

PREFACE

Introduction

Internationally, code officials recognize the need for a modern, up-to-date energy conservation code addressing the design of energy-efficient building envelopes and installation of energy efficient mechanical, lighting and power systems through requirements emphasizing performance. The 2011 *Vermont Residential Building Energy Standards* (RBES) is based on the *International Energy Conservation Code*® 2009 edition, and is designed to meet these needs through model code regulations that will result in the optimal utilization of fossil fuel and non-depletable resources in all communities, large and small.

This comprehensive energy conservation code establishes minimum regulations for energy efficient buildings using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and new energy efficient designs.

The *International Energy Conservation Code* provisions provide many benefits, among which is the model code development process that offers an international forum for energy professionals to discuss performance and prescriptive code requirements. This forum provides an excellent arena to debate proposed revisions. The model code also encourages international consistency in the application of provisions.

Development

The first edition of the *International Energy Conservation Code* (1998) was based on the 1995 edition of the *Model Energy Code* promulgated by the Council of American Building Officials (CABO) and included changes approved through the CABO Code Development Procedures through 1997. CABO assigned all rights and responsibilities to the International Code Council and its three statutory members at that time, including Building Officials and Code Administrators International, Inc. (BOCA), International Conference of Building Officials (ICBO) and Southern Building Code Congress International (SBCCI). The 2009 edition presents the code as originally issued, with changes reflected in the 2000, 2003 and 2006 editions and further changes approved through the ICC Code Development Process through 2008. A new edition such as this is promulgated every three years.

This 2011 RBES code is founded on principles intended to establish provisions consistent with the scope of an energy conservation code that adequately conserves energy; provisions that do not unnecessarily increase construction costs; provisions that do not restrict the use of new materials, products or methods of construction; and provisions that do not give preferential treatment to particular types or classes of materials, products or methods of construction.

Background

During the 1995 legislative session, identical bills addressing the issue of energy efficiency standards in new residential construction were introduced in both the Vermont House and the Senate. Although neither bill was voted upon, considerable committee work was devoted to the bills.

At the end of the 1995 legislative session, there was a consensus among the parties involved in working on this issue that the creation of a Task Force to examine the issues related to a proposed energy efficiency standard might offer an opportunity to address the concerns of all interested parties. To this end, the Governor's Task Force on Energy Efficiency Standards for New Residential Construction was created by Governor Howard Dean in late September of 1995 and was charged with developing a specific legislative proposal prior to the 1996 legislative session.

The Governor's Task Force included stakeholders from many different perspectives on this issue. After three months of intensive committee and subcommittee work, this Task Force reached a consensus that the legislature should adopt a code and they agreed that this code should include the following provisions:

- The code should be kept current by establishing a three-year cycle for revision and modification of the code through rule making. This should be established via a partnership between the DPS and the Department of Labor and Industry;
- Compliance with the residential code should be given the presumption of compliance with Act 250 Criterion 9(f), Energy conservation;
- To demonstrate compliance, builders should be required to complete a form self-certifying that the energy efficiency requirements of the code have been met for each new home that is built;
- Owner/builders should be allowed to build a home that does not comply with the code as long as they disclose how that home is deficient to subsequent prospective buyers; and
- In order to address indoor air quality, a requirement for automatic, mechanical ventilation systems should be included in the first update of the code three years from adoption.

PREFACE

Act 20, the *Vermont Residential Building Energy Standards* (RBES), was adopted by statute in 1997 and incorporated virtually all of the Task Force's recommendations. Since that time, an Energy Code Assistance Center has been established to provide builders and consumers with information on the code and answers to their questions. Workshops have also been held throughout the state to train builders, architects and trade allies about the code requirements and how to comply.

Update Process

The RBES Statute, Act 20, called for the code to be updated every three years beginning in 1999. The DPS is required by the statute to form an advisory committee of stakeholders similar to the original Task Force to provide the Commissioner of Labor and Industry with recommendations prior to that agency conducting a formal rule-making process to update the standards.

The statute reads:

“(c) Revision and interpretation of energy standards. On or about January 1, 1999, and at least every three years thereafter, the commissioner of labor and industry shall amend and update the RBES, by means of administrative rules adopted in accordance with 3 V.S.A. Chapter 25. The department of public service shall provide technical assistance and expert advice to the commissioner in the interpretation of the RBES and in the formulation of specific proposals for amending the RBES. At least a year prior to final adoption of each required revision of the RBES, the DPS shall convene an advisory committee to include one or more mortgage lenders, builders, building designers, utility representatives and other persons with experience and expertise, such as consumer advocates and energy conservation experts. The advisory committee may provide the commissioner with additional recommendations for revision of the RBES.”

The Vermont Energy Act of 2009 (Act 45), called for the commissioner of public service to amend and update the RBES to ensure that residential construction be designed and constructed in a manner that complies with the 2009 edition of the IECC. These amendments must be effective on final adoption, by means of administrative rules, no later than January 1, 2011.

The Vermont DPS held a series of six stakeholder meetings in 2010 to gather feedback on proposed changes to RBES. The Vermont DPS also convened an advisory committee of interested stakeholders to review the current code and make recommendations for changes and improvements. The revisions to the 2009 edition of the International Energy Conservation Code presented in this document were drafted based on input received from these meetings.

Effective Use of the 2011 Residential Building Energy Standards

The 2011 *Vermont Residential Building Energy Standards* (RBES) is a code that regulates minimum energy conservation requirements for new buildings. The 2011 RBES addresses energy conservation requirements for all aspects of energy uses in residential construction, including heating and ventilating, lighting, water heating, and power usage for appliances and building systems.

The 2011 RBES is a design document. For example, before one constructs a building, the designer must determine the minimum insulation *R*-values and fenestration *U*-factors for the building exterior envelope. The RBES sets forth minimum requirements for exterior envelope insulation, and window and door *U*-factors, duct insulation, lighting and power efficiency, mechanical ventilation, and water distribution insulation.

Arrangement and Format of the 2011 RBES

Before applying the requirements of the 2011 RBES it is beneficial to understand its arrangement and format. The 2011 RBES, like other codes published by ICC, is arranged and organized to follow sequential steps that generally occur during a plan review or inspection. The 2011 RBES is divided into five different parts:

Chapters	Subjects
1-2	Administration and Definitions
3	General Requirements
4	Residential Energy Efficiency
5	Reserved
6	Referenced Standards

The following is a chapter-by-chapter synopsis of the scope and intent of the provisions of the 2011 *Vermont Residential Building Energy Standards*:

Chapter 1 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 code. Only through careful observation of the administrative provisions can the building official or authority having jurisdiction reasonably expect to demonstrate that “equal protection under the law” has been provided.

Chapter 2 Definitions. All terms that are defined in the code are listed alphabetically in Chapter 2. While a defined term may be used in one chapter or another, the meaning provided in Chapter 2 is applicable throughout the code.

Where understanding of a term’s definition is especially key to or necessary for understanding of a particular code provision, the term is shown in *italics* wherever it appears in the code. This is true only for those terms that have a meaning that is unique to the code. In other words, the generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

Guidance regarding tense, gender and plurality of defined terms as well as guidance regarding terms not defined in this code is provided.

Chapter 3 General Requirements. Chapter 3 provides interior design conditions that are used as a basis for assumptions in heating and cooling load calculations, provides basic material requirements for insulation materials and fenestration materials, and provides standards for residential mechanical ventilation and combustion safety.

Chapter 4 Residential Energy Efficiency. Chapter 4 contains the energy-efficiency-related requirements for the design and construction of residential buildings regulated under this code. It should be noted that the definition of a *residential building* in this code is unique for this code. In this code, a *residential building* is an R-2, R-3 or R-4 building three stories or less in height. All other R-1 buildings, including residential buildings greater than three stories in height, are regulated by the energy conservation requirements in the Vermont Commercial Building Energy Standards (CBES). The applicable portions of a residential building must comply with the provisions within this chapter for energy efficiency. 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, the heating and cooling system and the service water heating system of the building.

Chapter 5 Reserved.

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 this code. 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 upon 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 this code that reference the standard.

Marginal Markings

Solid vertical lines in the margins within the body of the code indicate a technical change from the requirements of the 2009 edition. Deletion indicators in the form of an arrow (➡) are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted.

