DOCKETED	
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Project Title:	2022 Energy Code Compliance Manuals and Forms
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Document Title:	Presentation - 2022 Single-family, Nonresidential and Multifamily Compliance Manuals
Description:	December 7, 2021 Staff Presentation Provided at the 2022 Energy Code Compliance Manuals and Compliance Documents Workshop
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Docketed Date:	12/8/2021

2022 Single-family, Nonresidential and Multifamily Compliance Manuals

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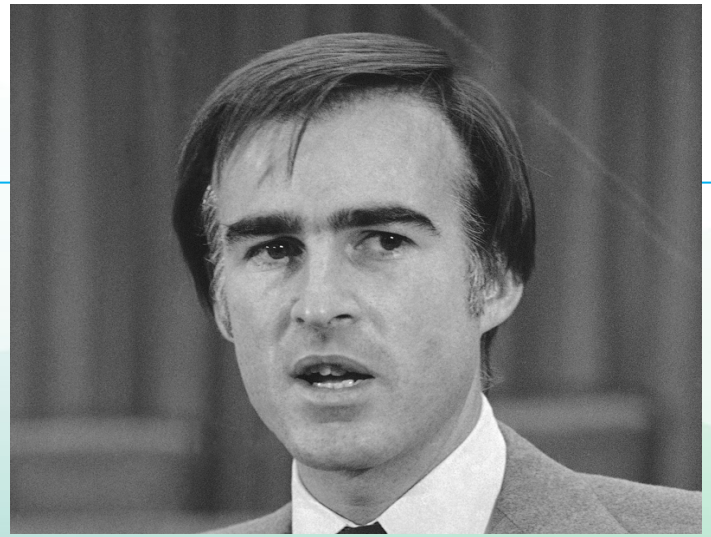
December 7, 2021

Always Start with a History

Authority & Process

Public Resources Code (PRC 25402): Reduction of wasteful, uneconomic, inefficient, or unnecessary consumption of energy

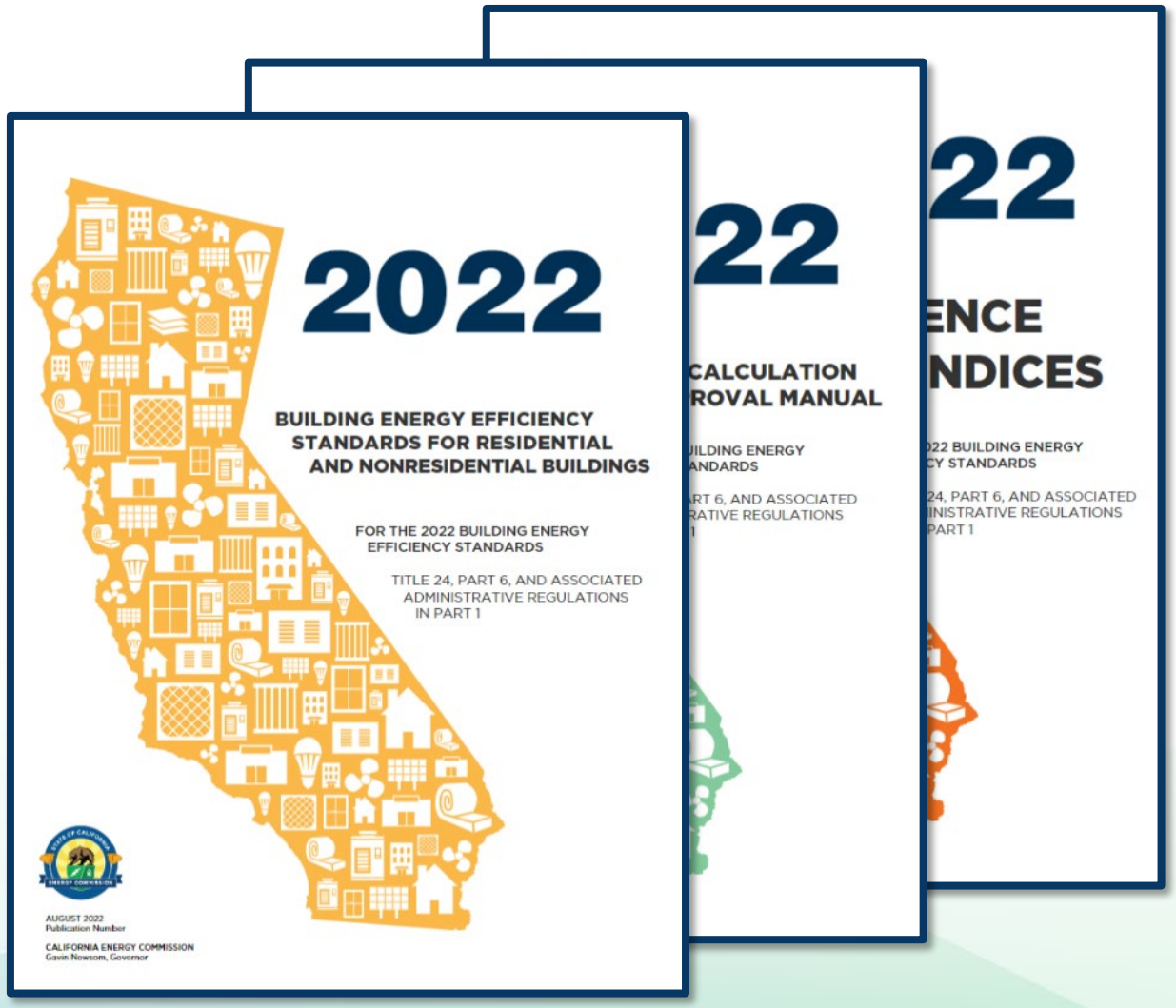
- (a)(1) Prescribe, by regulation, lighting, insulation, climate control system, and other building design and construction standards that increase the efficiency in the use of energy and water…
- Warren Alquist Act Signed into law in 1974 by Governor Ronald Reagan and launched by Governor Jerry Brown in 1975 which mandates updates Building Efficiency Standards and requires the building departments to enforce them through the permit process.



2022 Energy Code Adopted!

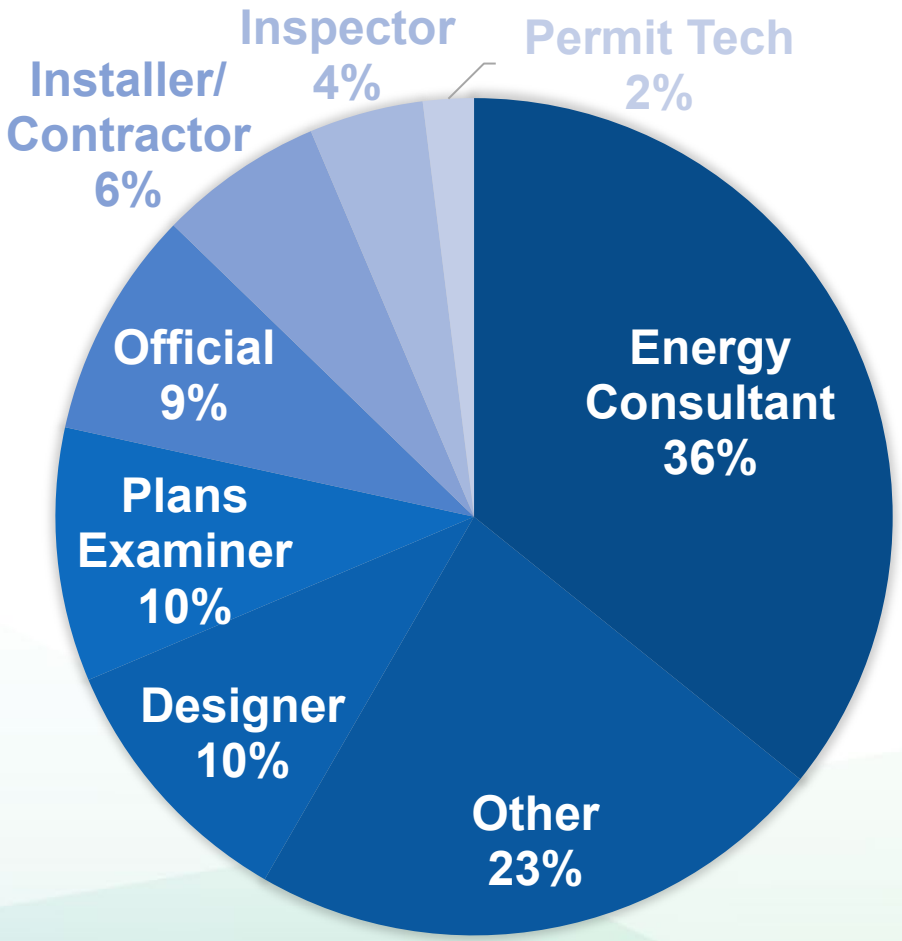
Parts 1 and 6

- Adopted August 11, 2021
- Effective January 1, 2023



Support Resources Survey

- In partnership with the CA Statewide Utility Codes & Standards Program
- 205 Responses to Date
- Top 5 Most Useful Resources
  1. Energy Code (Title 24, Part 6)
  2. Compliance Manuals
  3. Compliance Forms
  4. Reference Appendices
  5. CBECC-Software



Workshop Focus

Compliance Manuals serve as reference guides intended to aid professionals with compliance and enforcement of the recently adopted 2022 Energy Code

This workshop is NOT about:

- 2022 Code Language (Express Terms)
- Software: CBECC-Res & CBECC-Com
- Alternative Calculation Method Reference Manuals
- 2025 Code Cycle Planning

Compliance Manuals Key Users

- Architects
- Building Owners/Contractors
- Energy Consultants
- Enforcement Agencies
- Engineers
- Third-Party Verifiers
- Others from the Public

Timeline

DATE	MILESTONES
November 24, 2021	Start Public Comment on the 2022 Compliance Manuals (Not ACM)
December 7, 2021	Workshop on the 2022 Compliance Manuals (Not ACM)
January 7, 2022	End of Public Comment period on Compliance Manual
February – March 2022	ACM Reference Manual Workshop and Compliance Documents
May 11, 2022	Approval of the 2022 Compliance Manuals at a Business Meeting
May 11, 2022	Approval of the 2022 ACM Reference Manual and Software
On Going	Outreach and Education
January 1, 2023	Effective Date of 2022 Energy Codes

https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber= 21-BSTD-04

Stay Connected

Receive Energy Code updates

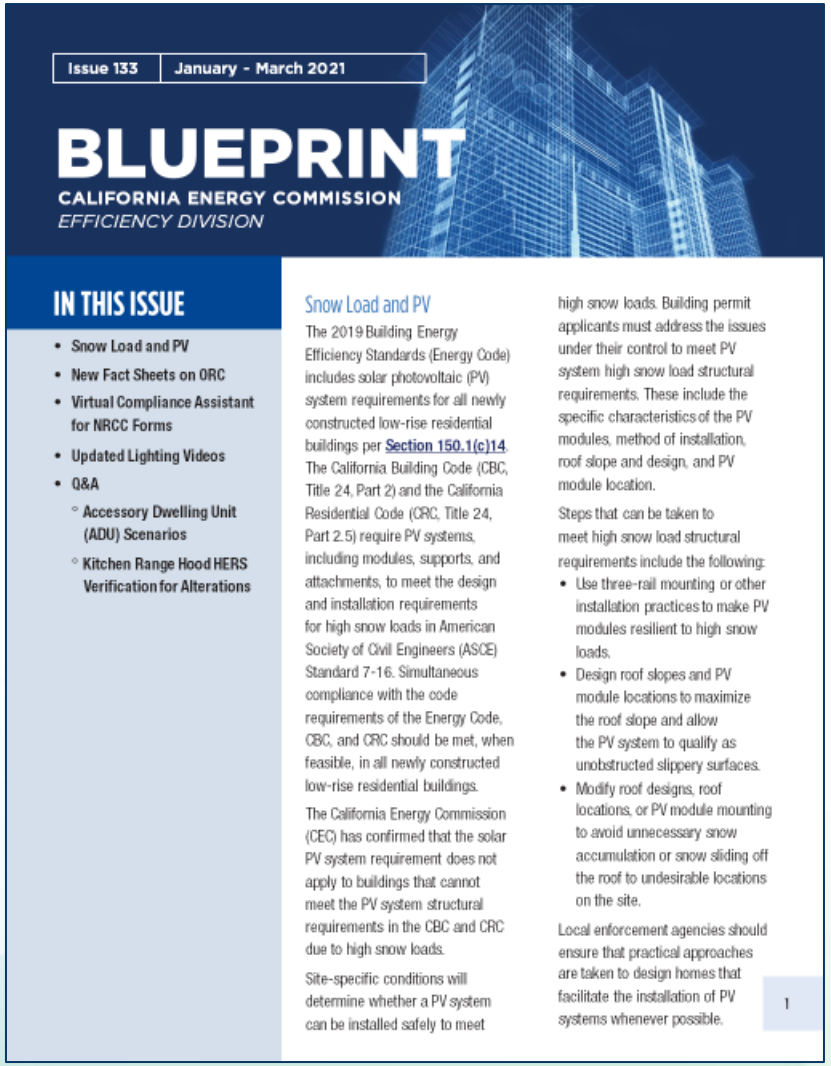
- Subscribe to Efficiency Division emails
  - Appliances
  - Blueprint
  - Building Standards
- Respond to confirmation email

Follow the California Energy Commission

Blueprint Newsletter

Energy Code Newsletter

- Published quarterly
- Updates
- Clarifications
- Frequently asked questions



Issue 133 | January - March 2021

BLUEPRINT

CALIFORNIA ENERGY COMMISSION

EFFICIENCY DIVISION

IN THIS ISSUE

- Snow Load and PV
- New Fact Sheets on ORC
- Virtual Compliance Assistant for NRCC Forms
- Updated Lighting Videos
- Q&A
  - Accessory Dwelling Unit (ADU) Scenarios
  - Kitchen Range Hood HERS Verification for Alterations

Snow Load and PV

The 2019 Building Energy Efficiency Standards (Energy Code) includes solar photovoltaic (PV) system requirements for all newly constructed low-rise residential buildings per Section 150.1(c)14. The California Building Code (CBC, Title 24, Part 2) and the California Residential Code (CRC, Title 24, Part 2.5) require PV systems, including modules, supports, and attachments, to meet the design and installation requirements for high snow loads in American Society of Civil Engineers (ASCE) Standard 7-16. Simultaneous compliance with the code requirements of the Energy Code, CBC, and CRC should be met, when feasible, in all newly constructed low-rise residential buildings.

The California Energy Commission (CEC) has confirmed that the solar PV system requirement does not apply to buildings that cannot meet the PV system structural requirements in the CBC and CRC due to high snow loads.

Site-specific conditions will determine whether a PV system can be installed safely to meet high snow loads. Building permit applicants must address the issues under their control to meet PV system high snow load structural requirements. These include the specific characteristics of the PV modules, method of installation, roof slope and design, and PV module location.

Steps that can be taken to meet high snow load structural requirements include the following:

- Use three-rail mounting or other installation practices to make PV modules resilient to high snow loads.
- Design roof slopes and PV module locations to maximize the roof slope and allow the PV system to qualify as unobstructed slippery surfaces.
- Modify roof designs, roof locations, or PV module mounting to avoid unnecessary snow accumulation or snow sliding off the roof to undesirable locations on the site.

Local enforcement agencies should ensure that practical approaches are taken to design homes that facilitate the installation of PV systems whenever possible.

1

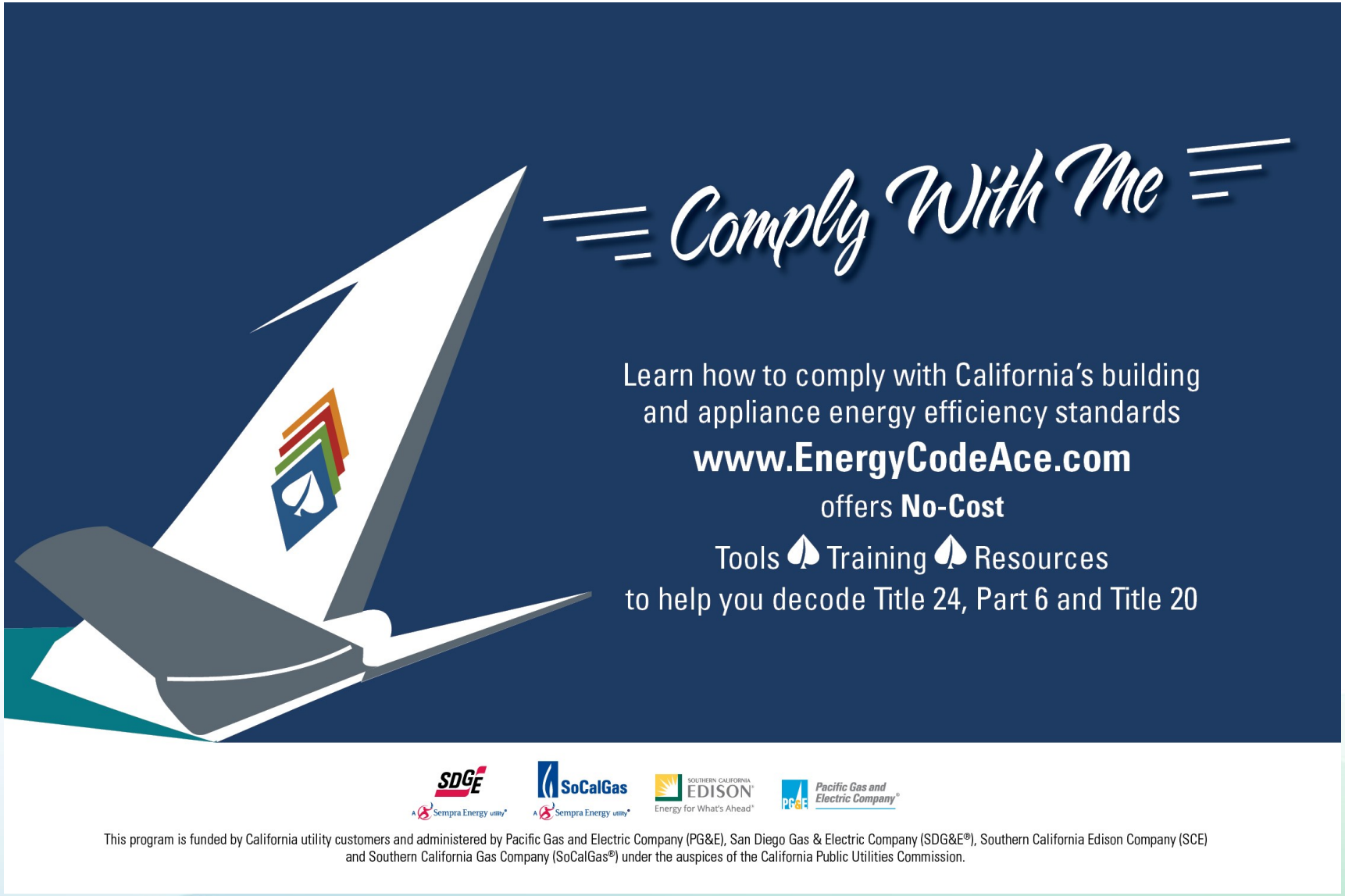
Online Resource Center

Online Resource Center

Educational documents and training information for building communities and enforcement agencies to assist with building energy standards compliance.

LEARN MORE >

Energy Code Ace



Hotline Contact Information

Monday through Friday

8:00 a.m. to 12:00 p.m.

1:00 p.m. to 4:30 p.m.

Call

800-772-3300 in CA

916-654-5106 outside CA

Email

Title24@energy.ca.gov

Written Comments

We strongly encourage submitting written comments via e-file.
Comments on the proposed 2021 Energy Code can be submitted to:
https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber= 21-BSTD-04

Comments can also be submitted physically or by e-mail, here:

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 21-BSTD-04
715 P Street
Sacramento, CA 95814-5512
Docket@energy.ca.gov

Final deadline for written comments is January 7, 2022 by 5:00 PM

Questions?

What's New In The Compliance Manuals

- Updated to complement the newly adopted 2022 Energy Codes
- Work in progress to meet the ADA requirement
- Restructured the Multifamily placed in Nonresidential Compliance Manual
- These are not the ACM Reference Manuals

Single-Family Compliance Manual

Single-Family Compliance Manual Chapters

CHAPTER 1 - Introduction

CHAPTER 2 - Compliance and Enforcement

CHAPTER 3 - Building Envelope Requirements

CHAPTER 4 - Building HVAC Requirements

CHAPTER 5 - Water Heating

CHAPTER 6 - Lighting

CHAPTER 7 - Photovoltaic, Community Shared Solar, Battery Storage, and Solar Ready Buildings

CHAPTER 8 - Performance Method

CHAPTER 9 - Additions, Alterations, and Repairs

CHAPTER 10 - Electric Ready Requirements (new chapter)

APPENDIX A - Compliance Documents

APPENDIX B - Climate Zone

APPENDIX C - RESERVED

APPENDIX D - Eligibility Criteria for Radiant Barriers

APPENDIX E - NATURAL GAS APPLIANCE TESTING (NGAT) STANDARDS

APPENDIX F - Field Verification of Zonally Controlled System

APPENDIX G - Verification of the Existing Features of a Home for Existing + Addition + Alteration Performance Approach

APPENDIX H - Demand Responsive Controls

Chapter 1 - Introduction

- Single-family manual scope will focus on single-family residence
- Change to the single fuel baseline
- New EDR – Details in Chapter 8
- Changes to mandatory, prescriptive, and performance requirements

Chapter 2 - Compliance and Enforcement

Compliance and Enforcement

- Overall focus – newly constructed single-family residences
- Refocus on the ICC permitting process
- Use of compliance documents to assist AHJs
- Manufacturer Certified Devices
- HERS Program

Chapter 3 - Building Envelope Requirements

- Updated to complement the newly adopted Energy Codes
- Removed Role Icons which was set in place in 2019

Designer

Plans Examiner

Contractor/Installer

Building Inspector

HERS Rater/ATT

Energy Consultant

Chapter 4 - Building HVAC Requirements

Mandatory Features and Devices - §150.0

- Ducts located in conditioned space can be uninsulated if specific conditions are met.
- Updated ventilation requirements based on 2019 ASHRAE 62.2 and added clarification language.
- Updated local exhaust requirements for kitchen range hoods.
- Filter racks or grilles must use a gasket or sealing to prevent air from bypassing the filter.

Chapter 4 - Building HVAC Requirements (Continue)

Prescriptive and Performance Compliance Approaches – §150.1

- Updated to complement the newly adopted Energy Codes
  - Prescriptive requirement for heat pump space heating for climate zones 3, 4, 13, and 14.
- Incorporation of Variable Capacity Heat Pump Compliance Option

Chapter 5 – Water Heating

Prescriptive and Performance Compliance Approaches – §150.1

- Updated to complement the newly adopted Energy Codes
  - Prescriptive requirement for HPWH with exception for gas instantaneous in Climate Zones 3, 4, 13, and 14
  - Updated mandatory electric ready requirements

Chapter 6 – Lighting

Mandatory Requirements Updates & Changes

- Removed and refined the examples about multifamily lighting requirements. Revised and clarified the lighting requirements in Section 150.0's in the 2022 residential lighting chapter.
- Clarified residential luminaires must be high luminous efficacy. Updated the manual table based on Table 150.0-A. Updated the language related to recessed luminaires installed on ceilings.
- Updated the language about residential indoor lighting controls requirements.
- Updated the language about residential parking garage lighting requirements.
- JA8 luminaires and light sources: Updated the manual language about the no-longer-required lumen maintenance and rated-life requirements (was in Joint Appendix JA8). Elevated temperature test is optional for 2022 Energy Code but is still mandatory for some light sources.

Questions for Chapters 1-6?

Chapter 7 – PV, Community Solar, Battery Storage and Solar Ready

Community Shared Solar Electric Generation and Storage Systems

- Provide clarity of the requirement

Mandatory Measures

- New Energy Storage System (ESS) ready requirement for all single-family buildings with one or two dwelling units.

Prescriptive & Performance Compliance

- Revised exceptions to the PV requirements
- New option for standalone battery storage in JA12

Chapter 8 – Performance Method

- Energy Design Rating 1 (EDR1) vs. Energy Design Rating 2 (EDR2)
- Changes affecting the standard design efficiency
- “New” HERS requirements
- Removed sections regarding mixed occupancy and multifamily buildings

Chapter 9 – Additions, Alterations and Repairs

- New language clarifying when ventilation requirements must be met for additions and alterations.
- Trigger for duct insulation and duct sealing requirements has been revised to 25 feet of altered ducts, and when any length of duct is extended to serve an addition.
- Updated duct insulation levels.
- Duct leakage target is now 10 percent, or leakage to outside 7 percent.
- Electric resistance space heating is prohibited.

Chapter 10 – Electric Ready Requirements

New Chapter for electric ready requirements in single-family

- New mandatory requirement for gas space heating, cooking, and clothes drying.
- Electric ready requirements for gas water heaters have been revised and expanded.

Questions for Chapters 7-10?

Appendix A – Compliance Documents

Prescriptive Compliance
Residential

2019

- HERS Registries

2022

- HERS Registries
- Multifamily in new group of MF compliance documents

Questions for Compliance Docs?

Appendix B Through H

- **APPENDIX B -** Climate Zone
- **APPENDIX C -** RESERVED
- **APPENDIX D -** Eligibility Criteria for Radiant Barriers
- **APPENDIX E -** NATURAL GAS APPLIANCE TESTING (NGAT) STANDARDS
- **APPENDIX F -** Field Verification of Zonally Controlled System
- **APPENDIX G -** Verification of the Existing Features of a Home for Existing + Addition + Alteration Performance Approach
- **APPENDIX H -** Demand Responsive Controls

Nonresidential & Multifamily

Nonresidential and Multifamily Compliance Manual

CHAPTER 1 - Introduction

CHAPTER 2 - Compliance and Enforcement

CHAPTER 3 - Building Envelope Requirements

CHAPTER 4 - Mechanical Systems

CHAPTER 5 - Indoor Lighting

CHAPTER 6 - Outdoor Lighting

CHAPTER 7 - Sign Lighting

CHAPTER 8 - Electrical Power Distribution

CHAPTER 9 - Photovoltaic, Community Shared Solar, Battery Storage, and Solar Ready Buildings

CHAPTER 10 - Covered Processes

CHAPTER 11 - Multifamily

CHAPTER 12 - Performance Approach

CHAPTER 13 - Building Commissioning guide

CHAPTER 14 - Acceptance Requirements

APPENDIX A - Compliance Documents

APPENDIX B - Excerpts from the Appliance Efficiency Regulations

APPENDIX C - Climate Zone

APPENDIX D - Demand Responsive Controls

Chapter 1 - Introduction

- Changes to mandatory, prescriptive, and performance requirements
- New Covered Processes and revisions to existing
- Multifamily Chapter scope included in this manual for both low rise and high rise
- Revisions to documents to include new forms for Low Rise Multifamily

Chapter 2 – Compliance And Enforcement

Updates are ongoing, planned updates include:

- Introduction – ICC permitting process
- HERS Registry and HERS Raters
- ATTCP Acceptance Test Process
    - Mandatory use of ATTs
- List of all required Compliance Documents

Chapter 3 – Building Envelope

- Updated to complement the newly adopted Energy Code requirements
- Added language to clarify the requirements for roof alterations:
  - roof replacement vs. a roof recover
- Removed section addressing aggregate default roof reflectance properties
- Revised section regarding RSHGC and shading factor to include exterior horizontal slats

Chapter 4 – Mechanical Systems

Updates to the Compliance Manual for the 2022 Code:

New Content:

- Fan Energy Index
- New fan power requirements
- Exhaust Air Heat Recovery
- Dedicated Outside Air Systems
- High-Capacity Space Heating Gas Boiler System

Content with revisions:

- VAV Airflow Deadband Controls
- Expansion of Airside Economizer Requirements
- Exception for controlled environment horticulture using carbon enrichment
- Duct leakage testing requirements
- Expansion of Occupant Sensor Ventilation Control (Occupied-Standby)

Restructuring:

- Remove and relocate content related to High Rise Residential

Questions for Nonres Chapters 1-4?

Chapter 5 – Indoor Lighting

Mandatory Measures

- Added new content and examples about the new mandatory occupant sensing controls requirements
- Revised the daylighting control examples for Automatic daylighting controls requirements to reduce controlled lighting power to 10 percent or less
- New mandatory requirement that automatic daylighting controls for secondary sidelit daylit zones (was a prescriptive requirement)

Other Updates & Changes

- Revised the luminaire classification examples about the luminaires with line voltage lamp holders, LED tape lighting, and LED linear lighting.
- Added lighting application examples pertaining to LED tape lighting, cove lighting and corridor lighting.

Chapter 5 – Indoor Lighting(continued)

Other Updates & Changes

- Multilevel lighting controls requirements table and example
- Power adjustment factors for
  - Daylight continuous dimming plus OFF controls,
  - Daylighting devices and
  - Demand responsive lighting controls
- Revised the examples about the lighting power compliance methods
  - Complete building ,the area category, and tailored
  - Increase flexibility and additional lighting power allowances in the Area Category Method combined with general lighting power
- Multifamily Restructuring - referencing nonresidential indoor lighting chapter requirements for common spaces

Chapter 6 – Outdoor Lighting

Mandatory Measures

- New content on rural, urban cluster (new) , and urban areas for lighting zone 1(LZ1) thru lighting zone 4(LZ4); updated the content on outdoor lighting zone designations LZ1 thru LZ4 and the determination process for outdoor lighting zones
- Revised the content on outdoor luminaire requirements to reflect the new term “shielding”, these terms refer to the same luminaire distribution features
- New lighting power allowances for security camera installations
- Added references to the new Section 11.6 for outdoor lighting requirements pertaining to multifamily buildings.
- Updated the outdoor lighting table to match up with the 2022 general hardscape lighting power allowance values

Other Updates & Changes

- Updated content to match the 2022 Energy Code requirements (including lighting power allowances, luminaire requirements and lighting controls requirements)

Chapter 7 – Sign Lighting

Clarification and cleanup

- No significant changes to this chapter
- New multifamily chapter in the manual covering sign lighting requirements for multifamily buildings

Chapter 8 – Electric Power Distribution

Mandatory Measures

- Added new article for the demand response requirements related to the controlled receptacles
- Modified the “Compliance documentation” article to include the new acceptance test requirements for demand responsive controlled receptacles

Chapter 9 – Photovoltaic, Community Shared Solar, Battery Storage, and Solar Ready Buildings

Clarification and cleanup

- Chapter has been repurposed from solar ready to include PV and Battery Storage
- Provided detail on the prescriptive requirements for PV and battery storage for certain nonresidential building types
- Provided details on community solar and storage systems

Questions for Nonres Chapters 5-9?

Chapter 10 – Covered Processes

Computer rooms, commercial refrigeration and refrigerated warehouses, and compressed air covered processes were included in previous versions of the Energy Code, but updates in 2022 includes additional requirements for these covered processes.

Computer Rooms:

- Minimum efficiencies for alternating current uninterruptible power supplies

Commercial Refrigeration and Refrigerated Warehouses Mandatory Measures:

- Transcritical CO2 refrigerated systems minimum condensing temperature requirements
- Transcritical gas cooler requirements
- Transcritical CO2 optimized head pressure control
- Added section to describe automatic door closers in refrigerated warehouses

Compressed Air System Mandatory Measures:

- Energy and air demand monitoring systems
- Leak testing requirements for compressed air piping
- Pipe sizing requirements

Chapter 10 – Covered Processes

Controlled environment horticulture and steam traps are covered processes that were added to the Energy Code during the 2022 update.

Controlled Environment Horticulture Mandatory Measures:

- Photosynthetic Photon Efficacy for horticultural lights
- Lighting system controls
- Dehumidifier standards
- Conditioned greenhouse envelope standards

Steam Trap Mandatory Measures:

- Steam trap monitoring system
- Steam trap strainer and blow-off valve requirements

Questions for Nonres Chapter 10?

Chapter 11 – Multifamily

New chapter dedicated to multifamily requirements

- Encompasses requirements for both low-rise and high-rise multifamily buildings
- Identifies multifamily-specific compliance and enforcement requirements
- Expands on multifamily third-party verification measures and acceptance testing for Low-Rise and High-Rise Residential
- Clarification of Testing of Hers measures requirements for multifamily greater than 3 stories

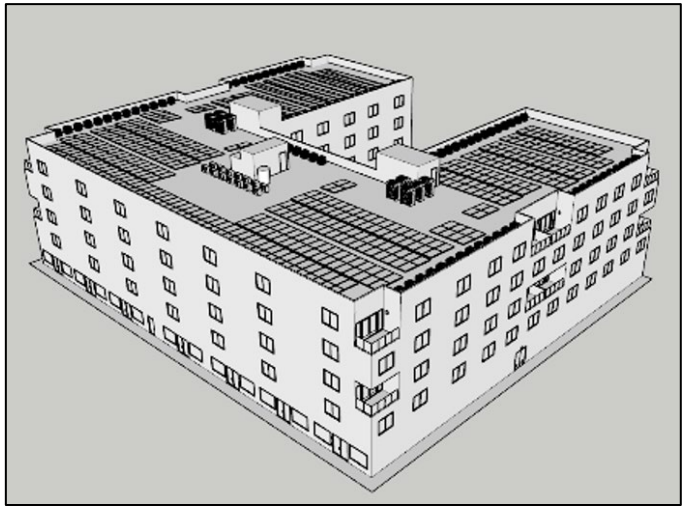
Dwelling unit requirements vs. common use areas

- Requirements specific to dwelling units included in this chapter
- Where common use area requirements are identical to those for nonresidential buildings, chapter refers to nonresidential chapters

Chapter 11 – Multifamily

"Code In Practice" Examples Projects Added

- Example projects created within subsections to demonstrate compliance
  - Two-story garden complex
  - Five-story mixed-use building
- Developed to evaluate possible compliance options
- Identify which mandatory and prescriptive requirements apply



Questions for Multifamily?

Chapter 12 – Performance Approach

Clarification and cleanup

- Renumbered to Chapter 12 (previously 11) after adding Multifamily Chapter
- General language updates to match current software processes and terminology
- Application Scenarios section – aligned language with current NRACM Reference Manual and added detail

New material

- Added multifamily Energy Code references alongside nonresidential references
- New section – Building Performance Metrics and sub-section Hourly Source Energy (HSE)
- PV and Battery Storage – general input requirements

Chapter 13 – Building Commissioning Guide

Clarification and cleanup

- Renumbered to Chapter 13 because of new Multifamily Chapter; previously Chapter 12
- Updated to complement the newly adopted 2022 Energy Codes

Chapter 14 – Acceptance Requirements

Clarification

- Renumbered to Chapter 14 because of new Multifamily Chapter; previously Chapter 13
- Similar to Residential Manual Chapter 3, removed Role Icons which was set in place in 2019

New Material

- Summarized changes to the acceptance testing requirements for the 2022 Energy Code.
- Addition of new requirements for Acceptance Test Technician Certification Providers in §10-103.1 and §10-103.2
- Electronic database systems
- Compliance document recording and repository reporting requirements

Questions for Nonres Chapters 12-14?

Appendix A – Compliance Documents

Prescriptive Compliance
Multifamily

2019

- Mix of Residential compliance documents and Nonresidential compliance documents
- Dynamic PDF
- VCA and EnergyPro
- HERS Registries

2022

- No Dynamic PDF
- VCA and 3rd party tools (non-HERS measures)
- HERS Registries (HERS measures)

Appendix A – Compliance Documents

Prescriptive Compliance
Nonresidential

2019

- Dynamic PDF
- VCA and EnergyPro

2022

- VCA and EnergyPro
  (Multifamily w/o HERS measures)
- HERS Registries
  (6 compliance documents)

Appendix A – Compliance Documents

Performance Compliance

Compliance through modeling software

- CBECC-Com and CBECC-Res
- 3rd Party
  - EnergyPro
  - IES

Appendix B – D

- APPENDIX B - Excerpts from the Appliance Efficiency Regulations
- APPENDIX C - Climate Zone
- APPENDIX D - Demand Responsive Controls:
  - Communication Pathways description updated
  - Update requirements for demand response controls for lighting systems
  - Added description demand response controls for controlled receptacles.

Any Remaining Questions?

Written Comments

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Contact Information

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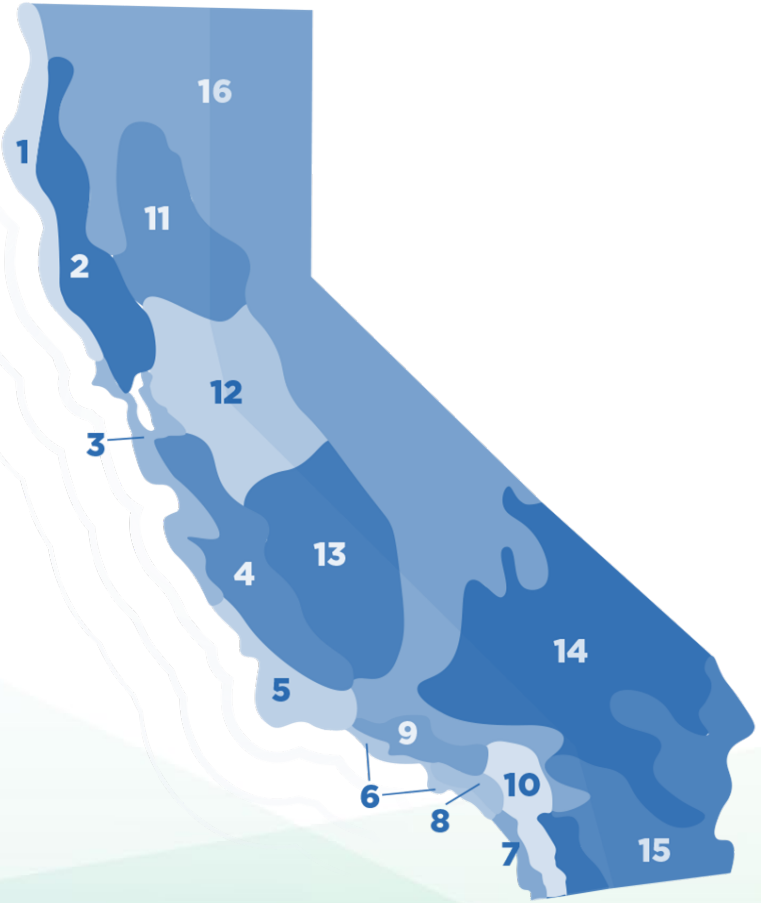

Thank You!