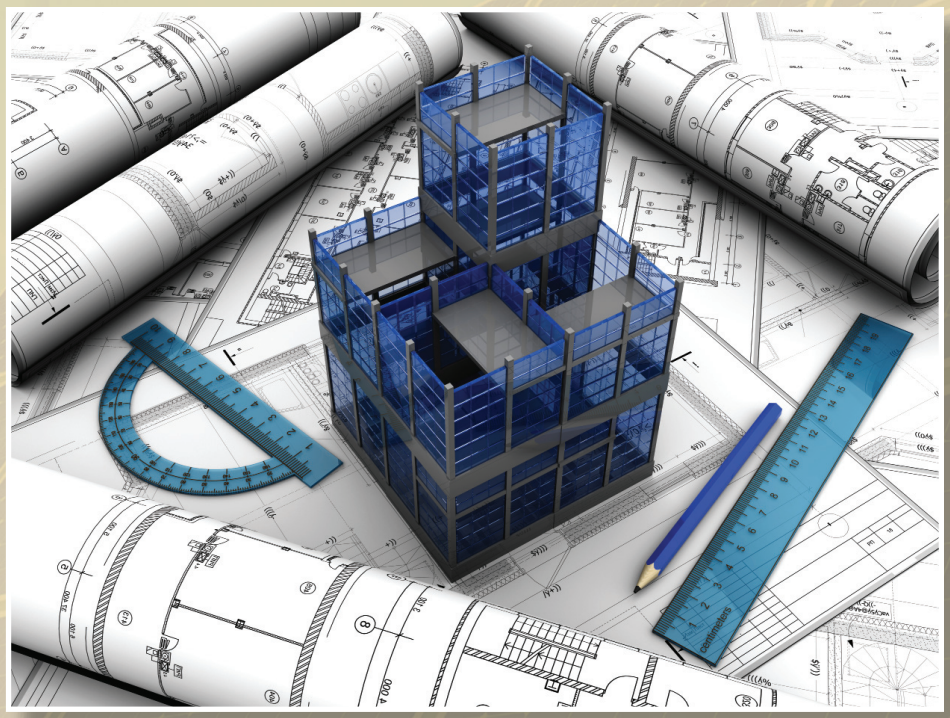
PART

II

General Commercial Energy Provisions



CHAPTER

3

General Commercial Energy Provisions

It is necessary to establish a framework to address the administration, application, and enforcement of the commercial energy provisions set forth in the *International Energy Conservation Code* (IECC), and the *International Building Code* (IBC), among other codes. The code official's responsibilities regarding plan review and inspections, the architect's and engineer's responsibilities concerning document preparation, and the contractor's responsibilities in regard to permits and inspections are clearly stated in the IECC. Code sections C101 and C102 of the IECC, discussed in this section, govern the relationships and understandings between the building department authority and the design and construction community.

SCOPE

These code provisions apply to commercial buildings and building sites, systems, and equipment. An italicized term in the IECC means the word or phrase has a specific meaning in code language and that a specific definition is used to clarify the meaning of that term. Chapter 2 of the IECC lists 123 words with specific definitions to establish the common vocabulary for the commercial energy regulations. *Commercial buildings* in this code are defined as "all buildings that are not included in the definition of *residential building*." Although this may not seem to provide enough information, those familiar with codes recognize this as a pointer to the definition of *residential building*. In the IECC, a residential building "includes detached one- and two-family dwellings and multiple single-family dwellings (townhouses) as well as group R-2, R-3, and R-4 buildings three stories or less in height above grade plane." **[Ref. 202]** This definition is specific to the IECC and is different than the definitions in the IRC and IBC.

As another example, the term *story above grade plane* can be defined by working through several definitions in the IBC. A story whose finished floor above is more than 6 feet above the average grade around the exterior wall of the building or more than 12 feet above grade at any point is considered a *story above grade plane* (Figure 3-1). A *story* is defined as "that portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above." The *grade plane* is "a reference plane representing the average of finished ground level adjoining the building at *exterior walls*." This measurement is used to determine building height. A basement is a story that is mostly below finished ground level.

Classifications of residential occupancies, which are defined as units where people live, eat, and sleep, are found in the IBC. Apartment and condominium buildings are multifamily structures and represent a typical R-2 occupancy. Common R-4 buildings are group homes, small assisted-living facilities, and halfway houses. The shared attribute of these residential uses is that the occupants are "nontransient." A three-story apartment building is not regulated by the commercial energy provisions (Figure 3-2). A three-story hotel is an R-1 building and must comply with the commercial energy provisions.

Thus, if the building uses do not fit into any of the defined descriptions of "residential" or the building is more than three stories in height above grade, the IECC commercial provisions must be applied. Common commercial uses are

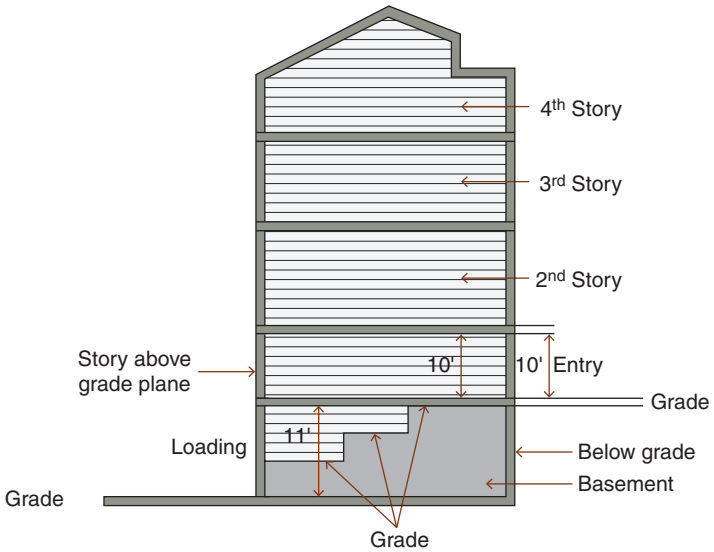


FIGURE 3-1 Story above grade plane

Code Essentials

Chapter 3 of the 2015 *International Building Code* classifies buildings into 10 main Occupancy Classifications of Assembly (A), Business (B), Educational (E), Factory and Industrial (F), High Hazard (H), Institutional (I), Mercantile (M), Residential (R), Storage (S), and Utility and Miscellaneous (U) ●

FIGURE 3-2 A three-story apartment building is not regulated by the commercial energy provisions.

offices, banks, clothing stores, restaurants, bars, retail sales, automobile repair shops and gyms. The IBC occupancy groups are Assembly, Business, Educational, Factory, High-hazard, Institutional, Mercantile, Residential, Storage, and Utility and Miscellaneous. A four-story hotel (Figure 3-3), tall office building (Figure 3-4), fire station (Figure 3-5) and corner store (Figure 3-6) are all regulated by the commercial energy code provisions. **[Ref. C101.5]**

FIGURE 3-3 Four-story hotel

FIGURE 3-4 Office building

FIGURE 3-5 Fire station

FIGURE 3-6 Corner store

INTENT

The intent of the IECC is stated simply in the code: "This code shall regulate the design and construction of buildings for the use and conservation of energy over the life of each building." The energy code regulations provide options for design and construction to accomplish the intent to conserve energy use. These regulations apply to new buildings and building systems, as well as construction projects in existing buildings. The life of a building is difficult to determine and affected by many factors. Whereas some buildings are only meant for a design life of 50 years or so, most government, university and hospital buildings are designed to be useful for hundreds of years. Typically, the longer the intended useful life of a building, the more it costs to build.

FIGURE 3-7 Straw bale insulation

FIGURE 3-8 Straw bale as a building material

Although the IECC lists the most commonly used and standard methods, it is not meant to limit the use of alternative approaches, equipment, or techniques that also conserve energy. If a mechanical, plumbing or electrical system; insulation material; or building envelope technique is not specifically listed as allowed in the code or does not meet the strict letter of the code, it may nonetheless be allowed by the building official, as energy-conserving innovations are encouraged. For example, Figure 3-7 illustrates the use of straw bale as insulation, and Figure 3-8 shows straw bale used as a building material for a school. **[Ref. C101.3]**

You Should Know

The 2015 IECC revised the intent from the "effective use and conservation of energy over the useful life of each building" to the "use and conservation of energy over the life of the building." The deletion of the ambiguous terms "effective" and "useful" aid in the proper application and enforcement of the code. ●

APPLICABILITY

The IECC lists both general and specific requirements, often in different sections, that may apply to the same condition or situation. When two different code provisions apply to the same condition or situation, the more specific requirement applies to the design and construction, rather than the more general requirement, as in the other companion I-Codes. **[Ref. C101.4]**

COMPLIANCE

Designers, builders and code officials all must agree about the energy provisions applicable to a proposed project. All plans, specifications, and details—whether concerning new construction or the alteration or repair of an existing building—must comply with the minimum provisions of the code.

Some jurisdictions offer prescriptive worksheets that establish the requirements for building components and systems applicable in that location. This method is the easiest compliance path for simple commercial structures; requirements for each building element are listed on the worksheets, and the plans are checked for compliance. The worksheets are specific to each climate zone and are often available from the state or local building department (Figure 3-9). **[Ref. C101.5.1]**

In addition, the U.S. Department of Energy offers COM*check*, a free and easy-to-use software program for verifying code compliance. The code official must approve the use of specific computer software such as COM*check*. In such programs, the user inputs building areas, efficiencies and other specifications for the building envelope, mechanical systems and interior and exterior lighting systems. The software then generates a compliance report for the approved plans and a customized field inspection checklist.

COM*check* compliance programs are available for editions of ASHRAE 90.1, the IECC, and specific state programs. The choices available in codes to match multiple jurisdictional adoptions make this a versatile compliance tool.

ALTERNATE METHODS AND MATERIALS

Because innovation is encouraged by the IECC, materials or methods of construction not specified in the code but meeting the intent of the applicable provision can be used if such are evaluated by the code official and approved before the building is permitted and inspected. The code official will consider the approval of the material or method based on the intent of the code provision that most closely describes the alternate. **[Ref. C102.1]**

Mechanical Summary MECH-SUM

2012 Washington State Energy Code Compliance Forms for Commercial, Group R1, and > 3 story R2 & R3 Revised June 2013

Project Info

Project Address	Date
	For Building Dept. Use
Applicant Name:	
Applicant Address:	
Applicant Phone:	

Project Description

Briefly describe mechanical system type and features.

☐ Includes Plans

Include documentation requiring compliance with commissioning provisions per Section C408.

Compliance Option

◯ Simple System ◯ Complex System ◯ Systems Analysis

Equipment Schedules

The following information is required to be incorporated with the mechanical equipment schedules on the plans. For projects without plans, fill in the required information below.

Cooling Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	Capacity[2] Btu/h	OSA CFM or Econo?	SEER or EER	IPLV[3]	Econmizer Option or Exception[6]	Heat Recovery Y/N

Heating Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	Capacity[2] Btu/h	OSA cfm or Econo?	Input Btuh	Output Btuh	Efficiency[4]	Heat Recovery Y/N

Fan Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	CFM	SP[1]	HP/BHP	Flow Control[5]	Location of Service

Service Water Heating Equipment Schedule

Equip. ID	Equip Type	Brand Name[1]	Model No.[1]	Input Capacity	Sub-Category	EF[7]	Location of Service

[1] If available. [2] As tested according to Table C403.2.3(1)A thru C403.2.3(8). [3] If required. [4] COP, HSPF, Combustion Efficiency, or AFUE, as applicable. [5] Flow control types: variable air volume (VAV), constant volume (CV), or variable speed (VS). [6] Economizer exception number per Simple Systems C403.3.1 or Complex Systems C403.4.1. [7] Efficiency Factor per Table C404.2.

FIGURE 3-9 An example of a state compliance form for the mechanical provisions of the IECC