

## **High-Performance Schools: Assistance Programs, Case Studies and Web Links**

The following is a listing of national and state assistance programs, case study examples, and web resources to assist school system with creating high-performance schools. This is not a comprehensive list.

### **Assistance Programs**

National and state assistance programs, such as those listed below, may provide information, technical assistance, grants, equipment, recognition, awards and other incentives for high-performance schools. The preponderance of these programs address energy efficiency, one aspect of high-performance schools. Some programs also provide information and assistance on a broader range of high-performance issues. Those listed below are a sample of assistance programs and is not intended to be a comprehensive list.

### ***National Assistance Programs***

#### **Alliance to Save Energy's Green Schools Program**

[www.ase.org/greenschools/index.htm](http://www.ase.org/greenschools/index.htm)): The Alliance to Save Energy is a non-profit coalition comprised of business, government, environmental, and consumer leaders. Energy conservation in schools is the primary focus of this program. It actively involves students in establishing an energy use baseline and identifying needed retrofits and behavioral changes to reduce energy consumption. Free lesson plans to incorporate energy concepts into the curriculum are provided, as well as links to other free materials and some that are available for a fee. The program also encourages teamwork between the school, school district, local organizations, and businesses. At least eighteen schools have participated in the program, with positive results.

Schools Going Solar ([www.irecusa.org/schools/](http://www.irecusa.org/schools/)): A project of the Interstate Renewable Energy Council (IREC), this web site provides information and links on solar energy and how it can and has been used in schools. The purpose of this project is to create a network of people involved with solar schools to assist those seeking to implement solar projects. The Database of State Incentives for Renewable Energy on this site allows one to search for schools that have incorporated solar technologies, complete with project summaries and points of contact for additional information.

#### **Sustainable Buildings Industry Council (SBIC)**

[www.sbicouncil.org/workshops/schools.htm](http://www.sbicouncil.org/workshops/schools.htm)): This group has organized workshops for California school-related personnel regarding sustainable schools that may become models for other states to adopt. Additionally, the SBIC works with states to assist them with updating design and construction documents and to educate appropriate people about high-performance schools.

Energy Smart Schools, Department of Energy ([www.eren.doe.gov/energysmartschools](http://www.eren.doe.gov/energysmartschools)): This campaign is operated by the Rebuild America program of the U.S. Department of Energy. Participating schools may receive training workshops, recognition, and access to

partners to help them in their efforts. The campaign also creates and compiles teacher materials and available lesson plans. The building resources available on the website include guidance documents to assist schools with new school design, renovations, operations and maintenance, and selecting appropriate building technologies. There are a variety of ways in which a school can become involved with Energy Smart Schools. In Albuquerque, New Mexico, the Rio Grande High School received lighting retrofits in four classrooms at no cost to the school, funded by four Rebuild America partners, to demonstrate natural lighting and associated energy efficiency. In these classrooms, little artificial lighting is needed.

Energy Star Buildings ([www.energystar.gov](http://www.energystar.gov)): This program provides a tool for benchmarking a school building to see how it compares with similar buildings across the country with respect to energy performance. Those schools that rank in the top 25% of similar schools can earn the Energy Star label, a bronze plaque signifying their accomplishments. An example is the Wilson Middle School in Wayandotte, Michigan with 10 buildings that have been awarded the Energy Star Building label (Fracassa 2001). The Kingston School District (NY) is also among those that have received the Energy Star award for energy efficiency upgrades (Kennedy 2001).

EPA Tools for Schools ([www.epa.gov/iaq/schools/](http://www.epa.gov/iaq/schools/)): This initiative of the U.S. Environmental Protection Agency aims to prevent, identify and resolve indoor air quality problems in the schools by actively involving schools in the program. Free kits are available to those seeking to implement a program to improve indoor air quality. Awards are given each year (since 2000) to those actively involved with the program.

### ***State Assistance Programs***

Collaborative for High-performance Schools (CHPS) ([www.chps.net](http://www.chps.net)): This is a collaborative of government, utilities and non-profit representatives with the goal to “improve the quality of education for California’s children and facilitate the design of learning environments that are resource efficient, healthy, comfortable, well-lit, and contain the amenities needed for a quality education”. The *Best Practices Manual* is available to assist designers and school districts with designing, constructing and operating high-performance schools. A point-based rating tool has also been developed to evaluate school facilities. Schools that earn at least 28 out of 81 available points can be certified as a CHPS school.

### New Jersey Sustainable Schools Network

(<http://community.nj.com/cc/sustainableschools>): Schools and a host of other organizations have formed this consortium to promote sustainability education. The current emphasis is to assist model green schools in New Jersey.

### California Bright Schools Program [www.energy.ca.gov/efficiency/brightschoools](http://www.energy.ca.gov/efficiency/brightschoools)

Schools in the state of California receive technical assistance from the California Energy Commission with the identification, design and implementation of energy efficient strategies, including assistance with obtaining loans for projects, at no cost to school

systems. A school submits an application describing the type of assistance it would like to receive. Assistance is limited by the availability of budgeted funds.

Sun4Schools Project: ([www.montanagreenpower.org/solar/schools/sun4schools.html](http://www.montanagreenpower.org/solar/schools/sun4schools.html)). The National Center for Appropriate Technology assists with administering the program. Twelve schools received 2 kilowatt photovoltaic systems that generate approximately 3000 kilowatt hours of electricity per year, funded by the Montana Power Company' Universal System Benefits Charge.

Partnership for Resource-Efficient Schools, Seattle, Washington: The partnership has two primary goals including 1) to show City support for the Building Excellence Program; and 2) to influence change in design and construction practices; to demonstrate schools can be built sustainably. The Partnership encourages sustainable design, construction, and operation of Seattle schools. The Building Excellence Program was established following a 1995, \$357 million school levy to lead the way for this capital campaign for schools. The Program is intended to ensure that economic responsibility and the provision of optimal learning environments are considered.

### **Case Studies**

In addition to assistance programs, several schools have incorporated sustainable building strategies to varying degrees and serve as models from which others can learn. The following case studies have been compiled from various sources. Unfortunately, while these and other case studies demonstrate the many benefits of high-performance school design, case study information is scattered and there is no standardized format for reporting the data. Also, there is typically little information provided as to how the numbers for cost savings or other results were calculated or derived. Again, this is not intended to be a comprehensive list, rather examples of success stories.

The Sonoji Saki Intermediate School, located in the Bainbridge Island School District in Washington State and occupied in January 2000, is one example. The school board established 3 sustainability-related goals for the school early in the project that included minimally impacting ecosystems, ensuring good indoor air quality and conserving resources. Sustainable strategies included sedimentation minimization during construction, watershed protection through stormwater management, banning pesticide use, replanting natural vegetation, and specifying higher than required ventilation rates (20cfm/person), low and non-toxic finishes, and recycled content products. The school also has displayed 2 signs describing the sustainable features of the building, and green building topics have been included into the curriculum design (Pollution Prevention Resource Center 2001).

McKinney, Texas: The Roy Lee Walker Elementary School is considered one of the most sustainable schools in the country (Fratt 2001)Fratt 2001). The energy-efficient design incorporates a daylighting strategy using baffles to bounce natural light into the building. Up to 68,000 gallons of rainwater are collected in cisterns for use in irrigation, lowering water bills substantially compared to other schools. The carpet inside the building is

recyclable and will be returned to its manufacturer for recycling after approximately 15 years of use, keeping more than 39,000 pounds of carpet out of a landfill. A windmill supplies power for circulating water from cisterns to the irrigation system and solar panels generates a portion of the school's energy requirements. The building was approximately \$1 million more expensive to build than a typical school of similar size, although it has been estimated that these costs will be recovered in 7-10 years due to savings in operation and maintenance

Raleigh, North Carolina: Durant Road Middle School is often cited as a successful example of a high-performance school, particularly for its daylighting strategies. The school opened in 1995 and cost \$12.3 million, less than the amount budgeted for it. Energy savings of approximately \$77,000 per year have been realized, when compared to the average school meeting the same ventilation standards and operating approximately 10 months out of the year. The daylighting is thought to contribute to higher attendance. Wake County had the highest attendance rate among the 100 schools in the district in 1996, averaging around 98% versus 95% county-wide (Innovative Design 2001).

Raleigh, North Carolina: The Ravenscroft School underwent a major renovation that cost \$1.4 million to improve the building shell, incorporate daylighting strategies and install a solar pool heating and hot water system. Approximately \$93,000 annually is saved from reduced energy consumption (Innovative Design 2001)

Johnston County, North Carolina: Two middle schools with daylighting were built in 1993. A prototype design was used and modified for the Selma Middle School (98,000 sf) and the Clayton Middle School (120,000 sf). The county has realized savings of more than \$500,000 since their completion. Two daylit elementary schools have also been built in Johnston County, Four Oaks Elementary, the first daylit school in the county (120,000 sf) and East Clayton Elementary (96,800 sf) (Innovative Design 2001).

Fort Collins, Colorado: The Johnson Elementary School has incorporated high-performance, green design elements into its facility into the HVAC and lighting systems, the building site, and classroom design (CEFPI 2001).

Los Angeles, CA: With the help of the Department of Water and Power have planted 8,000 trees on school campuses to reduce electricity costs and reduce flooding (Kennedy 2001).

Forest City and Akron-Westfield community schools, Iowa: These schools are using wind turbines to supply a portion of their power needs [Kennedy, 2001 #96].

Washington County, TN: Daniel Boone High School saved \$82,000 on energy costs by using geothermal heating and cooling (Dentch 2000; Reicher 2000). The heat pump was installed in the 1995-96 school year to replace a system that used electricity to heat the school and a two-pipe chilled water system for cooling, saving \$62,000 during the first complete year of operation (Innovative Design 2001).

West Jordan, Utah: Oquirrh Hills Elementary School was rebuilt after a fire destroyed it in 1995. The new school (61,200 sf) incorporates low-emissivity windows, light-colored interiors, a light colored roof with R-30 insulation, T-8 fluorescent lighting with electronic ballasts, and an energy management system. Operation costs are approximately \$22,000 less than the original building, which was located on the same foundation (Innovative Design 2001).

Minneapolis, Minnesota: The Interdistrict Downtown School, a magnet school with 520 Kindergarten through twelfth graders, extensively uses solar heating via a 2,115 square foot solar wall system, saving about \$5,600 annually. It is not uncommon for the active solar collector to preheat outside air by 30° F on an average winter day (Innovative Design 2001).

Spirit Lake, Iowa: Spirit Lake Elementary School boasts a wind turbine on its lawn that generates an average of 288,670 kilowatt hours of electricity annually. Operating since 1993, the turbine has generated enough power naturally to eliminate more than 3 million pounds of carbon dioxide and more than 400,000 pounds of sulfur dioxide that would have been produced using fossil fuel based energy sources. Students can monitor wind production and calculate positive environmental impacts (Innovative Design 2001).

Worthington, Ohio: Bluffsview Elementary School has installed a 2-kilowatt photovoltaic system that was purchased and installed using \$20,000 as a part of the Million Solar Roofs Initiative of the U.S. Department of Energy. Students can see how the system works, monitor the amount of energy produced by the panel and compare energy produced to energy consumed by the building using an Internet link through the American Electric Power's Datapult system (Innovative Design 2001).

Cambridge, MD: Choptank Elementary Schools anticipates savings of \$400,000 over a 20 year period as a result of using a geothermal heat pump for 45,000 square feet of building space conditioning (SBIC 2001).

### **Web Resources**

- Energy Quest [www.energy.ca.gov/education](http://www.energy.ca.gov/education)
- SolarQuest [www.solarquest.com](http://www.solarquest.com)
- Solar Now [www.eren.doe.gov/solarnow/solarnow.htm](http://www.eren.doe.gov/solarnow/solarnow.htm)
- Solar Schools [www.eren.doe.gov/solarschools](http://www.eren.doe.gov/solarschools)
- Watts on Schools [www.wattsonschoools.com](http://www.wattsonschoools.com)
- Schools Going Solar [www.ttcorp.com/upvg/schools/index](http://www.ttcorp.com/upvg/schools/index)
- Bright Schools Program (California Energy Commission)  
[www.energy.ca.gov/efficiency/brightschoools/](http://www.energy.ca.gov/efficiency/brightschoools/)
- Million Solar Roofs Campaign, Department of Energy: [web site] [describe]:
- Department of Energy, Energy Smart Schools Campaign  
[www.eren.doe.gov/energysmartschools](http://www.eren.doe.gov/energysmartschools)
- Rebuild America [www.rebuild.org](http://www.rebuild.org)

- Department of Energy, Energy Star Buildings Program [www.energystar.gov](http://www.energystar.gov)
  - Sustainable Building Industry Council [www.SBICouncil.org](http://www.SBICouncil.org)
  - American Institute of Architects, Los Angeles [www.aialosangeles.org](http://www.aialosangeles.org)
  - American Institute of Architects, Orange County [www.aiaoc.org](http://www.aiaoc.org)
  - American Solar Energy Society [www.ases.org/solarguide](http://www.ases.org/solarguide)
  - Collaborative for High-Performance Schools [www.CHPS.net](http://www.CHPS.net)
  - U.S. Green Building Council [www.usgbc.org](http://www.usgbc.org)
  - Whole Building Design Guide [www.wbdg.org](http://www.wbdg.org)
  - Green Schools Program (Alliance to Save Energy) [www.ase.org/greenschools](http://www.ase.org/greenschools)
  - California Energy Commission  
[www.consumerenergycenter.org/schools/high\\_performance.html](http://www.consumerenergycenter.org/schools/high_performance.html)
  - Green Building Articles/Publications, Center of Excellence for Sustainable Development, U.S. Department of Energy  
<http://www.sustainable.doe.gov/buildings/gbarttoc.shtml>
  - National Clearinghouse for Educational Facilities (extensive list of resources on high-performance schools) [www.edfacilities.org/ir/high\\_performance.cfm](http://www.edfacilities.org/ir/high_performance.cfm)
  - Department of Energy, Center of Excellence for Sustainable Development  
[www.sustainable.doe.gov](http://www.sustainable.doe.gov)
  - Second Nature, works with colleges and universities to become more sustainable  
[www.secondnature.org](http://www.secondnature.org)
  - Environmental Protection Agency, Indoor Air Quality [www.epa.gov/iaq](http://www.epa.gov/iaq)
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- *Case Studies*
  - Pollution Prevention Resources Center [www.pprc.org](http://www.pprc.org) [verify]
  - SHW Group Architect [www.shwgroup.com/walker/timeline.html](http://www.shwgroup.com/walker/timeline.html)
  - Sustainable Schools [www.innovativedesign.net](http://www.innovativedesign.net)
  - The Way to Go: Case studies in North Carolina, including some schools.  
<http://www.sustainablenc.org/thewaytogo/main/cases.htm>