

CHAPTER

3

Arrangement and Format of the Energy Code



The *International Energy Conservation Code (IECC)* acknowledges distinct differences in requirements for commercial and residential buildings; as such, the commercial and residential requirements are organized in separate sections of the code. Each set of provisions is applied separately to buildings within their scope:

- The commercial provisions apply to all buildings that are not included in the definition of residential building. Figure 3-1 shows a shopping center regulated by commercial provisions.
- The residential provisions apply to detached one- and two-family dwellings and townhouses as well as Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane. Figure 3-2 shows three-story townhomes regulated by residential provisions.

Note that the commercial provisions therefore contain requirements for residential buildings four stories or more in height. These scopes are based on the definitions of “Commercial building” and “Residential building,” respectively, in Chapter 2 of each set of provisions. These definitions are reiterated throughout this text.



FIGURE 3-1 Commercial shopping center.



FIGURE 3-2 Residential townhomes.

FORMAT OF THE 2021 IECC

Table 3-1 shows how the commercial and residential provisions of the IECC are divided.

TABLE 3-1 IECC Chapter Topics

CHAPTERS	SUBJECTS
1–2	Administration and definitions
3	Climate zones and general materials requirements
4	Energy efficiency requirements
5	Existing buildings requirements
6	Referenced standards
Appendix CA/RA	Board of appeals
Appendix CB/RB	Solar-ready zone
Appendix CC/RC	Net zero energy

Requirements for climate zones, permits, inspections and code administration are similar for commercial and residential construction, while building envelope, mechanical and lighting requirements greatly differ.

The following is a chapter-by-chapter synopsis of the scope and intent of the provisions of the 2021 IECC and applies to both the commercial and residential energy provisions:

Chapter 1: Scope and Administration. This chapter contains provisions for the application, enforcement and administration of subsequent requirements of the code. In addition to establishing the scope of the code, Chapter 1 identifies which buildings and structures come under its purview. Chapter 1 is largely concerned with maintaining “due process of law” in enforcing the energy conservation criteria contained in the body of the IECC. Only through careful observation of the administrative provisions can the code official reasonably expect to demonstrate that “equal protection under the law” has been provided.

Chapter 2: Definitions. Many code experts agree that the defined terms section is the most important part of any code or standard. Chapter 2 provides definitions for specific words and terms; these definitions generally represent what code users agree to understand as the meaning of such terms when written and appearing in the code provisions. In reading, interpreting and applying code provisions, it is essential to understand that some of the definitions in the IECC are unique to the energy code; these terms are generally shown in italics. Definitions may be added or revised between versions of the IECC to align with other codes or standards or to better represent the term as it is currently understood.

Code Essentials

The 2021 IECC—Commercial includes new or updated definitions for biogas, biomass, fan array, fan nameplate electrical input power, Fan Energy Index, fan system electrical input power, embedded fan, on-site renewable energy and renewable energy resources, among others.

The 2021 IECC—Residential includes new or updated definitions for dwelling unit enclosure area, high-efficacy light sources and renewable energy certificate, among others. ●

Chapter 3: General Requirements. Chapter 3 specifies the climate zones that will serve to establish the exterior design conditions. In addition, Chapter 3 provides interior design conditions that are used as a basis for assumptions in heating and cooling load calculations and provides basic material requirements for insulation and fenestration products.

Chapter 4: Energy Efficiency. Chapter 4 of each set of provisions contains the technical requirements for energy efficiency.

- **Commercial Energy Efficiency.** Chapter 4 of the commercial provisions contains the energy-efficiency-related requirements for the design and construction of most types of commercial buildings and residential buildings greater than three stories in height above grade. This chapter defines requirements for the portions of the building and building systems that impact energy use in new construction and promotes the effective use of energy. In addition to energy conservation requirements for the building envelope, this chapter contains requirements that impact the energy efficiency of HVAC systems, service water heating systems and lighting and electrical power systems. It should be noted, however, that requirements are contained in other codes that have an impact on energy conservation. For instance, requirements for water flow rates are regulated by the IPC.
- **Residential Energy Efficiency.** Chapter 4 of the residential provisions contains the energy-efficiency-related requirements for the design and construction of residential buildings regulated under the IECC. This chapter defines requirements for the portions of the building and building systems that impact energy use in new residential construction and promotes the effective use of energy. The provisions within the chapter promote energy efficiency in the building envelope, heating and cooling system, lighting system and service water heating system of the building.

Chapter 5: Existing Buildings. Chapter 5 of each set of provisions contains the technical energy efficiency requirements for existing buildings. Chapter 5 provisions address the maintenance of buildings in compliance with the code as well as how additions, alterations, repairs and changes of occupancy need to be addressed from the standpoint of energy efficiency. Specific provisions are also provided for historic buildings.

Chapter 6: Referenced Standards. The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 6 contains a comprehensive list of all standards that are referenced in the code. The standards are part of the code to the extent of the reference to the standard. Compliance with the referenced standard is necessary for compliance with the IECC. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the code official, contractor, designer and owner.

Chapter 6 is organized in a manner that makes it easy to locate specific standards. It lists all of the referenced standards, alphabetically, by acronym of the promulgating agency of the standard. Each agency's standards are then listed in either alphabetical or numeric order based on the standard identification. The list also contains the title of the standard; the edition (date) of the standard referenced; any addenda included as part of the ICC adoption; and the section or sections of the code that reference the standard. Figure 3-3 provides an example of a referenced standard.

RESNET	Residential Energy Services Network, Inc. P.O. Box 4561 Oceanside, CA 92052-4561
ANSI/RESNET/ICC 301—2019: Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index R406.4, R406.7.1, R406.7.6	
ANSI/RESNET/ICC 380—2019: Standard for Testing Airtightness of Building, Dwelling Unit and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems R402.4.1.2, R403.3.5	

FIGURE 3-3 Referenced standard example.

Energy Code Essentials: Based on the 2021 International Energy Conservation Code presents the commercial provisions in Chapters 3 [CE], 4 [CE] and 5 [CE] of the IECC in Parts II and III of this book. IECC Chapters 3 [RE], 4 [RE] and 5 [RE] contain the residential provisions and are addressed in Parts IV and V of this book.

APPENDICES

Appendices to the IECC provide options for jurisdictions to adopt and expand the requirements of the IECC; they are not mandatory unless specifically referenced in the adopting ordinances.

You Should Know

Codes and standards are often thought to be very similar documents; however, there are a few key differences between the two:

- A code is a body of laws that helps a city, state or country establish rules of compliance. A code outlines the mandatory provisions for ensuring compliance with the code, and may be prescriptive in nature and detail the exact requirements necessary for compliance or require that a specific performance target be achieved without specifications on how to do so, or both.
- A standard is developed to establish a target of performance. Materials and methods are measured and tested to determine performance and compliance with the applicable standards.

Standards are frequently referenced throughout the building codes. Chapter 6 in both the commercial and residential code provisions lists referenced standards with the publication date, edition year, title and code section referencing it. The specific standard edition provided to demonstrate code compliance must agree with the standard in Chapter 6. The specific code provision applies when there is a conflict between the code and the standard. ●

The IECC provides three appendices for commercial buildings:

- **Appendix CA: Board of Appeals—Commercial.** This appendix is new to the 2021 IECC and provides language for adopting a board of appeals.
- **Appendix CB: Solar-ready Zone—Commercial.** This appendix is intended to encourage the installation of renewable energy systems by preparing buildings for the future installation of solar energy equipment, piping and wiring.
- **Appendix CC: Zero Energy Commercial Building Provisions.** Also new to the 2021 IECC, this appendix requires renewable energy systems of adequate capacity to achieve zero-net-carbon.

The IECC also offers three appendices for residential buildings:

- **Appendix RA: Board of Appeals—Residential.** This appendix is new to the 2021 IECC and provides language for adopting a board of appeals.
- **Appendix RB: Solar-ready Provisions—Detached One- and Two-family Dwellings and Townhouses.** This appendix provides provisions for requiring the space(s) for installing solar systems, providing pathways for connections and requiring adequate structural capacity of roof systems to support the systems.
- **Appendix RC: Zero Energy Residential Building Provisions.** This appendix, also new to the 2021 IECC, enables residential buildings to achieve zero energy consumption over the course of a year.