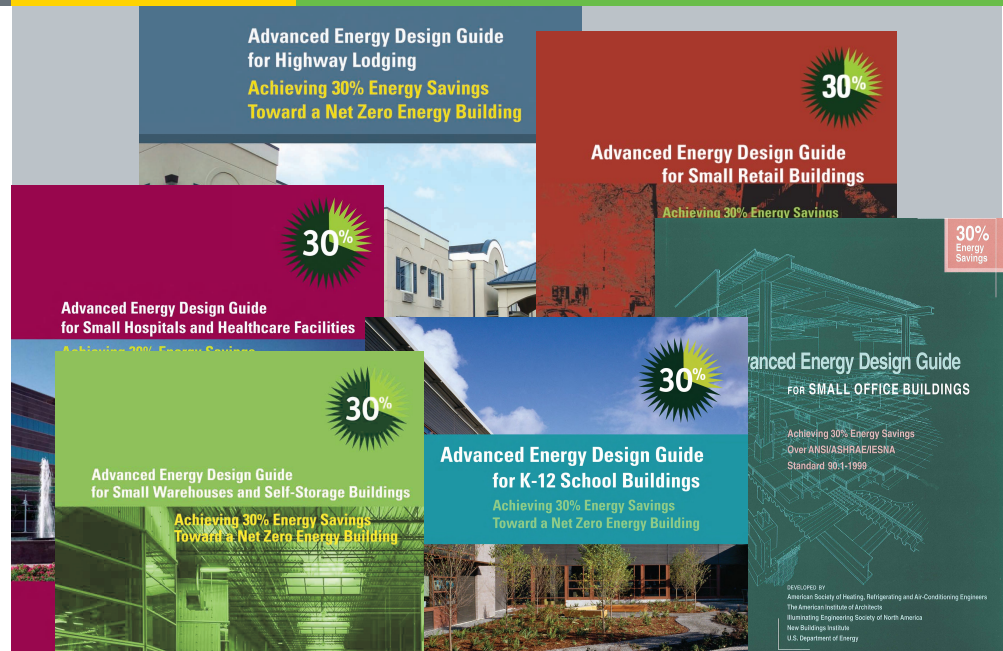


Advanced Energy Design Guides

Advanced Energy Design Guides (AEDGs) provide guidance to contractors and designers on how to construct commercial buildings that are significantly more energy efficient than those built to current code. The guides offer recommendations for the building design process, with a focus on ease of use, sustainable design, and exemplary design leadership.

One way to influence above-code exemplary energy performance in commercial buildings is to provide architects, engineers, and other design practitioners prescriptive guidance that indicates, measure by measure, how to do it. To this end, the U.S. Department of Energy (DOE) actively supports development of a series of AEDGs—publications designed to provide recommendations for achieving 30 to 50 percent energy savings over the minimum code requirements of ANSI/ASHRAE/IESNA Standard 90.1-1999. AEDGs are a product of collaboration between DOE, the American Institute of Architects (AIA), the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the American Society for Healthcare Engineering (ASHE), the Illuminating Society of North America (IES), the New Buildings Institute (NBI), and the U.S. Green Building Council (USGBC).

1. ASHRAE Standard 90.1 provides information for applying U.S. climate zones to international locations in Normative Appendix B—Building Envelope Climate Criteria.
2. Using on-site renewable energy sources, a net-zero energy building consumes as much energy as it produces.



Raising Expectations for Energy Efficiency

DOE and partners have produced six design guides targeting energy savings of 30 percent over ANSI/ASHRAE/IESNA Standard 90.1-1999: K–12 school buildings, small retail buildings, small office buildings, small hospitals and healthcare facilities, highway lodging, and small warehouses and self-storage buildings. Each guide incorporates recommendations for integrating energy efficiency into the design of buildings in each of the eight U.S. climate zones and suggests design practices that are based on real-life experiences with energy-efficiency performance models.

The AEDGs support the following goals:

- Provide easy-to-use guidelines for the eight U.S. climate zones¹
- Accelerate the construction of highly energy-efficient buildings
- Provide contractors and designers the means to achieve advanced levels of energy savings without expensive design reviews that require detailed calculations or analyses.

Design guides aimed at establishing 50 percent energy savings over the minimum code requirements of ANSI/ASHRAE/IESNA Standard 90.1-2004 are being developed for small-to-medium office buildings, mid-box retail, highway lodging, K–12 schools, grocery/supermarket, and quick-serve restaurants. In addition, AEDGs that provide guidance on how to improve energy efficiency in existing buildings are planned.

Introducing Options for Energy-Efficient Design

The guides identify opportunities for contractors and builders to insert energy efficiencies into small-building designs. The 30 percent guides offer a range of recommendations that are intended to provide easy approaches to reducing energy consumption.

Each guide offers “how-to” assistance for designers and builders, looking at factors such as envelope, lighting, HVAC, and service water heating energy-saving measures.

National laboratories performed analysis of recommendations in each guide, eliminating the need for detailed calculations or complex analyses. Thus, the AEDGs simplify design efforts for organizations that lack funding for expensive design reviews.

Examples of AEDG recommendations include:

- Provide an unoccupied air flow and temperature setback for spaces that are not used 24 hours a day
- Maximize the use of daylighting and controls through both side-lighting and top-lighting strategies in spaces that do not have air change requirements
- Design a daylighted school. If carefully designed, vertical fenestration and skylights can provide interior illumination without excessive solar heat gain. Electric lighting systems can be extinguished or dimmed, saving significant energy and maintenance costs.

Adjusting for Climate Differences

Buildings in one U.S. climate zone will use energy differently than buildings in another climate zone. For example, heating and air conditioning requirements in Seattle and Boston are different from those in Phoenix and Miami. However, commercial buildings are still held to minimum energy performance standards, even if the actual expectations for efficiency and cost may differ. The AEDGs make recommendations on how to accommodate climate differences while exceeding minimum performance standards. Each guide offers energy-

saving recommendations for each U.S. climate zone on a single page.

Some of the design guides offer case studies of facilities that meet energy targets in specific climate zones. Ultimately, case studies for each climate zone will be assembled using information from DOE’s High-Performance Buildings Database.

Accessing Free Downloads

AEDGs are available as free PDF downloads from the ASHRAE Web site at www.ashrae.org/aedg. Corresponding technical support documents are also available for download. The technical support documents contain details about the analysis and development process for the design guides. The table below presents a list of AEDG titles that are currently available for download.

30% Advanced Energy Design Guides Currently Available for Download		
Title	Developers	Audience
<i>Advanced Energy Design Guide for Small Office Buildings</i>	ASHRAE, AIA, IES, NBI, DOE	Office buildings up to 20,000 square feet
<i>Advanced Energy Design Guide for Small Retail Buildings</i>	ASHRAE, AIA, IES, USGBC, DOE	Retail spaces up to 20,000 square feet
<i>Advanced Energy Design Guide for K-12 School Buildings</i>	ASHRAE, AIA, IES, USGBC, DOE	Elementary, middle, and high school buildings
<i>Advanced Energy Design Guide for Small Warehouses and Self-Storage Buildings</i>	ASHRAE, AIA, IES, USGBC, DOE	Warehouses up to 50,000 square feet and self-storage buildings that use unitary heating and air conditioning
<i>Advanced Energy Design Guide for Highway Lodging</i>	ASHRAE, AIA, IES, USGBC, DOE	Roadside hotels up to 80 rooms and 4 stories
<i>Advanced Energy Design Guide for Small Hospitals and Health-care Facilities</i>	ASHE, ASHRAE, AIA, IES, USGBC, DOE	Small healthcare facilities up to 90,000 square feet including acute care, outpatient surgical, small critical access, and inpatient community hospitals

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy’s Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.