

SCHOOL leader

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The Holistic School Catalog

A truly sustainable school incorporates resource-saving techniques everywhere

GEORGE R. DUTHIE, ROBERT COLAVITA AND NORMAN TORKELSON

You want your school district to practice sustainability. But what does it really mean? How can you integrate sustainability into your day-to-day operations and make a real difference? What is holistic sustainability and where do I start? The answers may be less complicated than you think; in fact your district may be using sustainable strategies already.

What is Holistic Sustainability? Sustainability is generally defined as the process of using finite natural resources (i.e. air, water and earth) in such a way as to meet current needs while not diminishing their availability for use by the earth's future inhabitants. Holistic sustainability therefore incorporates sustainable principles in our day-to-day lives. The key words to remember are culture, community and continuity.

Holistic Sustainability in Our Schools Schools offer a unique opportunity for holistic sustainability because a school is a community of people open to learning and making a difference in their community and world. A strong sustainability effort requires the dedication and perseverance of the entire school community. To measure the effectiveness of your sustainability efforts, consider their impact on education, environment and economics.

Sustainability in the School Community Sustainable activities in schools can include such things as green curriculum, community gardens and composting, recycling, waste reduction, green cleaning,



electricity and water conservation efforts and many more.

Hopewell Valley Regional School District in Mercer County provides a great example of how a district can implement the principles of holistic sustainability in its daily operations. Hopewell Valley has made a gradual cultural shift to embrace sustainable measures throughout the school community and has been doing so for many years.

In the Hopewell Valley district, each

school has a 'Green Team' which consists of teachers, students, administrators and parents. Involved in everything from electricity conservation (turning off the lights and computer monitors) to recycling, the team serves as the core of the district's efforts.

A district sustainability coordinator is essential to rallying the troops for the district's sustainable efforts. In Hopewell Valley, Facilities Director Norman Torkelson serves in this role and facilitates and coordinates the district-wide endeavors. His efforts are in turn supported by the district administration and by the school board.

Over time, a school district's culture will evolve to embrace sustainability as the entire school community is engaged.

Sustainable School Maintenance and Operations Throughout Hopewell Valley, sustainable practices are employed in daily maintenance activities. Because much of the dust and dirt in a school is from the floor, particular attention is given to this area of maintenance. Environmentally friendly hard surface finishes are used on all vinyl and wood floors. These finishes prevent dirt from being ground in and greatly reduce floor maintenance efforts. In fact tile floors are now completely stripped and waxed only every four years, as opposed to annually. The use of removable and replaceable walk off mats at all major entrances captures 'street dirt'. All vacuums are HEPA rated, providing a



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Water conservation

Shown here are push button self closing faucets and waterless urinals. Both help to conserve water and reduce maintenance costs.



much higher level of particle capture and over time reducing cleaning efforts and HVAC filter changes. The lightweight HEPA vacs are of a backpack style, making them more portable and easier to use with both hands.

With few exceptions, cleaning products are 'green' and cost the same as conventional cleaning materials. Much friendlier to the environment, these products can be used more freely in schools without concern for exposing students and staff to harsh chemical cleaners. Different dilutions are used for different jobs, sim-

The district's sustainability efforts have strengthened its bottom line and generated significant savings over time.

plifying the cleaning process and reducing staff time and waste. Integrated pest management focuses on prevention as opposed to the need for pesticides, which are used only sparingly. Over time, these operational measures reduce overall costs for such items as annual floor stripping/polish, HVAC filter maintenance/replacement and pest control services.

Hopewell Valley keeps a building controls system technician on call under contract to address temperature control issues as they arise. The technician monitors the system and makes needed repairs and adjustments quickly, before the problem results in the excessive consumption of gas or electric.

This ongoing commissioning process can result in significant utility cost savings over time.

Sustainable Capital Projects Many types of smaller, routine capital projects offer opportunities for cost savings while promoting sustainability, often for only a nominal additional investment.

For example, a simple water fountain replacement project can make a big dent in water consumption and dramatically reduce the need to recycle water bottles.

Changing inefficient metal halide gym lighting fixtures to high output T-5 fluorescent fixtures is a low-cost project that

has a payback of less than 3 years (with help from state incentives). The savings are even greater if lighting controls are also installed or if the work is performed by a school district staff electrician.

Toilet room renovations offer opportunities for energy savings, water conservation and reduction of maintenance costs.

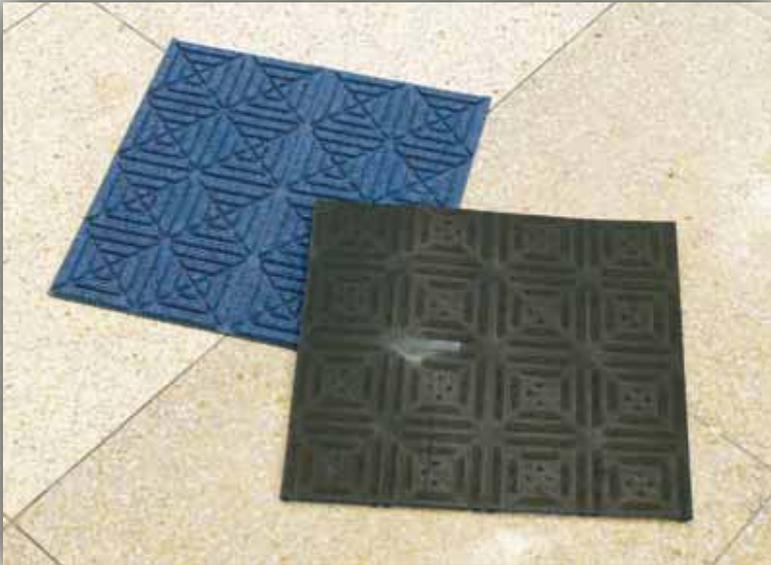
Sustainability Is Good Business Robert Colavita, the district's business administrator, knows first-hand that holistic sustainability makes good economic sense. The district's sustainability efforts have strengthened its bottom line and generated significant savings over time.

For example, the district's ongoing savings on gas and electric are placed into a budget line item for capital projects and help to fund new projects every year. Hopewell Valley has seen its gas and electricity costs greatly reduced, from \$1.8 million in 2009 to \$1.3 million in 2011. Much of this reduction is due to the savings realized by the district's energy-efficiency improvements. These measures include lighting fixture retro-fits and controls, educating building users to turn off the lights when not in use, replacement of constant volume ventilation systems with demand ventilation systems, installation of energy recovery ventilators, and ongoing building controls calibration and adjustments to suit conditions and to make sure that all existing equipment is operating "as designed".

In addition, improved indoor air quality has avoided potential teacher complaints and related workman's compensation



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At left, Removable walk-off mat tiles are cleaned frequently with the HEPA vacs and greatly reduce the amount of dirt being brought into the building. They have the added benefits of being slip-resistant and capturing water, increasing safety. **Below,** Carolyn McGrath, the high school's recycling club coordinator, at a water fountain that has been retrofitted to fill reusable water bottles.



Indoor air quality improvements are the result of reducing airborne pollutants by using walk-off mats

claims. The indoor air quality improvements are the result of reducing airborne pollutants by using walk-off mats, using HEPA vacuums for all cleaning, improving ventilation air quality by eliminating unnecessary outdoor air being drawn into buildings and adding economical intelligent heating and cooling modules to rooms in a phased manner. Air intakes are also raised to above the window lines or through-out the roof eliminating ground level contaminants and moisture. The district has seen a steady decrease in absenteeism of both students and staff.

When possible, the district takes advantage of available NJ Office of Clean Energy incentives such as Smart Start, Custom Measures and most recently, the Pay for Performance Program.

A large energy reduction program

being undertaken at Bear Tavern Elementary School will have more than 75 percent of its costs paid for by grants, incentives and energy cost savings. The program will continue the district's implementation of energy improvements on a much larger scale by introducing demand ventilation with energy recovery, intelligent heating and cooling, and lighting improvements to most of the building's areas.

Reach Projects Every district has its own ideas for 'reach' projects that require a significant investment of financial resources.

Getting these accomplished in today's economic climate can be challenging. However, the rewards and sustainable benefits can be much more significant.

A routine roof replacement project, for example, can use thicker R-30 insulation in lieu of the typical R-19. A reflective coating may also make sense in some cases. Together these upgrades can provide an additional 20 to 25 percent of utility savings over a typical installation (bearing in mind that the roof system typically comprises up to 80 percent of a building envelope).

Districts with roofs in good condition may be able to take advantage of a solar installation.

Many districts struggle with the need to cool their classrooms. Hopewell Valley has developed a classroom HVAC pro-



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The school community garden and composting



A perfect example of community-based sustainability, the school garden serves as a hands-on learning space and produces food which can be consumed in the cafeterias.

Composting is also an important element of the community garden. Select food waste is composted and that compost is used to fertilize the ornamental portions of the garden.



Roof mounted solar panels can save the district money on its electric bills, but are not as financially attractive as they used to be. Oversupply has created little demand for new solar systems and has caused SREC prices to drop sharply. Recent legislation is expected to bolster the NJ solar market, and may make solar installations utilizing Power Purchase Agreements viable once again.

One third-grader reported to the architect during an inspection on a 95 degree day, “We tried all the numbers (on the digital room thermostat) and we like 76 the best.”

prototype that improves the indoor environment and is economical to install. This prototype includes a fan-powered flat-plate energy recovery module coupled with a carbon dioxide sensor and a variable-volume refrigeration system, both of which can respond rapidly to changes in a rooms ventilation and temperature needs. Heat recovery on the mechanical Demand Side Ventilation captures enough energy from the exhaust air stream to reduce the HVAC load as much as 30 percent to 40 percent. For example, on a day when it is 20 degrees outside, tempered air enters the classroom at about 55 - 60 degrees instead of 20 degrees. Less thermal shock (swings) to room occupants, air and room contents equalize to a uniform temperature. Coupled with some humidity control, occupants report that their classrooms are now more comfortable at higher temps in the summer and lower temps in the winter. One third grader reported to the architect during an inspection on a 95 degree day, “we tried all the numbers (on the digital room thermostat) and we like 76 the best.”

Blocks of rooms can be done as funds become available in the district. The average cost per classroom is

\$25,000 - \$30,000, including the air conditioning and energy recovery demand ventilation. This is far less cost than a typical complete school-wide HVAC system replacement (boilers and chillers) which may cost \$1,000,000 or more.

More large scale energy oriented projects can take advantage of Energy Savings Improvement Programs (ESIPs) which can, in appropriate circumstances, pay for themselves through a combination of state incentives and energy cost savings.

We have seen how school districts can change their day to day operations to achieve holistic sustainability-making cultural changes, involving the entire school community and putting forth a continuous effort. Successful sustainability efforts take into account environment, education and economics. When used together, these can help your district to achieve goals that will benefit the present and future members of its community.

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