

Evaluating Costs, Benefits, and Financing for Sustainable Retrofits to Massachusetts Schools

Retrofitting Secures Environmental and Economic Benefits

It remains a dream for most school districts to build, from the ground up, an environmentally sustainable school with a healthy indoor environment. Managers of these schools reap the rewards of reduced utility bills, reduced maintenance headaches, well-illuminated spaces for learning and working, improved morale, and enhanced student achievement. The good news in these otherwise dismal economic times is that it is useful to start small—and financing is available for incremental projects. Retrofitting older schools to achieve higher efficiencies can produce many of the benefits of new construction.

The potential financial benefits of retrofitting an older school for environmental sustainability are, however, often overlooked by school districts in the day-to-day crunch of keeping aging facilities up and running. A feasibility study for green retrofits can produce planning figures for a school and demonstrate the potential paybacks. In addition, some sleuthing can uncover governmental and foundational grants to help defray a portion of the improvement costs.

Retrofitting Possibilities

Many schools have already instituted easy-to-stage green projects such as replacing incandescent lights with compact fluorescent lights to reduce electricity demand, installing

motion-based occupancy sensors to control lights in classrooms and offices, and insulating and weatherizing to decrease heating and air conditioning demands.

There are more technical and financial requirements—as well as potentially greater financial paybacks—in undertaking the following larger projects:

- Replacing aging boilers in schools to decrease water and energy demands
- Replacing aging windows with more energy-efficient systems
- Replacing roofs to provide better insulation
- Converting existing water systems to reusable water and/or low-flow systems to reduce water demands
- Installing solar collectors on roofs or solar screens on east-facing windows to generate a portion of the school’s electrical needs.

The choice of appropriate retrofits for a given school requires the involvement of the school superintendent, the facilities manager, and professionals with experience in green design and retrofits.

Featured Project: Westford Boiler Replacements



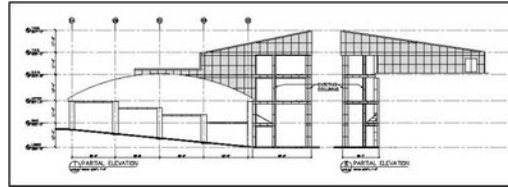
Three new energy efficient replacement boilers were installed at Westford Academy and Nabnasset Elementary Schools. Supporting calculations determined highest energy use and heat gain/loss, and were used to design and balance efficiency for the 2.5 MBH and 4.6 MBH gas boilers over the entire life cycle. Use of integrated electronic engineering, metallurgy considerations, and energy monitoring can meet or exceed planned energy demands for the years ahead.

Retrofit Costs and Benefits

Determining reliable figures for the costs incurred and the operational savings that may accrue from various types of retrofits requires a feasibility study that includes a preliminary engineering design, cost estimates for retrofit materials plus the manpower to install them, and estimates (based on manufacturers' specifications) of the future operational costs of the retrofits. The feasibility study will then show a comparison between the present value of historical energy costs incurred by the school and the projected energy costs that include the retrofits.

A feasibility study prepared by an LEED accredited architect (see the following section) will consider a variety of possible retrofits for a given school to identify those that are the most attractive in terms of the school's priorities, capital costs, ongoing maintenance costs, and impact on the day-to-day functioning of the school. In such a study, the information can be arrayed as either a single project or, for larger projects, a multi-year, multi-stage program.

Featured Project: Quabbin Regional Middle High School Feasibility Study



We performed an investigation and recommended solutions due to water leakage of the existing glazing system and metal wall panel at the Quabbin Middle/High School cafeteria. The design solution involved a new fiberglass unitized panel system. This new system conforms to current energy codes and offers a more comfortable environment for students, faculty, and staff.

Financing Sources

As a school goes forward with plans for a green retrofit feasibility study, the administration should look for possible grants to help defray the costs. Funding sources evolve over time, and some that are here today are gone tomorrow. Nevertheless, following are some potential sources to consult for possible leads.

- [Massachusetts School Building Authority — Green Repair Program for Roofs, Windows, and/or Boilers](#)
- [Massachusetts Energy Performance Contracting Program](#)
- [U.S. Green Schools Foundation](#)
- [U.S. Green Building Council \(USGBC\) — Green School Buildings](#)
- [U.S. EPA — Green Building Funding Opportunities](#)
- [American Recovery & Reinvestment Act of 2009 \(Recovery Act\)](#)
- [Walmart Foundation](#)
- [Home Depot Foundation — Grants](#)

Researching these institutions will likely lead the school to additional funding sources.

LEED Accreditation Advantages

Accredited professionals in LEED (Leadership in Energy and Environmental Design) have demonstrated a thorough understanding of green building practices and the requirements, resources, and processes for environmentally sustainable projects. LEED was developed by the U.S. Green Building Council (USGBC), a non-profit organization that promotes cost-efficient, energy-saving, and healthy green buildings and communities.

Boston Bay Architects, Inc. is led by Ronald Alex, a LEED accredited architect. Ron is also co-Founder and Principal at LPBA Architects, Inc. He and his team have over 30 years of experience working with Massachusetts municipal organizations, including public school superintendents. They have the skills to assist Massachusetts school managers in assessing both the capital costs for a full range of green retrofits and the potential benefits that the school may realize in reduced operating costs.

More Information

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