

## *Advanced Energy Design Guides* Slash Energy Use in Schools and Retail Buildings by 50%

Owners, contractors, engineers, and architects can easily achieve significant energy savings by leveraging the complex analyses and expertise captured in these guides.

The recently released *Advanced Energy Design Guides* (AEDGs) for K-12 Schools and Medium to Big Box Retail Buildings offer user-friendly design strategies and recommendations to help achieve 50% energy savings in new buildings and major renovations.

Researchers at the National Renewable Energy Laboratory (NREL) led the committee of industry experts that produced the guides. Additionally, NREL engineers helped develop and quantify the recommendations using advanced optimization, sector analysis, and modeling tools created by the laboratory.

The AEDGs provide specific measures, best practices, and tips, such as:

- Methods to significantly improve lighting power densities and building envelopes
- Detailed daylighting options for specific spaces with sample design layouts
- Various HVAC system types that achieve significant energy savings over typical systems
- Plug load reduction and control recommendations based on real-world experiences
- Information about integrating absolute energy use targets into the design process
- Whole-building and technology case studies.

An earlier series of AEDGs is available that targets 30% energy savings. To date, more than 400,000 AEDGs have been downloaded. Energy code developers also use the guides to improve building codes—increasing the impact of the AEDGs.

**Note:** The AEDGs were written in partnership with ASHRAE, the American Institute of Architects, the Illuminating Engineering Society of North America, the U.S. Green Building Council, and NREL's Commercial Buildings Group, under the direction of the U.S. Department of Energy. The guides can be downloaded for free at [www.ashrae.org/aedg](http://www.ashrae.org/aedg).

**Technical Contact:** Eric Bonnema, [eric.bonnema@nrel.gov](mailto:eric.bonnema@nrel.gov)

**References:** Hale, E.; Leach, M.; Hirsch, A.; Torcellini, P. *General Merchandise 50% Energy Savings Technical Support Document*. NREL Technical Report NREL/TP-550-46100. September 2009.

Bonnema, E.; Leach, M.; Pless, S.; Torcellini, P. *Development of the Advanced Energy Design Guide for K-12 Schools—50% Energy Savings*. NREL Technical Report NREL/TP-5500-51437. To be published.



*This new K-12 school in Greensburg, Kansas, used many of the energy efficiency measures outlined in the Advanced Energy Design Guides and was built to be 60% more energy efficient than a similar building constructed to standard code. Photo by Lynn Billman, NREL/PIX 17915*

### Key Research Results

#### Achievement

NREL's Commercial Buildings Group executed advanced energy modeling simulations and optimized the design of schools and retail buildings to develop recommendations that result in 50% energy savings over code. NREL developed the simulation tools and led the committee that produced the guides.

#### Key Result

The *Advanced Energy Design Guides*, based on the work of NREL's researchers, provide owners, contractors, engineers, and architects user-friendly, how-to guidance by climate zone to achieve 50% energy savings. Professionals recognize that these important tools help them to reach high-performance designs.

#### Potential Impact

More schools and retail buildings can be cost-effectively designed and built to use significantly less energy—reducing operating costs and greenhouse gas emissions.