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## **The Vermont Legislative Research Shop**

### **LEED Certifications in Public Schools**

Since 2002 there has been a growing interest within state and city governments in requiring all public schools and buildings to meet at least the minimum Leadership in Energy and Environmental Design (LEED) requirements. Since the legislation is fairly recent, there is limited information regarding the savings these cities and states have made since implementing LEED standards as it takes a significant amount of time to renovate all public buildings. In this report, the LEED standards will be outlined as well as what measures states have taken to reduce energy consumption in their public buildings. The purpose of this report is to see how Vermont may be able to benefit from adopting legislation that would require school buildings to be built to these LEED standards.

### **LEED Standards for New Construction**

The United States Green Building Council (USGBC) is an organization comprised of contractors, materials manufacturers, local, state and federal governments, insurance firms as well as others involved in the building industry whose purpose is to promote buildings that are environmentally responsible, profitable and healthy places to live and work. The USGBC has six areas for LEED construction including sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental atmosphere, and innovation and design process. In each category there are required elements that must be used in order to receive LEED approval and there are numerous optional elements that can be obtained in each category. For each optional element met points are received.<sup>1</sup>

The requirements include: creating and implementing an Erosion and Sedimentation Control Plan for all construction activities associated with the project; checking to make sure that the installed energy systems are calibrated and perform properly; establishing a minimum level of energy efficiency for the building; and, monitoring the refrigerant systems to reduce ozone depletion. The builders must also create an easily accessible area for storage of non-hazardous materials for recycling, including paper, corrugated cardboard, glass, plastics and metals. Finally a minimum indoor air quality must be established to enhance indoor air quality in the building, and the exposure of the building occupants, indoor surfaces, and ventilation air distribution systems to tobacco smoke must be minimized.

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<sup>1</sup> Full Text LEED standards for new construction from the USGBC, [www.usgbc.org/FileHandling/show\\_general\\_file.asp?DocumentID=1095](http://www.usgbc.org/FileHandling/show_general_file.asp?DocumentID=1095), accessed February 21, 2006.

## **Vermont School Energy Program (SEMP)**

In 1993, the Vermont Superintendents Association and the Vermont Department of Public Service came together to form the School Energy Management Program. This program offers help to Vermont schools with renovations and additions, new construction, energy efficiency and air quality. Funded by the US Dept. of Energy State Energy Program, need is determined based on an energy use index, either BTU's/student/year or BTU's/square foot/year. School administrators enter into an agreement outlining the scope of the energy project to be performed.<sup>2</sup>

### **Energy Programs and LEED Standard Programs across the Country**

#### **School Districts in New England**

According to M.L. Johnson from the Associated Press, schools around New England have saved hundreds of thousands of dollars, if not millions, by conserving energy, banding together to buy electricity and other measures introduced a conservation program run by Energy Education, Inc., a company that helps schools reduce energy use without buying new equipment.<sup>3</sup> West Warwick Public Schools in Rhode Island installed \$200,000 worth of new lighting equipment this year that should reduce their electricity bill by \$100,000 annually, said Ken Townsend, the school district's director of property services. Robert McIntyre, the superintendent of the Bridgewater-Raynham Regional School District in Massachusetts, claims to have saved \$765,000 in four years, reducing its energy cost per student from \$201 to \$158.50. In Londonderry, N.H., the schools have saved more than \$1 million with the Energy Education program according to Mr. Johnson's findings.

#### **UVM Davis Center**

The University of Vermont has recently completed its plans for new construction for the Dudley Davis Student Center as a LEED certified building. Consequently, compared to a non-LEED certified building, the Davis Center will spend approximately 52% less on electricity, heating and cooling and 41% less on water. UVM will re-use or recycle at least 50% of construction waste.<sup>4</sup> UVM is also committed to purchasing materials from local and regional vendors (within a 500-mile radius) as much as is feasibly possible. The building will be operated using a state-of-the-art computerized control management system where the exterior of the building (doors, windows, and roof) will be airtight.

#### **Other LEED Certified Buildings in Vermont**

- Waterfront Housing, Burlington, Owned by Burlington Community Land Trust. LEED Certified.

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<sup>2</sup> Vermont Department of Public Service School Energy Management Program, [http://publicservice.vermont.gov/energy-efficiency/ee\\_semp.html](http://publicservice.vermont.gov/energy-efficiency/ee_semp.html), accessed February 21, 2006.

<sup>3</sup> Johnson, M.L. "School Districts Find Saving Energy Means Saving Money" *Rutland Herald* October 24, 2005

<sup>4</sup> The University of Vermont, <http://www.uvm.edu/~davis/?Page=aboutleed.html&SM=greenmenu.html>, accessed February 21, 2006.

- Wind NRG Partners, Hinesburg, Owned by NRG Systems. LEED Gold Certified.
- ECHO at the Leahy Center for Lake Champlain, Burlington, Owned by the Leahy Center. LEED Certified.<sup>5</sup>

## **New Jersey**

On July 29, 2002 New Jersey Governor James McGreevey issued Executive Order #24 for Energy Efficiency. The purpose of the order was to create the New Jersey School Construction Corp (NJSCC) and to require all new public school designs to follow the United States Green Building Council's LEED guidelines.<sup>6</sup> The NJSCC will oversee these projects. McGreevey's plan was to make these schools have more of a community design with more public access and that the schools should be built using the LEED standards to increase energy efficiency and environmental sustainability.<sup>7</sup>

## **New York City**

In September of 2005 the New York City council passed legislation to amend the city's administrative code to require that from January 1, 2007 on, all NYC public buildings be LEED certified, depending on building type.<sup>8</sup>

## **Washington**

In April of 2005 the Washington State Legislature passed Bill S0897 which required public buildings larger than 5,000 square feet to be built and renovated using LEED silver standards. This project was the result of hearings of the Washington State Legislature on exploring how to make schools more environmentally sustainable.<sup>9</sup> This was the first bill of its kind to come out of a state legislature. It required that independent performance audits be used to monitor the progress of the program. An advisory committee of representatives from the construction industry, public agencies, the Board of Education, and the Office of the Superintendent of Public Construction is required to give advice on implementing the act. The Bill also required that all public agencies and school districts must document financial savings from their LEED projects. The Program goals include saving money, improving student performance as well as worker productivity.<sup>10</sup>

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<sup>5</sup> United States Green Building Council Certified Project List, [http://www.usgbc.org/LEED/Project/project\\_list.asp?CMSPageID=73](http://www.usgbc.org/LEED/Project/project_list.asp?CMSPageID=73), accessed February 21, 2006.

<sup>6</sup> Brezezowski, Edward. "New Jersey Schools LEED the Way: How the Garden State plans to green new schools," July 2003. HPAC Engineering, <http://www.hpac.com/member/feature/2003/0307/0307brezezowski.htm>, accessed February 23, 2006.

<sup>7</sup> Governor James McGreevy. State of New Jersey Executive Order #24,

<sup>8</sup> [www.cap-e.com/spotlight/index.cfm?page=1&newsid=25770](http://www.cap-e.com/spotlight/index.cfm?page=1&newsid=25770), accessed February 21, 2006.

<sup>9</sup> "Washington Sustainable Schools Program"

<http://www.betterbricks.com/default.aspx?pid=article&articleid=606&typeid=10&topicname=othernews&indextype> accessed February 21, 2006.

<sup>10</sup> State of Washington Senate Bill 5509, <http://www.leg.wa.gov/pub/billinfo/2005-06/htm/bills/senate%20bills/5509.htm>, accessed February 21, 2006.

## Possible Financial Savings of LEED Certification

Table 1 presents the findings of a study prepared for the California State Legislature by the Capitol E Group which studied the costs and financial benefits of 100 recently LEED certified buildings.

**Table 1:** Financial Benefits of Green Buildings<sup>11</sup>

Category	20 Year Net Present Value
Energy Savings	\$5.80 /square ft
Emissions Savings	\$1.20/square ft
Water Savings	\$0.50/square ft
Operations and Maintenance Savings	\$8.50/ square ft
Productivity and Health Value	\$36.90 to \$55.30/ square ft
<b>Subtotal</b>	\$52.90 to \$71.30/ square ft
Average Extra Cost of Building Green	-\$3.00 to -\$5.00/square ft
<b>Total 20 Year Net Benefit</b>	\$50 to \$65/square ft

Using these estimated savings, we calculated the potential savings if applied to schools in Vermont. We took the mean and median square footage of the sample of schools in Efficiency Vermont's 2002/2003 School Energy Consumption survey.<sup>12</sup> Then we multiplied the mean and median square footage by the estimated savings from the California Capitol E study. The average size of Vermont schools in the Efficiency Vermont data file is 54,491 feet squared and the median is 36,625 feet squared. When these numbers are multiplied by the Capital E estimates of 20-year energy savings per cubic foot, which is \$5.80, we find that energy savings/year could range from between \$15,802 (for the average school) and \$10,621 (for the median school). If all 331 of Vermont's public schools are LEED certified we found, using these stats, an estimated savings that range from \$5.2 million/year to \$3.5 million/year. These savings are merely an estimate and do not take into account the financial costs of renovating all 331 Public Schools in Vermont.

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Prepared at the request of Senator Matt Dunne by Emily Kueffner, David McCabe, and Geoffrey Frazier under the supervision of Professor Anthony Gierzynski on January 31, 2006.

**Disclaimer:** This report has been compiled by undergraduate students at the University of Vermont under the supervision of Professor Anthony Gierzynski. The material contained in the report does not reflect the official policy of the University of Vermont.

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<sup>11</sup> Kats, Gregory. \*Drawing on cost data from over 100 green buildings nationwide. [www.cap-e.com/ewebeditpro/items/059f3481.pdf](http://www.cap-e.com/ewebeditpro/items/059f3481.pdf), accessed February 21, 2006.

<sup>12</sup> Efficiency Vermont, 2002/2003 School Energy Consumption Data.