



# Energy Standards and Historic Rehabilitations

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Historic buildings have been called the greenest buildings.

Building construction requires an enormous amount of energy (as does building demolition); therefore this moniker is in large part due to the embodied energy that exists in historic building stock. In addition, there are negative environmental impacts when building material is hauled and accumulated in landfills.

Historic building rehabilitation is the epitome of recycling or even upcycling. While historic resources have many merits, in an era of social responsibility and demands for sustainable practices, they have also been put to the test by new standards and policies aimed at addressing such issues.

## Elective Energy Standards

Programs and standards that address the energy efficiency of the built environment have gained popularity among developers, architects and urban planners over the past few decades. One of the best-known programs is the Leadership in Energy and Environmental Design (LEED) designation, created in 1993 by the Natural Resources Defense Council

and administered by the U.S. Green Building Council (USGBC).

Historic rehabilitation developments have successfully gained these prestigious certifications even though early standards of the LEED program heavily favored new construction techniques and heavy-handed retrofitting guidelines that were not compatible with the Secretary of Interior's *Standards for Rehabilitation* that govern historic tax credit (HTC) projects. Thankfully, the USGBC added credits to its scoring for *Existing Building Reuse or Historic Resource Preservation and Adaptive Reuse* in 2009. These credits are applicable to the LEED for Neighborhood Development (LEED-ND) program. These along with the use of energy-efficient solutions that are not detrimental to the historic character or material of historic buildings have made it possible for many HTC properties to qualify.

Another program gaining popularity is Passive House. The Passivhaus Institute (PHI) is a German organization responsible for overseeing the



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development and certification of projects worldwide. Separately, there exists a Passive House Institute US (PHIUS) which has created a slightly different set of criteria than PHI, but which follows the same general principles. Both organizations require strict adherence to technical design criteria and each standard requires extensive energy modeling. The program focuses on five building-science principles that include continuous insulation that eliminates any thermal bridging, airtight building envelopes, high-performance windows and doors, balanced heat- and moisture-recovery ventilation, and minimal space conditioning systems.

*Image: Courtesy of MacRostie Historic Advisors*

**Requirements to meet the DC Green Area Ratio requirements and storm water management regulations enforced by the DC Department of Energy and Environment were fulfilled at AME, a market-rate residential development, by using green roof strategies, bio-retention areas, and micro bio-retention planters. (Developer: Jair Lynch Real Estate Partners)**

In order to encourage building reuse, PHI developed the “EnerPHit Standard.” (PHIUS does not have such a standard yet.)

The primary technical resource for projects pursuing the EnerPHit Standard is found on the PHI website in a manual called “Criteria for the Passive House, EnerPHit and PHI Low Energy Building Standard.”

Passive House has an extremely high threshold, making it difficult for a rehabilitation project to meet its standards. However, in some states such as Connecticut, housing agencies are adding it as a component of their qualified allocation process scoring system. This means that if you are twinning historic and low-income housing tax credits, you will need to integrate passive house into the development. Passive House projects must engage a certified Passive House consultant to guide the project design with technical energy and thermal bridge modeling.

Meeting the EnerPHit Standard is still a big challenge when combining that with HTCs, but not impossible. More modern buildings built in the 1960s and early

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1970s may be better candidates for the Passive House as they tend to already have gypsum wallboard on their interior that may be able to support the additional insulation. They also tend to have windows that may be easier to replicate to meet Passive House than traditional wood or industrial sash from earlier in the 20<sup>th</sup> century.

### Government-Imposed Energy Regulations

State and local governments are beginning to impose more rigorous requirements for energy efficiency for newly permitted developments. One of the most progressive examples of this type of policy is in the District of Columbia, where a zoning tool called the Green Area Ratio has been in place since 2013 and is administered by the DC Department of Energy and Environment. All new construction, as well as additions and existing buildings that exceed 100 percent of the assessed building value within a 12-month period, must take steps to reduce the use of impervious surfaces that raise ambient temperatures and to encourage the use of vegetation and other green infrastructure alternatives. In theory, these objectives align well with historic rehabilitation practices.

There are exceptions to these regulations for buildings certified as historic by the DC Inventory of Historic Sites of the state historic preservation office (SHPO). However, these developments must comply if the “change of use” or “increase of intensity of use” results in an increase to the gross floor area by 50 percent or more. While most of the requirements of the program pertain to landscaping solutions, for projects that are pursuing HTCs, these plans must be submitted to the National Park Service (NPS) for review and would be considered in the overall appropriateness of the rehabilitation.

This type of legislation is just the beginning and will surely be commonplace in many, if not all, states in the future. Twenty-two states have mandatory energy

efficiency standards and four have voluntary programs that address efficient generation, transmission and use of electricity. As new technology and climate science evolves, different standards will certainly be imposed. California, for example, renews its Building Energy Efficiency Standards every three years. Those standards govern the types of energy efficient systems that must be used in residential and nonresidential properties. The 2019 Building Energy Efficiency Standards goes into effect Jan. 1, 2020, and represents the first program of its kind in the country to require solar for residential projects.

### Sustainability Guidelines for Historic Rehabilitation

If a historic building rehabilitation development must abide by energy guidelines—required or desired—and HTCs are part of the plan, the design solutions must meet the previously mentioned *Standards for Rehabilitation*. To that end, Technical Preservation Services (the branch of NPS that reviews and approves HTC applications) issued *Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings* in 2013 that addresses some of the issues that may arise with incorporating these sustainability practices. In-depth guidance is provided for planning, maintenance, windows, weatherization, insulation, HVAC, solar technology, wind power, roofs, site features and daylighting.

In all cases, the general guidance is to start with the inherently sustainable features of historic buildings. Then, carefully consider all of the ways in which treatments to achieve energy efficiency will affect the historic material or appearance of the building.

Many treatments that could score well with energy efficiency programs are compatible with historic rehabilitation practices. Historic buildings, for instance, were largely designed to provide ample daylight and ventilation using partial glass partitions, glazed doors and transoms that reduce the need for

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artificial lighting and superfluous energy consumption. Retaining or restoring appropriate gardens, shade trees and landscaping can also be a great way to earn points and allow for innovative energy saving techniques like rainwater collection. Eliminating or reducing impervious surfaces immediately surrounding buildings also helps to reduce heat island effects, building temperature and damage to the foundation from stormwater runoff.

Lastly, it should be noted that even though any site improvements that are made must be reviewed by SHPOs and NPS, the costs incurred for them does not factor into calculations for qualified rehabilitation expenses for the project. They can, however, present reasons for denial of HTCs if not properly executed in relation to the historic context of the building. A good understanding of the historic merits of the

property is outlined in the statement of significance in the National Register nomination or in the Part 1 description of eligibility. Like all other energy efficiency improvements, proposed work should be considered against characteristics such as period of significance and architectural style to determine if the work is appropriate.

Sustainability is important in building development and will only become increasingly so. Historic preservation is important to authenticity and community development. These two development philosophies can and should complement each other. Policies and practices that encourage the two will bring about real results and environmental conditions. After all, the saying goes “the greenest building is the one that is already built.” ❖

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