

The Friends Center Renovation: a model of sustainability and preservation

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When people think about sustainability and green building often they conjure up ideas of solar panels, innovative HVAC systems, and green roofs. Fancy new buildings are the one to make headlines for innovation. An unassuming Quaker meeting house is hardly the poster child for the green revolution. While technology is an important part of sustainability, it is not the only element. An energy efficient building on the outskirts of a city that requires all visitors to arrive by car can hardly be considered an element of sustainable development.

The Friends Center in Philadelphia defies green building stereotypes. A two story 1856 brick meeting house, it is now part of a three building complex that was recently certified LEED Platinum by the US Green Building Council. The renovation was done by Philadelphia-based UJMN Architects, a firm specializing in museums and institutions.

The Friends Center complex used an array of techniques and technologies to achieve the most sustainable building possible given the constraints. The use of natural light for much of the interior lighting cuts down on the need for expensive and energy-intensive artificial light. This technique is known as daylighting. As anyone who has accidentally touched one can attest, in traditional incandescent bulbs much of the energy used is not converted into light but is instead emitted as heat. According to the Lighting Design Lab, in incandescent lamps only about 11% of the electrical input is turned into visible light.¹ The extra heat may seem negligible but it is in direct competition with air-conditioning systems during the warmer months. The Friends Center also has special windows “made from spectrally selective glass [that let] in light for illumination, but keep out most of the heat.”² Research suggests that there are human benefits to daylighting including feeling connected to the outdoors and maintaining circadian rhythms.³ For most uses, daylighting works best as part of a system that also includes electric lights. At the Friends Center, the “smart” system adjusts the inside electric

¹ Lighting Design Lab. "Lighting's Impact on Heating, Ventilation and Air Conditioning (HVAC) Systems ." Accessed October 22, 2011. http://lightingdesignlab.com/articles/lighting_hvac/lighting_hvac.htm.

² Friends Center. "Using Natural Daylight." Accessed October 24, 2011. http://www.friendscentercorp.org/?page_id=300.

³ MIT Daylighting Lab. "Healthy Lighting." Accessed October 22, 2011. http://daylighting.mit.edu/research_detail.php?project=Healthy_Lighting.; Daylighting Collaborative. and "Why Daylight?." Accessed October 21, 2011. <http://www.daylighting.org/why.php>.

lighting according to the amount of outside light, fluctuating to accommodate time of day and level of cloudiness, and automatically turns off the lights at night.

Another great feature in the complex is a geothermal system. A geothermal heat pump, or ground source heat pump, works by making use of the consistent temperature of the earth a few feet below the surface. At around 55 degrees Fahrenheit, the earth is relatively cool in the summer and relatively warm in the winter. As the Department of Energy explains, "In winter, heat from the relatively warmer ground goes through the heat exchanger into the house. In summer, hot air from the house is pulled through the heat exchanger into the relatively cooler ground."⁴ Usually these systems require a large area and are thus better suited to less dense environments. The Friends Center project, instead, made use of more efficient deep standing column wells. As they explain on the website, "these deep standing column wells produce up to 40 tons of exchange capacity per well. More conventional wells . . . offer 2-3 tons of capacity per well."⁵

One of the LEED categories is Indoor Environmental Quality. The Friends Center addressed this by choosing low-VOC materials and finishes. That "new car smell" so prominent in newly constructed buildings is really the off-gassing of Volatile Organic Compounds (VOCs). There are many health risks associated with these chemicals including nasal irritation, headaches, skin reactions, and, potentially, some kinds of cancer.⁶ Children are especially vulnerable to the effects of exposure. The Friends Center made a commitment to creating a healthy environment for all users of the space by choosing nontoxic and formaldehyde-free materials and making sure that the air is well-ventilated. Window views of natural settings and interior spaces furnished with green plants help to improve employee productivity and morale. Research suggests that humans have an instinctive bond with nature. Leading scientist Edward O. Wilson popularized this idea in his book entitled *Biophilia*.⁷

Speaking of the natural environment, the Friends Center complex also contains a native species garden. This feature serves many functions. It acts as a respite from the busy urban area and adds an attractive space to the site. Additionally, gardens help with storm water runoff- a big problem in cities- by providing pervious area to absorb rain. Since they naturally thrive in this climate, the use of native species contributes to xeriscaping, that is, landscaping that requires very little additional water from

⁴ US Department of Energy. "Geothermal Technologies Program." Accessed October 22, 2011. http://www1.eere.energy.gov/geothermal/geothermal_basics.html.

⁵ Friends Center. "Geothermal Heating and Cooling." Accessed October 21, 2011. http://www.friendscentercorp.org/?page_id=657.

⁶ EPA. "An Introduction to Indoor Air Quality." Accessed October 22, 2011. <http://www.epa.gov/iaq/voc.html>.

⁷ Edward O. Wilson, *Biophilia* (Cambridge: Harvard University Press, 1984.)

irrigation. Likewise, gardens like these can help create habitats for other native species of insects, birds, and small mammals. Choosing native plants also helps to foster a sense of place and community by creating a space that is, at its essence, local. This works especially well given the historic nature of the meeting house.

From simple changes in organizational buying behavior to the installation of monitors, there are many ways to increase energy efficiency and decrease waste. One of the most effective ways to do this is the computerized system they installed to monitor and optimize the heating and cooling systems. By reacting to changes in the environment, the system ensures optimum occupant comfort and cuts down on the cost. At night the system automatically goes into its “unoccupied” setting without anyone having to remember to set it. Likewise, as mentioned before, lights are automatically turned off at night. Smaller changes like consolidating all printing in efficient office-wide equipment and providing communal coffeepots requires very little behavior change from employees but helps to cut down inefficient individualized services while building camaraderie.⁸

Sometimes technology is the way to go. The installation of a photovoltaic array (solar panels) on the roof of the complex helps to harness the sun’s energy (photons) and convert it into electricity. As explained on their website, “Friends Center has a 10 kilowatt solar array on top of its roof, which generates 1-2% of its electricity. Most importantly, it generates electricity during ‘peak loads,’ those hot summer days when electricity to cool buildings is in high demand.”⁹

In addition to the on-site gardens, the Friends Center meeting house has a system for storm water capture and reuse in which rain water is collected by means of downspouts in holding tanks and is then filtered and used as grey water for flushing toilets. Bordered by both the Schuylkill and Delaware rivers and crisscrossed by a network of streams, storm water management is a huge problem in Philadelphia. The Philadelphia Water Department asserts that, “of the 72 stream miles within Philadelphia, 71 are impaired due to pollutant-rich, urban stormwater runoff.”¹⁰ The Friends Center clearly cannot solve this problem on its own but by making these changes it is contributing to a solution.

⁸ Friends Center. "Smart Systems." Accessed October 21, 2011. http://www.friendscentercorp.org/?page_id=679.

⁹ Friends Center. "Solar Panels to Generate Electricity." Accessed October 21, 2011. http://www.friendscentercorp.org/?page_id=304.

¹⁰ Marjoram, Christine. "Philly Moving Toward Better Stormwater Management." Philadelphia Water Department. Accessed October 22, 2011.

Another element that helps with this problem is the vegetated, or green, roof on the Friends Center office building. Vegetative roofs provide many benefits to both the building and the environment in general. They are useful for absorbing rainwater, insulating the building against heat loss and gain, mitigating the heat island effect, and protecting the roof of the building. In fact, researchers at Penn State claim that installing a green roof can “lengthen roof life by two to three times.”¹¹ By using highly tolerant varieties of sedums, vegetated roofs require very little maintenance.

All these features are great but what really makes the Friends Center complex stand out is the renovation and reuse of the original meeting house. It has been said so often as to become something of a cliché at this point but it is nevertheless true that “the greenest building is the one already built.”¹² There are many reasons why it often makes sense to reuse a building for its original or an adapted use instead of constructing a new one.

One of the major reasons is that existing buildings have a great deal of embodied energy. What is meant by this is that the costs associated with the labor, processing, transportation, and construction of these buildings has already been paid by previous generations. In some ways the initial construction of a building is an investment and the longer the building is in use, the better deal it becomes. An in-depth analysis of embodied energy savings in several historic structures by Booz, Allen & Hamilton done in 1979 concludes that “renovation, instead of comparable new construction, results in impressive energy savings.”¹³

Many older and historic buildings were built out of strong materials like masonry and old-growth wood. With regular maintenance and care, these can last for a very long time. In some cases there just aren't comparable replacements available. In almost all cases it is better to repair broken elements than to replace them with aluminum or vinyl parts.

Reusing buildings also keeps demolition debris out of the landfills. According to the EPA, “in 2002, [construction and demolition] debris accounted for 36 percent of all residential and commercial solid waste generated in Massachusetts, and nearly 50 percent of the state's total commercial solid

¹¹ Penn State University. "About Green Roofs." Accessed October 22, 2011.
<http://horticulture.psu.edu/cms/greenroofcenter/history.html>.

¹² Attributed to Carl Elefante, FAIA, LEED AP

¹³ The final report from Booz, Allen & Hamilton was: Advisory Council on Historic Preservation, *Assessing the Energy Conservation Benefits of Historic Preservation: Methods and Examples* (Washington, DC: 1979).

waste stream.”¹⁴ Our already overfilled landfills cannot continue to sustain the amount of waste being produced. In the Friends Center renovation “96% of the building’s existing envelope and structural components were retained.”¹⁵

Additionally, many older buildings are located in dense urban environments that are already serviced by infrastructure like roads, sewers, and power. These are all crucial elements of the Smart Growth model of development, which prizes, among other attributes, walkable neighborhoods, attractive communities with a strong sense of place, and access to a variety of transportation choices.¹⁶ Likewise, as Donovan Rypkema explains, “Historic neighborhoods were built from the beginning with a mix of uses in close proximity.”¹⁷ At one time extolled as the highpoint in land development, the post-WWII suburbs have become everybody’s favorite whipping boy. Now referred to with the near invective *sprawl*, admiration of low-density cookie-cutter residential development is all but verboten in educated circles. Trends change quickly but, luckily, much of the urban fabric remains from before the great suburban experiment. Urban redevelopment protects greenfields, revitalizes neighborhoods, and encourages commerce. The renovation of the Friends Center will help with all of those functions.

The Quakers are an important group in the history of Philadelphia. William Penn, the founder and mastermind behind the city of Philadelphia, was himself a Quaker or, as they self-identify, a member of the Society of Friends and some of the earliest principles of the city derive from that affiliation. Throughout the history of Philadelphia many civic-minded institutions were the brainchildren of the Quakers. These include the well-intentioned Eastern State Penitentiary (1829) with its emphasis on penitence instead of punishment and local academic institutions like Haverford College (1833) and Germantown Friends School (1845).¹⁸ It should be no surprise then that the Quakers are again on the forefront of progressive change.

Quaker beliefs line up very well with regard to sustainability and green building. The Quaker values of integrity, peace, equality, and simplicity all support sustainable living. The disproportionate resource use by Americans goes against the principle of equality and is, they believe, “a seed of war that

¹⁴ EPA. "Construction and Demolition (C&D) Debris." Accessed October 22, 2011. <http://www.epa.gov/region1/solidwaste/cnd/>.

¹⁵ UJMN Architects and Designers. Accessed October 22, 2011. <http://www.ujmn.com/home.html>.

¹⁶ Smarth Growth Online. "Why Smart Growth?." Accessed October 22, 2011. <http://www.smartgrowth.org/why.php>.

¹⁷ Rypkema, Donovan. "Why Historic Preservation is Smart Growth ." Wisconsin Historical Society. Accessed October 22, 2011. <http://www.wisconsinhistory.org/hp/smartgrowth/rykema.asp>.

¹⁸ Eastern State Penitentiary. Accessed October 22, 2011. <http://www.easternstate.org/home>.

Haverford College. Accessed October 22, 2011. <http://www.haverford.edu/>.

Germantown Friends School. Accessed October 22, 2011. <http://www.germantownfriends.org/>.

finds nourishment in our way of living.”¹⁹ Likewise, the return to passive systems and working with nature instead of against it fit in nicely with the belief in simplicity. Green building is more in tune with the natural world than conventional construction techniques. In keeping with their long tradition as educators, the Friends Center serves a didactic use as a model from which others can learn.

Sustainability is about more than just energy efficiency. It is about creating livable environments that are healthy, safe, and respectful of resources. The “greenest” building fails if no one wants to live or work there. In order to achieve truly sustainable communities, there must be a focus not only on technology but also on place-making and community engagement. When people feel a connection to their neighborhood, they are more willing to make changes in their habits to support it. The intangibles of this connectivity are character and heritage. For people to feel connected to their particular area it must be distinct from others. Historic preservation helps people feel linked to the past and engenders an ethos of responsibility to protect it for the future.

The Friends Center is an example of a truly sustainable project because it is energy efficient, supportive of the natural environment, and integrated into the cultural and historic fabric of the city of Philadelphia. By renovating this complex instead of replacing it, the organization managed to retain the distinctive character and upgrade the systems within. The Friends Center serves as a model for excellence in both green building and historic preservation. Hopefully it will initiate a domino effect and encourage similar projects in the area.

¹⁹ Friends Center. "Green Building and Quaker Beliefs." Accessed October 21, 2011. http://www.friendscentercorp.org/?page_id=648.

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