



**CALIFORNIA  
ENERGY COMMISSION**



**CALIFORNIA  
NATURAL  
RESOURCES  
AGENCY**

California Energy Commission

## **COMMISSION REPORT**

# **Initial Study and Proposed Negative Declaration for the 2025 Energy Code for Residential and Nonresidential Buildings**

**Gavin Newsom, Governor  
March 2024**

# California Energy Commission

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## ABSTRACT

The California Energy Commission (CEC) amends California's Energy Code on a three-year cycle contained in the California Code of Regulations, Title 24, Part 6, and associated administrative regulations, contained in the California Code of Regulations, Title 24, Part 1. The CEC is required to regularly amend the Energy Code "to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability." (California Public Resources Code 25402). The proposed 2025 amendments to the Energy Code (Proposed 2025 Amendments), if adopted, would be incorporated into the 2025 edition of the Energy Code, and become effective on January 1, 2026.

The CEC is the lead agency for undertaking an environmental review of the Proposed 2025 Amendments under the California Environmental Quality Act (CEQA). This initial study considers whether the Proposed 2025 Amendments have potential significant adverse environmental impacts. In addition to energy and emissions impact (including the emissions impact of refrigerant leakage), the CEC also analyzed the potential effects of the Proposed 2025 Amendments on water use (both onsite in newly constructed buildings and at California power plants), indoor air pollution, and changes in materials use (including the use of mercury, lead, copper, steel, plastic, silicon, gold, aluminum, fiberglass, glass, and wood).

The Proposed 2025 Amendments focus on three key areas: residential and nonresidential envelope, multifamily domestic hot water heating, and heat pumps for space heating. In addition, the Proposed 2025 Amendments examine several more targeted topics, and include an overall effort to improve clarity and consistency, correct errors, streamline requirements, and align with national standards and other parts of the California Building Standards Code.

CEC staff estimates that the implementation of the 2025 Energy Code will reduce statewide annual electricity consumption by about 404 gigawatt-hours per year, and natural gas consumption by 35 million therms per year. In addition, there will be an estimated net reduction in the emissions of nitrogen oxide by roughly 321,000 pounds per year, sulfur oxides by 2,000 pounds per year, carbon monoxide by 284,000 pounds per year, and particulate matter by 26,000 pounds per year. Lastly, the Proposed 2025 Amendments are estimated to reduce statewide greenhouse gas emissions by an amount equivalent to 177,000 metric tons of carbon dioxide (CO<sub>2</sub>e) annually.

The Initial Study and Proposed Negative Declaration demonstrates and finds that there is no substantial evidence, in light of the whole record, that the Proposed 2025 Amendments may have a significant adverse effect on the environment. The initial study includes an environmental checklist supporting this finding.

**Keywords:** The CEC, California Building Energy Efficiency Standards, Title 24, Part 6, 2025 Energy Code, initial study, negative declaration, residential, nonresidential, newly constructed, additions and alterations to existing buildings, mandatory, prescriptive, performance, solar, photovoltaic, windows, envelope, HVAC, heat pump, Guideline 36, building commissioning, process load, refrigerated warehouse, commercial refrigeration, data center, kitchen exhaust, , controlled environment horticulture, acceptance testing, data collection, , cooling tower, standards, onsite renewable electricity generation, demand, management, gigawatt hours,

megawatt, therms per year, nitrogen oxides, sulfur oxides, carbon monoxide, carbon dioxide equivalent, NO<sub>x</sub>, SO<sub>x</sub>, CO, PM<sub>2.5</sub>, CO<sub>2e</sub>, mercury, lead, copper, steel, plastic, silicon, gold, aluminum, fiber glass, glass, wood, Long-term System Cost, LSC.

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# EXECUTIVE SUMMARY

This Initial Study and Proposed Negative Declaration has been prepared under the direction and control of the CEC to comply with the requirements of the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., and the guidelines in California Code of Regulations, Title 14, Section 15000 et seq. (CEQA Guidelines). The CEC amends the California Energy Code on a three-year cycle contained in the California Code of Regulations, Title 24, Part 6, and associated administrative regulations, contained in the California Code of Regulations, Title 24, Part 1. The CEC is required to amend the Energy Code “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability.” (California Public Resources Code §25402). The proposed 2025 amendments would be the latest triennial update to the Energy Code. The proposed 2025 amendments, if adopted, would be incorporated into the 2025 edition of the Energy Code and become effective on January 1, 2026. The proposed 2025 amendments to the Energy Code are hereafter referred to as the “Proposed 2025 Amendments,” “2025 Energy Code,” or “Energy Code Updates.”

The CEC is the designated lead agency to undertake environmental review of the Proposed 2025 Amendments, as a project that could cause a direct or reasonably foreseeable indirect physical change to the environment. This Initial Study and Proposed Negative Declaration demonstrates and finds that there is no substantial evidence, in light of the whole record, that the Proposed 2025 Amendments may have a significant adverse effect on the environment. The initial study includes an environmental checklist supporting this finding.

## Summary of Proposed 2025 Amendments

The following is a summary of the 2025 amendments that the CEC proposes to the Energy Code. Detailed information on the proposed changes can be found in Chapter 4.

The proposed amendments to the 2025 Energy Code would:

- Introduce prescriptive heat pump standards for select nonresidential building types when replacing single-zone rooftop units less than 65,000 Btu/h.
- Update prescriptive heat pump standards for newly constructed single-family, multifamily, and select nonresidential building types.
- Update solar photovoltaic system requirements and standards for residential, nonresidential, hotel and motel buildings.
- Update energy storage system standards for high-rise residential, nonresidential, hotel and motel buildings.
- Increase envelope efficiency standards for residential and nonresidential buildings.
- Increase space conditioning system efficiency and control standards for residential and nonresidential buildings.
- Improve indoor air quality requirements for multifamily buildings by requiring balanced or supply-only ventilation systems and compartmentalization leakage testing, as well as



reduce energy from a prescriptive standard for energy/heat recovery ventilation (ERV/HRV) systems with a fault indicator display (FID).

- Introduce prescriptive heat pump standards for domestic water heating systems serving individual dwelling units in low-rise multifamily buildings.
- Establish electric-ready requirements for multifamily domestic water heating systems.
- Simplify standards for multifamily buildings.
- Require either solar heating or heat pump pool heaters for new pool and spa water heating systems.
- Expand the applicability of daylighting control requirements for nonresidential buildings by reducing the interior lighting threshold that triggers the code requirement.
- Add new airflow requirements and fan power limits for laboratory exhaust.
- Increase efficiency requirements for controlled environment horticulture buildings.
- Increase efficiency requirements for nonresidential refrigeration systems.
- Establish industrial pipe insulation requirements.
- Establish electric-ready requirements for commercial kitchens.
- Make general improvements to the clarity and consistency of existing provisions.
- Relocate portions of the Alternative Calculation Method Approval Manual pertaining to the application, approval, updates, expiration, and decertification of third-party compliance software to Title 24, Part 1.
- Relocate field verification and diagnostic testing requirements from Title 20 to Title 24, Part 1.

## **Environmental Impacts**

### **Potential Increase in Material Uses Is Less Than Significant**

Implementing the proposed changes to the Energy Code may cause increases in material uses. Such material uses include additional electronic equipment, lighting fixtures, heating and air-conditioning equipment, insulation, water-heating equipment, plumbing and wiring, and other building and equipment elements. The CEC has evaluated the proposed changes to the Energy Code for potential environmental impacts. The CEC evaluated the proposed 2025 measures for potential increases in material uses for each of the following materials: mercury, lead, copper, steel, plastic, silicon, gold, aluminum, fiberglass, glass, and wood. In doing so, the measures identified as having potential materials impacts are solar photovoltaic systems that include quantities of glass and silicon, as well as copper wire; battery energy storage systems; efficient cooling towers that use additional steel; controlled environmental horticulture lighting requirements; and requirements for the use of either solar pool collectors or heat pump pool heaters for pool heating. Measures for multizone heat pump space heating standards for newly constructed nonresidential buildings and single-zone, roof top heat pumps in nonresidential alterations projects were also evaluated for potential material and environmental impacts. New standards for heat pump space and water heating for single-family newly constructed buildings and for heat pump water heaters when using individual systems in multifamily buildings are

included in the energy and emissions analysis. These measures are included in the scope of the environmental impact analysis.

The CEC estimates that the contribution of each energy efficiency measure to the potential increases in material use is a small fraction of the material use in the current market and does not significantly affect the design or construction of the building into which the additional materials are incorporated. In each case, the CEC determined that the existing regulations governing the production, processing, handling, transportation, storage, use, and disposal are adequate to protect the public health and to restrict the potential environmental impacts such that environmental impacts from the Project would be less than significant.

### **Reduction of Water Consumption**

Implementing the proposed changes to the Energy Code is expected to decrease statewide water consumption. These savings come from California power plants because of the overall reduction in electric power demand from the proposed energy efficiency improvements. The CEC estimates that there will be an overall decrease of about 69 million gallons (roughly 212 acre-feet) per year of water consumption from implementing the proposed changes to the Energy Code, compared to the “no project” alternative.

### **Impact to Indoor Air Quality Is Insignificant**

There are no changes to the Energy Code that will adversely impact indoor air quality. Changes to specify installation standards for heat pump water heaters and the allowed ventilation options are expected to improve indoor air quality where the systems are installed.

### **Energy and Emission Benefits**

The implementation of the 2025 Energy Code will reduce statewide electricity consumption by 404 gigawatt-hours per year, and natural gas consumption by 35 million therms per year. In addition, there will be a net reduction in the emissions of nitrogen oxides by roughly 321,000 pounds per year, sulfur oxides by 2,000 pounds per year, carbon monoxide by 284,000 pounds per year, and particulate matter by 26,000 pounds per year. Lastly, the Energy Code Updates will increase refrigerant use and leakage by transitioning to heat pumps for space and domestic water heating with an associated increase of statewide greenhouse gas (GHG) emissions by an amount equivalent to 15,000 metric tons of carbon dioxide (CO<sub>2</sub>e). However, including the penalty associated with increased refrigerant leakage, overall, the Energy Code Updates will reduce statewide GHG emissions by a net amount of 177,000 Metric tons of CO<sub>2</sub>e annually.

The emission estimates associated with the reduction of natural gas use are expected to occur in California at each building location and are based on the emission factors for residential and nonresidential space heating and domestic hot water equipment.

The emission estimates associated with the change in electricity use (in terms of gigawatt-hours per year) are associated with generation throughout the western United States, western Canada, and Mexico, which is generally coordinated by the Western Electricity Coordinating Council (WECC). California imports about 30 percent of its annual electricity generation from out-of-state sources through the Western Interconnection (western regional electric grid) (Nyberg 2023). That electricity is generated by a combination of sources that may include nuclear, hydroelectric, natural gas, coal, and renewable energy power plants. The total

estimated emissions reductions described above, including those associated with out-of-state generation, are expected to occur from implementing the 2025 Energy Code.

The estimated reduction of greenhouse gas emissions, reported as CO<sub>2</sub>e described above, includes the emission reductions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and refrigerants.

## **Conclusions**

The CEC has analyzed the environmental impacts of the proposed 2025 Energy Code for residential, multifamily, and nonresidential buildings. The CEC considered air emissions, water savings at California power plants, indoor air pollution, and increased materials use. The initial study concludes that the potential environmental impacts associated with implementing the 2025 Energy Code are less than significant without need for mitigation. Thus, the initial study proposes no mitigation measures. A description of all potential impacts is included in this report. Therefore, a negative declaration for the 2025 Energy Code should be adopted.

# **CHAPTER 1:**

## **Project Description, History, Objectives, and Environmental Setting**

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### **Proposed Project**

The proposed project is a triennial update to the standards found within California’s Building Standards Code. The proposed updates to the Energy Code will ensure more efficient use of natural gas, electricity, and water in newly constructed buildings, as well as in additions and alterations to existing buildings. These updates are described in Chapter 4.

### **Project Location**

The project is a change to existing requirements for building design and construction that are applicable statewide. For purposes of this Initial Study and the analyses herein, the boundary of the project area is the boundary of the state of California as set forth in the California Constitution and state statutes.

### **History and Summary of Basic Statutory Authority**

In 1974, the California Legislature enacted statutes creating the CEC and requiring it to, among other things, adopt *Building Energy Efficiency Standards* (or Energy Code) (State of California 1974). The Energy Code must be cost-effective over the life cycle of the building and must include performance and prescriptive compliance approaches (Public Resources Code (PRC) section 25402, PRC 25402). The Energy Code is periodically updated to account for technological improvements in efficiency technology. Accordingly, the CEC has adopted and periodically updated the Energy Code (codified in Title 24, portions of Part 1 and in Part 6, of the California Code of Regulations) to ensure that building construction, system design, and installation achieve energy efficiency and preserve outdoor and indoor environmental quality. The Energy Code Updates establish a minimum level of building energy efficiency. A building may be designed to a higher efficiency level, resulting in additional energy savings. The proposed 2025 amendments to the Energy Code are hereafter referred to as the “Proposed 2025 Amendments,” “2025 Energy Code,” or “Energy Code Updates.”

The Energy Code addresses the building components that affect energy use in newly constructed residential and nonresidential buildings, and additions and alterations to existing buildings, including lighting, water heating, and space conditioning systems, process energy occurring in the building, and the building envelope. The Energy Code provides a prescriptive compliance option, where a list of applicable requirements must all be met, and a performance compliance option, which compares the proposed project to an energy budget (standard design or baseline) applicable to that building type and location. Compliance with the Energy Code Updates must be demonstrated to local enforcement agencies, city or county building departments, or a state agency that has responsibility for assuring compliance with building codes before a certificate of occupancy is issued.

The CEC amends the standards periodically to incorporate improvements in energy efficiency technologies, accounting for changes in the cost of fuels and energy conserving strategies, improved building science research, and better understanding of California building energy performance. As is the case for the original standards, the amendments must be cost-effective in their entirety. The CEC makes amendments in alignment with statutory direction that building codes be updated on a periodic basis (PRC 25402(a)(1)).

## **Additional Laws and Policies Affecting the Energy Code**

Public Resources Code sections 25402 and 25402.1 were enacted in the 1970s as part of the enabling legislation establishing the CEC and its basic mandates. These sections require the CEC to adopt, implement, and periodically update energy efficiency standards for both residential and nonresidential buildings. In addition, Public Resources Code section 25910 directs the CEC to adopt standards for the minimum amount of additional insulation installed in existing buildings. Senate Bill (SB) 639 (Rosenthal, Chapter 1067, Statutes of 1993) added Section 25402.5, which expressly directs the CEC to consider new and replacement interior and exterior lighting devices when adopting building standards. Senate Bill 5X (Sher, Chapter 7, Statutes of 2001) added subsection (c) to Section 25402.5 to clarify and expand the CEC's authority to adopt standards for outdoor lighting. Lastly, the CEC must evaluate the impact of the new building standards on indoor air pollution (PRC 25402.8).

California is a leader in energy policy and has set ambitious greenhouse gas reduction goals. Assembly Bill 1279 (Muratsuchi, Chapter 337, Statutes of 2022) declared it a policy of the state to achieve net zero GHG emissions. Senate Bill 1020 (Laird, Chapter 361, Statutes of 2022) requires that renewable and zero-carbon sources make up 90 percent of the state's electricity by 2035. Improving the energy efficiency of existing residential and nonresidential buildings is key to reducing greenhouse gas emissions that result from electricity and natural gas use in buildings.

Senate Bill 350 (De León, Chapter 547, Statutes of 2015) established California's 2030 greenhouse gas reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 set specific 2030 targets for energy efficiency and renewable electricity, among other actions aimed at reducing greenhouse gas emissions across the energy and transportation sectors. In particular, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030. (Senate Bill 32 [Pavley, Chapter 249, Statutes of 2016], followed by amending the California Global Warming Solutions Act of 2006 to establish a matching emissions limit in California's Cap and Trade Program.)

Finally, the 2023 Integrated Energy Policy Report (CEC 2023) establishes a roadmap for energy policy in California. While the state has added a large amount of distributed energy resources (DERs), including onsite photovoltaic systems and energy storage systems, the demand forecast was revised to be higher, to account for the rapid adoption of electric vehicles and the adoption of heat pumps. While improving energy efficiency remains very important, the 2023 IEPR sets priorities for equitable building decarbonization and load shifting to offset anticipated demand increase from electric vehicles and building electrification.

## Project Objectives

The Energy Code is a set of regulations that require energy-efficient designs, features, equipment, and practices in newly constructed buildings and additions and alterations to existing buildings that occur within California. As these regulations apply statewide, the environmental boundary of this Initial Study of the Proposed 2025 Amendments is the state of California.

The overall purpose of the Proposed 2025 Amendments is to employ technically feasible and cost-effective technologies and measures “to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy, including the energy associated with the use of water, and to manage energy loads to help maintain electrical grid reliability” consistent with the statutory direction in the Warren-Alquist Act.

The following specific objectives, derived from the statutory mandate, guided development of the Proposed 2025 Amendments:

**Objective 1:** Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy via the deployment of technically feasible and cost-effective technologies and measures when the Standards are taken in their entirety.

**Objective 2:** Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by increasing deployment and utilization of distributed, on-site renewable energy equipment and increasing the energy consumption in newly constructed residential and nonresidential buildings that can be served by renewable energy equipment.

**Objective 3:** Reducing the wasteful, uneconomic, inefficient, or unnecessary consumption of energy by ensuring that newly constructed buildings designed for use of natural gas equipment include wiring and other design features necessary to enable future use of electric equipment.

**Objective 4:** Reducing wasteful, uneconomic, inefficient, or unnecessary consumption of energy and maintaining grid reliability by improving the ability of buildings to engage in and benefit from energy storage and load management.

Based on the evidence in the record,<sup>1</sup> the CEC has determined that the project will provide benefits to the state by slowing energy demand growth, reducing the depletion of resources, improving grid reliability, minimizing costs, and reducing threats to the state’s environmental quality. In addition, the project is consistent with and supports other important statewide goals for the decarbonization of California’s economy.

## Environmental Setting

The Energy Code is a set of regulations that require energy-efficient designs, features, equipment, and practices in newly constructed buildings and certain additions and alterations

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<sup>1</sup> 2025 Energy Code Update Rulemaking, 22-BSTD-01. Available at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=22-BSTD-01>

to existing buildings occurring within California. As these regulations apply statewide, the environmental setting of this update to the Energy Code is the entire state of California.

In 2022, California generated 287,220 gigawatt-hours (GWh) of electricity<sup>2</sup>, and the primary sources of electricity generation remain the burning of natural gas and renewable sources, including solar, wind, nuclear plants, and large hydroelectric plants. Due to the state's shift towards building electrification and the transition from gasoline and diesel towards the use of electricity and hydrogen for transportation, the statewide electricity demand is expected to increase from approximately 47,000 MW in 2023 to over 51,000 MW by 2030 and to 55,000 MW by 2035 (CEC 2023). Renewable energy production from sources including wind and solar, biomass, geothermal and small hydroelectric generators, plus nuclear energy (non-GHG) accounted for nearly 60% of statewide energy production in 2022<sup>3</sup>. In addition, natural gas is consumed on-site in buildings for space heating, water heating, and other uses such as cooking. About one-third of the energy consumed in California is consumed by buildings, either via consumption of electricity or burning of natural gas.

As California's population grows, every year hundreds of thousands of buildings are newly constructed, expanded, or remodeled, adding to this energy use. The CEC estimates 65,022 newly constructed single-family homes and 53,628 newly constructed multifamily dwelling units will be built in 2026, along with 153 million square feet of newly constructed nonresidential buildings.

The Energy Code updates make buildings more efficient, resulting in an overall reduced consumption of natural gas and electricity. (The limited increase in electricity use due to the heat pump measures is overcome by a much larger decrease in electricity use from the other proposed energy efficiency measures.) These reductions, in turn, result in lower emissions from natural gas combustion at the building site and lower emissions from the generation of electricity that powers buildings and a reduced need to construct powerplants. There is a slight increase in emissions from additional refrigerant leakage from heat pumps, but that is more than offset by the reduction in emissions from reduction in consumption of gas at building sites and at power plants from the proposed measures.

The proposed project is a regular, triennial update to the Energy Code. Updating the Energy Code to require greater efficiencies will reduce the emissions of harmful air pollutants that threaten public health. The Energy Code Updates will reduce fuel consumption and reduce greenhouse gas emissions that contribute directly to global warming. The Energy Code Updates also target the reduction of "peak" electricity use or peak demand. During these peak demand hours, electricity generation relies heavily on fossil fuel combustion power plants, and peak periods coincide with hot, summer periods when air pollution is at its worst. Thus, reducing electricity peak loads also benefits air quality. While the move towards building electrification and the increased use of electric vehicles increases the winter peak demand, the California Independent System Operator expects the grid to have capacity to meet demand through 2032 from existing sources (California Independent System Operator 2023).

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<sup>2</sup> 2022 Total System Electric Generation: <https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2022-total-system-electric-generation>

<sup>3</sup> Draft 2023 IEPR: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=253086>.

## Method

The potential environmental impacts of specific, proposed increases in the efficiency requirements of the 2025 Energy Code are analyzed and documented in staff analyses, measure reports submitted to the CEC by external stakeholders, and evaluations completed by consultants working for and directed by the CEC. Staff has evaluated these measure-based analyses in determining the potential environmental impacts of the proposed standards relating to materials use, emissions, energy and water consumption, and indoor air quality. The Codes and Standards Enhancement (CASE) initiatives provided the bulk of the measure reports.<sup>4</sup> The CASE team, sponsored by Pacific Gas & Electric, San Diego Gas & Electric, Southern California Edison, Los Angeles Department of Water and Power and the Sacramento Municipal Utilities District, provided detailed analysis of proposed new requirements and modifications to existing requirements of the 2022 Energy Code. The proposals are evaluated by CEC staff and published for stakeholder feedback prior to the CEC rulemaking process. This process allows for early stakeholder engagement on proposed changes to the Energy Code.

To determine the impact of the proposed standards on energy production, the CEC's public domain building modeling software<sup>5</sup> was used to model prototype buildings first with a set of building features matching the 2022 Energy Code, and then with the proposed changes for the 2025 Energy Code, to estimate the expected natural gas and electricity savings. Annual Long-term System Cost (LSC) savings were determined by applying hourly multipliers (which depend on the hour of the day, season of the year, and account for the long-term system energy used to generate, transmit, and distribute electricity and natural gas) to the expected natural gas and electricity savings, then summing these LSC values for all hours of the year. These values were then multiplied by the forecasted amount of newly constructed buildings within the State to determine the statewide savings impacts. More information can be found in the economic and fiscal impact statement (Form 399) prepared for this rulemaking.<sup>6</sup>

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<sup>4</sup> Available at: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2025-building-energy-efficiency>

<sup>5</sup> California Building Energy Code Compliance (CBECC) software for residential and nonresidential buildings).

More information on this software is available at [http://www.energy.ca.gov/title24/2016standards/2016\\_computer\\_prog\\_list.html](http://www.energy.ca.gov/title24/2016standards/2016_computer_prog_list.html).

<sup>6</sup> Available at <http://www.energy.ca.gov/title24/2025standards/>.



## **CHAPTER 2:**

# **List of Agencies That Will Use or Comment on This Initial Study**

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The CEC is the lead agency for this rulemaking. Following adoption by the CEC, the standards must be reviewed and approved by the California Building Standards Commission, which will have access to this initial study and all other documents related to the rulemaking. Additionally, the Office of the State Fire Marshal and the Department of Housing and Community Development are consulted for some required standards determinations. The CEC will make the initial study, and all other documents in the proceeding, available to all potentially interested federal, state, and local agencies, and those agencies will be invited to comment.

# **CHAPTER 3:**

## **List of Permits and Other Approvals Required to Implement the Project**

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No permits are applicable for this project. The CEC and the California Building Standards Commission are the only agencies that must adopt and approve, respectively, changes to the Energy Code.

# CHAPTER 4:

## Description of the Proposed 2025 Amendments to the Energy Code

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### Overview

The 2025 Energy Code focuses on three key areas: residential and nonresidential envelope, multifamily domestic hot water heating, and heat pumps for space heating. In addition, the proposed standards examine several more targeted topics and include an effort to improve clarity and consistency, correct errors, streamline requirements, and align with national standards and other parts of the California Building Code. The complete list of topics addressed by the proposed 2025 Energy Code update follows.

### Residential

Measures applicable to single-family homes are as follows:

- **Space Heating:** extends the prescriptive standard for heat pumps for space heating for newly constructed buildings to all climate zones.
- **Residential HVAC Performance:** requires improved performance of heat pumps, including defrost timers and limits on supplementary heat to 35°F and below. Refrigeration charge verification is required in all climate zones except climate zones 6 and 7. The measure adds restrictions on the operation of crankcase heaters and requires that they be off when the compressor is running.
- **Domestic Water Heating Systems:** removes an exception that allowed gas instantaneous water heaters in homes in climate zones 3, 4, 13, and 14, to prescriptively require heat pump water heaters in newly constructed buildings in all climate zones.
- **Single-Family High-Performance Windows and Walls:** sets the prescriptive maximum U-factor of window assemblies in single-family homes to 0.27 in climate zones 1 through 5, 11 through 14 and 16 and to 0.30 in climate zones 6 through 10 and 15. Sets the prescriptive U-factor in homes 500 square feet or less to 0.27 in climate zones 1 through 4, 11 through 14, and 16 and 0.30 in the other climate zones. The code change is a slight increase in stringency for window performance in newly constructed single-family homes. The mandatory changes to wall and window minimum requirements improve the building envelope by limiting tradeoffs, but do not increase the code stringency.
- **Swimming Pool and Spa Heating:** provides prescriptive options for heating newly constructed swimming pools and newly installed pool heaters for an existing pool, including, but not limited to, solar collectors or heat pump pool heaters.

Measures applicable to multifamily buildings are as follows:

- **Compartmentalization and Balanced Ventilation/Indoor Air Quality (IAQ):** requires only balanced ventilation or supply-only ventilation for multifamily buildings; exhaust-only

ventilation is not allowed. Compartmentalization testing is required to confirm air leakage does not exceed 0.3 cfm/ft<sup>2</sup> at 50 Pa. Newly constructed multifamily buildings in climate zones 1, 2, 4, 11 through 14 and 16 prescriptively require balanced ventilation with an HRV or ERV.

- Multifamily Envelope
  - Cool Roof Updates: requires slight increase in aged solar reflectance from 0.20 to 0.25, for climate zones 10, 11, 13, and 15. The measure also extends the low-slope cool roof requirements to additional climate zones.
  - Improved Wall Performance: improves mandatory requirement for wall insulation performance; this does not impact the stringency of the Standard.
  - Improved Fenestration Performance: reduces maximum U-factor limitation from 0.30 to 0.28. The window solar heat gain requirement (RSHGC) for windows in climate zones 1, 3, 5 and 16 was removed.
- Multifamily Domestic Hot Water
  - California Plumbing Code (CPC) Appendix M Pipe Sizing: introduces a prescriptive requirement in Section 170.2(d) for sizing water pipes according to CPC Appendix M for central domestic hot water (DHW) systems in multifamily buildings. Previously, this was available as a compliance credit in the performance software. The requirement that hot water piping be sized according to California Plumbing Code Appendix M will result in material savings for copper piping, due to smaller-diameter piping requirements.
  - Pipe Insulation Enhancement: requires mandatory field verification of pipe insulation and installation quality.
  - Thermostatic Balancing Valves: provides a compliance option; this is not considered in the scope of this study.
  - Master Mixing Valves: requires a master mixing valve on the supply outlet leading to the recirculation loop.
  - Central heat pump water heater (HPWH) Cleanup: revises prescriptive system for larger central systems to be a single-pass heat pump water heater, and the requirement for a primary storage tank is removed to aid in design flexibility.
  - Individual HPWH Ventilation: modifies the definition of heat pump water heater types to differentiate systems that do not require ventilation air. It adds mandatory language defining acceptable ventilation paths.
  - Individual DHW Electric Ready: adds a provision to facilitate future heat pump water heater installation. This electric-ready measure is designed to facilitate future installation of heat pump water heaters. The change will reduce future labor and reduce material use by avoiding future retrofit work.
  - Central DHW Electric Ready: adds a provision to facilitate future heat pump water heater installation. This electric-ready measure facilitates future installation

of central heat pump water heaters in nonresidential buildings. The change will reduce future labor and reduce material use by avoiding future retrofit work.

## **Nonresidential**

- **Swimming Pool and Spa Heating:** requires either solar pool hot water collectors or heat pump pool heaters with a minimum coefficient of performance for newly installed nonresidential pools or newly installed pool heaters for an existing pool.
- **Nonresidential Refrigeration:** adds a mandatory requirement for minimum evaporator efficiency (Btu/W) for coolers and freezers.
- **Nonresidential Daylighting:** reduces the minimum threshold for lighting in the daylight zone from 120 W to 75 W that triggers daylight control requirements. The change was spurred by the reduction in costs of dimmable LED lighting. This measure will cause a slight increase in the use of daylight sensors with dimmable lighting.
- **Nonresidential Envelope:** requires higher performance for some opaque assemblies. This measure also adds a mandatory requirement for vestibules and a new mandatory minimum requirement (backstop) for vertical fenestration. The vertical fenestration mandatory requirement does not affect code stringency.
- **Nonresidential Laboratory Airflow:** revises requirements for nighttime set-back or demand-based controls; includes an alternate compliance pathway using exhaust air heat recovery; and a variable fan speed control on the exhaust fan.
- **Nonresidential Cooling Towers:** increases required efficacy of axial-fan cooling towers and adds a requirement for verification of proper blowdown controls.
- **Nonresidential HVAC Controls:** requires that controllers be pre-programmed with control sequences according to ASHRAE Guideline 36, to standardize and simplify the installation and/or commissioning process. This measure creates only a change in workflow, with pre-programmed controllers being used with HVAC equipment. It is expected to result in a slight increase in the efficiency of installers, as a portion of the field programming can be avoided.
- **Nonresidential HVAC Space Heating:** improves system performance of all-electric hydronic space heating systems, through specification of heat recovery and other measures.
- **Nonresidential Industrial Pipe Insulation & Verification:** extends pipe insulation requirements in Table 120.3-A of the 2022 Energy Code to piping in covered processes that are one-half inch or greater in diameter.
- **Nonresidential Controlled Environment Horticulture:** adds new requirements for greenhouses and indoor growing spaces that provide for both energy and water savings, while maintaining crop quality and crop yield.
- **Multizone Heat Pumps:** adds new prescriptive standards for newly constructed nonresidential buildings that have central heating systems serving multiple zones. The heating system must be either an air-to-water heat pump (AWHP) or a variable-refrigerant flow (VRF) system. The AWHP design must either use a four-pipe fan coil

(FPFC) to distribute conditioned air to the zones or use the AWHP with additional supporting measures including airside heat recovery. The hydronic system requirement with the FPFC uses a dedicated outside air system (DOAS) for ventilation.

- Single-zone Heat Pump Alterations: adds a prescriptive standard for heat pumps when replacing single-zone roof top units for most climate zones.
- Photovoltaic (PV) and Energy Storage Systems: revises capacity requirements and extends PV requirements to additional building types. The measure also revises energy storage required capacity levels and extends the energy storage system requirement to additional building types. The capacity is sized to limit exports to 10% of onsite production.

## **Energy Code Cleanup**

A multifamily restructuring measure aligns requirements for high-rise residential buildings—defined as four or more habitable stories above grade—with low-rise multifamily building requirements. This simplifies the code and removes a discontinuity in requirements when moving from a three-story to a four-story multifamily project. The net effect of this change is to enable savings in some climates due to increased slab insulation and shaft sealing of central ventilation systems.

# CHAPTER 5:

## Estimated Environmental Impacts

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The CEC has evaluated the proposed changes to the Energy Code for their potential for environmental impacts, as described in the Methodology section of Chapter 1.

While the Energy Code relates to newly constructed buildings, it does not cause newly constructed buildings to occur within the state. The Energy Code does not regulate where or when construction occurs, but rather applies to how newly constructed buildings and new construction in existing buildings are designed and built. The environmental impacts of the proposed changes are thus limited to the anticipated benefits of reduced energy consumption and reduced emissions, and any increase in material use necessary to comply with the updated Energy Code.

### Approach

The methodology used to evaluate environmental impacts is to: (1) review each of the measures and identify any that have the potential for an environmental impact, (2) use available market estimates on material use and determine incremental material use, either for newly constructed buildings, additions, or alterations. The estimates do not consider naturally occurring market adoption in the absence of the code measures. Moreover, this approach assumes projects will minimally comply with the new code, and it does not account for projects that exceed code. Adherence to the Energy Code Updates would not result in potential significant adverse impacts at the location of installation. Therefore, the analysis of potential impacts resulting from this project focuses on potential impacts from production of components that would be used to satisfy the proposed requirements.

As the proposed updates to the Energy Code build upon existing law, the impacts are limited to the marginal differences between existing and proposed efficiency standards. Only a few categories of proposed amendments would have any potential for causing a physical change in the environment, such as from increased use of materials in the construction of the building. The following measures were evaluated for potential environmental impacts, as presented in Chapter 5:

- Residential:
  - New Swimming Pool and Spa Heating
  - Compartmentalization and Balanced Ventilation / Indoor Air Quality (IAQ)
- Multifamily:
  - Compartmentalization and Balanced Ventilation / Indoor Air Quality (IAQ)
- Nonresidential:
  - Nonresidential Refrigeration
  - Multizone Heat Pumps
  - Single-zone Heat Pump Alterations
  - PV and Energy Storage Systems

- Cooling Towers
- Controlled Environmental Horticulture

The remaining amendments are either administrative or relate to features and performance targets that are independent of the size of the equipment or the amount of materials used for manufacturing or construction. In either case, they do not add new requirements to install additional or larger components that would represent additional material costs or require changes. The following types of measures do not impact the environment, and thus are not considered further in the environmental impact analysis:

- Mandatory backstop measures: measures that set a mandatory minimum efficiency, particularly building envelope, do not change the effective stringency of the code and are not included.
- Compliance options: these options are not considered because they only impact the performance approach. The performance approach is an alternate means of code compliance that uses whole building simulation to evaluate building energy efficiency performance. Compliance options provide greater flexibility in the Standards, while not increasing the required building energy performance. This approach is developed after adoption of the energy efficiency regulations and is approved by the CEC. A change in the performance approach does not alter the stringency of the Standards.
- Field verification – these types of measures are expected to have no impacts, as they require labor but not additional materials. Examples are refrigerant charge and duct leakage testing for residential buildings. Such measures ensure that the intent of the Standards is met, but do not require any additional materials. The current Energy Code already requires technicians to travel for field verification; no additional trips are anticipated to result from the Energy Code Updates.

This study evaluates the material impact of each measure and in aggregate, determines whether any increases in material use have a significant impact on statewide demand and consumption.

## **Estimated Increased Materials Use**

### **Potential Increase in Material Uses Is Less Than Significant**

The implementation of the proposed changes to the Energy Code may cause increases in material uses. Such material uses include additional electronic equipment, lighting fixtures, heating and air-conditioning equipment, insulation, water heating equipment, plumbing, and wiring, and other building and equipment elements. The CEC has evaluated the proposed changes to the Energy Code for their potential for environmental impacts. The CEC evaluated the potential increases in material uses for each of the following materials: mercury, lead, copper, steel, plastic, silicon, lithium, aluminum, fiberglass, glass, and wood. The CEC estimates that the contribution of each energy efficiency measure to the potential increases in material use is a small fraction of the material use in the current market. For example, the 2025 Nonresidential Cooling Towers CASE Report (Wynne 2023) estimates that annually, the measure increases consumption of steel by 73 tons, and plastic consumption by 20 tons. The United States' demand for steel and plastic in 2021 was 17 million tons of steel and 35.7 million tons of plastic (Statista 2023). In this context, the additional demand of steel and



plastic for cooling towers is a change of less than 0.00001 percent. The CEC determined that for each energy efficiency measure, the existing regulations governing the production, processing, handling, transportation, storage, use, recycling, and disposal of mercury, lead, copper, steel, plastic, silicon, lithium, aluminum, fiberglass, glass, and wood are adequate to protect the public health and to restrict the potential environmental impacts such that they are less than significant.

The proposed regulations do not affect whether building projects are sited in one location versus another, in a way that they would conflict with transit, roadway, bicycle, or pedestrian facilities, or that would affect hazards. The proposed regulations do not increase or decrease the potential vehicle miles travelled (VMTs) that might be associated with the construction or occupancy of buildings meeting the proposed regulations.

### **Compartmentalization and Balanced Ventilation**

This code change improves indoor air quality of multifamily buildings by requiring either balanced or supply-only ventilation to dwelling units, and by requiring compartmentalization to limit air leakage requirements to 0.30 cfm/ft<sup>2</sup> at 50 Pa. This reduces the risk of cross-contamination between dwelling units and provides a secondary benefit by reducing noise levels. The sealing requirements of the measure do result in minor increase in the use of plastic, polyurethane foam insulation, acrylic polymer, and fiberglass. However, the CASE proposal explains that these are only small increases, and that the measure results in a net reduction (benefit) in operational carbon emissions (Goebes 2023).

### **Controlled Environment Horticulture**

This measure requires the use of LED lighting in greenhouses and indoor grow spaces. Because the measure restricts the use of high-intensity discharge (HID) lamps, the measure will decrease the use of mercury in lighting. HID lamps contain mercury and trace amounts of cadmium and antimony. Toxic to humans, mercury can impact the soil and groundwater, when not disposed of properly. This measure is projected to reduce the use of mercury by 11 pounds annually, respectively, with no significant changes in material use of metal and plastic (Booth 2023). Moreover, LED lighting typically has a much longer expected life than HID lighting. The longer expected useful life will decrease the required product material use in the future. Therefore, this measure is expected to have tangible environmental benefits.

### **Cooling Towers**

The 2025 Standards include a revision that increases the required efficacy of axial-fan cooling towers, which requires increased surface area for heat transfer, and consequently, an increase in steel. This measure also implements additional controls to reduce tower blowdown, which clears and refills the cooling tower when the mineral concentration gets high enough to cause scaling. These controls will save significant water use in evaporative cooling towers.

As discussed above, the 2025 Nonresidential Cooling Towers CASE Report (Wynne 2023) estimates that annually, the measure increases consumption of steel by 73 tons, and plastic consumption by 20 tons. The United States' demand for steel and plastic in 2021 was 17 million tons of steel and 35.7 million tons of plastic (Statista 2023). As discussed above, Staff finds that the increase in steel use is de minimis in aggregate and does not cause any significant adverse cumulative physical change in the environment. Furthermore, some fraction

of the buildings that select cooling towers already select highly efficient cooling towers that meet or exceed the proposed efficiency standard, further reducing the expected cumulative impact of this measure. Moreover, the more efficient cooling towers result in reduced water consumption and reduced operational emissions through reduction in cooling tower energy use.

### **Solar Pool Heating Systems and Heat Pump Pool Heaters**

A change to the 2025 Standards adds a requirement for residential and multifamily swimming pools. Solar collectors for pool heating have been used for many decades to offset or eliminate the use of gas heating. For newly installed pools with a pool heater or newly installed pool heaters for an existing pool, the pool heating measure requires either a solar pool heater or a heat pump pool heater to be installed. The savings estimates are based on the solar pool option. The main materials used for unglazed solar collectors are copper and plastic, and much of the collectors can be recycled. The team that evaluated this measure estimates an increase in demand of 20 tons of copper and 769 tons of plastic for residential pools and 134 tons of copper and 1,700 tons of plastic for nonresidential pools. The increase in material use is directly addressed by the capability to readily recycle materials in these systems at the end of their useful life. Moreover, the use of solar pool heating systems reduces fossil fuel use of natural gas for pool heating.

### **Multizone Heat Pumps**

The 2025 Energy Code introduces heat pumps as the prescriptive standard for newly constructed office and large school buildings that use multizone systems. Instead of a gas boiler, the code specifies the use of an air-to-water heat pump for space heating. The new standard does provide for an option to use gas heating equipment, provided that other efficiency measures are installed. The proposed change eliminates the gas space heating boiler from the building but adds the air-to-water heat pump. The manufacturing of heat pumps requires iron castings, stainless steel, and aluminum tubing. Castings for the pump and motor can include small amounts of nickel and other metals for corrosion resistance. At the end of their useful life, a portion of the aluminum, copper and steel can be recycled.

When compared to gas boilers, heat pumps will have a higher use of steel for the compressor casings, and a higher use of copper for evaporator coils, condenser coils, and refrigerant lines. Roof curbs used for mounting heat pumps use galvanized aluminum or steel alloys for systems installed on the roof.

Heat pump systems have used a variety of refrigerants; recently, manufacturers have begun the transition from R-410A to refrigerants with lower global warming potential, such as R-454B and R-32. At the end of the heat pump useful life, the used refrigerant can be reclaimed. As this requires equipment for removing impurities and waste products and testing the composition for purity, currently, less than 2% of refrigerant is reclaimed (U.S. EPA 2022). The ongoing transition to products using low-GWP refrigerants is expected to further reduce heat pump emissions.

### **Heat Pump Alterations**

This measure targets nonresidential alterations that include replacement of single-zone packaged air conditioners and gas furnaces with heat pumps having a rated capacity of 65,000

Btu/h or lower. Prior standards allow replacement with single-zone air conditioners and gas furnaces in the units. The change to heat pumps as standards are not expected to have significant material impacts. The change will result in reduced use of metal due to the eliminated gas burner section and the elimination of gas piping and pressure regulators for each unit. Even with the addition of a solenoid reversing valve and electric resistance (“strip”) heat, the heat pump standards will not result in significant adverse environmental impacts.

## **Solar Photovoltaic Systems**

The 2025 Standards have expanded requirements for onsite photovoltaic (PV) systems and battery energy storage systems for nonresidential buildings. The measure extends PV requirements to additional building types and makes slight increases to PV capacity requirements for some building types. The Proposed 2025 Amendments will result in 375 MW of PV and 433 MWh of battery energy storage annually, statewide. This is 96.0 MW of PV and 20.5 MWh of battery energy storage more than if the Energy Code had been left unchanged; this compares with an added capacity of 2,057 MW over a three-year span from 2019 to 2022, to reach a total installed capacity of 12,535 MW in 2022 (Energy Solutions 2023). In a three-year span from 2019 to 2022, distributed battery storage in the state increased from 770 MW (3,080 MWh) to 5,546 MW (22,184 MWh) (State Of California 2023).

Photovoltaic systems will require significant amounts of glass, metal, and silicon for production. At the end of their life cycle, which is typically 30 years, the PV panels have historically been classified as hazardous waste and require specific disposal protocols. In 2021, California passed a law (DTSC 2020) to reclassify solar PV panels as universal waste rather than hazardous waste. This change makes it easier to store, transport and recycle used PV panels.

There are companies that specialize in handling all the materials in the panels and separating the glass and metal racking and mounting materials that can be recycled. While up to 80% of the materials in a PV panel can be recycled, separating out the materials can be difficult. These companies follow additional safeguards when handling panels that use heavy metals such as lead, cadmium, and selenium, to minimize environmental impacts. Since PV panels are not considered hazardous waste, their disposal and recycling can be directly addressed through continued development of recycling programs. Some manufacturers have already instituted recycling programs: for example, the facilities at First Solar can recycle up to 90% of PV materials.

## **Energy Storage Systems**

The 2025 Standards revise the requirements for battery energy storage systems in nonresidential buildings to extend the existing requirements to more space types while also increasing the sizing for some building categories. The measure is complementary to the PV requirement, as the two systems work together to produce renewable energy onsite, while managing exports to the grid. A typical battery system consists of the lithium-ion battery cells, the battery racks and thermal management system, a power conversion system to convert to AC power, and a transformer. The battery systems have a limited number of charge and discharge cycles and have a life expectancy of ten years. At the end of life, some of the components (rack and some electrical power components) can be reused.

Energy storage systems use lithium, cobalt, and nickel, and some require small amounts of manganese. Most of the cobalt used in batteries can be removed and reused, and manufacturers are working on newer batteries, such as those using a lithium-ion phosphate cathode that do not require cobalt.

Battery use accounts for 74% of global lithium demand, and supply is predominantly from mineral deposits in Australia and from operations in Argentina, Chile, and China (U.S. Geological Survey 2022). Efforts are also underway to determine the feasibility of extracting lithium from the Salton Sea, which would be an environmentally preferable alternative to the current mining sources. A recent study by Lawrence Berkeley National Laboratory found that the sea contains more lithium than previously believed, the equivalent to source 300 million electric vehicle batteries. (Roth 2023). Federal researchers determined that even with current technologies, 4 million metric tons of that is extractable. The United States consumes approximately 3,000 tons of lithium annually (U.S. Geological Survey 2022). With modern extraction processes, the Salton Sea can provide 600,000 tons a year of lithium carbonate (Ventura 2020).

Lithium-ion batteries produce 260 Wh of electricity per kg of lithium used in lithium-ion battery storage systems (Dragonfly Energy 2022). Applying the statewide estimate for the Title 24 energy storage measure, an estimated 1,659 metric tons of lithium demand will be added annually. Commercial battery recycling facilities have developed the ability to recycle, refine and remanufacture battery materials from expended batteries. Redwood Energy plans to have capacity in 2025 to produce materials for 100 GWh of batteries. The demand for battery storage is driven primarily by the electric vehicle market. Other facilities, such as the American Battery Technology Corporation, are expected to come online to meet rising demand. These facilities produce two benefits: they recycle the materials, and they eliminate the long distances that raw materials must travel from mine to manufacturing to end use. For these reasons, the incremental nonresidential and multi-family battery measure is not expected to have a significant adverse environmental impact.

In context, increased demand for lithium from the battery storage measure does not represent a significant portion of the U.S. demand for lithium. Electric vehicles and grid-scale energy storage are the primary contributors to increase in demand for battery storage. This measure merely extends the existing battery requirements to more space types while also improving the sizing calculation. For this reason and the others listed above, staff does not find that the energy storage requirements create the potential for a significant impact on the environment.

## **Savings in Water Consumption**

### **Cooling Tower Controls**

The blowdown control requirements for the cooling tower measure directly result in water savings, due to improvement in monitoring and management of mineral content in the tower basin. The statewide water savings from the cooling tower measure is estimated at 9.2 million gallons of water annually.

## HVAC Controls

The adoption of ASHRAE Guideline 36 control specifications is expected to save 50 million gallons of water annually, primarily due to savings of outdoor water use associated with power plant electricity use reductions. This estimate assumes that 3,280 kWh of embedded electricity uses results in one million gallons of water reduction. Additional savings can be attributed to reduced operation of cooling towers in large buildings due to improved control sequences, increased economizer operation and reduced cooling energy use.

## Multifamily Domestic Hot Water Pipe Sizing

The measure that would add a prescriptive requirement for pipe sizing according to CPC Appendix M for both central and individual DHW systems in multifamily buildings will save energy and therefore water usage at power plants. The water savings estimate is 9.3 million gallons of water annually.

## Refrigerant Leakage Impact from Heat Pump Measures

For both heat pump and air conditioning units, the refrigerant will gradually leak through the coils, piping holes, connections, and joints over the course of operation during the life of the equipment. At the end of equipment life, refrigerant in the equipment being replaced will be recaptured or released to the atmosphere. Different refrigerants have different levels of global warming potential (GWP). Annual refrigerant leakage throughout the life of the equipment and refrigerant leakage at the end of life must be accounted for when considering the impacts to the environment from the heat pump measure. The California Air Resources Board (CARB) adopted regulations that prohibit the use of refrigerants with a GWP higher than 750 in air conditioning equipment, including heat pumps, and these regulations become effective on January 1, 2025, or January 1, 2026, depending on the equipment type (State of California 2024). Equipment manufacturers will comply with the 750 GWP limit by using refrigerants such as, R-32, R-454B or R1234yf, which have a GWP of less than 750. As a result, the GHG impact associated with refrigerant leakage from heat pump measures will become smaller than it would have been without the CARB regulations.

For measures that switch the fuel source from natural gas to heat pumps (e.g., from gas water heating to HPWH and from gas boiler space heating to AWHP), the refrigerant leakage impact arises from the proposed heat pumps. For measures going from air conditioners (direct expansion (DX) systems) for cooling to heat pump heating and cooling, the impact is the difference in refrigerant leakage between the two system types.

## Methodology

The annualized GHG emissions of the heat pump measures were calculated as follows (E3 2023, In Press):

$$\text{Annualized Emissions} = \text{Refrigerant charge} * \text{GWP} * \left( \text{Annual Leakage rate} + \frac{\text{EOL Leakage Rate}}{\text{Lifetime}} \right)$$

Where:

GWP – metric tons of CO<sub>2</sub>e/ton of refrigerant charge

Annual Leakage Rate – Refrigerant leakage rate per year [%]

EOL Leakage Rate – End of life (EOL) refrigerant leakage rate [%]

Lifetime – Equipment lifetime

Refrigerant charge – tons of refrigerant charge. Charges are typically stated as lbs./cooling ton for nonresidential equipment and lbs./unit for residential equipment.

The equation above converts the end-of-life leakage rate to an equivalent annual basis and adds it to the annual leakage. GWP20 was used instead of GWP100 to recognize the short-term impacts of refrigerants. The analysis used an average of the GWP20 values for R-32 (HFC-32) and R-454B (HFC-454B) for direct expansion systems (both air conditioners and heat pumps) because both refrigerants will likely be used in equipment sold in the California market in 2026 when the 2025 Energy Code goes into effect. The annual end-of-life (EOL) leakage rates and refrigerant charge estimates were derived from CARB data (CARB 2020). CARB's estimates of refrigerant charge were based on R410A, the existing refrigerant. Switching to R-32 (HFC32) is expected to require less refrigerant (Xing Xu 2013) and lead to a lower GHG penalty. However, conservatively, the calculation did not account for this reduced refrigerant charge when using R-32 and R-454B.

The GHG emissions were first calculated per building or per multifamily dwelling unit for each prototype building and scaled to the statewide level by multiplying by the forecasted annual construction square footage or number of dwelling units. Table 1 shows the CO<sub>2e</sub> emissions from refrigerant leakage for heat pump measures in the Proposed 2025 Amendments. Note that there were no net refrigerant leakage emissions from the nonresidential single-zone heat pump alterations measure because refrigerant charge in the air conditioner unit and the heat pump unit was determined to be the same (CARB 2020).

**Table 1: Refrigerant Leakage Impacts from Heat Pump Measures**

<b>Measure Name</b>	<b>Total Refrigerant Leakage Emissions (Metric Tons CO<sub>2</sub>e)</b>
Nonresidential Multizone Heat Pumps in Newly Constructed Buildings	6,999
Nonresidential Single-Zone Heat Pumps in Alterations	0
Multifamily Heat Pump Water Heaters in Newly Constructed Buildings	993
Single-Family Space Heating Heat Pumps and Heat Pump Water Heaters in Newly Constructed Buildings	6,970

## **Indoor Air Quality**

Code change measures that impact HVAC systems have no impacts on indoor air quality (IAQ) and may result in improved IAQ, such as the supply-only ventilation systems and compartmentalization leakage testing measure for multifamily buildings. The requirement for controllers to adopt ASHRAE Guideline 36 are expected to have a new benefit to indoor air quality: by standardizing control sequences, this serves as a quality control check to ensure that the controls operate according to the design intent. The new standards for multizone heat pumps in newly constructed nonresidential buildings promote the use of hydronic space conditioning systems, coupled with dedicated outdoor air systems (DOAS). DOAS systems eliminate one potential source of poor indoor air quality – failures in airside economizer functions. By eliminating the gas boiler, the heat pump measure eliminates the risk of combustion-related pollution in the boiler room. In contrast, the air-to-water heat pump equipment is located outdoors. The measure to require heat pump water heaters when systems are specified for individual dwelling units will reduce onsite combustion and improve indoor air quality.

# CHAPTER 6:

## Energy and Environmental Benefits

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The CEC evaluated each proposed change to the Energy Code for energy and environmental benefits. The following discusses the overall potential energy, water, and emission benefits of the proposed changes to the Energy Code for each sector and specific measures that may have significant impact on this potential.

### Energy and Water Savings

Table 2 presents the projected reduction in annual electricity and natural gas energy consumption, peak demand, and water consumption from the residential sector, including single family and multifamily buildings, and the nonresidential sector, including process energy. These savings represent the impact of the Proposed 2025 Amendments.

**Table 2: Annual Reduction in Energy and Water Consumption and Peak Demand by Sector**

	<b>Electricity Savings [GWh]</b>	<b>Natural Gas Savings [Million Therms]</b>	<b>Water Savings [Million Gallons/yr]</b>	<b>Peak Demand Reduction [MW]</b>
Residential	19.35	10.85	9.30	-11.63
Nonresidential	384.83	23.68	59.56	44.33
<b>Total</b>	<b>404.18</b>	<b>34.53</b>	<b>68.86</b>	<b>32.70</b>

### Residential

The top three measures that contribute to the totals in Table 2 are listed in



Table 3 and Table 4. For individual measures, electricity savings may be negative if there is a projected net increase in electricity consumption due to a standard for electricity-based space heating or service water heating.

**Table 3: Top Three Residential Electricity Impact Measures**

<b>Measure Name</b>	<b>Construction Type</b>	<b>Electricity Savings [GWh]</b>
Requires heat pumps and heat pump water heaters in single-family homes	Newly Constructed + Additions	-72.77
Requires proper design and sizing of HVAC systems to avoid undersizing of heat pump heating and oversizing of cooling. Requires duct and diffuser design to match optimal equipment design.	Newly Constructed + Additions, Alterations	56.75
Requires installation and field verification of controls that lock out supplementary heating above a certain outdoor temperature on heat pumps. Sets supplementary heating capacity limits.	Newly Constructed + Additions, Alterations	12.70

**Table 4: Top Three Residential Natural Gas Impact Measures**

<b>Measure Description</b>	<b>Construction Type</b>	<b>Natural Gas Savings [Million Therms]</b>
Standardizes heat pumps and heat pump water heaters in single-family homes.	Newly Constructed + Additions	7.88
Requires solar pool heating systems.	Newly Constructed + Additions	1.26
Requires heat pump water heaters in multifamily homes.	Newly Constructed + Additions	0.52

## Nonresidential

The top three measures which contribute to the nonresidential sector totals are listed in Table 5 and Table 6.

**Table 5: Top Three Nonresidential Electricity Impact Measures**

<b>Measure Description</b>	<b>Construction Types</b>	<b>Electricity Savings [GWh]</b>
Expands the PV and battery requirements to additional building types and revises the PV and battery capacity requirements for building types in the 2022 Energy Code.	Newly Constructed + Additions	151.86
Increases the minimum efficacy of indoor horticultural lighting.	Newly Constructed + Additions, Alterations	111.71
Requires the use of HVAC control sequences from ASHRAE Guideline 36.	Newly Constructed + Additions, Alterations	44.46

**Table 6: Top Three Nonresidential Natural Gas Impact Measures**

Measure Description	Construction Types	Natural Gas Savings [Million Therms]
Reduces ventilation rate during unoccupied hours.	Newly Constructed + Additions, Alterations	5.53
Requires pipe insulation and verification requirements for covered processes.	Newly Constructed + Additions, Alterations	5.47
Requires the use of heat pump technologies for multizone systems used in offices and schools.	Newly Constructed + Additions	2.73

## Environmental Benefits

Reducing natural gas and electricity use is expected to result in reductions in greenhouse gas emissions, as well as emissions of a range of pollutants, including nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), sulfuric oxides (SO<sub>x</sub>), particulate matter (PM), and carbon dioxide (CO<sub>2</sub>), both at power plants, and at the building site.<sup>7</sup> Table 7 presents the projected annual reductions from the residential sector, including single-family and multifamily buildings, and the nonresidential sector, including process energy. The CO<sub>2</sub>e impact also includes the impact of refrigerant leakage discussed in Chapter 5.

**Table 7: Greenhouse Gas and Pollutant Emission Impact**

	CO <sub>2</sub> e [metric tons]	NO <sub>x</sub> [lbs.]	SO <sub>x</sub> [lbs.]	CO [lbs.]	PM [lbs.]
Residential	42,041	97,413	463	89,317	8,081
Nonresidential	135,355	223,648	1,544	195,021	17,645
<b>Total</b>	<b>177,396</b>	<b>321,061</b>	<b>2,006</b>	<b>284,338</b>	<b>25,726</b>

## Residential

The top three residential measures which contribute to the greenhouse gas and pollutant emission totals are listed in Table 8 and Table 9.

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<sup>7</sup> The Energy Commission uses hourly emission factors for electricity and natural-gas CO<sub>2</sub>e, and electric-grid-sourced NO<sub>x</sub> and SO<sub>x</sub> that account for long-term energy supply system resources transitioning to 100 percent renewables, transmission and distribution system losses, and the carbon intensity of fuels (including methane leakage). In addition, CO<sub>2</sub>e also includes the impacts of refrigerant leakage from heat pump technologies as documented in **Error! Reference source not found.** Natural gas NO<sub>x</sub>, SO<sub>x</sub>, CO and PM are calculated using EPA factors on the combustion of on-site natural gas: [https://www.epa.gov/sites/default/files/2020-09/documents/1.4\\_natural\\_gas\\_combustion.pdf](https://www.epa.gov/sites/default/files/2020-09/documents/1.4_natural_gas_combustion.pdf).

**Table 8: Top Three Residential Measures Contributing to CO<sub>2</sub>e, NO<sub>x</sub>, and SO<sub>x</sub>**

<b>Measure Description</b>	<b>Construction Types</b>	<b>CO<sub>2</sub>e [tonnes]</b>	<b>NO<sub>x</sub> [lbs.]</b>	<b>SO<sub>x</sub> [lbs.]</b>
Requires heat pumps and heat pump water heaters in single-family homes.	Newly Constructed + Additions	16,850	67,799	191
Requires solar pool heating systems.	Newly Constructed + Additions	7,563	11,729	74
Requires pipe insulation verification of domestic hot water systems.	Newly Constructed + Additions	2,637	4,707	30

**Table 9: Top Three Residential Measures Contributing to CO and PM**

<b>Measure Description</b>	<b>Construction Types</b>	<b>CO [lbs.]</b>	<b>PM [lbs.]</b>
Requires heat pumps and heat pump water heaters in single-family homes.	Newly Constructed + Additions	64,894	5,871
Requires solar pool heating systems.	Newly Constructed + Additions	10,371	938
Requires heat pump water heaters in multifamily homes.	Newly Constructed + Additions	4,282	387

**Nonresidential**

The top three nonresidential measures which contribute to the greenhouse gas and pollutant emission totals are listed in Table 10 and

Table 11. Life-cycle assessments of heat pumps and condensing gas boilers have determined that the use of heat pumps is expected to have a positive (non-negative) impact on abiotic depletion potential (Gabriel Naumann 2022).

**Table 10: Top Three Nonresidential Contributors to CO<sub>2</sub>e, NO<sub>x</sub>, and SO<sub>x</sub>**

<b>Measure Description</b>	<b>Construction Types</b>	<b>CO<sub>2</sub>e [tonnes]</b>	<b>NO<sub>x</sub> [lbs.]</b>	<b>SO<sub>x</sub> [lbs.]</b>
Reduces ventilation rate during unoccupied hours.	Newly Constructed + Additions, Alterations	30,866	51,637	333
Requires pipe insulation and verification requirements for covered processes.	Newly Constructed + Additions, Alterations	30,008	50,940	323
Limits space heating hot water supply temperatures to 130 °F.	Newly Constructed + Additions, Alterations	15,129	25,480	163

**Table 11: Top Three Nonresidential Contributors to CO and PM**

<b>Measure Description</b>	<b>Construction Types</b>	<b>CO [lbs.]</b>	<b>PM [lbs.]</b>
Reduces ventilation rate during unoccupied hours.	Newly Constructed + Additions, Alterations	45,517	4,118
Requires pipe insulation and verification requirements to covered processes.	Newly Constructed + Additions, Alterations	45,010	4,072
Requires the use of heat pump technologies for multizone systems used in offices and schools.	Newly Constructed + Additions	22,482	2,034

# CHAPTER 7:

## Cumulative Effects

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Cumulative impacts can result when “two or more individual effects, which, when considered together, are considerable or which compound or increase other environmental impacts.”<sup>8</sup> This section analyzes the potential for significant, adverse cumulative impacts resulting from the 2025 Standards update and concludes that the project’s impacts are not cumulatively considerable. This report examines the impact of the 2025 Energy Code on projections of material use, state energy use, and renewable resources, to address the requirements of CEQA Guidelines section 15130.

### Materials

#### Photovoltaic Systems

The Proposed 2025 Amendments increase the requirements for onsite PV panels for building types covered by the 2022 Standards and expand PV requirements to cover additional nonresidential building types. These requirements apply to newly constructed buildings only. The changes do not affect existing buildings, which comprise approximately 98 percent of the total building stock in the state. By the end of 2022, California had 14,370 MW of existing installed behind-the-meter (BTM) capacity (CEC 2023). The requirements for onsite generation from PV and energy storage reduce the state’s energy demand making it easier to meet both the state’s renewable portfolio standard targets and carbon neutrality goals, by reducing the use of combustion power plants that cause major levels of pollution. The 2025 Energy Code change is estimated to add 96.0 MW of distributed PV capacity each year compared to the 2022 Energy Code, beginning with the 2026 effective date. Given the substantial load from existing buildings and the naturally occurring market adoption of PV systems within the state, the new requirement for PV systems in the 2025 Standards that merely expand the substantial existing 2022 Standards requirements are expected to have a negligible impact on the demand for PV production.

The California Public Utility Commission (CPUC) Net Billing Tariff revises prior net energy metering rates resulting in a reduction in the short-term outlook for residential PV installations in California, which in 2024 are expected to drop by 41% from 2023 levels, but national PV sales are expected to rebound to 15% sales growth, and 8% sales growth between 2025 and 2028 (Balaraman 2024). Moreover, states are expected to continue to install utility-scale solar to meet national goals. The effect of the Proposed 2025 Amendments, in the context of the Net Billing Tariff changes and broadens the PV panel market for residential, nonresidential, and utility scale systems, but is not cumulatively considerable.

#### Energy Storage Systems

While energy storage supports grid resiliency, its primary Energy Code purpose is to limit onsite PV generation exports to the grid during off-peak hours and to use stored energy to

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<sup>8</sup> Cal. Code Regs., tit. 14, § 15355.

reduce building peak demand during times when utility rates and high-emission, combustion power plant use are highest. In California, more energy storage capacity was installed between 2020 and 2022 than in all previous years combined, with an estimated capacity of 1,146 MW at the end of 2022 (CEC 2023). The 2025 Energy Code is estimated to add 238 MWh of energy storage capacity (59.5 MW with 4-hour storage) to the state each year beginning with the code adoption in 2026.

By comparison, the estimated 800,000 electric vehicles in the state had a combined initial battery capacity of 48,000 MW drawing electricity from the grid, and the demand is predicted to grow tenfold by the year 2032 (Aydin, Mariko Geronimo, and Cevat Onur Aydin 2023). The increase in energy storage demand from the 2025 Energy Code update is not expected to have a significant effect on the market for lithium-ion batteries.

Electric vehicle batteries at the end of their service life represent a large potential capacity for stationary energy storage in buildings, but procedures to repurpose the batteries for a reliable use in buildings are still developing. Companies are developing circular supply chain processes to recycle battery metals and refine them for reuse. The market demand for lithium-ion batteries is accelerating the development of recycling capacities; expended battery storage cells can be repurposed for use in electric vehicles.

## **Heat Pump Measures**

The heat pump market in the United States is expected to grow from \$9.87 billion dollars at an annual growth rate of 9.4% through 2027 (Morodor Intelligence 2023). Unit sales of air-source heat pumps in 2022 were 4.33 million, a 65% increase from 2017 (Air Conditioning, Heating and Refrigeration Institute 2023). New codes and incentive programs from multiple states and jurisdictions, including New York, Washington, Denver, and Seattle are helping to drive this change. Globally, the European market is moving away from using combustion heating equipment towards using heat pumps instead (Nowak 2023).

The 2025 Proposed Amendments include new standards that will improve the performance of heat pump installations for single-family residential buildings. First, there are design requirements for documentation of load calculations for system sizing, of duct and diffuser design, and for minimum heat capacity. This will result in significant energy and emissions savings with no environmental impact. There are new limitations that lockout resistance heating above a specified outdoor temperature and limit the capacity of supplementary resistance heating. There are minimum timer delay requirements between defrost cycles, which address both energy use and peak demand. For systems with smart thermostats, there are new crankcase heater controls that ensure that the heater does not operate when the system is running, and that the heater is off above specified temperatures. Refrigerant charge verification requirements for heat pumps ensure that the systems are operating to their intended performance levels. Each of the measures reduces energy and emissions, with no significant adverse environmental impact.

There are also several measures that improve the performance of water heating systems in multifamily buildings. The practice of using California Plumbing Code Appendix M sizing procedures for low-flow fixtures results in smaller pipe diameter sizes in central domestic hot water recirculation loops and at the primary storage tank and the temperature maintenance tank used with recirculation loops. This reduces material use for central water heating



systems. There are requirements for cleanup of pipe insulation requirements and a new requirement for field verification of insulation levels. This will not result in significant adverse environmental impacts. A new requirement for a master mixing valve to be placed at the outlet of the primary heater, rather than downstream towards the dwelling units, will also have no significant adverse environmental impact.

The heat pump alterations prescriptive measure to replace nonresidential roof top units is expected to significantly increase statewide demand for packaged air-source heat pumps (nominal capacity of 65,000 Btu/h or lower). This measure will only affect a subset of building types, —primarily small office buildings, retail buildings and small schools. The replacement rate for these units is typically every 15 years, based on their life expectancy. The multizone heat pump prescriptive measure for select newly constructed nonresidential buildings will result in an increased demand for air-to-water heat pumps and variable refrigerant flow (VRF) heat pump systems, while reducing demand for central gas boilers and multi-zone package furnace/air conditioners, respectively. The 2025 Energy Code will still allow a gas alternative option for each of these standards that meets the energy budgets using heat pump baselines. Affected office and school projects that comply with the 2025 Energy Code using gas alternative options will have reduced energy use and reduced emissions, compared with the previous 2022 code cycle.

There are positive effects resulting from the combination of the heat pump measures and the photovoltaic and energy storage requirements. The specification of heat pumps allows for buildings to better utilize onsite generation during the winter months, which benefits both the consumer (through fully realized electricity rate offsets) and the grid (through reduction of exports). These measures are seen as vital towards meeting California’s long-term energy resource plans. By reducing the need for new conventional energy generation sources, the measures will help to address risks associated with combustion power plant generation, often near disadvantaged communities, which often suffer from significant, adverse cumulative environmental impacts from multiple sources of pollution.

Heat pumps and air conditioning units use the same components, except for a solenoid reversing valve, a second expansion valve for heating mode, and a defrost timer. They also use a suction line accumulator to store the portion of refrigerant that is not required in the heating mode. The additional parts require a comparatively very small amount of material to manufacture. Nonresidential heat pump equipment affected by the 2025 Standards have the same life expectancy as air conditioning equipment with gas furnaces. Therefore, the environmental impact of the heat pump standard is not cumulatively considerable.

## **Energy**

The proposed changes result in both energy and emissions reductions, while meeting the life-cycle cost-effectiveness mandate of the Warren-Alquist Act (Public Resources Code section 25402(b)(3)). The 2025 Energy Code includes measures that will “reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of electricity ... and manage energy loads to help maintain grid reliability” as required by Public Resources Code section 25402.

The proposed Energy Code measures are estimated to affect 65,000 newly constructed single-family homes, 53,000 newly constructed multifamily dwellings, and 142 million square feet of newly constructed nonresidential buildings in the first year that the 2025 Standards take

effect, in 2026. Also, the heat pump alterations measure will impact specific existing building types. With an equipment turnover rate of every 15 years, the savings from end-of-life replacement projects that comply with the alterations measure adds to the statewide savings achieved for newly constructed buildings measures.

The heat pump baseline measures in the 2025 Energy Code will increase electricity consumption and peak demand in the winter months. While the winter peak is expected to increase, it is expected to stay well below the summer peak demand through 2032 (CEC 2023). There is no change to the summer peak from the heat pump measures because the heat pump measures result in increased electricity demand during heating months, but do not result in a significant change in demand during cooling months in the summer. Therefore, the projected effect of the heat pump baseline measures will not trigger a requirement for additional generation at the utility level. Also, the PV and battery energy storage will mitigate impact of heat pump baseline measures on utility peak loads. The heat pump baseline and photovoltaics/battery storage measures will not have a considerable cumulative environment impact.

The estimated cumulative energy savings of implementing the proposed 2025 Standards are 319 gigawatt-hours per year (GWh/yr). Natural gas consumption will be reduced by 54 million therms.

**Emissions**

The emissions reductions described in Chapter 6 are the cumulative results of avoided energy demand and generation. This reduction occurs through energy efficiency, through measures that promote decarbonization, and through increased requirements for onsite renewables. The measures are expected to reduce emissions of a range of pollutants, including nitrogen oxides, carbon monoxide, sulfuric oxides, particulate matter, and carbon dioxide. The avoided emissions will have a lasting impact over the life of the measures. Table 12 presents the total reduction in emissions. Details on key measures contributing to this total are discussed in CHAPTER 6:

Energy and Environmental Benefits. The net cumulative impact of the Proposed 2025 Amendments is a reduction in GHG emissions and pollutants.

**Table 12: Total Greenhouse Gas and Pollutant Emission Reductions**

CO <sub>2</sub> e [metric tons]	NO <sub>x</sub> [lbs.]	SO <sub>x</sub> [lbs.]	CO [lbs.]	PM [lbs.]
178,314	321,061	2,006	284,338	25,726

The Proposed 2025 Amendments include requirements for both PV and battery energy storage in nonresidential buildings. The two technologies are complementary: battery energy storage minimizes excess electricity exported to the grid, benefitting both the consumer and the utility provider. Distributed storage has the direct benefit of limiting electricity demand, reducing the state’s reliance on combustion power plants. The substantial majority of these plants are combined cycle and account for the substantial majority of gas emissions that are avoided by the Proposed 2025 Amendments. A limited number of these power plants are combustion turbines that are rarely used, only when California is in critical peak conditions a limited number of hours per year. These peaker plants run at capacity factors below 15 percent, and

occasionally as low as 1 percent. PSE Energy (2020) reports that half of California's peaker plants, which have pollution emission rates that are substantially higher than for combined cycle power plants, are located in disadvantaged communities. All pollution from combustion power plants can make its way into homes and nonresidential buildings, getting trapped and raising indoor air pollution levels. Distributed battery energy storage can contribute to reducing that pollution, leading to earlier retirement of peaker plants, and improvement of indoor air quality. For these reasons, the incremental change to PV requirements in nonresidential buildings is considered to have no significant adverse environmental impact.

## **CHAPTER 8: CEC Recommendations**

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The analysis provided for the proposed changes to the Energy Code concludes that there will be no significant adverse impact on the environment. A negative declaration is proposed to be adopted for the Proposed 2025 Amendments.

## **CHAPTER 9: Initial Study Preparers**

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This Initial Study and Proposed Negative Declaration was prepared by the CEC in coordination with the CEC consultants, NORESO, and managed by Payam Bozorgchami of the Efficiency Division's Building Standards Branch, with contributions from the Office of the Chief Counsel, including Mike Murza, Lisa DeCarlo, Ralph Lee, Deborah Dyer, Jared Babula, Kathryn Colson, and Alex Mayer.

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# GLOSSARY

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Abiotic Depletion Potential	A measure of the use of nonrenewable energy sources for energy production, often included in Life Cycle Assessments.
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
Btu/hr	British thermal unit per hour. One Btu equals the amount of heat needed to raise the temperature of one pound of water 1 degree Fahrenheit. Used for measuring heating and cooling equipment output.
Climate Zone	The CEC established 16 climate zones that represent a geographic area for which an energy budget is established.
Ton(s)	A unit of energy equivalent to 12,000 Btu/hr; used in specifying the heating capacity or cooling capacity of HVAC equipment.
VRF	Variable refrigerant flow

# APPENDIX A:

## California Environmental Quality Act Checklist

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A negative declaration is proposed for the 2025 Energy Code, update.

<b>Project Title</b>	2025 Energy Code Docket #24-BSTD-01
<b>Lead Agency/Project Sponsor Name and Address</b>	California Energy Commission, 715 P Street, Sacramento, California, 95814
<b>Contact Person and Phone Number</b>	Payam Bozorgchami, Building Standards Branch, Efficiency Division Payam.bozorgchami@energy.ca.gov
<b>Project Location and Environmental Setting</b>	The regulations would be applicable statewide
<b>Project Description</b>	The California Energy Commission (CEC) amends the California Energy Code on a three-year cycle contained in the California Code of Regulations, Title 24, Part 6, and associated administrative regulations, contained in the California Code of Regulations, Title 24, Part 1.
<b>Responsible Agencies</b>	California Building Standards Commission
<b>Other public agencies whose approval is required</b> (e.g., permits, financing approval, or participation agreement)	None
<b>Have California Native American Tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1?</b>	California Native American Tribes have been notified and consultations will be provided as requested.
<b>Names of persons who prepared or participated in the initial study</b>	CEC Building Standards Branch, CEC Chief Counsel Office, NORESKO

**ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED**

The CEC’s analysis reveals no significant adverse impacts.

**Table 2: Potentially Affected Areas**

Potential Positive Impact Determined	Environmental Factor	Potential Positive Impact Determined	Environmental Factor
	I. Aesthetics		XII. Mineral Resources
	II. Agriculture and Forestry Resources		XIII. Noise
	III. Air Quality		XIV. Population/Housing
	IV. Biological Resources		XV. Public Services
	V. Cultural Resources		XVI. Recreation
	VI. Energy		XVII. Transportation
	VII, Geology/Soils		XVIII. Tribal Cultural Resources
	VIII. Greenhouse Gas Emissions		XIX. Utilities/Service Systems
	IX. Hazards & Hazardous Materials		XX. Wildfire
	X. Hydrology/Water Quality		XXI. Mandatory Findings of Significance
	XI. Land Use/Planning		

Source: 2019 CEQA Guidelines Appendix G and California Energy Commission

**Evaluation of Environmental Impacts**

**Table 3** lists specific potential issues for each of the factors presented in **Table 2**.

**Table 3: Specific Potential Issues**

<b>Issues</b> <b>I. AESTHETICS. Except as provided in Public Resources Code Section 21099 would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant with Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?				X
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?				X

COMMENT: The proposed regulations focus on updating regulatory standards and compliance options related to building energy efficiency. The Energy Code updates would not approve or result in additional specific construction projects or otherwise impact the rate of building construction. The 2025 amendments would have no impacts on aesthetics.

<p align="center"><b>Issues</b></p> <p><b>II. AGRICULTURE AND FORESTRY RESOURCES.</b> In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. <b>Would the project:</b></p>	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime farmland, Unique farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				X

COMMENT: The proposed regulations will have no impact to agricultural and forestry resources and no impact on any of the specific concerns listed above. These regulations do not require land, including forest or agriculture land, to convert to other uses. The proposed regulations focus on updating regulatory standards and compliance options related to building energy efficiency. The Energy Code updates would not approve or result in additional specific construction projects or otherwise impact the rate of building construction.

<b>Issues</b> <b>AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Conflict with or obstruct implementation of the applicable air quality plan?				X
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard?				X
c) Expose sensitive persons to substantial pollutant concentrations?				X
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?				X

COMMENT: The proposed regulations will have no adverse impact to the air quality concerns listed above. The proposed regulations focus on updating regulatory standards and compliance options related to reduction of wasteful, uneconomic, inefficient, or unnecessary energy consumption. The Energy Code updates would not approve or result in additional specific construction projects or otherwise impact the rate of building construction. The 2025 amendments also would not affect the ability for local air districts to impose air quality requirements on construction projects. The proposed standards will result in reduced electricity consumption, which will have a significant positive impact on the environment through energy efficiency gains and avoiding greenhouse gas emissions and criteria pollutant emissions associated with the generation of electricity from fossil fuels.

The amendments do not affect the ability for local air districts and jurisdictions to impose air quality requirements on construction projects to reduce the exposure to substantial pollutants by sensitive receptors. Moreover, they would improve indoor air quality, which would help to prevent sensitive persons from being exposed to substantial pollutant concentrations

<b>Issues BIOLOGICAL RESOURCES. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant with Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

COMMENT: The proposed regulations will have no impact on biological resources and no adverse impact on the specific concerns listed above. The proposed regulations do not direct where construction should occur and do not include provisions or exceptions that would make it more likely for construction to be sited, designed, or constructed in ecologically-rich areas or require land, including wetlands or habitat, to convert to other uses, in such a way as to introduce new or additional adverse effects on candidate, sensitive, or special-status species either directly or indirectly. The proposed regulations would benefit biological resources by reducing ambient criteria pollutants from power production, such as nitrogen oxides and sulfur dioxides.

<b>Issues</b> <b>CULTURAL RESOURCES. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
<u>V. CULTURAL RESOURCES.</u> Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to in Section 15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?				X
c) Disturb any human remains, including those interred outside formal cemeteries?				X

COMMENT: The proposed regulations will have no impact on any cultural resources and no impact on any of the specific concerns listed above. The proposed regulations do not include any provisions that would cause proposed building projects to be more likely to be sited or designed in such a way as to adversely change the significance of a cultural resource. The proposed regulations do not require land, including burial grounds or archaeological / paleontological sites, to convert to other uses.



<b>Issues Energy. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less than Significant with Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?				X
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?				X

COMMENT: The proposed regulations will have no impact on any energy resources and no impact on any of the specific concerns listed above. The amendments will not result in the approval of any specific construction project. The proposed regulations are part of state policy to reduce wasteful, uneconomic, inefficient, or unnecessary energy consumption. Overall, the proposed regulations are expected to reduce electricity and natural gas usage when compared to continued compliance with the 2022 Energy Code requirements. While PV and energy storage systems, envelope efficiency measures, and covered process load improvements reduce the use of natural gas, electricity, and long-term system costs across all building types, the new prescriptive and performance standards for heat pump technology for water and space heating are expected to result in a modest increase in the total electricity consumed in affected buildings. However, the increase in electricity resulting from heat pumps would be more than offset by the natural gas savings in the same buildings through long-term system cost and source energy savings. The electricity savings from measures for both newly constructed buildings and additions and alterations to existing buildings, including PV and energy storage, efficiency measures, and reductions in covered process loads, would strongly outweigh the relatively small increase in electricity used by heat pumps. As such, the project does not result in wasteful, uneconomic, inefficient, or unnecessary consumption of energy. Any winter peak demand impacts from this project can be met with existing in-state under-utilized thermal capacity. Given the decrease in energy demand the proposed regulations will have over the existing standards, the regulations would have less than significant impacts on local or regional energy supplies or capacity.

The proposed regulations further state and local plans for renewable energy and energy efficiency, so the proposed regulations have no impact on energy resources.

<b>Issues GEOLOGY AND SOILS. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?				X
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?				X

COMMENT: The proposed regulations will have no impact to geology and soils and no impact on the specific concerns listed above. The proposed regulations do not include any provisions that would directly or indirectly cause proposed building projects to be more likely to be sited in one location versus another or require changes to land use that might affect its seismic or stability characteristics.

<b>Issues GREENHOUSE GAS EMISSIONS. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?				X
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?				X

COMMENT: The proposed regulations will have no significant impact to the greenhouse gas emissions concerns listed above and will not result in any net increase in greenhouse gas emissions, either directly or indirectly. The standards for heat pumps will increase emissions associated with refrigerant use; however, such increase will be less than the emissions reductions due to reduced energy consumption from the affected buildings. The amendments will not result in the approval of any specific construction project. Overall, the proposed efficiency standards will result in reduced electricity consumption, which will have a significant positive impact on the environment through energy efficiency gains and avoiding greenhouse gas emissions and criteria pollutant emissions associated with the generation of electricity from fossil fuels.

The proposed regulations support and further California's plans, policies, and regulations adopted for the purpose of reducing GHGs and mitigating the effects of climate change. The proposed regulations accomplish this by reducing the reliance of California buildings on natural gas and propane to provide space and water heating for residential and nonresidential uses, expanding distributed PV generation and energy storage, and introducing numerous new building energy efficiency measures. The proposed regulations would not have a significant impact on GHG emissions and would not conflict with any plan, policy, or regulation that would further reduce GHG emissions.

<b>Issues HAZARDS AND HAZARDOUS MATERIALS. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				X

COMMENT: The proposed regulations will have no impact on hazards and hazardous material. This project focuses on updating regulatory standards related to reduction of wasteful, uneconomic, inefficient or unnecessary energy consumption and does not affect decisions by building developers and local agencies regarding whether to build or the location of specific future projects. The marginal increase in routine transport, use, and disposal of batteries needed to install building energy storage systems in accordance with the proposed regulations would not pose a significant hazard to the public or the environment. While photovoltaic systems do contain heavy metals, materials that are not recycled are classified as universal waste, allowing for more options in transport and safe disposal. This report also contains a description of the increasing capacity for refining, recycling, and reusing battery storage materials at the end of their useful life.

PV projects at or near airports should submit Form 7460-1, confirming that an analysis for potential glint and glare has been performed. However, airport projects are no longer required to submit the results of an ocular analysis, based on evidence that glare from panels poses no greater threat than bodies of water or building facades. Battery energy storage systems can be installed at airport sites.

<b>Issues</b> <b>HYDROLOGY AND WATER QUALITY.</b> <b>Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?				X
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				X
(i) result in substantial erosion or siltation on- or off-site;				X
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;				X
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or				X
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				X
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				X

COMMENT: The proposed regulations will not affect hydrology or water quality. They do not include any provisions that would cause building projects to be more likely to be sited or designed in such a way as to affect hydrology or water quality. The proposed regulations do not require land, including flood zones and drainage, to be altered. The proposed regulations do not alter existing water supply, usage, or discharge.

<b>Issues</b> <b>LAND USE AND PLANNING. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Physically divide an established community?				X
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				X

COMMENT: The proposed regulations will have no impact on land use and planning and no impact on any of the specific concerns listed above. The proposed regulations do not induce or incentivize building projects to be sited in one location versus another. The proposed regulations do not require land, including habitat and community development sites, to convert to other uses. The project would not have any effect on, and would be consistent with, existing zoning, plans, and other applicable land use controls.

<b>Issues</b> <b>MINERAL RESOURCES. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				X

COMMENT: The proposed regulations will have no adverse impact on mineral resources and no impact on any of the concerns listed above. The proposed regulations do not induce or incentivize building projects to be sited in one location versus another. The proposed regulations do not require land, including mineral-rich land, to convert to other uses.

<p style="text-align: center;"><u>Issues</u> NOISE. Would the project result in:</p>	<p style="text-align: center;"><b>Potentially Significant Impact</b></p>	<p style="text-align: center;"><b>Less Than Significant With Mitigation Incorporated</b></p>	<p style="text-align: center;"><b>Less Than Significant Impact</b></p>	<p style="text-align: center;"><b>No Impact</b></p>
<p>a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?</p>				X
<p>b) Generation of excessive groundborne vibration or groundborne noise levels?</p>				X
<p>c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?</p>				X

COMMENT: The proposed regulations will have no noise impact and no impact on the specific concerns listed above. The proposed regulations do not induce or incentivize building projects to be sited in one location versus another. The proposed regulations do not increase the level of noise expected to occur during construction or occupancy of regulated buildings.



<p style="text-align: center;"><u>Issues</u>  <b>POPULATION AND HOUSING. Would the project:</b></p>	<p style="text-align: center;"><b>Potentially Significant Impact</b></p>	<p style="text-align: center;"><b>Less Than Significant With Mitigation Incorporated</b></p>	<p style="text-align: center;"><b>Less Than Significant Impact</b></p>	<p style="text-align: center;"><b>No Impact</b></p>
<p>a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?</p>				X
<p>b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?</p>				X

COMMENT: The proposed regulations will have no impact on population and housing and no impact on any of the concerns listed above. The proposed regulations do not affect whether building projects are sited in one location versus another. Nor do they induce or incentivize additional building or infrastructure projects or action that would induce population growth or displacement.

<b>Issues PUBLIC SERVICES.</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				X
Fire protection?				X
Police protection?				X
Schools?				X
Parks?				X
Other public facilities?				X

COMMENT: The proposed regulations will have no impact on public services and no impact on any of the concerns listed above. The proposed regulations do not affect whether building projects are sited in one location versus another. The proposed regulations will not require the construction or alteration of governmental buildings in a way that will cause significant negative environmental impact. The proposed efficiency standards will result in reduced electricity consumption, which will also result in a reduced need to site and construct new power plants.

<b>Issues RECREATION.</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X

COMMENT: The proposed regulations will have no impact on recreation and no impact on any of the specific concerns listed above. The proposed regulations do not affect whether building projects are sited in one location versus another. The proposed regulations do not require park or recreational land to be included in projects or to convert to other uses.

<b>Issues</b> <b>TRANSPORTATION. Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadways, bicycle, and pedestrian facilities?				X
b) Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?				X
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
d) Result in inadequate emergency access?				X

COMMENT: The proposed regulations will have no impact on transportation and no impact on any of the specific concerns listed above. The proposed regulations do not affect whether building projects are sited in one location versus another, in a way that they would conflict with transit, roadway, bicycle, or pedestrian facilities, or that would affect hazards. The proposed regulations do not increase or decrease the potential VMTs that might be associated with the construction or occupancy of buildings meeting the proposed regulations.

<b>Issues</b> <b>TRIBAL CULTURAL RESOURCES.</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				X
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or				X
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.				X

COMMENT: The proposed regulations will have no impact on tribal cultural resources and no impact on any of the specific concerns listed above. The proposed regulations do not affect whether building projects are sited in one location versus another. The proposed regulations will have no impact on landscape, sacred places, or objects with cultural value to a California Native American tribe.

<b>Issues</b> <b>UTILITIES AND SERVICE SYSTEMS.</b> <b>Would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?				X
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?				X
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the providers' existing commitments?				X
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?				X
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?				X

COMMENT: The proposed regulations will have no adverse impact on utilities and service systems and no impact on any of the concerns listed above. The proposed regulations would not approve specific construction projects, the occupancy of buildings, or otherwise affect the location or rate of building construction. Overall, the proposed regulations are expected to reduce electricity and natural gas usage, and reduce corresponding reliance on utility infrastructure. Increased electric energy and electric demand usage from specific heat pump measures will be distributed throughout the state and offset by other measures. Therefore, the project will result in little to no relocation or construction of new electric power infrastructure to accommodate the increase in electricity for some buildings and the overall statewide reduction in electricity. Rather, the proposed regulations will have beneficial effects on energy utilities by reducing the need to procure additional electricity generation and supporting the grid transition to renewables by facilitating the deployment of greater quantities of distributed battery energy storage and solar PVs.

<b>Issues</b> <b>WILDFIRE. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:</b>	<b>Potentially Significant Impact</b>	<b>Less than Significant with Mitigation Incorporated</b>	<b>Less than Significant Impact</b>	<b>No Impact</b>
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				X
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				X
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				X
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				X

COMMENT: The proposed regulations will have no impact on any of the concerns listed above. The proposed regulations would not approve specific construction projects, the occupancy of buildings, or otherwise affect the location or rate of building construction, including fire risk zones.

Issues <b>MANDATORY FINDINGS OF SIGNIFICANCE.</b>	<b>Potentially Significant Impact</b>	<b>Less Than Significant With Mitigation Incorporated</b>	<b>Less Than Significant Impact</b>	<b>No Impact</b>
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number, or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?				X
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				X
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?				X

COMMENT: The proposed regulations will have no adverse impact on any of the concerns listed above. The proposed regulations would not approve specific construction projects, the occupancy of buildings, or otherwise affect the location or rate of building construction. The proposed regulations would not degrade the quality of the environment but result in a benefit as they would reduce overall energy use and the pollution-associated with electricity generation from combustion of fossil fuels, including nitrogen deposition and other environmentally harmful emissions that adversely affect flora and fauna. This reduced energy use will provide positive impacts for humans by reducing air pollutants due to a reduction in power generation, improving indoor air quality, and reducing GHG emissions. No potential exists for any adverse impacts on any animal or human populations.

No impacts were identified in the specific topic areas, and none of the impacts are cumulatively considerable. Moreover, improvements in the efficiency of general service lamps resulting from the proposed standards will result in beneficial environmental impacts including reduced electricity consumption, which will have a significant positive impact on the environment through energy efficiency gains and avoiding greenhouse gas emissions and criteria pollutant emissions associated with the generation of electricity from fossil fuels. Additionally, the reduced electricity consumption is likely to lead to reduced power plant operation and a reduced need to build power plants and power lines in the future.

Source: 2019 CEQA Guidelines Appendix G and California Energy Commission

No environmental factors are significantly and adversely affected by the 2025 Title 24 Energy Efficiency Standards.



# **APPENDIX B:**

## **Proposed Text of Negative Declaration**

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Under the California Environmental Quality Act (CEQA), the CEC approves the initial study analyzing the environmental impacts of the 2025 Standards.

Based on the initial study, the CEC finds that:

(1) There is no substantial evidence, in light of the whole record, that adopting the 2025 Energy Code, in Parts 1 and 6 of Title 24 of the California Code of Regulations, will have a significant adverse effect on the environment.

(2) The initial study reflects the CEC's independent judgment and analysis.

The CEC therefore also adopts a negative declaration for the proposed 2025 Standards based on the approved initial study.