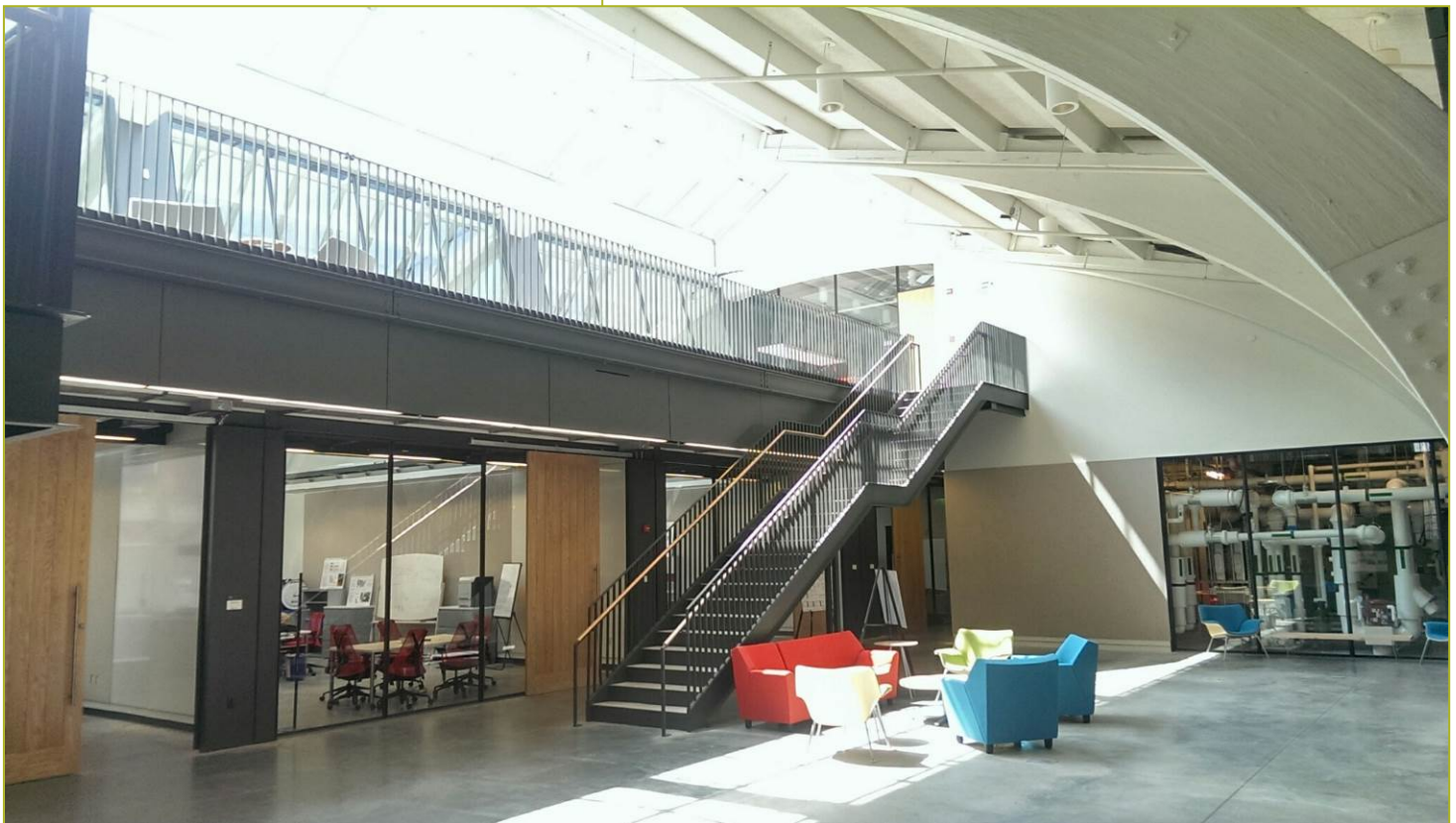


Title: Federal Historic Preservation and Energy Efficiency Policies: Exploring Alignments and Conflicts

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CBEI was referred to as the Energy Efficiency Buildings HUB at the time this report was developed.



Report Abstract

CBEI conducted a review of current federal historic preservation policies and their impact on energy efficiency retrofits.

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**FEDERAL HISTORIC PRESERVATION AND ENERGY EFFICIENCY POLICIES:
EXPLORING ALIGNMENTS AND CONFLICTS**

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1. Introduction

This report investigates conflicts and positive alignments between federal policies related to historic preservation and those advancing energy efficiency in buildings. It constitutes the deliverable for Task 6: Policy, Markets, And Behavior, Subtask 6.2 Informing Policy Makers of the Energy Efficient Buildings Hub (EEB), Budget Period Two.

The EEB Hub is a federal program primarily engaged with technical aspects of energy efficiency in buildings, including those related to materials, and systems, practices. Public policy and regulatory aspects of energy efficiency are among the specialized interests of the project. During the first year research, it was realized that work encouraging energy efficiency likely would run up against conflicting policies in other sectors - notably historic preservation. The University of Pennsylvania, with the assistance of the Preservation Green Lab, a project of the National Trust for Historic Preservation, was commissioned to investigate the real and potential conflicts between energy efficient buildings and historic preservation at the federal policy level. While this paper is limited to a discussion of federal policy, there are many other important aspects of the relationship between energy conservation and preservation that relate to non-federal, private, or NGO matters.

The principal research question explores areas of alignment and conflict between historic preservation policy and policies advancing energy efficiency in buildings. There is evidence for both positive alignment and conflict between historic preservation and energy efficiency policy: in some instances historic preservation and energy efficiency policies are at odds, for example, with regard to the installation of solar panels or wall insulation that increases energy performance while potentially destroying some of the architectural value of an historic building. Yet some strong synergies are also manifest between historic preservation and energy conservation policy. According to data from the Energy Information Agency and other sources, older commercial buildings - especially those constructed before 1920 - use less energy per square foot than those constructed between 1920 and 2000.¹ This reflects the inherent energy saving qualities of some older buildings, which due to their materials, construction systems and design typically have high thermal mass, natural ventilation, good daylighting and other features that help to reduce energy demands.

As demonstrated in the Preservation Green Lab's 2012 study, *The Greenest Building*:

¹ U.S. Energy Information Administration, Commercial Buildings Energy Consumption Survey (2003) plaNYC, "New York City Local Law 84 Benchmarking Report," available at http://www.nyc.gov/html/gbee/downloads/pdf/nyc_ll84_benchmarking_report_2012.pdf (August 2012).

*Quantifying the Environmental Value of Building Reuse*², rehabilitation of existing buildings also avoids the environmental impacts of new construction, and can produce substantial savings in carbon and other environmental impacts. For example, *The Greenest Building* finds that it takes an average of 20 - 30 years for a new, energy efficient building to compensate for the carbon expenditures that occur during the construction process. While it is commonly assumed that new, green construction offers the path to the greatest environmental savings, reusing and greening existing buildings - especially historic building with good design qualities - can offer superior environmental performance.

With more than a million buildings listed on the National Register for Historic Places, significant energy savings can be realized by addressing the conflicts that arise from integrating sustainability and preservation goals, and in maximizing alignment between historic preservation and energy efficiency policies and programs. In addition to offering a path to significant environmental savings, addressing the relationship between preservation and energy conservation also ensures the protection of the cultural, economic and social value of historic places and buildings, which contributes to sustainable place-making.

2. Methodology and Outline

This research should be regarded as a preliminary investigation, and conducted a literature review and interviews before identifying specific types of conflicts and alignments in integrating preservation and sustainability goals. Recommendations are then offered on how to better align historic resource and energy efficiency goals. A subsequent phase of research in Year 3 of EEB Hub activity will investigate specific policies, applications and projects combining preservation and energy efficiency measures in greater depth.

Specific questions addressed in this report include:

- To what extent do historic preservation regulations and standards create barriers for potential energy efficiency gains?
- In what ways do federal energy efficiency goals and policies make it difficult to adhere to federal historic preservation standards?
- What steps are needed to address conflicts between federal energy and preservation policy?
- What steps are needed to leverage potential synergies in federal preservation and energy policy?

Conflicts and alignment in federal preservation and energy efficiency policy must be mapped against three distinct categories of building ownership: historic buildings that are owned and managed by the federal government and therefore subject to federal energy and preservation policy; historic buildings that are owned privately, but receive federal funding or incentives and are thus subject to federal energy and preservation regulation; and historic buildings that are

² National Trust for Historic Preservation, Preservation Green Lab, "The Greenest Building: Quantifying the Environmental Value of Building Reuse," available at http://www.preservationnation.org/information-center/sustainable-communities/sustainability/green-lab/lca/The_Greenest_Building_lowres.pdf (January 2012).

privately owned, but are designated at the state or local level as historically significant and are typically subject to regulation that is derived from federal preservation policy.

Methodologically, this study scans the interplay of federal energy and preservation policy through the analysis of two sources of data:

- A review of existing literature to document and analyze research, policy and implementation studies already completed by others. This review assesses a wide range of resources from a variety of professional fields and disciplines, extracting findings especially relevant to this report's study questions. The full literature review is available in Appendix A of this report; and
- Personal interviews with a diverse cross section of professionals involved in federal historic resource and energy conservation policy, including federal agency representatives, State Historic Preservation Office staff, private developers/building owners, architects, and others with experience working at the intersection of federal preservation and energy efficiency efforts. Detailed, confidential telephone interviews with 22 professionals were conducted by a member of the research team. Transcripts of conversations are not provided in order to protect the anonymity of those interviewed; however, interview questions and a list of types of professionals interviewed are available in Appendices B and C, respectively.

The following section of this report details the various federal preservation and energy policies that are germane to federal cultural resource and energy conservation efforts. The results of the literature review and interviews are then provided in Section 4, while Section 5 offers an analysis of these findings. Section 6 offers a number of recommendations to address conflicts and enhance alignments in federal cultural resource and sustainability goals, while Section 7 presents concluding thoughts.

One note on terms: throughout the document, the terms "energy efficiency," "green," and "energy conservation" are used interchangeably with the term "sustainability." While "sustainability" has become a very widely used term, and is defined in appropriately broad ways to include social, cultural, economic and environmental elements, it is used within this document primarily as relates to environmental considerations and more specifically energy efficiency—which is the focus of the overall EEB Hub project.

3. The Building Blocks: Federal Preservation and Energy Policy

Federal cultural resource and energy conservation regulations stem from several key sources. For cultural resources, several policies are relevant. The 1906 Antiquities Act is the original preservation regulation that established the National Monument program and gave authority to the President of the United States to protect and restrict the use of historic landmarks controlled by the federal government. Perhaps the most important aspect of the Antiquities Act is that it firmly established and permanently expanded the federal role in preservation. The 1916 Organic Act established the National Park Service as the lead federal agency in supervising and managing national parks, battlefields, historic places and monuments, while the 1935 Historic Sites Act established a national policy of preservation for public use

of historic sites, buildings and objects.³

The National Historic Preservation Act (NHPA) of 1966 is the most influential and far-reaching preservation regulation, as it establishes as federal law the preservation of historic sites of national, state, tribal and local significance. The Act specifically directs the federal government to actively promote preservation of historic resources. To this end, under NHPA all agencies participate in review of federal preservation projects to ensure the responsible stewardship of the nation's cultural resources.

A number of agencies have especially key roles in administering federal historic preservation policy. The Secretary of the Department of the Interior and its agency the National Park Service is responsible for establishing professional standards, providing guidance regarding the preservation of the nation's historic resources as well as administering the National Register of Historic Places.⁴ The Advisory Council on Historic Preservation (ACHP) has the legal responsibility to encourage federal agencies to factor historic preservation into federal project requirements. ACHP administers the National Historic Preservation Act's Section 106 review process, described more fully below, in order to fulfill their legal responsibility.⁵ The General Services Agency (GSA), as the government's property manager, also plays an extremely important role in managing both cultural resource conservation and efficiency goals, as does the Department of Defense, which has a large inventory of buildings. State Historic Preservation Officers (SHPOs), a position established and mandated under NHPA, serve as the primary manager of historic resources in each state. SHPOs, along with their staff, are responsible for conducting surveys of historic resources, maintaining inventories, identifying and nominating historic resources for the National Register of Historic Places, administering state programs of federal assistance, and consulting with federal, state and local governments in matters of historic preservation.⁶

The National Register of Historic Places was authorized as a component of the NHPA in 1966 to facilitate the preservation of America's historic sites and to support the mission of the NHPA. The National Register is the official federal list of districts, sites, buildings, structures and objects significant in American history, architecture, archeology, engineering and culture. Places are listed accordingly to established criteria. Importantly, listing on the National Register often does not protect properties from alteration or demolition; however, listing on state or local historic registers typically makes it more difficult to demolish or significantly change a historic building.

Formal recognition and listing on the National Register may make a building eligible to apply for the Federal Historic Preservation Tax Credit program.⁷ This program provides a tax credit of up to 20% for qualified rehabilitation expense, and is regarded as one of the nation's most successful and cost-effective community revitalization programs.⁸ The National Park Service is charged with ensuring the compliance of federal historic tax credit projects with preservation guidelines as outlined in the Secretary of the Interior's Standards for Rehabilitation, discussed more completely below.

Section 106 of the NHPA is an especially critical element of preservation policy. It gives legal status to historic preservation in federal planning, decision-making and project implementation. Section 106

³ "Federal Law: Other Federal Statutes," <http://www.preservationnation.org/information-center/law-and-policy/legal-resources/understanding-preservation-law/federal-law/other-federal-statutes.html#.UQAWridX074>.

⁴ "National Register of Historic Places Program: Frequently Asked Questions," <http://www.nps.gov/nr/faq.htm>.

⁵ "About the ACHP: General Information," <http://www.achp.gov/aboutachp.html>.

⁶ "National Conference of State Historic Preservation Officers," <http://www.ncshpo.org/about/whatisshpo.htm>.

⁷ "Tax Incentives for Preserving Historic Properties," <http://www.nps.gov/tps/tax-incentives.htm>.

⁸ Liz Petrella, "Historic Tax Credits Spur Sustainable Rehabilitation," <http://ncptt.nps.gov/historic-tax-credits-spur-sustainable-rehabilitation/> (August 2012).

requires all federal agencies to take into account the effect of their actions on historic properties, and provides the Advisory Council on Historic Preservation (ACHP) with a reasonable opportunity to comment on the proposed actions.⁹ Federal Preservation Officers (FPOs) are designated in each agency to carry out these duties, and these FPOs play an active role today in managing the federal integration of sustainability and preservation goals.

Secretary of the Interior Standards

The Secretary of the Interior (SOI) is responsible under the NHPA for establishing professional standards and providing guidance regarding the preservation of the nation's historic resources. *The Secretary of the Interior's Standards for Treatment of Historic Properties* offer guidance for approaching the conservation of historic properties that have been identified as historic or eligible for listing on the National Register of Historic Places.¹⁰ These standards are applied to the full range of publically and privately held historic properties listed on the National Register, including:

- federally owned properties;
- privately owned properties receiving federal historic tax credits; and
- privately owned properties subject to state and local landmark or historic district regulation.

The Secretary of the Interiors Standards are most often applied to building exteriors;¹¹ however, under certain circumstances they may be applied to interiors, including rehabilitation projects seeking historic tax credits and nearly all historic federal buildings.¹²

The Standards offer four treatment approaches to historic preservation projects - "preservation," "rehabilitation," "restoration," and "reconstruction" - each relating to progressively more invasive changes to historic building fabric. The preservation approach is least invasive, focusing on the maintenance and repair of existing historic materials. The rehabilitation approach offers guidance for alterations or additions to a historic property while simultaneously maintaining the property's historic character. The restoration approach focuses on preservation projects that aim to restore a property to a particular period of time in history, sometimes eliminating existing building elements. Reconstruction standards present guidance on how to re-create demolished or non-surviving elements of a historic property for interpretive purposes.¹³ "Rehabilitation" standards are most commonly used and are designed to accommodate necessary changes to buildings in order to ensure its continued use. *Unless otherwise noted, further references in this report to the Secretary of the Interior's Standards relates to their use in rehabilitation projects.*

The approaches outlined by the Standards are neither prescriptive nor technical. They set expectations, rather than defining "right" and "wrong" solutions, and are intended to promote responsible

⁹ "The National Historic Preservation Program: Overview," <http://www.achp.gov/overview.html>.

¹⁰ "National Historic Preservation Act," Section 110 (16 U.S.C. 470), http://www.nps.gov/hps/fapa_110.htm.

¹¹ "The Secretary of the Interior's Standards for Rehabilitation," <http://www.nps.gov/tps/standards/rehabilitation/rehab/stand.htm>.

¹² Advisory Council on Historic Preservation, Sustainability and Historic Federal Buildings, available at <http://www.achp.gov/docs/SustainabilityAndHP.pdf>.

¹³ "The Secretary of the Interior's Standards," www.nps.gov/history/hps/tps/standards_guidelines.htm.

preservation practices that protect historic properties. The application of the Standards to all federal preservation activities is meant to guarantee proper and consistent approaches to preservation.¹⁴

Federal Energy Efficiency Policy

Several federal energy acts have encouraged energy efficiency in buildings since the Department of Energy was created in 1977. The National Energy Conservation Policy Act of 1978 and the Energy Policy Act of 1992, for example, required measures such as slowing the growth in demand for electricity in buildings through energy audits and the creation of new building energy codes. The first bill passed by Congress to deal specifically with overall reductions in energy usage in buildings, however, was the Energy Policy Act of 2005. Also known as EPAct2005, the act required Energy Star appliances in all new and existing federal buildings and furthermore required a 30% decrease in energy consumption over the standard required in ASHRAE 90.1, the energy code for all non-low rise residential buildings created as a result of the 1992 act.

Much of the federal government's recent efforts to promote energy conservation in buildings come not from Congress but from the executive level. In fact, a number of presidential executive orders and policy initiatives have been issued or proposed relating to the sustainability of federally owned buildings. Two relatively recent Executive Orders are particularly relevant. President Bush's E.O. 13423, Strengthening Federal Environmental, Energy, and Transportation Management (2007), required federal agencies to achieve an energy intensity reduction of 30% by 2015 - though this made no mention of the potential contribution that retrofitted historic buildings could make toward this goal.

In late 2009, President Obama signed E.O. 13514, Federal Leadership in Environmental, Energy and Economic Performance. This Executive Order is President Obama's directive to federal agencies to lead by example in the effort to create a "clean energy economy." Among the Act's requirements, each federal agency was directed to report within 90 days a percentage reduction target for agency-wide greenhouse gas emissions by 2020. Additionally, each agency is required to develop, implement and annually update a Strategic Sustainability Performance Plan (SSPP). E.O. 13514 perhaps has been the most far-reaching effort yet to require federal agencies to become more environmentally responsible. Unlike earlier executive orders and policy initiatives, it required agencies to set out their own energy efficiency targets and to plan out specific actions toward achieving them rather than simply requiring them to comply with overall greenhouse gas emission goals.

Although E.O. 13514 does not specifically target the sustainable rehabilitation of historic buildings, it encourages retrofitting of buildings to promote their "long-term viability." For many federal agencies the relationship between upgrading historic buildings and achieving the energy efficiency goals set forth in the order has been implicit, since a significant portion of federally owned buildings are listed or eligible for listing on the National Register of Historic Places and therefore will be central to E.O. 13514 compliance. The Executive Order has precipitated a number of SSPP documents that largely focus on the reuse of such buildings, most notably from the General Services Administration (GSA) and the Department of Defense (DOD).

Notably, GSA has completed nearly a hundred sustainable rehabilitations as of 2011, and has proposed using life-cycle analysis and life cycle cost analysis to more accurately determine whether reusing existing buildings is more efficient than new construction from and cost and environmental perspective. The GSA has also prioritized the reuse of "legacy" buildings. As part of its compliance with E.O. 13514,

¹⁴ Ibid.

DOD pledged to ensure that 15% of their existing buildings meet the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings, (a product of the Executive Order). Like the GSA, DOD uses a life cycle analysis and life cycle costing for lifecycle cost and analysis process for decision making about that could be assessment process that is more favorable to existing or historic buildings.

Although the executive orders discussed above relate only to federally-owned historic buildings, congressional legislation proposing a direct tax incentive for private owners of historic buildings to increase energy efficiency has been proposed over the past several years. The Creating American Prosperity through Preservation Act was proposed first in the House in 2011 and again by the Senate in 2012 (H.R. 2479 and S. 2074, respectively). In addition to increasing the Federal Historic Investment Tax Credit from 20% to 30%, a 2% supplement for projects that achieve a 30% energy use reduction is proposed. Although neither of these bipartisan bills has come to a vote, if passed the act would create the first federal program to directly incentivize energy efficiency retrofits in privately owned, historically significant buildings, raising the profile of sustainable rehabilitation nationally.

Sustainability and Preservation Policy at the State and Local Level

Federal preservation standards - specifically the Secretary of the Interior's Standards - often govern the treatment of historically designated and eligible buildings at the state and local level because non-federal jurisdictions have decided to adopt the SOI standards for consistency. While it is beyond the scope of this work to recount various efficiency related policies at the state and local level, some elements of this research report touch on the integration of federal preservation policy and state and local preservation and sustainability efforts. Future research should include a more direct assessment of the conflicts and alignment surrounding cultural resource and energy conservation efforts at the non-federal level.

4. Literature Review

Literature Review

Several previous research reports and other resources were identified on the subject of integrating preservation and sustainability goals. In nearly every instance, whether discussing conflicts or alignment, these resources specifically address the application of SOI standards to federally owned projects, federal historic tax credits projects, and privately owned buildings that are subject to SOI standards through local landmark or district listing. Little of this research assessed efforts to meet specific federal energy policies - such as E.O. 13514 - in historic projects, with the important exception of the Advisory Council on Historic Preservation's 2011 *Sustainability and Historic Federal Buildings*.¹⁵ In almost all other resources, conflicts and alignment between preservation and energy efficiency goals are discussed in much more general terms.

Federal Resources - ACHP Guidance on Integrating Preservation and Energy Conservation

In 2011, the ACHP released "Sustainability and Historic Federal Buildings," a guide written in accordance with Executive Order 13514. The purpose of the ACHP guide is to integrate the

¹⁵ Ibid.

requirements of the National Historic Preservation Act with the requirements of Executive Order 13514. Federal decision makers, facility managers, and other program and project managers are able to refer to the guide for assistance with green historic preservation projects. The guide makes several recommendations:

- Consider reusing a historic building before constructing a new building;
- Rehabilitate a historic building by using, reclaiming, and enhancing historic sustainable features and by adding compatible sustainability improvements when needed;
- Design compatible new green construction in existing historic communities when needed; and
- Consider disposing of a historic building only after other options are appropriately considered.¹⁶

ACHP also recently published a report titled, “In a Spirit of Stewardship: A Report on Federal Historic Property Management,” which provides specific recommendations for federal agency collaboration to develop guidance on the benefits of reusing historic buildings and leveraging the advantage of the durability of historic buildings, materials and systems.

Federal Resources - National Park Service Technical Preservation Briefs

The National Park Service has published nearly 50 technical preservation briefs to provide preservation, rehabilitation, and restoration guidelines to owners of historic buildings. They are especially useful for Historic Preservation Tax Incentives Program applicants as they recommend methods and approaches for rehabilitating historic buildings in a way that is sensitive to the historic integrity and character. Preservation Brief 3, “Improving Energy Efficiency in Historic Buildings,” is one of the most widely referenced guides regarding sustainable historic renovations. The guidance prioritizes efficiency strategies that are the least invasive, such as installing storm windows and improving occupant behavior. The brief also directs building owners to recognize and capitalize on the energy efficient features that are inherent in many historic buildings.¹⁷

In addition to Brief 3, last modified September 2012,¹⁸ there are a number of other Briefs relevant to sustainability and energy efficiency, including: Brief 4 - Roofing for Historic Buildings; Brief 9 - The Repair of Historic Wooden Windows; Brief 13 - The Repair and Thermal Upgrading of Historic Steel Windows; and Brief 24 - Heating, Ventilating, and Cooling Historic Buildings: Problems and Recommended Approaches.¹⁹

Other guidance is also offered on the National Park Service website regarding the integration of preservation and sustainability standards, including the “Illustrated Guidelines on Sustainability

¹⁶ Ibid.

¹⁷ National Park Service, Preservation Brief 3: Improving Energy Efficiency in Historic Buildings, available at <http://www.nps.gov/history/hps/tps/briefs/brief03.pdf>.

¹⁸ Ibid.

¹⁹ “Preservation Briefs,” <http://www.nps.gov/tps/how-to-preserve/briefs.htm>.

for Rehabilitating Historic Buildings.”²⁰

Federal Resource - GSA’s Technical Preservation Guidelines

GSA has published a number of technical guidelines to assist with better management and rehabilitation of historic resources. Several of the guides specifically address energy efficiency, including the publications “Upgrading Historic Building Windows,” “Upgrading Historic Building Lighting,” “HVAC Upgrades in Historic Buildings” and “Historic Building Roofing.” These guides communicate the “do’s” and “don’ts” of green rehabilitation of historic buildings.²¹

EPA

The Environmental Protection Agency has identified “green preservation” as a priority. EPA Regions 3 and 5 have taken specific measures to address and support the integration of historic preservation and sustainability efforts. EPA region 3 has an audio podcast on “green preservation” available on their website, and EPA region 5 has developed and pioneered a “Green Historic Building Preservation Initiative.” The goal of the Initiative, started in 2010 with an inaugural green preservation symposium, is to bring together preservationists and green building specialists to work on two issues: identifying barriers to sustainable preservation and the policies needed to break down those barriers.²²

Other Resources

A review of other written material yielded a mixture of conclusions on the nature of the relationship between energy and preservation goals, but in general the literature appears to suggest that there is much more alignment between preservation and energy efficiency than is often assumed. Many historic structures were designed with inherently energy efficient qualities, such as operable windows and abundant natural light - and these features can help to meet new energy efficiency goals. Further, many studies note that building conservation itself is environmentally friendly,²³ as it avoids the negative environmental impacts associated with new construction.²⁴

One study by the Over-the-Rhine Foundation and Gray & Pape is illustrative – it recounts green preservation efforts in the Over-the-Rhine neighborhood in Cincinnati. This project, which deals specifically with the LEED²⁵ certification of historic buildings, notes that because of “various reports, conference sessions, media coverage, and professional discussion” the design team “fully expect[ed] to find significant barriers and difficult challenges in developing green historic

²⁰ “Illustrated Guidelines for Rehabilitating Historic Buildings,”

<http://www.nps.gov/tps/standards/rehabilitation/rehab/index.htm>.

²¹ “GSA Technical Preservation Guidelines,” <http://www.gsa.gov/portal/content/101402>.

²² “Green Historic Preservation Initiative,” <http://www.epa.gov/Region5/sustainable/historicpreservation.html>.

²³ David Shiver, Cheryl Widell, Rachael Terada, et al., “Demonstrating the Relative Cost-Benefits of Reusing Historic & Non-Historic DoD Properties Using Scientifically-Derived Data. Demonstration Plan: ESTCP Project Number SI 0931” (2010).

²⁴ See footnote #2

²⁵ “LEED (Leadership in Energy Environmental Design),” <http://new.usgbc.org/leed>.

buildings.” This was not the case, however. The team concluded that “the project clearly established that achieving LEED certification and meeting the SOI Standards can be achieved in a cost-effective manner, and that it is reasonable to conclude that a green-historic approach is very achievable for projects where use and ownership would qualify for the historic rehabilitation credit.”²⁶ They noted that the project team did encounter some challenges in integrating green and preservation efforts - especially around the issues of daylighting and windows – but concluded that these were ultimately resolved.



Figure 1 | Over-the-Rhine neighborhood (photo courtesy of: Townhouse Center)

Other sources identified common sources of conflicts, including: inappropriate installation of solar roofing materials; addition of non-historic features to support daylighting measures (dormers, skylights, etc.); and removal of historic character-defining features like doors and windows for energy efficiency. Insulation is repeatedly mentioned as a challenge, as the application of insulation to exterior or interior walls can offer substantial efficiency improvements, but can destroy original fabric. Some preservationists also express concern that it will degrade a building’s ability to “breathe,” thereby accelerating material deterioration.

The literature review suggests that conflicts were typically resolved through conversations with city code officials, SHPO, NPS, and the project team to assist with appropriate modification of the design. Proper engagement of the appropriate inter-disciplinary professionals at the outset of a project is found to be integral to the future success of that project. Multiple sources recommend increased communication and knowledge of both preservation and green building disciplines to eliminate many of the existing conflicts between preservation and energy efficiency.

5. Interviews

As noted in Section 2, a variety of professionals engaged in federal preservation and energy efficiency activities were interviewed, including: Federal Preservation Officers, State Historic Preservation Officer staff, architects, developers, and historic property owners. Participants

²⁶Over-the-Rhine Foundation and Gray & Pape, Inc., Over-the-Rhine Green-Historic Study, available at http://www.boldstatementwebdesign.com/OTRFoundation/Docs/OTR_GREEN_HISTORIC_STUDY.pdf.

were asked an open question about which federal policies govern the greening of historic buildings, and which policies govern historic preservation practice. This helped establish a sense of the basic “building blocks” of federal energy and preservation policy, and provided an understanding of the regulatory landscape in which decisions are made about historic buildings. Interviewees were also asked a number of broad questions about the interplay between preservation and energy efficiency goals, and were also prompted to answer more specific questions about their experience in integrating specific green technologies into historic buildings.

Across the board, respondents indicated that the Secretary of the Interior’s (SOI) Standards are essential in setting the preservation criteria for federally-owned buildings, as well as privately-owned listed buildings, including those which receive federal historic tax credits. Many also cited the National Park Service’s recently released “Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings” as a relevant document.

Federal agency representatives noted that Executive Orders 13514 and 13423 play a role in terms of establishing federal energy efficiency goals. Secondary policies, such as internal policy guides, also play a role in governing energy efficiency strategies in historic buildings. For example, the General Services Administration responded that their “Strategic Sustainability Performance Plan” (SSPP) sets maximum BTUs per square foot in every agency owned building and applies to both new and existing buildings.

Many of the interviewees also reported the importance of LEED (Leadership in Energy and Environmental Design) within their organization and the reliance on LEED as a standard or minimum for energy efficiency. The LEED program was developed in 1998 by the U.S. Green Building Council, and is a voluntary, market-driven program that provides a framework for identifying and implementing green building solutions. LEED is widely used in the marketplace for both new construction and existing (historic) buildings. GSA has relied on LEED as a standard for energy efficiency since 2001. As of 2010, GSA requires all GSA new construction and substantial renovation projects achieve LEED Gold Certification under the LEED Existing Buildings Operations and Maintenance Program.²⁷

Lessons in Integrating Preservation and Energy Standards

Respondents were asked whether these federal energy and preservation policies were effective at encouraging the sustainable rehabilitation (or maintenance) of federally owned historic buildings. In general, the participants responded that while federal policies do not necessarily encourage sustainable historic rehabilitation, they do not discourage it either. For example, the SOI Standards do not specifically mention sustainability as a goal, but in practice green technologies are often easily integrated into historic buildings, and it is possible to leverage the inherently green features of older buildings. The general sentiment appeared to be that sustainable historic rehabilitation which adheres to the SOI Standards is nearly always possible so long as building owners or developers are willing to be creative, and willing to work with relevant review committees. It was noted repeatedly that such review processes can be

²⁷“Sustainable Design,” <http://www.gsa.gov/portal/content/104462>.

prolonged, however.

Respondents were asked to comment on whether they thought federal energy efficiency policies present specific barriers in meeting historic preservation standards, or conversely, whether historic preservation standards present barriers to meeting federal energy policy. They were also asked to discuss areas of alignment between preservation and energy policy. None of the respondents appeared to have strong feelings about historic preservation standards presenting specific or significant barriers to meeting federal energy policy, such as E.O. 13514. Neither did interviewees appear to think that federal efficiency goals would stand in the way of meeting federal preservation obligations.

However, the respondents provided ample feedback regarding the alignments and conflicts between historic preservation and sustainability in a more general sense. Interviewee opinions on several specific green strategies are offered below. In general, most concerns center on those strategies which affect the exterior appearance or fabric of a building, though in some cases, such as with interior insulation, concerns are raised about damage to interior materials.

Windows

Windows are one of the most frequently identified sources of tension and are an area of conflict *and* alignment in integrating preservation and energy efficiency goals.

Though many assume that old windows are drafty and need replacement, historic windows often have considerable remaining life and offer a number of sustainability advantages. The continued use of an existing window avoids the negative environmental impacts of manufacturing new windows, avoiding the construction impacts of energy intensive materials such as aluminum, or potentially toxic materials such as vinyl. Older windows are often made of old growth wood, which is considerably more durable than wood sourced today, meaning that older windows are likely to endure well beyond their more modern counterparts. And unlike nearly all new windows, older windows are often repairable - meaning that when one element of the system fails, it can be fixed. When components of new windows fail, typically replacement of the entire unit is required.

Further, replacement is not always necessary to achieve efficiency goals. For example, respondents noted that it is common practice to install interior or exterior storm windows to contribute to sustainability goals while still meeting preservation standards. The Preservation Green Lab recent report, *Saving Windows, Saving Money: Evaluating the Energy Performance of Window Replacement and Retrofit*, finds the application of various retrofit measures can achieve energy performance results comparable to new replacement windows.²⁸ What is more, these improvements can often be attained at lower cost than the new alternative.

²⁸ National Trust for Historic Preservation, Preservation Green Lab, "Saving Windows, Saving Money: Evaluating the Energy Performance of Window Replacement and Retrofit," available at <http://www.preservationnation.org/information-center/sustainable-communities/sustainability/green-lab/saving-windows-saving-money/#.UQITeidX074> (October 2012).



Figure 2 | Interior storm windows installed to support original windows (photo courtesy of: Environmental Window Solutions, LLC.)

Nonetheless, many developers, owners, and/or design teams continue to replace older windows as an unquestioned assumption in renovation. In some instances, windows have deteriorated to the point that they are no longer serviceable and must be replaced (SOI guidelines make provisions to accommodate such needs.) But those interviewed for this study also noted that there were other practical considerations that come into play when making decisions about windows. For example, in affordable housing or elder facilities, owners often prefer replacement units because these can be easier to operate. Lead paint abatement regulations by the EPA are also cited as a common reason for replacement. Finally, others note that "it's just easier to replace" in general - labor to complete rehabilitations can be costly and difficult to find.

Insulation

Increasing insulation in historic buildings - some of which never included insulation in their original design - is a key sustainability strategy, and typically one of the most cost effective. Yet the installation of insulation emerged as one of the largest areas of conflict between preservation and efficiency goals.

Installation of heavy insulation in the roof or attic is typically met with approval by the Park Service or other governing agencies applying SOI Standards. However, several respondents noted that there are particular concerns about spray foam installation, and that in nearly every case, spray foam installation has been denied because of concerns that the installation of this material will destroy original fabric because it cannot be removed. Reviews also worry insulation will negatively alter the breathability of a building, and accelerate material deterioration over time. Recent modifications to Preservation Brief 3 in September 2012 provide that spray foam insulation is now acceptable "only when there are no gaps in the sheathing which could allow the foam to expand under slates or shingles, preventing the re-use of the roofing material" and if "a breathable layer of material that will allow for future removal

without leaving a residue" is installed.²⁹ One interviewee for this research noted that a home in Michigan was recently successful in getting approval for roof spray foam insulation as the conditions of the home met the requirement as specified by the Park Service.



Figure 3| Spray foam insulation as approved, after successful appeal by homeowner, by Michigan SHPO (photo courtesy of: Matt Grocoff)

Wall insulation is another common tool for achieving improved efficiency, though can raise substantially more concerns among preservation reviewers than the installation of conventional roof insulation. Insulation applied to the exterior walls can be problematic, as this can often lead to the destruction of historic fabric or alteration of a building's appearance. In some instances, for example where the clapboard siding for an entire building can be removed and fully replaced after installation, exterior installation can be deemed appropriate and will be approved by reviewers.

Reviewers will sometimes propose interior insulation as an alternative, but this approach is often more costly than exterior insulation and can bring about other challenges. Reviewers have denied applications to install insulation to the interior of historic buildings where it would add significantly to the thickness of the walls or require the removal of a significant amount of historic fabric, typically a plaster coating. This is both because of concerns about destruction of historic fabric that often accompanies wall insulation installation, and because of concerns that such treatments would degrade the breathability of a wall in the longer term, resulting in historic fabric loss. Wall insulation does not always run afoul of preservation regulations, however. Several interview participants have been successful in guiding applicants with interior wall insulation installation as opposed to more invasive exterior installation.

It should be noted that while many expressed worries about insulation and the ability of a building to "breathe," these concerns are not necessarily warranted by the best available science on building envelope design. Additional discussion of this topic is provided below in

²⁹ National Park Service, Preservation Brief 3: Improving Energy Efficiency in Historic Buildings, available at <http://www.nps.gov/history/hps/tps/briefs/brief03.pdf>.

the Research Recommendations section.

Heating/Cooling Systems

Responses to the survey indicate that the replacement of conventional heating/cooling systems with more efficient units rarely runs contrary to preservation guidelines, as this typically does not affect the historic integrity of a structure. One instance was noted in which a local landmark advisory board first resisted a proposal to remove and replace radiators in the rehabilitation of building into supportive housing. Arguments made by the design team that the efficiency, cost, and comfort would be negatively impacted by radiator retention led the local board to accept the replacement of the radiator/steam system with new hydronic radiant panels. While it was suggested that the radiators be kept as a “decorative feature,” the project team persuaded the board that many of the apartments were too small (some as small as 9’ X 12’) to accommodate the older radiators.

Renewable Energy Systems - Geoexchange

The installation of geoexchange heating systems or ground source heat pumps in preservation projects rarely presents a challenge to maintaining the historic integrity of a project. Such systems are buried underground, are typically out of sight, and do not affect the aesthetics of a historic structure. In fact, responses suggest that the use of geoexchange as an energy efficient strategy in historic structures is strongly aligned with the SOI standards, and may even serve as a more easily accommodated alternative to solar panels. However, ground connected systems can be considerably more expensive than other alternatives.

The only potential conflict that respondents identified relates to the excavating and digging required to bury the geoexchange equipment outside of the building. Such excavations can uncover artifacts that are then subject to archeological review. None of the interviewees provided an example of an instance in which sensitive archeological materials were identified.

Renewable Energy Systems - Solar Arrays

While conventional heating and cooling system replacement and the use of ground connected systems typically align easily with preservation standards, the installation of solar panels on historically significant buildings can be a significant challenge. Preservation standards often seek to protect the historical design and composition of a building, and dramatic alterations to roofs - such as occurs with the installation of some solar arrays - can be seen as damaging to the character of a building. In other instances, the installation of solar panels or roofing materials is easily accommodated - such as when they can be installed on a flat roof or on a secondary façade away from public views.

Some owners are unable to install solar panels in a sufficiently inconspicuous location. Such was the case with a historic home in New Orleans’ French Quarter historic district. A homeowner encountered several challenges while attempting to win approval to install solar panels on the rear slope of the roof of his historic French Quarter townhouse. The city’s regulatory agency for the Quarter denied the owner’s application, citing visual impact and

concerns about introducing the 'new' technology into the neighborhood and setting an unwanted precedent. The owner ultimately appealed the denial and the City Council later overturned the original decision, approving the panels with some conditions.

In other cases, renewables are installed or approved, but in a way that is less energy or financially efficient than the ideal. For example, homeowners in Washington DC's Cleveland Park Historic District were required to revise the scope of their solar panel installation design because of concerns from the local Historic Preservation Office. If this home had not been located in a historic district or considered historically important, the installation of a large solar array would have reduced the home's power consumption from the grid by approximately 70%. However, with the design modification required because of the building's location in a historic district, the potential power consumption was reduced to only 30%. This made the solar panels financially infeasible and the owners decided against their installation.³⁰



Figure 4 | 606 Esplanade Street, New Orleans (source: Bing Maps)

³⁰ Kaid Benfield, "When Values Collide: Balancing Green Technology and Historic Buildings," available at http://switchboard.nrdc.org/blogs/kbenfield/when_values_collide_balancing.html



Figure 5 | Example of successful solar panel installation on an Ann Arbor historic district house, approved by historic commission (photo courtesy of: Matt Grocoff)

Renewable Energy System - Solar Hot Water Heaters

While the installation of solar panels on a historic property often can be accommodated, respondents noted more of a challenge with solar hot water heaters. This technology, which can be particularly effective for small-scale buildings, must be located outside with unobstructed solar access. The scale of these units often means that they are difficult to disguise from the street, and thus are often determined to have a significant visual impact on the historic character and architectural integrity of a building.

Solar Shading

Solar shading - such as awnings - can be an extremely effective means of reducing thermal gain, and thereby helping to save energy that would otherwise be expended to cool a building. However, it was noted that if the shading is not original to the design of the structure, it will almost always be denied and deemed out of compliance with SOI standards. Concern was expressed that when installation is allowed, reviewers usually require the use of traditional technologies and materials, which raise concerns about maintenance and potentially serve as a deterrent to installation.

Lighting Fixtures

The historic appropriateness of lighting fixtures on the exterior of a building or in designated interiors is an important consideration in reviewing historic preservation projects. But such fixtures are typically compatible with new, energy efficient lights. Interviewees indicated that new, green lighting fixtures are nearly always approved and have no trouble meeting the SOI standards.

Green Roofs

The potential for conflicts between preservation and sustainability/energy efficiency goals in

the installation of green roofs is highly dependent on the particulars of a historic building and the design of the green roof. If such roofs are installed on flat roofs and out of sight - such as would be the case with a green roof on a tall commercial building - this design approach is typically easily accommodated. One respondent, an experienced historic preservation architect, uses green roofs on a regular basis and has found them to be a very cost effective way to address stormwater management requirements for historic buildings.

Green roofs are not always easily accommodated, however. This strategy can be denied if it is believed to affect historic roofing materials since the SOI standards place a high value on protection of original historic fabric. Green roofs can also be denied if vegetation is visible from the street, as under the SOI standards it is important to maintain the original character and aesthetic of a building. Visible vegetation, if not historically accurate to the building, is typically viewed as an unacceptable alteration.³¹



Figure 6 | Example of incompatible green roof treatment from the National Park Service³²

General Interview Comments

Reviewer Knowledge

According to research findings, historic preservation reviewers involved in the assessment of sustainable preservation projects possess uneven knowledge about green practices. Some noted that reviewers were fairly well informed about various green strategies, while others felt frustrated that reviewers aren't better trained on efficiency issues and able to offer more constructive feedback about acceptable alternatives. Concern was expressed by some interviewees that the review staff recommends denial without understanding the true impact that it would have on the building and its goals.

Flexibility of Standards and Uncertainty of Outcomes

³¹ National Park Service, ITS Number 54: Interpreting the Secretary of the Interior's Standards for Rehabilitation, available at <http://www.nps.gov/tps/standards/applying-rehabilitation/its-bulletins/ITS54-GreenRoofs.pdf>.

³² Ibid.

Several interviewees wished to see more flexibility in applying the Secretary of the Interior's Standards to rehabilitation projects. One respondent noted that it often appears the review staff is singularly concerned with visual impacts, and not with other important goals of a project - such as achieving substantial environmental improvements, and/or the generation of affordable housing. Several of those interviewed felt it was important to take issues other than aesthetics into consideration in reviewing preservation projects.

One participant explained that much time and energy is spent "speculating" about the outcome of National Park Service reviews. This uncertainty is a major project risk factor for the team, and increases anxiety about and frustration with the preservation review system. According to this interviewee, NPS requirements can lead projects to allocate resources towards aesthetics but away from stewardship. In one project, for example, the replacement of lost plaster was required, which may necessitate the use of an asphalt roof rather than a more historically accurate and durable slate roof.

Guidance on Integrating Preservation and Sustainability

The vast majority of interviewees were aware of the National Park Service's "Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings." Published in 2011, this document provides a list of "recommended" and "not recommended" green interventions for historic buildings. There was general agreement that these guidelines are helpful for less experienced practitioners who are unfamiliar with the basics of preservation, but that they are of more limited value for seasoned professionals. Interviewees noted that advice offered in the Guidelines was very general in nature, and that they would have liked to see more specific recommendations. That said, at least one interviewee noted that it would be inappropriate to be offer overly-prescriptive recommendations as buildings can differ significantly from each other, and what would be appropriate for one may not necessarily work for another.

The desire for improved flexibility was also seen in the discussion regarding the new Guidelines. One interviewee noted that they thought the guidelines were a "step backward" because they restate and reinforce old positions in a new way, rather than evolving with changing values and needs. There was a desire to see the Park Service become more ambitious in terms of establishing particular energy efficiency goals, though again interviewees stated that it would be unwise to prescribe energy efficiency solutions to reach these goals. Rather, design teams should be given the flexibility to design solutions that meet the individual needs of buildings.

6. Analysis

This research finds that **meeting current federal energy efficiency requirements is compatible with adherence to federal preservation standards.** Today, federal energy efficiency goals are very modest - targeting an approximately 20% improvement in energy performance - and these requirements are spread out among thousands of federally owned buildings. Further, the Secretary of the Interior's Standards provide some degree of flexibility in the incorporation of various green strategies. Within this current context, it appears relatively easy for historic projects to meet energy efficiency goals.

The general consensus among the interview participants is that sustainable historic rehabilitation projects are nearly always possible, so long as owners and project teams are willing to work with historic preservation reviewers and be flexible in their approach to integrating green measures so that they will meet SOI requirements. In some instances, the literature and interviews suggest that when one sustainability strategy is denied, it can easily be replaced by another intervention that achieves an equivalent sustainability goal. In other cases, compromises which result in reduced energy efficiency for a building are clearly required - such as the case when the pitch of a solar array must be designed in a way that meets SOI standards, rather than in a way that maximizes the performance of the unit.

Nonetheless, several specific areas of tension between application of preservation and efficiency standards surfaced in the literature review and in interviews of involved parties.

Many interviewees - especially those from outside the preservation field - noted concern and frustration about three issues in particular: The lack of flexibility demonstrated by reviewers in applying SOI standards; the focus on aesthetics and visual impacts in the determination of appropriate green strategies without taking into consideration other important public benefits, such as reduced energy usage and the provisions of affordable housing; and many reviewer's lack of expertise on various energy efficiency strategies, and the ability to offer alternative solutions that would satisfy preservation requirements.

As we look to the future, the challenges in integrating preservation and federal efficiency goals are likely to become more acute. While federal efficiency goals at the moment are rather modest, these goals are likely to become more stringent over time. For example, Senator Barbara Boxer recently announced her intent to introduce legislation that will require GSA to identify additional energy savings within the federal building stock. Such iterative steps towards improved efficiency should be anticipated as the government wishes to take advantages of significant cost and carbon savings available from the federal stock.

Tensions that are relatively easily resolved today may prove much more difficult to address in the future. If, for example, the federal government were to move towards advanced levels of energy efficiency (45% over baseline or greater) or even net-zero buildings, it will be considerably more difficult to navigate the integration of sustainability and preservation goals.³³ Achieving such increased levels of energy efficiency are typically not possible without substantial interventions, including wall insulation and on site-renewable - both of which can be difficult to accommodate under existing preservation standards.

7. Recommendations

This is a unique moment in which preservationists, federal agencies, State Historic Preservation Officers, green advocates, and others can build on the lessons learned during the last decade in green preservation, and work to creatively and preemptively address anticipated future challenges. There are several interrelated steps that should be taken to

³³ Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, available at <http://www.gpo.gov/fdsys/pkg/FR-2009-10-08/pdf/E9-24518.pdf>.

both leverage the inherent benefits of older building reuse, and address current challenges in integrating preservation and sustainability standards and longer term conflicts, which are expected to increase over time.

Establish Clear Reuse Goals

As has already been noted, the preservation of historic buildings can offer important environmental savings on two fronts. First, it avoids the negative environmental impacts of new construction, and second, many older buildings are extremely well designed, and have a number of features that can be leveraged to maximize energy and other environmental savings.

Yet outside of material generated by individual agencies that highlights the green value of older buildings or explains how historic preservation and sustainable design can be combined, there is little if any acknowledgement in federal policy of the environmental value of building reuse. In fact, some current federal and agency policy strongly favors short-term cost considerations in determining whether reuse of a building is appropriate, and fails to reflect the interconnectedness between the federal government's desire to reduce environmental impacts from the building sector and the substantial carbon savings offered by building reuse, especially rehabilitation of historic buildings.

Future federal policy should build on the research and lessons learned during past decades, make explicit the benefit of building reuse, and establish as a goal the increased reuse of existing structures in fulfilling federal space requirements.

Level the Playing Field for Historic Buildings

As previously noted, compliance with current federal energy efficiency regulations and preservation policy is relatively easily achieved, primarily because cross-agency conservation goals target modest energy efficiency improvements, and this is accommodated within the somewhat flexible framework of the Secretary of the Interior's Standards for Rehabilitation. Yet as energy efficiency targets become more ambitious, it is clear that tensions will increase between preservation and sustainability goals.

There is a growing movement among energy code officials and advocates that has strong potential to help alleviate these anticipated tensions for both privately and publically owned buildings. Led by the New Buildings Institute, National Institute of Building Sciences, City of Seattle, and the Preservation Green Lab, efforts are underway to develop a new energy code framework that will enable existing buildings – including historic buildings – to achieve significantly increased conservation goals by allowing for design innovation and mandating verified outcomes.

Simply put, the outcome-based framework exchanges most of the menu of prescriptive strategies in current energy codes, and allows building designers and owners to pursue any strategy that will lead to the desired performance outcome – with stringent requirements both for design and enforcement, to ensure outcomes. This approach benefits all stakeholders, allowing building owners and designers to invest only in strategies that result in optimal performance for highest return-on-investment, while

municipalities can rely on verified performance in their broader ambitions for reducing energy consumption and environmental impacts. This strategy also offers significant potential to help design teams navigate challenges posed when working with historic buildings, as it allows for the preservation of important design features while still ensuring that overall energy targets are achieved.

The role of this new energy code framework, as well as complimentary technical and financial tools that reward innovation and performance, is described in detail in the Preservation Green Lab's forthcoming report, *Realizing the Energy Efficiency Potential of Small Commercial Buildings*. This report includes key recommendations for DOE to lead this market transformation, including the development of a national data platform, quantifying and conveying the economic impacts of reducing inefficiency, and promoting regulations that reward measured energy performance.

Develop Needed Research

In some instances, efforts to better integrate green strategies are stymied by a lack of preservation specific research. The topic of insulation is one such area requiring updated study. While the knowledge and experience of building envelope engineers has advanced dramatically in the last 20 years, particularly about how insulation and penetrations will affect the thermal and moisture characteristics of a wall assembly, questions by preservationists persist. The location (climate) of the building, method of construction and materials, and type of insulation in question can be best addressed by licensed engineers drawing upon local knowledge and experience. Nationally coordinated research is needed to bring together climate specific research and engineering best practices to provide preservation professionals with a better understanding of available solutions

In other cases, efforts to leverage the inherent environmental qualities of older buildings can be undermined by the absence of data. For example, while the energy savings potential for wood windows at the residential scale have been well documented, this subject has not been adequately studied for commercial/industrial buildings, and for other window types (aluminum or steel frame for example). Energy modelers - often employed by green project teams during the design process to determine which strategies will achieve advanced levels of energy efficiency - do not have access to sufficient engineering data about the performance characteristics of retrofitted window assemblies. Lack of data causes teams to pursue window replacement when retention of existing windows could have successfully achieved even advanced energy efficiency goals. A reliable database for retrofitted assemblies, including U-factors, solar heat gain coefficients, and air leakage rates, is needed for a broader range of historic window configurations including energy saving attachments such as insulating shades, storm windows and applied film.

A coordinated effort is needed by preservation organizations - including the Department of Energy, National Park Service (and National Center for Preservation Technology and Training within NPS), State Historic Preservation Officers, the National Trust for Historic Preservation, ACHP, GSA, and other federal agencies and university partners to identify priority research needs so that limited financial resources can be directed towards those research issues that are most pressing.

Establish Clear Sustainability Goals for Preservation Projects

There is little question that reviewers of preservation projects have a primary obligation to ensure careful treatment and conservation of the nation's historic resources; yet this work is done in the larger context of place-making and the pursuit of other public benefits, including reductions in energy usage. As the lead public agency charged with the protection of historic resources, it is clear that the National Park Service has taken valuable and important steps towards facilitating the integration of sustainability and preservation standards in the issuance of guidance, training of staff, and active work with applicants to integrate preservation and sustainability goals.

Yet confidence in the National Park Service's commitment to work proactively with applicants to achieve these multi-faceted public benefits would be strengthened by the issuance of a clear, unambiguous statement acknowledging the important role of historic buildings in meeting sustainability goals. This statement might include a commitment to not just to accommodate - but to *actively advance* sustainability goals - by National Park Service staff.

Such a proactive call is especially important because states and local governments rely heavily on Park Service guidance and practice in informing their own management of historic resources. A clear statement to encourage the greening of historic projects at the federal level would help to set an important tone at the state and local level that may help to address perceptions of inflexibility and conflict in green preservation projects.

Improve Education for Preservation Project Reviewers

The National Park Service, many State Historic Preservation Officers, and other agencies have taken great strides in recent years to educate reviewers on green issues so they are better able to work with green rehabilitation projects. Nonetheless, the knowledge of reviewers appears to be uneven and should be improved by providing ongoing education opportunities. This will enhance the ability of reviewers to understand proposed solutions and their implications (including resulting efficiency improvements), as well as better empower them to provide recommended alternatives.

Increase Flexibility in Application of Standards

One of the major challenges with the current regulatory framework for preservation is that it provides few - if any - tools to distinguish between different qualities of historic resources. The highly significant Carson Pirie Scott Building is an iconic example of famed architect Louis Sullivan, and a building that transformed the way commercial space was conceived and expressed in American architecture. Yet from a regulatory point of view, little distinguishes the famed Sullivan building from other historic buildings, such as the handsome Royal Mills building in West Warwick, Rhode Island. This historic hydro-powered cotton mill sat vacant for over ten years until it was purchased in 2007 by a local developer with plans to renovate and adapt to be a mixed-use building with apartments, retail and office space.



Figure 7 | Carson Pirie Scott Building (source: NPS)



Figure 8 | Royal Mills (source: www.RoyalMillsLiving.com)

Like the Carson Pirie Scott Building, Royal Mills is listed on the National Register of Historic Places and subject to the Secretary of the Interior's Standards.³⁴ While both of the buildings are clearly important in our nation's history, they possess different qualities and it is reasonable to consider whether more flexibility might be provided to a mill building (of which there are thousands throughout the country) than to a Sullivan masterpiece (of which there are relatively few). In practice, project reviewers may well provide more flexibility to mills than they do to a building such as Carson Pirie Scott. But such differentiation is not reflected well in - or necessarily even justified by - the existing preservation regulatory framework.

Resource gradation - assigning a rank to different qualities of historic resource - could help to address this challenge. Such a system could establish clarity in distinguishing which sort of sustainability interventions may be appropriate for different kinds of buildings. There are a number of other countries that use such a system, such as English Heritage which developed a grading system to prioritize between different categories of listed buildings. The system includes three levels: I, *II (generally referred to as "two star"), and II. Grade I is reserved for buildings of international importance and only applies to 2.5% of all listed buildings. Grade *II

³⁴ "Royal Mills Living," <http://royalmillsliving.com/>.

buildings are defined as 'outstanding' and make up 5.5% of all listed buildings. The remaining listed buildings are classified as Grade II, meaning they are noted and recognized for their 'special' interest and national significance.³⁵



Figure 9 | Stationers' Hall – London: Grade I³⁶



Figure 10 | Hoare's Bank – London: Grade *II³⁷



Figure 11 | The Crown Tavern Public House - London: Grade II³⁸

The development of a grading system for America's historic resources should be accompanied by improved guidance on the types and levels of sustainability intervention that are appropriate for different kinds of resources. For example, greater flexibility might be afforded to a lower graded resource in installing a visible green roof or solar hot water heater (both of which are still reversible) than to a top-graded resource, in which preservation of character and aesthetic is of the highest importance. The installation of interior insulation in a lower graded industrial building might be allowed (with provisions to prevent wall deterioration in place), while visible

³⁵ "Listed Buildings and the Listing Process," <http://www.imagesofengland.org.uk/faqs/default.aspx?topic=4>.

³⁶ "Heritage Gateway," <http://www.heritagegateway.org.uk/Gateway/>.

³⁷ Ibid.

³⁸ Ibid.

solar panels on a high-graded resource might be determined inappropriate.

A system of gradation - and accompanying clarification on appropriate green strategies - would seem to go a long way in addressing many of the concerns about the lack of flexibility in meeting preservation goals and achieving other public benefits. It would also make compliance with increasingly stringent energy goals more achievable for many historic buildings.

8. Conclusion

This research identifies a number of points of tension in the integration of federal sustainability and preservation policy, though significant incompatibilities in *current* federal energy and preservation policy were not observed. Nonetheless, future efforts to achieve increased levels of energy efficiency in the federal stock – potentially including net zero requirements – will inevitably pit one public benefit against another: achieving carbon reduction goals is essential to addressing the threat of climate change, but historic preservation efforts are also central to protecting the story of America, and play a vital role in creating the sustainable communities that attract residents from more auto-dependent, carbon-intense lifestyles.

In this context, existing paradigms must be challenged. Conventional historic preservation practice must be re-evaluated and adapted to meet new and increasing goals of energy conservation. Improved research, education and training are key, but the existing framework for preservation work must also be transformed such that more aggressive energy conservation measures – with potential impacts to fabric and character – are allowed for certain classes of historic resources. So too must federal energy conservation efforts be altered to embrace and advance the carbon-saving value of building reuse, which is currently unrecognized in agency-wide policy. Federal efficiency approaches must also be structured such that they provide the necessary flexibility to accommodate the needs of existing buildings, and historic buildings in particular.

With cooperation from both preservation and green building interests, substantial carbon reductions can be achieved in the historic building stock, while still ensuring the protection of the nation's most cherished cultural resources.

APPENDIX A

Literature Review for Preservation and Energy Efficiency in Buildings: Policy Alignment and Conflicts Research Project

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National Trust for Historic Preservation (2008). *Green Building Practices and the Secretary of the Interior's Standards for Historic Preservation: A White Paper Prepared in Advance of the 2008 Pocantico Symposium*. <http://www.preservationnation.org/information-center/sustainable-communities/sustainability/additional-resources/pocanticowhitepaper.pdf>

- This is a great overview document and is one of few that specifically look at the conflicts with the Secretary of the Interior's Standards. Information from interview data and case examples are presented in the discussion of the main conflict areas and there is a brief discussion of policy implications. The paper concludes with a brief discussion considering the benefits and disadvantages of changing the Secretary of Interior's Standards to more explicitly support environmental aims.

Stein, Andrew (2009). *Greening Historic DC: Challenges and Opportunities to Incorporate Historic Preservation into the District's Drive for Sustainable Development*. Georgetown University Law Center. http://scholarship.law.georgetown.edu/cgi/viewcontent.cgi?article=1031&context=hpps_papers

- This academic paper mostly provides broad background on EE and HP topics with some analysis of specific conflicts in Washington DC. From pg. 16 onward the document looks at the Green Building Act of 2007 and the Energy Act and how these interact with historic preservation standards. The paper does directly discuss some conflicts but only briefly, quotes are provided below Good but brief discussion of conflicts (Pgs. 17-27). The paper considers the costs/benefits of historic districts versus greater density through the example of a proposed transit hub. Solar panels on roofs are presented as the biggest challenge in DC (Mt. Pleasant solar cooperative example).
- Direct quotes on conflict between HP and Washington DC's Green Building Act:
 - "There is little tension between the Green Building Act and the Historic Preservation Act. ... rehabilitations of historic buildings need not meet the requirements of the Green Building Act, provided the rehabilitation does not increase the size of the building to the point that the rehabilitation would be considered new construction. Indeed, because a builder can get out from under the requirements of the Green Building Act by rehabilitating a historic structure, there may be an incentive for builders to rehabilitate historic buildings..." (pg. 18)
 - "... "new construction in historic districts could present issues of compatibility. However, concerns about fights over the aesthetics of new "green-looking" buildings in historic districts are likely overblown. With respect to privately-funded new construction, the project must be at least 50,000 square feet before the Green Building Act requirements kick-in. New construction of this size is simply not that common in historic districts." (pg. 19)
- Direct quotes on conflict between HP and Washington DC's Energy Act:
 - "Unlike the Green Building Act, the Energy Act and Historic Preservation Act do not mesh quite so easily. Specifically, the "Renewable Energy Incentive Program" ("REIP" or "the REIP") could prove problematic as applied to historic landmarks and districts. The REIP offers rebates for property owners to install renewable energy systems. Aesthetic concerns may make it difficult for historic property owners to take advantage of REIP. Indeed, recent efforts in Mount Pleasant highlight some of these difficulties." (pg 20)
 - "The DDOE Guide states a preference for solar installations that are "accessible to public viewing." Under the DC-HPO guidelines, a rebate applicant in a historic district would not be able to satisfy this preferred criterion." (pg 22)

Merlino, Kathryn (September 2011). *Report on Historic Preservation and Sustainability*. Summary Report for Washington State Department of Archeology and Historic Preservation. University of Washington, Dept. of Architecture. http://www.dahp.wa.gov/sites/default/files/sustainability_SummaryReport.pdf

- The majority of the paper presents research on HP and EE. A small section looks at Secretary Standards and conflicts: “The most common conflicts are installing inappropriate solar roofing materials, insulating walls without restoring original trim details, adding non-historic features for day lighting such as dormers or inappropriate skylights, and removing historic character-defining features like doors and windows for energy efficiency.” The paper provides great detail on particular strategies and recommendations for increasing EE in HP buildings but does not go into great depth on the conflicts in standards or policy recommendations.

Richard Leigh (March 2012). *The NYC Energy Code and Historic Preservation - Some Technical Issues*. The Preservation League of New York State, NYSERDA Energy Code Training.

http://www.preservenys.org/energyworkshops/wp-content/uploads/2012/05/RLeigh_CodesPreservation.pdf

- This resource is a presentation slide deck that was presumably presented at a NYSERDA Energy Code Training event in 2012. The presentation provides a good overview and some specific examples of conflicts between HP and EE in NYC (particular to NYC ECC and NYC Landmarks legislation). The two specific examples of conflicts presented in the presentation are windows and the trend of removing plaster in order to expose brick interior walls. The presentation states that the practice of exposing brick is not efficient as it reduces the insulating property of the wall if it is not a party wall and it is also not sensitive to the historic qualities of the building. The presentation then briefly touches on “Prescriptive” and “Performance” paths as means to meet NYC ECC requirements. .
- Direct quotes from the presentation on conflicts:
 - ... “NYC Landmarks regulations make it hard to add solar collectors to your roof and walls, but that flashy stuff is the last milepost you should reach on the road to sustainability, not the first. You can cut emissions and energy use and operational cost by 25–35% by doing invisible, boring retrofits and enhanced practices inside the building and without conflict with either NYC ECC or Landmarks...then go back to expensive and difficult items like solar collectors.” (pg. 11)
 - The statistic in this quote is in reference to the McKinsey graph (from the well-known 2009 “Unlocking Energy Efficiency in the US Economy” report) which shows that 25-35% of energy reduction can be achieved through upgrading heating equipment and installing wall heating, both of which have no affect on historic features. (The McKinsey graph is shown in the presentation.)

Over-The-Rhine Inc. and Gray & Paper Inc. (2009). *Over-The-Rhine, Green-Historic Study, Exploring the Intersection Between Environmental Sustainability and Historic Preservation*

http://www.boldstatementwebdesign.com/OTRFoundation/Docs/OTR_GREEN_HISTORIC_STUDY.pdf

- This is a great resource which is “intended to further the national discussion regarding historic preservation’s role in creating green buildings and environmental sustainability, and vice versa”. Over-The-Rhine is a neighborhood in Cincinnati that has many historically significant 19th century buildings and problems with demolition and vacancies. Because of the qualities of its buildings and high number of vacant units, the neighborhood was selected to be a case study of how historic buildings can be rehabilitated using green and LEED principals.
- The OTR report directly discusses the relationship between EE and HP and goes into considerable depth on the details of the conflicts between the two. The report presents an overview of LEED, Secretary of the Interior Standards, and local preservation laws. The

methodology of the study is then presented explaining how the four buildings in the study were selected based on being prototypical of the neighborhood's building stock and appropriate for addressing specific green-historic issues. Architects and "green" experts were chosen to study the four buildings and examine the various ways they could be rehabilitated in the most sustainable methods. All four projects needed to be able to meet the Secretary of the Interior Standards and LEED Certification in a cost-effective manner (these projects involved inspection of the actual buildings and review of the design proposals as the standards would likely be applied).

- The report presents each building with photographs, notes, observations by the architectural team, proposed treatments, LEED analysis, and green historic considerations. The report considers economic limitations which are important in the application to low-income historic building projects. The study explores the challenges of restoring historic buildings using green standards and the need to have local, state and federal regulations and requirements work more in tandem together
- Key conclusions from the study:
 - Many of the inherently green aspects of the neighborhood's building stock now violate codes and building codes should be reexamined from a "green" perspective (key examples were transom windows and greywater harvesting).
 - Far fewer conflicts between green and historic were identified by the project than was assumed at the onset. Where actual conflicts exist, they were primarily related to un-insulated walls and historic windows, but even these challenges can be overcome.
 - "A paramount finding is that all four projects were cost-effectively designed to meet, at minimum, the certification level for LEED, and also meet the Secretary of the Interior's Standards for Rehabilitation. This finding is extremely important because through various reports, conference sessions, media coverage, and professional discussion, we engaged in the project fully expecting to find significant barriers and difficult challenges in developing green historic buildings." ... "Due to eventual end use only one of the four projects (1700 Vine) may apply for federal historic tax credits and it is unknown whether any will apply for state historic rehabilitation tax credits. However, this should not negate the findings; the projects are simply not eligible for the historic rehabilitation tax credit because of the end use. However, the project clearly established that achieving LEED certification and meeting the SOI Standards can be achieved in a cost-effective manner, and that it is reasonable to conclude that a green-historic approach is very achievable for projects where use and ownership would qualify for the historic rehabilitation credit." (pg. 73)
 - "Throughout the project, roughly 25% of initial design ended up being revisited because the approach did not comply with code, including design approaches that resolved green-historic conflicts, but resulted in code problems. However, virtually all of the code conflicts were resolved through conversations with city code officials and the project team modifying the design." (pg. 74)
 - "Despite all the positive outcomes of the project, and findings that should serve to explode some myths about the difficulties of developing green historic projects – the study did encounter some inherent challenges between LEED and the SOI Standards for Rehabilitation. These challenges were substantially surrounding issues of daylighting and energy efficiency." (pg. 75)... "Windows and uninsulated walls and roofs were the primary areas of perceived conflict between SOI Standards for Rehabilitation and LEED certified design in the study. Throughout the project, a question has consistently arisen:

When, if ever, is it necessary to fur and insulate brick or plaster-on-brick walls to meet LEED standards, and will this ever be acceptable by SOI Standards? In other words, when does an actual conflict exist between meeting both LEED and SOI requirements in the treatment of brick and plaster-on-brick walls?"

- "Engagement of the appropriate inter-disciplinary professionals at the onset of the project is critical to the success of green-historic. The greatest "conflict" between historic preservation and green building design is limited communication or misunderstanding among different disciplines. Resolving this resolves most of the perceived "conflicts." (pg. 2)
- Some energy systems are not cost-effective at this point in time such as solar thermal systems and geo-thermal systems.
- Green roofs for historic buildings may not be possible due to the limited weight loads of the existing roofs. This was a large disappointment in the project because there were so many flat roofed buildings
- The study found that in the case of the four studied buildings, working with the plaster and brick materials is the most cost effective method for energy reduction and also the most historically sensitive
 - "Energy modeling was used to determine the feasibility and expense of making the prototypical building stock reach this goal. The study concludes that as a general rule, 7/8 inch to 1.5 inch furring strips, use of a rigid foam insulation layer and surface drywall will let most buildings attain sufficient insulation to meet Energy Star requirements. This treatment can be minimally intrusive to most historic, plaster-on-brick interiors; and it performs almost as well as more intrusive and expensive approaches (i.e. the most historically appropriate approach is also the most cost-effective.)" (pg. 3)

Jean Carroon (May 2012). *High-Performance Reconstruction and Historic Preservation: Conflict and Opportunity*. http://www.bdcnetwork.com/sites/default/files/Ch8WP_BDC0512_low%20res.pdf

- Very well written overview of the inherent environmental benefits of preservation. Discussion of embodied energy, how "high performance" and "historic preservation" go well together, the windows debate, and the need for cooperation between the disciplines. No direct discussion of policy conflicts.

Energy Efficiency in Local Historic Preservation Design Standards

Leimenstoll, Jo Ramsey (Spring 2009). *Going Green: Applying a Sustainability Lens to Historic District Guidelines*. National Trust for Historic Preservation Forum Journal.

<http://www.rhdc.org/sites/default/files/GoingGreen.pdf>

- "Current best practices for historic district guidelines emphasize the need to put the Secretary of the Interior's Standards for Rehabilitation in local context by creating accessible documents that tailor educational information, specific guidelines, and illustrations..."
- The article looks specifically at Davidson, NC's local guidelines and goes through the sections of the guideline and analyzes how historic preservation and sustainability goals are balanced in the language of the document. Leimenstoll suggests that Davidson guidelines be used as a model guide for others because it properly balances the emphasis on preservation and sustainability and makes for preservation by bringing a broader audience of supporters.

Sustainability and Design Review Guidelines Sources and Best Practices. February, 2011.

<http://www.okc.gov/planning/hp/documents/Report%20on%20Sustainability%20and%20Design%20Review%20Guidelines.pdf>

- The City of Oklahoma hired a consultant to find examples in other municipalities of historic design review guidelines that tie energy efficiency and historic preservation formally in the language and stipulations. The report is based on the notion that sustainability can be integrated as a basic principle of design review to the benefit of both fields of discipline.
- This report is very helpful as it provides the results of a literature review that focused on historic district and design review board language. As research for the report, the author reviewed the following journals: The Alliance Review, NTHP's Forum Journal, Preservation News, and The Old House Journal. The author also sent queries to numerous forums and claimed that the best information was provided by Kimberley Kooles of NTHP (the information she gave is subsequently included).
- The following peer cities' design review guidelines were selected in the report as best practices and models for Oklahoma City: Davidson, NC; Littleton, CO; Lexington, KY; and Loudon County, VA
 - These guidelines integrate energy efficiency matters throughout or they dedicate a separate chapter. The report goes through the specifics of each sample guideline showing the extent to which these guidelines promote energy efficiency

City of Bayfield, Wisconsin (2009). *It's Easy Being Green: Sustainability from a Historic Preservation Perspective*.

- Bayfield, Wisconsin prepared a report to support its initiatives to become a green and sustainable community. The report discusses inherent energy conservation and efficiency represented by the city's historic buildings and serves to bolster their design review guidelines which were adopted in 2005.
- The report presents an overview of how sustainable preservation and sustainability go together, the importance of preserving original materials, the proper use of solar energy and geothermal units, and the kinds of alternative materials best suited for historic areas. The material in the report contains good arguments and is written with the aim of persuading property owners to preserve their historic homes while also improving efficiency.

Clean Air, Cool Planet (2009). *Sustainable Preservation, an Addendum to Building with Nantucket in Mind*. http://www.nantucket-ma.gov/pages/nantucketma_histdist/Sustainable%20Preservation%20-%20Final.pdf

- This report was prepared in 2009 by the non-profit group Clean Air-Cool Planet with assistance from the Nantucket Historic District Commission.
- The report is written to provide building owners and construction professionals with information on the importance of preserving and maintaining original doors and windows, the appropriate use of solar technology, and the potential use of wind energy conversion systems. There are also guidelines for the use of alternative materials and energy conservation methods such as rain barrels and permeable pavers.

Clean Air, Cool Planet (2009). *Energy Efficiency, Renewable Energy, and Historic Preservation: A Guide for Historic District Commissions*. http://www.cleanair-coolplanet.org/for_communities/HDCGuide.pdf

- An overview of the energy efficiencies and inefficiencies of historic buildings, particularly for houses in the New England climate. The report has recommendations for restoring windows, using solar panels, installing insulation etc.

- The report recommends that Historic District Commissions get involved by using the historic district to demonstrate traditionally “green” practices as embodied by historic buildings and learn the language of LEED. There is also the recommendation to include a “sustainability” section or page on the HDC’s website with information on weatherization, building codes and green preservation.

Winter, Nore (December, 2010). *Developing ‘Green’-Friendly Guidelines: Advice for Preservation Commissions*. National Trust for Historic Preservation, Forum News.

<http://www.preservationnation.org/forum/library/public-articles/developing-green-friendly.html>

- This article is a summary of recommendations contained in a booklet published in February of 2011 by the National Trust, “Developing Sustainability Design Guidelines for Historic Districts.”
- The Forum News article maintains that preservation commission members have the opportunity to advocate for the inherent energy efficiency of historic buildings and to use their design guidelines to promote preservation and sustainability. Winter’s comment is a great summary of where things stand right now regarding HP/EE policy: “The basic principles of most guidelines certainly call for preserving original materials and other character-defining features as well as respecting the inherent energy-saving properties of historic resources, but they usually only touch on sustainability indirectly. Commissions should take steps to move beyond that point, to provide clearer, positive guidance to users.”

Energy Efficiency and Historic Preservation in Federal Agencies

National Park Service

Grimmer, A. E., Hensley, J. E. et al. (2011). *The Secretary of the Interior’s Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings*. US Department of the Interior, National Park Service. <http://www.nps.gov/tps/standards/rehabilitation/sustainability-guidelines.pdf>

- This guide replaces the “Energy Conservation” chapter in the 1992 version of the “Illustrated Guidelines for Rehabilitating Historic Buildings” report. This updated report provides specific guidelines on how to make historic buildings more sustainable in a way that is also in line with historic preservation best practices. “Recommended” and “Not Recommended” specifics are provided for a long list of rehabilitation activities and decisions. The usual issues and recommendations for EE/HP are provided such doing integrated design planning early in the project, advice on windows, advice on HVAC, etc.

Energy Efficiency, Sustainability, and Green Building Practices in Historic Buildings

<http://www.nps.gov/tps/standards/applying-rehabilitation/successful-rehab/energy-efficiency.htm>

- Overview of NPS’s role in protecting historic resources and how energy efficiency is balanced with this. Little detail is provided but this is the NPS’s most direct discussion of historic preservation and energy efficiency conflicts.
 - “Historic preservation, energy efficiency, and environmental sensitivity are not mutually exclusive. Many historic structures were designed with inherent energy-saving qualities including: operable windows; ample natural light sources; clerestory windows and skylights; wide, overhanging eaves; or heavy masonry walls. These factors should be considered when evaluating the energy efficiency of an individual structure. During rehabilitation projects, the most common energy efficiency-related issues that arise are reducing air infiltration around windows and doors and insulating attics and walls. The NPS generally encourages boosting

efficiency in these areas ... As long as a proposed measure does not diminish the historic character of a building or endanger historic materials, then improving the energy efficiency of a structure will meet the Secretary of Interior's Standards for Rehabilitation."

- "The standards and requirements of the LEED Rating System are currently undergoing review with the potential for revisions that will ... rectify the conflict between replacing historic finishes and features with new "earth-friendly" products rather than retaining the historic material intact. This coalition is also attempting to determine how to evaluate the energy saved when existing materials are re-used instead of using newly manufactured or harvested products."
- ... "the NPS recognizes a need for users of the Historic Preservation Tax Incentives program to be aware of the compatibility of these two elective programs and how they have been successfully combined in the past. A number of historic buildings have been rehabilitated in a way that both met the Standards and received recognition for incorporating energy-efficient and environmentally-friendly products and systems. Several of these have also achieved LEED certification. Practices that promote environmental sustainability are important and should always be considered in a historic rehabilitation project."

ITS Bulletins. ITS Bulletins assist building owners in applying the Standards to rehabilitation projects.

<http://www.nps.gov/tps/standards/applying-rehabilitation/standards-bulletins.htm>

- This page hosts a list of Bulletins which provide guidance on interpreting relevant standards. (the Bulletins are case specific and provide only guidance). Many are not relevant to historic preservation, the ones that are: "Windows: Selecting New Windows to Replace Non-Historic Windows" and "Installing Green Roofs on Historic Buildings". Additional briefs:
- [Preservation Brief 3: Conserving Energy in Historic Buildings, National Park Service](#)
- [Preservation Brief 9: The Repair of Historic Wooden Windows](#) (1981)
- [Preservation Brief 13: The Repair and Thermal Upgrading of Historic Steel Windows](#) (1984)
- [Preservation Brief 44: The Use of Awnings on Historic Buildings](#) (2005)

Park, Sharon (1998). *Sustainable Design and Historic Preservation*. National Park Service.

<http://www.smartplaces.com/general/21-2-4.pdf>

- Article on HP and EE covering the usual topics and looking at case studies such as the Presidio in San Francisco. Somewhat dated article.

Advisory Council on Historic Preservation

ACHP Task Force on Sustainability and Preservation

<http://www.achp.gov/TaskForceSustainabilityHistPresrv.html>

- Notes on the task force are included on the website. Links to the usual HP/EE resources are provided as well as a few links to state SHPO documents:
<http://www.achp.gov/sustainabilitylinks.html>

In a Spirit of Stewardship: A Report on Federal Historic Property Management. The Preserve America Executive Order Report to the President. 2012.

<http://www.achp.gov/docs/2012Section3ReportFINALLowRes.pdf>

- This is a very thorough and long report which ultimately recommends better integration between energy efficiency programs and Secretary Standards and NPS technical guidance. There are no specific examples of conflicts provided.

Sustainability and Historic Federal Buildings. May 2011.

<http://www.achp.gov/docs/SustainabilityAndHP.pdf>

- This guidance report is an overview document that explains the connection between sustainability and historic preservation. The report is intended for federal decision makers, capital asset managers, facility managers, and other program and project managers.
- Starting on pg. 17 the report provides a list of how the Secretary guidelines can be met while still pursuing energy efficiency upgrades. The report asserts that for every sustainable improvement proposed for a historic federal building, there are both concerns and opportunities to resolve those concerns with stakeholders. There is a heavy emphasis in the beginning of the report on how integrated design management can be used to address incompatibilities between energy efficiency goals and historic preservation standards. The reports review of the EE/HP concerns and covers the usual territory such as:
 - Exploring all possibilities before considering window replacement
 - Solar panels are often the easiest to conform with standards as compared with other alternative energy options
- The report also addresses policy regarding disposal, transfer, and how new requirements to locate federal buildings in high density areas effects preservation

Assessing the Energy Conservation Benefits of Historic Preservation: Methods and Examples. January 1979. <http://www.achp.gov/1979%20-%20Energy%20Conserv%20and%20Hist%20Pres.pdf>

- This is an old document on embodied energy and the conservation benefits of building reuse but it is potentially one of the first documents released by ACHP on this topic. If nothing else, it is good to know this exists, though much of the information contained in it is dated.

NCSHPO – National Council of State Historic Preservation Officers

Energy Efficiency, Sustainability, and Green Design Best Practices from the NCSHPO Archives.

<http://www.ncshpo.org/current/bestpractices/green.htm>

- This is a great resource and provides many specific examples from across the country of properties or local government regulation that deals with particular EE/HP conflicts. Discussion topics include white roofs, green roofs, insulation, and wind farms triggering Section 106

NCSHPO Squaretable Discussion of LEED (2007). <http://www.ncshpo.org/current/leed.htm>

- This website discusses in general terms the greenness of historic buildings and considers how LEED and Secretary Standards should go well together but that many of the USGBC guidelines do not properly take into consideration benefits and unique features of historic buildings. This conversation likely needs to be updated.

GSA – General Services Administration

GSA Technical Preservation Guidelines. <http://www.gsa.gov/portal/content/101402>

- The Illustrated Technical Guidelines show innovative preservation design solutions that have been developed for GSA historic projects. Relevant topics include “Upgrading Historic Building Windows”, “HVAC Upgrades in Historic Building Lighting”, “Historic Building Roofing”, and “Upgrading Historic Building Lighting”.

NCR Historic Preservation Note Series. <http://www.gsa.gov/portal/content/104184>

- The Historic Preservation Note Series are a series of technical briefs prepared by the GSA NCR Historic Preservation staff as a resource on preservation project design, contracting, construction and historic management issues. Relevant technical briefs include “Natural Light in Historic Buildings” and “Duct Installation in Historic Buildings”. Most of the technical briefs are

on preservation issues such as paint color, bronze work, etc. that do not relate to energy efficiency issues.

Ramirez, C., Horn, D.R., and Bradley Wolf (1999). *The Economics of Preserving Historic Federal Buildings*. National Trust for Historic Preservation "Forum Journal", Vol. 6, No. 1, Sept/Oct 1999.

<http://www.gsa.gov/portal/content/graphics/pbs/ForumArticleFall1999.doc>

- Reports on a GSA study comparing operating costs at GSA's historic buildings with operating costs at buildings constructed less than 50 years ago. The study showed that many historic buildings are more efficient and profitable than newer buildings.

DOE – Department of Energy

EERE – Energy Efficiency and Renewable Energy

Historic Preservation and Energy Efficiency. 2006. Federal Energy Management Program.

http://www1.eere.energy.gov/femp/news/news_detail.html?news_id=10482

- Website discusses the intersection of HP and EE. In December 2006 meeting was put on by FEMP (Federal Energy Management Program) to discuss intersection of EE/HP. The Renwick Gallery Retrofit was the central case study of the meeting. Proceedings from the meeting:
- FEMP (2006). Proceedings of the Workshop on Historic Preservation and Energy Efficiency in Federal Buildings. http://www1.eere.energy.gov/femp/pdfs/ee_historicbldgs_report.pdf

Historic Building Renovations - Guide to Integrating Renewable Energy in Federal Construction.

http://www1.eere.energy.gov/femp/reconstructionguide/mr_historic.html

Executive Order EO13514. <http://www1.eere.energy.gov/femp/regulations/eo13514.html#sbc>

EPA – Environmental Protection Agency

Greening Historic Communities: What Works, What Doesn't, and What Should Change?

US EPA Region 5 Symposium, Wilmington, Delaware. June 2011

<http://epa.gov/region5/sustainable/pdf/greenhp-synopsis-201106.pdf>

- This Symposium was the second symposium after the 2010 meeting in Indianapolis. Lecturers at the event included many of the usual experts in this area (Jean Carroon, Patrice Frey, Druscilla Null). No details are provided in the synopsis document, perhaps follow up with attendees to gather information.

Green Historic Preservation Symposium, Indianapolis, Thursday January 21, 2010.

http://www.greenhistoricpreservation.org/GHP-IndySymposiumSummary_Final.pdf

- The first symposium. Again, little information is provided regarding meeting notes and resources.

DoD - Department of Defense

Shiver, D., Widell, C., Terada, R., et al. (2010). *Demonstrating the Relative Cost-Benefits of Reusing Historic & Non-Historic DoD Properties Using Scientifically-Derived Data*. Demonstration Plan: ESTCP Project Number SI 0931

- This is an interesting report includes a list of all Executive Orders and mandates that relate to historic preservation, green building, and energy for federal buildings. Majority of the report presents an explanation of the demonstration project for developing software which can be used to conduct life cycle assessment analysis.

National Institute of Building Sciences (NIBS)

Sustainable Historic Preservation – Whole Buildings Design Guide

http://www.wbdg.org/design/historic_pres.php

Richard Paradis - rparadis@nibs.org - (202) 289-7800

- This website discusses the broad range of issues relevant to HP and EE and has a long list of resources. The recommended resources have all been captured in the literature review.

Articles from Collector Sites and Local News

Kaid Benfield, June 2012. *Can Solar Panels and Historic Preservation Get Along?* The Atlantic Cities.

<http://www.theatlanticcities.com/design/2012/06/can-solar-panels-and-historic-preservation-get-along/2364/>

- Benfield discusses a number of examples of conflict between preservation and solar (examples in Cleveland Park, Washington DC and Ann Arbor, MI)
- California's Solar Rights Act prohibits local governments from restrictions on solar energy systems unless they are unreasonable (unreasonable restrictions would cause costs exceeding \$2,000 or decreasing performance by more than 20%).
- Ypsilanti, MI preservation commission has legislation that states it will approve solar panels in a historic district only after a property owner has demonstrated that he/she has taken all other measures to increase energy efficiency first

Kaid Benfield, October 2012. *How LEED-ND Can Improve Older Neighborhoods.* The Atlantic Cities.

<http://www.theatlanticcities.com/design/2012/10/how-leed-nd-can-improve-older-neighborhoods/3601/#>

- LEED-ND is primarily useful for new developments but the rating system can also be used by municipalities for policy guidance and it can be used for greening existing neighborhoods
- LISC and NRDC partnered to explore how LEED-ND can be used in low-income, inner-city communities with Codman Square, Boston as the pilot site. This neighborhood had older buildings which will be upgraded and reused. How many (if any) national register historic properties are included in the LEED-ND target area is not discussed in the article but it is known that there are many buildings in the area that are appreciably old and in a poor state.
- The article considers a few general, possible incompatibilities between LEED-ND and existing neighborhoods but finds that for the most part it is compatible. The article does not consider LEED-ND application to a historic district and what possible conflicts would arise
- Syracuse Arts District (SALT) earned gold-level certification in LEED-ND pilot project in an area with many older building that will be retrofit and reused through the LEED-ND plan (http://switchboard.nrdc.org/blogs/kbenfield/ambitious_revitalizing_arts_di.html)

Lloyd Alter, July 28, 2010. *In With The Old: Fixing What We've Got Comes Before Re-imagining What Might Be*. TreeHugger.

<http://www.treehugger.com/sustainable-product-design/in-with-the-old-fixing-what-weve-got-comes-before-re-imagining-what-might-be.html>

- This article discusses the problems that often arise when applying new energy efficiency technologies to old buildings (for example, insulating bricks and therefore potentially impeding the natural breathing a drying process of bricks). There is no discussion of policy conflicts between historic building and energy efficiency programs.

Noelle Lord. *Embracing Energy Efficiency*. Old House Journal.

http://www.oldhousejournal.com/embracing_energy/magazine/1453

- This article is one of many providing specific and technical advice on how to implement energy efficiency measures in old houses without running into problems with the Secretary Standards. The tips from this and other similar articles are: pay to get an audit done, start by sealing up air leaks, update rather than replace historic windows, etc.

Local News

Michael R. Allen, October, 22, 2012. *New Solar Panel Standards Proposed for City Historic Districts and Sites*. Preservation Research Office. <http://preservationresearch.com/2012/10/new-solar-panel-standards-proposed-for-city-historic-districts-and-sites/>

- New standards to allow solar on City Landmarks and Sites in Local Historic Districts in St. Louis under consideration

Richard Thompson, November 7, 2010. *In New Orleans, Alternative Energy Innovations Sometimes Conflict with Preservation Goals*. The Times-Picayune.

http://www.nola.com/business/index.ssf/2010/11/in_new_orleans_sometimes_alter.html

- Discussion of failed attempt to get solar on historic house in French Quarter of New Orleans

David Alpert, May 31, 2012. *Preservation Staff Reject Solar Panels on Cleveland Park Home*. Greater Washington.

<http://greatergreaterwashington.org/post/15012/preservation-staff-reject-solar-panels-on-cleveland-park-home/>

- Article on failed attempt to get solar on historic house in Washington DC

Kathy Orton, Solar power project eclipsed in D.C.. June 22, 2012. The Washington Post.

http://www.washingtonpost.com/realestate/solar-power-project-eclipsed-in-dc/2012/06/21/gJQADxrdtV_story.html

- More coverage on the failed attempt to get solar on historic house in Washington DC

Mark Ferenchick, August 2, 2012. *City seeks advice on historic-neighborhood renovations- Consultant to help study 'green' ideas*. The Columbus Dispatch.

<http://www.dispatch.com/content/stories/local/2012/08/02/city-seeks-advice-on-historic-fixes.html>

- Columbus, OH government plan to hire an architectural consultant to help city officials determine which new "green" improvements and materials meet historic-preservation standards

Alexei Rubenstein, March 8, 2011. Balancing energy efficiency with historic preservation. WCAX News. Montpelier, VT. <http://www.wcax.com/story/14212961/balancing-energy-efficiency-with-historic-preservation>

- Owner of historic apartment building in downtown Montpelier purchased new windows to replace old windows before realizing preservation restrictions against this. The Commission allowed her to replace some windows but ultimately she was stuck with \$40,000 of extra windows.
- Article presents owner's frustration with this added hardship to owning historic downtown buildings and city's arguments that there are likely more efficient measures than replacing windows that an energy audit and working with the commission might have revealed.

Deep Energy Retrofit Online Debate

Deep Energy Retrofit's – The Conversation. April 5, 2012. Sean Lintow Sr. Homeowner's & Trades Resource Center. <http://blog.sls-construction.com/2012/deep-energy-retrofits-the-conversation>

- This article explains the discussion/debate that began online about the Mallett House and the loss of architectural detail in this deep energy retrofit

Deep Energy Retrofits, Historical Properties, and the Conversation. April 17, 2012. Homeowner's & Trades Resource Center. <http://blog.sls-construction.com/2012/deep-energy-retrofits-historical-properties-and-the-conversation>

- This article carries on the conversation/debate about deep energy retrofits (DER) and historic homes.
- Author offers his/her opinion on some specific topics that have been addressed in the debate such as:
 - Comparable new materials are usually drastically different than original materials (for example, new wood is less resistant to water intrusion than old wood because there is less old growth wood available today) and therefore it might be necessary or most practical to work with composite materials

Historic Preservation and Deep Energy Retrofits — Natural Enemies? Allison Bailes, April 9, 2012. Energy Vanguard Blog. <http://www.energyvanguard.com/blog-building-science-HERS-BPI/bid/52722/Historic-Preservation-and-Deep-Energy-Retrofits-Natural-Enemies>

- Another review of the debate (not particularly helpful)

Deep Energy Retrofits and Historic Preservation: The Beginning of a New Dialogue. April 7, 2012, John Poole. A Preservationist's Technical Notebook (Blog).

<http://birminghampoint.co/blog/2012/04/07/historic-home-performance/deep-energy-retrofits-and-historic-preservation-the-beginning-of-a-new-dialogue/>

- Article carries on the DER debate and offers author's opinion on the topic.
- *Historic Home Performance: The Adoption, Care, and Feeding of a New Meme*
- <http://birminghampoint.co/blog/2011/11/10/historic-home-performance/historic-home-performance-the-adoption-care-and-feeding-of-a-new-meme/#manifesto>

- Poole discusses attempt to coin term “historic home performance” to define the union of historic preservation and energy efficiency. Poole provides a manifesto for what exactly “historic home performance” means

Case Studies

Examples of completed or ongoing energy efficiency upgrades in historic buildings. These cases deal with conflicts with both federal level HP requirements and local requirements. Potential sources for interviewees.

Lowell, MA

- http://www1.eere.energy.gov/buildings/betterbuildings/neighborhoods/m/lowell_profile.html
- Lowell, MA is attempting to become the first carbon neutral historic district. They have hired consultants to provide technical assistance to property owners implementing energy efficiency upgrades.
- The Lowell team has not had any substantial problems with implementing energy efficiency technologies in the many buildings. Any issues that have emerged have mostly been about color, window (single v. double pane), maintaining front façade and none of these really get in the way of the preservation requirements. Need to consider insulation and how it affects walls/décor on walls. State and local board are reviewing the buildings.
- 30% savings per building attempted with measurements for 1st year. No sanctions for not meeting goal.

Deep Energy Retrofit Demonstration Program Case Study –Sacramento, CA

- <https://www.smud.org/en/business/save-energy/documents/Maydestone-case-study.pdf>
- Detailed report of retrofit of a nationally registered historic building in Sacramento. Concluding remarks from the report are quite critical of the preservation limitations that were placed on the project (namely window preservation and also lighting specs)

Mallett House Deep Energy Retrofit Project – Freeport, ME

- <http://www.energycircle.com/blog/2011/02/11/mallett-house-deep-energy-retrofit-project-passes-town-project-review-board>
This article addresses the conflict between deep retrofit goals and historic preservation requirements as they unfolded for this project (which is since complete).
- http://www.pressherald.com/news/a-public-demonstration-of-what-can-be-done_2012-06-16.html
This article discusses the project after completion in 2012.

Technical Information on Issues of Common Conflict

Windows

"Sustainability and Historic Preservation Lessons Learned." In Technical Preservation Services, edited by National Park Service: National Park Service, 2007.

M. Asif BSc MSc, A. Davidson BSc, T. Muneer PhD DSc ECng. "Life Cycle of Window Materials - a Comparative Assessment." 12. Edinburgh, U.K.: Napier University.

Brad James, Andrew Shapiro, Steve Flanders and David Hemenway. "Testing the Energy Performance of Wood Windows in Cold Climates: A Report to the State of Vermont Division of Historic Preservation Agency of Commerce and Community Development." National Center for Preservation Technology and Training, 1996.

Klems, J. H. "Measured Winter Performance of Storm Windows." Berkeley, California: Lawrence Berkeley National Laboratory.

Robert Scope and Bradford S. Carpenter (2009). "An Analysis of the Thermal Performance of Repaired and Replacement Windows," Vol. XL; No. 2

Vermont Division for Historic Preservation (1996). [Testing the Energy Performance of Wood Windows in Cold Climates.](#)

Summary Observations from Literature Review

- Many of the reports that look directly at actual examples of conflicts between the federal standards and energy efficiency efforts (informal, subsidies, voluntary rating systems etc.) conclude that most of the conflicts can be overcome with creative design and a historic review board that is willing to compromise.
- The higher level literature and articles which just talk generally about this issue simply say that there are conflicts but they do not give specifics nor do they suggest that these conflicts are actually not barriers.
- At this point in the research I would dare conclude that the greater issue is a pervasive perception that federal preservation standards impede energy efficiency efforts. It seems that there are far more examples of people being able to retrofit their buildings with few problems than the opposite... the few cases where there are conflict seem to be highlighted and the success stories ignored.

APPENDIX B

Overview – Guidance to Interviewer:

We are eager to collect examples of federal policy that are supportive of efforts to integrate green building strategies into historic preservation projects, as well as examples of federal policy that can serve as an impediment to greening historic buildings. Our research may also yield evidence of green building policies that are harmful to preservation practice – we should be sure to document any such findings.

We are also interested in *positive* and *negative project-based* experiences in integrating green building techniques into historic preservation projects. For the project-based analysis, we're primarily interested in federal historic tax credit projects, but may also consider other projects that have been subject to the Secretary of the Interior's Standards for Historic Preservation.

For all interviews, please ask interviewee to be as specific as possible in his/her response and speak to examples whenever possible. (General feedback is not as helpful as description of specific challenges/successes.)

***Note for project-focused interviews:** In some instances, the interviewee should be able to speak to the specific energy efficiency reductions that occurred as a result of NPS/SHPO decisions –the project team will have modeled different scenarios. (This should be the case with design elements like solar panels, which if not tilted at optimum angle will produce less energy.) Please encourage the interviewee to offer as many details as possible and ask him/her to share documentation if it is available.

Policy-Focused Questions

- 1) What is your role in your agency/organization as it relates to historic preservation?
- 2) In your agency/organization what policies govern the approach to greening historic buildings?

Examples: Secretary of Interior Standards; Executive Orders related to energy efficiency; agency specific or internal policies. Note: these policies may be formal (regulation) *or* informal
- 3) In your experience, are these policies effective at encouraging the sustainable rehabilitation (or maintenance) of federally owned historic buildings, or privately owned historic buildings (where relevant)? Please be specific.
- 4) Do any of these federal policies present barriers to meeting historic preservation standards – or do historic preservation standards present barriers to meeting federal environmental policy? If so, please be specific: (To interviewer: you should refer here to list of supplemental questions to prompt respondent for answers on topics like solar panels, windows, etc. These questions should be modified in a way that speaks to policy and not to specific projects.)

- 5) Are there policy or regulatory changes in process – or anticipated – that will affect efforts to integrate green building practices into the rehabilitate of historic buildings, whether federally or privately owned?
- 6) Do you have any recommendations for others we should interview?

Project- Focused Questions

- 1) How many historic tax credit projects have you completed?
- 2) In which states?
- 3) What was your role in these projects?
- 4) Did these projects include sustainability features? If so, please provide specific examples of the types of green elements or sustainable practices that were implemented in your project(s).
- 5) When working with the Secretary of the Interior's standards, were you able to include the sustainability features that you desired? If so, which design elements were approved? Which design elements required alteration or were denied?
- 6) Did you find the review process (with regard specifically to sustainability features) to be efficient? Did you find it to be fair? Please describe.
- 7) If green design elements were denied, was the SHPO or NPS staff helpful in identifying an alternate solution that satisfied both green goals and preservation standards?
- 8) Do you have any recommendations for others we should interview?

Supplemental Questions

If the following issues are not addressed in interviewee's responses above, please inquire about the following.

- A) Have you worked on a project that included solar (PV) arrays? If so, what was your experience in integrating renewable energy technologies and meeting the Secretary of the Interior's standards?
 1. Were you required to alter the panels in such a way as to reduce their efficiency? If so, were you ultimately satisfied with the solution?

- B) Have you worked on a project where there were concerns expressed by SHPO or NPS about adding insulation to a building? If so, what was the nature of the concern? How was this resolved? Was this resolved to your satisfaction?
- C) Have you worked on a project in which the NPS or SHPO encouraged you to retain the entire original heating system or elements of the original heating system? If so, how was this issue resolved? Did the solution result in reduced mechanical system efficiency? Were you satisfied with the final result?
- D) Have you worked on a project that included a green roof? If so, were concerns expressed by SHPO or NPS about the green roof? If so, what was the nature of the concern? How was this resolved? Was this resolved to your satisfaction?
- E) Have you worked on a project that included geothermal heating/cooling? If so, what (if any) were the challenges in integrating geothermal with historic preservation standards? Did SHPO or NPS object/ require changes to any portion of the project? If so, please be specific.
- F) Have you worked on a project in which you replaced historic windows, or wished to replace historic windows for **energy efficiency reasons** but were not allowed to do so? What was the nature of SHPO/NPS's concern? How was this resolved? Was this resolved to your satisfaction?
- G) Are you familiar with The Secretary of the Interior's *Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings*? If so, have these offered helpful guidance for developing design schemes that meet historic preservation and sustainability goals? Where do you find the guidelines to be particularly helpful? How do you think they could be enhanced?
- H) Are there other NPS or SHPO resources that have been helpful to you in efforts to green historic tax credit projects? If so, what?
- I) Have you found NPS/SHPO staff to be knowledgeable on topic of green building and prepared to help identify alternate sustainability solution when an initial request has been denied?
- J) What suggestions do you have for improving or making even stronger NPS/SHPO's efforts to encourage green building techniques in historic rehabilitation projects?

Policy-Focused Questions

- K) What is your role in your agency/organization, especially as it relates to historic preservation projects?

- L) In your agency/organization what policies govern approach to greening historic approach?
Examples: Secretary of Interior Standards; Executive Orders related to energy efficiency; agency specific or internal policies. Note: these policies may be formal (regulation) *or* informal
- M) In your experience, are these policies effective at encouraging the sustainable rehabilitation (or maintenance) of federally owned historic buildings, or privately owned historic buildings (where relevant)?
- N) Do any of these federal policies present barriers to meeting historic preservation standards – or do historic preservation standards present barriers to meeting federal environmental policy? If so, please be specific: (To interviewer: you should refer here to list of supplemental questions to prompt respondent for answers on topics like solar panels, windows, etc.)
- O) Are there policy or regulatory changes in process – or anticipated – that will affect efforts to integrate green building practices into the rehabilitate of historic buildings, whether federally or privately owned?

APPENDIX C

Among the 22 sustainability and historic preservation professionals interviewed for their involvement in preservation and energy conservation work, were the following:

- SHPO Staff
- Former SHPO
- Preservation Consultant
- Federal Agency Officials (including preservation and energy officials)
- Developers
- Architects
- Energy/Green Building Consultants
- Architectural Historian