation Code (IECC) Commercial, a national model code the CEC follows, regulates greenhouses and allows for “internal curtain systems.” However, the CEC notes no certification body currently validates that greenhouse glazing systems meet the target values of the IECC Commercial standard.³ As a result of this lack of verifiable performance data for internal curtain systems, the CEC adopted the double-paned glazing requirement to provide, as the CEC noted to committee, “a verifiable minimum performance level until reliable certification methods exist for alternatives like internal curtain systems.”

The CEC is coordinating with the Attachment Energy Rating Council (AERC), a U.S. Department of Energy-recognized organization that rates window attachments, and the Codes and Standards Enhancement (CASE) Team, a ratepayer-funded investor-owned utility program

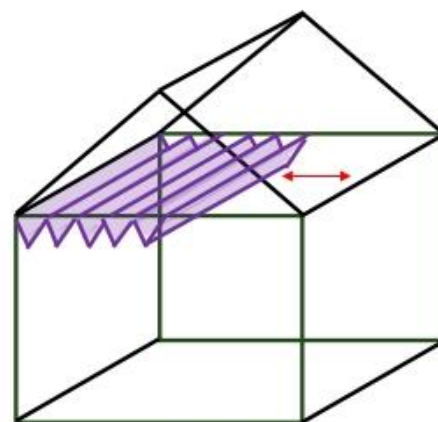
¹ CEC, pg. iv, 2022 Building Energy Efficiency Standards for Residential and Non-residential Buildings – Title 24, Part 6, and Associated Administrative Regulations in Part 1, August 2022.

² Pg. 246, Section 120.6 (h)(3), CEC, *2025 Building Energy Efficiency Standards for Residential and Nonresidential Buildings*, July 2025, https://www.energy.ca.gov/sites/default/files/2025-07/CEC-400-2025-010-F_0.pdf

³ From IECC Section C402.1.1.2: U-factor targets of 0.5 for skylights and 0.7 for vertical fenestration

that presents recommendations to the CEC to update the Energy Codes, to both verify and incorporate alternative compliance pathways to the greenhouse standards. On March 5, 2026, the CASE Team recommended creating a new compliance path for conditioned greenhouses with single-glazed glass envelopes that have curtains to be compliant with the 2028 Energy Codes.⁴

Windset Farms – According to their own promotional materials, Windset Farms, located in Santa Maria, California, operates the largest single-site greenhouse vegetable facility in the United States, cultivating tomatoes, peppers, and cucumbers across 168 acres of glass.⁵ The facility uses the KUBO Ultra-Clima system, a Dutch-engineered greenhouse design that KUBO developed over 15 years ago as a departure from traditional passive greenhouse structures.⁶ Rather than relying on double-paned glazing for insulation, the Ultra-Clima is built around single-pane glass combined with a retractable thermal curtain system that actively manages heat retention, humidity, light transmission, and airflow. The thermal screens can be deployed or retracted based on time of day and weather conditions, retaining heat at night while allowing maximum solar gain during the day. Research indicates this approach can reduce heat demand by 20–40% compared to an unscreened greenhouse.⁷ Windset also leverages the single-pane system to condense humidity out of the air without mechanical dehumidification, collects 100% of CO₂ from on-site boilers to feed to plants, and recirculates irrigation drain water through biofilters for reuse. While Windset Farms is the only California operator known to the committee to use the Ultra-Clima greenhouse design, other agriculture groups also deploy the technology throughout the United States and world: such as BrightFarms’ Pennsylvania⁸ and Texas locations.⁹



Example of gutter-to-gutter curtain installed below attic

COMMENTS:

- 1) *Author’s Statement.* According to the author, “AB 2200 will give food producers flexibility in meeting energy efficiency standards in ways that are tailored to local conditions and specific crop needs, helping keep costs down and produce more affordable produce. Current energy regulations require double-paned windows for new agricultural

⁴ Lydia Miner, “Greenhouse Envelope Alternative,” CAST Team Comment Letter to the CEC, March 5, 2026, https://title24stakeholders.com/wp-content/uploads/2026/03/2028-T24-Stakeholder-Round-2_-CEH-Greenhouse-Envelope-and-Glazing.pdf

⁵ Windset Blog post, “Kubo and Windset Farms Pave the Way for Sustainable Greenhouse Expansion – Windset Farms”, <https://windsetfarms.com/kubo-partners-with-windset-farms-to-pave-the-way-for-sustainable-greenhouse-expansion/>

⁶ Ultra-Clima Greenhouse – KUBO Sustainable Greenhouses, <https://www.kubogreenhouses.com/en/innovations/ultra-clima-greenhouse>

⁷ Boyaci et al. (2023). “Determination of the Effect of a Thermal Curtain Used in a Greenhouse on the Indoor Climate and Energy Savings.” *Energies*, 16(23), 7744. <https://doi.org/10.3390/en16237744>

⁸ <https://www.kubogreenhouses.com/en/innovations/ultra-clima-greenhouse>

⁹ “BrightFarms Expands to Texas with New State-of-the-Art Greenhouse in Lorena,” December 10, 2024, <https://www.brightfarms.com/press/brightfarms-expands-to-texas/>

greenhouses to improve energy efficiency. Many greenhouse systems, however, rely on the temperate climate and extensive sunlight found in much of California. Single-paned windows with curtain systems provide the necessary sunlight into these greenhouses and give growers the ability to adjust to changing conditions for optimal crop growth and yield. AB 2200 helps support innovative greenhouses, bolster crop production, and keep more farms here in California by creating a narrow exemption for greenhouses that utilize single-paned windows.”

- 2) *Purpose of the bill.* AB 2200 seeks to create an exemption to California's Title 24 energy efficiency building standards for greenhouses, allowing new facilities to use single-paned windows paired with retractable thermal curtain systems (or other alternative technologies) in lieu of the double-paned glazing currently required under the 2022 Energy Code. The bill is premised on the position that certain advanced greenhouse systems, such as KUBO's Ultra-Clima used by Windset Farms across its 168-acre Santa Maria operation (detailed above), are specifically engineered around single-paned glass and thermal curtains as an integrated climate control system, and that forcing compliance with the double-pane requirement undermines the viability of these designs without a corresponding energy efficiency benefit. The bill addresses this by creating a statutory exemption recognizing thermal curtain systems as a compliant alternative to double-paned glazing for glass greenhouses.
- 3) *Lack of Data to Justify Exemption.* When the CEC adopted the double-pane glazing standard in the 2022 Energy Code, it did so in alignment with the national model code – the IECC Commercial – and in the absence of verifiable performance data for thermal curtain systems as an alternative. Since Windset Farms disclosed its plans to expand its Santa Maria facility, which would subject the new construction to the updated Energy Code requirements, the CEC has been actively engaged with the company in exploring a regulatory solution that would allow Windset's greenhouse design to qualify for, or be exempt from, the current standard. However to do that, the CEC must have sufficient data to justify an exemption to their building code; data the CEC claims to have not yet received. This lack of data could be due to difficulties in collection or concern around confidentiality or market sensitive information, but until the CEC can analyze the data, they cannot know that the greenhouse design lives up to the stated energy and water efficiency claims.

This bill provides a statutory exemption to the greenhouse’s Energy Code compliance, without sufficient evidence to justify such an exemption. Even the CASE Team, in recommending an exception for thermal curtains in the 2028 Energy Code, noted the need for building inspectors to confirm curtain installation and control strategies are compliant, and field verifications to ensure all conditions were correct.¹⁰ Given these considerations, *the committee recommends an amendment to the exemption for single-paned windows with alternative technologies (§ 18944.22 (b)(1-2)) to state that such an exemption can only be granted upon a finding by the CEC that such alternative arrangements are as efficient as the current regulations.* This addresses what would otherwise be a risk that the Legislature is simply declaring a technology compliant

¹⁰ Pg. 23, Lydia Miner, “Greenhouse Envelope Alternative,” CAST Team Comment Letter to the CEC, March 5, 2026, https://title24stakeholders.com/wp-content/uploads/2026/03/2028-T24-Stakeholder-Round-2_-CEH-Greenhouse-Envelope-and-Glazing.pdf

without the technical verification to back it up. By requiring the CEC to affirmatively find energy equivalence before the exemption applies, the amendment ensures that the standard is not lowered.

- 4) *CEC's Role in Future Standards.* This bill directs the CBSC to develop permanent building standards “in consultation with” the CEC and the Department of Food and Agriculture. While this phrasing of agency consultation with the CBSC is common throughout the Health and Safety Code, it misrepresents the contribution of the CEC to the code development underway. *The committee recommends amendments to this subdivision (§ 18944.22 (c)) to replace “in consultation with” the CEC to “after the development of a standard by” the CEC,* acknowledging the CEC’s central role in the Energy Code’s development. This ensures that when the permanent standard is ultimately codified in the triennial building code update, it is built on a technical foundation developed by the agency with primary jurisdiction over energy efficiency, rather than emerging from a broader consultation process where the CEC's role could be diluted. *Second, the committee recommends removing the Department of Food and Agriculture as a consulting party.* While agricultural interests are clearly relevant to this bill's goals, CDFA does not have technical jurisdiction over building energy standards and including it in standard setting could introduce procedural complexity without adding meaningful technical expertise.
- 5) *Additional Corrections.* *The committee recommends amendments to the findings and declarations to keep them grounded in established fact rather than anticipated outcomes, and to the operative provisions to specify “glass” windows throughout.*
- 6) *Related Legislation.*

AB 2458 (Bennett) requires the CEC’s appliance efficiency standards to apply not only to appliances that are sold or offered for sale in California, but also to appliances that are rented, imported, distributed, or leased, or offered for rental, importation, distribution, or lease in the state. Status: set for hearing in this committee on April 8, 2026.

AB 2612 (Schultz) requires the Building Standards Commission to adopt mandatory building standards for building electrical circuit features to enable plug-in photovoltaic systems to operate in the state. Status: set for hearing in the Assembly Committee on Housing on April 15, 2026.

- 7) *Prior Legislation.*

AB 130 (Committee on Budget) among its many provisions, prohibits the CBSC and any other adopting agency, from October 1, 2025, until June 1, 2031, from considering, approving, or adopting any proposed building standards affecting residential units unless conditions are met. Status: Chapter 22, Statutes of 2025.

AB 1738 (Boerner) requires the Department of Housing and Community Development (HCD) to research and develop building standards for electric vehicle charging stations when retrofits are completed in existing residential structures and gives HCD the option of proposing those standards for adoption. Status: Chapter 687, Statutes of 2022.

REGISTERED SUPPORT / OPPOSITION:

Support

Windset Farms

Opposition

None on file.

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