# Truly Green: A Look at the Advantages of Maintaining Historic Campus Buildings

*Facilities Manager (APPA)*
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Most colleges and universities have taken great strides in recent years to embrace "being green." These steps may include paperless applications and forms, campus-wide recycling, composting dining hall scraps, and recycling cooking oil for bio fuel, to name a few. Many institutions have established an Office of Sustainability or similar department, to implement these practices and foster the image of environmental consciousness that the universities want to project.

To date there are almost 700 signatories to the American College & University Presidents Climate Commitment, a nationwide pledge to reduce campus carbon footprints, with numerous other colleges issuing similar commitments and climate action plans. Institutions are realizing that being green is not only better for the environment, but it makes fiscal sense as well.

## The Greenest Building is the One That Is Already Built

LEED (Leadership in Energy Efficiency and Design) Certification, a rating and certification system currently administered by the U.S. Green Building Council, has taken hold in both public and private construction. Most institutions pursue some level of LEED when constructing new buildings and do so with great fanfare. But one often overlooked, or at least undervalued, method of achieving overall resource efficiency is to maintain and/or adaptively reuse our older building stock. As the preservation and sustainable design worlds meld together through organizations like the AIA, USGBC, National Trust for Historic Preservation, and the Association for Preservation Technology, the slogan that you'll be hearing is: "the greenest building is the one that is already built."

The idea of "green building" is not a new concept, having taken root in the 1970s (if not earlier), but in the last few years, it has finally become what its early promoters have longed for: accepted. No longer does the argument need to be made as everywhere you look, buildings, cleaning supplies, shoes, appliances, etc., are being marketed as green. This flooding of the market tends to water down what really constitutes being green, and the general inclination tends to be that all things green must therefore be new. The problem with that is we lose sight of what is right in front of us: our historic buildings are green by their very nature.

## Historic Buildings Contribute Value to Our Campuses

This article makes a deliberate distinction between “existing” and “historic” buildings. “Historic buildings” are defined as buildings that are greater than 50 years old and contribute to our cultural value. Thus, there are many buildings constructed after the 1960s that are now becoming eligible for historic status. These buildings are generally excluded from the category of “historic” for the purposes of this article, along with many post-World War II buildings that were not typically constructed with energy efficiency in mind. Quite the opposite it seems, since energy at the time was cheap and seemingly plentiful.

Therefore, these buildings tended to have a greater reliance on mechanical heating and cooling, allowing experimentation with newer materials and technologies that weren’t always successful in their response to the environment and microclimate. In addition, the surge of the personal automobile was booming and as a result buildings were constructed farther apart, fostering further reliance on cars. These buildings contrast sharply with the more traditionally historic buildings erected prior to this era, particularly at the turn of the 20th century, and certainly the 19th and 18th centuries when time-tested principles of design for climate were typically utilized and communities were more pedestrian-oriented.

College campuses are home to many of our oldest buildings, and these historic buildings contribute tremendously, if not define, the character of our campuses. It’s the historic buildings that dominate marketing materials and draw students to campus. They convey an image of a solid, lasting institution appealing to both the students and the parents paying tuition. These iconic historic buildings are often what alumni think of as they remember the campus. In architecture, this is known as cognitive mapping: the images that are seared into your brain when you think of a place. For example: while Harvard University occupies large portions of Cambridge and Boston, Massachusetts with many new buildings, it’s hard not to think first of Harvard Yard with its historic red brick buildings around the campus green.

Historic buildings are truly the hearts of our campuses. Harvard’s own oldest surviving building is Massachusetts Hall, built in 1718 as a dormitory. Housing John Hancock and John and Samuel Adams, it still operates as a residence hall today. Many colleges, such as the University of New Hampshire and the University of Vermont, use their oldest buildings (Thompson Hall and Old Mill, respectively) as their official logos. The College of William and Mary, the second oldest continuously operating campus (after Harvard), has the oldest surviving campus building, the Wren Building, now in its fourth century. Perhaps W&M says it best in their own marketing, with a banner across the image of the Wren Building on their website proudly proclaiming: “Some call it history, we call it campus.”

## The Original “Green Buildings”

When you combine the history, character, and culture that these buildings contribute to our campuses, the case becomes very strong for reinvesting capital funds. The little known secret is that these buildings are already green; tying in quite nicely to campus goals to reduce overall energy and resource consumption. While often revered for their beauty and detail, historic buildings admittedly may seem to many facility departments however as just "old," obsolete, or inflexible to current needs. They are often leaking or full of lead paint and asbestos…rarely are they thought of as being green.

Yet, compared to what is involved in constructing an entirely new building; renovating an existing building wins when it comes to sustainable site development, resource conservation, embodied energy, and construction waste management. In addition, historic buildings were designed for the climate: passive heating and cooling, natural ventilation, daylighting, and utilization of durable and regionally sourced materials.

There are reasons that our New England campuses have so many brick buildings with steep slate roofs. The brick was locally produced, its mass retained heat in winter and kept interiors cool in summer, its thickness kept water out, and it is durable enough for the tough winters. Slate is locally retrieved, easily worked, lasts a century, and perfect to use on steep sloped roofs to shed snow. Southern campuses often have historic buildings with deep arcades and porticos to shade buildings and pedestrians, and central entrances with large halls to encourage natural ventilation (e.g., Thomas Jefferson's designs at the University of Virginia). Buildings in both climates incorporated passive solar heating and cooling concepts (before they knew to use those terms) because they were not initially serviced by fossil fuels or able to rely on them to the extent we do today.

## Does Rehabilitating Buildings Really Contribute to Sustainability?

While major renovations to historic buildings can sometimes be as costly as new buildings, the life-cycle (or cradle-to-grave) cost will typically be less. This may not be as appealing to a private developer planning to sell the building in a few years, but should be appealing to universities and colleges, many of whom have been in existence for centuries (Harvard, William & Mary, Yale, Princeton, UVA, and Rutgers to name a few) and hope to continue long into the future. A rich inventory exists in the northeast alone with nine of the ten oldest campuses in the United States and literally hundreds more with historic campuses. Several of these institutions, such as Middlebury College, UVM, Colby, Harvard, and Champlain College, have discovered the contribution of their historic campus buildings through renovations which have achieved LEED Platinum and Gold Certification.

However, a campus does not have to pursue LEED to prove it is reducing its carbon footprint. Maintaining existing buildings and adaptively reusing them goes a long way toward meeting campus sustainability goals. When comparing a new building to an existing building, no matter how green the new building is, there are still huge

embodied energy costs consumed by the construction of a new building. Embodied energy is defined as the total amount of energy it takes to construct a building. This includes the energy required for extraction and transportation of raw materials; energy to process, transport, and manufacture the materials into a product; energy to transport it again to the site and erect it; and then additional energy to transport construction waste to a recycling or waste facility. There is an immense amount of energy expended in constructing a building, no matter how green the building is going to be. When maintaining or rehabilitating existing buildings, we are preserving energy that has already been consumed.

Another advantage is the ability to reuse high-quality materials that may no longer be available (e.g., historic elements built of solid, old-growth wood). Not only are the old-growth woods no longer available (or are expensive if found), but the newer growth wood used today (particularly fast-growing species available from certified sustainable forests) typically lacks the rich resins and inherent durability of the old growth heart pine, Douglas fir, or mahogany that was common a century ago. Reuse and restoration not only saves valuable resources in this instance, but preserves the historic character of the campus.

While it may seem that older buildings require more work compared to newer buildings, the reality is that these buildings were constructed to last and now having aged a century or more, are in need of maintenance. Buildings much younger (post-War to present), on the other hand, are exhibiting premature failure due to inferior design, materials, and workmanship and may require as much, if not more work, than historic buildings. As universities consider new construction projects, they need to ask themselves, will the proposed assemblies and construction details last 100 years or more?

## Practicalities of Maintaining Historic Campus Buildings

The University of Vermont (UVM) is an example of where maintaining historic campus buildings has been an ongoing practice. As the fifth oldest college in New England (est. 1791), UVM has over 40 continuously operating campus buildings on the National Register of Historic Places, with 29 of these buildings built between 1800 and 1900. In fact, UVM has more historic buildings on campus than modern. Having acquired several of these buildings over time, many were originally constructed for other purposes and have been adaptively reused more than once by the University. UVM is no stranger to a backlog of deferred maintenance, however, common to most institutions. Understandably, with so many buildings and limited budgets, only so much can be done at a time. As a result, priorities must be established.

When maintaining historic campus buildings, health and safety must be first on the list of priorities. A common issue with historic buildings is that they have been modified over decades and as mentioned previously, certain time periods used materials or

technologies that were later found to have unintended consequences. Asbestos is an effective fire protection material and lead paint made a great preservative coating for wood. Both of these materials were used widely in the early part of the 20th century until about the 1970s. However, we know now that there are potential health issues related to their use, and abatement or encapsulation is a familiar process for many facility departments.

Also related to health and safety, and one of the highest priorities to address when it comes to historic buildings, is stabilizing the exterior envelope. Keeping water from infiltrating the exterior walls, roof, structure and foundations prevents damage to materials that can result in life safety issues (i.e., structural degradation and masonry falling to the ground), as well as indoor air quality issues related to the growth of mold. It's not only important to address these issues, it's even more important to address them appropriately. This does not mean having someone go around with a caulking gun, sealing up deteriorated joints. An investigation of the building envelope should be performed to identify deficiencies and sources of water infiltration.

Different approaches for repairs should be considered that balance cost with occupancy considerations and scheduling requirements, as well as effectiveness and durability. Waterproof coatings over masonry may have a lower first cost vs. repointing, for example, but may lead to other problems if water is trapped in the wall system. Without qualified designs, appropriate materials, and careful workmanship, more damage can be done to the building than the original repair may have required. This may lead to irreparable harm to the historic fabric, as well as further costs being incurred to repair the additional damage.

At UVM, the long-term maintenance of items is also examined when selecting replacement material. For example, when can a newer synthetic material, such as Fipon, be used to replace finials and balustrades while maintaining the historic integrity of the building? If wood elements are necessary, the university selects wood materials that can tolerate lack of routine painting, such as Spanish cedar or mahogany. There may be a higher initial cost, but the wood integrity is maintained for a longer period of time when maintenance staff is stretched thin. Window restoration is always a challenge when balancing historic considerations and energy efficiency. Several options might be evaluated prior to design selection, including renovating existing wood windows, installing interior storm windows, or total window replacement.

Other important considerations include balancing the work being done to an historic building with meeting current building codes including: structural loads, energy efficiency, handicapped access, and integration of life safety systems. The newer code requirements often reflect a use that the building may not have been originally intended for, particularly if it has been adaptively reused or no codes were in place when the building was originally constructed. For example, restoring or returning a roof surface to

slate may require a structural evaluation to determine if the roof structure can support the heavier dead load.

Addition of insulation to meet current energy codes may also be necessary on low-slope roofs, which can increase the snow load on the roof, as less snow will melt from heat escaping from the building. Thus a new roof may also require structural upgrades to the framing. Reconciling the code requirements with historic commissions, preservation standards, occupant needs, and budgets requires a partnership between the facility department and designer, and communication with the State Historic Preservation Office and the local planning and zoning office.

Whether the project includes an existing historic building that has been a mainstay of the campus, or an historic building recently acquired for adaptive reuse, or even an historic building that is salvaged and relocated to make way for a new building, universities have an opportunity to do something truly green while fortifying the character of the campus.