

# Building Environmentally Friendly Schools

## ARIZONA HIGH PERFORMANCE SCHOOLS

Funded by a 2005 Pollution Prevention Grant from US EPA Region IX

The ADEQ Pollution Prevention Unit was awarded a pollution prevention grant by EPA Region IX to implement a High Performance Schools Technical Assistance Campaign. A High Performance school is one that uses integrated design in planning for new school construction, rejuvenation and retrofitting to improve our children's learning environment and reduces toxic substances. The project will:

- provide high performance school design and operations information to school districts, architects, and school building officials through a variety of means.
- work with schools to develop case studies on individual school's project implementation.
- assist in developing statewide recommendations or guidelines for High Performance Schools.

## WHAT IS A HIGH PERFORMANCE SCHOOL?

**HEALTHY** - Good indoor air quality is essential. The significant amount of time students and teachers spend inside schools during their educational career, combined with children's increased susceptibility to indoor pollutants, underscores the importance of high indoor environmental quality. A properly designed heating, ventilating, and air-conditioning (HVAC) system minimizes the intake and circulation of pollutants by providing air filtration, ventilation, and air changes. Implementing Integrated Pest Management, reducing chemicals in maintenance products, and proper training of chemical applicators and maintenance and operations staff, help assure an environment with less toxic chemicals.

**ENERGY EFFICIENT** - Energy efficient schools save money while conserving non-renewable energy resources and reducing air pollution. HVAC systems using high efficiency equipment; are "right sized" for the estimated demands of the facility; and include controls that optimize system performance. The school's lighting system uses high efficiency products; optimizes the number of light fixtures in each room; incorporates control devices that ensure peak system performance; and successfully integrates electric lighting and day-lighting strategies. The walls, floors, roofs, and windows of a high performance school are energy efficient and cost effective. The building shell integrates and optimizes insulation levels, glazing, shading, thermal mass, air leakage, and light-colored exterior surfaces to minimize the use of HVAC systems.

**MATERIALS EFFICIENT** - To the maximum extent possible, the school incorporates local and regional building materials that have been produced in a way that conserves raw materials. Such materials may be manufactured with a rapidly renewable resource or recycled content, are durable, or can be recycled or reused. In addition, the school is designed and built in a manner that reduces waste and keeps useful materials out of landfills.

**AN ENVIRONMENTALLY RESPONSIVE SITE** - The site is recognized as an essential element of the school building's high performance features. To the extent possible, the site conserves existing natural areas and restores damaged ones; minimizes stormwater runoff and controls erosion; and incorporates products and techniques that do not introduce pollutants or degradation to the project site.

**WATER EFFICIENT** - Water scarcity is a major problem in much of Arizona. High performance schools are designed to use water efficiently, saving money while reducing the depletion of aquifers and river systems. The school uses as little offsite water as possible to meet its irrigation needs, controls and reduces water runoff from its location, and consumes fresh water from public sources as efficiently as possible.

**EASY TO MAINTAIN AND OPERATE** - Building systems are simple and easy to use and maintain. Maintenance staff are trained to assure the school maintains its high performance operating standards. Teachers are trained how to most effectively use building systems.

## WHAT ARE THE BENEFITS OF HIGH PERFORMANCE SCHOOLS?

**REDUCED OPERATING COSTS** - High Performance Schools are specifically designed - using life cycle cost methods - to minimize the long-term costs of facility ownership. By using less energy and water than standard schools, overall operating costs are lower.

**IMPROVED HEALTH OF CHILDREN AND TEACHERS** - High Performance schools provide superior indoor air quality by controlling sources of contaminants, providing adequate ventilation, and preventing moisture accumulation. Some evidence shows that high performance schools can lead to increased average daily attendance and increased teacher satisfaction and retention. A growing number of studies are confirming that a better facility - one with appropriate acoustics, lighting, indoor air quality, and other high performance features, will enhance learning and lead to higher test scores.

**REDUCED ENVIRONMENTAL IMPACT** - High performance school buildings are energy and water efficient, use durable, and low toxicity or non-toxic materials that are high in recycled content. As a result, they are good environmental citizens.

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