

# Energy Sustainability:

## It's Easier (and Cheaper) Than You Think

By Molly Smith, AICP, REFP and Dr. David Peterson

*In this economy, it's hard to implement any kind of school facility improvement plan with tight budgets and rising energy costs. The following strategies and suggestions are just some of the many ways schools can reach toward sustainability. In creating this presentation, our objective was to point out what you can do to save energy right now with little resources or additional funding.*

### Schools and Energy: (Some of) the Facts

Buildings use 39% of the total energy and 70% of all electricity in the United States. For school districts, energy is about 6% of the total district budget – roughly equal to the cost of all textbooks. With many buildings and one comprehensive approach, school districts have a unique opportunity to make small changes in their energy consumption behavior to make a big impact and save money.

For example, lighting accounts for about 37% of a school's budget and is responsible for 20-25% of the electricity used by an individual school. Surveys of electricity use in schools show that school corridor lighting is by far the largest consumer of electricity in a school facility – accounting for about 8,770 hours of use as compared to just over 2,000 hours in the classrooms. Reducing corridor lighting by 20-25% (one lamp in a four lamp fixture) saves 25% of the lighting costs for corridors and is virtually undetectable to the human eye.

### Plan for Energy Savings

These days, who doesn't want to be "green"? You can show that

you are a good steward of ALL the green stuff - the earth and your taxpayer's money. Schools can model green technologies and responsible energy conscious behavior effectively and on a large enough scale to really make a difference. Finally, staff and students benefit from increased daylighting (linked to higher test scores), better indoor air quality and more money for other programs.

Creating an Energy Conservation Plan is a great first step toward long term energy savings. A good plan has five basic parts: goals/policy, objectives, assessments, recommendations and implementation.

When setting your initial goals and policies, make sure to be realistic. Balance time, people and money. No matter how good a plan is, it won't go anywhere if you can't achieve it.

Objectives are HOW you intend to reach your goals. They are the steps you intend to take to get there and should be measurable. Establishing a baseline of energy consumption for each facility over a period of time will help you understand how each school is performing now. Describe your energy con-

servation measures based on facts, not feelings.

Assessing each facility means getting out and making a physical examination of each building. It is important to look at the big picture: site orientation; building envelope; windows and doors; equipment; lighting, water and gas use. The Environmental Protection Agency's ENERGY STAR Program offers a free application called "Portfolio Manager" to help you track energy and water consumption, identify under-performing buildings, set priorities, monitor progress and verify improvements. Some states, corporations and energy companies will also help with energy audits free of charge. Some schools have also used their earth science classes to help out with monitoring.

Recommendations for Energy Conservation Measures (ECMs) should be specific and evaluated by savings, initial cost and payback period. A good ECM should show a payback of eight years or less unless part of a longer term strategy. Longer term strategies such as whole system replacements, solar, wind and geothermal should be included in the study for comparison. Sometimes small improve-

ments provide more savings and sooner.

Implementation plans should be specific and achievable. They should be monitored regularly to keep improvements on track.

### **Performance Contracting and Sustainable Energy Programs**

Recent government incentives in sustainable and energy efficiency programs can be a boon to schools. The Department of Energy, federal and state agencies, as well as numerous non-profits are providing incentives for the installation of solar, wind and geothermal technologies.

States such as Arizona have passed laws allowing school districts to enter into performance contracts with third party companies in order to take advantage of the massive grant rebates and credits from the state and local energy companies. At Scottsdale Unified School District, solar photo-voltaic systems have been installed at no cost to the district. The third party provider installs, maintains and operates the system at a fixed utility cost for a period of time, at the end of which the district will own the equipment and be able to provide a portion of its own electricity through solar power.

### **The Little Things Count: Magic Energy Strategies at Little or No Cost**

Budgets are tight and school maintenance always seems to get cut first. Here are a few low or no cost strategies that will help you save big:

- Don't Idle! Turn off the bus and you'll save over \$22K in a fleet of 100 buses
- Turn off lights in unoccupied hours by linking them to your security alarm and save 12-20% energy
- De-lamp areas with excessive lighting (ex: remove the 4th lamp from a 4 lamp fixture) and

save 25%, you can dim light by up to 80% and the human eye will not perceive it.

- Provide inside and outside switching
- Change exit signs to Light Emitting Diode (LED) and save 5-10% energy
- Change T12 fixtures to T8 and save 20% of lighting energy
- Tuning up your HVAC systems will save 10%; upgrade components for maximum efficiency
- Close outside dampers when the space is unoccupied
- Do the following for highest Return on Investment (in order of highest return for shortest time)
  - o System tune up
  - o Lighting efficiency upgrades
  - o Energy load reductions
  - o Fan and motor systems repair and upgrade
  - o Plant upgrades
- Limit afterschool activities to as few heating/cooling zones and turn off the rest of the building (save 25%)
- Do not block air flow to HVAC vents to allow efficient operation (up to 10% of heating/cooling costs)
- Close doors and windows while system is running (1-25% savings)
- Set cooling to 78-80 degrees and 85 degrees unoccupied
- Set heating to 68-72 degrees
- Put timers on electric water heaters and vending machines

You don't need flashy and expensive technologies to create significant savings. Sometimes the little things add up. ■

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Molly Smith, AICP, REFP is a nationally-recognized authority on all aspects of K-12 planning, working with school districts across the country for over 18 years. Her consulting firm, thinkSMART planning, inc. is committed to the creation of learning environments that support the latest thinking in teaching and learning. She has addressed numerous practitioner-based audiences at national educational conventions and has written extensively on school planning techniques and school facilities' connection to student improvement.

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Dr. David Peterson

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Dr. Peterson previously served as the Director of Operations at the Mesa Unified Public School District and was with Mesa Public Schools for ten years. He was Vice President for Estimating/Project Management/Engineering at Summa Mechanical Contractors, and an Intelligence Officer with the U.S. Air Force.