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The *Advanced Energy Design Guide for Small Retail Buildings* (AEDG-SR; the Guide) is intended to provide a simple approach for contractors and designers who create retail buildings up to 20,000 ft². Application of the recommendations in the Guide should result in small retail buildings with 30% energy savings when compared to those same retail buildings designed to the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-1999. This document contains recommendations and is *not* a minimum code or standard. It is intended to be used in addition to existing codes and standards and is not intended to circumvent them. This Guide represents *a way*, but *not the only way*, to build energy-efficient small retail buildings that use significantly less energy than those built to minimum code requirements. The recommendations in this Guide provide benefits for the owner while maintaining quality and functionality of the space.

This Guide has been developed by a committee representing a diverse group of energy professionals drawn from the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the American Institute of Architects (AIA), the U.S. Green Building Council (USGBC), and the Illuminating Engineering Society of North America (IESNA). To quantify the expected energy savings, these professionals selected potential envelope, lighting, HVAC, and service water heating (SWH) energy-saving measures for analysis. These included products that were deemed to be both practical and commercially available. Although some of the products may be considered premium, products of similar performance are available from multiple manufacturers. Each set of measures was simulated using an hourly energy analysis program for two retail prototype buildings in representative cities in various climates. Simulations were run for reference buildings (buildings designed to Standard 90.1-1999 criteria) compared to buildings built using recommendations contained in this Guide to determine whether the expected 30% savings target was achieved.

The scope of this Guide covers small retail buildings up to 20,000 ft² in size that use unitary heating and air-conditioning equipment. Buildings of this size with these HVAC system configurations represent a significant amount of commercial retail space in the United States. This Guide provides straightforward recommendations and how-to tips to facilitate its use by anyone in the construction process who wants to produce more energy-efficient buildings.

In general, this Guide addresses typical retail building uses: retail (other than shopping malls); strip shopping centers; automobile dealers; building material, garden sup-

ply, and hardware stores; department stores; drugstores; furniture, home equipment, and home furnishing stores; liquor stores; and wholesale goods (except food). The Guide *excludes* certain building uses such as car washes; laundry and dry-cleaning establishments; gasoline service stations; motor vehicle repair, service, and maintenance buildings; personal service establishments (barbers, hair dressers, manicurists, etc.); and other facilities that have significant point source heat or pollutant generation. The Guide also excludes treatment of food service facilities such as delicatessens and restaurants. Also excluded from the Guide are “built-up” HVAC systems using chillers and chilled-water systems.

As an added value for designers and contractors, this Guide features technology examples and case studies of energy-efficient buildings. The case studies demonstrate that effectively addressing environmental challenges can also result in the creation of good, often excellent, architecture. The examples illustrate how energy considerations have been incorporated in various design strategies and techniques. However, the example buildings may incorporate additional features that go beyond the scope of the recommendations of the Guide.

It is hoped that the Guide will result in a more sustainable environment for society. The energy savings target of 30% is the first step in the process toward achieving a net zero energy building (NZEB), which is defined as a building that, on an annual basis, draws from outside sources equal or less energy than it provides using on-site, renewable energy sources. ANSI/ASHRAE/IESNA Standard 90.1-1999, the energy conservation standard published at the turn of the millennium, provides the fixed reference point for all the Guides in this series. The primary reason for this choice as the reference point is to maintain a consistent baseline and scale for all the 30% AEDG series documents. A shifting baseline between multiple documents in the AEDG series would lead to confusion among users about the level of energy savings achieved. The average energy savings for this Guide over all climates and buildings analyzed was approximately 37% when compared to Standard 90.1-1999. However, it is interesting to see what the energy savings of the Guide would be relative to Standard 90.1-2004, which has reduced the lighting power densities and improved efficiency levels for the cooling equipment. Using Standard 90.1-2004 as the basis, the average energy savings for this Guide over all climates and buildings analyzed was approximately 30%, or seven percentage points less than when compared to Standard 90.1-1999.

Plans are in place for development of additional AEDG documents in this decade that will assist users in achieving 50% and 70% energy-saving levels as milestones toward the NZEB goal. The ultimate goal of the participating organizations is to assist in the design and construction of NZEBs.

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Chapter 2 of this Guide contains a chart that walks the user through the design process of applying the recommendations in this Guide, while Chapter 3 provides the actual recommendations for a way to meet the 30% energy savings goal. Chapter 3 includes eight recommendation tables, which are broken down by building component and organized by climate according to the eight climate zones (and specific counties within each climate zone) identified by the U.S. Department of Energy (DOE). The user should note that the recommendation tables do not include all of the components listed in Standard 90.1-1999 since the Guide focuses only on the primary energy systems within a building. Chapter 4 provides technology examples and case studies of actual energy-efficient buildings and systems. Chapter 5 provides essential guidance in the form of concise how-to tips to help the user understand and apply the recommendations from this Guide. Additional “bonus savings” strategies are also found in Chapter 5.

This Guide includes specific recommendations for energy-efficient improvements in the following technical areas to meet the 30% energy savings goal:

- Building Envelope
 - Roofs
 - Walls