Transitioning to Healthy and Sustainable Buildings

Cost-Effective Energy Efficiency Requirements

HIGH-RISE HOT WATER PERFORMANCE

Applies to:	New high-rise residential construction
Description of Requirement:	State Energy Code includes two compliance options for builders: a prescriptive option using specific methods known to be efficient and a performance option allowing design flexibility provided the building achieves the same overall efficiency as an equivalent building under the prescriptive option. Under the performance option for this proposed requirement, new high-rise residential buildings with central hot water systems are required to achieve 5% enhanced energy performance beyond State Energy Code (Title 24, Part 6) requirements. Under the prescriptive option for high-rise hot water performance, new high-rise residential buildings that install a mixed fuel central hot water system must meet additional requirements related to solar water-heating. All-electric central hot water systems do not have additional requirements beyond State Code under the prescriptive option.
Reason/Benefit:	High-efficiency central water heating systems, including heat pump water heaters (HPWH) and solar thermal systems, significantly reduce building energy use and greenhouse gas emissions. The City's General Plan and Climate Action Plan call for improved building energy efficiency in new buildings.
Cost-Effectiveness:	According to the 2022 Multifamily New Construction Cost-Effectiveness Study, the performance and prescriptive options are cost-effective in the City of San Diego.[1] Under the performance option, builders using an all-electric heat pump hot water heater (HPWH) achieve immediate savings at installation compared to minimum State Energy Code requirements, which call for an electric HPWH plus a back-up gas-powered system (additional energy efficiency measures may also be needed to meet the required energy performance). Under the prescriptive option, builders using a gas-powered hot water heater would be required to also install a solar-thermal system. The payback period for the prescriptive option could be up to 30 years. Overall, an all-electric HPWH under the performance option results in significantly greater savings than a mixed fuel (gas and solar thermal) package under the prescriptive option due to the avoided cost of a gas-powered system. Amendments to the State Energy Code affecting allowed energy use must be "cost-effective" as measured using a benefit-to-cost ratio. "Benefit" is defined as the total value of energy savings over a 30-year lifetime and "cost"

[1] The City of San Diego is located in Climate Zones 7 and 10.

is defined as initial incremental cost, any additional maintenance costs, and replacement costs of complying with the amendment. A measure is cost-effective when the value of the benefits exceeds the costs over the lifecycle of the analysis (i.e., a ratio of at least 1.0).[2] The California Codes and Standards Program produces cost-effectiveness studies to support findings that local amendments to the Energy Code are cost-effective.

Proposed Code Language:

§1410.0402 Central Water Heating in Residential Buildings

(a) Section 4.201.1.2 is added to the California Green Building Standards Code pursuant to Section 1410.0106 of the San Diego Municipal Code in accordance with Section 1410.0402 (b).

(b) 4.201.1.2 Central Water Heating in High Rise Residential Buildings. For high-rise residential buildings with a proposed central water-heating systems serving multiple dwelling units, the proposed building design shall comply with the additional requirements outlined below for either the performance approach or the prescriptive approach for the climate zone in which the building is located. Climate zones are designated in the reference to the 2025 California Energy Code, Title 24, Part 6 (Energy Code) reference titled "Joint Appendix JA2—Weather/Climate Data".

(1) 4.201.2.1 Performance Approach. A Multifamily building complying with the performance approach is deemed to comply with Section 4.201.1.2 if the proposed building design has an Energy Budget that is not greater than 95 percent of the "Energy Budget" for the Standard Design Building as calculated utilizing compliance software certified by the California Energy Commission.

(2) 4.201.1.2.2 Prescriptive Approach. A Multifamily building that complies with the prescriptive standards shall be designed, constructed, and equipped to meet the following additional requirement:

(A) Domestic hot water systems.

Domestic hot water systems. When a gas or propane fired central water heating system serving multiple dwelling units is provided, the water-heating system shall also include a solar water-heating system meeting the installation criteria specified in the Energy Code, reference titled "Residential Appendix RA4" and

[2] The benefits and costs may be measured from either the billpayer's or society's perspective. The billpayer's test simply examines cash flows to the owner/occupant. The societal test uses an estimate of the overall societal savings as the benefit (including factors like the value of emissions reductions and energy grid impacts), instead of just the energy bill savings. Source: Primer: The Local Government Reach Code Process (2024). Available at: https://localenergycodes.com/download/1895/file_path/fieldList/Reach%20Codes%20Primer.pdf

shall provide a minimum solar savings fraction of 0.35 in Climate Zone 7, or a minimum solar savings fraction of 0.50 in Climate Zone 10.