Chapter 1: Administration

General Comments

The need for energy conservation is due to the increased demand for primary energy in this country coupled with the decline of domestic energy resource development. The vulnerability of our nation was illustrated by the Arab States' oil embargo of 1973. This event highlighted the United States' dependency on foreign energy supply, and awakened the nation to the crippling effects that might occur should offshore supply lines be interrupted. In 1975, the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) published Standard 90, *Energy Conservation in New Building Design*. This standard was a culmination of efforts that began in 1972, when the National Conference of States on Building Codes and Standards, Inc. (NCSBCS) voted to request continued National Bureau of Standards (NBS) emphasis on building-related standards for energy conservation.

In August 1973, NBS agreed to develop and design an evaluation criteria for energy conservation in new buildings, and in February 1974, ASHRAE accepted the responsibility to develop a national voluntary consensus standard based on the NBS criteria. After two public reviews, ASHRAE 90-75 was approved for publication in August 1975. This standard was subsequently revised in 1980, with the first nine sections published as ASHRAE 90A, and the remainder published as ASHRAE 90B and 90C.

Over the next several years, all 50 states eventually enacted regulations or developed their own energy-related codes based on the 1975 edition of ASHRAE 90 or on one of the several regional energy codes that also used the standard as a technical base.

The energy conservation code development efforts of the model code agencies and the various state energy conservation offices were first published as a separate code volume in 1977 as the *Code for Energy Conservation in New Building Construction*; subsequently renamed the *Model Code for Energy Conservation* (MCEC) in 1981 and then published as the *Model Energy Code* (MEC) by the Council of American Building Officials (CABO) in 1983. The CABO MEC was also based on the ASHRAE 90 series, specifically the 1980 edition of ASHRAE 90A. The CABO MEC was developed jointly by the International Code Council® (ICC®) legacy organizations: Building Officials and Code Administrators International (BOCA); International Conference of Building Officials (ICBO); National Conference of States on Building Codes and Standards (NCSBCS); and Southern Building Code Congress International (SBCCI), under a contract funded by the United States Department of Energy (DOE).

During that same year, the results of an extensive research program initiated by ASHRAE and DOE on energy conservation in building design demonstrated that significant cost-effective improvements could be made to the existing ASHRAE 90 series. The ASHRAE Standing Standards Project Review Committee (SSPC) 90R became responsible for maintaining the provisions of the ASHRAE 90 series applicable to other than low-rise residential buildings and buildings three stories or less in height. It took six years to finalize revisions to ASHRAE 90A and 90B as the 90.1 Standard. After three public reviews and two appeals, these revisions were published in 1989 as ASHRAE/IES 90.1, *Energy Efficient Design of New Buildings Except Low-rise Residential Buildings*. Since 1989, numerous addenda to this standard have been developed. Some have been published and others have undergone development and review.

With the 1990 Iraqi invasion of Kuwait, lawmakers in Washington again saw the need to lessen the nation's precarious dependence on sources of foreign oil. The federal government issued a mandate to regulate energy usage for the United States. This federal mandate began as two congressional bills: the National Energy Efficiency Act of 1991 for the House and the National Energy Security Act of 1991 for the Senate. After months of debate, the bills were combined into one document that was renamed the Energy Policy Act of 1992. On October 24, 1992, former President George H.W. Bush signed the Energy Policy Act of 1992 (EPAct) into law (Public Law 102-486). EPAct established the 1992 CABO MEC (applicable to detached one- and two-family dwellings and low-rise residential buildings three stories or less in height) and AHRAE 90.1 (applicable to all other buildings) as the acceptable criteria for several building energy-related requirements. By October 24, 1994, each state had to certify to the secretary of the DOE that it had reviewed the provisions of its residential building code regarding energy efficiency and made a determination as to whether a revision of that code was needed to meet or exceed the 1992 CABO MEC. The states were not required to update their residential building energy codes, but only to review the code and determine if it was appropriate to update. If, for whatever reasons, a state determined that it was not feasible to revise its residential energy code, the state was required to submit to the Secretary of Energy, in writing, the reasons for such determination.

EPAct also mandates that whenever a new edition of the CABO MEC is published, the Secretary of Energy has one year to make a determination as to whether or not the new edition "would improve energy efficiency in residential buildings." The states then have two years

from this determination to repeat the review process previously described. This analysis is also intended to assist the Department of Housing and Urban Development (HUD) in determining whether the latest edition of the CABO MEC meets EPAct's criteria for justifying its adoption of HUD loan programs.

Since the signing of EPAct in October 1992, two subsequent editions of the CABO MEC have been published and made available for adoption by the states: the 1993 and 1995 editions. While the CABO MEC is revised every three years, it was published again in 1993 because of a larger-than-average number of changes introduced during the 1992 code adoption cycle. The 1993 edition introduced more stringent ceiling and wall insulation requirements for single-family and low-rise multiple-family buildings in warmer (southern) locations, included new requirements for heating, ventilating and air-conditioning (HVAC) equipment efficiencies, which are consistent with the National Appliance Energy Conservation Act of 1987 (Public law 100-12); had less stringent requirements for duct insulation; and adopted by reference the 90.1 Standard for commercial buildings and high-rise residential buildings. The 1995 edition added a reference to a National Fenestration Rating Council (NFRC) standard for glazing *U*-factors and provides default U-factors; added criteria to specifically correct metal-stud framing in wall thermal calculations; strengthened the duct-sealing provisions and applied them to all supply and return ducts; adopted by reference the 1993 ASHRAE *Handbook of Fundamentals* in place of the 1989 ASHRAE *Handbook of Fundamentals*, thereby directing users to assume a higher fraction of wall area in framing; and adopted the *Energy Code for Commercial and High-rise Residential Buildings—Based on ASHRAE/IES 90.1-1989* (90.1 Code) by reference in place of the current reference to ASHRAE/IESNA 90.1-1989.

On January 10, 2001, the DOE issued a Federal Register notice declaring that the 2000 *International Energy Conservation Code*® (IECC®) "will achieve substantial energy efficiency in low-rise residential buildings" compared to the 1995 CABO MEC and the 1998 IECC (FR 01742).

This determination implies that states must certify whether revision of their residential building energy codes meet or exceed the 2000 edition of the IECC by January 10, 2003. Furthermore, this determination justifies the adoption of the 2000 IECC for HUD-assisted housing.

Effective December 4, 1995, CABO assigned all rights and responsibilities of the MEC to the ICC. Through its efforts to develop a complete set of international construction codes without regional limitations and to provide proper interface with the *International Codes*® (I-Codes®), the ICC subsequently introduced the first edition of the IECC in February 1998. The first edition of the IECC replaced the 1995 CABO MEC. To facilitate the transfer of responsibility, the secretariat, committee members, bylaws, appeals procedures and guidelines were simply redesignated ICC activities without change. In its first edition, the 1998 IECC incorporated the provisions of the 1995 edition of the MEC promulgated by CABO and included the technical content of the MEC as modified by approved changes from the 1995, 1996 and 1997 CABO code development cycles. Note that until the publishing of the 1998 IECC, code development activities during 1995, 1996 and 1997 were carried out under CABO code development procedures.

Significant changes incorporated into the 1998 IECC included:

- An organizational restructuring of the code's chapter to accommodate differences in format between a CABO code that has since evolved into an ICC *International Code*.
- The addition of maximum solar heat gain coefficient (SHGC) criteria for glazing in cooling-dominated climates.
- Revisions to the default *U*-factor tables for fenestration products.
- Heat traps for nonrecirculating service water heating systems.
- The addition of a simplified compliance approach for commercial buildings three stories or less in height, having a window and glazed door area not exceeding 40 percent, and having "simple" (a.k.a., single zone) mechanical systems.

In the 2000 edition, the IECC expanded in scope to include energy-related provisions for *all* commercial buildings into Chapter 8. Comprehensive language was also added to introduce useable provisions specific to "complex" (a.k.a., multiple zone) mechanical systems. A simplified and enforceable "total building performance" alternative to the estimated energy cost budget provisions of Chapter 7 was another improvement. Likewise, the interior lighting power requirements were revised, and are now fully autonomous from related requirements adopted by reference into Chapter 7.

The majority of the work involved in determining code compliance with this chapter is done during the plan review stage, thereby establishing a focal point for energy-related code enforcement.

A completely new, stand-alone chapter for one- and two-family dwellings, townhomes and low-rise, multiple-family residential buildings was added to the 2000 IECC. The new chapter, titled "Simplified Prescriptive Requirements for Residential Buildings," creates a platform for technical coordination of related energy conservation provisions in the *International Residential Code*® (IRC®).

The 2006 edition of the code represents another monumental edition in the development of the energy code. Between the 2003 and 2006 editions a major effort was made by the DOE and other interested parties to dramatically simplify the code. This effort was done to encourage and improve the enforcement of the provisions. The intention was that at a national level the overall energy requirements would be similar to those of the 2003 edition. The belief was that with an easier-to-understand code there would be additional adoptions and improved enforcement that would then result in a large savings of

energy. Primarily, these changes affected the administrative provisions, the introduction of new climate zones and the complete replacement of the residential provisions. While this process was occurring, a similar effort of simplification was being led by others to address the commercial requirements. This overall effort resulted in an easier-to-understand document that was about one-third of the size of the previous edition.

The 2009 edition of the IECC represents the culmination of aggressive efforts to increase residential energy efficiency requirements. Although the most aggressive effort to increase the energy efficiency levels required in the code by 30 percent were not successful, the 2009 IECC represents a significant increase over the 2006 code in energy efficiency. these aggressive code change proposals are reflective of a new national focus on reduction in energy consumption that stems not only from concerns about our oil reserves, but also from growing concerns over global warming.

Purpose

Though not stated specifically, this code is applicable to all buildings and structures and their components and systems that use energy primarily for human comfort. The code does not regulate the energy for industrial equipment for manufacturing or that needed for items like computers or coffee pots. The code, therefore, addresses the design of energy-efficient building envelopes and the selection and installation of energy-efficient mechanical, service water heating, electrical distribution and illumination systems and equipment in residential and commercial buildings alike [see Figures 1(1) and 1(2), respectively].

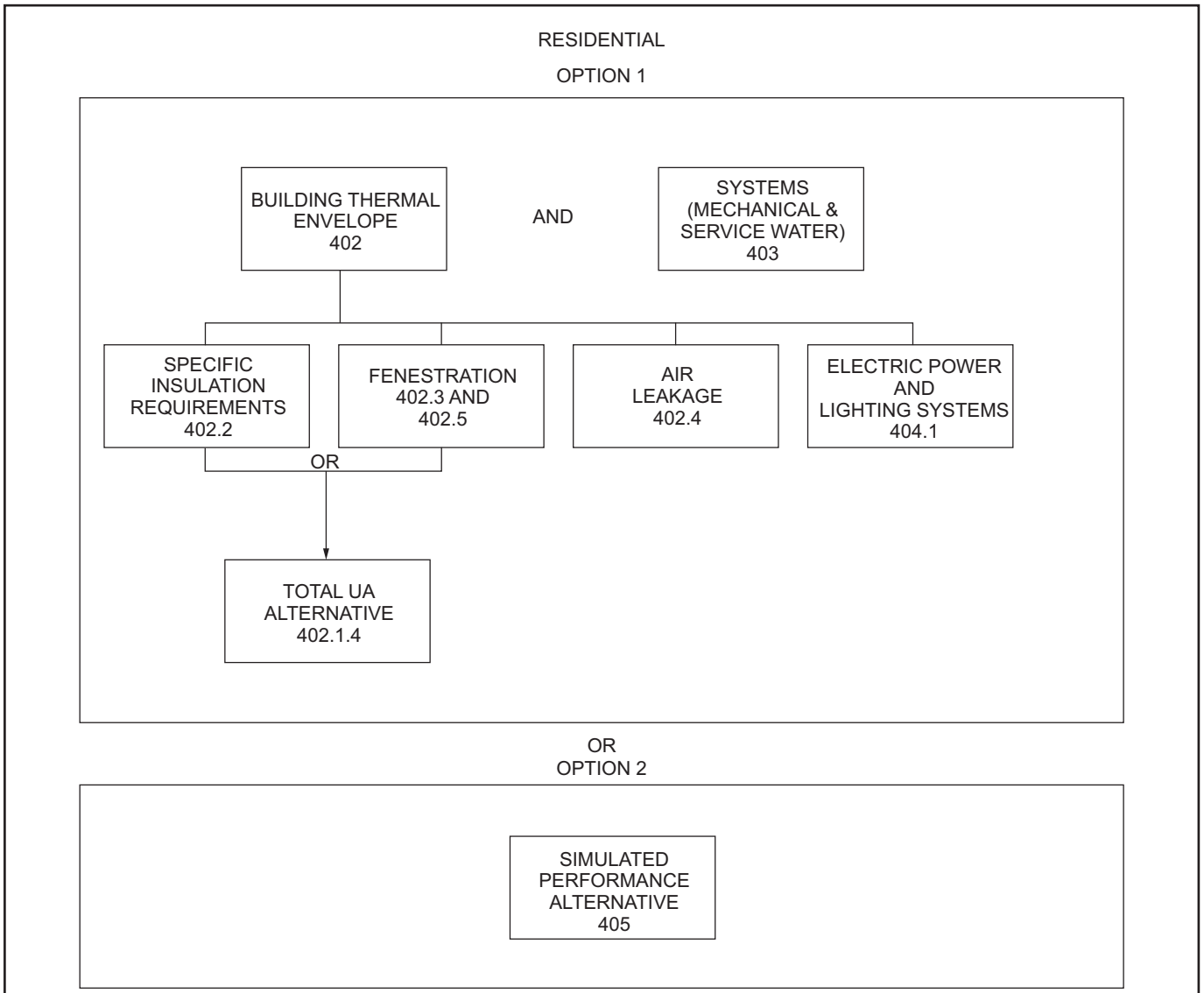

Figure 1(1)
IECC SCOPE AND APPLICATION ABSTRACT—RESIDENTIAL