

Roof Insulation-The Top Performer

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PIMA

National Association of State Energy
Officials Webinar

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Trying to cut energy costs?



Your mom was right about wearing a hat to keep warm. But there's a better way to keep your energy costs from going through the roof. Polyiso Insulation. It's quite simply the most cost-effective choice for the R-value you need. And it offers the best energy efficiency on the market. That's why Polyiso is the most trusted and specified roof insulation. To learn more about why your building should be wearing Polyiso, please visit www.polyiso.org.



The Ethics of Energy Conservation

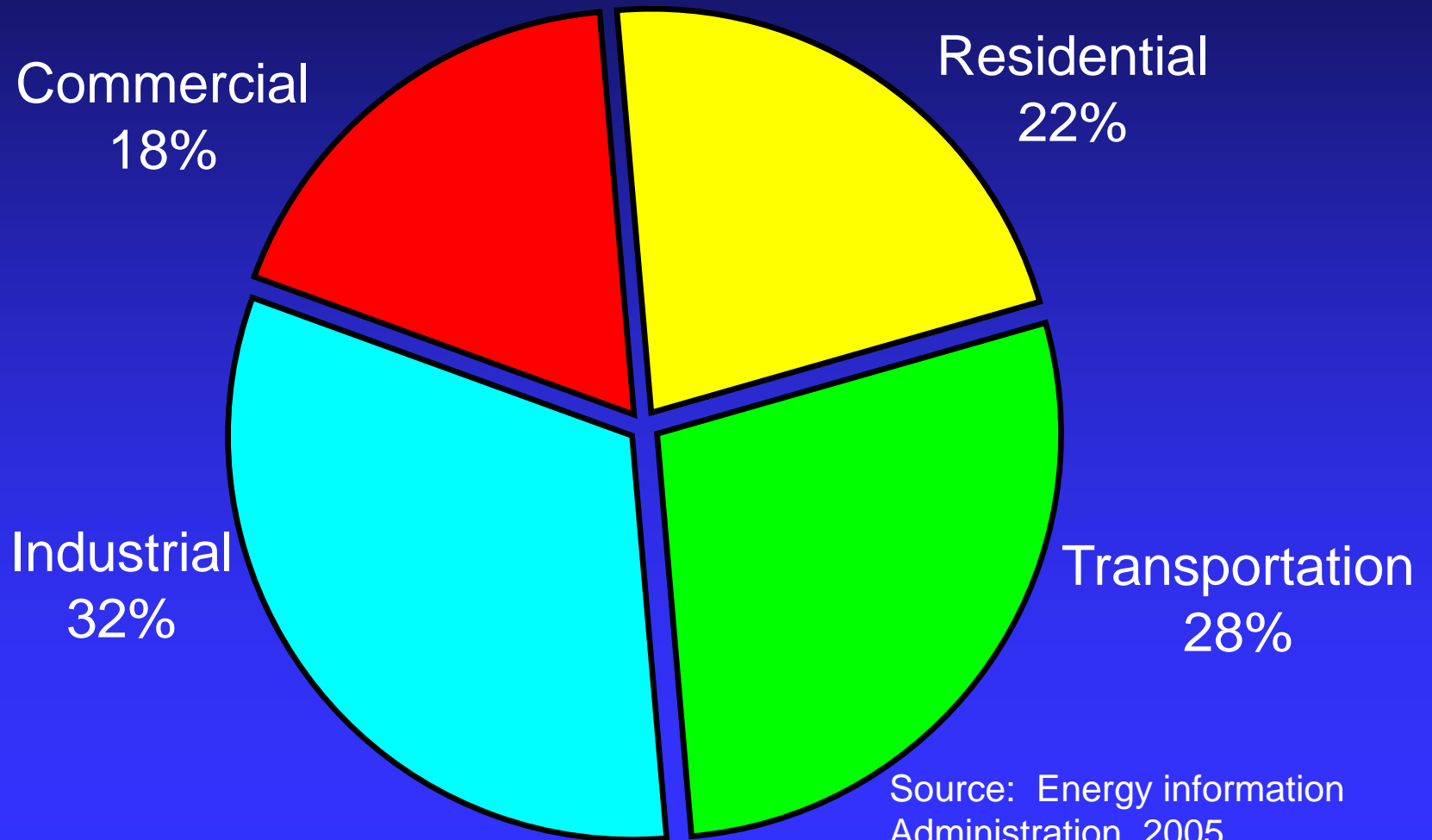
“Concern for man himself and his fate must always form the chief interest of all technical endeavors, in order that the creations of our mind shall be a blessing and not a curse to mankind. Never forget this in the midst of your diagrams and equations.”

Albert Einstein, 1931

“Insulation is sexy”

President Barack Obama, 2009

Buildings: 40% of Our Energy



Source: Energy information Administration, 2005

BOMA Energy Facts

- The commercial real estate industry spends approximately \$24 billion annually on energy and contributes 18% of US carbon dioxide emissions.
- Energy represents the single largest controllable operating expense for office buildings, typically a third of variable expenses.

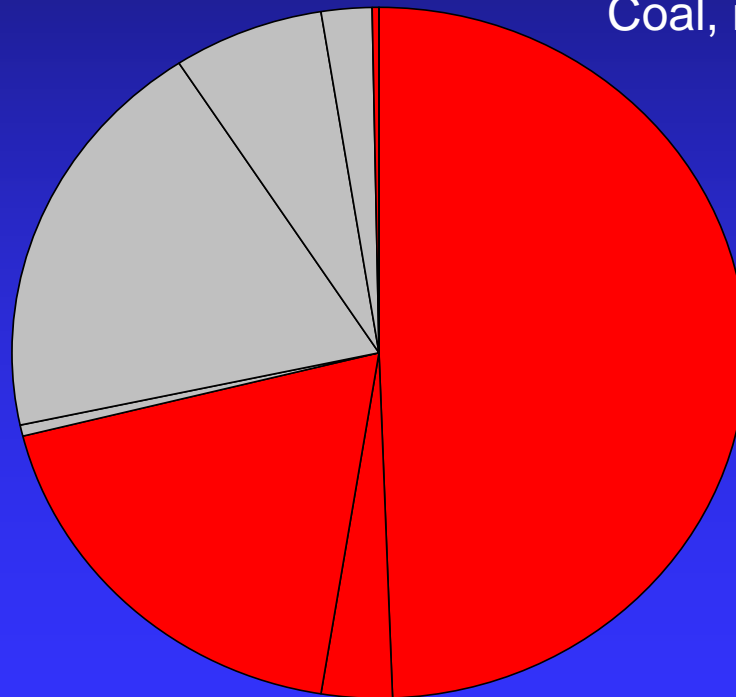
■ www.boma.org

BEEP (BOMA Energy Efficiency Program)

Did You Know? Electricity Generation

Fossil Fuels 71.4%

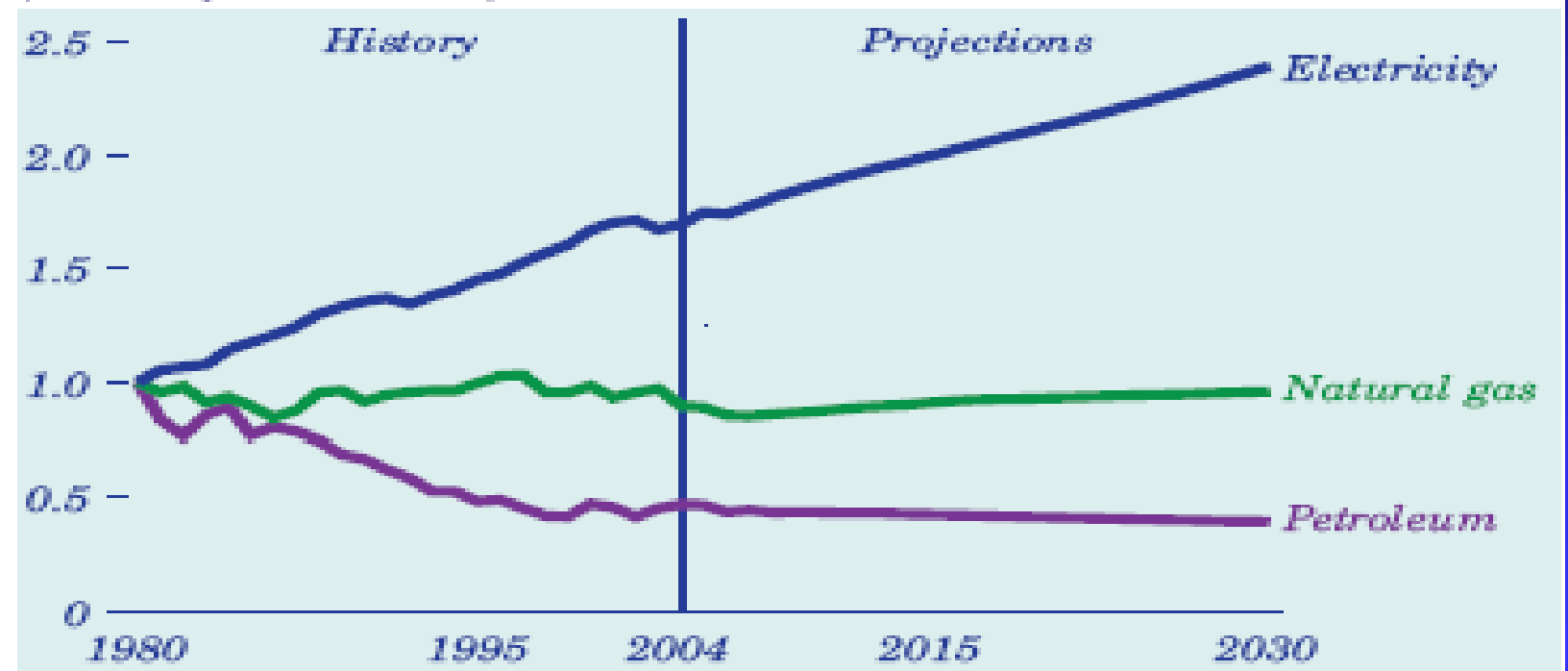
Coal, natural gas, petroleum



Source: EIA 2009

Commercial Energy Consumption

Figure 39. Delivered commercial energy consumption per capita by fuel, 1980-2030 (index, 1980 = 1)



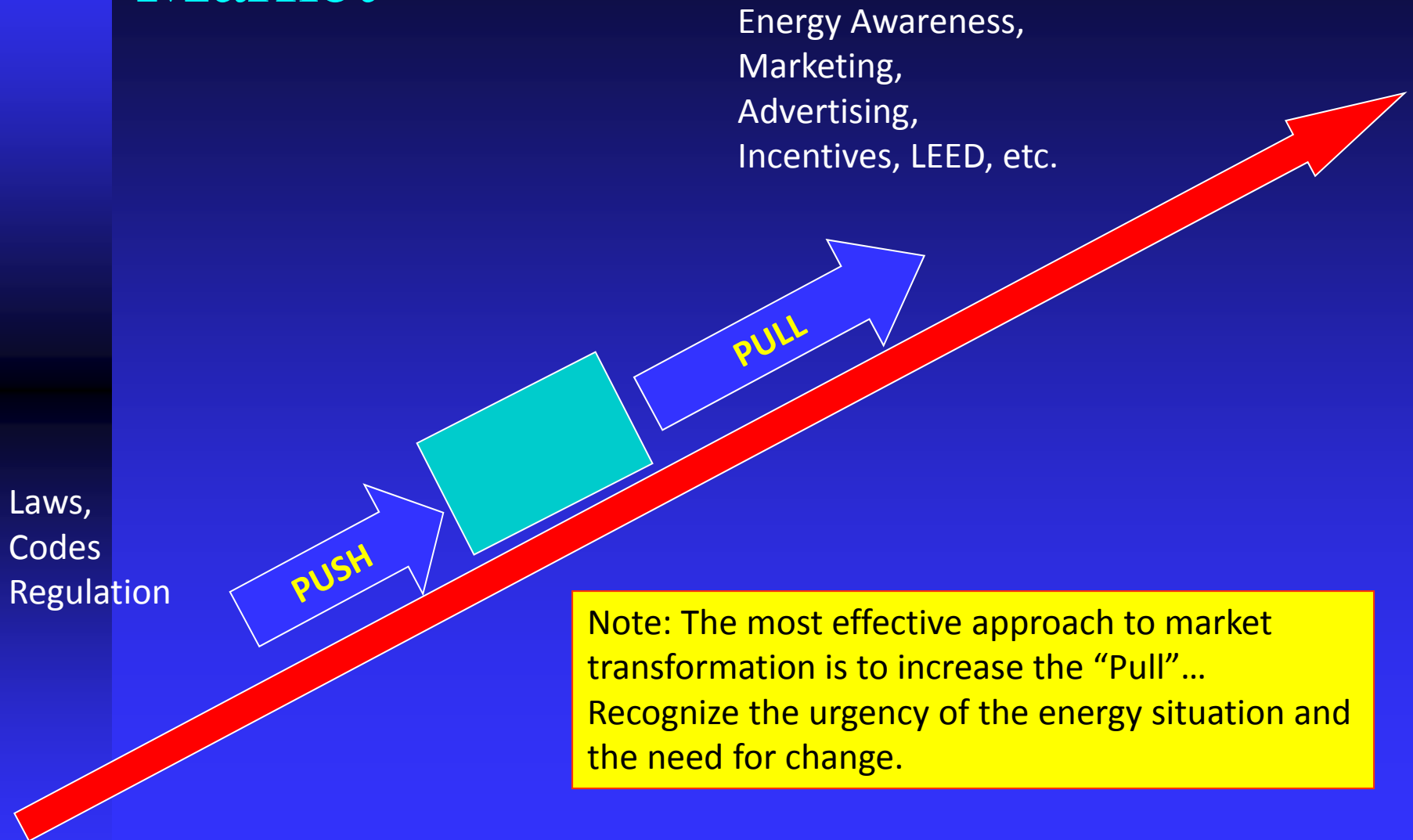
Source: EIA 2005



Beyond Codes

- Code of Hammurabi
- The Burning of Rome--64 AD--fire safety and sanitation required
- Great London Fire--1666 AD
- Chicago Fire--1871
- San Francisco Earthquake--1906
- Hurricane Andrew and Katrina

Moving the Energy Efficiency Market



What Did We Do After 1973?

- **Tried to Save Energy**
 - ◆ Increased Energy Conservation Consciousness
 - ◆ **Developed Standards**
 - ◆ Buildings, Cars, Appliances, Industrial Processes
- **Innovated (developed new technologies)**
 - ◆ Insulation (polyiso), Glazing Technologies, HVAC, Lighting
- **Adopted Minimums (codes)**
- **Provided Incentives**
 - ◆ Utility Programs, Rebates, etc.

Why Roofs Matter

- Not your grandparents' roof anymore
- Roofs now responsible not just keeping building comfortable and dry
- Local and global issues-Storm water runoff, Urban Heat Island, Peak Electricity Loading, Energy Security and Production, Climate Perturbations all impact roofs

Photovoltaic System



Solar Panels



Vegetative Roof



Building Roof Performance

- Majority of Nation's Commercial buildings 3 stories or less
- Median size is 28,000 square feet
- Majority are flat, low slope-perfect fit for high performance continuous insulation
- 50 billion square feet of existing commercial roofs provide huge opportunity
- High thermal retrofits can save \$2 billion annually





What about white roofs?

- Effective in reducing cooling load
- Studies show northern tier states where heating load greater not as effective
- Reflectivity can be affected by aging, discoloration, exposure to air pollution
- Most designers and architects insist on thermal insulation with white roofs as insulation is persistent 24/7.

ASHRAE

- American Society for Heating, Refrigerating and Air Conditioning Engineers
 - ◆ A Standards writing organization
 - ◆ Significant focus on building performance
 - ◆ **Authors of Standard 90.1 - *Energy Standard for Buildings Except Low-Rise Residential Buildings***

Recent Past & Current Trends

New ASHRAE 90.1-2007 Envelope R-values



Trends:

- Energy Prices
- Energy Availability
- Energy Security
- Peak Power Concerns
- Looking back for lost opportunities...

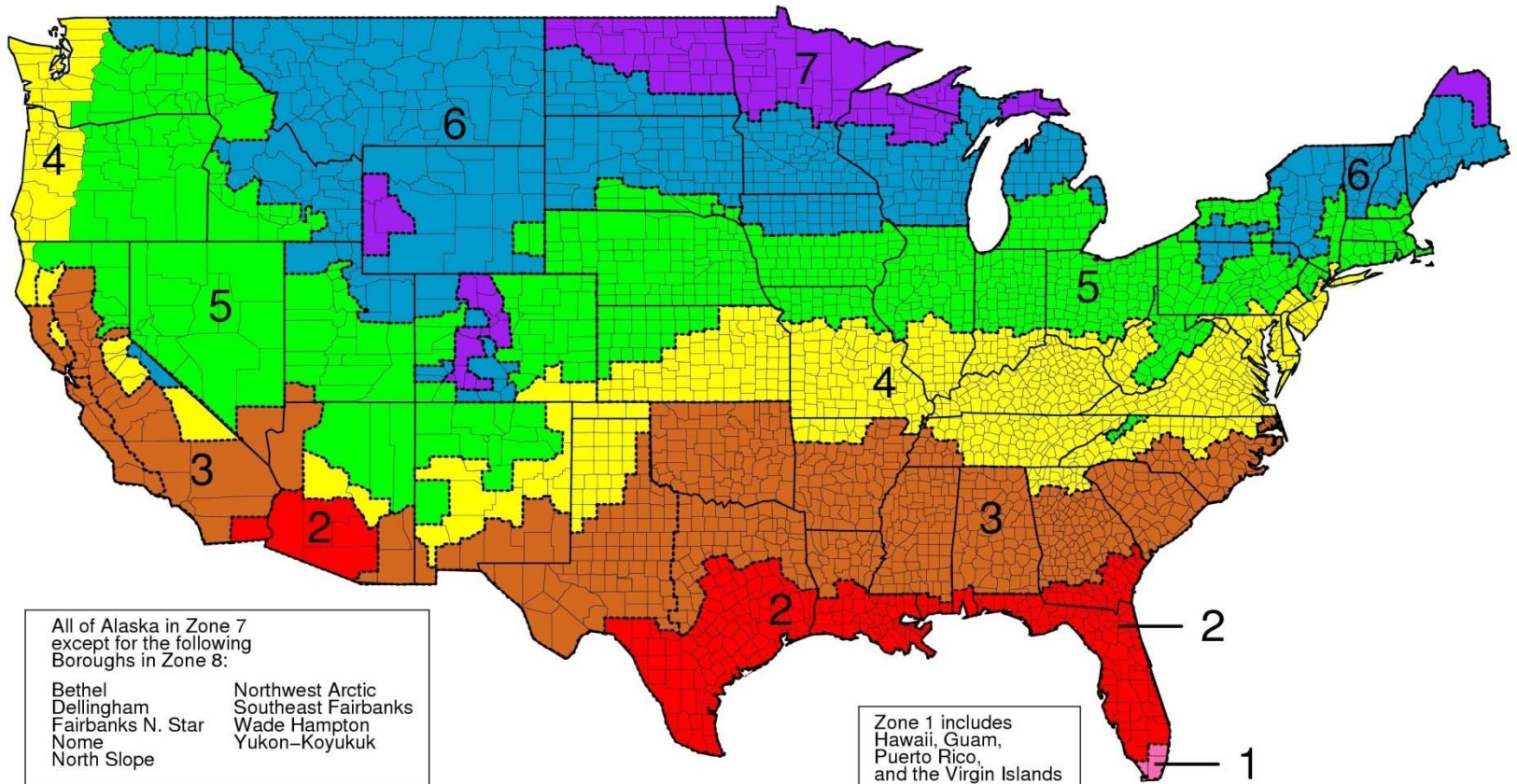
Why is 90.1 Important?

- The National standard referenced in law
 - ◆ Energy Policy Act of 1992
 - ◆ Energy Policy and Conservation Act 2005
- The “Model” against which all state codes must be compared
 - ◆ DOE must certify state code compliance as being at least as efficient as 90.1
- The “Standard of Care” for design professionals

ASHRAE 90.1-2007 and 2010

- Latest increases in roof and wall insulation since 1989!
- Impacts all climate zones and building types
- Passes ASHRAE cost effectiveness tests
- Pending 2010 amendments raise the bar even higher
- Recognizes geographic limits of roof color

ASHRAE Climate Zone Reminder



State Adoption Can Be Slow

- Each State acts on its own time table regarding adoption of its new code
 - ◆ Usually 3- to 5-year cycles
 - ◆ PIMA/AIA Urge Builders Employ the national code requirements even if the state lags behind.

What Does It All Mean?

- An average 33% increase in required minimum insulation levels for roofs
 - ◆ Similar increases for walls
 - ◆ Possible increases for metal building insulation requirements in next code cycle
- When adopted, becomes the new “Standard of Care” for certifying professionals – the building’s “designer of record”

Remember: First change since 1989... These are MINIMUM values... the WORST we can build...

National Versus State

- ASHRAE 90.1 is the benchmark
- The new ASHRAE 90.1-2007 roof insulation values exceed all state codes that adopted energy codes based on the ASHRAE 90.1-2004 version.

Federal Leadership on Roof Thermal Performance

- DOE/ORNL Testing and Advocacy
- EPA Energy Star Roof Products
- President Executive Order 13514-GSA and Sustainability- net-zero-energy buildings
- Federal tax incentives in EPACT 2005

ARRA, New Jobs Bill, New Executive Order Target Reroofing

- State Energy Programs, Energy Efficiency and Conservation Block Grants
- Senate and House Energy Proposals-REEP Program
- **Building Star Proposal** (Jobs Bill)- includes rebates for reroofing that exceed energy codes-reroofing 60 day project from start to finish

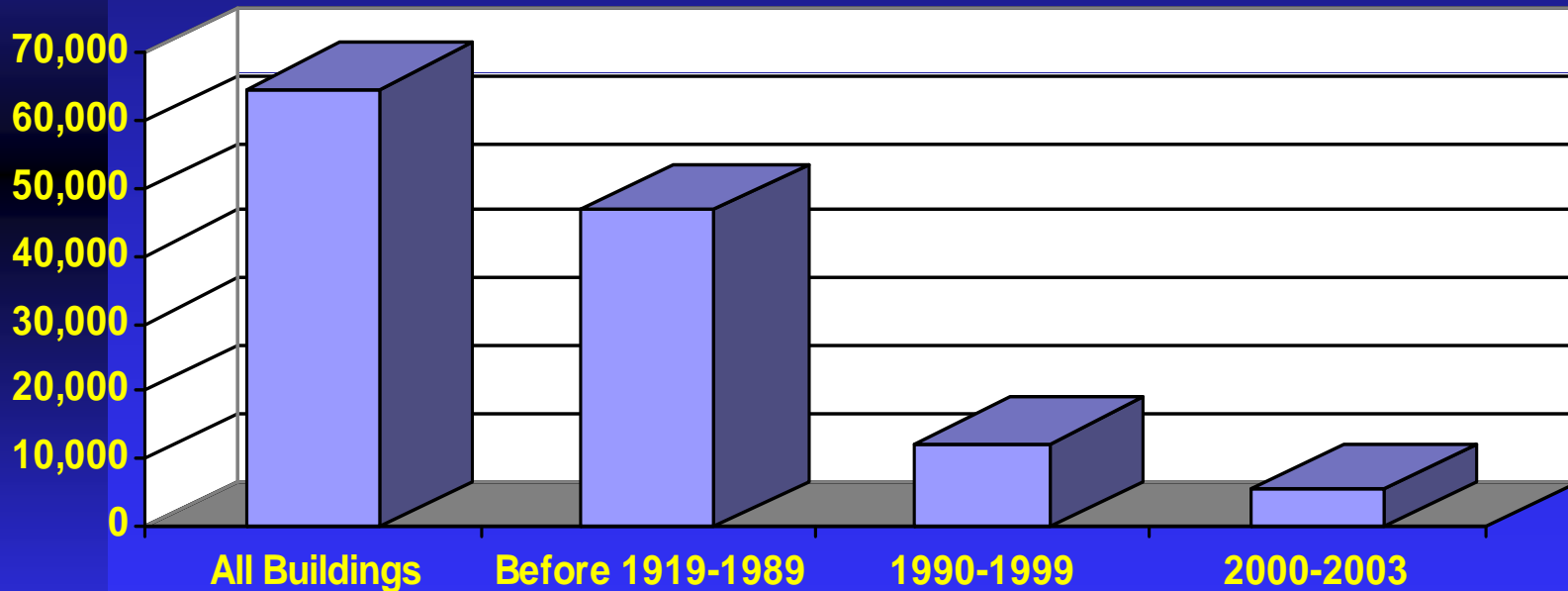
Reroofing

- Re-roof focus is a great opportunity for being a valued partner with up-to-date information
- Should be a top priority for code officials
- Many older codes weak on requiring energy efficient measures during re-roofing
- Exceeding the energy code where it does regulate reroofing

Age Distribution: Existing Commercial Floor Space

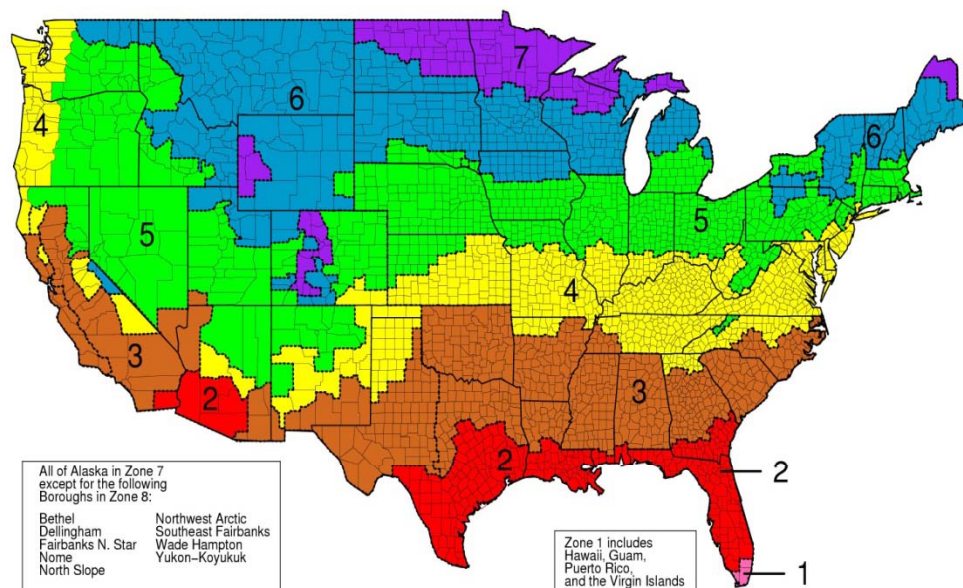
Most Buildings constructed before 1989:

Likely Under-insulated



US EIA Commercial Buildings Energy Consumption Survey, 2003

Consider Upgrading Roof Insulation when Re-roofing



Recommended R-values

Zone	Roofs	Walls
1-3	R-25	R-20
4-6	R-30	R-25
7-8	R-35	R-25

Summary

Buildings (and roofs) Matter

- (More) change is coming
 - ◆ New minimum R-values
- Codes are minimum
 - ◆ Can drive markets
- Beyond the code initiatives
 - ◆ AIA, USGBC, Energy Star, BOMA, Mayors, Governors-local climate initiatives
 - ◆ Shift from supply to demand reduction
 - ◆ Growing awareness of environment/energy link

Tools from PIMA: www.polyiso.org

- Case studies – commercial buildings
- Product/Installation Information
- Energy Code Updates

Some Web Sites of Interest

- www.pima.org
- www.usgbc.org
- www.boma.org
- www.ashrae.org
- www.bcap-energy.org
- www.nrca.net
- www.specright.net
- www.architecture2030.org/
- www.energystar.gov
- www.energycodes.gov/

Questions??

