BUILDING REUSE:
BEYOND PRESERVATION, TOWARDS POLICY

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STATEMENT BY AUTHOR

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ABSTRACT

To be truly sustainable, a society must maximize the use and reuse of its existing resources. Yet the economics of the construction industry are designed to encourage the construction of new buildings as quickly and as cheaply as possible, and the demolition of existing buildings just as quickly. In order to achieve the levels of sustainability deemed essential by many of our nation's leaders, the vast resource that our existing building stock represents can no longer be ignored, regardless of lack of historic significance, perceived aesthetics, or energy efficiency. This thesis summarizes and assesses the effectiveness of existing policies established in the interest of preservation, sustainability, and economic development that provide a strong framework for building reuse. This thesis outlines a feasible building reuse policy, conceived as largely independent from, but with the potential for, far-reaching benefits for preservation, sustainability, and economic interests.

...the green building movement remains blind to its most troubling truth: We cannot build our way to sustainability.

—Carl Elefante in "The Greenest Building Is...One That Is Already Built"[1]

INTRODUCTION

Many people today would hesitate to dispose of an empty Coke can in the wrong receptacle for fear of being ostracized by friends and loved ones. However, the same feelings often do not apply when we witness a building that has seemingly reached the end of its life being torn down to be replaced with a shiny new structure, especially if that new building incorporates all the latest environmentally friendly technologies and materials. We call this progress.

In a truly sustainable society, one that minimizes waste and maximizes the utilization of existing resources, the demolition of an existing building would be regarded with the same shock that is afforded the improperly sorted aluminum can.

The Need to Maximize Building Reuse

In the United States our existing building stock represents a massive repository of existing energy and materials. The average embodied energy (the sum total of all energy used in the construction of a building) in existing buildings is the equivalent of as much as 15 gallons of gasoline per square foot. That means that the average embodied energy in a 250,000 square foot office building is the equivalent of 3.75 million gallons of gasoline.[2] In addition, the National Trust for Historic Preservation states that building a 50,000

1 Carl Elefante, "The Greenest Building Is...One That Is Already Built," *National Trust For Historic Preservation Forum Journal*, v. 21 n. 4, (Washington D.C.: National Trust For Historic Preservation, 2006), 26.

2 National Trust for Historic Preservation, "Sustainability By the Numbers," http://www.preservationnation.org/issues/sustainability/sustainability-numbers.html (accessed April 19, 2009).

square foot commercial building requires the same amount of energy needed to drive a car 20,000 miles a year for 730 years.[3] According to the U.S. Green Building Council (USGBC), building operation and construction annually accounts for approximately 72 percent of total electricity consumption in the U.S., 39 percent of energy use, 40 percent of raw materials used, and 30 percent of waste output (136 million tons annually).[4] Similarly, approximately 45 percent of the greenhouse gases created in the U.S. are produced by building construction and operation, compared to 28 percent produced by transportation.[5] Recent calculations indicate that it could take a new energy-efficient building as many as 60 years to save enough energy to replace the total energy lost through the demolition of an existing building and consumed during the construction of the new building.[6]

Consider, now, the positive impact upon these numbers by increased buildings reuse combined with energy-efficient renovations. Building reuse offers three primary environmental benefits. First, it preserves the significant energy-embodied of a building's initial construction and continued maintenance over the building's lifetime; second, it preserves the energy and materials required to demolish and construct anew; and third, it minimizes the amount of construction and demolition waste that is sent to the landfill. With the reality of humanity's detrimental impact on our environment and the ever increasing scarcity of resources becoming more apparent each day, there has never been a more appropriate time to frankly reevaluate our building practices and create policy that strongly encourages building reuse and relegates easy and unquestioned building demolition to the dustbin of history.

3 Ibid.

4 U.S. Green Building Council, "Green Building Research," http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1718 (accessed April 19, 2008).

5 Patrice Frey, *Building Reuse: Finding a Place on American Climate Policy Agendas* (National Trust for Historic Preservation, September 2008), 5.

6 National Trust for Historic Preservation, "Sustainability By the Numbers."

Preservation as a Catalyst for Reuse

Since 1966, the year the National Historic Preservation Act transformed the preservation movement into the preservation industry, far-reaching standards and policies and have been established that provide protection to millions of buildings in the U.S. No existing policies have done as much to encourage building reuse as those established to preserve our country's built cultural heritage.

The often complicated task of planning for the reuse of historic buildings has been one of the primary concerns of preservationists since 1966. It is a basic tenet of preservation practice that keeping a building occupied is one of the best ways to prolong its life. Preservation standards also discourage incongruous changes in the use of historic buildings. These factors help to ensure that many historic buildings remain in use and that renovations do as little damage to existing materials—and thus embodied energy—as possible. Historic recognition adds a layer of protection to aging buildings that helps to ensure that the maximum lifespan of historic buildings will be achieved.

With the recent inundation of disturbing data on global warming and skyrocketing oil prices, the public's attention has once again been drawn to issues of sustainability and energy efficiency. Preservation practitioners have not missed the opportunity to reemphasize the inherently sustainable nature of preservation. Within the last few years it has been a central topic at conferences of the Association for Preservation Technology and the National Trust for Historic Preservation, and other preservation organizations. Many publications and studies have outlined the links between sustainability and preservation. Among other ideas, the passive heating and cooling methods incorporated in buildings built before the advent of mechanical heating and cooling are cited; the idea that historic windows must be replaced in order to achieve energy efficiency has been debunked. There

is little room for argument about the highly sustainable nature of preservation. While nothing has done more to actively promote building reuse than our country's preservation policies, it is not *exactly* the goal of current preservation policies and standard practices to unconditionally promote building reuse. Large gaps remain in the protection that preservation policies provide to existing buildings.

Sustainability as a Catalyst for Reuse

The environmental benefit of reusing existing buildings instead of building anew is given cursory recognition by the country's primary method for promoting and guiding sustainable development, the USGBC's Leadership in Energy and Environmental Design (LEED) rating system. However, LEED is geared towards encouraging energy efficiency in new construction and promoting the use of environmentally friendly building materials. There is a feeling among many preservation practitioners that building reuse is not weighted heavily enough within its rating system. While LEED is still a relatively young program, and there is a good chance that building reuse will be weighed more heavily in future versions, there are still fundamental difficulties with using LEED to most effectively promote building reuse. So as with preservation, the LEED rating system is not the perfect tool for unconditionally promoting building reuse.

Thesis Objectives

This thesis proposes that in order to achieve a truly sustainable society, building reuse must become standard practice and demolition must be heavily discouraged. The thesis will seek to accomplish the following:

- Examine existing preservation and sustainable development policies that actively promote building reuse, and demonstrate why both are imperfect tools to achieve that goal.

- Make the case that building reuse should be encouraged through policies largely independent from existing preservation or sustainability policies.

- Draw on exemplary policies of preservation and sustainable development to demonstrate how viable policies could be developed to encourage an increase in building reuse.

- Demonstrate how incentives for building reuse will not only help to forward the basic goals of preservation and sustainability, but also create a culture of durability and creative problem solving in the building industry.

Definitions

Sustainability: Sustainability is the ability of a system to achieve ecological balance within itself. Applied to the construction industry sustainability implies that buildings are constructed and operated with as little ecological damage as possible—to the environment and to the occupants. Within this definition it is implied that resources are maximized and operations are as efficient as possible. The current vision of what a truly sustainable building is has been set by the 2030 Challenge issued by the Architecture 2030 organization.[7] The 2030 Challenge, which has been adopted by the U.S. Conference of Mayors as well as the AIA Committee on the Environment and various other leading organizations, calls for the development of economically viable buildings in which the energy consumed is equal to the energy produced on site by alternative fuel sources and the operations of which emit no carbon dioxide into the atmosphere.

Building Reuse: Within this document the phrase building reuse signifies the use of an existing building for a new purpose. The idea is essentially the same as adaptive reuse. However, the phrase adaptive reuse, at least among preservation practitioners, has the connotation that the building being reused is historic. It is the goal of this document to demonstrate that this particular treatment is desirable for any existing building, regardless of its age or historic status. It is also implied that there is a level of renovation, beyond that of simple tenant improvement, which will accompany this reuse.

USGBC: United States Green Building Council. The 501(c)(3) non-profit organization that administers the LEED Program.

7 Architecture 2030, "The 2030 Challenge," http://www.architecture2030.org/2030_challenge/index.html, (accessed April 28, 2009).

LEED: Leadership in Energy and Environmental Design. A rating system administered by the USGBC that measures environmental performance in buildings. It is largely regarded in the U.S. as the standard by which environmental performance in building design is judged.

Recent Past: Less than 50 years ago. In respect to historic preservation, the phrase is often used to refer to buildings built in the Modern aesthetic following World War II. The difficult task of advocating preservation for buildings of the recent past is a central topic among preservation practitioners. However, the difficulties associated with advocating the preservation of buildings of the recent past has been difficult in past eras and will remain difficult in future eras.

IS IT REALLY MORE EFFICIENT TO REUSE? A REVIEW OF EXISTING LITERATURE

Upon initial observation, it may not appear that there is a real need to encourage building reuse outside of the regular market forces of supply and demand. Visit any community and any number of older buildings can be seen performing admirably for their occupants. However, a 2004 study by Arthur C. Nelson for the Brookings Institution Metropolitan Policy Program has estimated that by the year 2030, 82 billion of an existing 296 billion square feet, or about 27 percent, of the country's existing building stock will have been replaced.[8] Holding an equivalent embodied energy of about 1.23 trillion gallons of gasoline.[9] Since this number is not calculated to include any extraordinary occurrences between now and the year 2030 that might effect the demolition rate, it may be interpolated that the 27 percent figure could represent the percentage of the existing

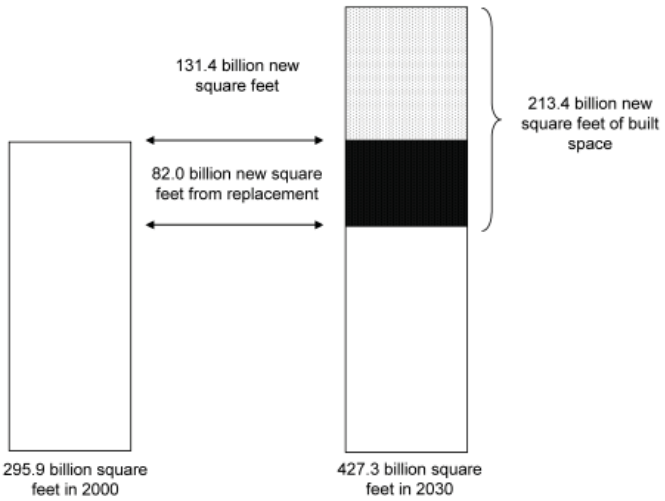

Figure 1. Square footage of built space: 2000 and 2030 (Nelson 2004).

8 Arthur C. Nelson, *Toward A New Metropolis: The Opportunity to Rebuild America,* (Washington D.C.: The Brookings Institution Metropolitan Policy Program, December 2004), 7.

9 This number is based on the estimate that embodied energy in an existing building is the equivalent of 15 gallons per square foot, National Trust for Historic Preservation, *Sustainability By the Numbers.*

building stock that is replaced during any given 30-year period. This is a substantial amount of tearing down and rebuilding. Despite the fact that a large number of buildings are reused due to market forces, it is evident that existing buildings are replaced at a rapid rate.

It is apparent that many buildings are being demolished and replaced, but is it really more efficient to reuse an existing building than building a state-of-the-art energy efficient new building? Admittedly, the science of calculating the resources contained within existing buildings is still relatively imprecise. However, the body of research surrounding this issue is continually being honed and there is every indication that it will ultimately provide the hard facts to back up what seems to be common sense.

Today measures of environmental degradation are taken in two primary ways: one, in the amount of energy something consumes and two, in the amount of carbon that it produces. When we are talking about buildings, energy is typically discussed in two ways. Embodied energy, the total sum energy required to complete the building, is weighed against operating energy, the energy that is required for the building to preform its day-to-day functions.

Embodied Energy

The concept that buildings are repositories for unrecoverable energy was first defined in 1976 by the U.S. Energy Research and Development Administration with its publication of the report *Energy Use for Building Construction*.[10] This report provided the first in-depth look at the energy used in building construction and introduced the concept of embodied energy—the sum of all the energy required to extract, process, deliver, and install the

10 B.M. Hannon et al, *Energy Use for Building Construction*, (Springfield, VA: Energy Research and Development Administration, Division of Buildings and Community Systems, 1976)

materials needed to construct a building. The report examined the common building materials of the day and assigned a energy value, measured in BTUs per square foot, for each material. This report remains the most thorough evaluation of embodied energy that has been done in the U.S. and still serves as the underlying framework that most subsequent embodied energy studies are based upon.[11]

With an oil embargo causing energy prices to skyrocket, the Advisory Council on Historic Preservation saw an opportunity for the findings developed by *Energy Use for Building Construction* to further preservation interests, and used the report as the basis for their own 1979 report, *Assessing the Energy Conservation Benefits of Historic Preservation: Methods and Examples.*[12] This report developed a model for comparing the energy needed to restore and rehabilitate existing buildings with the energy used for demolition, reconstruction, and operation. This document provided an analysis of three different historic buildings at a range of scales. It analyzed the adaptive reuse of the Austin House, a carriage house which was converted into a three-unit apartment building in Washington D.C.; the renovation of the Lockfield Garden Apartments, an early federal housing project of medium size in Indianapolis; and the Grand Central Arcade, a large scale commercial complex at Pioneer Square in Seattle. The report concluded that in all three cases reuse would entail a net energy savings over the expected life of the structures:

- *The total energy investment to renovate and operate a rehabilitated Lockfield Garden Apartment will be less than the energy required to construct and operate new facilities for over 50 years—even though new facilities might use less energy annually for operations.*

11 Mike Jackson, "Embodied Energy and Historic Preservation: A Needed Reassessment," *APT Bulletin*, v. XXXVI, n. 4, 47.

12 Advisory Council on Historic Preservation, *Assessing the Energy Conservation Benefits of Historic Preservation: Methods and Examples*, (Washington D.C.: The Advisory Council on Historic Preservation, 1979)

- *The Grand Central Arcade will have a net energy investment advantage of an equivalent new structure for the next two centuries.*
- *Over a 30-year period, the rehabilitated Austin House will conserve enough energy to heat and cool an equivalent new apartment building for over 10 years.*[13]

However, later research has varied widely from the findings initially reported in *Energy Use for Building Construction*. Raymond Cole, a researcher from British Columbia, estimated in the 1990s that embodied energy in commercial structures is only about one quarter of what was estimated in *Energy Use for Building Construction*.[14] The Athena Institute, an institution at the forefront of building life-cycle research, calculates that embodied energy counts for a relatively small percentage—10-15 percent—of total energy spent over a 50-year operation period.[15] Research being conducted in other parts of the world seems to place a higher importance on embodied energy. A 2007 survey by Dutch researcher Laure Itard finds that embodied energy can account for a total of 30 percent of the total energy usage in homes.[16] A Swedish study assessing multi-family homes found that embodied energy can account for upwards of 45 percent of the energy costs over a building's lifespan.[17]

A National Trust for Historic Preservation report at the forefront of the building reuse discussion entitled *Building Reuse: Finding a Place on American Climate Policy Agendas*

13 Ibid, 6.

14 Frey, 10.

15 Ibid, 11.

16 Laure Itard, "Comparing Environmental Impacts of Renovated Housing Stock with New Construction," *Building Research & Information* 35, no. 3 (2007), 252-267.

17 Catrina Thormark, "A Low Energy Building in a Life-Cycle—Its Embodied Energy, Energy Need for Operation and Recycling Potential," *Building and Environment* 37, no. 4 (2001).

attributes these differences in numbers to a lack of a unifying methodology for calculating embodied energy. Some studies consider embodied energy the energy required to produce materials from their extraction until they leave the factory. Other studies measure embodied energy as the energy required to extract materials, convert them to product, ship the product, and install the product.[18]

It is also difficult to compare the embodied energy in buildings from different eras. When the Advisory Council on Historic Preservation published *Assessing the Energy Conservation Benefits of Historic Preservation* it used data and methods from *Energy Use for Building Construction* which were largely based on new building materials in the late 1960s. Clearly a different amount of energy was required for a brick to find its way to a wall in the 1960s as was required in 1900. Today, when the National Trust for Historic Preservation states that it could take as many as 60 years for a new energy-efficient building to replace all the energy lost by demolishing an existing building, they are using the same model that was used by the Advisory Council on Historic Preservation in the 1970s.[19] It is relatively easy to do a simple conversion for inflation, what is harder is to evaluate the differences in energy required to produce the same materials 40 years later.

Carbon Footprint

It is easy for the average consumer to understand environmental issues relating to energy consumption when they have as direct an effect on the wallet as the oil embargo in the 1970s or the more recent rapid increase of oil prices of the summer of 2008. However, in the last few years our attention to the environment has shifted focus from relatively easy to grasp energy issues to terms of carbon production. The excess production of carbon

18 Frey, 11.

19 National Trust for Historic Preservation, "Sustainability By the Numbers."

dioxide (CO_2) is seen as the cause of what most scientists agree is a dangerous global warming trend. Ultimately, this is perhaps a more difficult concept for the average person to relate to because, unlike skyrocketing oil prices, for the time being global warming is possible to ignore. But a look at the long list of potential calamities resulting from global warming presented by many scientists shows that excess carbon production has the potential of becoming an even more dangerous problem than the availability of affordable oil.

Preliminary studies are being conducted, thus far primarily in the United Kingdom, to attempt to quantify the CO_2 that is associated with the construction and operation of buildings in a way similar to that used by the Advisory Council on Historic Preservation to study embodies energy. Researchers at the University of Bath are developing a report called the *Inventory of Carbon and Energy,* which compiles existing data on embodied carbon and assigns a kilograms-of-carbon-released-per-square-meter value for common building materials.[20] The U.K.'s Empty Homes Agency used an earlier version of this report as a basis for their own study, released in March 2008, in which they concluded that it can take as many as 50 years for an energy efficient new home to recover the CO_2 expended in construction.[21] This figure doesn't even take into account the carbon expended if an existing building is demolished to make room for the new.

It is more common in the building industry—outside of preservation circles—for issues of energy consumption and CO_2 production to be discussed in relation to the operation of buildings. Building operations account for about 40 percent of the total energy use

20 Geoff Hammond and Craig Jones, *Inventory of Carbon and Energy (Version 1.6a),* (Bath, U.K.: University of Bath, 2009).

21 Empty Homes Agency, *New Tricks with old Bricks,* (London, U.K.: March 2008), 4.

and about 50 percent of the CO_2 produced in the U.S.[22] Recent discussions surrounding building operation have revolved around two ideals, referred to as Net Zero Energy Buildings (NZEB) and Carbon Neutral. A NZEB is a building that produces as much energy as it consumes. A Carbon Neutral building is a building in which no fossil fuels are used in its operation, and therefore no greenhouse gases are produced. Carbon Neutral buildings would necessarily operate totally on clean energy, such as the energy created by wind turbines or photovoltaics cells. Several initiatives have begun to help realize these ideals. The non-profit organization Architecture 2030 has put forth its 2030 Challenge with the goal of reducing fossil fuel consumption in new buildings to zero by the year 2030. Many organizations have embraced this goal, including the U.S. Conference of Mayors. The U.S. Department of Energy's building technologies program has issued a call for development of a commercially viable NZEB by the year 2025 and has invested over $100 million dollars into achieving this goal.[23]

Raw Materials

Although it is talked about as an issue considerably less frequently than energy and carbon, the continued use of non-renewable resources is another danger of the rapid pace of new construction. According to the Worldwatch Institute, building construction utilizes 40 percent of the raw stone, sand, and gravel consumed each year, along with 55 percent of the wood cut for non-fuel uses.[24]

22 Paul Schwer, P.E. LEED AP, "Carbon Neutral and Net Zero – How Soon Can We Get There? The Case for Net Zero Energy Buildings" BetterBricks.com, http://www.betterbricks.com/DetailPage.aspx?Id=947, (accessed April 23, 2009)

23 Ibid.

24 D.M. Roodman and N. Lessen, *A Building Revolution: How Ecology and Health Concerns are transforming construction*. World Watch Paper 124, (Washington D.C.: World Watch Institute, 1995),12.

Life Cycle Assessment

Understanding the implications of embodied energy and CO_2 are essential in any discussion of the advantages of building reuse. However, there is an entire field developing around the study of the total effects that production has on our environment. This methodology is called life cycle assessment, or LCA. LCA examines products from "cradle-to-grave," or from the time the raw materials are extracted from the earth until the materials once again return to the earth. LCA is the most comprehensive tool for determining true production costs, both literally and figuratively, because it creates a framework within which dissimilar factors can be quantified and weighed against one another. The following example is offered in the U.S. Environmental Protection Agency's report *Life Cycle Assessment: Principles and Practice:*

> *...when selecting between two rival products, it may appear that Option 1 is better for the environment because it generates less solid waste than Option 2. However, after performing an LCA it might be determined that the first option actually creates larger cradle-to-grave environmental impacts when measured across all three media (air, water, land) (e.g., it may cause more chemical emissions during the manufacturing stage). Therefore, the second product (that produces solid waste) may be viewed as producing less cradle-to-grave environmental harm or impact than the first technology because of its lower chemical emissions.*[25]

However, performing an LCA is a complex procedure where the slightest inaccuracy of data can significantly skew results. LCAs are also time consuming and labor intensive to conduct. The application of the LCA methodology to the built environment is a relatively new field. LCAs were first designed to consider one product at a time; buildings themselves are incredibly complex products that are made up of thousands of individual products. The Athena Institute, a Canadian organization dedicated to fostering

25 Environmental Protection Agency, 2006, *Life Cycle Analysis: Principles and Practice*, EPA/600/R-06060. (Reston VA: Scientific Applications International Corporation).

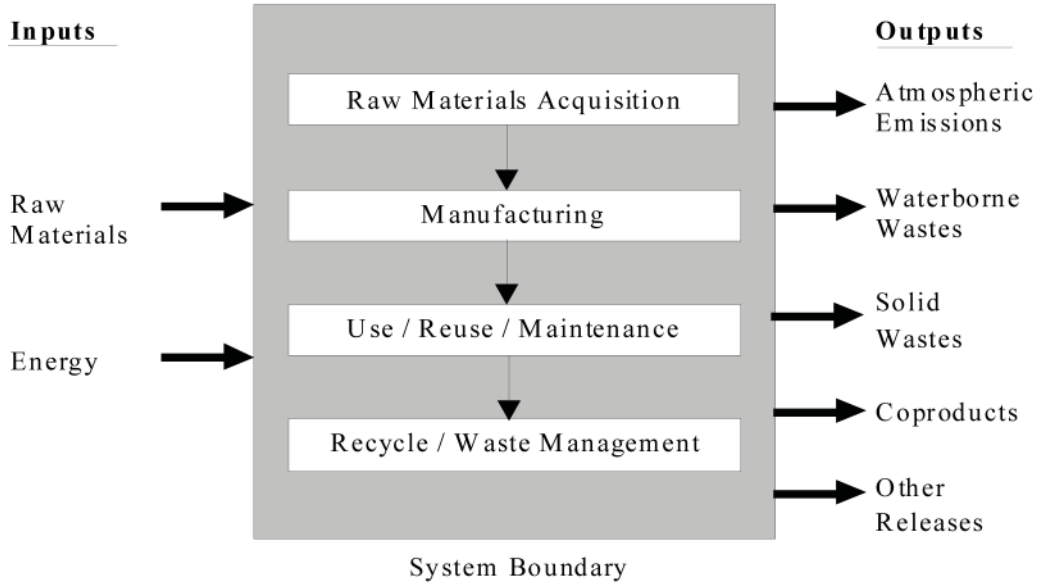

Figure 2. Diagram showing the typical stages in a life cycle analysis with possible input and output factors. (Environmental Protection Agency, 1993.)

sustainability, has developed a computer based "EcoCalculator" program that applies LCA methodologies to buildings. In 2009 the Athena Institute released the report *A Life Cycle Assessment Study Of Embodied Effects For Existing Historic Buildings.* The intent of the study was very similar to the report produced by the Advisory Council on Historic Preservation in the 1970s in that it looked at four different historic buildings, this time in Canada, and compared the effects of retaining the historic structures with rebuilding in the same location. The results were similar also: in all four buildings it was demonstrated that from an LCA perspective, it was far more sustainable to retain the existing building then build anew. One particularly interesting aspect of this report is that it compared operating energy of the existing buildings with the operating energy of an optimally renovated existing building, a typical new building, and an optimally designed new building. In almost every instance, the existing building performed comparably or better than the new building.[26]

26 Athena institute, *A Life Cycle Assessment Study of Embodied Effects for Existing Historic Buildings,* (Prepared for Parks Canada by Athena Sustainable Materials Institute in association with Morrison Hershfield Limited, March 30, 2009), 21.

Building	Whole Building Total Avoided Impacts Primary Energy GJ	Total Avoided GWP Impact CO2 equivalent tonnes	Equivalent CO2 Emissions From
Ottawa Parkdale Fire Station	2550151.08	184.76	Energy use of **85. 2** homes for one year
Winnipeg Birks Building	27434748	1,561.6	Energy use of **473** homes for one year
Calgary Lougheed Building	41800928	3,449	Energy use of **1,591** homes for one year
Vancouver Chinese Freemasons Building	6766376.8	484.48	Energy use of **224** homes for one year

*Figure 3. Diagram showing results of the Athena Institutes study. Primary energy is measured in Giga-joules (Gj), and includes all non-renewable energy, direct and indirect, used to transform or transport raw materials into products and buildings, including inherent energy contained in raw or feedstock materials that are also used as common energy sources—for example, natural gas used as a raw material in the production of various plastic (polymer) resins. In addition, the measure captures the pre-combustion (indirect) energy use associated with processing, transporting, converting and delivering fuel and energy. This measures provides a close approximation of the fossil fuel use. Global Warming Potential (GWP) is a reference measure. Carbon dioxide is the common reference standard for global warming or greenhouse gas effects. All other greenhouse gases are referred to as having a "CO2 equivalence effect" which is simply a multiple of the greenhouse potential (heat trapping capability) of carbon dioxide. This effect has a time horizon due to the atmospheric reactivity or stability of the various contributing gases over time. The International Panel on Climate Change (2001) 100-year time horizon figures have been used here as a basis for the equivalence index: (*Athena Institute 2009, 4-5)

While it may be difficult to prove beyond a doubt that it is more efficient to reuse an existing building than it is to rebuild, especially when emphasis is given to sustainable design in new construction, it is even more difficult to argue the opposite: that we can minimize our impact on our environment while continuing to demolish existing buildings and consume limited resources to building anew at the current pace.

PRESERVATION AND BUILDING REUSE

Recently, Richard Moe, the president of the National Trust for Historic Preservation, has traveled the country delivering a speech that emphasizes the common goals of preservation and sustainability. The speech outlines six preservation-based guiding principles to sustain the built environment. The very first principle stated is "promote a culture of reuse." He goes on to say:

We know that the way we use our buildings causes big problems but incredibly, we keep trying to solve the problem by constructing more and more new buildings while largely ignoring the ones we already have. That makes no sense. In addition to building green, we have to make wiser use of what we've already built.[27]

While this may seem like a particularly current topic, preservation practitioners have been touting the environmental benefits of preservation for decades. The Advisory Council on Historic Preservation introduced the idea in 1979 with the previously discussed report, *Assessing the Energy Conservation Benefits of Historic Preservation: Methods and Examples.* This report developed a model for comparing the energy needed to restore and rehabilitate existing buildings with the energy used for demolition, reconstruction, and operation and demonstrated that, even at different scales, it was more efficient to use an existing building than build anew.[28]

In 1981 the National Trust for Historic Preservation published *New Energy from Old Buildings*, a book extolling the inherent energy efficiency of historic buildings and strengthening the discussion of the energy saving benefits of preservation. In the

27 Richard Moe, "Historic Preservation & Green Building: Finding Common Ground," November 20, 2008, National Trust for Historic Preservation, http://www.preservationnation.org/issues/sustainability/sustainability-preservation-1.html, (accessed April 27, 2009).

28 Advisory Council on Historic Preservation, 1979.

book's introduction Michael L. Ainslie, then president of the National Trust for Historic Preservation, makes this urgent, and now familiar, plea:

> *The fact that preservation conserves energy must now be taken to our legislators, our corporate leaders, and our opinion molders. It must become the foundation for national policy on the built environment. We must find, highlight, and change the laws, practices, and misconceptions that have led us as a nation to treat buildings as simply more disposable items, rather than the capital assets that they are.*[29]

Unfortunately, in the decades of decreased energy prices that followed, Mr. Ainslie's plea went largely unheard. However, with our nation's attention once more brought to our dangerous reliance upon foreign energy, "green" has become a buzz word, and the inherent links between sustainability, energy conservation and preservation have once more become a topic of discussion. In 2001 the topic was taken on at the 4th annual US/ICOMOS International Symposium and the proceedings were published as *Managing Change: Sustainable Approaches to the Conservation of the Built Environment*. The Association for Preservation Technology held a symposium discussing the issue at their 2004 conference in Halifax and published a complete issue of *APT Bulletin* discussing the results, and more recently, the National Trust for Historic Preservation took on the topic of "Green Preservation" at their 2006 conference.

At its heart, preservation is about reusing buildings. Preservation efforts seek to prevent the destruction or irreparable alteration of buildings that, over an extended period of time and for any number of reasons, have had meaning that transcends the mere materials they are built from conferred upon them by the community they that they are located in. Unlike the earliest preservation efforts in the U.S., where buildings of historic significance were preserved as fixed museum pieces, today most historic buildings are

29 Ainslie, 16.

either maintained in their original capacity, or rehabilitated for others uses. Because it is impossible to advocate preservation without also advocating reuse, preservation is one of the strongest catalysts for building reuse. While preservation succeeds at encouraging building reuse in many ways, there are particular ways in which it falls short. The following section will present a discussion of the ways preservation successfully encourages building reuse.

Despite the public appeal of historic preservation, most preservation projects are not undertaken because the entity paying for the project is devoted to, above all else, ensuring the safety of our cultural heritage. Most preservation projects are undertaken for two reasons, the first being that they are required by law. National, state, and local laws are in place that require certain actions to be taken in order to ensure that historic resources will not be damaged during a building project. The second driving force behind many preservation projects is economic gain. It can often be an economic burden to undertake a project that makes successful use of a historic building, so many governments have turned to economic incentives to encourage preservation. The following is a brief summary of the ways in which current preservation policies help to keep aging buildings in use.

The National Register of Historic Places

The most fundamental preservation tool is the National Register of Historic Places (Register). Not only does inclusion on the Register afford protection to properties—albeit primarily indirect—but most other forms of protection available to historic properties presuppose it being listed on the Register.

The Register is administered by the National Park Service and provides guidelines for determining if a property possesses sufficient significance to be considered a "historic" resource. Possessing any of the following criteria—or any combination thereof—buildings can be nominated:

A) *That are associated with events that have made a significant contribution to the broad patterns of our history; or*

B) *That are associated with the lives of persons significant in our past; or*

C) *That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*

D) *That have yielded or may be likely to yield, information important in prehistory or history.*[30]

A Register nomination form can be filled out by anyone and is then submitted to the State Historic Preservation Office (SHPO). A committee headed by the SHPO either approves or rejects the application. If the application is approved by the SHPO, it is then sent along to the National Park Service where, if it passes their evaluation, it will be added to the Register. If the owner of an individual property or the majority of owners in a district being nominated does not agree to the inclusion of their property in the Register, then the resource can not be listed. The resource is categorized as "eligible" for the National Register, but is not included.

There are over 80,000 entries, or over 1.4 million individual properties, currently recognized by the Register.[31] The ability to include multiple properties in a single

30 Excerpted from "Listing a Property: Some Frequently Asked Questions, Criteria for Evaluation." http://www.nps.gov/nr/listing.htm. (accessed August 12, 2007).

31 National Park Service, "Welcome to the National Park Service," http://www.nps.gov/nr/about.htm, (accessed August 13, 2007).

nomination, either as a district or as a multiple properties listing—properties related by any particular theme—has provided a way to grant historic recognition to many buildings that could not all have been nominated on an individual basis.

Inclusion on the Register is the broadest defense applied to historic properties. It recognizes nationally significant landmarks, but also affords protection to the most humble buildings of the past; structures that were never intended to be grand statements for the ages, but nevertheless paint a clear picture of the era in which they were produced.

However, because it is so broad and inclusive, the protection that inclusion on the Register offers is minimal. A review of any potential negative impact on a listed historic resource, referred to as Section 106 Review, must be conducted by the Advisory Council for any federally funded project that may encroach upon resources. The Advisory Council can attempt to mitigate the problem, but ultimately can not prevent the project's undertaking.

Aside from Section 106 Review, inclusion on the National Register of Historic Places offers no other direct methods for impeding damage to historic properties. It does, however, indirectly prevent damage to many historic properties in several ways.

The Market Value of Historic Recognition

At the most basic level the Register provides honorific recognition to a property, the exact value of which is difficult to ascertain. There is unquestionably a certain amount of status gained by a property that resides on the Register that may increase its regard in its community and result in at least some hesitation in the mind of a party interested in alteration or demolition of that property.

There also may be an increase in property value in relation to inclusion on the Register. While most of the added economic benefits afforded a historic property come from its qualification for heritage grants or tax credits, studies have shown that inclusion on the Register can increase the market value of the property. A series of studies conducted in the late 1990s by the South Carolina Department of Archives and History shows that in several South Carolina communities, property values were increased by their inclusion on the Register:

- *In Columbia, house prices in local historic districts increased 26 percent per year faster than the market as a whole.*
- *In Beaufort, houses in the locally protected historic district sold for 21 percent more, all other factors being equal, than similar houses not in the district.*
- *In Greenville, establishing a local historic district caused prices of houses in the district to go up. House prices rose, on average, over 50 percent in just a few years.*
- *In six smaller towns and cities across the state, local historic district status was a positive factor in determining the value of a house. For example, in Georgetown, houses in the local historic district sold for 11 percent more than comparable non-district houses, while in Anderson, district houses sold for 36 percent more.*[32]

Real estate and economic development consultant Donovan Rypkema provides the following list of ways in which inclusion on the register can increase property value:

- *In some communities the creation of a National Register district triggers the creation of a corresponding local district. This local district then would provide the protections (and perhaps incentives) ... leading to economic value enhancement.*
- *In real estate markets that have a level of knowledge and sophistication among both real estate professionals and buyers regarding historic properties, National Register listing can have an economic premium attached. How do you know if the local market has reached that point? When the real estate ads say, "This house is located within the XYZ National Register Historic District," or "This house is listed in the National Register." The broker wouldn't pay for the extra lines in the ad if he/*

32 Elizibeth Morth, *Historic Districts Are Good for Your Pocketbook: The Impact of Local Historic Districts on House Prices in South Carolina*, (South Carolina Department of Archives & History, January 2000), 1.

she didn't believe that potential buyers responded knowingly and positively to that information.

- *A common characteristic of neighborhoods—both residential and commercial—that are seen as places of sound investment is the existence of a strong citizen-based advocacy organization. Often the creation of a National Register district is a catalyst for the creation of such a citizen advocacy group. The group may have been formed for the specific purpose of getting a neighborhood listed, but once that mission is accomplished the organization expands its focus to broader neighborhood advocacy. This can have a positive affect on property values.*[33]

Rypkema also explains the four factors that tend to be present when inclusion on the National Register leads to increased property value:

> *...it has been found that when a local district has the greatest positive impact on property values four variables are usually in place: clear, written design guidelines for the affected properties; staff for the preservation commission; active educational outreach by the staff and commission to property owners, real estate brokers, architects, builders, etc.; and consistent and predictable decisions by the commission.*[34]

What Rypkema suggests is an inversion of what one might suppose to be the relationship between historic significance and market value. Economic advantages based strictly on market value granted to owners of Register-listed properties are most readily available to owners of properties within historic districts. Properties which are individually listed often posses greater historic significance than properties which are listed as a part of a larger district. However, their lack of context may make it more difficult to assure that they can achieve a maximum value in the ways Rypkema lists above.

While it can be argued with some certainty that the added market value of owning a historic property has helped to prevent the destruction of many buildings, it has also had

33 Donovan D. Rypkema, "The (Economic) Value of Historic Register Listing," *CRM*, v. 25, n. 1, (Washington D.C.: United States Secretary of the Interior, 2002), 7.

34 Ibid., 6.

a serious negative effect. A properties inclusion within an established neighborhood may actually be more monetarily valuable than owning a historically significant property. This has, in large part, lead to the current teardown crisis that is effecting historic districts throughout the country. Historic districts represent mature, healthy neighborhoods. However, often the houses in these neighborhoods are small by today's standards and lack the modern amenities that many of the people that can afford to purchase a home in a historic district expect in a house. The outcome is that the old house is torn down and a much larger, and in many cases, incongruous house is built in its place. In 2001, the National Trust for Historic Preservation documented over 100 communities in 20 states that had experienced significant numbers of teardowns. Over 1,000 early twentieth-century homes were lost in Dallas, while in Denver some 200 bungalows from the 1920s and 1930s were demolished to make way for homes thrice their size.[35]

While difficult to quantify in a broad way, there is little doubt that increases in market value of historic properties result in many buildings being reused instead of demolished. However, the market is unpredictable and not always the most reliable tool for preservation, as represented by the teardown phenomenon.

Federal Tax Incentives Programs

There are other forces that help to keep properties listed on the Register in use. One of the most successful of these programs is the Federal Historic Preservation Tax Incentives (FHPTI) program. The FHPTI program was established with the Tax Reform Act of 1976, quickly creating a culture of rehabilitation in many older commercial and industrial areas. In 1986 the FHPTI program was scaled back considerably, reducing the tax credit from 25 percent to 20 percent.

35 Adrian Scott Fine and Jim Lindberg, *Protecting America's Historic Neighborhoods: Taming the Teardown Trend*, (Washington D.C.: National Trust Press, 2002), 1.

Today tax incentives are available to those willing to rehabilitate a historic or older property for commercial purposes. A tax credit of 20 percent of the cost of a rehabilitation that follows the *Secretary of Interior Standards for Rehabilitation* on a building listed on the Register is available. A 10 percent tax credit is also available for the rehabilitation of non-historic buildings built before 1936.

In order for the property to be considered for the 20 percent tax credit the building must be income-producing. The renovations must also be significant. The "rehabilitation expenditures must exceed the greater of $5,000 or the adjusted basis of the building and its structural components. The adjusted basis is generally the purchase price, minus the cost of land, plus improvements already made, minus depreciation already taken."[36]

Since its inception in 1976, the FHPTI program has proved to be very successful. More than $40.83 billion in private investment has been put towards the rehabilitation of nearly 34,000 projects across the country, and 86,508 low and medium income housing units have been created.[37]

The FHPTI program has also been successful in other ways. It has been acknowledged for spurring advances in nationwide preservation design, winning a prestigious Presidential Design Award from President Reagan; the administrative efficiency with which the program runs has been acknowledged by a study conducted by the U.S. General Accounting Office; and the program has served as the basis for similar programs

36 Michael J. Auer, *Preservation Tax Incentives for Historic Buildings, (*Washington D.C.: U.S. Department of the Interior, National Park Service, Cultural Resources, Heritage Preservation Services, 2004), 10-11.

37 National Park Service, *Federal Tax Incentives for Rehabilitating Historic Buildings: Statistical Report and Analysis for Fiscal Year 2006, (*Washington D.C.: U.S. Department of the Interior, National Park Service, Cultural Resources, Heritage Preservation Services, 2007), ii.

in nations across the globe.[38] The FHPTI program has not only been successful at promoting rehabilitation projects, but by offering quality incentives for buildings listed on the Register, it has actually increased the rate of buildings being listed on the National Register. This is apparent in Figure 3 below, where the number of National Register nominations completed is charted against the number of FHPTI projects completed.

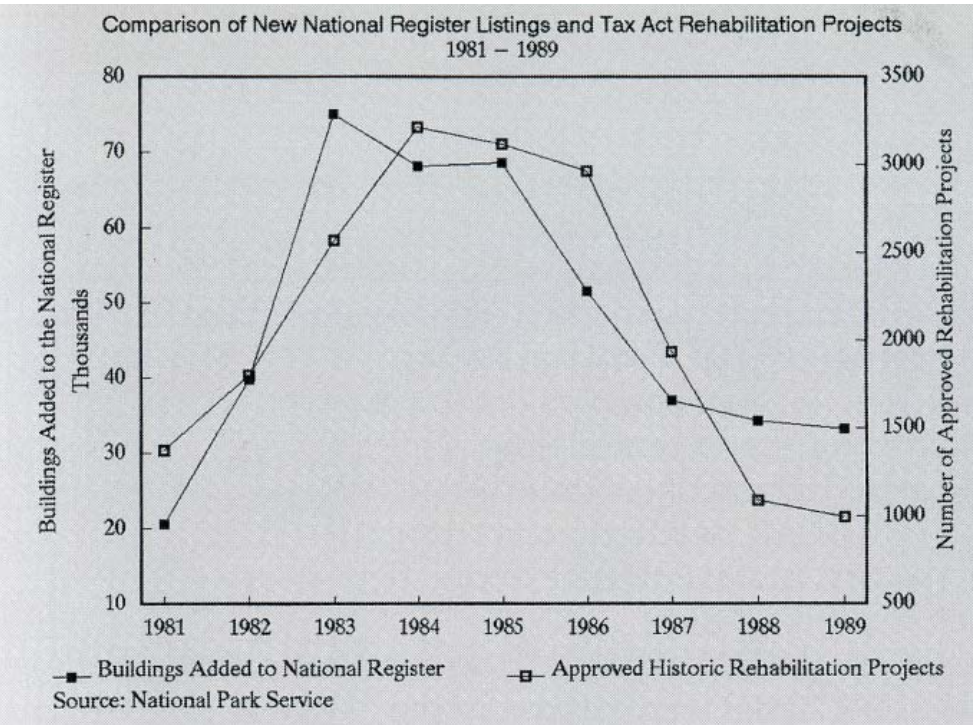

Figure 3. Comparison of New National Register Listings and Tax Act Rehabilitation Projects, 1981-1989. (Rypkema, 1997)

State Programs

There are a wide range of programs and grants offered by individual states that strengthen and complement the protections offered by the federal government. In Arizona, the owner and resident of a property listed on the Register can participate in the State Historic

38 Charles E. Fisher, "Historic Preservation Tax Incentives Program: The First 20 Years" *CRM*, v. 20 n. 2, (Washington D.C.: Department of the Interior, 1997), 5.

Property Tax Reclassification program. By entering into a 15-year agreement with the state to maintain their property according to the *Secretary of the Interior Standards for the Treatment of Historic Properties*,[39] the owner can have their property taxes reduced by 35 to 45 percent.[40] In addition, the Arizona State Parks Historic Preservation Heritage Fund provides grants of up to $150,000 to Arizona governments and institutions wishing to undertake projects involving properties on or eligible for the Register.

Other states offer a variety of differing types of assistance. Oregon's Special Assessment of Historic Property Program, which was established in 1975, is the nation's oldest state-level historic preservation tax incentive. The program is used to put a 15-year "freeze" on a historic property's value before substantial rehabilitation work is done, thereby freezing the building's property taxes. The program is available to any property, income-producing or not, listed on or eligible for the Register. Currently, there are 834 buildings in Oregon taking advantage of the program.[41] Recent legislation in Oregon has made it possible for property owners to reapply to the program once their 15 year period is up. Along with an updated preservation plan, one of the original requirements for application, commercial properties reapplying must submit a renovation plan that details how a property is meeting Americans With Disabilities Act requirements, seismic improvements, and energy conservation. Since these applications are reviewed by the Oregon SHPO it ensures that energy-efficient design is done in a way that complies with the *Secretary of the Interior Standards*.

39 *The Secretary of the Interior Standards* are published by the National Park Service and provide guidance and philosophic consistency to preservation projects. They insure that the character-defining features that give the property significance are not damaged in the process of a rehabilitation project.

40 State Historic Property Tax Reclassification (SPT) for Owner-Occupied Homes, http://www.pr.state.az.us/partnerships/shpo/spt.html, (accessed September 3, 2007).

41 Oregon State Historic Preservation Office, *Historic Building Special Assessment Projects in Oregon (Active),* List generated 6/7/2007, 47.

In Utah, a tax incentive program that mimics the requirements and 20 percent tax credit of the FHPTI program is available through the SHPO to owners of non-income producing historic residences. The Utah Heritage Foundation's Revolving Fund Loan Program also provides low-interest loans to property owners wishing to restore and rehabilitate properties eligible for or listed on the register.

A recent report issued by the Abell Foundation, an organization dedicated to improving the quality of life in Maryland, provides an excellent summation of the successes of Maryland's heritage tax credit program, which has been called "one of the most successful economic development programs ever designed by Maryland state government."[42]

The Maryland Heritage Structure Rehabilitation Tax Credit (MHRTC) program is intended to encourage the redevelopment of historic properties by offering tax incentives of up to 20 percent of eligible rehabilitation costs. MHRTC tax funds are available in addition to federal heritage tax credits. Both commercial and owner-occupied residential historic properties can be eligible for the program, however, the bulk of rehabilitation activity and state expenditures have involved commercial structures.

Over its 12-year life span, the program has facilitated the redevelopment of 407 historic commercial structures. The projects involved over $1.02 billion (all figures cited from the Abell Report have been adjusted by the report's authors to reflect 2009 dollars) in total rehabilitation spending by developers, assisted by an investment of $213.9 million

42 Joseph Croynyn and Evans Paull, "Heritage Tax Credits: Maryland's Own Stimulus to Renovate Buildings for Productive Use and Create Jobs, an $8.53 return on Every Dollar Invested," *The Abell Report,* (Baltimore, MD*:* March 2009), v. 22, n. 1., 2.

in state tax credits.[43] Completed commercial rehabilitation projects have generated a total economic impact of more than $1.74 billion, employing an estimated 15,120 persons earning $673.1 million. Construction labor on the job-sites totaled an estimated 9,248 workers earning $443.4 million—over three-fifths of the total economic impact.[44]

According to the report, the project confirms the experience that rehabilitation activity creates 20 percent more jobs than new construction. Over the past 12 years, the state's tax credit investment has generated 1,850 more jobs than would have been created had the same funds been used for new construction.[45]

As well as generating economic activity and creating jobs, the commercial property rehabilitation aspect of the program has at least partially paid for itself by generating an estimated $83.7 million in state and local taxes—effectively paying down more than one-third of the state's total $213.9 million tax credit investment.

Maryland's program has also helped the state capture federal money that would not have otherwise been available. The Maryland Historical Trust estimates that $172.2 million in FHPTI program tax credits have been leveraged by the Maryland tax credits—almost a one-to-one match to the dollars provided by the MHRTC program. The report suggests that, due to the difficult nature of rehabilitation projects, most commercial projects would not be attempted without the equity provided by the combination of state and federal incentive programs.

43 Ibid, 3.

44 Ibid.

45 Ibid.

However, the Maryland program is also available to residential projects. Over 12 years, completed residential projects have generated a total economic impact on the Maryland economy of more than $354.9 million in total economic activity, employing an estimated 3,343 persons earning $88.5 million. Construction labor on the job-sites totaled an estimated 1,606 workers earning $38.9 million—almost half of the total economic impact.

As with the commercial program, the 2,351 residential projects generated an estimated $23.5 million in state and local taxes—effectively paying down a similar one-third of the state's total $41.6 million tax credit investment. The greatest return on the state's investment, however, comes from the long-term increase in property taxes for the historic properties and their neighbors in perpetuity.

Over three-fifths (62.4 percent) of residential applicants have stated that they would not have attempted rehabilitation of their historic properties unless the Maryland tax credits were available.[46]

The Abell Report also demonstrates that Maryland's Tax Credit program has had a significant beneficial environmental impact. The graph below demonstrates that impact, per $1 million dollar investment in historic tax credits.

Local Programs

While federal and state incentive programs have no doubt helped ensure the long life of thousands of historic buildings, that has been accomplished by encouraging their reuse, not actively preventing their destruction. While many municipalities may offer incentives

46 Ibid.

Environmental Impact of Historic Preservation:
Benefits of $1.0 Million Investment in Historic Tax Credits*

Benefit	Quantification
Renovated space	50,000 sq ft
Environmental Impacts:	
• Lower VMTs (20%-40% saving compared to sprawl)	198,000 – 264,000 VMTs
• Lower travel-related CO_2 compared to sprawl	92 – 123 metric tons CO_2
• If the rehabilitation is also LEED equivalent for energy efficiency, the CO_2 "saved" relative to conventional construction in suburban location	164 – 195 metric tons CO_2
— This is equivalent in gallons of gasoline	18,700 – 22,000 gal. of gas
— This is equivalent taking vehicles off the road	30 to 35 vehicles
• Retained "embodied" energy	55,000 MBTUs
• Greenfield land preserved	5.2 acres
• Lowered run-off per sq ft or DU, relative to low density sprawl – percentage reduction	70%
• Less demolition debris in landfills, relative to demolition and new construction	2,500 tons
• Value of natural resources conserved, relative to new construction	$100,000
Infrastructure investments "saved"	$500,000 - $800,000

* *Calculations assume 20% credit and rehabilitation cost of $100 per sq. ft.*

Figure 5. Table showing the environmental benefits of the Maryland historic preservation tax credit, per 1.0 million dollars. VMTs are vehicle miles traveled. DU are dwelling units. (Cronyn and Paull, 2009)

similar to those presented above at the state level, municipal governments also have the power to put in place protections that specifically prohibit the demolition or alteration of historic properties.

In Tucson, protection is provided to several historic neighborhoods by the application of a Historic Preservation Overlay Zone. The demolition of a building in a Historic Preservation Overlay Zone is only permitted under a few exceptional circumstances. Besides guarding against demolition the overlay zone also requires that renovations must

be approved by a design review committee. Also, new construction must be approved by a review committee in order to ensure that new design is compatible with the character of the historic district. Local historic districts tend to be fewer in number than National Register districts. In Tucson, a city with over 25 districts either on or eligible for the Register, there are only 6 that are also local districts. Zones and ordinances similar to Tucson's are common in communities throughout the country.

Another legal tool that is utilized by some communities to prevent the destruction of historic or potentially significant structures is a process called demolition review. Typically these laws are distinct from historic preservation ordinances. They work under the principle that in many communities it is not possible to evaluate all properties that may be significant to a community beforehand and acts as a buffer to slow down demolition while a review is done of the property applying for a demolition permit. If the property under review is deemed to be significant to the community, the issuance of a demolition permit is delayed while alternatives such as landmark designation or some alternate preservation solution are considered. Since an ordinance such as this is typically applied to *any* building built before a certain date or of a certain age, they provide a more flexible tool for protecting properties that may not meet established criteria for significance, but which the community nonetheless deems worthy of protection.

Many governments across the country have enacted demolition review laws. In Massachusetts they have been enacted in over 100 communities and have been successful, helping to slow down the pace of teardowns, preserve Modern homes and move resources that would have been otherwise lost.[47]

47 Julia H. Miller, *Protecting Potential Landmarks Through Demolition Review,* (Washington D.C.: National Trust for Historic Preservation, 2006), 14.

As demonstrated by the brief overview of the mechanisms used for preserving historic buildings outlined above, it can be clearly seen that historic preservation has helped hundreds of thousands of buildings remain intact and useful. However, for the all the good preservation has done, it offers very little protection to the majority of buildings, those of the recent past. In order to ensure that the vast resource that these buildings represent is not squandered, it will be necessary to examine the potential of preservation protections to be extended to buildings of the recent past. This topic is discussed in further detail in the *Making the Case for Independent Building Reuse Policies* section.

SUSTAINABILITY AND BUILDING REUSE

Today the discussion of sustainable building practices revolves around the USGBC's LEED rating system. LEED has become the industry standard by which the sustainability of buildings is measured in the United States. Across the country, the LEED rating system has been adopted by governments or serves as a reference point for individual local programs.

The USGBC and LEED

The USGBC was created in the early 1990s as a way to promote sustainable building practices. LEED is a rating system which establishes a quantifiable standard by which buildings can be rated for their overall environmental qualities. The LEED rating system, as described by the USGBC, was designed to be a voluntary, consensus-based national standard for developing high-performance sustainable buildings which:

- Facilitate positive results for the environment, occupant health and financial return
- Define "green" by providing a standard for measurement
- Prevent "greenwashing" (false or exaggerated claims)
- Promote whole-building, integrated design processes[48]

The rating system is point-based, with most goals, or credits, worth one point. Originally, the program consisted of a single list of potentially achievable credits, but as it became apparent that not all building projects could be judged by exactly the same standards, the system has grown into multiple lists for several different building types:

48 USGBC, *An Introduction to the U.S. Green Building Council and the LEED Green Building Rating System*, (Washington D.C.: U.S. Green Building Council. 2002).

- LEED-NC for New Construction
- LEED-EB for Existing Buildings
- LEED-CI for Commercial Interiors
- LEED-CS for Core and Shell
- LEED-H for Homes
- LEED-ND for Neighborhood Development
- LEED-S for Schools
- LEED-R for Retail

LEED-NC is the most commonly utilized category and also the most relevant to the topic of this report. While it might seem logical that building reuse would fall under LEED-EB for Existing Buildings, this category is primarily intended for building operators wishing to improve their building's environmental performance. This report is concerned with reaching the organizations and entities that are at the critical stage in their development where they have outgrown their current facilities and are considering a move to more accommodating facilities, or are looking to obtain facilities for the first time—the time when the decision is made to build a new building, or relocate to a more accommodating existing building. A move to an existing building to accommodate a new program would most likely put the project in the LEED-NC category, as it would require what is considered a major renovation.

At the start of a building project, the architect, client, and contractor agree to attempt to attain a LEED rating and register their project with the USGBC, which will monitor the project throughout its execution. Depending on how many points the project team is awarded, the project can achieve either: Certification (26-32 points), Silver (33-38), Gold (38-51), or Platinum (52-69).

Within LEED-NC v2.2, the most commonly used version of LEED-NC,[49] there are 6 primary categories and a total of 69 achievable points, which break down as follows:

LEED Category	*Possible Points / (% of Total)*
Sustainable Sites	14 (20%)
Water Efficiency	5 (7%)
Energy and Atmosphere	17 (25%)
Materials and Resources	13 (19%)
Indoor Environmental Quality	15 (22%)
Innovation and Design	5 (7%)
Total	*69 (100%)*

LEED Successes and Failures

It is undeniable that LEED has been a successful and popular program. There are 19,957 member organizations including corporations, governmental agencies, non-profits and others from throughout the building industry. Over 5 billion square feet of commercial building space is involved with the LEED green building certification system. Every business day, projects representing 464 million construction dollars register with LEED. According to the 2006 McGraw Hill Green Building Smart Market Report, by 2010, approximately 10 percent of commercial construction starts are expected to be green.[50] For the most part the outcomes of LEED projects are meeting intentions. In a March 2008 report released by the New Building Institute studying the energy performance of LEED-NC certified commercial buildings, it was shown that average energy usage, in kBtus/sf/year, of LEED certified buildings was 24 percent lower than that of typical commercial buildings.[51]

49 As this sentence is being written, the USGBC website is down, being overhauled for the release of LEED 3.0, the most comprehensive update to LEED in years. Except where noted, this report will refer to v2.2, as it is the most widely tested version of the program.

50 USGBC, *U.S. Green Building Facts: Green Buildings by the Numbers,* April 2009, http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1718, (accessed May 3, 2009).

51 Cathy Turner and Mark Frankel, *Energy Performance of LEED for New Construction Buildings FINAL REPORT*, (Vancouver, WA: New Buildings Institute, March 4, 2008), 2.

LEED	New Construction	Commercial Interiors	Existing Buildings	Core & Shell	Neighborhood Development	Schools	Retail	Total
Registered Projects	11,597	2,047	2,490	2,488	225	713	189	19,524
Certified Projects	1,600	479	200	157	13	4	36	2,476

Figure 6. Number of LEED projects as of April 2009. (USGBC, April 2009)

However, several serious issues with the LEED rating system have been raised. In their 2002 report on the comparison of the results of a life cycle assessment and an analysis based on LEED criteria performed on the same building at the University of Michigan, *Evaluation of LEED Using Life Cycle Assessment Methods,* Chris Scheuer and Gregory Keoleian took issue with LEED's largely unscientific basis. They warn that the voluntary industry stakeholder committees, made up of experts and interested parties who develop program features, can potentially lead to industry favor and the watering down of environmental standards. Their results found LEED to be far short of LCA methodologies in determining the true costs of construction, and they offer the following conclusions:

> *This project revealed a variety of discrepancies in outcome in LEED credits. These discrepancies undermine the achievement of individual credit intentions and the goals of the program as a whole. Life cycle assessment has proven to be a valuable methodology for simulation of impacts from utilization of the LEED program. The lack of comparability between LEED ratings and LCA results indicates that when considered in a life cycle perspective LEED does not provide a consistent, organized structure for achievement of environmental goals. Further, the disaggregation into individual credits may stimulate specific solutions, but overall building integration may be less than ideal. Finally the lack of balanced results may lead to so much variation in total building environmental performance that a building's rating may not align with its actual performance. In these respects the LEED program does not fulfill its goal of providing a standard of measure. While LEED appears to be accomplishing the goals of an eco-labeling program that is successful as a marketing and policy tool it is not as successful at being a comprehensive methodology for assessment of environmental impacts. This is especially troubling from a consumer perspective, as the LEED rating is intended to become the "currency" of*

> *environmental value, upon which future users, owners, and public agencies rely. Refinement of LEED should emphasize integration of life cycle oriented measures and standards.*[52]

In the 2005 article "LEED is Broken, Let's Fix It," Auden Schendler and Randy Udall put voice to many LEED-accredited professionals' frustrations with the byzantine system. A list of common grievances are laid out against LEED, the most prominent of which are:

- *LEED Costs too much* The authors state that receiving LEED certification can add from one percent to five percent of the total budget to the project cost. They site a local project of 10,000 square feet that cost $50,000 to have certified. These numbers appear outlandish when you consider the sustainable features that could be added to a project for the $50,000 spent on an honorary certification.

- *Point mongering* The combination of the equal weight of all points, the unequal difficulty of the various tasks, the relatively low number of points needed for basic certification, and the desirability of the LEED label as a marketing tool have encouraged the practice of striving for the inexpensive and easy-to-obtain points while neglecting the expensive and often more environmentally beneficial points. This has lead to the certification of many projects where the environmental advantages are hardly better than those specified by existing building codes.

- *The Complexity of Energy Modeling* LEED requires a complex energy modeling procedure on projects that wish to gain the points designated for energy conservation. While energy modeling is important, it is often prohibitively time-consuming and costly for smaller projects.

52 C.W. Scheuer and G.A. Keoleian. "Evaluation of LEED Using Life Cycle Assessment Methods." NIST GCR 02-836. (Ann Arbor, MI: University of Michigan, 2002).

- *Crippling Bureaucracy* LEED certification is a long and drawn out process and the requirements seem to be constantly changing. Assumptions that are made at the beginning of a project are not necessarily true by the project's completion.[53]

In November 2008 Joseph Lstiburek, a principal of the Building Science Corporation, presented a pointed criticism of the LEED system in the ASHRAE Journal (American Society of Heating, Refrigerating and Air-Conditioning Engineers). He warns that unless the LEED system changes and stops rewarding points for features that should be standard in any competently designed building anyway, that

the failures are beginning to bubble to the surface, and we are in danger of ruining the 'green brand'… it's pretty pathetic if we have to reward architects and engineers when they provide details and specifications that should be basic to fundamental practice. If you design and install a controlled ventilation system that meets Standard 62[54] , you get points. You get more points if you keep the rain out and design the building to dry if it becomes wet. And, you get still more points if the occupants are actually comfortable. Aren't these code requirements? Shouldn't these be "the standard of care?"

Lstiburek is particularly incensed by the idea that a 'glass box' could receive LEED certification:

Do you want to save serious energy and serious money? That's easy. Use less glass. Windows and curtain walls are the most expensive component in a building and provide the worst energy performance. The more you use, the more energy and money you burn. Limit the glazing area to approximately 30 percent, and use good glass and frames.[55]

A primary criticism of LEED is that it works better as a marketing tool and as a promoter of the newest green products than it does at offering sensible design solutions. An article

53 Auden Schendler and Randy Udall, "LEED is broken, Lets Fix it," *Grist Magazine,* October 2005.

54 ASHRAE Standard 62, outlining ventilation requirements for acceptable indoor air quality.

55 Joseph W. Lstiburek, "Why Green Can be Wash," *ASHRAE Journal*, November 2008, 28.

from the contemporary-issues magazine *Fast Company,* echoes Lstiburek's skepticism by looking questioningly at the building housing the magazine's own headquarters. The magazine is located at 7 World Trade Center, a building touted as the world's first "green" office tower and the recipient of a LEED gold rating from the USGBC. The article asks "What does the plaque on the front of a $700 million glass box really mean?" The article points out other powerful "ecological" issues related to the program: "The business case isn't just that green building saves money on energy. It's that LEED certification sells buildings to high-end clients and governments, gets architects and builders sparkling free publicity, and creates a hook for selling new products, materials, and systems to builders. It's a whole new commercial ecosystem." Richard Fedrizzi, a founding member and the current USGBC CEO, speaks to the business interests at the very core of the USGBC's existence: "The great majority of environmental organizations had invested in keeping companies on the other side of a fence... David [Gottfried][56] thought that we could do things differently. If we could invite business to the table, we could develop standards relative to building performance, buy in at the very top, and be able to transform the marketplace toward sustainable buildings."[57]

Whether by design or not, the growth of the LEED rating system has undoubtedly been a boon for the makers of green products. It is hardly a coincidence that the original name of the U.S. Green Building Council was U.S. Green Manufacturers.[58] In August of 2005, attention was drawn again to conflicting interests within the USGBC when it was voted to allow industry trade associations to participate as full members, a decision that

56 David Gottfried is a multidisciplinary developer and the founder and first staff president of the USGBC.

57 Anya Kamenetz, "The Green Standard?" *Fast Company,* Decmber 19, 2007, http://www.fastcompany.com/magazine/119/the-green-standard.html, (accessed April 24, 2009).

58 David Gottfried, *Greed to Green, the Transformation of an Industry and a Life.* (Berkely, CA: WorldBuild Publishing, 2004), 102.

disappointed some activists. Bill Walsh, national coordinator of the nonprofit Healthy Building Network, also a USGBC member, fears this could tilt the Council's agenda further toward business interests. "Since every member of every trade association can also be a member of the USGBC, and often is, this gives some interests in the Council two bites at every apple."[59]

Despite the criticisms, LEED has been successful in many ways. Clearly this is in no small part because of its usefulness as a marketing tool. It is questionable whether LEED, as it is currently designed, could function as effectively as it has if it is bogged down by concerns that are harder to fit into LEED's "commercial ecosystem."

LEED and Building Reuse

Of the six LEED categories, the Materials and Resources category is the category most relevant to building reuse. The points available in the Materials and Resources category break down as follows:

Credit #	*Credit Description*	*Points*
Prereq. 1	Storage & Collection of Recyclables	Required
Credit 1.2	Building Reuse, Maintain 75% of Existing Walls, Floors & Roof	1
Credit 1.2	Building Reuse, Maintain 95% of Existing Walls, Floors & Roof	1
Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1
Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1
Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1
Credit 3.1	Materials Reuse, 5%	1
Credit 3.2	Materials Reuse, 10%	1
Credit 4.1	Recycled Content, 10% (post-consumer + ½ pre-consumer)	1
Credit 4.2	Recycled Content, 20% (post-consumer + ½ pre-consumer)	1
Credit 5.1	Regional Materials, 10% Extracted, Processed & Manufactured Regionally	1
Credit 5.2	Regional Materials, 20% Extracted, Processed & Manufactured Regionally	1
Credit 6	Rapidly Renewable Materials	1
Credit 7	Certified Wood	1
Total Points:		13

59 Ted Smalley Bowen, "Constructive Criticism: LEED green-building program confronts critics and growing pains," *Grist*, October 26, 2005, http://www.grist.org/news/maindish/2005/10/26/leed/index.html, (accessed July 7, 2007), 3.

Out of the 13 points available, only credits 1.2 and 1.3 are directly related to building reuse. Therefore, if a project were to reuse 95 percent of an existing building, both interior and exterior, it would receive both of the 1.2 credits, for retaining 95 percent of existing walls, roof, and floor, and credit 1.3 for retaining over 50 percent of non-structural interior elements. The reuse doesn't necessarily automatically qualify for other seemingly related credits. For instance, by reusing a building instead of building anew, it would seem that a project would at least meet the spirit of credits 2.1 through 4.2, dealing with, respectively, diverting construction waste, reusing existing materials, and using materials with recycled content. This is not the case though, these credits must be applied for separately and must be demonstrated to have been accomplished in addition to the building reuse, regardless of the fact that the intention of these categories has been met in a far more meaningful way than by merely accomplishing them individually in a new building.

Essentially, there are 3 total credits available out of 69, or about 4% of the total credits available for building reuse. This is a fairly low percentage, considering research has indicated that embodied energy can account for as much as 45 percent of a building's energy consumption over a 50-year lifespan.[60]

LEED v3.0

About two weeks before the presentation of this thesis the most significant reworking of the LEED rating system since the year 2000, LEED v3.0, was introduced. Not surprisingly, the biggest advocate for existing buildings during LEED v3.0's planning and design phases came from the preservation community. In 2006, the National Trust for Historic Preservation established the Sustainable Preservation Coalition to guide further development of the LEED Building Rating Systems to better recognize historic and existing buildings. In order to do this, the Trust partnered with several organizations

60 Thormark, 2001.

that were developing their own sustainability agendas, including the American Institute of Architects, the Association for Preservation Technology International, the National Park Service, the General Services Administration, and the National Conference of State Historic Preservation Officers. The coalition recognized that LEED and preservation were certainly compatible but that there were areas in which LEED could be improved to align better with preservation goals:

1) The LEED rating system should better reflect the importance of existing buildings to sustainable stewardship of our planet and its limited resources;

2) LEED tends to overlook the impact of projects on cultural value;

3) LEED does not effectively consider the performance, longer service lives, and embodied energy of historic materials and assemblies; and

4) LEED is overly focused on current or future technologies, neglecting the advantages of many traditional building practices.[61]

The biggest change apparent in LEED v3.0 is that the rating system has been reorganized to better reflect true life cycle assessment methodologies. The number of points has been increased from 69 to 100, with 10 bonus points being available. An attempt has been made to weigh the point allocations to better balance the potential benefits and relative difficulty of the various credits. For instance, mitigating a brownfield, a very difficult and expensive task, will no longer have the same point allocation as installing environmentally-friendly carpet.

61 Barbara A. Campagna, "How Changes to Leed Will Benefit Existing and Historic Buildings," *National Trust for Historic Preservation Forum News,* November/December 2008 Vol. XV No. 2, (Washington D.C.), 6.

Ultimately preservationists may be disappointed with the results of their efforts. In certain areas, points have been increased that would seem to favor building reuse, specifically, those dealing with regional specificity, density development, and community connectivity. Up to six points, instead the one available previously, are now available depending on a project's access to public transportation. Up to five points are available for undertaking a project in a densely developed area. Both of these credits could still be accomplished by demolishing and building anew, but by encouraging projects in densely developed areas it is likely to increase the reuse of existing buildings.

At first glance, it would appear that LEED v3.0 has increased the amount of points available for building reuse. Instead of the previous maximum of two points, there are now three points available if 95 percent of existing walls, floors, and roof are utilized. The single credit available for the reuse of non-structural interior elements also remains. Hence, there are a total of four points instead of three readily available for building reuse. This is a frustratingly small number considering that the total points available have increased to 100. Overall, the weight of building reuse has actually been slightly diminished:

- Total points awarded for substantial building reuse in v2.2: 3 out of 69, or 4.35%
- Total points awarded for substantial building reuse in v3.0: 4 out of 100 or 4%

Initial reports stated that a completely new alternate compliance path would be included in v3.0 that would benefit existing buildings, entitled "Life Cycle Assessment of Building Assemblies." It was reported that this would be an optional path to use the Materials & Resources Credits based on the durability and embodied energy of existing materials as determined through LCA criteria.[62] However at the date of the publication of this thesis,

62 Campagna, 9.

weeks after the rollout of LEED v3.0, there is no information available from the USGBC on this alternate compliance path.

Despite LEED's failure to weigh the reuse of existing buildings more appropriately, there is little question that LEED and preservation can work very well together. By now there have been enough historic buildings that have also achieved LEED certification that it should be evident that undertaking a historically sensitive project is not a hindrance to becoming LEED certified. This idea is aptly demonstrated by a recent $98 million project just north of San Francisco, where the historic 1905 Fort Baker Army Base was turned into the luxurious Lodge at Cavallo Point. The project has received $11 million in historic tax credits[63] and has applied for, and will likely be granted, a LEED Silver rating—all while retaining the essential character of the historic site.[64]

There are some things that LEED does very well. The fact that the USGBC has managed to establish a widely implemented national standard for sustainable design, however flawed, is an achievement in itself. The sheer visibility of the program has at least engaged the majority of the construction industry in a debate on the pros and cons of sustainable building. The fact that there is so much discussion over whether LEED is a good program or not, will undoubtedly make it a better program. Despite the fact that LEED is not perfect, especially from a building reuse standpoint, it does not specifically work against preservation goals, and in an increasing number of examples has been shown to be very effective in historic buildings.

63 It is indicative of the complexity of the LEED certification process that the project received approval for its $11 tax credits months ago, while approval of it LEED certification is still pending at the publication date of this thesis.

64 Suzanne Stephens, "Cavallo Point, The Retreat at the Golden Gate: Leddy Maytum Stacy Architects and Architectural Resources Group turn a historic army base into an environmentally conscious hotel." *Architectural Record*, December 2008, http://archrecord.construction.com/projects/bts/archives/hotels/08_CavalloPoint/default.asp, (accessed April 25, 2009).

OTHER PROGRAMS ENCOURAGING BUILDING REUSE

In November of 2008, the City of San Francisco introduced one of the most ambitious green building ordinances in the country. The ordinance requires that all new construction or significant renovations—with stricter requirements for larger buildings—meet a high level of LEED equivalency. Perhaps the most interesting feature of the program, from the standpoint of this research, is that the program rewards the retaining of character-defining features of historic buildings and penalizes the demolition of existing buildings. Historic significance is determined by the San Francisco Planning Department, based on established environmental review procedures in the state of California. This means that a building doesn't necessarily have to be listed on, or determined eligible for, inclusion on the National Register to be considered historic. An example of how this system works:

- If a project retains all historic windows, there is a 6-point reduction in the total amount of LEED points the project must achieve.

- If the project retains only 50 percent of the historic windows on the principal facade then the reduction in LEED points is 2.

- Retaining character-defining features of significant interior spaces will save the project 2 LEED points if 50 percent are retained and 4 points if 100 percent are retained.

Likewise, significant number of LEED points are added to the total number required if the project entails demolishing an existing building. If the existing building that is being demolished has been determined a historic resource, then even more LEED points are

added. For example, if the project replaces a building and does not at least triple the density of the building demolished, then an extra 10 percent of the LEED points initially required for the project are added on. If the same project demolishes a historic building, then the project must achieve an extra 10 percent of the total LEED points available. This means that if the project is required to achieve a total of 70 out of 100 total LEED points, the non-historic demolition would require an extra 7 points and the historic demolition would require an extra 10 points.[65]

Since the Green Building Ordinance is so new, there is little indication as to whether it will actually help protect existing buildings from being demolished. The first benchmarks of its success will not be studied in-depth until the year 2012.

Most existing incentive programs for building reuse in the U.S. require that buildings be historic. However, that is not the case in the United Kingdom where a well established set of policies concerning building reuse exists, independent of the building's historic status. Most of these programs revolve around providing adequate and affordable housing. Since its founding in 1992, the U.K.'s Empty Homes Agency (EHA), which functions as a non-profit NGO, has been central to the effort of raising awareness of the potential of empty homes in England to meet housing needs and devising and promoting sustainable solutions that will bring empty homes back into use. The EHA works both nationally and locally in order to achieve the following goals:

Nationally—by campaigning, lobbying and communicating for policy change:

- Lobbying the Government and political parties, the Agency presses for changes

65 City of San Francisco, Department of Building Inspection, "Administrative Bulletin AB-093," Attachment A, Tables 2 and 3.

in housing policy and the law to encourage owners to bring their homes back into use.

- Working with the Government, the Agency provides information on the empty homes situation and develops measures to tackle the problem.

- Keeping the scandal of empty homes in the public eye, by running campaigns, publishing research, organizing seminars and conferences, and holding National and London Weeks Of Action.

- Recognizing the good work of local authorities and housing associations, by holding annual awards for good practice around the country.

Locally—by providing support to local authorities, housing associations, and community groups, which want to bring empty homes back into use.

- Aiding the regeneration of communities, by ensuring their economic stability, through work with local authorities.

- Persuading local authorities to adopt Empty Property Strategies and to appoint Empty Property Officers, which over 200 councils have done and which are bringing tens of thousands of empty properties back each year.

- Supporting owners of empty homes, the Agency can advise owners of the available options for putting their homes to use.[66]

66 Empty Homes Agency: What We Do, http://www.emptyhomes.com/whatwedo/what_we_do.html, (accessed April 26, 2009).

The EHA has had a profound impact on policy in the UK, as mentioned above they have managed to have Empty Property Officers established in hundreds of UK communities. Also through the EHA's advocacy, many communities, from London to Glasgow, now have "Empty Property Grants" available for the refurbishment of existing housing. For example, the London borough of Barnet administers an Empty Properties Grant program with the following requirements and characteristics:

- The property has been empty for one year or more.
- The grantee is the owner or leaseholder of the property and is responsible for all structural repairs (there must be at least three years or more outstanding on the grantee's lease).
- The property does not meet the Decent Homes Standard.[67] To be 'decent' the property must be in reasonable repair, have reasonably modern facilities and services and have a reasonable degree of thermal comfort.
- Any grant to be a maximum of £11,000 (approximately 16,000 US dollars) per unit of accommodation or 50 percent of the reasonable cost, whichever is the lesser amount. An applicant can apply for a maximum of six units.
- The Decent Homes Standard and the [Barnet Borough] Council's Energy Efficiency and Security Standard must be met on completion of the works and maintained for three years thereafter.
- All applicants are advised to employ an architect or surveyor to assist in the process.[68]

67 A program administered by the UK's Department for Communities and Local Government that establishes a baseline for the quality of a dwelling.

68 Barnet-London Borough Council, *Empty Property Grants Leaflet*, http://www.barnet.gov.uk/empty-property-grants-policy-landlords-2007-8.pdf, (accessed April 26, 2009).

Of particular interest in this example is the inclusion of a standard for basic quality, an environmental requirement, and the recommendation that an architect or surveyor be employed to assist in the process. The Energy Efficiency and Security Standards include provisions relating to heating requirements, minimum insulation requirements, and window requirements. Preservationists will be pleased to know that the window requirements specify that windows be replaced in-kind, with a special provision protecting wood-sash double-hung windows. These requisites ensure that not only is the building lifespan lengthened by keeping it in use but that the process actually improves the quality of the building and reduces its environmental impact. Empty Properties Grants across the UK tend to follow this general outline.

While reuse programs are still fairly rare in the U.S. the recent downturn in the economy has brought with it a few innovative programs. Aiken, a city of about 25,000 in South Carolina has an incentive program to encourage redevelopment of large empty buildings. In order to qualify, a building must have been vacant for a minimum of 24 months and have a minimum size of 30,000 square feet of heated space. The incentive payment is based on the difference in the city tax liability between the amount dictated by the current assessed value of the property and the assessed value of the property after construction is complete. That difference would then be multiplied by the number of years the building has been continuously vacant to determine the total incentive payment.

The thought behind the program is that it will help new owners reduce overhead cost and thus reduce the number of vacant buildings located throughout the city. In turn, it is hoped that these redevelopments and restorations will enhance the value of real estate for the area of the city where the reused building is located. The City acknowledges

that a possible benefit of the program would be to reduce development sprawl and the substantial cost associated with water and sewer infrastructure for new development.[69]

A little to the north of Aiken, the Rural North Carolina Economic Development Center (RNCEDC), acting as overseer for the North Carolina General Assembly, administers an innovative incentive program that encourages building reuse without the stipulation that buildings be historic. The RNCEDC recognizes that reusing existing buildings is an effective way to revive once-thriving centers of commerce, create jobs and add to the much-needed tax base of struggling communities. Buildings need be vacant for only 3 months to qualify for the grants. Development grants of up to $480,000 are awarded to projects ready for renovation. In order to achieve this two types of grants have been developed. Predevelopment grants of $25,000 help cover the cost of an initial architectural study, or other activity necessary to secure commitments from a business or investors. The grant amount is determined by the number of expected jobs to be created through the project, with $12,000 available for each potential job. This must be matched by at least an equal amount of private and public funds. Awards are limited to local governments in rural counties or the most economically distressed urban areas, with priority given to towns with fewer than 5,000 people.[70]

Melody Adams, director of the North Carolina Rural Center's Building Reuse Initiative, is unaware of any other programs in the U.S. similar to the Rural Center's program. Over the four-year life span of the incentive program, the Rural Center has awarded 134

69 City of Aiken: Business News, Redevelopment of large empty buildings incentive, http://www.cityofaikensc.gov/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=71&cntnt01returnid=31, (accessed April 24, 2009).

70 The Rural North Carolina Economic Development Center: Building Reuse Initiative, http://www.ncruralcenter.org/reuse/index.html, (accessed April 25, 2009).

Building Reuse and Restoration grants totalling $15.8 million. Altogether, the projects are expected to create over 4,233 jobs and leverage more than $266 million in private investments.[71]

The building reuse incentive programs that are outlined above have been created for economic reasons. However, just as the USGBC has made the economics of sustainability incredibly appealing, and preservation practitioners are constantly reiterating the economic and environmental benefits of preservation, these building reuse programs would be wise to effectively incorporate preservation and sustainability[72] directives into the core message of their programs.

71 Email exchange with Melody Adams: Director, Building Reuse and Restoration, North Carolina Rural Center, April 29, 2009.

72 The Empty Homes Agency has already begun doing this, see page 19.

MAKING THE CASE FOR INDEPENDENT BUILDING REUSE POLICIES

In an era with the looming catastrophes of global warming, dependence on volatile governments for rapidly depleting fossil fuels, and an economy that has left people lacking basic necessities, every available resource should be made the most of. The question is not whether we should be encouraging building reuse, but how to go to achieve it most effectively. Exemplary practices and policies have been developed in the fields of preservation, sustainable development, and economic redevelopment. The next sections will examine the best ways for a comprehensive building reuse policy to interrelate with these existing policies.

The Problem with Preservation as a Place for Building Reuse Policy

Preservation as an industry has developed powerful tools to prevent the destruction of buildings that have been deemed historically significant. Through grassroots and centralized advocacy along with federal leadership and incentives, preservationists can proudly claim to have helped prolong the life of hundreds of thousands of buildings.[73]

However, these tools do not apply to the *majority* of the building stock in the U.S. All buildings built before the end of the World War II, an age that can easily be described as "historic," consist of a slight 18 percent of the total existing commercial building stock, and 24 percent of the existing housing stock. Whereas commercial buildings built following the completion of the World War II through the 1980s consist of 56 percent of the existing

73 There are over 1.4 million individual properties listed on the National Register of Historic Places, http://www.nps.gov/nr/research/index.htm, (accessed April 26, 2009).

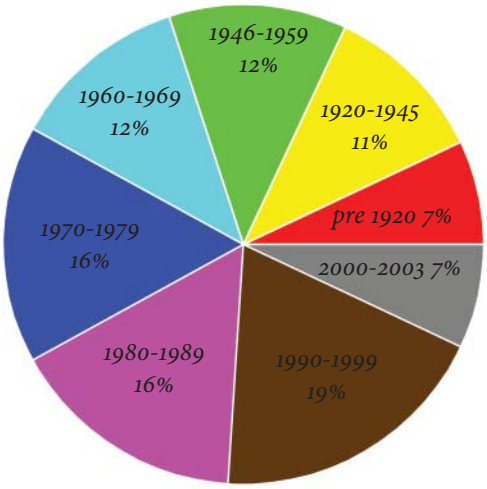

Figure 6. Percentage of U.S. commercial building stock by construction date.

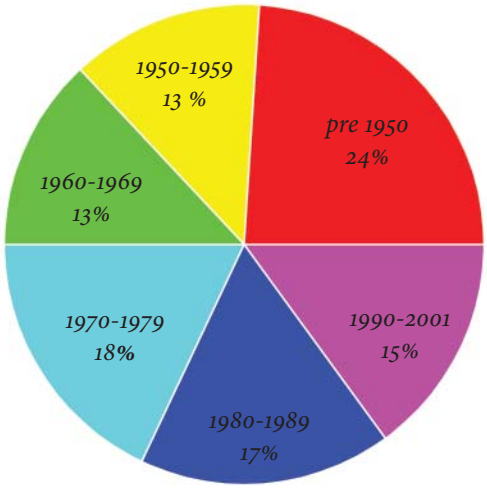

Figure 7. Percentage of U.S. housing stock by construction date.

commercial building stock[74] and over 61 percent of the residential building stock.[75] While this relatively short 40 year period represents a small time period in the history of American building, it represents a majority of the existing building stock. Buildings in this age group are extremely vulnerable to demolition: too young to receive the protections that historic recognition offers, but old enough to be in need of serious infrastructure upgrades.

The vulnerability of the buildings of this era is evidenced by a review of demolition permits issued in Austin, Texas over a recent 6 month interval (see figure 9). Of the 185 permits that included dates of construction, 69 percent of the structures being destroyed were built from 1945 through the 1980s.[76]

74 United States Department of Energy, Energy Information Administration, Commercial Building Energy Consumption Survey (CBECS), Table A3. Census Region and Division, Number of Buildings for All Buildings (Including Malls).

75 United States Department of Energy, Energy Information Administration, 2001 Residential Energy Consumption Survey: Housing Characteristic Tables, Table HC1-2a. Housing Unit Characteristics by Year of Construction, Million U.S. Households, 2001.

76 Austin, Texas was used as the sample because it is the only community that includes construction dates for demolition permits on its permit reports aand makes this information available through it city website. A query of permits applied for was conducted from March 15 through August 15th, 2007. Of 312 demolition permits issued 185 permits included dates of construction. http://www.ci.austin.tx.us/oss_permits/index.cfm, (accessed August 15, 2007).

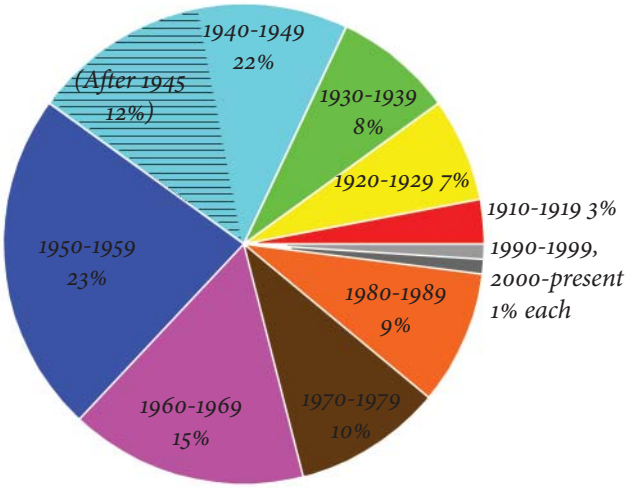

Figure 8. Percentage of demolition permits issued by the city of Austin, Texas for buildings by construction date.

It is evident that buildings of this era are the most endangered buildings in the U.S. today. It is also easy to understand why there has been little effort to preserve the majority of them to date. The simplified detailing of the Modern aesthetic popular in the decades following World War II, combined with the increasingly industrialized design and construction trades, necessitated by the corresponding post-war building boom often resulted in drab architecture lacking many of the humanizing qualities that made preservation for an earlier generation of buildings an easier task. Efforts at educating the public in the value of the buildings of this era are difficult because they lack the easy-to-relate-to hand craft that earlier buildings possess.

There has been some discussion in the preservation community about whether the mandatory 50-year age buildings must achieve for historic consideration should be lowered. However, that 50 years does much to ease the difficult burden in trying to argue a structure's significance. Architectural historian Richard Longstreth elaborates on the difficulties of evaluating the significance of the recent past:

> *Analysis should be based upon as objective a viewpoint as possible, premised on factual evidence and on understanding that evidence within the context of its own time. Yet biases, discernible and otherwise, affect every stage of research, and interpretation by its very nature is a subjective undertaking. History is a continuum; it has no "end." Nevertheless, one cannot achieve a historical perspective of the present. Some passage of time is necessary to give that perspective clear focus so that, among other things, the salient factors contributing to the subject under examination can be identified and the subject itself can be considered with a sense of detachment.*[77]

77 Richard Longstreth, "Preserving the Recent Past" *APT Bulletin*, v. 23, no. 2, (Springfield, IL: Association for Preservation International, 1991), 13.

Often, preservation movements gain momentum not because many people agree on the importance of the subject building, but because a certain number of people simultaneously realize that world they live in is no longer the world they grew up in. Our forefathers would no doubt be greatly amused if they knew we were bestowing their carriage houses with historical significance and likewise, it can be nearly guaranteed that there will be an effort to preserve the big malls that we children of the 1980s and 1990s grew up inside because they were so important to so many lives when we were young. It is likely that this will occur when these buildings are about 50 years old.

This is not just the case with buildings of the post-war era, but it was the case with buildings of earlier eras and will continue to be the case with buildings of eras to come However, the difficulty of predicting the significance of buildings of the recent past does not only apply to this era and to buildings of the Modern aesthetic. The history of Old Main at the University of Arizona provides an excellent example. What is today the symbolic and literal linchpin of the University's campus has narrowly avoided demolition several times during its long and tenuous life.

Built in 1891, the building was condemned in 1938 at the treacherous age of 47. The state legislature was not inclined to pay the required $80,000 to renovate a building that had cost $35,000 to build in the first place.[78] The University's president suggested that the building be demolished. However, he met with opposition from alumni and as it was the middle of the Depression, the University lacked sufficient funds to even tear the building down.[79] Only coincidence saved Old Main. With the outbreak of World War II a Navy

78 Douglas D. Martin, *The Lamp in the Desert*, (Tucson, Ariz.: University of Arizona Press, 1960), 175.

79 Phyllis Ball, *A Photographic History of the University of Arizona 1885-1985*, (Tucson, Ariz.: University of Arizona Foundation, 1987), 218.

indoctrination school was set up at the University. In need of a headquarters for the school, the Navy paid $89,000 for a complete renovation.[80]

In the early 1950s, architects hired to design the University's first Student Union recommended that the Union be placed where Old Main stood. Most students and alumni, saving the oldest generation, were in favor of this plan. The Regents compromised and allowed the building to be built on a site to the northeast of Old Main, provided that the area directly to the south of the Union be converted from a cactus garden to a lawn area in order to provide the Union with spacious landscaping.[81]

The popular opinion seemed to be that Old Main was not a positive representation of the university. After the end of his tenure as University of Arizona president in 1951 J. Byron McCormick lamented not making significance alternations to Old Main during his administration:

> *One thing which has disturbed me was that I had the consent of the board to authorize architects to draw plans for the job, and they came up with plans I thought were good. These called for replacing the railing and posts with ornamental iron, giving the walls a stucco job, and replacing the tin roof with tile. Both the east and west stairways, which are rather steep, would have been broken with a landing while the interior of the structure would have been beautified with tile.*

The history of Old Main's struggle to remain standing highlights the many factors threatening buildings throughout their lifespan. If it is this difficult to prevent the demolition of a building that today is so obviously historic, imagine the difficulty of keeping lesser buildings from being demolished.

80 Martin, 193.

81 Martin, 224.

Preservation is a powerful tool for promoting building reuse, but it will only remain powerful if it is easy to argue that the buildings being preserved are historic. The majority of buildings being demolished will likely always be those that are in the 20 to 50-year age range. An efficient tool for protecting the majority of buildings of this age will need to be far more objective than the proof of aesthetic merit or historic significance required to be eligible for the benefits offered by preservation policies. For building reuse policies to be effective added protections, irrespective of historic status or aesthetic merit, must be given to buildings that fall in the 20-50 year age range.

The problem with Sustainability as a Place for Building Reuse Policy

Today, sustainability in the building industry means LEED, and LEED has been a bonanza for the industry in many ways. It has been a bonanza for the USGBC, which charges hefty fees for almost everything it provides. Want a brief pamphlet explaining what LEED is? Pay 65 cents apiece. Want a reference guide to help understand their incredibly complicated rating systems? Pay 185 dollars for each of their 6 different rating systems. Want to take the sustainable approach and order an electronic version instead of a hardcopy? Then it's only 175 dollars.[82] It has been a bonanza for the green product manufacturers who's products are specified—and the not-so-green product manufacturers with less scruples about their marketing material. It has been a bonanza for property managers who have acquired another selling point for their properties, and it has been a bonanza for designers, who now have an altruistic cause behind which to rally their marketing efforts.

However, with over 100,000 LEED-accredited professionals now registered, it is undeniable that the construction industries' collective knowledge of sustainable design

82 Non-member pricing. If you are a member, which at the lowest level will runs 300 dollars a year, the cost is a mere 150 dollars. USGBC , USGBC Store, USGBC Publications, http://www.usgbc.org/Store/PublicationsList.aspx?CMSPageID=1518, (accessed April 28, 2009).

has increased greatly. LEED's most compelling feature is that it is designed in a way that encourages voluntary participation despite difficult procedures and hefty fees. Bogging down the rating system with credits that cannot easily be perceived as money-saving, revenue-generating, or flashily marketable, may ultimately make the system less desirable to undertake voluntarily.

It is difficult to convince someone administering a project on a tight budget that they should do something expensive for the greater good. The power of the LEED "brand" as a marketing and promotional tool should not be scofffed at. LEED works well because it is relatively easy to convince clients that, despite the added cost and headache, there is a benefit to LEED certification. Admittedly, this benefit is more often expressed in terms of fiscal sensibility with sustainability as an added bonus. There isn't much hope that a client who wants a new building would put themselves through the difficulty of rehabilitated an existing building merely for points towards a plaque. The reluctance of the USGBC to assign building reuse the weight it warrants within the LEED rating system is likely due to the fact that it would disrupt the "commercial ecology" that LEED relies on to remain the effective, market driven, force that it has become.

Requiring LEED certification, as many local governments are beginning to do, is also problematic. If LEED is undertaken voluntarily, then it may be permissible to turn a blind eye to some of LEED's questionable aspects, particularly the weighing of points out of proportion to their actual environmental benefit. Any voluntary, privately funded steps toward sustainable design, even using an imperfect tool, can be seen as an improvement. While using 7 World Trade Center as a model of sustainable design is highly dubious, (see page 48) there is little question that it is a better building than it would have been had it not incorporated LEED. If the trend of governments requiring LEED equivalency

continues, it is essential that the system be designed to accomplish the most sustainable outcomes, and no system that gives so little weight to the reuse of existing buildings can possibly hope to do this.

It is not practical or efficient to use existing preservation or sustainability policies to maximize building reuse. Ultimately successful building reuse policy should be administered independently of these concerns. This is not to say that they are incompatible, but that incentives should be made available for building reuse projects that do not necessarily require LEED certification or require that the building be historic. A project that successfully improves an existing building has gone a long way in forwarding both sustainability and preservation goals, and should be eligible for incentives on its own.

Preservation Benefits

While it may not be beneficial to attempt to alter preservation policies to be more inclusive, successful building reuse policies have the potential to greatly forward preservation goals, realized by the added protection afforded to buildings not yet 50 years of age and older buildings that have not yet been deemed "historic." By taking better care of all existing buildings, more buildings would reach an age when the perspective necessary to objectively assess historic significance can be achieved. By providing incentives for building reuse, durability and flexibility would become a more desirable design features in new construction, resulting in buildings that would remain useful longer.

Preservationists do themselves a disservice when they argue, as they often do, that "historic" buildings are more energy efficient than buildings built following World War II. It won't be long before these buildings will also be old enough for historic consideration.

As Figure 9 demonstrates, there *is* a difference in energy efficiency between the two eras of buildings, but it is not as large as it is often implied. With a mere 20 percent difference in the efficiency between the best and the worst eras, it seems worthwhile to begin studying how to improve energy efficiency in post-war buildings instead of using them as an example of why it is sustainable to preserve historic buildings.

Buildings built after World War II are a huge part of the built environment yet most are unexceptional. The rapid growth of the country during this era encouraged bulk and abundance over quality in its buildings. Often they are more voluminous than the buildings that preceded them. In many cases, excellence in these buildings comes in moments; a thoughtfully considered entry sequence, an effective shading device, or a single carefully detailed space. Do excellent moments warrant the preservation of an entire building? Or does the overall mediocrity of a building warrant its demolition? The first option saves the excellent elements of the building, while taking a lot of excess baggage with it. The second leaves an entire era of buildings vulnerable to wasteful renovations or demolition.

The best policy to assist buildings of the recent past will be objective, flexible, and will encourage creative treatments. Similar to Rural North Carolina's program (see page 59) Incentives could be offered that make a certain amount of money available up front for initial studies. These initial studies would provide direction on sustainable solutions, highlight unique features, and make an objective assessment of what the building does well and where problems lie. The rest of the money could be awarded following the completion of the initial studies. Projects could then better forward more informed about the potential of their buildings. A well designed reuse policy would encourage respect for character-defining features while making room for innovation and creative problem

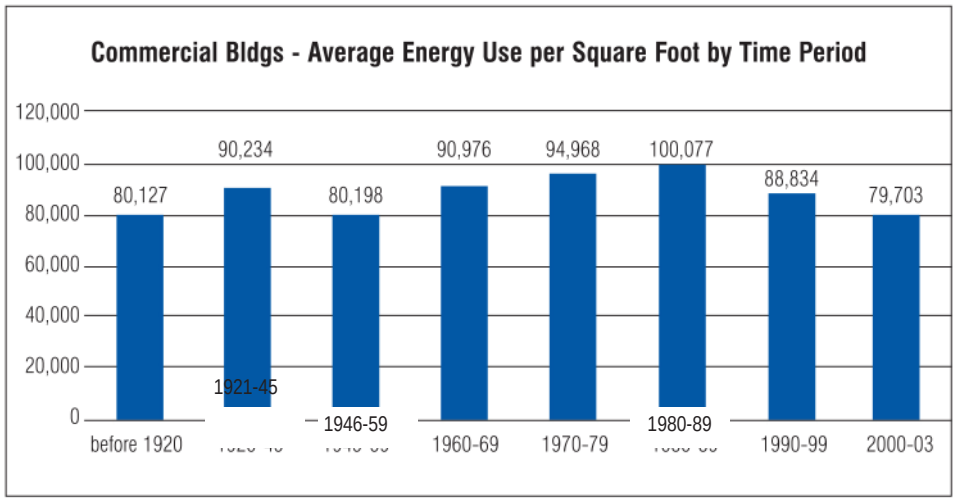

Figure 9. Graph showing average energy use per different time periods. (Cronyn and Paull, 2009)

solving. The complications of preserving buildings of this era are great; however, they represent far too large a resource not to begin addressing now how to manage them as they age.

Sustainable Benefits

The environmental benefits of buildings reuse are many. The practice retains embodied energy, carbon, and non-renewable material resources. It lessens the impact that new building has on previously undisturbed land. Less waste is sent to landfills. Less energy and carbon is used by municipalities that must extend their infrastructure to accommodate new buildings.

Research compiled in this thesis suggests that merely reusing a building is more sustainable than building a "green" new building. By creating policies that encourage building reuse outside of the established boundaries created by the LEED system, it will be possible to protect existing buildings while allowing LEED to remain primarily market-driven. LEED can, and has been, be successfully applied to major renovations of existing buildings, so there is little doubt that the two ideas could work together effectively.

Economic Benefits

Although they are relatively rare, programs exist that do promote building reuse for economic benefits. These programs, along with tax credit programs developed for historic resources, such as the Maryland Heritage Structure Rehabilitation Tax Credit program, provide a basic model and demonstrate the economic potential of encouraging building reuse.

As was demonstrated by the Maryland program, rehabilitation projects provide more jobs than new construction. Building reuse incentives give potential business operators the opportunity to begin a venture without the costly overhead of building a new building. Building reuse is beneficial for municipalities because it encourages building within city limits, thereby increasing the tax base. It reduces the municipality's spending on infrastructure. It also encourages development in central areas where public transportation is better equipped to serve residents and commuters. The second principle outlined by Richard Moe in his speech outlining the National Trust for Historic Preservation's position on sustainability is "Reinvest at a Community Scale."[83] Incentives that encouraged building reuse in non-historic buildings are as likely to accomplish this as projects in historic buildings.

It is clear that in a sustainable society, maximizing building reuse will be essential. It has been demonstrated that reusing buildings saves considerable amounts of embodied energy, carbon and materials. Examples of policies that encourage building reuse have been explored. Existing preservation and sustainability policies have been analyzed for their usefulness in better accommodating building reuse. It should be clear that the best

83 Richard Moe, November 8, 2009.

building reuse policies will be ones that work towards the same goals as preservation and sustainability policies, but which are administrated separately from existing policies. In the last section, the steps necessary to accomplish this are outlined.

CONCLUSION: NEXT STEPS

Research

Work should be done to solidify a recognized standard for determining the total environmental benefits of reusing existing buildings instead of building anew. Systems like the Athena Institute's "EcoCalculator" are the first step in this process. Building consensus among concerned parties and developing standard measures of embodied energy and carbon are essential to this process. Once standard tools are developed that accurately assess the benefits of using existing buildings, incentives can be designed that fully reflect that benefit.

Further research should be done to examine the potential of existing buildings to achieve net zero energy and carbon neutrality. Even if the ideals presented by Architecture 2030 (see page 21) for Net Zero Energy Buildings and carbon neutrality are met for new buildings, energy will still be consumed and carbon produced in the construction of the buildings. If these goals are to be achieved primarily through new technologies, then there is little reason why alternative energy production techniques couldn't be applied to existing buildings, thereby negating the energy used in building demolition and construction and the sacrificed embodied energy.

Municipalities should be encouraged to keep better demolition records. At the minimum, original date of construction, total square footage, and principal building construction system should be recorded when a building is demolished. Once better demolition records are established an in-depth study of building demolition trends, as related to age, should be undertaken.

Engage economists. A huge part of the nation's economy revolves around the building industry. Changing that economy from one that revolves around constructing new buildings as quickly as possible to one that places the highest value on the maintenance and improvement of existing buildings will require a sea change in that economy. This will be no small task, and will require in depth economic analysis before a truly effective model can be developed.

Policies

This thesis has presented several successful existing policies that serve as a starting point for the design of building reuse policy. The preservation movement was brought to the nation's attention with the National Historic Preservation Act of 1966. Likewise, an effective building reuse policy must begin with strong leadership at the national level. Federal management and incentives similar to those established in regards to preservation will be essential in providing momentum to other policies.

Advocacy will also be essential. Prominent organizations such as the National Trust for Historic Preservation and the U.K.'s Empty Homes Agency provide good models for the establishment of a similar advocacy group relating to building reuse policy. A building reuse advocate group would lobby governments at all levels, provide research on building reuse issues, establish best practices, connect individuals and organizations with available existing buildings that meet their needs, and provide information on the incentives available for reuse projects.

The federal and Maryland historic tax credit programs along with the North Carolina Rural Center's building reuse program have proved that building reuse incentives can successfully encourage building reuse and stimulate the economy. Similar incentive

programs for building reuse should be established at the federal level with corresponding programs at state and local levels. As is the case with the Rural Center's program, money should be made available at the beginning of projects for initial studies to ensure that rehabilitations are undertaking with the proper guidance.

An effective building reuse policy will encourage creative problem solving. Existing buildings represent a known set of problems and identifiable positive features. Unlike a new building, where some positives are certainly guaranteed, there also exists the potential for any number of unforeseen problems. A thoughtful reuse project allows problems to be addressed while accentuating existing positive features.

The administration process that building reuse policy might require should be as free from complicated bureaucratic procedures as possible. The environmental benefits of building reuse are relatively straight forward. Merely *not* demolishing an existing building and *not* building a new building is at least as sustainable as building a new LEED certified building. Policies should reflect this simplicity. In an exemplary reuse project, LEED certification would be sought along with building reuse incentives. The complexity of the LEED system should not make the extra task of pursuing building reuse incentives undesirable.

The concept of carbon trading, wherein companies that produce an amount of carbon in excess of established standards can buy carbon "credits" from companies that produce less carbon is also an interesting model to be studied for its application towards building reuse policy. The system essentially creates a market for carbon efficient practices. The same system could serve as the basis for a "demo trading" market. This would entail that new buildings, especially projects where demolition was occurring, would pay a fee that

reflects the amount of resources they are consuming by building anew. This fee would then be used to fund grants that would be made available to organizations that wish to undertake a building reuse project.

San Francisco's Green Building Ordinance serves as an early comprehensive model for a policy in which building reuse, sustainability, and preservation are integrated. However, from a building reuse standpoint, there are a several issues with the program. The ordinance rewards projects in historic buildings by reductions in LEED points required, thereby making it likely that historic buildings will not be retrofitted to the same environmental standards that new buildings are designed to. The reduction in points required acknowledges that the project is already environmentally responsible by using an existing building instead of building anew, but it is still desirable for retrofits to be as environmentally sensitive as possible in historic buildings. Holding historic buildings to a lower environmental standard in major retrofits is not going to be doing those concerned with preservation or building reuse any favors in the long run.

The ordinance also requires extra LEED points for projects that replace existing buildings with new buildings. This is also a step in the right direction, but perhaps a better system would be to charge a fee, as outline above, for projects that demolish existing buildings. Every project manager that has ever attempted LEED certification knows that there is a not-insignificant dollar amount associated with every LEED point attempted, and in many cases the time savings of just paying a fee might be more desirable than the extra time required to track the extra LEED points. This money would in turn fund grants available for significant renovation projects in existing buildings.

It is not the intent of this thesis to say that there should be incentives available every time a new occupant moves into an existing building. In a city such as San Francisco, where property values are high and buildings vacancies are relatively low, there is little need for such incentives. However, in cities like Detroit or Cleveland, where unoccupied buildings abound and urban infrastructure already exists, innovative programs encouraging building reuse could be economically beneficial. National Register of Historic Places Districts serve as a model. Perhaps "Building Reuse Districts" could be established in areas where building vacancies are high. These could start relatively small in order to create focused pockets of development where increased activity within the district might encourage un-incentivized development at the edges.

Education

At many architectural schools, the University of Arizona's is a prime example, the idea of respecting "site" is held in almost reverent regard. Far too much emphasis is given to creating heroic interpretations in untouched settings. In a truly sustainable society there will be no "site" in this regard. The vast majority of architectural projects will be conducted on previously disturbed sites in urban areas, ideally incorporating existing buildings and site features. The same reverence that is given to site should be given to existing buildings. Students should be taught to examine even the most seemingly mundane existing buildings for character-defining features and use them as inspiration for innovative design.

Practice

Instead of having less work to do because better care is being paid to existing buildings; preservationists, architects, and construction workers will have more work to do. As has been discussed, rehabilitation projects employ more workers that new construction. A

well designed reuse policy will require the assistance of preservationists to objectively assess any unique architectural trends a building might represent and to providing guidance on how to best incorporate them into new design. Sustainability professionals will be required to provide assessments of potential energy savings and other environmental concerns, and architects will be engaged in creating innovative solutions to the often difficult problems of designing in an existing building.

Conclusion

Existing buildings represent not only a resource, but an opportunity. Well-designed policies that encourage building reuse have the potential to increase society's sustainability, better protect our existing and future cultural resources, and stimulate the economy. By adding value to existing buildings through innovative design, improved energy efficiency, and creative problem solving, we have the opportunity to make mediocre buildings good and good buildings historic.

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