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ABSTRACT

This publication offers information on energy efficiency in schools. It discusses the high costs of energy in schools, the benefits of smart energy use, options for schools to be smarter in their energy use, energy's impact on student performance, how schools can participate in the EnergySmart Schools campaign operated by Rebuild America, why the time is right to begin making smart energy choices, and successful initiatives at other schools. Also included are a list of resources and factsheets on myths about energy in schools, the Rebuild America campaign, and energy initiatives at Seattle public schools. (EV)

Get Smart
About Energy

Save money. Create better places to teach and learn.

Full text available at:
http://www.eren.doe.gov/
energysmartschools/pdfs/31606.pdf

EnergySmart Schools

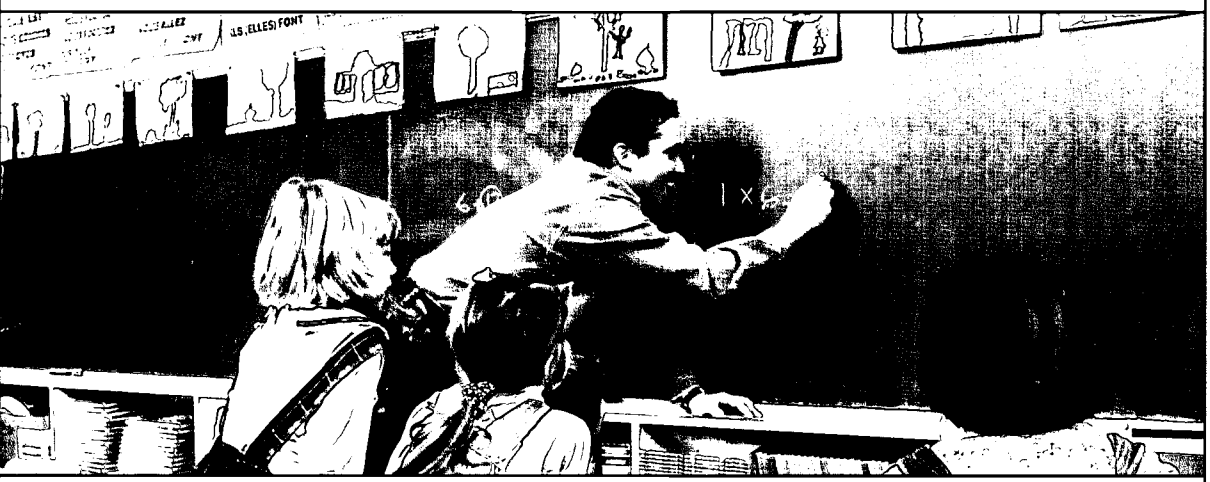
Rebuild America Schools
U.S. Department of Energy

School energy costs are too high

Energy costs in schools are bigger than most of us ever imagine. The typical school district spends $400,000 each year on utility bills while those in huge metropolitan areas may spend $20 million or more. In most districts, utilities are the second-largest expense after salaries.

Other energy-related costs are more hidden and, perhaps, even more harmful to education. Inadequate lighting systems, uncomfortable classroom temperatures, and poor acoustics take their toll on teachers and students alike. Poor air quality from inadequate design and maintenance of heating and cooling systems threatens their health.

Clearly, the costs of energy in schools are too high.



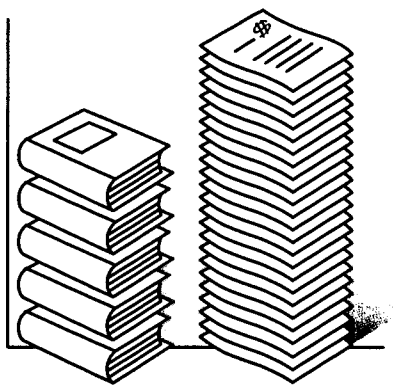
Smart energy use offers big benefits

The astonishing fact is that most schools could save 25 percent of these high costs by being smart about energy. In the typical district, that's $100,000 in savings each year. Nationwide, the savings potential is $1.5 billion, or enough to pay for 30,000 new teachers every year.

While improving their energy use in buildings and bus fleets, schools are likely to create better places for teaching and learning, with better lighting, temperature control, acoustics, and air quality. Smart districts also realize benefits in student performance. Daylighting—a common system in energy-efficient schools—provides ample natural light, which has been associated with higher test scores.

The view from Grandview, Missouri

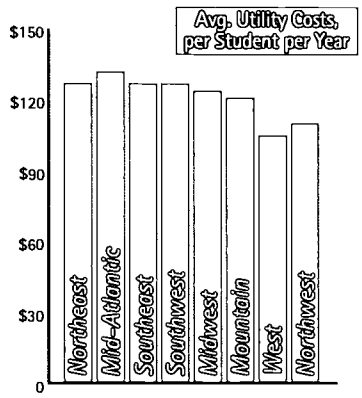
In the Grandview school district's 1998/99 budget, utilities represented the largest area of expenditure after personnel. No other single category in the operating budget commanded as much money. While figures may vary from district to district—depending on size, number of students and facilities, State and local reporting requirements, and other factors—many districts, like Grandview, spend more on utilities than they do on textbooks.



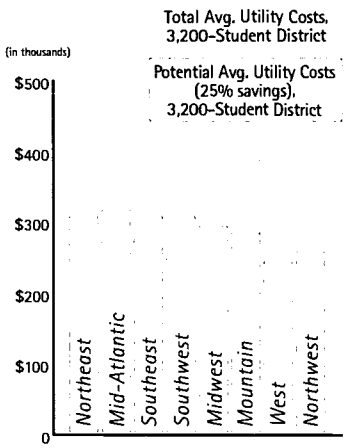
1998/99 Grandview Expenditures

Like many school districts, Grandview spends more on utilities than on textbooks.

How much does your school spend?



How much could it save?



Note that energy consumption is related to climate and a host of other factors, and that utility costs vary from one energy provider to the next.

Any school can do it

Schools have a range of options for being smarter about energy, from no-cost changes to large-scale renovation projects.

- **Behavioral changes** alone can greatly affect energy consumption. Just turning off one typical computer at night and on weekends can save more than $30 annually—a district with 100 computers could save $3,000 each year.

- **Operations and maintenance improvements** can provide substantial savings at very little cost and give schools more funds to spend on textbooks and teachers. The Idaho Falls School District in Idaho saves more than $20,000 annually just by turning down thermostats over winter holiday breaks.

- **Building renovations or retrofits** offer even greater benefits. Alaska's Tanana School District cut its lighting energy costs 25 percent by installing high-efficiency lighting and occupancy sensors. The superintendent said the lighting quality was so much better that staff asked if walls had been painted. The Daniel Boone High School in Tennessee completed an even bigger project, installing a geothermal heating and cooling system to save $82,000 annually.

Energy's impact on student performance

Evidence is growing that energy systems in school buildings are directly linked to student performance and health. Some of the links are intuitive: students can't read the blackboard if lighting is inadequate, can't hear clearly over the din from noisy heating and cooling systems, can't concentrate if they're freezing in classrooms with poor temperature control, and are likely to miss school days if their asthma is aggravated by indoor air contaminants that travel through heating, cooling, and ventilation systems.

Initial research is providing additional evidence of strong connections between daylighting—building systems that capture sunlight for indoor lighting—and better student performance. A 1999 study by Heschong Mahone Group (sponsored by Pacific Gas & Electric Company) found that students in three districts with daylit classrooms scored 7 to 26 percent higher on reading and math tests than those in classrooms with minimal amounts of daylighting. Another study—by the architecture firm Innovative Design—found that students attending three daylit schools in North Carolina outperformed students in neighboring, non-daylit schools by 5 to 14 percent. More research is needed on this topic, and the U.S. Department of Energy is looking forward to working with a variety of partners to document the positive effects of energy-efficient schools.

- New buildings that are smart from the start offer great potential for both energy savings and improved learning environments. The Grafton Middle/High School in Virginia, for example, uses 32 percent less energy than the average school in its region and 9 percent less energy than local energy-performance goals. The buildings' energy-efficient design—which also uses renewable energy—means the school saves money despite operating well beyond standard school hours.

- Buses that use alternative fuels not only reduce pollution in areas where children learn and play but often cost schools less than traditionally fueled buses. After accounting for both fuel and maintenance, the newest compressed natural gas buses at California's Antelope Valley School District cost 11 cents per mile less than advanced diesel buses and are quieter and far less polluting.

- Energy learning activities ensure that students get hands-on educational opportunities, learn about energy and the environment, and become future consumers and leaders who understand the value of being smart about energy. Like numerous schools, the Bluffsview Elementary School in Ohio has a solar electric system that not only provides clean energy but is monitored by students and teachers as part of the science curriculum.

Daylighting—using sunlight for indoor lighting—may improve student performance.

Grafton Middle/High School
Virginia Beach, Virginia

Photo by Hedrich Blessing, courtesy of Burt Hill Kosar Rittelmann Associates

Rebuild America:

The program behind EnergySmart Schools

EnergySmart Schools is part of Rebuild America, a national DOE program of community-based partnerships that are committed to improving energy performance in buildings. This means that if your school is part of a Rebuild America community partnership, you're ready to benefit from EnergySmart Schools.

Just be sure you ask about energy improvements and educational materials for your bus fleet as well as your buildings—Rebuild America focuses on buildings, but its representatives can also direct you to resources for buses. After all, the goal of EnergySmart Schools is a comprehensive one: a nation of schools that are smart about energy in every way.

Elementary school student David Faich won the grand prize in a poster contest among Philadelphia students.

Get help from EnergySmart Schools

The U.S. Department of Energy created EnergySmart Schools to focus on improving the energy efficiency of K-12 schools. It addresses not only buildings but also bus fleets and student learning activities.

The core of Rebuild America EnergySmart Schools is a voluntary network of community partnerships formed by school districts and local organizations. These partnerships get access to resources for improving energy use—customized assistance, workshops, and technical tools, to name a few. EnergySmart Schools also builds awareness among local leaders and school administrators about the high price schools and their communities pay for wasted energy.

EnergySmart Schools works to remove barriers to school energy improvements and encourages businesses to provide more energy-saving products and services tailored to schools. A particularly important piece of this work is the development of the Energy Design Guidelines for High Performance Schools.

Finally, EnergySmart Schools creates and locates educational materials so that tomorrow's decision-makers build better buildings, use renewable energy technologies, design better buses, and continue to be smart about energy.

Rebuild America
U.S. Dept. of Energy

How schools participate

School districts participate in Rebuild America EnergySmart Schools by joining or creating a community partnership. Some Rebuild America partnerships are statewide, while others represent a single community; some may be the school district alone, while many others include city and State governments, financial institutions, and local businesses such as utility companies. The participants make that choice.

Community partnerships get help from a local Rebuild America EnergySmart Schools representative. This person guides the partnership to resources for assessing their energy opportunities, developing an action plan, and implementing the plan. The action plan identifies target buildings, systems, or buses; sets goals for energy savings; identifies financing options; and describes how the partnership will coordinate and mobilize its efforts.

To get started with EnergySmart Schools, call DOE's Energy Efficiency and Renewable Energy Clearinghouse at 1-800-DOE-3732, or go to: **www.eren.doe.gov**

Visit the EnergySmart Schools Web site at: **www.energysmartschools.gov**

How do your school buildings rate?

The ENERGY STAR label on a school building's wall tells an important story. The label not only describes a school building whose energy performance is among the nation's top 25 percent—it lets taxpayers know you're using money wisely, spending the resources on education instead of high energy bills. The label tells students that their school cares about the environment, that you're doing your part to reduce energy-related pollution. And it indicates that your school probably has the great lighting, comfortable temperatures, and high-quality air that so often go hand-in-hand with smart energy use.

To determine if your buildings qualify for this label from DOE and U.S. EPA, your facilities director or other professional should provide data about your school's energy use over the past 12 months, the square footage of your buildings, the number of students enrolled, and other details. You can then enter this data into the ENERGY STAR computer analysis tool available on the Internet.

Each school building that scores 75 or higher, while maintaining indoor air quality that meets industry standards, can apply for the ENERGY STAR label. Buildings that rate below 75 should be assessed for energy savings opportunities with help from EnergySmart Schools.

For more information about the ENERGY STAR label and analysis tool, go to: www.energystar.gov

Money Isn't All You're Saving

Photo by Hedrich Blessing, courtesy of Burt Hill Kosar Rittelmann Associates

Energy-efficiency measures, like daylighting, free up dollars that can be spent for learning.

Now is the time to make smart energy choices

A host of forces have combined in recent years to make now the time to ensure that your schools are smart about energy:

Growth in student population

Chances are high that your district is adding buildings, buses, or entire new schools to serve the many baby boomer children now reaching school age. If efficient, these new buildings and buses will free up your tax dollars for teacher salaries, improved security systems, and computers for years to come. If inefficient, your district will continue wasting huge sums on unnecessary utility bills.

Expanded school hours and community use

Your district may be one of those embracing the concept of "Schools as Centers of Community," hosting more non-student events during off hours and integrating more public facilities. Yours may also have adopted year-round schedules, which add to cooling bills during hot summer months. Efficient buildings help ensure that expanded hours don't break your budget.

Larger building size

If your district is like most today, it is adopting new technologies and educational approaches aimed at improving education. One unanticipated result may be larger buildings—and larger utility costs. Each computer in a classroom, for example, requires 50 percent more space than a traditional work area. Smaller class sizes, more one-on-one instruction, and greater numbers of specialized laboratories also require additional space, bigger buildings, and—potentially—higher utility costs.

More portable classrooms

Faced with a rapidly rising student population, many schools are employing portable—sometimes called "modular"—classrooms, which are faster and less expensive to construct. The bulk of them are also much less energy efficient than permanent buildings. Contact EnergySmart Schools for help in identifying portable classrooms that will cost you less to operate and provide better places for teaching and learning.

Deregulation of the electric utility industry

Deregulation of electric utilities allows (or will allow) schools and other building owners to choose their electricity supplier and negotiate for rates. These rates depend on many factors: your school's overall electricity demand, its pattern of electricity use throughout the day, and the predictability of its energy demand, among others. Schools that are smart about energy have more leverage in negotiating for the best rates.

Volatile bus fuel costs

In the spring of 2000, school districts found out just how vulnerable their budgets can be to oil and gas price increases. Many fleets dependent on such fuels saw price increases of 30 cents per gallon or more—on buses that travel an average of 7,400 miles per year. Fleets powered by compressed natural gas and other domestically produced fuels were better able to maintain their budgets.

A view of success: College Station Independent Schools

District leverages energy to avoid salary cut, make capital improvements

The 7,200-student College Station Independent School District in Texas knows from experience how EnergySmart Schools can help. It faced a salary cut but instead found huge savings by joining the local community partnership—the Rebuild Brazos Valley Energy Conservation Coalition.

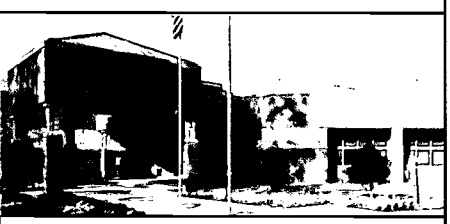
In fiscal year 1999-2000, the district lacked $3 million for critical capital improvements but had reached its maximum legal tax cap. District officials began looking to salary reductions as one way to meet the shortfall, but, fortunately, district Director of Operations George McLean and Deputy Superintendent for Business David Neal became involved in the EnergySmart Schools community partnership.

The partnership introduced these school officials to another partner—Texas A&M University and its Energy Systems Laboratory. The Laboratory provided project oversight as a private-sector firm—Texas Energy Engineering Services, Inc. (TEESI)—analyzed the district's utility bills and conducted a walk-through energy audit of the district's buildings to determine how it could reduce energy costs. Their analysis revealed that some of the district's building systems were old and highly inefficient, and many were the same systems that had been identified for capital improvement work.

The partnership went into action again, helping the district locate low-interest financing that required no up-front funds. TEESI provided engineering and construction management services, while the university's Energy Systems Laboratory provided third-party oversight as well as independent metering and verification. The new equipment will be amortized through the resulting annual energy savings.

Ultimately, the College Station Independent School District found private funding for $1.5 million of its capital improvement work with help from EnergySmart Schools. Its buildings have new heating and cooling system equipment and controls, better lighting, and more comfortable temperatures, and its energy bills are $183,000 lower each year. Through the use of creative financing, the district will soon be able to spend the money saved however it chooses. Students, teachers, and the community are already reaping the benefits of a better, more productive learning environment.

A&M Consolidated High School
College Station, Texas



For helpful resources or more information:

Call DOE's energy hotline: 1-800-DOE-3732

- *Ask a question about saving energy in your school or request information about EnergySmart Schools. You may want to inquire about the availability of the following EnergySmart Schools resources:*

Publications and videotapes

- *Energy Design Guidelines for High Performance Schools*
- *Best Practices Manual for EnergySmart Schools*
- *Portable Classroom Guidelines*
- *"Get Smart About Energy" CD-ROM featuring teaching and learning materials*

Services

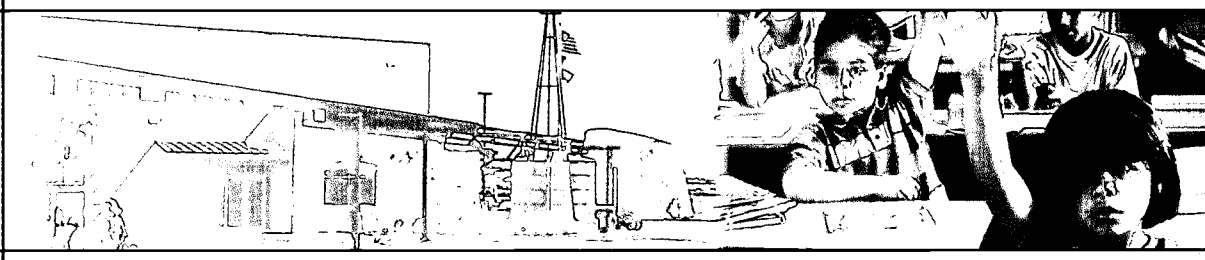
- *Technical assistance*
- *Regional peer exchange forums*
- *State-based forums for school decision-makers*
- *Financing workshops*
- *Technology workshops*

Visit the Rebuild America EnergySmart Schools Web site

- *Get practical guidance for improving energy efficiency in schools*
- *Tap into resources for teaching and learning about energy*

www.energysmartschools.gov

Myths about energy in schools



25%

Fact: Our schools spend more than $6 billion a year on energy. Most schools could save 25 percent of these high costs by being smart about energy.

$1.5B

Fact: Energy improvements have the potential to save our nation's schools $1.5 billion each year and, at the same time, create better learning environments.

Myths

1. Energy isn't a major budget item for schools.
2. Schools can't save much by being energy smart.
3. Energy efficiency is not related to student performance.
4. Energy improvements in existing buildings require major upfront investments.
5. New schools are energy efficient.
6. Constructing an energy-efficient school costs more.
7. Designing energy-efficient buildings takes more time.
8. Tracking energy use isn't necessary.
9. Local communities won't support energy improvements.
10. Help is hard to find.

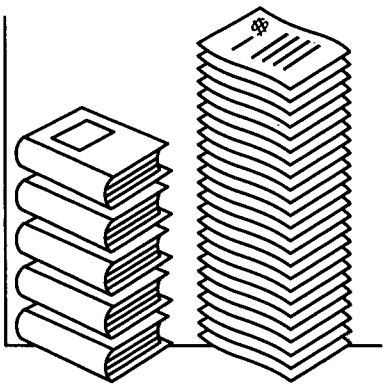
Turn the page to get the facts about energy in schools.

EnergySmart Schools

Building America Schools
Department of Energy

The View from Grandview, Missouri

In the Grandview school district's 1998/99 budget, utilities represented the largest area of expenditure after personnel. No other single category in the operating budget commanded as much money. While figures may vary from district to district—depending on size, number of students and facilities, State and local reporting requirements, and other factors—many districts, like Grandview, spend more on utilities than they do on textbooks.



1998/99 Grandview Expenditures

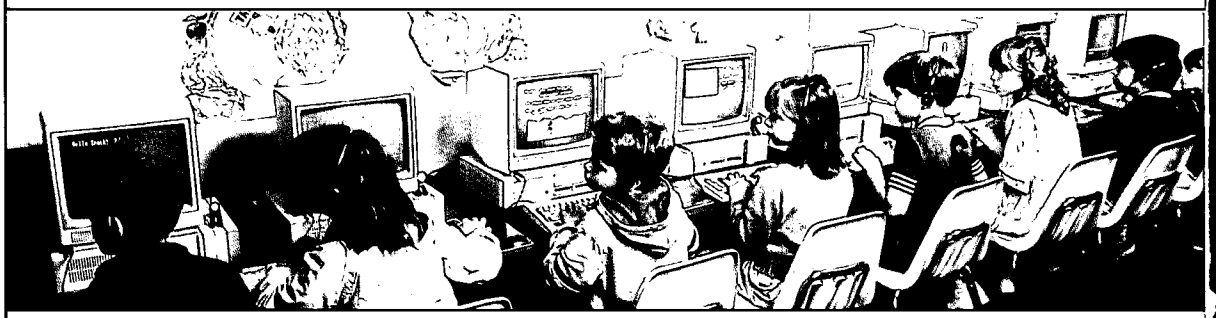
Like many school districts, Grandview spends more on utilities than on textbooks.

Facts

Myth 1: Energy isn't a major budget item for schools

Fact: **Not so.** In many school districts, energy costs are second only to salaries, exceeding the cost of supplies and books. Nationally, K-12 schools spend more than $6 billion a year on energy and, according to the U.S. Department of Energy, at least a quarter of that could be saved through smarter energy management. Energy improvements could cut the nation's school bill by $1.5 billion each year.

There are a wide range of ways to improve existing buildings and build smarter new schools. One example, daylighting, is a particularly cost-effective option. According to the Sustainable Buildings Industry Council in Washington D.C., the average middle school that incorporates daylighting will likely save tens of thousands of dollars annually—and improve student performance at no extra cost.



Myth 2: Schools can't save much by being energy smart

Fact: **Not so.** Changes in behavior alone—such as turning off lights in unoccupied rooms and turning off computers at night and on weekends—can save an individual school thousands of dollars every year. Even vending machine lights can make a difference: Seattle School District saved $20,000 a year by turning off the lights in its 250 vending machines. The Green Schools program, managed by the Alliance to Save Energy, has helped cut the energy bills of 15 pilot schools by an average of $7,700 annually. Many of these schools realized savings simply by improving building operation and changing everyday behavior. The changes weren't hard or complicated—mostly common sense.

In addition to making behavioral and operational changes, many schools have reaped tremendous benefits by incorporating energy-efficient equipment and undertaking energy retrofits. For the Oquirrh Hills Elementary School in Utah, energy-saving features have saved $22,521 in electrical and natural gas bills. Daniel Boone High School in Washington County, Tennessee, has achieved a 34 percent reduction in annual energy costs since 1995 when it installed a geothermal heating and cooling system. The school has realized average annual savings of $82,000 as well as reduced maintenance needs, improved air quality, and better control of individual classroom temperatures.

Myth 3: Energy efficiency is unrelated to student performance

Fact: **Not so.** Evidence is growing that energy-efficient schools can provide learning environments that lead to improved student performance. In part, the link between smart energy use and improved learning is intuitive. If lighting quality is poor, students can't read the blackboard; they can't hear teachers over noise through leaky walls and windows; and they can't concentrate if they're roasting or freezing in classrooms with poor temperature control.

In addition, studies have shown that daylighting—an integral part of most new energy-efficient schools—may have a positive effect on student attitudes and performance. One study by Innovative Design, an architectural firm in Raleigh, North Carolina, concluded that students attending daylit schools for two or more years scored 14 percent better on tests than students in non-daylit schools.

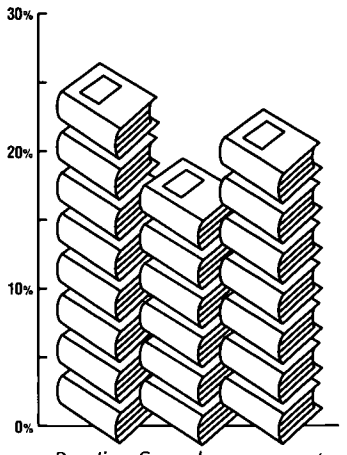
Myth 4: Energy improvements in existing buildings require major upfront investments

Fact: **Not so.** Fortunately, financing options such as energy savings performance contracts and lease-purchase programs allow schools to make improvements with little or no investment. With performance contracts, an energy services company (ESCO) pays for the energy improvements, and is paid back over time through the utility bill savings the project creates. The National Association of Energy Service Companies (NAESCO) has a list of qualified ESCOs (see www.NAESCO.org for more information). To ensure that an ESCO provides the best mix of energy measures, get an outside expert to review its proposal. Some companies provide this service for free or at a low cost for schools.

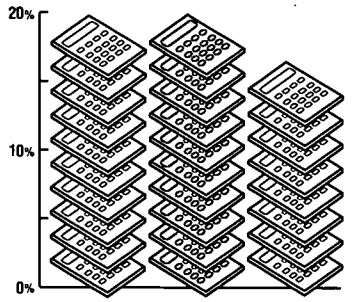
With lease-purchase programs, schools make payments each month and own the equipment at the end of the contract period. This is an increasingly popular approach for schools engaged in building improvements as well as bus purchases.

Many districts are taking advantage of these types of financing options. For example, the Duxbury, Massachusetts, School District joined forces with an energy service company, NORESCO, to design and build an energy-efficient retrofit that also addressed a serious indoor air quality problem. The resulting $2.7 million project, financed by a third party brought in by NORESCO, is being paid for by the school district under a 10-year shared savings contract. During the 10-year contract period, NORESCO guarantees Duxbury an energy cost savings of $271,900 per year, provides ongoing maintenance, and measures the school district's energy use to verify continued savings.

Daylighting Linked to Improved Test Scores



Reading Score Improvement (in one year)



Math Score Improvement (in one year)

Windows
Daylighting
Skylights

A 1999 study by energy consulting firm Heschong Mahone Group revealed a correlation between the use of daylighting and improved student performance. In the Capistrano school district in California, students in classrooms featuring daylighting strategies, large windows, or a well-designed skylight performed 19 to 26 percent better on standardized reading tests than students in classrooms without these features. Capistrano students performed 15 to 20 percent better on standardized math tests.

To Learn More

To learn more about myths and facts related to energy in schools, visit the EnergySmart Schools website at www.energysmartschools.gov or call 1-800-DOE-3732.

EnergySmart Schools is part of Rebuild America, a U.S. Department of Energy program that focuses on improving communities nationwide through energy-saving solutions. EnergySmart Schools serves as a catalyst to leverage public and private resources to develop and support schools that incorporate energy-smart building designs and improvements.

EnergySmart Schools not only works with school districts to introduce energy-saving improvements to the physical environment, it also takes a proactive role in promoting energy education in our schools. Rebuild America and EnergySmart Schools offer free technical assistance and training, as well as contacts in other communities who have already built or renovated using smart energy concepts.

U.S. Department of Energy
Office of Building Technology, State and Community Programs
Office of Energy Efficiency and Renewable Energy

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Myth 8: Tracking energy use isn't necessary

Fact: **Not so.** As school administrators in Utah found out, understanding how energy is used can help schools identify energy waste and equipment problems, as well as overcharges and errors on energy bills. Through careful tracking, five Utah school districts uncovered thousands of dollars in utility overcharges. In 1997, Jordan School District uncovered $93,000 in credits for one high school alone.

Once school personnel know their buildings' energy consumption rate, school districts can provide incentives for reducing consumption through tracking. Careful monitoring of school energy use led Philadelphia's school district to cut its utility costs nearly $7 million annually for the past seven years. These savings are reinvested in educational or recreational programs in each school.

Myth 9: Local communities won't support energy improvements

Fact: **Not so.** Energy-efficient design for schools can be a selling point in bond elections because energy improvements translate to more comfortable classrooms for students, reduced energy bills, and lower operating and maintenance costs. Communities across the country have recognized the benefits of energy-wise design. In Montpelier, Vermont, for example, more than 300 volunteers from the community supplied labor to construct two new classrooms with natural daylighting, good ventilation, and energy-efficient design to create a positive learning environment.

Myth 10: Help is hard to find

Fact: **Not so.** Help is available through programs at the national, state, and local level. State energy offices provide technical assistance and grant programs. Utilities and energy service companies provide expertise and resources to reduce energy consumption. These resources range from financing for new construction and retrofits to technical assistance and instructional materials on energy.

More and more school districts are finding ways to utilize resources from the business community as well. Under Michigan's SolarSchools program, for example, six Detroit Edison commercial customers are partnering with ten southeastern Michigan school districts. Each participating school receives an annual credit toward its electric bill of 2,000 kilowatt-hours of electricity from a solar electric facility. The credits are donated to the schools by their business partners. In addition, Detroit Edison developed curricula on solar and renewables for grades 4-6.

For more information and ideas to help your district take strategic advantage of available resources, visit the EnergySmart Schools website at www.energysmartschools.gov or call the Energy Efficiency and Renewable Energy Clearinghouse at 1-800-DOE-3732 for tools and support available from DOE.

Myth 5: New schools are energy efficient

Fact: **Not so.** Unfortunately, this often isn't the case. Unless a school directs its architect to design energy-efficient buildings, new schools may be as inefficient as old ones. Or they may incorporate only modest energy efficiency measures. Well-designed schools are properly oriented on their sites to take maximum advantage (or provide relief from) the sun. They use windows, walls, lighting systems, heating and cooling systems, and other elements that are efficient and well-integrated. And they allow areas of the building to be shut down when not in use, among other energy-smart features.

During the rush to construct new buildings, schools often focus on short-term construction costs instead of long-term, life-cycle savings. The key to getting an energy-smart and well-designed school is to ask for an energy-efficient design in your request for proposals (RFP). And schools need to select architects who are experienced in making sure that energy considerations are fully addressed in design and construction.

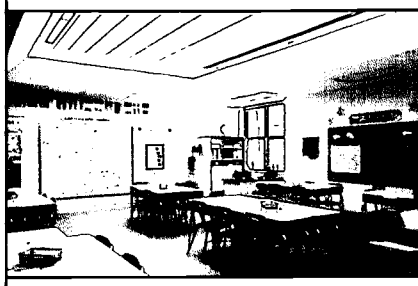


Photo: Robert Flynn

The cost of adding daylighting components to the design for Durant Road Middle School in Raleigh, North Carolina, was in large part offset by cooling and lighting load reductions—reductions made possible by the daylighting and building shell efficiency measures incorporated.

Myth 6: Constructing an energy efficient school costs more

Fact: **Not so.** Total construction costs for energy-efficient schools are often the same as costs for traditional schools, even though individual building features may cost more. The reason is simple: efficient buildings leak less air and take better advantage of the local climate. Therefore, their heating and cooling systems—among the most expensive aspects of buildings—don't need to be as extensive to provide comfort. In many cases, schools can pay the same price to construct an efficient building and pay much less to operate it year after year after year. And even when construction costs are higher, energy savings can pay for additional upfront costs very quickly—sometimes in less than a year.

The energy-efficient design for Durant Road Middle School in Raleigh, North Carolina, resulted in reduced construction costs as well as reduced operating costs. Not only does this school save tens of thousands of dollars in energy costs each year, but the decision to decrease the size of the cooling and electrical systems saved $115,000 in construction costs in 1996. Daylighting—combined with a radiant barrier on the roof that reflects the sun's heat—lessens the cooling load about 30 percent below that of a conventional school.

Myth 7: Designing energy-efficient buildings takes more time

Fact: **Not so.** The design process for an energy-efficient building is slightly different but not necessarily more time consuming. The process is less linear—design documents don't just go from architect to engineer to subcontractors, with each adding information at a specific stage. Instead, all of these professionals work closely together from the beginning to ensure that the building's systems are fully integrated with each other and with the structure.

Check out the back cover for more Myths and Facts about energy in schools.

Daylighting strategies at Clayton Middle School in Johnston County, North Carolina (left and below), save money by reducing electric lighting needs as well as heating and cooling loads. The use of daylighting has also been connected to increased attendance and improved academic performance.

Energy

"Energy isn't a major budget item for schools." This statement is one of a number of myths about energy in schools. The fact is that in many school districts, energy costs are second only to salaries, and exceed the cost of supplies and books.

The following pages take a look at some of the myths and misconceptions about energy in schools, and provide the facts that can help school districts make smart energy choices. Around the country, many school districts are already proving that energy-smart building choices can significantly reduce their operating costs and, at the same time, create better places to teach and learn.

ENERGYSMART SCHOOL CLOSE-UP

Seattle Public Schools:

Seattle, WA Utilities Help Public Schools Conserve Energy

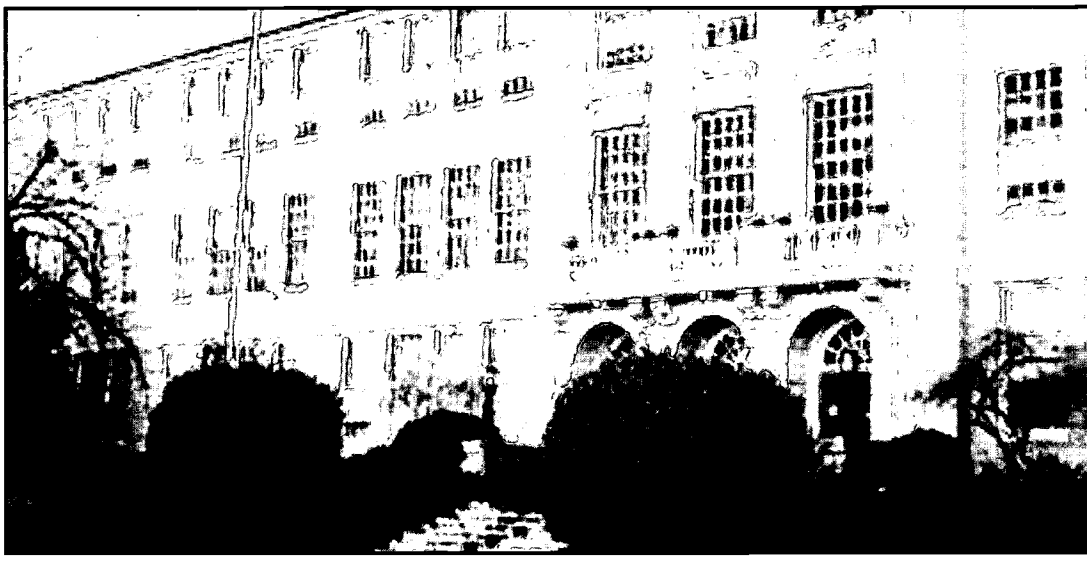
EnergySmart School Close-Ups highlight schools and school districts that have found ways to use energy more wisely, lowering their energy bills and raising awareness of energy issues.

- ☑ Improving Existing Buildings
- ☑ Financing Building Improvements
- ☑ Operating and Maintaining Buildings
- ☐ Designing New Buildings
- ☑ Teaching and Learning
- ☐ Using Renewable Energy Technologies
- ☐ Using Alternatively Fueled School Buses

Energy$mart Schools

...aign of Rebuild America
...Department of Energy

A collaborative effort involving Seattle City Light, Seattle Public Utilities, Puget Sound Energy, and Bonneville Power Administration has resulted in Seattle Public Schools (SPS) reaping the extensive rewards of energy-saving retrofits.



Seattle's Roosevelt High School

A wealth of opportunity

Before the energy-efficiency measures were put in place, the school system was spending nearly $4 million annually on energy costs for its more than 100 educational buildings and facilities. Many of the outdated structures were over a century old and few were resource-efficient.

The project's Resource Conservation Manager, Dave Broustis, helped to implement energy-efficiency measures throughout SPS—performing lighting retrofits in 15 schools, replacing and retrofitting toilets and urinals in 81 facilities, and upgrading energy management systems in 25 facilities.

Lighting improvements were the first concern, given the high costs associated with lighting retrofits. NORESCO, a Rebuild America Business Partner and the district's lighting contractor, worked with school and utility officials to audit schools and determine the scope, costs, and expected utility incentives for each facility. SPS replaced 65,000 high-wattage incandescent and pendant fluorescent fixtures with energy-efficient T-8 compact fluorescent lights. The total cost came to $5.5 million, with Seattle City Light providing $1.8 million in incentives. Estimated energy savings are expected to exceed 15.5 million kWh annually.

PROFILE:

Location:
Seattle, WA

District size:
Over 100 school facilities

Energy project scope:
Lighting retrofits, water conservation, upgraded energy management systems, and energy education

Date completed:
June 2000

Energy saved:
15.5 million kWh annually

Dollars saved:
$1.3 million annually

Project funding:
Seattle City Light, Seattle Public Utilities, Puget Sound Energy, Bonneville Power Admin., NORESCO

Contact:
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Olympia, WA 98504
360-956-2136
WolfS@energy.wsu.edu

Water conservation was another concern, and a $467,391 grant from Seattle Public Utilities allowed SPS to install 2,216 low-flow toilets in 62 school facilities and perform more than 500 urinal retrofits. "We were very happy with the results," said Frank Griffin, Mechanical Coordinator for SPS. The retrofits enabled the schools to realize real savings, at minimum cost to the public. Total project costs came to $7.2 million, approximately half of which were recouped through utility financial incentives.

Educating the entire school community

To highlight the extensive retrofits across the school system, the resource conservation project sought to educate the entire school community about both its efforts and energy efficiency as a whole.

"Working with facilities employees proved to be the most effective thing in terms of behavioral savings," stated Broustis. Once employees understood the high cost of inefficiencies like leaks and continuously running pumps, they were quick to identify and remedy problems.

The conservation project was also an opportunity to educate Seattle teachers and students about energy efficiency, especially electricity-related concerns such as classroom lights, overhead projectors, and other equipment. Some schools even created "resource patrols" that checked for water leaks, lights on in unused classrooms, and other wasteful practices. The heightened awareness increased monetary savings and provided vital education about energy and water conservation.

A unique success

While many conservation projects are based on collaboration, few take that interaction to the level shown in SPS. "What really makes [this project] unique in my mind, is that the different utilities got together and tried to encompass the different resources," said Broustis.

Financially, the district embarked on a different path by borrowing money for the conservation project and paying it back through utility savings. The district's chief financial officer and others backed the unusual agreement. "This is not something we normally do," said Griffin. "District officials wanted assurances that the debt would be reasonably repaid and they found that the numbers showed what they wanted to see, persuading them to proceed with the project."

SPS continues to emphasize natural resource conservation, and each of the project's partners has provided on-going staff support. According to David Van Holde of Seattle City Light, "The major effort that the collaboration took was worth it. It helped partners to focus on the ultimate goal of reducing the schools' operating costs."

See the EnergySmart Schools Web site at: www.eren.doe.gov/energysmartschools

Or call the Energy Efficiency and ble Energy Clearinghouse (EREC) 0-DOE-3732

The EnergySmart Schools campaign is operated by Rebuild America, through the U.S. Department of Energy's Office of Building Technology, State and Community Programs.

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April 2001
DOE/ESS004

Rebuild America:
Improving Communities by Saving Energy

Rebuild America

Rebuild America is a network of hundreds of community-based partnerships across the nation that are dedicated to saving energy, improving building performance, easing air pollution through reduced energy demand, and enhancing the quality of life through energy efficiency and renewable energy technologies. Created by the U.S. Department of Energy (DOE) in 1994, Rebuild America serves as a tool for community revitalization and job creation in many U.S. communities.

Rebuild America partnerships are led by municipalities, state agencies, nonprofit organizations, businesses, schools and universities that are committed to investing in energy-saving building improvements and redirecting those savings to more productive uses.

This network of partnerships helps communities adopt more environmentally and economically sound practices by encouraging smarter energy use in buildings. Rebuild America helps communities identify, prioritize and solve energy-related problems. Partnerships strive to:

- Reduce energy costs in buildings
- Take the smart path to retrofitting existing buildings
- Preserve and upgrade historic buildings while improving energy efficiency
- Build energy efficiency into new facilities
- Tap into renewable energy technologies to save energy
- Promote energy education in schools
- Encourage the use of alternatively fueled vehicles

What do Rebuild America partnerships do?

- Establish goals
  - Determine how many buildings and what type of buildings to retrofit
  - Estimate investment needed for improvements and energy and cost savings
- Develop and implement an action plan for achieving goals
- Conduct energy audits on targeted buildings
- Arrange financing for building improvements
  - Commission building retrofits
- Track building energy performance before and after retrofitting

Rebuild America partnerships target these market sectors for building improvements and environmentally sound practices:

- K-12 Schools
- Local and State Government
- Colleges and Universities
- Public and Affordable Housing
- Commercial

Partnership Support

Rebuild America partnerships are further supported by Business Partners, Strategic Partners and the DOE national laboratories.

Business Partners are providers of energy-saving products and services that help partnerships meet their energy-saving goals. Rebuild America is also strengthened by its links to its Strategic Partners, typically national organizations whose memberships share common ground with market sectors served by Rebuild America. Through its collaboration with Rebuild America, Strategic Partners are better equipped to address energy-related issues that impact their constituents.

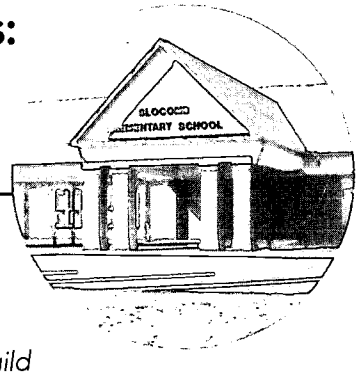
DOE national laboratories provide valuable assistance to partnerships in the form of on-site visits, technical support, software, guidebooks and other resources.

How can I find out more about Rebuild America?

For information about participating in Rebuild America, contact the DOE Energy Efficiency and Renewable Energy Clearinghouse at ***1-800-363-3732****. Information is also available on the Web:* ***www.rebuild.org****.*

Rebuild America
U.S. Dept. of Energy

Rebuild America's EnergySmart Schools:
Helping Schools Make Smart Choices About Energy



EnergySmart Schools

EnergySmart Schools is part of Rebuild America, a U.S. Department of Energy (DOE) program that focuses on improving communities nationwide through energy efficiency. *For more about the overall Rebuild America program, see reverse side of this page.*

In many school districts, energy costs are second only to salaries. Energy costs exceed the cost of supplies and books. Nationally, K-12 schools spend more than $6 billion annually on energy and, according to DOE, at least 25 percent of that could be saved through smarter energy management. Energy improvements could reduce school energy costs by over $1.5 billion each year.

Rebuild America's EnergySmart Schools build partnerships with K-12 Schools to:

- Raise awareness of the operational and instructional benefits of making smart choices about energy
- Act as a catalyst to leverage public and private resources to develop and support schools that incorporate energy-smart building designs and improvements as well as energy education
- Provide technical assistance, products and services for energy solutions
- Encourage energy efficiency and renewable energy practices in the K-12 academic setting to cultivate future decision-makers

Why be an EnergySmart School?

- To use the physical environment of the school as a "lab" for student learning about energy use.
- To get schools to implement energy-saving strategies that save money, help children learn about energy, and that create improved teaching and learning environments.
- To teach students the importance of energy conservation and efficiency through hands-on lessons.
- To involve students, parents, teachers and the community in energy-saving efforts.
- To help the environment by adopting energy-efficient practices that reduce energy consumption and the impacts and pollutants that power production generates.
- To explore renewable energy technologies and alternatively fueled transportation options
- To become advocates for implementing energy-efficiency strategies.

How can I get involved in Rebuild America's EnergySmart Schools?

Contact the DOE Energy Efficiency and Renewable Energy Clearinghouse (EREC) at 1-800-363-3732. EREC can provide you with information and put you in contact with your state representatives for:

- Technical information about improving the energy efficiency of your school
- Guidelines for designing energy-efficient schools
- EnergySmart Schools resources and materials for educators, parents and students

The opportunity to build an energy smart generation is here. EnergySmart Schools is working to ensure that those who make decisions about energy use in schools have the understanding and tools they need to make wise choices about creating better teaching and learning environments.

EnergySmart Schools use energy wisely to reap rewards that last for generations.

- More money for teaching and learning
- Better environments for educating students
- Increased understanding of energy issues

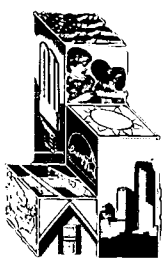
For more information, visit the Rebuild America Web site at ***www.rebuild.org*** and click on EnergySmart Schools.

EnergySmart Schools
Rebuild America Schools
U.S. Department of Energy

You may also wish to investigate other DOE programs or campaigns that help schools and other organizations: Clean Cities, a program aimed at helping communities adopt alternatively fueled vehicles and buses; the Million Solar Roofs Initiative, which helps schools and other organizations employ solar energy technologies; and the State Energy Program, a DOE program that provides grants to schools and other organizations and is administered through State energy offices. Also, you can find information about how to put solar energy on your school via the Schools Going Solar initiative, which is sponsored by DOE. Your EnergySmart Schools representative can guide you to these resources, or you can find them through the DOE energy hotline and the EnergySmart Schools Web site.

U.S. Department of Energy

Office of Energy Efficiency and Renewable Energy



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