



Federal Energy Management Program

Leading by example,  
saving energy and  
taxpayer dollars in  
federal facilities

# Proceedings of the Workshop on Historic Preservation and Energy Efficiency in Federal Buildings

**December 6-7, 2006  
Decatur House Museum  
Washington, DC**

*Sponsored by*

**Federal Energy Management Program  
Office of Energy Efficiency and  
Renewable Energy  
U.S. Department of Energy**



**U.S. Department of Energy  
Energy Efficiency  
and Renewable Energy**

Bringing you a prosperous  
future where energy is clean,  
abundant, reliable, and  
affordable

## Historic Preservation and Energy Efficiency in Federal Buildings

### INTRODUCTION

On December 6-7, 2006, the U.S. Department of Energy's (DOE) Federal Energy Management Program (FEMP) conducted a Workshop on Historic Preservation and Energy Efficiency in Federal buildings.

About 25% of GSA's 1,600 buildings are on the National Register of Historic Places, and fully 50% are over 50 years old. Similarly, 30% of DOD's 350,000 buildings are historic with a full 69% eligible within 20 years. Both National Park Service and Smithsonian Institution are also known for their stewardship of a large number of historic buildings. Clearly agencies need to take measures in historic buildings in order to meet the EPACT 2005 goals, yet energy projects are often precluded by historic preservation requirements. This meeting was a first step to identify obstacles, recommend solutions, and identify topics for additional research. The meeting concluded with a tour of an HVAC retrofit at Smithsonian Renwick Gallery which demonstrated what to do and how to do it: modern HVAC technology contributing to a historic preservation mission and financed by a public/private partnership with the utility.

The meeting was planned by a committee consisting of Alicen Kandt, FEMP/NREL; Antonio Aguilar, NPS; Barbara Judy, NPS; Constance Ramirez, NPS; Jennifer Groman, US Army Joe Ellen Hensley, NPS; Cynthia Field, Smithsonian Institution; Matt Nowakowski, ANG; Ted Hillmer, NPS; Rosie Field, Mcneil; MaryLynn Wrabel, Energetics; Andy Walker, FEMP/NREL; Gretchen Menand, FEMP/NREL; Chastity Nelson, Energetics; and Daniel Davies, Smithsonian Institution.

Recent hikes in the price of fuel and electricity have cut into agencies preservation budgets in recent years. There are several requirements imposed on historic Federal buildings by various orders and legislation. The National Energy Policy Act of 2005 sets the goal of reducing energy use by 2% per year until 2015, while the National Historic Preservation Act of 1966 requires that the heritage of our buildings be preserved. Interestingly, the Energy Policy Act does not exclude historic buildings from energy reduction goals and does not include historic preservation as one of the reasons that an agency head could exempt a building.

Congress encourages public-private partnership by authorizing Energy Savings Performance Contracts, where the private sector would finance energy improvements in Federal buildings. The act also authorized tax credits for private partners implementing efficiency and renewable energy measures, which could be realized in a private/public partnership. Executive Order 13287 Preserve America also encourages public/private partnerships to meet preservation goals. FEMP has put in place programs to facilitate such partnership.

Many energy managers and practitioners have considered historic buildings "off limits" for energy projects. But with historic buildings representing a significant fraction of the Federal building stock the energy community and the historic preservation community must coordinate

closely and pursue energy projects in historic buildings. Some measures such as restoring historic daylight complement both historic preservation and energy efficiency. Others such as advanced wireless controls can be implemented without affecting the historic fabric. And then there are measures which would never be appropriate for a historic building. This meeting is intended to enhance this dialogue between experts in each field.

The meeting was held at the Decatur House Museum, a National Historic Trust Site in Washington, DC. Participants included officials from Federal agencies and relevant organizations to hear from experts in the field of historic preservation and energy efficiency. The Decatur House was designed in 1818, by Benjamin Henry Latrobe, the “Father of American Architecture,” for Naval War hero, Stephen Decatur **for more information, go to <http://www.decaurhouse.org/>**.

**PROCEEDINGS OF THE WORKSHOP ON HISTORIC PRESERVATION  
AND ENERGY EFFICIENCY IN FEDERAL BUILDINGS**

**DECEMBER 6 – 7, 2006**

**DECEMBER 6, 2006**

Presentations were made by the following individuals:

**OPENING REMARKS: RICK KHAN, DIRECTOR FEDERAL ENERGY MANAGEMENT PROGRAM..... 6**

**CONSTANCE RAMIREZ, FEDERAL PRESERVATION INSTITUTE ..... 6**

**RICHARD PARADIS, STEVEN WINTER ASSOCIATES ..... 7**

**JO ELLEN HENSLEY, NATIONAL PARK SERVICE (NPS), AND ANTONIO AGUILAR, TECHNICAL PRESERVATION SERVICE (TPS)..... 8**

**SUE O’NEIL. STEPHEN DECATUR HOUSE GUIDE..... 10**

**DON HORN, GENERAL SERVICES ADMINISTRATION (GSA) ..... 10**

**JENNIFER GROMAN, U.S. ARMY..... 12**

**CARL ELEFANTE (QUINN EVANS ARCHITECTS) ..... 13**

**OPEN DISCUSSION FORUM. A DISCUSSION ON THE DECATUR HOUSE AND TECHNOLOGY IMPROVEMENTS IN HISTORIC BUILDINGS. BARBARA CAMPAGNE. NATIONAL TRUST FOR HISTORIC PRESERVATION. .... 15**

**BARBARA JUDY, NPS..... 16**

**ALICEN KANDT, NATIONAL RENEWABLE ENERGY LABORATORY. (SLIDES WERE PREPARED BY MATT NOWAKOWSKI, AIR NATIONAL GUARD)..... 17**

**Attachments**

**ATTACHMENT A MEETING AGENDA ..... 18**

**ATTACHMENT B PARTICIPANT LIST ..... 21**

**ATTACHMENT C ROUND ROBIN INTRODUCTIONS..... 24**

**ATTACHMENT D IDEAS FROM THE BREAK-OUT GROUP SESSIONS ..... 27**

**ATTACHMENT E PRIORITY AREAS FOR MORE RESEARCH AND FUNDING.....31**

**ATTACHMENT F ACTION ITEMS ON ENERGY EFFICIENCY IN HISTORIC BUILDINGS.....35**

## **Opening Remarks: Rick Khan, Director Federal Energy Management Program**

*-Presentation available online*

Shawn Herrera of FEMP welcomed participants to the Decatur House and introduced Rick Khan who gave the opening remarks. Mr. Khan thanked the planning committee for their efforts to organize the workshop and provided participants with a brief overview of FEMP.

Mr. Khan explained that FEMP's focus is on market transformation. The goal is to achieve energy efficiency in the Federal Government through public-sector financing due to the lack of appropriated funds. In addition, FEMP will continue to provide services in the areas of outreach, technical assistance, policy coordination, and procurement.

There are a number of public laws that address energy efficiency and restoration of historic buildings. For example, the *Energy Policy Act (EPACT) of 2005* mandates that existing Federal buildings reduce energy use by 2 percent per year from 2006 – 2015. *EPACT* also stipulates that agencies are required to obtain 7.5 percent of their electricity from renewable sources by 2015. Double credits towards meeting this goal will be given to renewable technology installations that are located on a Federal site and when the electricity is used on that site. The *National Historic Preservation Act* (1966- last Amended in 2000) established the Advisory Council on Historic Preservation (ACHP) and the National Register of Historic Places.

Overlapping issues associated with historic preservation and energy efficiency include energy cost savings, waste reduction, and maintaining historic features while adding new technologies to better use and preserve these features.

In closing, Mr. Khan noted that the purpose of the workshop is to:

- Share information through presentations and break-out sessions
- Examine synergies between energy efficiency and historic preservation
- Identify obstacles and possible solutions
- Identify areas requiring more research

He added that he hopes the workshop will result in a list of priorities for advancing energy efficiency in historic Federal facilities and will foster future collaboration among agencies and experts in the fields of efficiency and historic preservation. More information about FEMP can be found at <http://www.eere.energy.gov/femp>.

## ***Round Robin Introductions- Refer to Attachment C***

### **Historic Preservation Learning Portal: Constance Ramirez, Federal Preservation Institute**

*- Presentation available online*

In 2000, the National Park Service (NPS) launched the National Park Service's Federal Preservation Institute. Constance Ramirez's first task involved the development of the Historic

Preservation Learning Portal to support the Federal sector's historic preservation activities. Currently, 17 agencies provide funding for this activity.

The portal serves as an information clearing house providing a direct link to 1,500 historic preservation web sites. The portal functions as a "concept matching" search engine, which enables the user to search different types of materials on one subject. A login on the portal site is available for anyone with a government (.gov) or student (.edu) e-mail address. Visitors to the site can also save their search results and access a news service and discussion forum. Government contractors can obtain a password from the Federal Preservation Institute based on the contracting agency's request.

Future portal features will include:

- Visualization of clusters
- Indexes of State Historic Preservation Officer (SHPO) compliance documents
- An increase in Federal agency participation
- Funding for FY 2007
- Foreign language capability

The NPS maintains and updates the portal and receives new information from sponsoring agencies; the portal operates on each sponsoring agency's web site. To update the portal, sponsoring agencies provide information directly to NPS.

For more information on providing portal input or participation in monthly meetings, contact Ms. Ramirez at 202-354-6967 or e-mail her at [constance\\_ramirez@nps.gov](mailto:constance_ramirez@nps.gov). The portal can be accessed by going to <http://www.historicpreservation.gov>.

**Whole Building Design Guide: Richard Paradis, Steven Winter Associates, Inc.**  
*- Presentation available online*

Richard Paradis' presentation focused on the benefits of using the Federal government's Whole Building Design Guide (WBDG) to find solutions for renovating historic buildings. The purpose of the guide is to provide users with a centralized source of facility-related information in a knowledge based management environment. The site provides topical snapshots, which enable users to explore topics of interest in more detail.

Mr. Paradis described whole building design as an integrated design and team process involving accessibility, aesthetics, cost effectiveness, functionality, security, sustainability, to achieve a high performance building; it is more than energy efficiency and more than green building. A whole building approach involves a review of the entire design to achieve project goals. An effective process includes an integrated project team of designers, engineers, owners, operations and maintenance staff, and specialists in such fields as security and acoustics. During the early planning stage, the team examines all important issues, such as requirements for historic preservation.

The site's newest topical feature deals with Operations and Maintenance (O&M). Mr. Paradis is currently working with the Naval Facilities Command (NAFAC) to develop sustainable design online training; once the training package is completed, it will be available through the WBDG web site.

The WBDG site is currently experiencing over one million downloads per month. One of the driving forces for the popularity of the site is that it is the only way to access building criteria for Federal agencies. Although the WBDG is a Federal resource, only 30 percent of the users are Federal officials.

Other key elements of interest include:

- GSA Leadership in Energy and Environmental Design (LEED) application guide
- Green Construction Guide
- Construction and Waste Management Contractor Database

To access the site's historic preservation guidance, go to:

- WBDG Homepage ->Design Objectives -> Historic Preservation.

The WBDG web site is located at <http://wbdg.org/>.

In his closing remarks, Mr. Paradis invited workshop participants to prepare and submit historic preservation materials for posting on the site or to join one of the WBDG subcommittees.

### **National Park Service (NPS) Technical Preservation Services and Synopsis of Symposium on Improving the Energy Efficiency of Historic Buildings: Jo Ellen Hensley, NPS, and Antonio Aguilar, Technical Preservation Service (TPS)**

Jo Ellen Hensley's presentation addressed the March 2006 Symposium on Improving the Energy Efficiency of Historic Buildings. The symposium served as a fact-gathering activity to facilitate a dialogue among participants and provide new insight into a complex topic. The symposium focused on a NPS "brief," Conserving Energy in Historic Buildings (Preservation Brief #3), which can be viewed at <http://www.cr.nps.gov/hps/tps/briefs/brief03.htm>. The symposium involved 12 participants, including engineers, architects, scientists, and preservationists from the private sector, non-profits, and government agencies.

The symposium included five sessions:

- Evaluation: Measuring the energy performance of historic buildings
- Thermal control in historic assemblies
- Ventilation and moisture control
- Air infiltration and windows
- HVAC and codes

Key points made by symposium participants include the following recommendations:



- A holistic approach should be taken when evaluating energy consumption. Several evaluation factors should be considered, including building condition, history of energy consumption, use, and length of time involved. .
- Building management should be addressed, including physical controls to regulate use, maintenance, selecting equipment for large and small buildings, etc.
- Air conditioning is a major energy consideration. Energy savings have much to do with adjusting indoor air conditioning, including thermostat regulation and control of window use. Lighting and appliance loads may outweigh space conditioning energy costs.
- Insulation is most effective in the attic, followed by walls and floors, if at all.
- Infiltration and exfiltration are considered major areas of heat loss and moisture.
- Windows are an important character-defining feature of historic buildings and replacement is generally not cost effective. Calking, weather stripping and interior or exterior storm windows are recommended instead of replacement.

Antonio Aguilar followed Ms. Hensley's presentation by discussing areas to be addressed as a result of the symposium. One issue involves how to weigh the cost of energy saving measures with the use of materials incurred during insulation as well as the consequences of moisture control and impeding the warming effect in solid masonry buildings. The intent is to keep the interior warm and more protected from extremes of freezing and thawing in cold weather. The question is how do you address this problem with historic buildings?

Another issue involves the hydrothermic action in buildings and vapor retardance. How to address this issue, which is critical to the preservation of historic materials, is evolving; the building industry is waiting for the publication of ASHRAE's new standards of performance.

Mr. Aguilar continued his presentation by discussing "where to go from here" issues, which include the following.

- Energy efficiency and the entire evaluation of historic buildings need a holistic approach. User maintenance, operations, and physical process are important.
- Since each project is unique, development of a general approach for historic buildings would be more useful than specific recommendations.
- An energy brief would be better to provide an approach for improving energy efficiency vs. specific recommendations for improvements, as many project elements differ, as does much of the advice.

- Additional research needs to be performed in order to develop a full appreciation of the costs and effects of retrofit measures, their efficacy, and how the measures perform over time. Since research is a long-term task, it is difficult to plan and fund long-term studies.

### **Stephen Decatur House Museum: Sue O'Neil, Stephen Decatur House Guide**

Sue O'Neil provided a brief history of the Decatur House. Benjamin Henry Latrobe, an architect and Naval hero, built the house in 1818-1819. This was his last commission in the District of Columbia before his death in 1820. In designing the house, his idea was to build a "house as plain as a ship."

The house is currently being remodeled, and through this process, flooring from the 1820s has been revealed. The house first underwent reconstruction in the 1880s and 1890s. Mr. Latrobe incorporated the kitchen into the main body of house (his idea of an American house), which was odd for the time, and located the entertaining rooms on the second floor, following English and British models.

Three Secretaries of State rented the house following Mr. Decatur's death in 1820: Henry Clay, Martin van Buren, and Edward Livingston. John Gatsby built the gift shop and exhibit gallery, which was originally the kitchen and slaves' quarters.

Edward Beal took over the house following Mr. Gatsby's addition of Victorian flooring and gas lighting. The family owned the house until 1956, and upon the death of the last family member, the house was donated to the National Trust for Historic Preservation. This was the second or third house acquired by the Trust.

To read more about the Decatur House, please visit: <http://www.decatourhouse.org>.

### **High Performance and Sustainable Buildings: An Historic Preservation Perspective: Don Horn, General Services Administration (GSA)**

*- Presentation available online*

Don Horn of GSA made a presentation on the Memorandum of Understanding (MOU) for Federal Leadership in High Performance and Sustainable Design Buildings. The MOU was signed at a White House Summit on Sustainable Design in January 2006. Twenty-one agencies signed the voluntary MOU. To read the MOU, go to <http://www.wbdg.org/sustainablemou>.

The signing agencies agreed to commit their agencies to design, locate, construct, maintain, and operate facilities in an energy efficient and sustainable manner. The purpose of the MOU is to achieve a balance for high living standards, wider sharing of life's amenities, maximum attainable reuse, and recycling of depletable resources, all in an economically viable manner consistent with each agency's unique mission.

The MOU goals include:

- Reduction of total ownership costs of facilities, looking at total life cycle cost
- Improvements through energy efficiency and water conservation
- Provide safe, healthy, and productive built environments
- Promotion of sustainable environmental stewardship

Mr. Horn explained that the MOU goals relate to LEED standards. For example, agencies adopting the MOU principles will receive 16 LEED-certified points.

A 1999, the GSA draft report on financing historic Federal buildings found that in all categories, historic buildings are less expensive to operate than non-historic buildings. Tasks examined included operating, cleaning, maintenance, and utility costs. Mr. Horn provided several examples to make his point.

**The Ariel Rios Federal Building** was renovated in 1994 by turning this building into an energy efficient and environmentally friendly facility through the following measures:

- Ceiling height was kept above the windows (not covering them) and walled offices were located away from windows to share the light.
- Functional items were placed near the corridors for easy reach
- Interior storm windows were added

**The Howard Metzenbaum Courthouse**, which was built in 1910, received LEED certification in 2006. The atrium was enclosed in the middle of the building, converting the atrium into a modern gathering space.

**The Internal Revenue Building**, which is leased for the agency by GSA, is owned by a private developer. The entire exterior of the building and most of interior space was renovated, resulting in a 30 percent increase in efficiency.

**GSA's Central Office Building** was renovated and serves as a good example of what not to do: window air conditioning units throughout the building, miles of wire, and pulled window shades - exactly how historic buildings should not be treated. He recommends ordering flexible furniture to adapt to the building and workplace and take advantage of efficient lighting.

Mr. Horn referred to a 1979 report by the Advisory Council on Historic Preservation, entitled *Assessing Energy Conservation Benefits*. The authors examined embodied energy and formulas for assessment, which steered preservation in the wrong direction. He recommends that instead of embodied energy, preservationists should look at life cycle assessments (LCA), which define the scope with parameters, energy through life cycle, materials and emissions resulting in a much lower life cycle cost than a new building.

To conclude, Mr. Horn noted that sustainable design and historic preservation must balance the intents of how to approach a project. Each situation is unique. Furthermore, the intangible factors of historic buildings, such as productivity and cultural values, must not be forgotten.

**Leadership in Energy and Environmental Design (LEED) Rating Systems Update. LEED-NC, LEED-EB, and LEED CI Applied to Historic Buildings; Updates to Existing Systems; New Systems Being Released in Pilot (LEED-Homes and LEED Neighborhood Development (with credit for preservation)): Jennifer Groman, U.S. Army**  
*- Presentation available online*

Jennifer Groman is an architect, certified in historic preservation and an accredited LEED professional. Her presentation focused on LEED trends and how historic buildings fit into these trends. She noted that some Federal agencies find it difficult to adopt LEED standards, including the prescription for historic building restructuring projects. Ms. Groman also provided an overview of the U.S. Green Building Council (USGBC) and the LEED system. For more information, visit the organization's website at <http://www.usgbc.org>.

In many ways, green rating systems are not friendly to historic preservation; however, USGBC's mission is to transform the way buildings and communities are designed. LEED adopts ASHRAE's indoor environmental quality standards, which have been instrumental in encouraging private companies to adopt LEED to improve the workplace environment for employees. A resulting benefit is the reduction of sick hours and improvement of morale.

The major LEED product focuses on New Construction (NC). LEED Existing Buildings (EB) addresses buildings two years or older, focusing on improving the efficiency of existing systems such as the mechanical systems. LEED for Homes is the most recent standard and is currently in the test and pilot phase. LEED for Neighborhood Developments is also new and offers credit for historic preservation.

LEED currently offers five main credit categories: indoor air quality, sustainable sites, water efficiency, energy and atmosphere, and materials and resources.

Site selection is often more difficult to adapt for historic buildings. Energy, atmospheric, and water issues are difficult too, because background knowledge is often lacking. Dealing with physical structures, such as fixtures, can be difficult. Furthermore, although a key LEED feature involves bringing the entire project team together in the early stages, this has proven difficult for Federal historic projects. Accurate LEED implementation involves taking planning, design, and analysis into greater account.

Ms. Groman recommended several steps to ensure that LEED properly addresses historic preservation. A green rating system specific for historic buildings is necessary. The rating system should strive for true value in a building's construction systems and improvements. She also recommended using the GSA LEED application guide as a precedent for Federal rating system guidance.

## Re-Cycling Buildings - the Ultimate Green Strategy: Carl Elefante, Quinn Evans Architects

- *Presentation available online*

Carl Elefante, the luncheon speaker, promoted the reuse of existing buildings for green building design. He provided an overview of sustainability principles, describing the three pillars of sustainability: ecology, economy, and the environment. He described the building industry as a significant contributor of environmental consequences, such as energy, materials, and waste.

Mr. Elefante's remarks included a discussion about the U.S. Department of Interior's (DOI) Standards for Historic Preservation, which serve as operating instructions for DOI's historic buildings. In contrast, LEED standards are prescriptive. The DOI standards guidance is as follows.

1. Use to retain historic character
2. Maintain cultural value
3. Avoid inappropriate changes
4. Change over time is historic
5. Value craftsmanship
6. Repair rather than replace: today, there is little value in something that is not new
7. Cause no harm
8. Protect archeology resources
9. Differentiate new work to an extent
10. New construction should be reversible in the future

He explained that the preservation of historic buildings provides an economic benefit by exploiting the cultural value of a building. However, original craftsmanship is often overlooked. Old buildings also possess an environmental value, which is described in the book, *Building Community: A Frontier for Architecture Education and Practice*, by Boyer and Mitgang and available at <http://www.carnegiefoundation.org>. The authors state that many older buildings are climate responsive and have a respect for their natural surroundings, such as vernacular shelters. Mr. Elefante recommends thinking about the integrated value of current design as being as simple as a grove of trees for climate control.

He stressed the importance of embodied energy and materials conservation as key conversation topics for historic buildings. For example, traditional masonry buildings possess a significant amount of embodied energy. He recommends studying avoided impacts of not constructing new buildings. The [Athena Institute](http://www.athenasmi.ca/about/) (<http://www.athenasmi.ca/about/>) is a good resource for understanding impact avoidance and life cycle assessment. He also referenced the book, *The Restoration Economy*, by Storm Cunningham, which explains the new global mode of restorative development.

Mr. Elefante provided several examples of green rehabilitation projects:

- *Draper Hall* at Berea College, (Berea, Kentucky), by Van Der Ryn. This university building has a superimposed Victorian House style passive ventilation system located in a humid climate. The building tower creates a thermal chimney.
- *The Jean Vollum Natural Capital Center* (Portland, Oregon). This building is a good example of the reuse of a classic loft building. EcoTrust published the book, *Rebuilt Green: The Natural Capital Center and the Transformation Power of Building*, by Bettina von Hagen, Erin Kellogg, and Eugenie Ferichs, which serves as a valuable resource for green building design. For more information see: [http://www.ecotrust.org/publications/rebuilt\\_green.html](http://www.ecotrust.org/publications/rebuilt_green.html).
- *The Monroe School*, (Topeka, Kansas). This is the site of the Brown vs. Board of Education National Historic Landmark. A ground source heat pump for heating and cooling was installed in the building.
- *California College of Arts and Crafts* (San Francisco, California), by Leddy Maytum Stacy. The facility is a good example of adaptive use in a modern context.
- *Chicago Center for Green Technology* (Chicago, Illinois). This facility offers nearly every available green technology upgrade. It looks very normal, but is a good showcase of green technology and design.
- *The Ocean Conservancy* (Washington, DC) by William McDonough and Quinn Evans. The building serves as a good example of poor historic building rehabilitation, because the historic exterior was replaced with an entirely new façade.
- *The Greening of Dana* for the School of Natural Resources and Environment (SNRE) (Ann Arbor, Michigan). An important starting point for a green building project has a green agenda. A key project issue often involves how to expand and find space within a building, which is often a challenge in the design of a green building. The Dana includes a large steel courtyard umbrella, which hangs one floor over the existing building. The building's space increased by 25 percent.

Participants were provided with the following commercial building statistics:

- The trend is to build more commercial facilities
- 27 percent of the current building stock is historic
- 45 percent of the current building stock will be historic in 25 years
- 2 percent of buildings constructed in the last 15 years are LEED certified

*Architect Magazine* published an article on October 15, 2006, entitled the [America Circa 2030: The Boom to Come](http://www.architectmagazine.com/industry-news.asp?sectionID=1006&articleID=385542) (<http://www.architectmagazine.com/industry-news.asp?sectionID=1006&articleID=385542>). The authors state that 85 percent of the current

building stock will be renovated over the next 25 years, which indicates that building reuse is an important issue deserving additional research.

Mr. Elefante highlighted two green building tools that are important to both preservationists and green builders.

**Energy Modeling-** Computer simulations are used to test building energy performance. Critical inputs include building configuration, envelope details, equipment and controls, occupancy patterns (such as behavioral issues), and indoor air quality (IAQ) settings. Critical outputs (estimates of energy use and cost) include energy use, peak demand and energy trade offs. An energy model can be realistically calibrated for existing buildings, which is another high point of historic building upgrades vs. new construction.

**Life Cycle Analysis (LCA)-** LCA is an important tool for the energy practitioner, because this too addresses the before, during, and after-use impacts on the environment. Buildings are complex systems, composed of a super structure, the shell, the interior, and operating systems. The U.S. Environmental Protection Agency (EPA) and National Institute of Standards and Technologies (NIST) BEES 3.0 LCA analysis includes only before and during impacts; he recommends that this issue should be addressed by preservationists. William McDonough's book, *Cradle to Cradle*, clarifies the use of LCA. Also, [The Natural Step](http://www.naturalstep.org/com/nyStart/) (<http://www.naturalstep.org/com/nyStart/>) is working on LCA issues. TNS has many parallels with the Department of Interior's guidelines.

### **Break-Out Groups: Identify Opportunities, Challenges, Strategies and Solutions - Refer to Attachment D**

Participants were divided into three breakout groups to examine issues in more detail:

- Group 1: Sustainability Rating Systems (such as LEED) and Historic Buildings
- Group 2: Importance of Holistic Approach to Energy Efficiency Projects in Historic Buildings and Unintended Consequences of Energy Efficiency Projects in Historic Buildings/Energy Saving Myths
- Group 3: Best Practices and Latest Trends in Energy Efficiency Projects in Historic Buildings

**DECEMBER 7, 2006**

### **Open Discussion Forum. A Discussion on the Decatur House and Technology Improvements in Historic Buildings: Barbara Campagne, National Trust for Historic Preservation.**

Barbara Campagne provided an overview of the Decatur House's retrofit history. The project was largely unsuccessful due to the installation of an HVAC system. She noted that over the

last 10 years, most National Trust HVAC retrofits were unsuccessful; the Trust has since instituted a moratorium on any HVAC retrofits. The Trust determined that the installation of “new” technologies change the way in which historic buildings function.

She referenced the 1991-1992 New Orleans Charter, which endorses the need for balance between architecture and artifacts in historic property. For example, a high impact velocity system was installed at Decatur House in response to concerns over the building’s artifacts. However, the system created greater temperature fluctuations in one day, than without the HVAC system. The fluctuations caused more damage to materials than the more steady increase and decrease of temperature that is caused by masonry walls. Other retrofit features included a wireless network; after the installation they were informed that the building was too close to the White House and the network is now blocked. A new sprinkler system was installed, but the system leaks, causing further damage to the house.

One of the Trust’s most successful retrofit sites is Drayton Hall in Charleston, South Carolina. The project was successful because it does not include an HVAC system. Instead, attention focused on training staff to make the building look like it did when the hall was in use. A new monitoring system was installed to direct staff to open and close windows, but the system does not function properly and there is no technical support for the system. Now, staff decides when and to how to operate the windows. In another historic property, the electricity bill doubled because lights were added to shut windows.

Ms. Campagne stressed that for a building to be sustainable, it is important to balance energy efficiency, the collection of artifacts, and the building itself. Staff should be trained, practical improvements should be made, and research should focus on the right systems. Modeling must be performed prior to considering a project and maintenance should be supportive. She emphasized that in sustainable design, the best design is the simplest ones.

**Case Study: An Energy Project in the Golden Gate National Recreation Area (GGNRA) Park Headquarters (Fort Mason Building 201 (FM201)): Barbara Judy, NPS**  
*- Presentation available online*

Barbara Judy provided brief background information on the subject building (FM201), which has a combination of solid masonry walls and wood frame wings, with a working, original hot water radiant heat system that relies on a circa 1930s boiler located in the building’s basement. The project had two objectives: 1) using a life cycle analysis, determine if energy efficiency improvements could be made and 2) determine if a cogeneration system would be environmentally and economically sound.

The project began with a building energy audit. Although the initial analysis for the cogeneration project looked positive, a more in-depth analysis that accounted for an increase in natural gas prices and a decision on the part of the local utility provider to not buy back excess electricity production revealed that the system was not economically or practically viable. Other issues included consideration of noise generated by the cogeneration equipment, and.



Based on the building energy audit that identified 47% of the building energy consumption was being used for interior lighting, the project was developed to replace and upgrade all interior lighting. Secondly, interior ventilation improvements were identified as an essential project component, based on code standards. The resulting construction project removed inefficient and inappropriate light fixtures and installed a combination of contemporary compatible fixtures in office areas, and period-replica fixtures in the primary interior spaces of the building. The interior ventilation system was brought up to code for ventilation standards, thus improving indoor air quality.

Electrical consumption for lighting the building was reduced by 50 percent. Total construction costs amounted to \$560,000 from 2002-2006. Ms. Judy said the project had an overall favorable result.

**Findings of the Greening of Historic Properties National Summit, Pittsburg, PA, October 2006: Alicen Kandt, National Renewable Energy Laboratory. (Slides were prepared by Matt Nowakowski, Air National Guard, who was not present)**

*- Presentation available online*

Alicen Kandt presented the findings of the 2006 National Preservation Conference, which was one of the first events to bring preservationists together with the sustainable design community. The summit addressed five key areas: HVAC systems, building systems, lighting, materials, and policy. Summit findings included the following:

**HVAC Systems:** Understand a building's use, including passive systems. Consider installing radiant systems.

**Building Envelope:** Further research is needed to address historic assemblies, walls, and windows. The historic preservation community should work with LEED developers to establish a credit for embodied energy,

**Materials:** Additional vocational training is required to address the best approaches for working with old materials and applying new materials to old buildings. With respect to green materials, summit findings include establishment of life cycle costs and certifications for historic buildings.

**Lighting:** For renovation projects, historic facilities require specific lighting expertise; lighting experts should be hired for large projects.

**Policy:** Application guidelines for sustainable design and historic preservation should be developed with supporting policy briefs. Increase sustainable design and historic preservation reviews.

Ms. Kandt also mentioned that education is needed to inform both preservationists and sustainable building professionals about the availability of financial (e.g., tax and rebate) incentives for both preservation and green building.

As a result of the summit, organizers prepared a White Paper entitled “Pinpointing Strategies and Tactics for Integrating Green Building Technologies into Historic Structures.” To review and submit public comments on the white paper, go to <http://www.gbapgh.org/Publications.asp>. The white paper will be presented at the American Institute of Architect’s (AIA) May 2007 meeting.

**Discussion Session – Identify Priority Areas of Research and Funding Sources - All Participants. Led by Andy Walker, National Renewable Energy Laboratory – Refer to Attachment E**

The group addressed priority research and funding issues.

**Develop Action Items. Group Discussion led by Andy Walker, National Renewable Energy Laboratory – Refer to Attachment F**

The group identified action items for energy efficiency in federally owned historic buildings.

**Closing Remarks**

Andy Walker thanked the workshop participants for their contributions to the discussion. Participants were invited to attend the Ecobuild Conference and the Renwick Gallery case-study tour following the workshop.

**Attachment A**



**AGENDA**

**Meeting Agenda:** *Historic Preservation and Energy Efficiency in Federal Buildings*

**Dates:** December 6-7, 2006

**Location:** Decatur House Museum, Washington, DC

---

**Objective:**

Examine the synergies between energy efficiency and historic preservation: identify obstacles; recommend possible solutions; identify topics that require more research.

---

**Wednesday, December 6, 2006**

- 8:00-8:30** Opening Remarks – Rick Khan, Director USDOE Federal Energy Management Program, overview of workshop goals and procedures;
- 8:30-9:20** Round Robin Introductions – All participants  
Each participant will be asked to summarize the key “challenges” facing their agency in integrating energy efficiency, renewable energy, and sustainability goals as part of rehabilitation efforts for historic buildings.
- 9:20-9:40** Historic Preservation Learning Portal - Constance Ramirez (Federal Preservation Institute)  
[www.historicpreservation.gov](http://www.historicpreservation.gov)
- 9:40-10:00** Whole Building Design Guide Sustainable Historic Buildings Resource Page -Richard Paradis (Steven Winter Associates)  
[http://www.wbdg.org/design/sustainable\\_hp.php](http://www.wbdg.org/design/sustainable_hp.php)
- 10:00-10:15** Break (coffee and water will be available)
- 10:15-10:35** NPS Technical Preservation Services and synopsis of symposium on improving the energy efficiency of historic buildings - Antonio Aguilar and Jo Ellen Hensley (Technical Preservation Service; National Park Service)
- 10:35-10:55** Energy Concepts for Historic Buildings - Horace Foxall (US Army Corps of Engineers)
- 10:55-11:25** High Performance and Sustainable Buildings: A Historical Preservation Perspective – Don Horn (General Services Administration)
- 11:25-12:05** LEED rating systems update- Jennifer Groman (US Army)  
LEED-NC, LEED-EB, and LEED-CI applied to historic buildings; Updates to existing systems; New systems being released in pilot (LEED-Homes and LEED Neighborhood Development (with credit for preservation))
- 12:05-1:05** Lunchtime Presentation: Re-cycling Buildings – the Ultimate Green Strategy - Carl Elefante (Quinn Evans Architects)  
Lunch will be provided
- 1:05-1:15** Break
- 1:15-2:50** Four Breakout Groups – identify opportunities, challenges, strategies/solutions  
1) Sustainability Rating Systems (such as LEED) and Historic Buildings  
2) Importance of a Holistic Approach to Energy Efficiency Projects in Historic Buildings  
3) Unintended Consequences of Energy Efficiency Projects in Historic Buildings/Energy Savings Myths  
4) Best Practices and Latest Trends in Energy Efficiency Projects in Historic Buildings
- 2:50-3:00** Break (soft drinks and snacks provided)
- 3:00-3:50** Report ideas from small groups back to large group – Breakout Group Leaders

**3:50-4:00** Closing Remarks for Day 1 – Andy Walker

---

***Thursday, December 7, 2006***

- 8:00-8:30** Open discussions and recap of findings from Day 1 – Led by Andy Walker
- 8:30-8:50** Case Study of Energy Projects in GGNRA Park Headquarters (FM210) - Barbara Judy (National Park Service)
- 8:50-9:10** Findings of the Greening of Historic Properties National Summit, Pittsburgh, PA, October 2006 - Matt Nowakowski (Air National Guard)
- 9:10-10:10** Breakout groups to identify priority areas for more research – All participants  
Possible funding sources; other research/decisions that come first; other research/decisions that would come after
- 10:10-10:20** Break (coffee and snacks provided)
- 10:20-10:40** Report ideas from breakout results with larger group - Breakout Group Leaders
- 10:40-11:30** Group discussion – Led by Andy Walker or FEMP representative  
Bulletize draft guidance; identify process to go through to customize a solution for your particular building; how to make informed decisions
- 11:30-12:00** Develop action items – Led by Andy Walker or FEMP representative  
(ex: Campaign for Fed Energy Award for EE in Historic Buildings)
- 12:00-1:00** Break for lunch on your own
- 1:00-2:00** *(Optional)* Transition 2030 at the Ecobuild Conference in the DC Convention Center - Ed Mazria (EcoBuild Keynote Speaker)
- 3:00-5:00** Case-study tour of energy retrofits in Renwick Gallery - Daniel Davies (Smithsonian Institution)
- 5:00** *Adjourn following tour*

## Attachment B

### PARTICIPANT LIST

Hector Abreu  
GSA Liaison  
Advisory Council on Historic Preservation

Antonio Aguilar  
Historical Architect  
National Park Service

Gay M Bindocci  
Sustainability Coordinator  
Department of Interior  
National Business Center

Barbara Campagna  
Graham Gund Architect  
National Trust for Historic Preservation

Lexie Carroll  
Civil Engineer  
Forest Service  
Martha Catlin  
Program Analyst  
Advisory Council on Historic Preservation

Liz Creveling  
Architectural Historian  
National Park Service

Mr Lance Davis  
Architect-Sustainable Design  
General Services Administration  
Research & Expert Services Division (PLA)

Carl Elefante, AIA  
Principal  
Quinn Evans Architects

Beth Erickson  
Cultural Resources Manager  
National Guard

Cynthia Field  
Architectural Historian Emerit  
Smithsonian Institution

Larry Fleming  
Architect  
U.S. Department of Agriculture

Alfred Foster  
Cultural Res. Staff Officer  
Department of the Army

Horace H Foxall Jr  
Historic Architect  
Army Corps of Engineers  
Center of Expertise for Historic Structures  
Seattle District, Corps of Engineers

Tom Gaulke  
Facility Engineer Consultant  
Indian Health Service

Jere Gibber  
Executive Director  
National Preservation Institute (NPI)

Jennifer Groman  
Preservation Branch Chief  
Base Operations Support Division  
U.S. Army Environmental Command

Jo Ellen Hensley  
Architectural Historian  
National Park Service  
Technical Preservation Services

Shawn M Herrera, EE-2L  
General Engineer  
Department of Energy  
FEMP

Don Horn  
Director, Sustainable Design  
General Services Administration

Melinda Humphry  
Architect, Design Manager  
Smithsonian Institution

Ms Barbara Judy  
Historical Architect  
Department of Interior  
Gateway National Recreation Area

Ms Alicen Kandt  
Engineer  
National Renewable Energy Laboratory

Katharine Kerr  
Historic Preservation Spc.  
Advisory Council on Historic Preservation

Rick Khan  
Program Manager  
Department of Energy  
FEMP

Thomas Knapp  
Architect  
Bechtel Corp

Michelle Lewis  
Environmental Program Manager  
Air National Guard

Terri Liestman  
Heritage Program Leader  
U.S. Department of Agriculture  
Rocky Mountain Region

Malcolm Lillywhite  
Renewable Energy Consultant  
Domestic Technologies

Willam Luper  
Manager  
Enviro-Aire Mechanical Services

Brian Lusher  
Architectural Conservator  
Navy  
Navy Facilities Engineering Command (ENV)

Mr Harry I Martin, III  
Project Leader/Architect  
Navy  
NAVFAC Washington

Patricia McCoy  
Conservation Program Manager  
Army

Gretchen Menand  
Science Communicator  
National Renewable Energy Laboratory

Sarah Miller  
Civil Engineer  
Naval Facilities Engineering Command

Mohammed Moiduddin  
Electrical Engineer  
Army

Rebecca Nielsen  
Historic Pres. Specialist  
General Services Administration

Matt Nowakowski  
Cultural Resource Consultant  
Air National Guard

Elizabeth O'Hara  
Director of Federal Affairs  
National Trust for Historic Preservation

Mr Richard Paradis  
Program Manager  
Sustainable Buildings Industry Council

Sharon Park  
Chief  
National Park Service  
Technical Preservation Services Branch

Jenny Parker  
Historian  
National Park Service

Constance Ramirez  
program manager  
National Park Service

Andrea Robinson  
Assistant Security Manager  
Smithsonian Institution

Jonathan Sager  
Preservation Officer  
MD State Historic Preservation Office

John Sandor  
Architectural Historian  
National Park Service  
Technical Preservation Services

Kathleen Schamel  
Federal Preservation Officer  
Department of Veterans Affairs

Herman Shaw  
Contracting Officer  
International Broadcasting Bureau

Rhonda Sincavage  
Program Associate, State and Local Policy  
National Trust for Historic Preservation

Katherine Slick  
Preservation Officer  
State of New Mexico  
State Historic Preservation Office

Maureen Sullivan  
Federal Preservation Officer  
Department of Defense  
Off of the Dpty Under Secretary of Defense

John Thurber

Program Manager  
Navy

Andrea Valentine  
Asst for Engineering Mgmt  
Army

Mr Andy Walker  
Senior Engineer  
National Renewable Energy Laboratory

## Attachment C

### PARTICIPANT INTRODUCTIONS

During the opening session of the workshop, participants were asked to briefly introduce themselves and note historic preservation issues they would like addressed.

**Barbara Judy:** National Park Service, Gateway National Recreation Area. She mentioned that at NPS, the agency often does not have the ability to solve complex structural problems due to each project's unique goals.

**John Thurber:** Naval Facilities Engineering Command. During major projects, NAFVAC leadership tends to focus on current costs, rather than life cycle costs. He recommends Energy Policy Act of 2005 guidance.

**Sarah Miller:** Naval Facilities Engineering Command. Operational facilities pose a significant challenge; it is difficult to maintain the historic appearance if a facility serves the same purpose for which it was originally built. There is a need to balance operational needs with energy legislation requirements.

**Martha Catlin:** Advisory Council on Historic Preservation. Conflicts will exist between different policy mandates, especially with respect to NPS. For example, there are potential issues associated with LEED standards vs. Department of Interior standards. It is important to discuss these issues at an early stage.

**Maureen Sullivan:** Department of Defense (DOD), Federal Preservation Officer. DOD has over 350,000 buildings; 30 percent are over 50 years old and 68 percent will be considered historic in 20 years. Historic preservation is an issue for DOD and presents many technology-related challenges.

**Patricia McCoy:** Department of the Army, Conservation Program Manager. The aging infrastructure represents a challenge for the Army.

**Katherine Curr:** Advisory Council for Historic Preservation. She is interested in learning more about topical issues.

**Brian Lusher:** Naval Facilities Engineering Command. Historic preservation should increase its focus on engineering and architecture.

**Jo Ellen Hensly:** National Park Service, Technical Preservation Services. She is primarily involved in reviewing rehabilitation projects, including historic preservation and energy efficiency. She is involved in updating the Preservation Brief on energy, which is nearly 30 years old.

**Jenny Parker:** National Park Service, Technical Preservation Services. She is interested in advising property owners about tax credits and incorporating LEED standards into projects.



**Jonathan Sager:** Maryland State Historic Preservation Office. He noted that states would benefit from flexible or holistic guidance from Federal agencies, particularly the advisory Council and the National Park Service.

**John Sander:** National Park Service. More information is needed on technologies – e.g., best solution data to justify project ideas and solutions.

**Kathleen Schamel:** Department of Veterans Affairs, Federal Preservation Officer. Preservation of VA facilities could compete with mandates associated with veterans care and the changing medical system. She is interested in identifying options for integrating preservation with veterans care.

**Jere Gibber:** National Preservation Institute. The institute plans to conduct a seminar on energy; he hopes to learn more about the topic at this workshop. For more information regarding the energy seminar, please click [here](#).

**Donna Meyer:** Federal Preservation Officer, Department of Agriculture (USDA) for Rural Development. Her office provides financial assistance for low-income housing, businesses, and utilities. The office often has encountered problems with windows and energy efficiency and renewable energy issues.

**Don Horn:** Director of Sustainable Design, General Services Administration. He noted that many Asset Managers involved with historic preservation projects often look at bottom-line costs only.

**Rhonda Sincavage:** National Trust for Historic Preservation. She is interested in working with the USGBC on their green rating system in order to address historic preservation issues.

**Katherine Slick:** State Historic Preservation Officer, State of New Mexico. She noted that many processes do not include a holistic approach, which is important for achieving projects requirements. She is a member of the National Conference of State Historic Preservation Officers Board. A state executive order requires that state projects meet LEED standards.

**Richard Paradis:** Steven Miller Associates. He noted that many technological advances may be helpful in solving some current problems, such as lighting issues.

**Harry Martin:** Department of the Navy. He serves as a Navy liaison, presenting projects to the National Capital Planning Committee. He is presently converting industrial buildings into office buildings, which presents a challenge to maintain the integrity of the facilities.

**Antonio Aguilar:** National Park Service. He noted as that there are many challenges to finding sensible solutions with realistic goals for historic preservation and energy conservation.

**Constance Ramirez:** National Park Service, Federal Preservation Institute. She works with Federal agencies to provide training for government officials. The challenge is to promote the

sharing of information and lessons learned among agencies; many agencies have their own directives and procedures to follow.

**Alicen Kandt:** National Renewable Energy Laboratory

**Gretchen Menand:** National Renewable Energy Laboratory

**Tom Gaulke:** U.S. Public Health Service, Indian Services He is working with the historic Indian Services' facilities; health care is considered more important than historic preservation or energy efficiency. He is interested in how to achieve energy efficiency without compromising an agency's mission.

**Hector Abreu:** Advisory Council, General Services Administration Liaison. He is interested in sustainable education.

**Barbara Campagna:** National Trust for Historic Preservation and President of the Association of Preservation Technology. She is interested in bringing together LEED and historic preservation. Many projects she has been involved in do not take into account, embodied energy of life cycle analysis. She has worked with various agencies to create a national policy on sustainable historic preservation.

**Allan Miller:** General Services Administration. His group is in the process of incorporating building commissioning in order to determine energy savings.

**Jennifer Groman:** Department of the Army and Advisory Council on Historic Preservation. She noted that the LEED Silver certification is difficult to achieve for the preservation of historic buildings. Her agency has over 35,000 small buildings and she is interested in integrating sustainability.

**Lee Foster:** Department of the Army. The Army has a large inventory of historic buildings; he is an advocate of adaptive reuse and finding new ways to use buildings vs. demolition of facilities.

**Terry Liestman:** Heritage Program Leader, National Forest Service, Department of Agriculture. She is involved in the restoration of old buildings. The Forest Service has many buildings that are unusable, not wanted, and off the energy grid. Her goal is to adapt these buildings into usable structures.

**Malcolm Lillywhite:** Domestic Technologies, Department of Agriculture Contractor. A major issue is that USDA facilities are off the energy grid. He believes renewable energy could be the foundation for providing power to USDA buildings. He hopes to use buildings for eco-development and eco-tourism and in merging technology with the cultural environment and economic development.

## Attachment D

### BREAK-OUT GROUP SESSIONS RECOMMENDATIONS

#### Group 1 - Sustainability Rating Systems and Historic Buildings

Participants noted that one “cultural value measurement” is an important element that is missing from current rating systems. The discussion focused on LEED and resulted in the following points made by this group:

1. Recognize that there is an existing initiative to encourage the incorporation of historic building qualities into LEED, for which only historic buildings can qualify.
2. Encourage the review of credit categories.

##### Energy Efficiency:

- Reexamine the energy efficiency performance threshold
- Include a new measurement platform for examining new construction vs. old construction over the course of the life cycle

##### Materials:

- Establish a credit for retention and repair and traditional craft
- Measure the quality of materials removed; currently credit is provided only for remaining materials
- Assign points for the design of repairs
- Reexamine the point system for no action or retention of existing materials

##### Sighting:

- Recognize the difficulty for historic buildings in terms of siting issues

##### Indoor Air Quality:

- Amplify current benefits

##### Innovation:

- Introduce cultural value; possibly applicable for historic buildings only
- Recognize intrinsic value of traditional building structures and systems
- Recognize the need for a technical study on durable materials worthy of an environmental credit

## **Group 2 - Importance of a Holistic Approach to Energy Efficiency Projects in Historic Buildings and Unintended Consequences of Energy Efficiency Projects in Historic Buildings/Energy Saving Myths**

The group defined a holistic approach as having the following characteristics:

- Climate specific
- Examines urgency of upgrades; applicable primarily for long-term projects
- Must account for a building's total needs
- Studies a building's inherent energy efficiency features
- Should examine the history of building and energy use
- Should consider possible unintended consequences of modern technologies in historic buildings
- Respect historic preservation and energy efficiency ideals

The group identified obstacles to a holistic approach:

- Stove-piping
- Costs, time, and knowledge constraints
- Policy makers are too isolated and not directly related to the decisions made
- Mandates too specific and not appropriate or part of a comprehensive plan
- Exclusion of real costs of demolition and mitigation (i.e. exclusion of LCA)
- Separation of capital operational budgets, which discourages LCA
- Costs to collect/determine a building's original design, due to costs for energy upgrades
- Understanding a building's current situation; e.g., what works and what is problematic
- Obtaining accurate information about life-cycle costs of products
- Lack of motivation

The group identified solutions for achieving a holistic approach:

- Leadership of the Federal Energy Management Program (FEMP) and Federal Government
- Develop a comprehensive historic preservation plan within each agency
- Case studies of successful Federal energy efficiency projects in historic buildings
  - How decisions were made and funded
  - How obstacles were overcome
  - In absence of these projects, launch piloting studies
- Create energy efficiency excellence awards for Federal agencies; consider a collaboration between the National Trust and DOE
- Train laborers to make historic buildings perform better/be more energy efficient and architects/engineers and preservationists on how to meet energy efficiency and historic preservation goals
- Draft statement of work and work criteria for contractors to encourage energy efficiency standards
- Provide better energy efficiency software analysis tools that are specific to historic buildings
- Cross education of State Historic Preservation Officers (SHPO's) in historic preservation and sustainability; this could be funded by DOE

- Ask DOE to serve as an advisor to the Advisory Council on Historic Buildings
- Ask Advisory Council to issue a policy statement on energy efficiency in historic buildings

### **Group 3 - Best Practices and Latest Trends in Energy Efficiency Projects in Historic Buildings**

The group stressed the importance of communications, especially with respect to best practices.

1. How to identify trends and best practices?
  - a. Ask for submissions and gather data to share between agencies
  - b. Use portal or WBDG to blog and share practices
  - c. Use APT List serve
  - d. Awards: emphasize currently recognized best practices
  - e. Conduct seminars for Federal officials to encourage the flow of ideas among agencies
  - f. Prepare and submit a paper on best practices, historic preservation, and energy efficiency
  - g. Identify best practices by asking people to make presentations on projects
  
2. Challenges to finding and communicating best practices:
  - a. Funding is derived from a disbursed source
  - b. Lack of funds
  - c. Information needs depend on the project
  - d. Communication is a major issue: energy efficiency and historic preservation are different communities
  - e. Balance
  
3. Strategies for identifying best practices:
  - a. Prepare a list of appropriate measures and techniques
  - b. Use language that people can understand
  - c. Need a high-level MOU and enhanced relationships; meet SHPO's to encourage a greater dialogue
  - d. Establish team building from top to bottom; this is necessary to encourage working together. (This group called for a change in the workplace – an environment that is more centered on communications and working together)
  
4. Examples of Best Practices:
  - a. Best examples occur with early communications across disciplines
  - b. Firehouse demolition project at Fort Bragg: project across agencies
  - c. Award recognition to encourage high-level projects
  - d. Best practice sessions at conferences and seminars
  - e. Involvement of all stakeholders from top to bottom
  - f. Heat pumps
  - g. Credit trading

- h. Operating historic buildings following other changes; for example, re-opening skylights
- i. In-floor heating and cooling and individual controls
- j. Projects: Lafayette building (tried to keep historic windows - forced a study to be performed)
- k. Identify areas for additional research

5. Areas for further research:

- a. Masonry walls, moisture, vapor barriers
- b. Conducting research to support good projects
- c. Encouraging current technologies to be more visually inclusive

## Attachment E

### PRIORITY AREAS FOR ADDITIONAL RESEARCH AND FUNDING

Regarding the need for additional funding, the group noted that the smallest historic buildings are often the most expensive to upgrade. Yet, if non-technological solutions can be identified, small renovations may work the best and include the least costly solutions.

The group compiled the following list of potential areas for additional research:

1. Mass effects and revisit models
2. Catalog research from other organizations:
  - a. DOE laboratories
  - b. Universities
  - c. Construction Engineering Research Library (CERL) (sustainability and historic preservation guidance)
  - d. International
  - e. National Institute for Science and Technology (NIST)
3. Application of testing
  - a. Blower door tests
  - b. DOE assessment centers
  - c. Compile the results
4. Include manufacturers in discussions to help them adapt to different needs
5. More information is needed on the differences between the refurbishment/ replacement of windows
  - a. Film
  - b. Weatherization (caulking)
  - c. Research on how to retrofit large metal frame windows
  - d. Appropriate storm windows: interior/exterior
6. Effect of insulating walls
  - a. Geographically specific
  - b. Insulation performance and understanding of the types of insulation
  - c. Damage to materials
  - d. Climate specific
  - e. Building Enclosure Technology and Environmental Council (BETEC) – the group conducts building and testing in conjunction with universities
  - f. Proper installation, e.g., to preserve paints

7. Pros and cons of attic ventilation
  - a. Moisture, change in temperature
  - b. Condensation on ducts
8. Different audit protocol for historic buildings and understanding comfort levels
  - a. Not all about human comfort (preservation)
  - b. For comfort in buildings, how to condition for space; look at the Cherry Creek Restaurant example
  - c. May need better information to overcome dominance of HVAC system
  - d. Cannot forget comfort because buildings are often used differently today than in prior years; creates more stress for the buildings.
  - e. Period and geographic locations are important for making decisions; Different suite of measures
9. Study assembly's tolerance to modification
  - a. Database of failures due to heating and cooling
10. "Wisdom of use" - how to maintain
11. Ventilation (CFD)
  - a. Understand how heating and cooling work compared to fresh air
12. Cost-benefit study of measures specific to historic buildings
  - a. Authoritative source
  - b. Specific with historic buildings to capture issues of easy preservation versus relative cost (e.g., include externalities)
  - c. Include impacts on historic buildings
  - d. Revisit 10CFR436 regulation criteria: do we need something special for historic buildings?
  - e. Consider synergistic effects all the way through
  - f. Expand conventional cost/benefit to include historic buildings issues – e.g., radiators, baseboards
13. Health effects and indoor air quality impacts of measures
14. Consider buildings that will be designated historic: post-WWII construction
15. How to mitigate ultra violet (UV) criteria for integrity of glass in modern buildings?
16. Identify different funding pools that can be merged by different/multi-agencies sources.



17. Market research: statistics of historic inventory; find existing data, look in the GSA Federal Property Inventory.
18. Hazard Mitigation: How to rebuild after disaster and maintain historic building integrity; how do you deploy knowledge of research? Most appropriate way to repair and retrofit; some historic properties considered outdated because tools not adapted to historic buildings
19. What are effects of force-protection requirements on historic preservation and energy?

*Following this discussion, participants voted to identify priorities*

## **Participant Voting Results: Research Priority Areas, led by Andy Walker**

### **Issue 1: Most important research projects identified by the group:**

Priority 1: Cost benefit study (#12)

Priority 2: Research cataloging (#2)

Priority 3: Different audit protocols for historic buildings (# 8)

Priority 4: Effects of insulating walls and damage to wall assembly (#6)

Priority 5: Enveloping buildings research (# 5)

### **Issue 2: How best to communicate this discussion and resulting ideas?**

It was determined that the best way to communicate a cost-benefit analysis (CBA) study and the cataloging of research is to use a web site for blogging and gathering materials. It was suggested that the forum Historic Preservation Learning Portal and the Whole Building Design Guide host a forum on the topic.

### **Issue 3: Will the documents have quality control?**

In-depth review as well as little review of materials was discussed. However, the Whole Building Design Guide maintains a built-in review component, the group recommended using this existing tool or allow individuals to post reviews (e.g., similar to Amazon.com). The approach will speed-up the process and will allow people to review materials on their own time.

Major action items resulting from this discussion include:

- Contact the WBDG administrator and request that the site host a portal to catalog research information on historic buildings. The contact will likely be the WBDG historic preservation group. Funding will be an issue.
- The process for citing materials will involve posting all materials on the web site and soliciting comments.
- Another issue involved selecting a specific agency to serve as the “overseer.” Mr. Walker suggested that FEMP serve as the main coordinator for energy efficiency and renewable energy issues with the involvement of the historic preservation community. FEMP’s Historic Preservation Lead will be approached about facilitating the cataloging of materials and further discussions among the group.

## Attachment F

### ACTION ITEMS ON ENERGY EFFICIENCY IN HISTORIC BUILDINGS

The group established a list action items for energy efficiency in Federally owned historic buildings, which are listed below:

1. Develop process guidance for achieving energy efficiency and renewable energy in historic buildings for all renovation project team members.
2. Use the Historic Preservation Learning Portal to gather completed research on historic preservation energy efficiency and renewable energy topics.
3. Pursue each opportunity listed in the research objectives above, especially those identified as priority items.
4. Conduct a decathlon-type showcase competition, similar to the DOE program which challenges college/university student teams to design and construct solar homes on the Washington, DC Mall; the goal is to market historic preservation in higher institutions of education. The competition will require collaboration between engineering and architectural students.
  - a. The proposed competition will be expensive
  - b. An historic preservation contest could target Preserve America Communities (ACHP is custodian) vs. conducting a competition on the Mall.
  - c. Information on the DOE Solar Decathlon program is available at:  
[http://www.eere.energy.gov/femp/newsevents/release.cfm/news\\_id=9108](http://www.eere.energy.gov/femp/newsevents/release.cfm/news_id=9108)
5. Create energy-specific awards in historic buildings. Can historic building segment/criteria be added to the energy efficiency awards program?
6. Consider selecting DOE or other agencies to serve as the coordinator/facilitator for energy efficiency in historic buildings.
7. Cross fertilization of national conferences:
  - a. Historic Preservation Track at Energy 2007/2008. Lance Davis of GSA mentioned that he is a Track Leader for Energy 2007, and will consider adding an historic preservation workshop to his track
    1. Energy 2007 will be held August 5-8 in New Orleans. For more information, please visit: <http://www.govenergy.gov>.

- b. The Association for Preservation Technology International (APTI) will hold a conference on November 3–7, 2007 in Puerto Rico, and will include an Energy Efficiency Track. Visit this site <http://www.apti.org/conferences/conference-current.cfm> for more information.
  - c. The National Trust for Historic Preservation meeting will be held on October 2-6, 2007 in St. Paul, Minnesota, and will include an Energy Efficiency Track. For more information, visit this site <http://www.nthpconference.org/>.
  - d. The Greenbuild conference will be held on October 17-19, 2007 in Los Angeles. For more information, visit this site <http://www.greenbuildexpo.org/DisplayPage.aspx?CMSCategoryID=1>.
8. Go to agency meetings and try to have tracks sponsored by agencies.
- a. GSA events: Visit [here](#) (<http://www.gsa.gov/Portal/gsa/ep/eventView.do?pageTypeId=8199&channelPage=%2Fchannel%2FgsaOverview.jsp&channelId=-13257>) to see the full listing of GSA events
  - b. Department of Interior (DOI) conferences, especially the one for facilities managers
  - c. National Conference of State Historic Preservation Officers (NCSHPO) will take place February 26-March 1, 2007, in Washington, DC. For more information, visit <http://www.ncshpo.org/meetinginfo/>
  - d. National Association of Tribal Historic Preservation Officers (NATHPO) conference.
  - e. The American Institutes of Architects conference will be held in San Antonio, TX from May 3-7, 2007. For more information, visit [http://www.aiaconvention.com/aia\\_splash/2007/index.html](http://www.aiaconvention.com/aia_splash/2007/index.html)
9. Industry trade shows and conferences also offer opportunities to address historic preservation and energy efficiency:
- a. At HVAC conferences
  - b. BOMA, BOMI, Building Managers
  - c. Traditional Building Conference: March 7-10, 2007 in Boston; for more information see <http://www.traditionalbuildingshow.com/>
10. Create talking points, presentations, and handouts for these events and include statistics on the importance of historic buildings.
11. Provide your comments on recommendations resulting from the Historic Preservation Summit in New Orleans
- a. Look on <http://www.ACHP.gov>

12. Encourage the development of LEED standards to take into account, historic structures.