



Energy Answers for Schools

Schools spend more on energy than on textbooks: typical energy costs are second only to salaries. The good news is that schools can reduce energy expenditures by implementing energy efficiency measures. This fact sheet provides an overview of typical energy efficiency strategies and a list of resources for more detailed information.

Raise Performance at Existing Schools

There are three key ways to reduce energy consumption in existing school buildings:

- 1. Enlist an army of savvy energy savers.** You can produce significant results through quick and easy conservation measures. Get the whole school involved for maximum impact.
- 2. Update Operation and Maintenance (O&M) procedures.** Save up to 20% on energy bills simply by improving your current practices. These measures can extend the useful lifetime of equipment and cut down on emergency repairs.
- 3. Implement energy efficiency retrofits.** Simple energy efficiency measures and equipment replacements save up to 30% annually. These steps also will produce a healthier, more comfortable learning environment.

Strategy #1: Enlist an Army of Savvy Energy Savers

Involve students and staff in this energy conservation effort. Walk through the school to identify wasteful energy practices and develop specific solutions. Pay extra attention to lighting and equipment that run 24/7.

- Assign student conservation captains to turn off lights in empty classrooms and make sure doors and windows are fully closed when air conditioning is running.
- Activate sleep settings on computers. Save \$10 to \$30 per monitor and \$15 to \$45 per desktop computer annually by placing them into a low-power sleep mode.
- Make sure that programmable thermostats adjust to 84 degrees at the end of the day.
- Look for curriculum connections. Concepts link easily with science, math and social studies lessons.

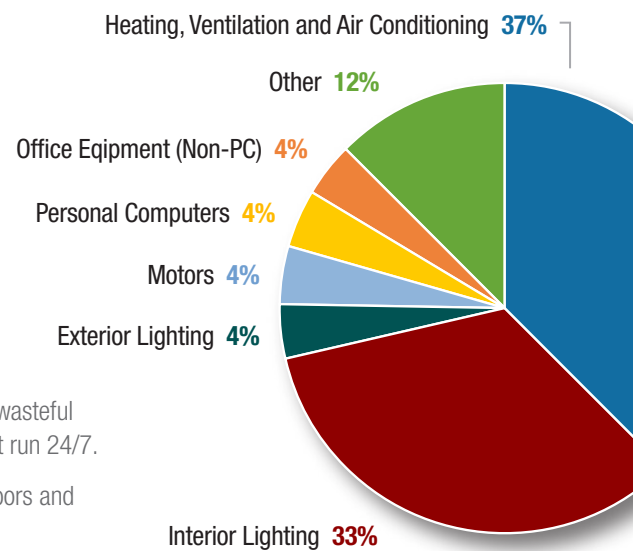
Strategy #2: Update O&M Procedures

According to the U.S. Department of Energy, a well-crafted O&M program can save 5% to 20% on energy bills without a significant capital investment.

Your O&M program may include activities such as: cooling tune-up, cleaning coils, changing air and water filters, verifying operation and adjusting set-points of sensors and controls, calibrating thermostats and humidistats, cleaning light fixtures and group re-lamping. The program should account for changes in occupancy and use, such as vacation and weekend shutdowns.

APS provides Building Operator and Facility Maintenance training in conjunction with the Electric League of Arizona. APS subsidizes 50% of the program tuition for qualified business customers.

Fig. 1 Typical Electricity End Use by Primary and Secondary Schools in Arizona



If It's Not Broken, Why Fix It?

Group relamping schedules the replacement of lamps at their maximum economic value, generally at about 70% of their calendar life. Though it means replacing lamps before they expire, it dramatically reduces the time spent replacing each lamp, which can reduce your overall lighting maintenance budget by more than 25%.

Strategy #3: Implement Energy Efficiency Retrofits

Identify potential energy efficiency improvements through a walk-through assessment or a professional energy audit. Establish baseline energy usage and track changes to document the impact. You might target your most inefficient systems first and then use the savings for additional capital investments. Consider using performance contracting to fund the improvements. Keep in mind that each measure will impact the others.

Heating, Ventilation and Air Conditioning (HVAC)

HVAC is the largest energy expense for Arizona schools and will become even more significant if schools shift to 12-month schedules. An efficient HVAC system creates a comfortable and healthy learning environment and reduces maintenance demands. Measures to consider:

- Replace aging or inoperable equipment with high efficiency models. Be sure the system is properly sized. Bigger is not necessarily better.
- Install energy management controls to match occupancy patterns to the cooling schedule.
- Check duct system and building shell for leaks and seal gaps with appropriate materials.
- If re-roofing, consider Cool Roof materials, which can pay back in two years.

Lighting

Interior lighting uses almost as much electricity as HVAC, it adds to the cooling load, and it's relatively easy to change. Measures to consider:

- Replace incandescent bulbs with ENERGY STAR® qualified compact fluorescent lamps (CFLs).
- Install occupancy sensors, timers and photocells, which will cut usage.
- Replace T12 fluorescent lamps and magnetic ballasts with T8/T5 fluorescent lamps and electronic ballasts.
- Replace high intensity discharge (HID) lights in high bay systems (often in gyms and auditoriums) with T5 high output (HO), T8, or CFL high bay fixtures.
- Install light-emitting diode (LED) or electro-luminescent exit signs, which last longer and use less energy.
- Upgrade your exterior lighting. Use efficient lamps and fixtures with timers. Adjust settings seasonally.

Food Service

Don't forget about other energy hogs like refrigerators, ice makers, steam cookers, hot food holding cabinets, water heating and vending machines. Install controls and replace old equipment with efficient models.

Let Your (Efficient) Light Shine

Publicize your efforts and results. Recognize your energy champions. Encourage energy sleuths to be heroes at home and school. Become an ENERGY STAR partner. Tell the community about energy reductions, dollar savings and environmental benefits.

FACT

Installing energy-efficient lighting will improve your lighting quality and also reduce the cooling load.

FACT

ENERGY STAR labeled commercial solid door refrigerators and freezers can save as much as 45% with a 1.3 year payback.

FACT

Replace old, high-volume kitchen sprayers with high-velocity, low-flow models and save hundreds of dollars a year in hot water costs.

Can We Help?

APS offers incentives for qualified efficiency measures. Learn more about the Solutions for Business Program at aps.com

Recommended Resources

APS: Solutions for Business Center, Energy Survey and "Ways to Save" Technology Fact Sheets aps.com

Building Operator Training
www.electricleagueofarizona.org

Energy Design Guidelines for High Performance Schools: Hot and Dry Climates
www.nrel.gov/docs/fy02osti/32103.pdf

Energy curricula: National Energy Education Development Project
www.need.org

ENERGY STAR for K-12 School Districts:
www.energystar.gov/index.cfm?c=k12_schools.bus_schoolsk12

School Operations and Maintenance: Best Practices for Controlling Energy Costs
www.ase.org/uploaded_files/greenschools/School%20Energy%20Guidebook_9-04.pdf