High Performance Schools:

Facts for Wellesley Decision-Makers

A document prepared by

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SMART

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What is a High Performance School?

A High Performance School has three key characteristics:

It is **cost-effective** to operate and maintain;
It is **healthy and productive** for students and teachers; and
It is **environmentally sustainable**.

How is a High Performance School certified?

- The Massachusetts Technology Collaborative (MTC), an agency that oversees the Massachusetts Trust Fund, can certify a Massachusetts school as "high-performance" if it passes certain criteria.
- These criteria are embodied in a series of volumes compiling best practices for the design and construction of K-12 public schools, known as MA-CHPS (Massachusetts Collaborative for High Performance Schools)[1].
- The MA-CHPS criteria, like CHPS criteria in other states, borrow from the format and content of the nationally recognized rating system for high performance buildings known as LEED (Leadership in Energy and Design).[2]

Cost-Effectiveness

How is a High Performance School cost-effective?

A High Performance School is cost-effective to operate and maintain because:

- It optimizes energy and materials performance. Using renewable energy, water recycling, daylighting, passive solar siting, and other efficient technologies, the average High Performance School in Massachusetts saves 30% annually on utilities. In concrete terms, this is the equivalent of two teacher salaries per year. With rising energy costs in New England, savings are expected to be even higher.

- It uses the life-cycle cost approach that is appropriate for long-term public buildings. For example, a High Performance School favors more durable materials and technologies, or materials that require a lower maintenance cost, rather than materials that are cheap initially but cost more over the life of the building.

[1] The MA-CHPS credits for green schools include design elements in the following 6 categories: Building site, Water, Energy, Materials, Indoor Environmental Quality (IEQ) and Extra Credits for policy and planning elements. By considering the breadth of these elements in the design phase and using Life cycle Cost analyses, appropriate green design elements can be an integral part of the building design.

[2] MA-CHPS is, however, different from LEED in that (a) MA-CHPS is designed specifically for schools and for the codes and climate of Massachusetts while LEED applies more generally to high performance buildings, and (b) MA-CHPS has no fee associated for application review or certification.

Is there any assistance available to help Wellesley design and build a High Performance School?

Massachusetts is in the midst of an energy crisis, and it is committed to ensuring that there are more High Performance Schools built in the Commonwealth.[3] Sixteen schools in towns as diverse as Newton, Dedham, Ashland, Beverly, Salem, Waltham and Woburn have received significant grants from the state and their utility companies for green design and construction.

Massachusetts currently provides a number of incentives:

- If a school building project qualifies for reimbursement from the Massachusetts School Building Authority (MSBA), the project will be awarded an *additional* 2% reimbursement of total renovation expenses if the building is certified as High Performance under the MA-CHPS program. In the case of Wellesley High School, the chance of MSBA reimbursement may be high since the MSBA recently graded the high school building as a "4" on a scale of 1 (good condition) to 4 (poor condition). For a complete set of criteria for reimbursement, see the MSBA website at http:/www.massschoolbuildings.org.

- Through its *Green Schools Initiative* program, the Massachusetts Technology Collaborative (MTC) is willing to act as a consultant and advisor, provided it is included in the design process in the early stages. These services are provided for free. The contact at the *Green Schools Initiative* is Sam Nutter at nutter@masstech.org or (508) 870 – 0312 x277.

- For schools served by investor-owned utilities, there are significant utility rebates for schools which invest in renewable energy. Although Wellesley does not fit into this category, there may be federal or private grants available for such investments. Further research is needed.

- The most accessible place for town decision makers to come up to speed on High Performance schools is a website run by the Sustainable Building Industry Council (SBIC) at http:/www.sbicouncil.org/highperformanceschoolbuildings.htm. For an online video tutorial, visit http:/www.buildingmedia.com/SBIC.

- For a complete list of resources, see the attached list, compiled by the Northeast Sustainable Association.

[3] According to a Boston Globe opinion piece (Thursday, 12/12), current Speaker of the House Salvatore DiMasi plans to overhaul energy policy in the state. Hoping to create the Green Communities Act of 2007, DiMasi wants to appoint a secretary of energy, establish a 5-year energy reduction goal, establish "green communities" to encourage/sponsor energy efficiency projects and initiatives, and seek ways to fund towns and projects that use renewable energy.

How much will the construction of a High Performance School cost Wellesley taxpayers?

Two studies compared the costs of High Performance Schools in Massachusetts to the costs of conventional schools:

- A study by HMFH Architects, Inc. and Vermont Energy Investment Corporation analyzed eight recently designed Massachusetts CHPS school projects. It found an average less than 1% (0.77% to be exact) net initial incremental cost, after receiving the 2% green school incentive from the MSBA. The actual projected benefits to these school districts over 20 years were found to be 8 times this investment. See: http:/www.masstech.org/RenewableEnergy/green_schools/HMFHstudy121905.pdf

- A study by Greg Kats of Capital E showed that constructing High Performance Schools demonstrated that they cost 1.5 to 2.5% more, but provide financial benefits that are 10 to 20 times as large. With the 2% construction reimbursement from Massachusetts, the initial costs would actually be lower than conventional schools. See: http:/www.masstech.org/RenewableEnergy/green_schools/Kats-study.pdf

These and other studies have shown that construction costs decrease when the design team has experience building certified High Performance schools. Our architects, SMMA, have had such experience designing and building a MA-CHPS certified school in Massachusetts —the Gill Montague Regional High School and Middle School in Turner Falls.By carefully selecting specific "green" building options based on life cycle cost analyses in the design stage, the annual savings on utilities can be optimized.

We're still trying to figure out how much this renovation will cost. Can't we wait until the end to see how much "green" our budget will allow?

Not if we care about the short-term construction costs. Several studies have shown that the costs of certifying a school rise drastically when the technology is introduced late in the design stage, or in a non-integrated fashion.

The most cost-effective way to make a building "green" is to make it an integral part of the building design from the very beginning, and to include all members of the design team in this commitment. For example, according to the Boston-based *Green Roundtable*, simply ensuring the proper orientation of a building to the sun's angle can save up to 30% in heating costs. Such orientation is "free" but is decided very early in the design phase. Percentage of building to be demolished, site placement and window placement are other low-costs ways to design high-performance into a building.

Health and Productivity

How is a High Performance School more healthy and productive?

Aside from the long-term benefits to Wellesley's budget and the benefits to our environment not discussed here, evidence exists that High Performance schools lead to fewer student absences and improved student performance.

- High Performance Schools emphasize "daylighting," the use of natural light. Not only does this save money on electricity, but a study by the Heschong Mahone Group for Pacific Gas & Electric found that those students with the most daylight in their classrooms performed up to 20% faster on math tests and 26% faster on reading tests. This study analyzed test scores of more than 21,000 students from three major school districts. Several other studies have reached similar conclusions.

- A different study conducted in North Carolina found that students in full-spectrum light attended school 3.2 to 3.8 days more per year and had nine times fewer dental problems, attributed to the additional vitamin D from full-spectrum light. These students actually grew an average of 2.1 cm more over a two-year period than students attending school with traditional lighting.

- High Performance Schools decrease teacher complaints and absenteeism. According to the U.S. Environmental Protection Agency, as many as one half of the nation's 115,000 schools have problems related to indoor air quality, which can trigger asthma attacks, spread disease and expose occupants to toxic substances. Unhealthy school buildings have become a common issue in negotiations with teacher unions across the country.

- In addition to its environmental, financial and health benefits, a "green" school is a building that teaches. A rooftop photovoltaic system, for example, can be used to increase students' interest in science, math, and other subjects. Water cycles, renewable energy, and environmental conservation are all subjects that students need in today's global economy. CHPS will conduct a study in 2007 that examines the positive impact of a High Performance school's systems on the science and technology curricula of its students.

Environmental Sustainability

High Performance Schools lessen the impact of building construction and operations on the environment. They also set an example for future generations that environmental quality is essential to our long-term well being.

What can be done to learn more about a cost-effective CHPS school for Wellesley?

1. Learn about CHPS by visiting the above websites.
2. Contact the Massachusetts Technology Collaborative for further consultation.
3. Commit to **s**ustainable **m**anagement of **a**ppropriate **r**esources and **t**echnology – make Wellesley Schools "S.M.A.R.T."
4. Draw on citizen support and research efforts for further information by contacting us at smartwellesleyschools@yahoo.com