Historic Buildings and Energy Efficiency

• Operating energy = how much energy a building will use for heating, cooling and illumination

• Buildings account for 40% of ALL energy used in the United States

• Buildings built prior to 1920 use an average 80,127 BTu’s/SF

• Buildings built after 1920 use 100,000 Btu’s/SF

• Buildings built since 2000 use 79,703 Btu’s/SF

• Buildings with poorest energy efficiency
  built 1940-1975
**Historic Buildings and Energy Efficiency**

- Historic buildings where the ratio of glass to wall is often Less than 20%, are better energy conservers than new buildings.

Russell Senate Building

Typical Commercial Building: Note wall mass to window ratio; light harvesting transoms; inset windows; awing
Embodied Energy

• Bound up energy.

• Half of **ALL** the energy associated with the life of a building is embodied in its construction.

1970's National Trust poster
A NEW green building does not guarantee the best environmental result.

“The Greenest Building is the one that is already built.” (yet so many iconic structures sit vacant while millions of tons of waste are created from new construction next to and around them)

-Carl Elefante, APT

“The most environmentally responsible building material is the one that isn’t used.” - Center for Resource Conservation, Boulder, Colorado
WHAT MAKES A PROPERTY HISTORIC?

Designated “Historic” by:

- Federal
- State
- Local Governing Bodies (County and City)
National Historic Preservation Act of 1966
“... the preservation of historic properties is in the public interest not only because of cultural, educational, aesthetic, inspirational, economic, and energy benefits.”
National Register of Historic Places - Nominations

- State Historic Preservation Officers (SHPO)
- Federal Preservation Officers (FHPO) - for Federal Properties
- Tribal Historic Preservation Officers (THPO) - for Tribal Properties

Private Individuals - Organizations - Local Governments

- Initiate the process & prepare the nomination
NR Properties Must Meet Criteria and have Integrity:

- Location
- Design
- Setting
- Materials
- Workmanship
- Feeling
- Association
National Register Listed Properties:

- Most are privately owned
- No restrictions on properties unless imposed by state or local governments
- Must follow preservation guidelines if seeking financial incentives
- Properties affected by Federally involved projects are protected

Digitized Records online at:
http://nrhp.focus.nps.gov/
State and Local Designations

- May have restrictions
- Financial Incentives for rehabilitation may be available - including RE projects
Applying Renewable Energy to Historic Properties
Tom Keohan, Historical Architect, LEED GA

Heritage Partnerships Program
Intermountain Regional Office
National Park Service
U.S. Department of Interior

Type of Designation is Central to Any Required Regulations

• First check with SHPO
• Second check with local governments (County and City)
• Financial Incentives- tax credits and deductions and grants
Preservation Projects including RE features qualify for incentives providing they meet standards and guidelines.
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“Historic Character” – “Historic Integrity”
Minimize the Visual Effects of a RE System

• NPS Preservation Brief # 24-
  Don’t place condensers, solar panels, ... on visible portions of roofs or at significant locations on the site.
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Guidance

- NPS.GOV
- NTHP.ORG
- NREL.GOV

Implementing Solar Projects on Historic Buildings and Districts

Colorado Capital Building
Alicen Kandt, NREL
June 7-8, 2010

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.
Case Studies

19th Century Farmhouse, Georgia
Applying Renewable Energy to Historic Properties

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Gund Brewery, Wisconsin
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Historic Mining Town, Colorado
Applying Renewable Energy to Historic Properties

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Historic High School, Arkansas
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Hilton Hotel, New Mexico