

Pathways for Achieving Zero Energy Small to Medium Office Buildings

Understand the strategies and benefits of achieving a zero energy office space in this discussion hosted by Building Energy Exchange and ASHRAE New York, emphasizing key insights outlined in ASHRAE's Advanced Energy Design Guide for Small to Medium Office Buildings.

Moderator

Zachery Wills, Senior Project Engineer, JBB

Speakers

Daniel Nall, Director, Daniel Nall Consultant LLC

Elias Dagher, Senior Principal, Dagher Engineering

Cassandra Leyden, Head of Engineering, WeWork



Zero Made Easy

Advanced Energy Design Guidance for Office Buildings



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Daniel Nall Consultant, LLC

Advanced Energy Design Guides

- Collaboration of professional organizations and DOE.
- Specialized Project Committee for each guide.
- Oversight is provided via AEDG Steering Committee.
- Backed by DOE's national laboratory leadership, energy simulation, technical analysis and support.
- Open peer review and commentary process.



Advanced Energy Design Guides

- Educational guidance—not a code; not a standard; not a guideline
 - Intended audience are architects and engineers looking for beyond code guidance for implementing energy efficiency strategies
- Available for free as a PDF download from www.ashrae.org/freeaedg

Advanced Energy Design Guides

- 14 guides published and available for free download
- Circulation is 650,000+ copies



www.ashrae.org/freeaedg

Multiple Audiences for the AEDG



Building Owners



Architects

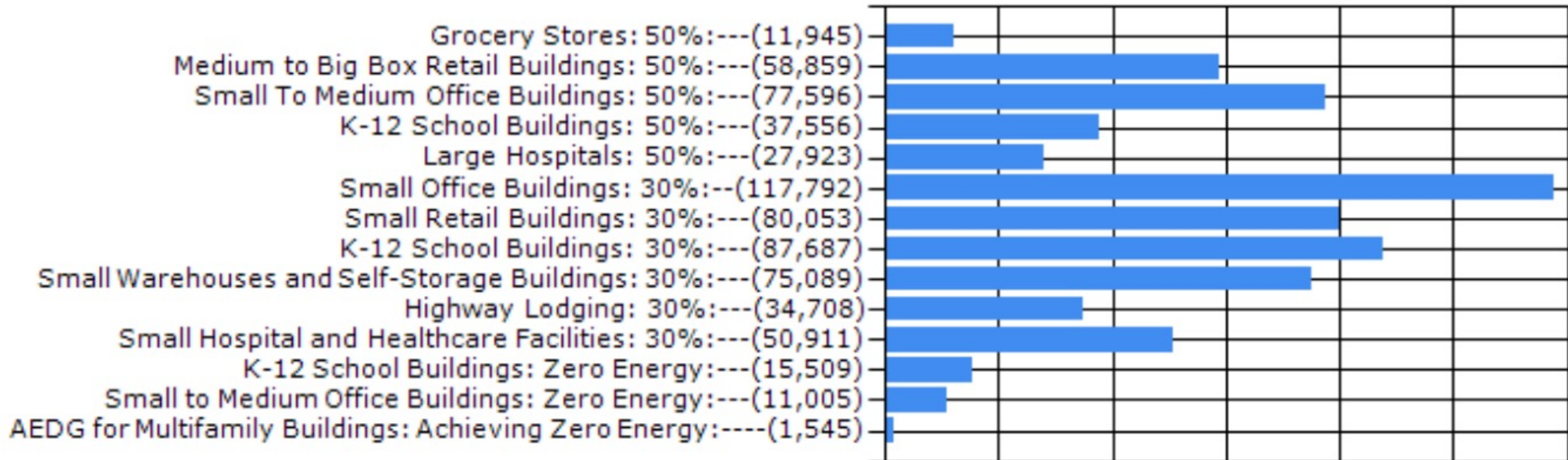


Engineers

Advanced Energy Design Guides

Total Downloads - Guides

Title and Quantity

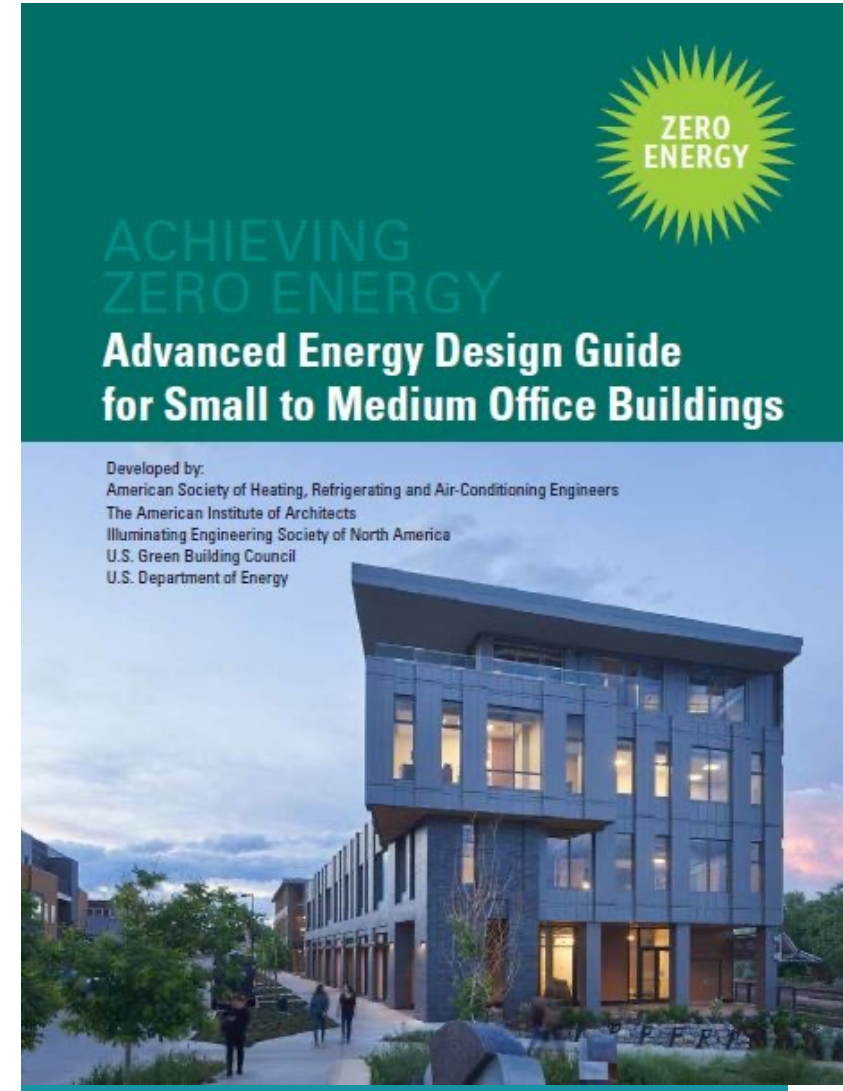


Total Downloads - Guides: 688,178

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Advanced Energy Design Guides

- Definitions and process
- Solution sets by climate zone; mix of prescriptive and performance based approaches
- Guidance on specific strategies, whole-building integration approaches, additional considerations when using new technologies in field
- Recommended energy targets
- Examples of buildings with performance data showing that techniques work and that targets are achievable



The AEDG Development Process

- Steering Committee Representing Stakeholders
- Project (Authoring) Committee of Experts
- ASHRAE Standard 90 Methodology for Building System Comparisons
- Building Energy Simulation by National Lab to Evaluate Energy Conservation Measures
- Draft Documents Incorporating Requirements and Guidance
- Open Peer Review at 65% and 90% Drafts
- Final Review by AEDG Steering Committee
- Final Editing and Publication by ASHRAE

What is in the AEDG?

Chapters

- 1 Introduction**
- 2 Principles for Success**
- 3 A Process for Success**
- 4 Building Performance Simulation**
- 5 How to Strategies**

Includes **184** tips!

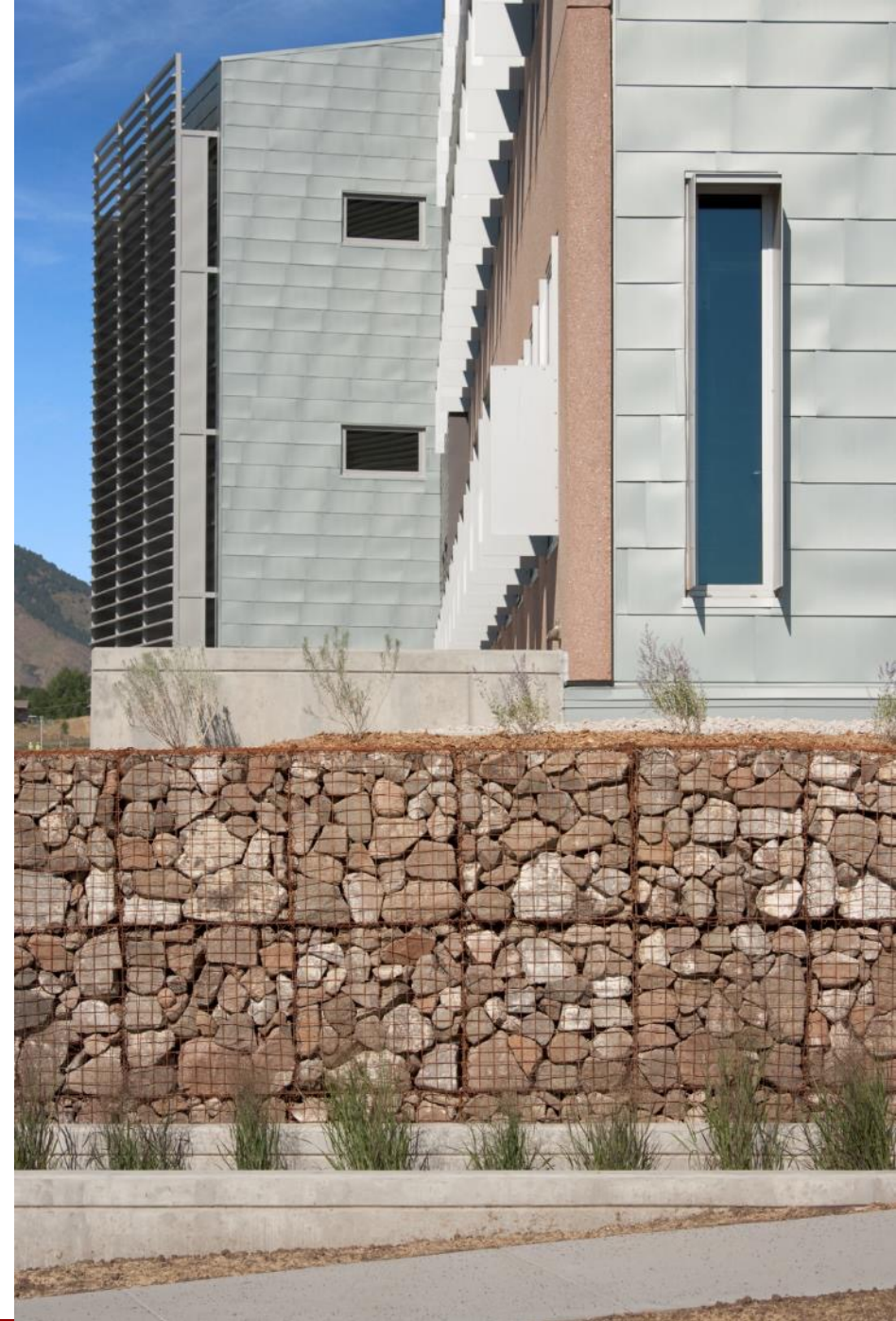
- Building and Site Planning
- Envelope
- Daylighting
- Lighting Controls
- Electric Lighting
- Plug Load and Power
- Service Water Heating
- HVAC Systems and Equipment
- Renewable Energy

Chapter 5: How-to Strategies

- Table showing how the strategies can be applied
- Collection of small pieces of text with strategies to help move towards zero.
 - Building and Site Planning
 - Envelope
 - Lighting (daylighting and electric lighting)
 - Plug Loads and Power Distribution
 - Kitchen Equipment
 - Service Water Heating
 - HVAC Systems
 - Renewable Energy

Zero Energy Building Definition

An energy-efficient building, where on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy.



Zero Energy Buildings

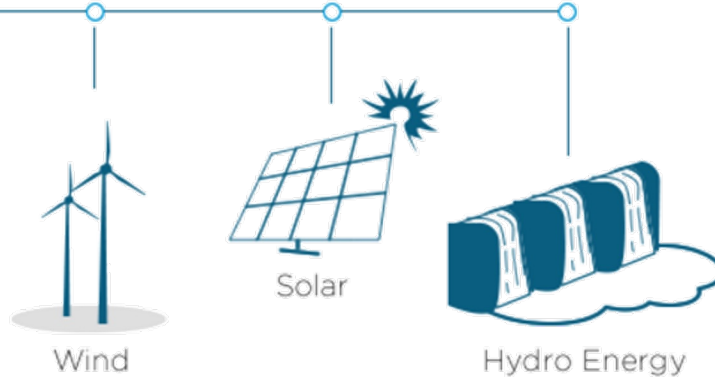
To Create a Zero Energy Building...

STEP 1 Increase energy efficiency

- Efficient building construction
- Efficient systems and appliances
- Operations and maintenance
- Change in user behavior



STEP 2 Address remaining needs with on-site renewable energy generation

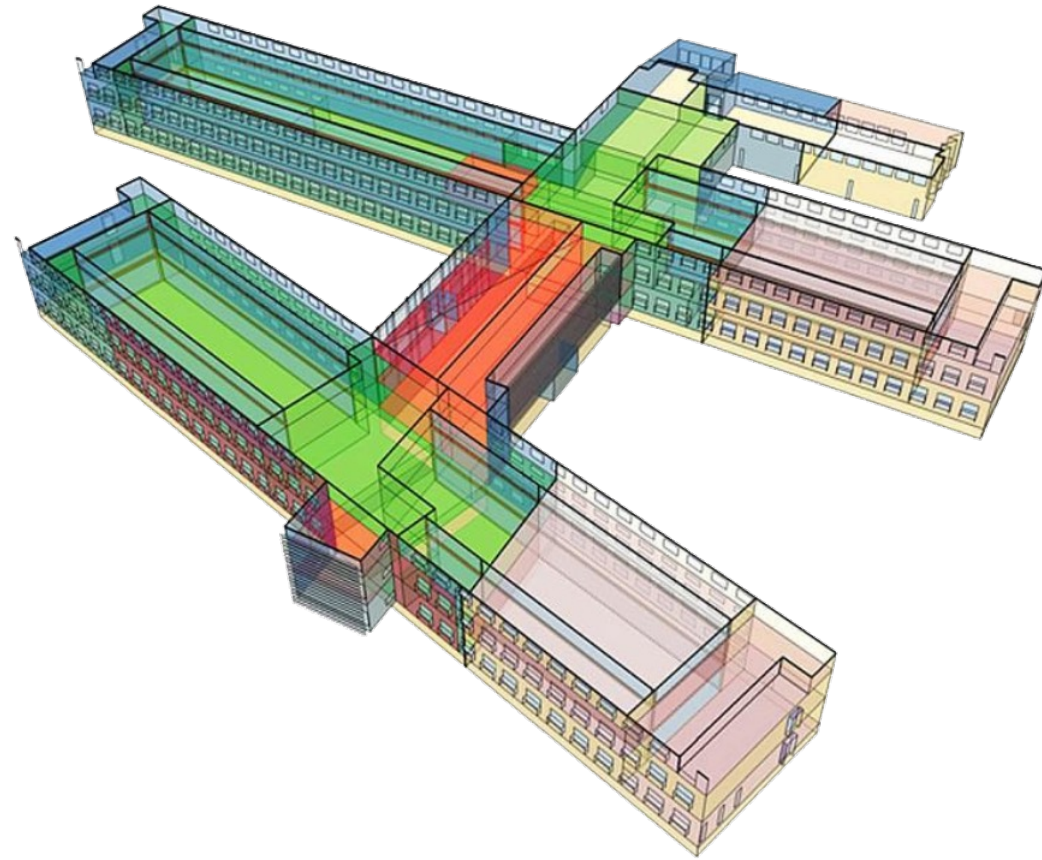


Optimization of EUI reduction
through efficiency and PV
system capacity

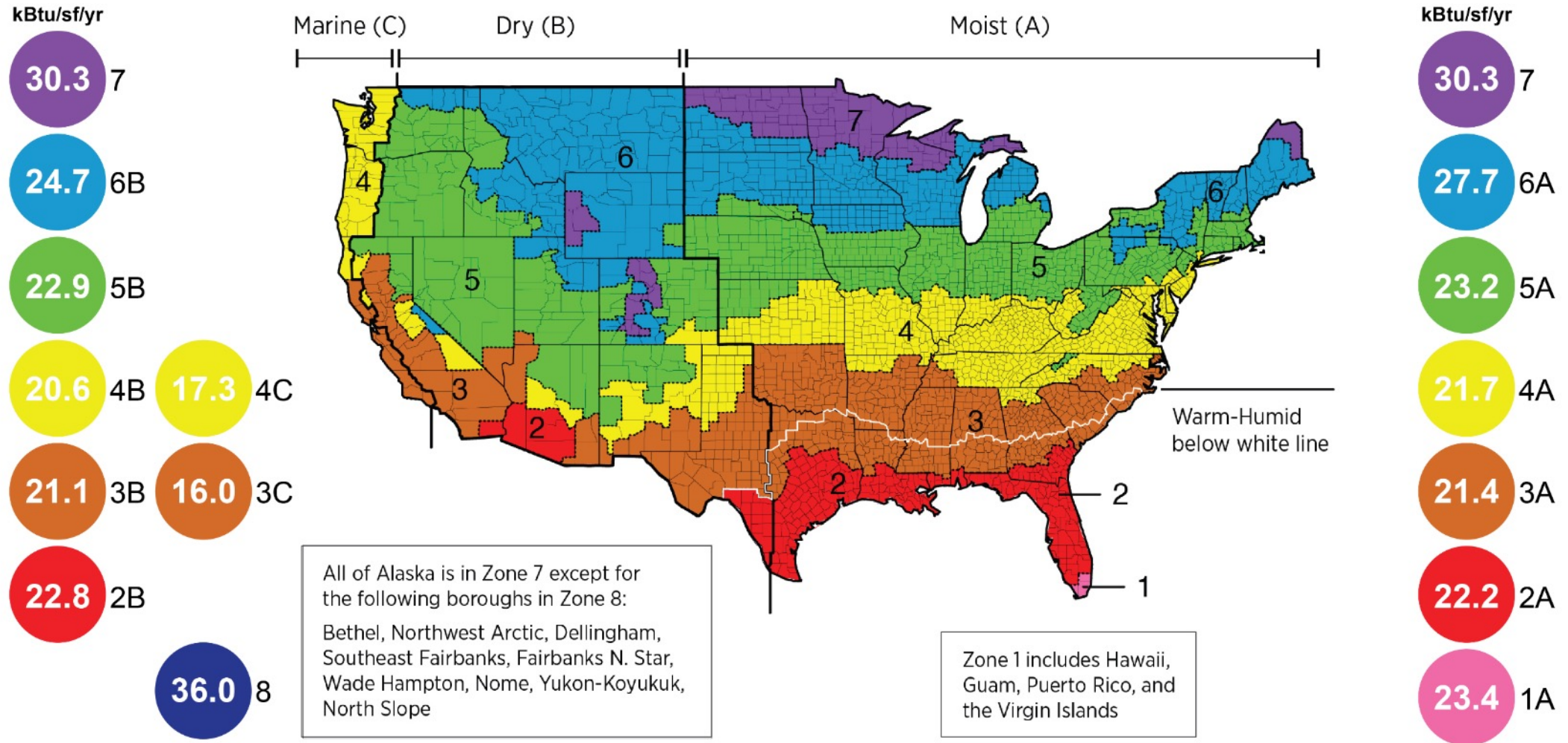
Zero Energy AEDG Goals

The opportunity: zero energy office buildings are attainable

- Measurable goals
- Financially feasible
- Technically achievable in all climates
- Operationally workable



AEDG Zero Energy Office Targets



Zero Energy Case Study

Boulder Commons

Location: Boulder, CO

Area: 100,000 SF

Client: Morgan Creek Ventures

Architect: Coburn Architects & EHDD

Key Strategies:

- Daylighting and natural ventilation
- Automated blinds
- Highly insulated, air-tight envelope
- Variable refrigerant flow HVAC
- BIPV facade



Photo by Bruce Damonte, courtesy of Integral Group

ZE 2.0: Electric Grid Integration

- Grid Friendly ZEBs
- Carbon Neutrality
- Battery Storage
- Electric Vehicle Integration

*It's not just how much energy use,
it is when you use it.*



The AEDG – Your Guide!

Zero Energy Office Guide

available for Download

www.ashrae.org/freeaedg

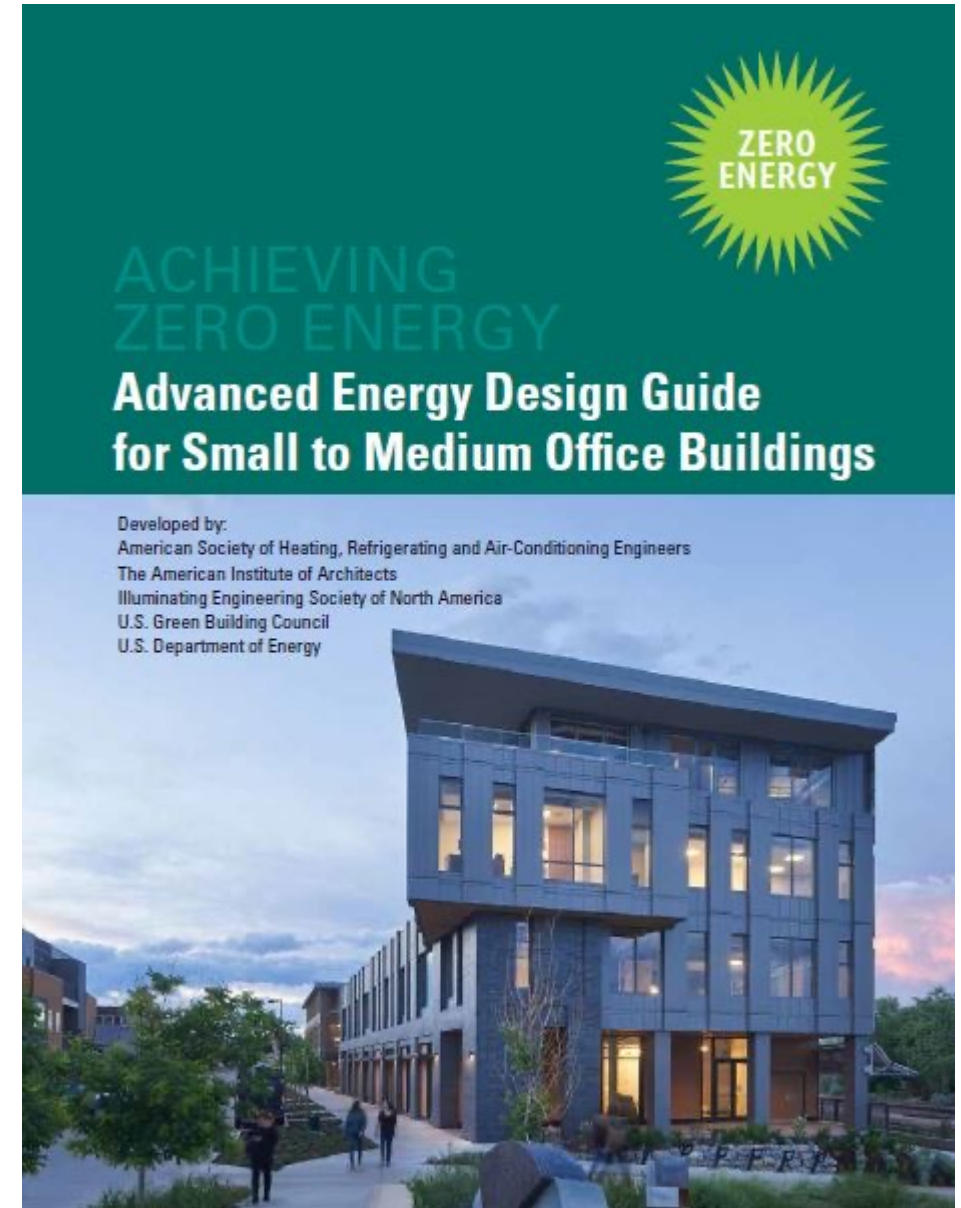
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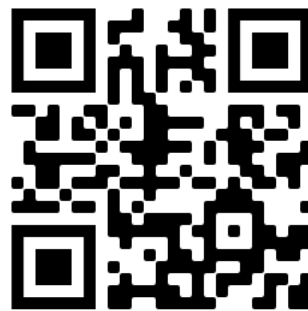
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thank you.

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