

Historic preservation and adaptive use: a significant opportunity for sustainability

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ABSTRACT:

Recent budgetary perspectives of the current presidential administration indicate that recognition of preservation and adaptive use as a sustainability strategy has fallen short of what it can and should be. With the emergence of programs, such as the United States Green Buildings Council's Leadership in Energy and Environmental Design (LEED™) and the American Reinvestment and Recovery Act (ARRA) funding incentives, it is time to expand the language and interdisciplinary nature of preservation to give a broader voice to enhance the public perception that sustainability stems *from* preservation rather than the common general misperception that preservation and adaptive use of existing older buildings *can not* enhance sustainability in the built environment.

This research explores the basic tenets of sustainability through the integrated lens of social, environmental, and economical factors. Specifically, this research provides insights into a holistic view of interdisciplinary practice. By advancing beyond the current practice of "going green," preservationists can use these factors to promote a greater understanding how reusing existing buildings is a viable sustainability strategy. This presentation will supplement the social argument for community revitalization through preservation and adaptive use by exploring the implications of energy utilization indices, the impacts of demolition and replacement, vernacular climate-based design and low technology comfort strategies that are inherent in many older and historic buildings. Lastly, the findings will demonstrate the economic incentives available and the types of collaborative partnerships and incentive programs that have been used to make a project meet the economic goals of the developer or investor. This latter exploration provides the primary thrust to promote the argument in economic terms that drive the actual realization of a project.

CONFERENCE THEME: On measurement: quantifying sustainability, are we using the correct measures?

KEYWORDS: preservation, sustainability, social, environmental, economics

INTRODUCTION

While not all existing or older buildings are historically significant, their rehabilitation contributes to a sustainable future. Retaining buildings is the ultimate form of recycling. As noted "green" architect Carl Elefante has stated "...the greenest building is one that is already built" (Elefante 2007, 26). Stewardship of the built environment balances social and economic needs and their impact on the built environment and, ultimately, natural environment. Stewardship of the built environment recognizes the value of reusing existing buildings as a means to mitigate the long term extraction and depletion of natural resources and abating the landfill pressures caused by the unnecessary demolition of buildings, the energy needed to create new or replacement buildings and subsequently reduce unsustainable sprawl (Young 2008, 3).

Sustainable design (see Figure 1) occurs where Social (S), Environmental (E), and Economic (E) systems converge with one another. This "SEE" approach includes consideration of all three subsystems in seeking sustainable solutions. Solutions where only two components overlap may be detrimental to the excluded component. For instance, constructing an electrical generation plant may raise living standards (Social), provide jobs and reduce overall power generation cost (Economic) but without attention to the Environment. (e.g., increased air pollution, degraded natural habitats, and accommodating suburban sprawl), the project would not be considered sustainable design.

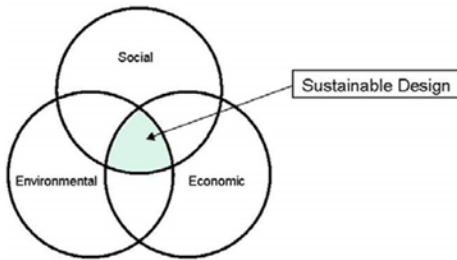


Figure 1: Sustainable design occurs where Social (S), Environmental (E), and Economic (E) systems converge.

I. SOCIAL FACTORS

As a growing comprehensive view of sustainability evolves, various rating systems have emerged. The current front runners in the United States are LEED™ developed by the United States Green Building Council (USGBC) and EnergyStar® jointly developed by the United States Environmental Protection Agency and the United States Department of Energy.

With their focus just on a building and the immediate site, these metrics have created an unintended consequence of “green sprawl,” where green buildings are built where they negate the efforts they make towards sustainability. As an example, the Philip Merrill Environmental Center (completed in 2000) was the first LEED™ platinum building. However, the building site, constructed 10 miles from the original downtown headquarters, has caused many of the 100 employees to drive instead of walk to working. It is unknown how the increased fuel consumption for commuting will offset the energy savings from the new building (Curtis 2008, 23).

Conversely, the sustainability potential of reusing buildings has been undervalued. Early LEED™ systems were insensitive to historic buildings but with the efforts of the National Trust for Historic Preservation (NTHP), the American Institute of Architects, the Association for Preservation Technology, and the National Park Service (NPS), recognition of the sustainability of reusing historic buildings has been added (Kienle 2008).

I.1 HISTORIC PRESERVATION AND ADAPTIVE REUSE

Historic preservation began in the United States in the 19th century and gained traction throughout the 20th century. *The National Historic Preservation Act (NHPA) of 1966* and the *National Environmental Policy Act (NEPA) of 1969* created several federal agencies and programs that included the State Historic Preservation Office (SHPO), the National Register of Historic Places (NRHP), and the Environmental Protection Agency (EPA). The SHPO program created an administrative office in every state. The NRHP was established to certify which resources have historic significance. The EPA was created to review environmental impact statements (EIS) that includes a mandate to “preserve important historic, cultural, and natural aspects of our national heritage” (ACHP 2010).

Based on 19th century attitudes that only the best architecture or buildings associated with famous people mattered, preservation is seen as the purview of the rich who could afford to purchase and preserve these buildings. Vernacular constructions and working class neighborhoods were dismissed and many succumbed to urban renewal programs and interstate highway construction. As preservation oriented groups struggled against this phenomenon, public awareness of the importance of history began to slowly gain support. The period from 1976 to 1986 saw significant increases in historic preservation and adaptive reuse and demonstrated the economic and social benefits of preservation.

Attitudes about patriotism and heritage coupled with the economic recession have people reconnecting with their roots and celebrating their community’s uniqueness. The NTHP advocates the environmental benefits of retaining buildings through its *Sustainability Initiative* which is guided by four core tenets of sustainable stewardship: (1) reuse buildings; (2) reinvest in older and historic neighborhoods; (3) retrofit older and historic buildings for energy efficiency; and (4) respect historic integrity (Moe 2008).

1.2 A SOCIAL CONUNDRUM

The preservation movement has been marked by compounding forces that have occurred unevenly across the country:

- Preservation viewed as anti-progressive
- Laws and statutes that provide multiple paths of oversight
- Issues of perceived civil liberties infringement
- Myths and misconceptions that have perpetuated from these previous forces.

As such, property owners, developers, lending institutions and municipal leaders view preservation and reuse as risky and look to develop where oversight is less or rely on demolition to clear a site.

In 1950, the average house was 218.2 m² (983 sf) which had grown to 218.2 m² (2,349 sf) by 2004 (Solomon 2009). Without local preservation ordinances, neighborhoods are vulnerable to market forces, such as when a property owner wants to expand living space and the result is a “monster house.” The impact on older neighborhoods is twofold: first the architectural heritage is eroded (and consigned to a landfill); and second, the massive out-of-scale structures “threaten the very qualities that make these neighborhoods attractive and desirable.” This trend is an example of how people “carelessly throw away our valuable heritage in the name of progress and change.” (Fine and Lindberg 2002, 2).

Arthur Nelson, director of the Metropolitan Research Center at the University of Utah, indicates that by 2030, households with children will drop to 27% (down from 33% in 2000). Nelson concludes that “single people and households without children don’t want big houses on big lots.” (Kiviat 2009, 57-58). He predicts that they will be attracted to inner-city and first-tier suburban neighborhoods.

By the late-20th century, smart growth concerns over the living in an automobile-dominated culture began to grow. Critics of the smart growth movement saw it as anti-suburb. From the findings of Urban Land Institute’s *Smart Growth: Myth and Fact*™ (O’Neill 1999, 6), “smart growth encourages development that meets multiple objectives in downtown, suburban, and suburban fringe locations.” Suburbs had created social isolation, segregated land uses, an increased reliance on the automobile, and longer commutes which did not appeal to the homebuyer. Smart growth projects located in inner-city and first-tier suburbs include building rehabilitation, redevelopment, new infill, or a combination of these three. In 1999, Richard Moe, president of the NTHP, noted that:

Historic preservation is of critical importance to smart growth advocates. By preserving historic structures, towns and cities can revitalize older areas and preserve the uniqueness of their community. In turn, vibrant downtowns, thriving small towns, and places that are worth saving reduce our appetite for outward sprawl and new development (Sierra Club 1999, 22).

This assertion was later supported by David R. Porter, a growth management consultant, who observed:

Smart growth encourages more growth in urban areas (and less growth in nonurban areas) because growth in urban locations conserves resources, makes efficient use of existing capital assets (building and infrastructure), and adds to the quality of life in metropolitan regions (Porter 2002, 117-118).

Reducing growth pressures at the suburban periphery retains open land, reduces vehicle miles traveled, lowers costs of living by forestalling taxes to build new infrastructure, and encourages greater cultural diversity.

1.3 COLLABORATIVE PRACTICE

Preserving and reusing the built environment can be complex and nearly undecipherable for those unfamiliar with the processes involved. There are many opportunities and constraints in a preservation or adaptive use project that multiply as the scale of the project increases. While each city or town has its own, sometimes idiosyncratic, interpretation of the process, a survey of housing developers in Atlanta revealed the following barriers:

- High land costs
- Neighborhood opposition
- Complex zoning and permitting processes
- Inflexible zoning restrictions and regulations
- The need to design new projects to fit into existing neighborhoods
- The high cost of deck parking (for high-density projects)
- Lack of popular and market support for and knowledge of higher-density and mixed use projects (Porter 2002, 130).

These are fairly typical and become further complicated when the requirements of historic district oversight, government incentive programs, financial institutions, and, as of late, high performance building standards are added to the mix.

To minimize risk and ensure project completion, the collaborative practice strategies have emerged to more comprehensively understand the requirements and facilitate a successful completion. This often has meant forming temporary partnerships between firms in the planning, design, and construction industry. Each firm and consultant retain their separate internal structures but together the partnership emulates the activities of a much larger, more sophisticated organization with broader and deeper levels of expertise. The actual presence of the various entities becomes more pronounced and directly engaged as the scope of work increases. Collaborations may also include federal, state, and local agencies' partnerships with private and public entities.

1.4 TOOLS AND PROCESSES

Preservation and adaptive use of historic and older buildings present challenges to those unfamiliar with them. First, what constitutes a historically significant building; second, when is a building deemed significant, what benefits, protections, and regulations apply to it; and third, what are considered appropriate treatment practices.

The National Register of Historic Places (NRHP) is comprised of resources (e.g., sites, buildings, structures, and objects) deemed historically significant at either the national, state, or local level or a combination of the three. Many states and local governments also maintain historic registers. Inclusion on the NRHP does not automatically place that resource on a local register nor does placing a resource on a local register automatically include it on the NRHP. Although simultaneous listing on the NRHP and local registers occurs, NRHP resources are only added to local registers as local ordinances, staffing, and funding for oversight allows. Designation to the NRHP protects the resource from adverse effect from federally funded projects and provides numerous funding incentives but does not automatically provide local protection accorded to resources on other more local registers.

The Secretary of the Interior (Secretary) administers the NPS and has responsibility for preservation activities pertaining to government interests. The Secretary has defined four types of treatment: preservation, rehabilitation, restoration, and reconstruction. The most commonly used treatment of rehabilitation is:

...the process of returning a property to a state of utility, through repair and alteration, which makes possible an efficient contemporary use while preserving those portions and features which are significant to its historic, architectural, and cultural values (Morton et. al. 1992, v).

The *Secretary of the Interior Standards (SOTIS)* were published in 1976 to codify how alterations could include sensitivity towards historic character-defining features. Subsequently published in 1977, the *Guidelines* “help property owners, developers, and Federal managers apply the [SOTIS] during the project planning stage by providing general design and technical recommendations” (Morton et al. 1992, viii).

The *Guidelines* are the basis for many local design guidelines that aid in creating additions and alterations sensitive to local context. Design guidelines are not uniform nationwide but their goal is to protect character-defining features that can be seen from a public way. The criteria that guidelines follow are based on context cues. Alterations, additions, or new construction must include attention to height, width, and setback, massing, proportion of openings, horizontal rhythms, roof form, and material palette. Design guidelines may also include signage, pedestrian orientation, vehicle circulation, and parking. One aspect that is gaining attention is how to accommodate sustainability. The use of solar panels and photovoltaic panels has hastened this debate as their use may conflict with design guidelines developed before sustainability became an issue.

The NTHP created the National Main Street Center (NMSC) in 1980 to assist local communities in their revitalization efforts. The NMSC provides training and technical assistance through a series of programs for Main Street “managers” and their constituencies. The NMSC has developed the “Main Street Approach” that consists of these four points: organization, promotion, design, and economic restructuring. The NMSC has assisted more than 1600 communities in revitalization efforts over the past 25 years (NMSC 2010c) and currently lists more than 1300 communities in 40 states and the District of Columbia (NMSC 2010b).

2. ENVIRONMENTAL FACTORS

The preservation movement started in the mid-19th century to provide stewardship to historic buildings (and subsequently, structures, objects, sites and the districts that contain them). The ascending environmental movement in the late-19th century emerged from the social imperative of providing stewardship to the nation’s natural resources. By the late-20th century, much of the general public (and unfortunately many civic leaders as well) still perceived these movements as having separate purposes. This period fostered recognition that stewardship of both the built and natural environments have many overlapping goals and the preservation movement became expanded beyond simple nostalgia and emotional attachment in their advocacy efforts. The social and regulatory environment included increased incentives for preservation. In turn, preservationists redefined and broadened their efforts to understand the potential environmental and economic implications of preserving and adaptively using buildings. The important critical aspects of this awareness are accounting for the energy utilization index, embodied energy invested in existing buildings, energy recovery for new buildings, material flows from raw materials to landfill wastes, and life cycle assessment.

2.1 ENERGY UTILIZATION INDEX

The Energy Utilization Index (EUI) is the energy used for heating, cooling, and lighting for one year expressed in kilo-British-Thermal-Units per square foot of the building (kBtu/sf). In a study released by the United States Department of Energy in 2008 (see Table 1), the perception of energy inefficiency in commercial buildings of the 1960-1980 period is true with the 1980 decade after the energy crises being the worst performers. Furthermore, comparing the post-1990 EUIs with the 1950s and pre-1920s EUIs shows an extremely similar EUI between them. More telling is the fact that post-2000 buildings exhibit an EUI that is only *marginally* better than commercial buildings built prior to 1920.

Many commercial buildings built before 1920 were constructed of heavier masonry materials that provided thermal mass, included natural ventilation strategies for cooling, and relied a great deal on daylighting. Air-conditioning, although invented in the early 20th century, did not become widely used until after World War II. The fluorescent lamp and double-paned window, introduced in the 1930s, and the aluminum curtain wall gained greater use in the 1950s and beyond. Eventually, building with operable windows, thermal mass, and other pre-1920 design elements disappeared from the latter-20th century design mindset. With the advent of commercially available nuclear electrical power sources, the promise of electrical power “too cheap to meter” (Adams 2005) led to reliance on larger heating, ventilating, and air-conditioning systems. This expanding cycle of energy use and design insensitivity continued well into the 1970s and was only curtailed by the energy crises.

Period	kW/m ²	kbtu/sf
Before 1920	253.0	80.2
1920 – 1945	284.9	90.3
1946 – 1959	253.3	80.3
1960 – 1969	286.8	90.9
1970 – 1979	299.7	95.0
1980 – 1989	315.8	100.1
1990 – 1999	280.1	88.8
2000 – 2003	251.4	79.7

Table 1: Energy utilization index for commercial buildings (non-malls). Source: (USDOE 2008; conversion to SI by author)

Period	kW/m ²	kbtu/sf
Before 1939	176.7	56
1940 – 1949	170.3	54
1950 – 1959	154.4	49
1960 – 1969	148.3	47
1970 – 1979	145.1	46
1980 – 1989	129.3	41
1990 – 1999	123.0	39
2000 – 2001	116.7	37

Table 2: Energy utilization index for residential buildings. Source: (USEIA 2010; conversion to SI by author)

In the 1990s, energy sensitive designs gained popularity and have taken firm hold of the building industry.

Conversely, newer buildings in the residential sector have lower EUIs (see Table 2) that have prompted a firestorm of outcry for upgrading their energy performance. The major issues prompting this have been largely based on the amount of insulation used in the older buildings, the performance of existing windows, poorly controlled infiltration, and mechanical and electrical system inefficiencies.

2.2 EMBODIED ENERGY

The Advisory Council on Historic Preservation (ACHP) describes embodied energy as:

the energy used to process the materials required to construct the building and that [energy] needed to put them into place. (Advisory Council on Historic Preservation 1979b, 6)

Demolition energy is the energy required to raze and haul away demolition materials (ACHP 1979a, 8). While attitudes of the era did not foster a broad acceptance of these concepts, the NTHP was an early advocate promoting energy savings accrued through preservation and reuse of buildings rather than replacing them.

Carl Elefante has said, “We cannot build our way to sustainability; we must conserve our way to it” (Elefante 2008, 27). When many sustainability proponents talk of creating a sustainable environment by focusing solely on removing buildings and replacing them with new buildings that are more energy efficient, they typically justify the benefits based on just the lower operational energy usage of the new building compared to the existing building. That view does not account for embodied

energy (see Table 3) needed to construct the new building nor the demolition energy needed to remove the existing building and especially disregards the inherent embodied energy within the existing building itself. The demolition and replacement of a building presents a controversial point that many designers and property owners do not tend to understand: the lost embodied energy of the demolished building has significance. According to Mike Jackson, FAIA, of the Illinois SHPO, a new office building may take as many as 40 years to recover the new energy used to build the building. For a new office building, this period approaches 65 years when a building is torn down to make way for the new building (Jackson 2005, 51). In each scenario, the energy recovery period exceeds the expected useful lives of many buildings being constructed today. There is no real return on investment in terms of energy, since following the current mindset of demolish and rebuild or build new would repeat these wasteful practices before the recovery period concludes.

Material	MJ/kg	BTU/lb
Stone	0.79	340
Concrete	1.3	559
Lumber	2.5	1,075
Brick	2.5	1,075
Aluminum (recycled)	8.1	3,483
Steel (recycled)	8.9	3,827
Glass	15.9	6,837
Steel	32.0	13,760
Plastic (PVC)	70.0	30,100
Aluminum	270.0	97,610

Table 3: Embodied energy for construction materials. Source: (CanadianArchitect.com, N.D.; Conversion to IP by author)

2.3 MATERIAL FLOWS

Building construction consumes 40% of world resources and contributes 40% of the material going into landfills (NJN Public Television and Radio 2009). This flow could be reduced by reusing buildings. The “reduce, reuse, and recycle” philosophy has public support when it comes to aluminum, glass, and plastic containers, but falls short when it comes to buildings. Donovan Rypkema (2007) noted that razing a typical downtown building (25 feet wide and 120 feet deep), in terms of landfill impact, would wipe out the environmental benefit gained from recycling 1,344,000 aluminum cans. The Institute for Local Self-Reliance (ILSR) reports that while reusing salvaged and deconstructed materials in their existing form occurs within the renovation sector, this is a small percentage of the market and the remaining materials are reduced to constituent components and combined with raw materials to make “recycled content” products (ILSR, N.D.).

Research conducted on the G. H. Schettler House rehabilitation in Salt Lake City, UT, compared material flows of three alternative cases (Young 2004). Case #1 was the rehabilitation of the existing house. Case #2 was the construction of a similar house in the suburbs. Case #3 was the demolition and replication of the existing house. The study analyzed the material flows including the extraction of new raw materials and the impact of construction and demolition wastes on the landfill. Case 1 realized 85.9% recycled content in the rehabilitated building and had the lowest total impact (43 metric tons (47.3 tons)) on the material flows. Case 2 had lower construction waste, but had an overall material flow (165 metric tons (182.4 tons)) nearly four times greater than Case 1. Case 3 material flows (319 metric tons (351.8 tons)) were more than seven times greater than Case 1. This fully shows how retaining buildings reduces overall demand on resources.

Wayne B. Trusty, President of The Athena Sustainable Materials Institute, which specializes in Life Cycle Assessment (LCA) studies, explains that LCA methodology defines the overall impacts on the environment (Trusty 2003, 2). The analysis has more affinity for new construction as the current associative data is more readily available but applying it to reusing buildings is possible. A 2009 analysis of four historic buildings in Canada revealed that retaining existing buildings had more favorable impact values than replacement with new construction (ASMI 2009).

2.4 REGIONAL CLIMATE-BASED DESIGN

Vernacular building construction practices are based on methods that had been tuned through time to meet local climate demands. Builders understood form as a means to environmental control and the opportunities that passive thermal and lighting systems presented. When appropriately restored, these features can reinvigorate the building's sustainability. When recognizing these climatic adaptations, sustainable technology can supplement these inherent sustainable features without compromising historic character (WBDG Historic Preservation Subcommittee 2009).

Building form, window and door placement, shading devices, thermal mass, and daylighting all enhance comfort without mechanical systems and electric lighting. Vernacular traditions grew in response to local climate and provide insights into passive thermal design (building orientation, size, massing, and ceiling height) and daylighting. Today, these vernacular strategies, used well before modern HVAC and lighting systems came into use, are being re-employed on new buildings.

In the 1950s, as curtain wall and lighting technology progressed, buildings were sealed to enable HVAC systems to control thermal comfort. Many low-technology thermal design principles fell out of use. Buildings became climatically disconnected and depended strictly on electric lighting and HVAC systems for comfort.

3.ECONOMIC FACTORS

The period around the American Bicentennial in 1976 saw significant increases in reusing historic buildings. However, the 1986 tax law changes vastly reduced investment opportunities in these projects. Fortunately, the last two decades have seen incentive programs emerge for historic preservation, low income housing, and new markets as well as a grant program for improving energy efficiency in buildings. Tax credits encourage investment growth in specific directions to offset the perceived risk associated with an activity and are a significant incentive for preserving buildings. Economic success is indicated by job creation and increased economic activity, projects using preservation and reuse well demonstrate these aspects.

3.1 TAX CREDITS AND GRANTS

The federal Historic Preservation Tax Credit (HTC) program was instituted in 1976 and amended in 1981 and 1986. Unfamiliarity with appropriate preservation practices had led to the perception that working with an existing building was more expensive than new construction. The HTC offset some reluctance of working with older buildings. Research has shown that reusing a building will cost about 4% less. However, if the new building includes razing an existing building, then the cost of the rehabilitated building becomes 3 to 16% less than the new replacement building (Rypkema 2005, 89).

Since tax credits occur after the project is completed, many potential investors balked at waiting for them. This gave rise to syndicating historic preservation tax credits at the start of the project where a syndicator buys tax credits at \$0.90-1.00 on the dollar (Historic Tax Credit Coalition 2010, 30). There are two federal HTCs. The first is a 20% HTC available for a certified rehabilitation of a certified historic structure used for income generating purposes. The second is a 10% HTC used on non-historic income-generating buildings built before 1936 that are being rehabilitated for commercial purposes (National Park Service 2009a). The HTC is claimed over six years and is calculated based on eligible rehabilitation costs, construction loan interest and taxes, and a variety of associated fees. Costs for landscaping or expanding the building are not eligible. Many states also

provide preservation tax credits. In fiscal year 2009, 37.5% of the projects certified by the National Park Service included state tax credits (NPS 2009a 19). As noted above, early LEED™ rating systems put historic preservation oriented projects at a disadvantage. Despite this, numerous projects have met the highest LEED™ standards and qualified for HTCs. Some notable examples include the Christman Construction Headquarters, Grand Rapids, MI, (LEED™ Double-Platinum), the Big D Construction Headquarters, Salt Lake City, UT, (LEED™ Gold), and the Ecotrust Building, Portland, OR, (LEED™ Gold) (Tess 2010; Taylor-Wells 2008, 109-112).

The Low Income Housing Tax Credit (LIHTC) program, enacted in 1986, encourages investment in affordable rental housing. The tax credit can be used to renovate existing or construct new rental buildings. For existing buildings in census tracts area designated by HUD as being in particular need of investment, the LIHTC subsidizes 40% of the applicable project costs for existing buildings, claimed over a ten year period. The eligible costs include construction costs (for the low income portion only) and fees. Costs not allowed include the land acquisition cost for new buildings, permanent financing costs, and initial deposits to reserves (Rypkema 2002, 10-11; HUD 2010).

The New Market Tax Credit Program (NMTC) is part of the Community Renewal Tax Relief Act of 2000 and creates new business activity in low income communities. The NMTC is administered by the Department of the Treasury's Community Development Financial Institutions Fund which allocated \$3.5 billion in 2009. This amount was supplemented by \$1.5 billion from the American Recovery and Reinvestment Act. NMTCs equal 39% of the investment and are claimed over a seven year period. The program has financed projects in existing buildings in distressed communities nationwide. One example is the First Security Bank, Salt Lake City, UT, which cost \$20.8M and received \$2.8M in tax credits. This project created 2,842 new jobs and \$4.3M in new taxes (NPS 2010a; USTREAS 2009; USTREAS 2010a; NTCIC 2005).

Another incentive for existing buildings is the Energy Efficiency and Conservation Block Grant program (EECBG) funded by the American Recovery and Reinvestment Act (Recovery Act) of 2009. The Recovery Act funding for the EECBG Program provides \$3.2 billion in grants for energy efficiency and conservation (USDOE 2009). Approximately 2,300 cities, counties, and Native American tribes have been designated to receive EECBG funding to improve energy efficiency and reduce energy use and fossil fuel emissions in their communities (USDOE 2010).

3.2 ECONOMIC INDICATORS

The parameters that are commonly used to measure economic success are property values, job growth and tax revenues, and revitalized communities. These economic impacts are indeed measurable and describe success (or failure) in comparable terms. Property values are a concern for many property owners. As such, one anxiety that arises when talk of creating historic districts begins is that additional regulations that accompany local designation will limit or depreciate property values. Numerous studies show that properties in historic districts appreciate at least as fast as or much faster than similar properties in adjoining neighborhoods.

Job growth and tax revenues gained from preservation and reuse incentive programs are quantifiable. *The Federal Tax Incentives for Rehabilitating Historic Buildings: Statistical Report and Analysis for Fiscal Year 2009* states that from 1977-2009, the HTC programs have created a nominal (not adjusted for inflation) \$55.5 billion in historic preservation activity (NPS 2010a, 2). Subsequently, the *First Annual Report of the Economic Impact of the Federal Historic Tax Credit* further reveals that in FY2008 dollars (adjusted for inflation), the cumulative activity has been the equivalent of \$85 billion in historic rehabilitation at a cost of \$16.6 billion in HTCs and has garnered \$21 billion in federal and state tax receipts. The HTC program has generated 1,815,200 new jobs (Historic Tax Credit Coalition 2010, 12-14). This is equivalent to \$9,145/job or 109.3 jobs created/\$1 million spent.

In FY2009 alone, \$4.69 billion in rehabilitation work was approved for 1,044 new projects which created 70,992 new jobs and 6,710 low and moderate income housing units (out of the 13,743 housing units created or renovated overall). The cost to the government was less than \$993 million (National Park Service. 2010a, 2). This translates to \$13,987 per job created or 71.5 jobs created/\$1 million spent. The Recovery Act creates only four jobs/\$1 million spent (Rypkema 2010). So from just this economic parameter, the HTC is a success.

Building rehabilitation is a significant job creator. Rypkema (2005, 11) has found that at the state level, \$1 million spent on building rehabilitation created:

- 29 more jobs than pumping \$1 million worth of oil in Oklahoma
- 22 more jobs than \$1 million cutting timber in Oregon
- 20 more jobs than \$1 million mining coal in West Virginia
- 12 more jobs than \$1 million manufacturing cars in Michigan.

Rypkema states also that these jobs can be retained indefinitely if 2-3% of a community's building stock is rehabilitated annually (Mize 2009).

Community revitalization-based spending creates a multiplier effect when these funds recirculate through the community. The NMSC reported that a dollar spent on operating a local Main Street program generated \$40.35 in return to the community (NMSC 2010a). As money stays within the local economy, the community becomes more economically sustainable. In appraising the Main Street program, Donovan Rypkema (Rypkema 2008) has stated:

In the last 25 years, some 1,700 communities in all 50 states have had Main Street programs... [T]he total amount of public and private reinvestment in those Main Street communities has been \$23 billion. There have been over 67,000 net new businesses created, generating nearly 310,000 net new jobs. There have been 107,000 building renovations. Every dollar invested in a local Main Street program leveraged nearly \$27 of other investment. The average cost per job generated—\$2,500—is less than a tenth of what many state economic development programs brag about.

This strong evidence of the success in the social context of creating new businesses and jobs is a compelling and yet often overlooked aspect of preservation and reuse. Rypkema (Rypkema 2008) has concluded that this program “is the most cost-effective U.S. program for economic development... of any kind.”

CONCLUSION

Beyond misperceptions and myths about preserving and reusing buildings, the truth is that preservation and reuse can have an integral role in sustainability. Communities that balance the social, environmental, and economical factors stand the best chance at sustainability. As noted by Richard Moe:

We're on the threshold of a new phase as growing numbers of people are concerned about the degradation of the environment and our relentless consumption of irreplaceable energy and natural resources. Preservation certainly isn't the solution to these problems, but it can be—and should be—an important part of the solution (Moe 2007).

Stewardship of the built environment will expand perspectives on how to truly achieve a sustainable environment. The measurement systems demonstrate that preserving and reusing buildings is sustainable. Unfortunately, despite this evidence, public perception still inhibits acceptance of the broader reach that reusing existing buildings provides and perpetuates the “extraction and depletion” mode of thinking that delivered society to where it is today.

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