

# Greater Efficiency Today Blue Skies Tomorrow

Innovation for a Sustainable Built Environment

Kent W. Peterson, PE, Fellow ASHRAE



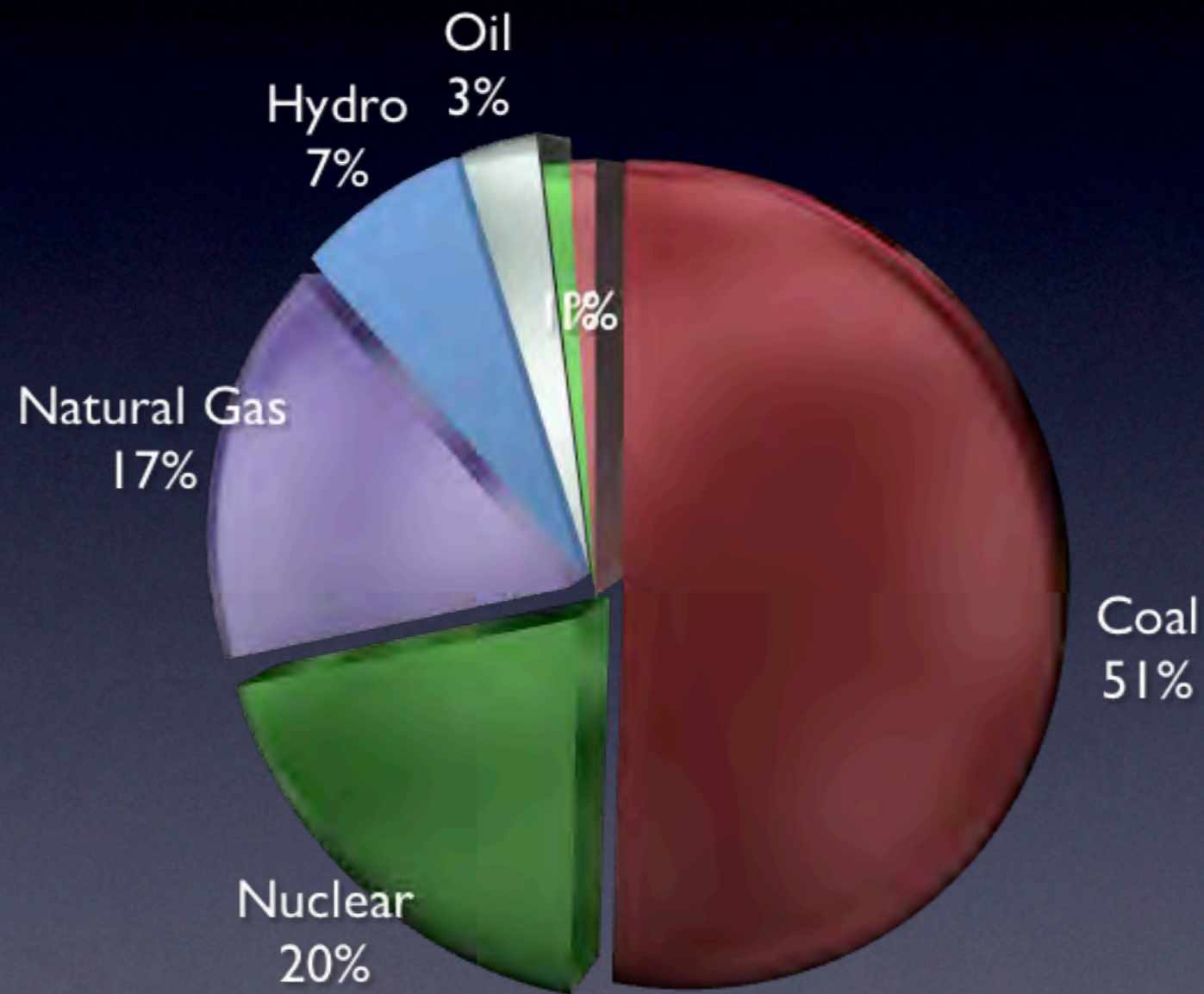
**Think globally, act locally**



Global greenhouse gas emissions have increased  
by 70% between 1970 and 2004

Largest growth in global GHG emissions  
between 1970 and 2004 has come from the  
energy supply sector

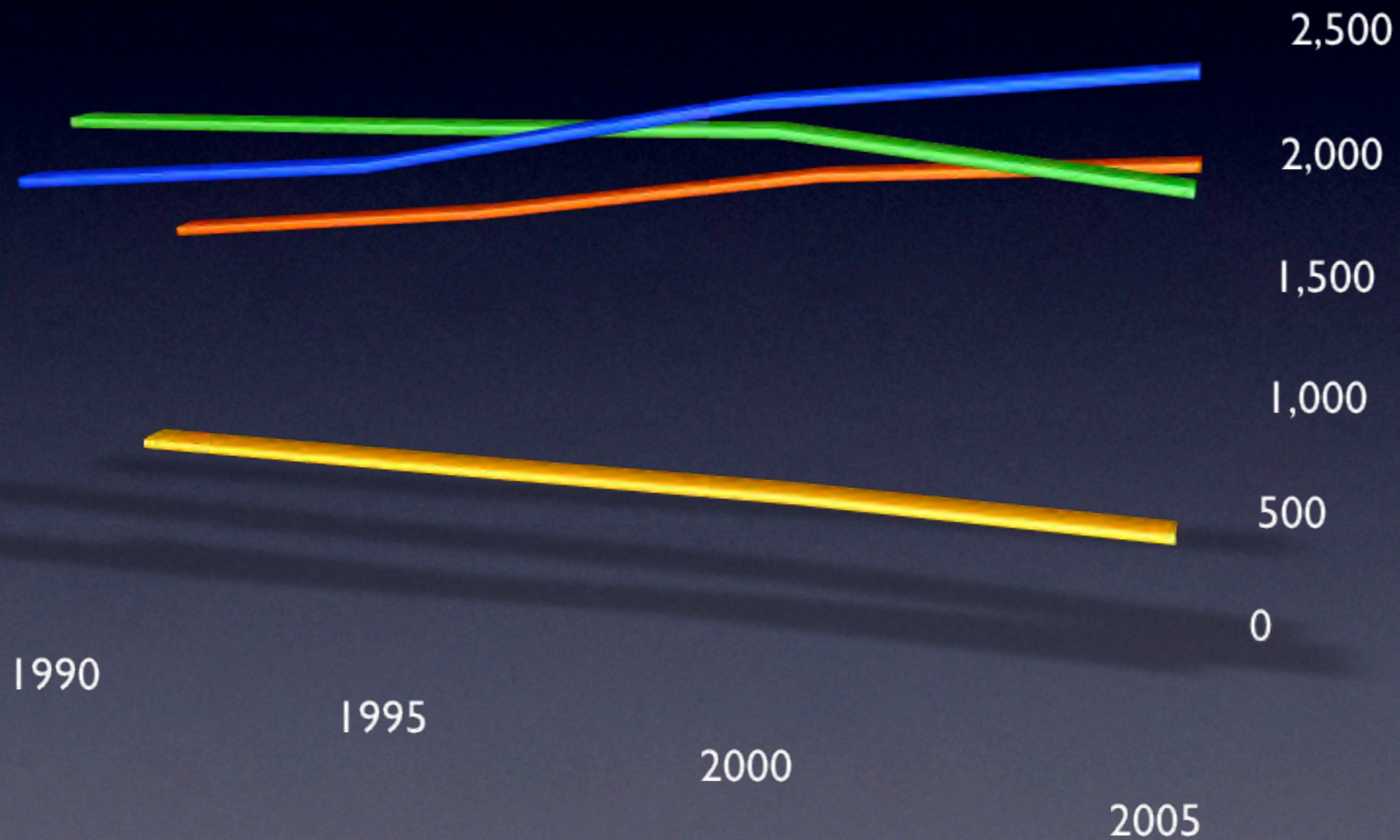
# 2005 U.S. Electricity Generation By Energy Source



# U.S. GHG Emission Trend by Sector

Teragrams of CO2 Equivalents

— Buildings — Industry — Agriculture — Transportation



U.S. EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2005

# 2004 Carbon Emission Rates

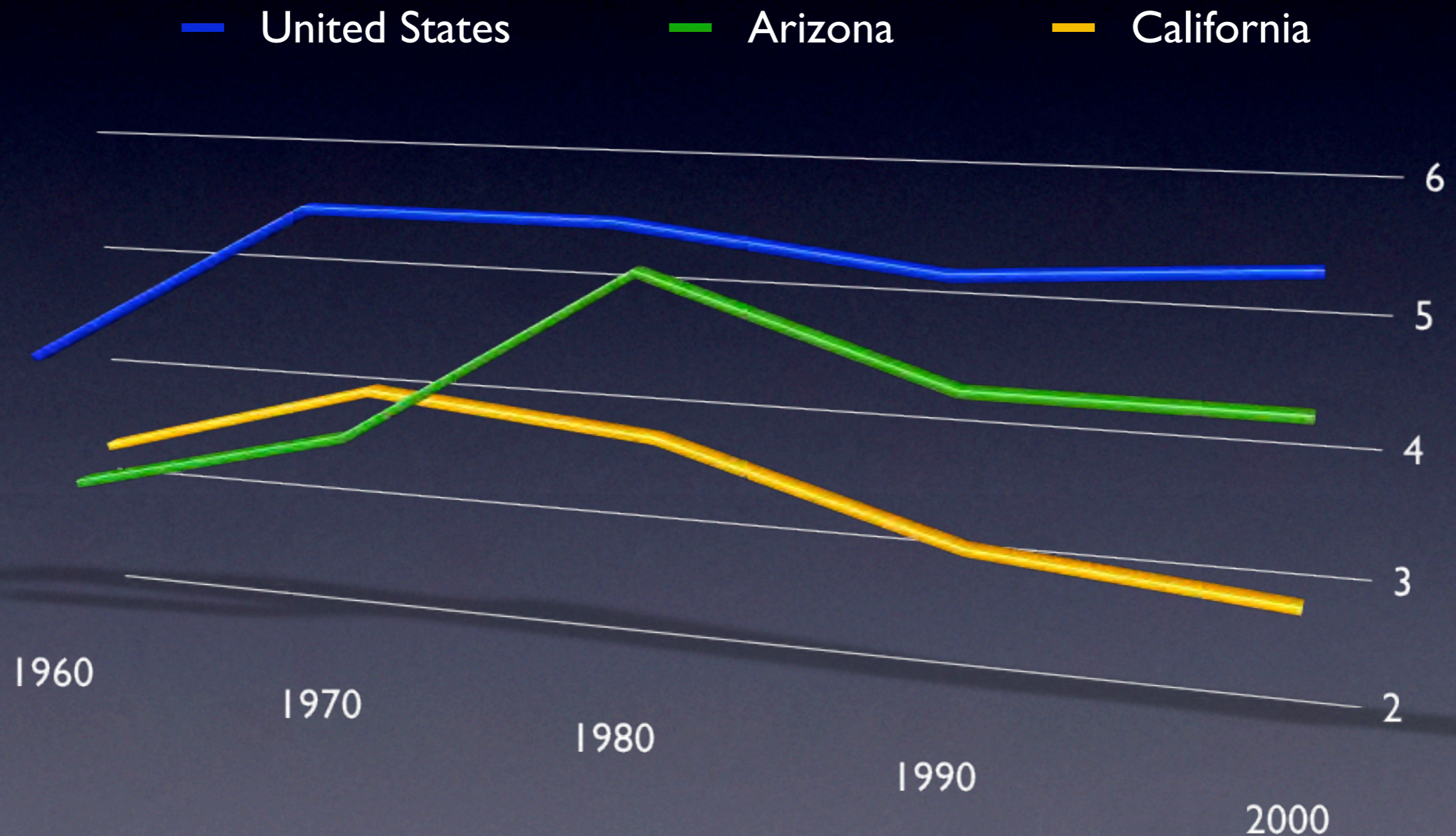
## lb/MWh CO<sub>2</sub> from Electric Power Sector



U.S. EPA Emissions & Generation Resource Integrated Database (eGRID2006 Version 2.1)

# Per Capita Carbon Emission Rates

## Metric Tons of Carbon

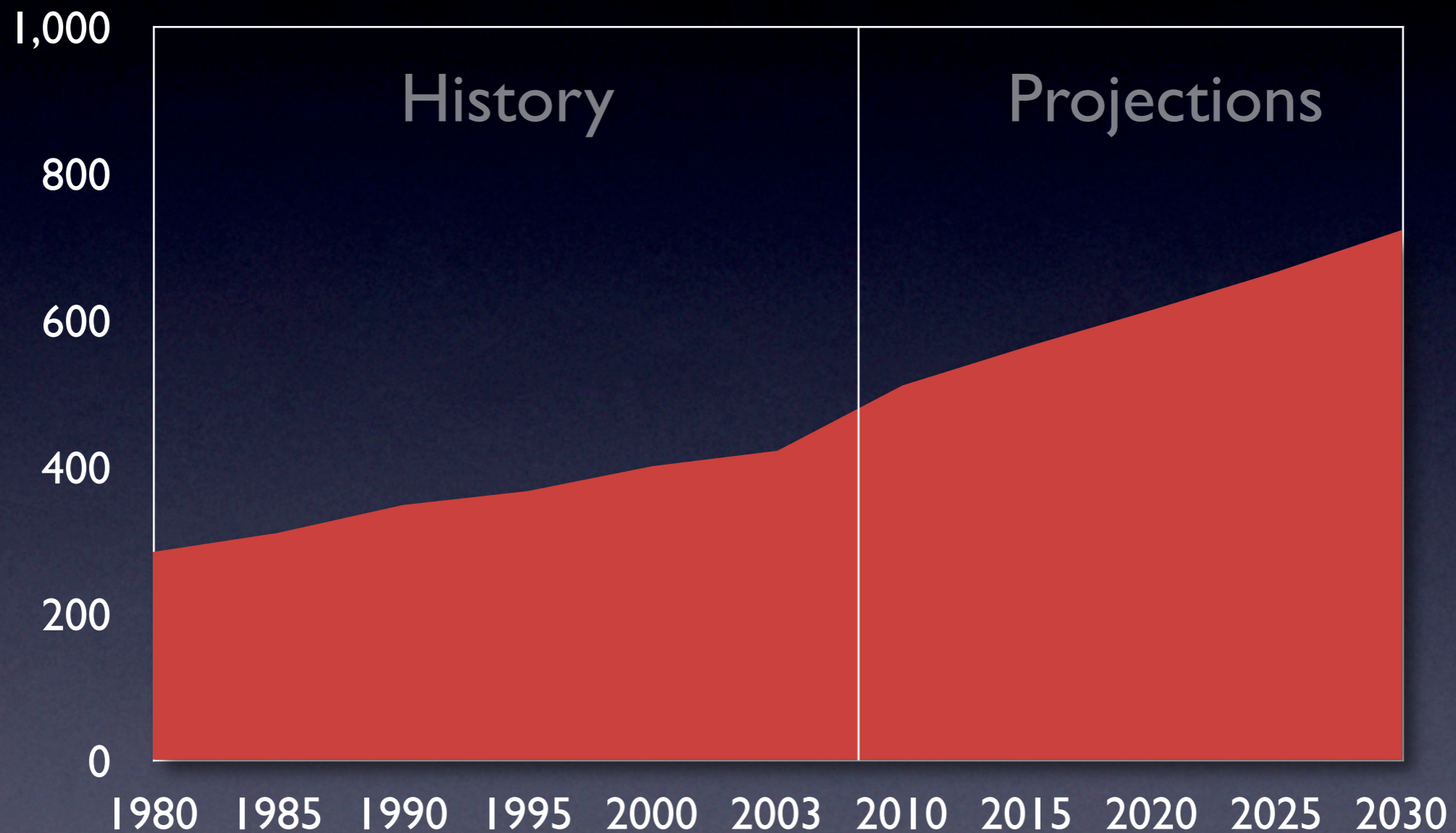


Source: ORNL Carbon Dioxide Information Analysis Center

Why  
We Should Care

# World Energy Consumption

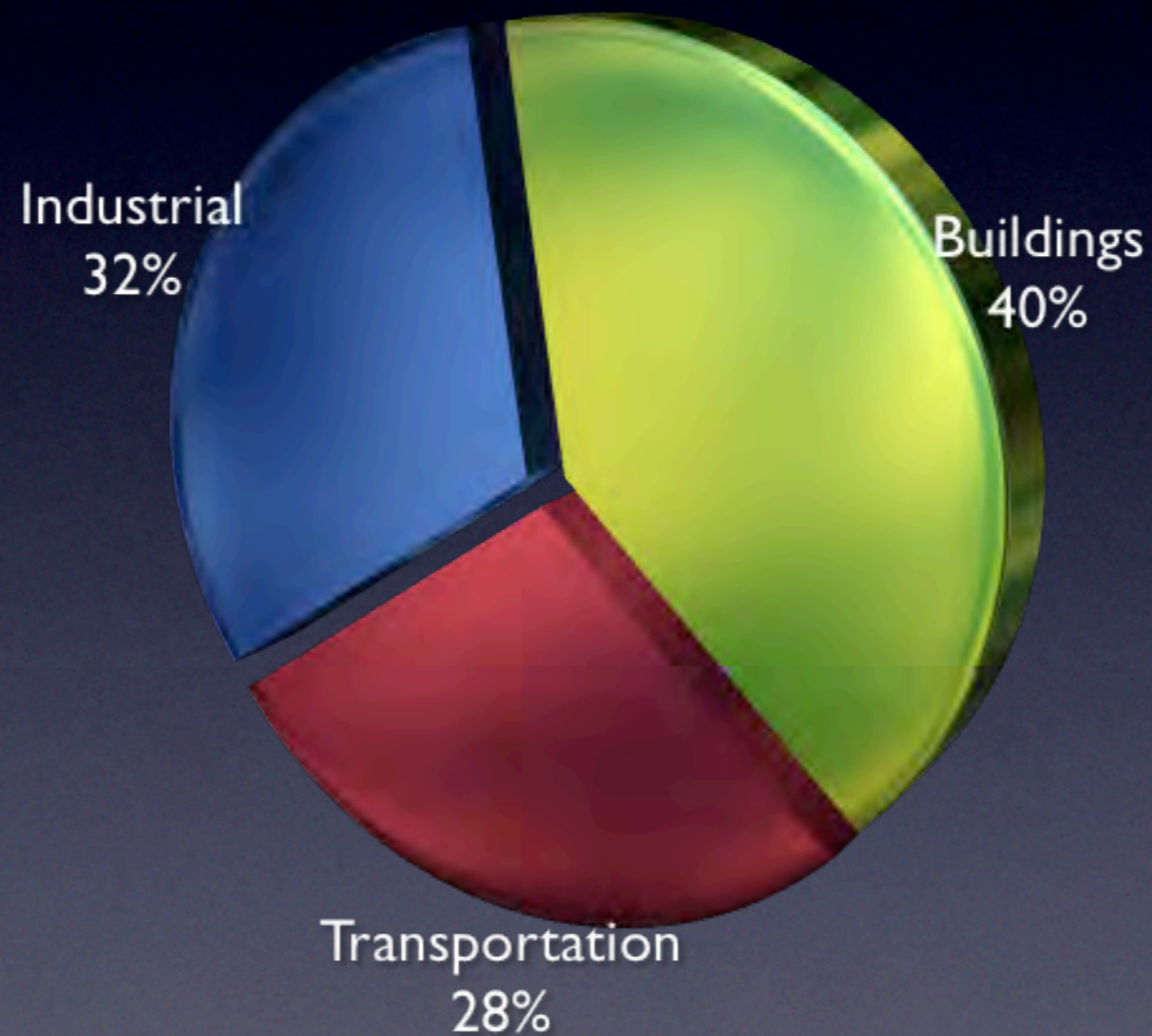
Quadrillion Btu



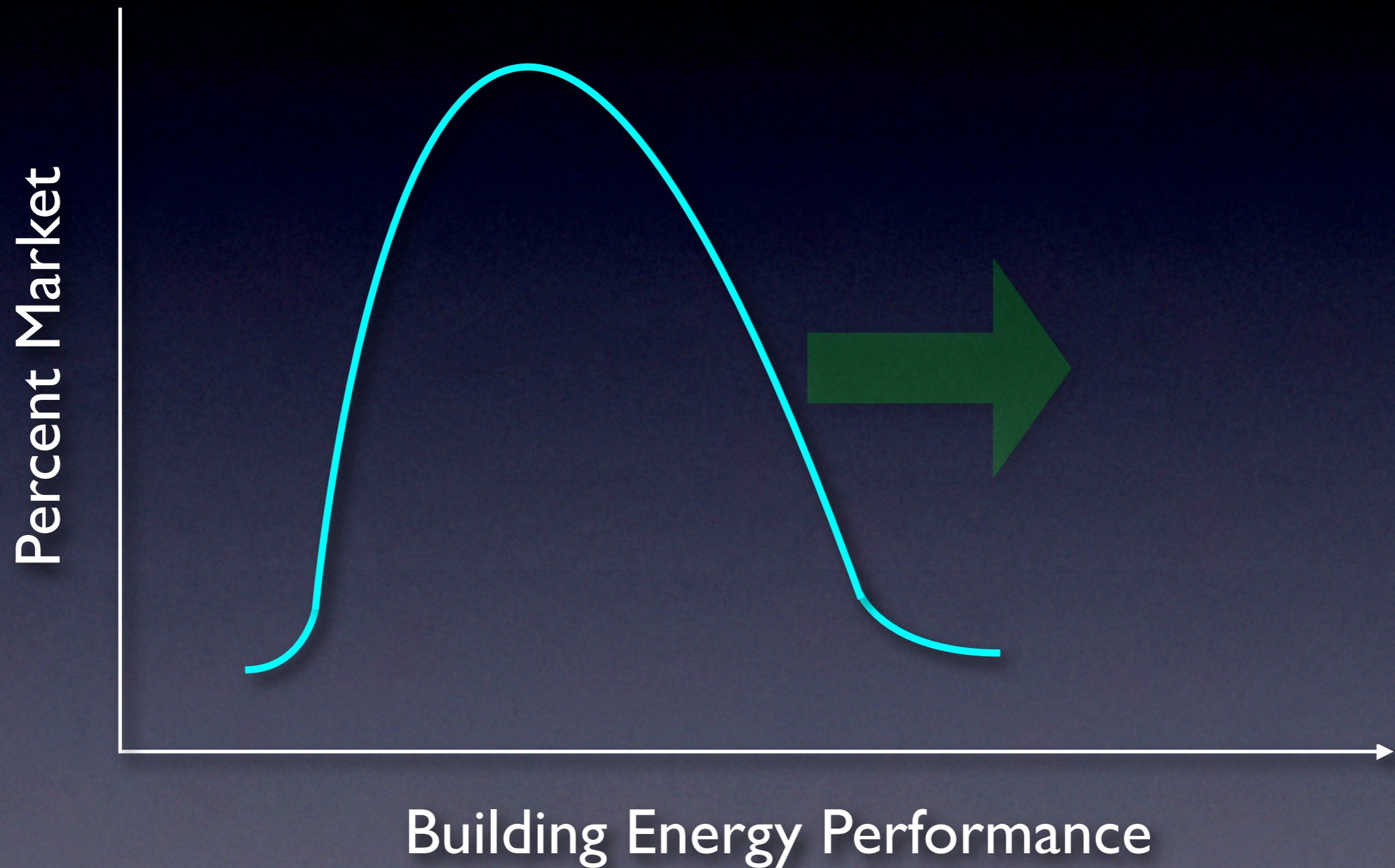
Source: Energy Information Administration (EIA), International Energy Annual Report 2004

# Total Primary Energy Consumption

## United States



# Building Performance Challenge



ASHRAE Research Strategic Plan 2005-2010

Navigation for a Sustainable Future

# ASHRAE Research



American Society of Heating, Refrigerating and Air-Conditioning Engineers

ANSI/ASHRAE/IESNA Standard 90.1-2007  
 (Supersedes ANSI/ASHRAE/IESNA Standard 90.1-2004)  
 Includes ANSI/ASHRAE/IESNA Addenda listed in Appendix F



# ASHRAE STANDARD

## Energy Standard for Buildings Except Low-Rise Residential Buildings

I-P Edition

ASHRAE Standards Committee, the ASHRAE Board of Directors, the ASHRAE Standards Committee (SSPC) for which the ASHRAE Board of Directors is the sponsor, and the ASHRAE Standards Committee (SSPC) for which the ASHRAE Board of Directors is the sponsor, hereby approve this standard as an American National Standard.

This standard is the result of the work of the ASHRAE Standards Committee (SSPC) for which the ASHRAE Board of Directors is the sponsor, and the ASHRAE Standards Committee (SSPC) for which the ASHRAE Board of Directors is the sponsor, hereby approve this standard as an American National Standard.

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 www.iesna.org



**American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.**  
 1791 Tullie Circle NE, Atlanta, GA 30329  
 www.ashrae.org

ISSN 1041-22



BSR/ASHRAE/USGBC/IESNA Standard 189P

## Public Review Draft

### ASHRAE® Standard

#### Proposed Standard 189, Standard for the Design of Buildings Performance Except Green Residential Buildings

First Public Review (May 2007)  
 (Complete Draft for Full Review)

This draft has been recommended for the response of a project team. To comment on this draft, please use the form and the ASHRAE Public Review process. The draft is available for review until May 1, 2007. For more information, visit [www.ashrae.org](http://www.ashrae.org).

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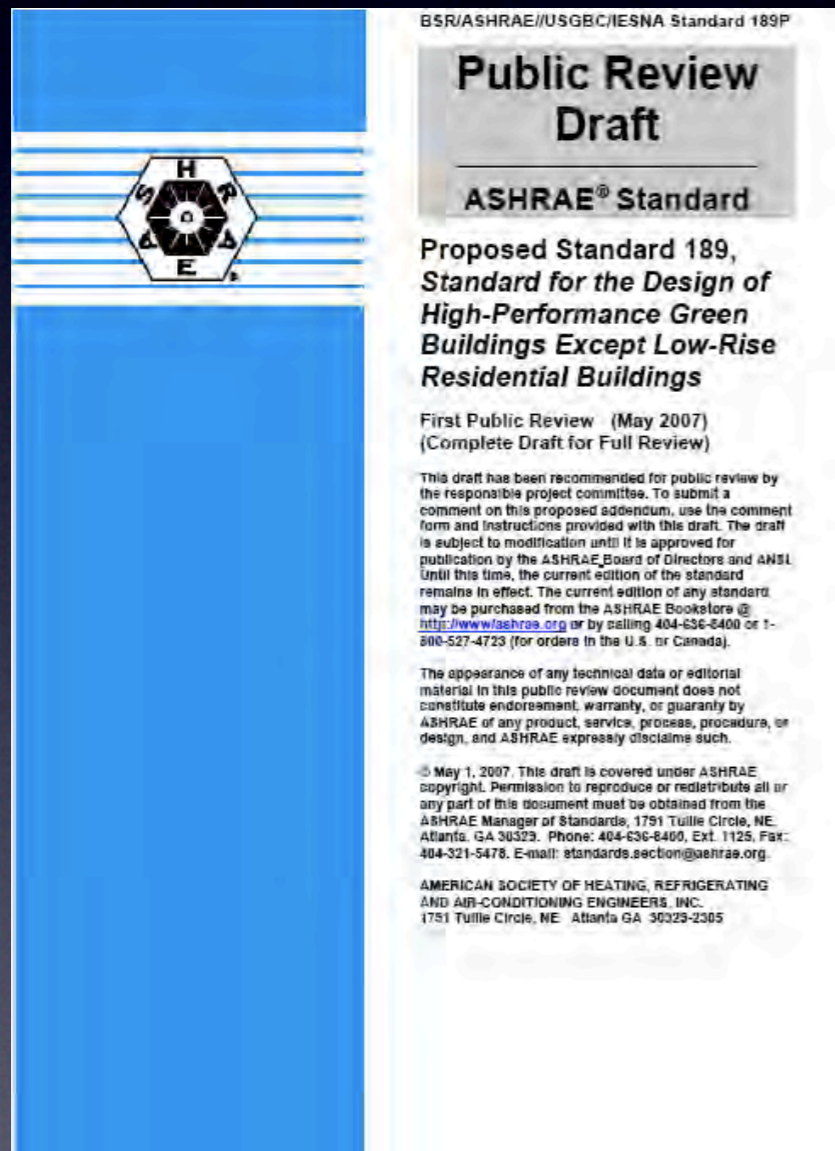
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**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.**  
 1791 Tullie Circle, NE Atlanta GA 30329-2305

# ASHRAE Standards

# Standard 189.1P

## Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings



- Sustainable Sites
- Water Use Efficiency
- Energy Efficiency
- Impact on Atmosphere, Materials and Resources
- Indoor Environmental Quality
- Construction and Operation

It is all about

# Performance

The stated intent for energy efficiency at the design stage must transcend into the build and operate stages

# New ASHRAE Magazine



# Satellite Broadcast

ASHRAE SATELLITE BROADCAST/WEBCAST



**April 16, 2008**  
1:00–4:00 p.m. EDT

**INTEGRATED BUILDING DESIGN:**  
Bringing the Pieces Together to Unleash the Power of Teamwork

This broadcast explains what you and other members of the building team must do to advance high-performance buildings with improved design, construction and operations processes. Buildings that meet the needs of occupants and truly achieve sustainability objectives can only be created if the building community shares its knowledge and experiences. Join ASHRAE in learning more about your role in integrated building design and helping to create a sustainable built environment.



**REGISTER ONLINE AT [WWW.ASHRAE.ORG/IBDBROADCAST](http://WWW.ASHRAE.ORG/IBDBROADCAST)**  
Online registration for satellite site coordinators and webcast viewers will begin March 1, 2007. Satellite viewer registration will begin March 15, 2007.

**There is no fee for registration.** If you have any questions, call 678-539-1139 or email [ashrae-satellitebroadcast@ashrae.org](mailto:ashrae-satellitebroadcast@ashrae.org)

- *Integrated Building Design*
- **April 16, 2008**

# ASHRAE Certification

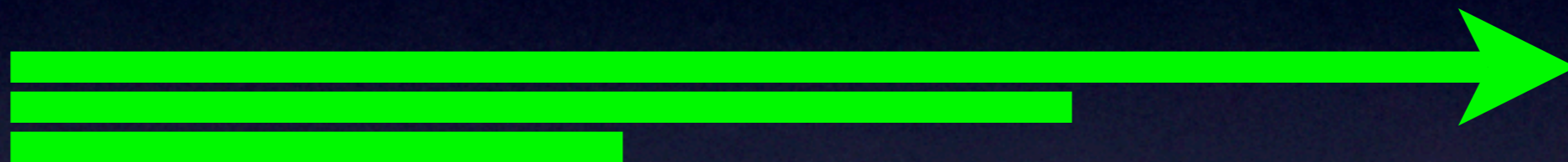
- New certification programs from ASHRAE
  - ▶ Healthcare Facility Design Professional (HFDP)
  - ▶ High-Performance Building Design Professional (HBDP)
  - ▶ Commissioning
  - ▶ Building Operations & Management

# Advanced Energy Design Guides



1999

2020

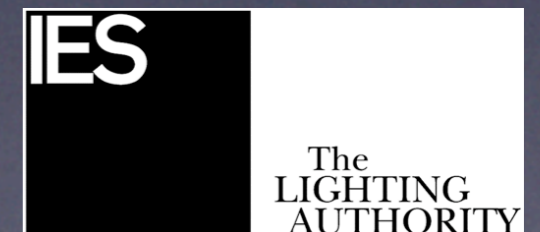


Std  
90.1

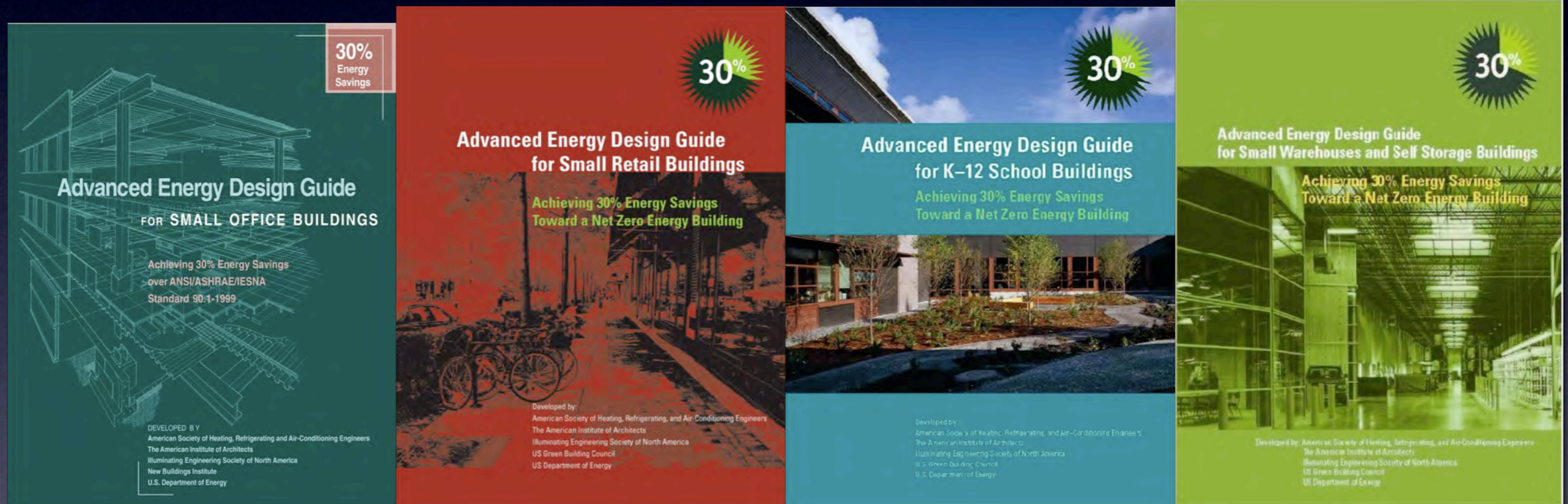
30%  
AEDG

50%  
AEDG

Net Zero  
Energy  
Bldg



# Advanced Energy Design Guides



# AEDG - What's Next?

- Goal to produce two guides per year
- 30% AEDG for Highway Lodging
- AEGs for Existing Buildings
- 50% and beyond towards NZEB

# Consider the Possibilities



# What If

Energy was treated as a valuable limited resource  
and not as a commodity that simply follows  
the laws of supply and demand?

# What If

We were able to drive innovation through improved building research and development?

# What If

We could incorporate the ethics of energy responsibility and environmental responsibility into every building decision we make?

# What If

We could provide a culture for  
continuous innovation in each of our organizations?

# What If

We actually measured and reported the energy performance of all buildings?

# What If

Each of us accepts our responsibility to aggressively incorporate energy efficiency and could deliver better energy performance, year-after-year?

# Make a Positive Difference

