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Acknowledgments

The Building Energy Efficiency Standards (Energy Standards) were first adopted and put into effect in 1978 and have been updated periodically in the intervening years. The Energy Standards are a unique California asset that have placed the State on the forefront of energy efficiency, sustainability, energy independence, and climate change issues, and have provided a template for national standards within the United States as well as for other countries around the globe. They have benefitted from the conscientious involvement and enduring commitment to the public good of many persons and organizations along the way. The 2019 Energy Standards development and adoption process continues a long-standing practice of maintaining the Standards with technical rigor, challenging but achievable design and construction practices, public engagement, and full consideration of the views of stakeholders.

2019 is a major step towards meeting the Zero Net Energy (ZNE) goal by the year 2020 and is the last of three updates to move California toward achieving that goal.

The 2019 Energy Standards revision and the supporting documents were conceptualized, evaluated and justified through the excellent work of Energy Commission staff and consultants working under contract to the Energy Commission, supported by the utility-organized Codes and Standards Enhancement (CASE) Initiative, and shaped by the participation of over 150 stakeholders and the contribution of over 1,300 formal public comments.

We would like to acknowledge Commissioner Andrew McAllister and his adviser, Martha Brooks, P.E. for their unwavering leadership throughout the standards development. Payam Bozorgchami, P.E., who served as the project manager and senior engineer; Bill Pennington, Special Advisor to the Efficiency Division, who provided overall guidance and contributed to the technical content of the Standards documents; Mazi Shirakh, P.E., who served as the senior engineer and senior technical lead for solar photovoltaic standards; Christopher Meyer, who served as the Manager for the Buildings Standards Office; Peter Strait, who served as the supervisor for the Standards Development Unit; Todd Ferris, who served as the supervisor for the Standards Tools Unit, Rebecca Westmore, Matt Chalmers, Jacqueline Moore and Galen Lemei, who provided legal counsel; and technical staff contributors of the Building Standards office including Mark Alatorre, P.E.; Courtney Jones; Larry Froess, P.E.; Simon Lee P.E; Jeff Miller, P.E; Ronald Balneg; Adrian Ownby; Dee Anne Ross; Michael Shewmaker; Alexis Smith; Danny Tam; Gabriel Taylor, P.E.; RJ Wichert; Thao Chau; Ingrid Neumann; The Standards Outreach and Education Unit under the supervision of Christopher Olvera; Andrea Bailey; Amie Brousseau; Paula David; Kelly Morairty; Javier Perez; Daniel Wong, P.E. The Standards Compliance Office, Joe Loyer; Rashid Mir, P.E; Lea Haro who served as the supervisor of the Compliance and Enforcement Unit; Judy Roberson Veronica Olvera; and Tav Commins; Energy Commission editors office managed by Sandy Louey and including Carol Robinson; Amber Beck; Albert Lundeen; Lana McAllister;

Edward Ortiz; and Michael Ward, and the Energy Commission Hotline staff and Web Team.

Key Energy Commission and CASE consultants included NORESO, Bruce Wilcox, Benya Lighting Design, Frontier Energy, McHugh Energy, Energy Solutions. The CASE Initiative is supported by a consortium of California utility providers which includes the Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas and Electric Company, Southern California Gas Company, the Sacramento Metropolitan Utility District, and the Los Angeles Department of Water and Power.

Abstract

The Building Energy Efficiency Standards were first adopted in 1976 and have been updated periodically since then as directed by statute. In 1975 the Department of Housing and Community Development adopted rudimentary energy conservation standards under their State Housing Law authority that were a precursor to the first generation of the Standards. However, the Warren-Alquist Act was passed one year earlier with explicit direction to the Energy Commission (formally titled the State Energy Resources Conservation and Development Commission) to adopt and implement the Standards. The Energy Commission's statute created separate authority and specific direction regarding what the Standards are to address, what criteria are to be met in developing the Standards, and what implementation tools, aids, and technical assistance are to be provided.

The Standards contain energy and water efficiency requirements (and indoor air quality requirements) for newly constructed buildings, additions to existing buildings, and alterations to existing buildings. Public Resources Code Sections 25402 subdivisions (a)-(b) and 25402.1 emphasize the importance of building design and construction flexibility by requiring the Energy Commission to establish performance standards, in the form of an "energy budget" in terms of the energy consumption per square foot of floor space. For this reason, the Standards include both a prescriptive option, allowing builders to comply by using methods known to be efficient, and a performance option, allowing builders complete freedom in their designs provided the building achieves the same overall efficiency as an equivalent building using the prescriptive option. Reference Appendices are adopted along with the Standards that contain data and other information that helps builders comply with the Standards.

The 2019 update to the Building Energy Efficiency Standards focuses on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings. The most significant efficiency improvements to the residential Standards include the introduction of photovoltaic into the prescriptive package, improvements for attics, walls, water heating, and lighting. The most significant efficiency improvements to the nonresidential Standards include alignment with the ASHRAE 90.1 2017 national standards. The 2019 Standards also include changes made throughout all of its sections to improve the clarity, consistency, and readability of the regulatory language.

Public Resources Code Section 25402.1 also requires the Energy Commission to support the performance standards with compliance tools for builders and building designers. The Alternative Calculation Method (ACM) Approval Manual adopted by regulation as an appendix of the Standards establishes requirements for input, output and calculational uniformity in the computer programs used to demonstrate compliance with the Standards. From this, the Energy Commission develops and makes publicly available free, public domain building modeling software in order to enable compliance based on modeling of building efficiency and performance. The

ACM Approval Manual also includes provisions for private firms seeking to develop compliance software for approval by the Energy Commission, which further encourages flexibility and innovation.

The Standards are conceptually divided into three basic sets. First, there is a basic set of mandatory requirements that apply to all buildings. Second, there is a set of performance standards – the energy budgets – that vary by climate zone (of which there are 16 in California) and building type; thus the Standards are tailored to local conditions, and provide flexibility in how energy efficiency in buildings can be achieved. Finally, the third set constitutes an alternative to the performance standards, which is a set of prescriptive packages that provide a recipe or a checklist compliance approach.

Keywords:

California Energy Commission	Mandatory	Envelope Insulation
California Building Code	Prescriptive	HVAC
California Building Energy Efficiency Standards	Performance	Building Commissioning
	Time Dependent	Process Load
Title 24, Part 6	Valuation	Refrigeration
2016 Building Energy Efficiency Standards	TDV	Data Center
	Ducts in Conditioned Spaces	Exhaust
Residential	High Performance Attics	Compressed Air
Nonresidential	High Performance Walls	Acceptance Testing
Newly Constructed	High Efficacy Lighting	Data Collection
Additions and Alterations to Existing Buildings	Water Heating	Cool Roof
	Windows	On-site Renewable