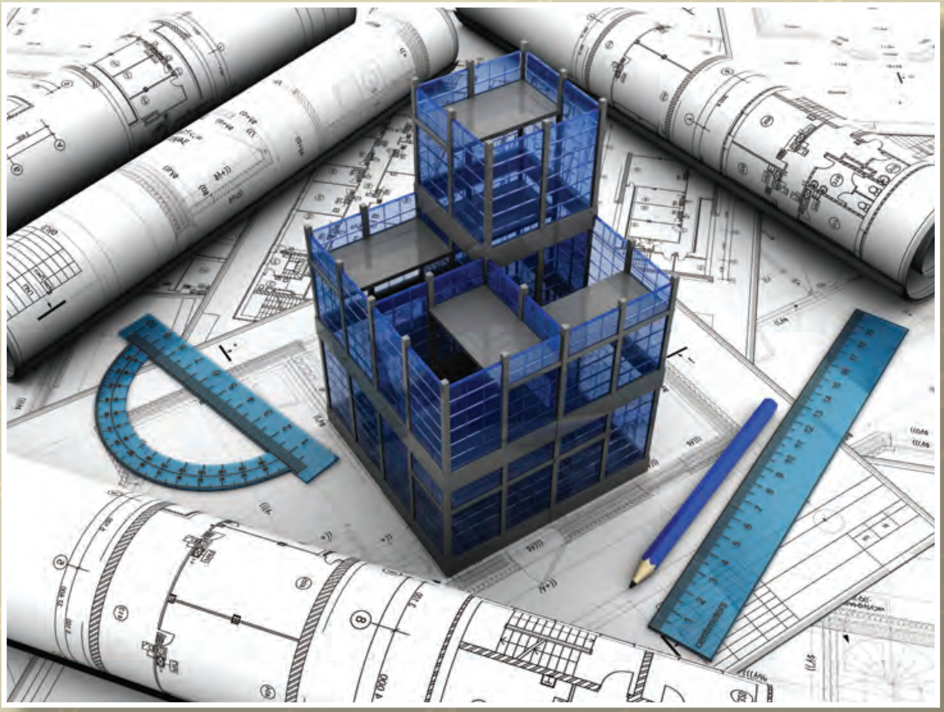
PART

II

General Commercial Energy Provisions

Section 3: General Commercial Energy Provisions

Section 4: Administration and Enforcement



SECTION 3

General Commercial Energy Provisions

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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), *International Residential Code* (IRC), and *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 85 words and 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 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 "non-transient." 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, the IECC commercial provisions must be applied. Common commercial uses are offices, banks, clothing stores, restaurants, bars, retail sales, automobile

Code Basics

2012 International Building Code in Chapter 3 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) ●

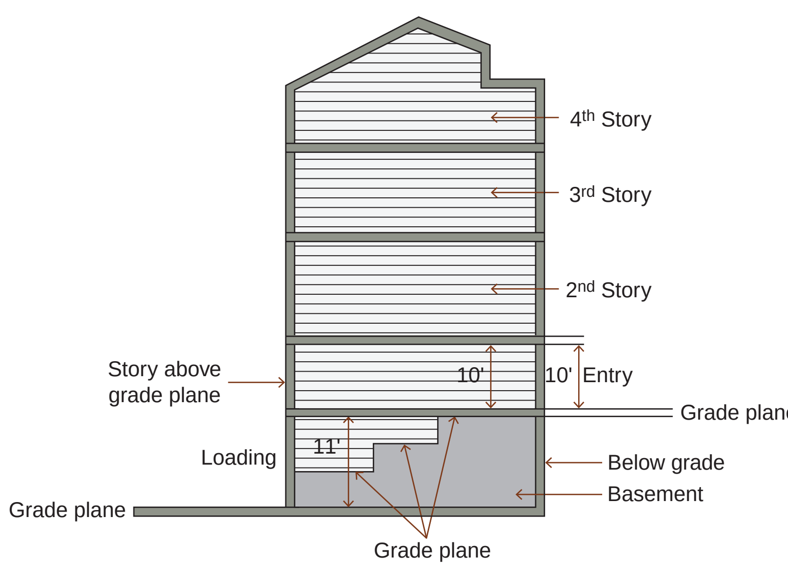

FIGURE 3-1 Story above grade plane

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

repair shops, and gyms. The IBC commercial 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]**

INTENT

The intent of the IECC is stated simply in the code: "This code shall regulate the design of and construction of buildings for the effective use and conservation of energy over the useful

FIGURE 3-3 Four-story hotel

FIGURE 3-4 Office building

FIGURE 3-5 Fire station

FIGURE 3-6 Corner store

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. "Over the useful life of each building" is a somewhat vague statement, as the "useful life" is difficult to determine, and affected by many factors. Whereas some buildings are only meant for a useful 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.

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]**

FIGURE 3-7 Straw bale insulation

FIGURE 3-8 Straw bale as a building material

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]**

EXISTING BUILDINGS

The term "existing buildings" refers to buildings constructed before the code's provisions took effect. The IECC does not require a legally constructed (permitted) existing building or building system to comply with the energy code provisions for new buildings. However, buildings constructed without a permit in a jurisdiction that administers building codes are not covered by this exemption. In addition, proposed work in any existing building that requires a permit must meet the IECC provisions, and is not exempt. **[Ref. C101.4.1]**

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FIGURE 3-9 Historic building

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FIGURE 3-10 Historic building designation

HISTORIC BUILDINGS

Certain existing buildings are currently listed, designated, or certified as historic or in the process of becoming certified as historic (Figures 3-9 and 3-10). Alterations or repairs to such buildings are exempt from the provisions of the IECC. Most communities have historic preservation programs, which can be valuable sources of information in determining whether a particular building is or could be certified as historic. The historic building exemption applies to mechanical, electrical, and plumbing systems as well as wall and roof insulation and window replacement. Alterations of historic commercial buildings are quite complex, as many unique issues are involved in maintaining the delicate systems in balance. **[Ref. C101.4.2]**

In 1986, the Empire State Building (Figure 3-11) was recognized as a National Historic Landmark. Construction of the iconic building began in 1930 and was completed in 1931, when there were no energy codes in place. The New York City Energy Conservation Code, an above-code program, is now the law of the land. **[Ref. C102.1.1]**

In 2010, a major rehabilitation project for the Empire State Building was announced, and certain energy-related retrofits were included in the plan. Major components of the energy upgrades include improvements to the windows, heating components and cooling system, and installation of lighting and ventilation controls. All 6,514 windows were refurbished onsite. The existing dual-pane glass was removed from the frame, cleaned, and reassembled with new seals. At the same time a suspended film was installed between the panes and the window unit was filled with inert gas. Note that the existing glass, sash, and frame of each window were reused to maintain the original materials and historic look. Inside, the radiators were removed and insulation barriers were installed behind the heating units on the exterior walls. Energy-efficient improvements were made

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FIGURE 3-11 Empire State Building