



NATIONAL ASSOCIATION OF INDEPENDENT SCHOOLS

## Go Green, Save Green September 2009

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- **We Pay for What We Value: Building a Culture of Conservation, Stewardship and Sustainability for the Long-Term** .....

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## Introduction

In the current economic climate, incentives to “go green” have never been more compelling. Schools can do the right thing – lessening their impact on the environment – and save money at the same time. Indeed, many independent schools across America are implementing no-cost behavior changes in energy use, landscaping, and paper use, and seeing quick financial gains. They are also spending money to improve their recycling programs, retrofit their lights, and upgrade their heating systems – and seeing paybacks on their investments within one to three years. Even high-cost projects (such as green construction and renovation) will pay back over time, and bring a host of tangible and long-term benefits.

This guide presents 20 case stories from institutions across the country – 13 independent schools, 3 universities, 2 colleges, a public school district, and 1 temple – that demonstrate financial savings through green investments. These examples provide the detail and context that we hope will encourage schools to launch projects and initiatives of their own. Topics cover a large range including recycling, energy saving behaviors and technology, energy purchasing, sustainable food programs, water conservation, sustainable landscaping, and green purchasing.

## Case Stories

Increasingly schools are embracing sustainability in all dimensions of school life: from operations to curriculum to community service to mission and planning. Schools are rapidly appointing sustainability or environmental coordinators to help steer their efforts in a coherent way. Motivations range from the desire to save money through eco-efficiency to a commitment to nurture future leaders who will help build a more sustainable world.

The case stories in this section are told by school representatives – sustainability coordinators, teachers, trustees, facilities managers and others – who believe deeply in the importance of environmental responsibility. Though they have found ways to save money, they also tend to view these actions in the larger context of seeing that education is fundamental to fostering engaged citizens and committed stewards of a planet in peril.

Five of the 20 examples below are from higher education. Since colleges and universities have been leaders in campus greening for many years, they can in some cases provide stronger data. We present several cases that did not result in overall savings – they broke even – because we believe that the long-term benefits of these initiatives outweigh concerns about savings (these include Unquowa School’s sustainable food program, Woodward Academy’s sustainable landscaping, and Harvard University’s green cleaning initiative). The following stories are only a sample of those that exist. The authors and their contact information are listed so that you can find out more in order to implement similar projects on your campus.

## Reduce, Reuse, Recycle

### 1- Paperless Communications: Princeton Day School (NJ)

Liz Cutler, sustainability coordinator, lcutler@pds.org (NAIS Institute for Leadership in Sustainability alumna)

In the last few years, Princeton Day School (PDS) has implemented a host of green programs and initiatives, including planting an organic garden, getting rid of disposables, discussing sustainability in the curriculum, and conducting a trash audit. In this example of converting to paperless communications, we realized that we could save significantly on paper and printing costs by changing some old habits. Like most schools, we were accustomed to printing our own hard copies of student handbooks, newsletters, booklets, and invitations. But the conversion has been quite painless. It's better for the environment and has had a real impact on our bottom line.

Examples include:

(a) Athletic Hall of Fame Award Program/Bifold, Fall, Winter, and Spring

No longer printing, using a PowerPoint presentation instead

*Standard quantity:* 275

*Price for printing:* \$161.13 x 3 for each season = \$483.39

(b) Upper School Summer Reading Booklet

No longer printing, HTML version on [www.pds.org](http://www.pds.org) since summer 2007

*Standard quantity:* 1,000

*Price for printing* = \$1,553.26

(c) Lower School Summer Reading Booklet

No longer printing, HTML version online since summer 2008

*Standard quantity:* 375

*Price for printing* = \$589.71

(d) PDS Handbook/Directory

No longer printing handbook section, only directory; therefore, reduced by at least 100 pages.

Handbook is now found as an HTML version online since fall 2008.

*Standard quantity:* 1,200

*Price for printing:* \$6,155.40 for handbook/directory version; \$4,037.55 for directory only version.

*Savings* = \$2,117.85

*Price for postage:* \$2,000 for mailing of handbook/directory version; \$1,100 for mailing of directory only version. *Savings* = \$900.

*Total savings* = \$3,017.85

(e) PDS Newsletter

No longer printing biannual PDS Newsletter. Converted to monthly electronic version – *ePDS* – in 2007. Printed edition had gone to about 2500 parents, staff and faculty and about 6000 alumni. Now alumni receive news through other electronic tools such as e-mail blasts, news posted on the alumni portion of the school website, and specific news posted on *Facebook*.

*Price for printing and mailing newsletter twice/year to total of 8,500 people:* \$18,388.08

*Total savings* = \$18,388.08

## **2- Recycling Organics: Lake Country School (MN)**

Sarah Sponheim, parent and trustee, [sfsponheim@yahoo.com](mailto:sfsponheim@yahoo.com)

In the fall of 2007, I was introduced to the concept of organics recycling, a system in which all biodegradable material (food scraps, including meat, and non-recyclable papers such as paper towels, food packaging, tissues, paper plates, etc.) is separated and collected in biodegradable bags. Materials that can't be composted include metal, glass, and all plastics. This organic waste is hauled to a commercial composting facility. The finished compost is sold to landscapers and farmers.

I approached our principal and building manager with a proposal that we switch from traditional waste and recycling hauling to separated organics, trash and recyclables. We met with a salesperson

from a private hauling company that collects organics. We also met with a representative from the county who has been working to convert suburban schools and neighborhoods to organics recycling. Our principal and building manager were receptive. The salesman from the hauling company assisted us in terminating our standing waste-hauling contract and establishing a new one.

In January 2008, we launched the program. Our 300-student school does not offer hot lunch, so students in our lunchroom learned how to separate the remains of their lunch boxes. Teachers in individual classrooms set up their own collection systems for organics. Student and teacher compliance has been strong; administrative staff may need additional guidance.

A small grant from a private foundation funded the initial purchase of supplementary bins and compostable bags as well as the publication and mailing of an educational brochure about organics recycling that was sent to all Lake Country families. Ongoing expenses include the cost of biodegradable bags, which is somewhat higher than standard bags.

Lake Country School has seen significant financial savings since introducing organics recycling. The tipping fee for organics in Hennepin County is lower than that for garbage and is not taxed. Garbage tipping fees are heavily taxed (about 30%). Our waste hauling bills seem to indicate that most of our savings can be attributed to fewer pickups and, perhaps, to contracting with a more ethical hauler than we had before.

The primary benefit of organics recycling, however, resides in the environment. We are diverting a significant quantity of organic matter from the Minneapolis incinerator and local landfills, thus offsetting carbon dioxide and methane emissions. At the same time, by furnishing the raw material necessary to create compost, we are helping to replenish the soil and increase carbon sequestration through enhanced plant growth without reliance on petroleum-based fertilizers.

*Cost of hauling separated waste and recyclables in 2007 = \$6,120.00*

*Cost of hauling separated trash, organics, and recyclables in 2008 = \$2,833.00*

*Savings: \$3,287.00 (54 percent)*

### **3- Single-Stream Recycling: Saint Mark's School of Texas (TX)**

Dan Northcut, Director of Environmental Studies, [northcut@smtexas.org](mailto:northcut@smtexas.org) (NAIS Institute for Leadership in Sustainability alumnus)

When we started our sustainability movement here at St. Mark's in 2006, we contracted with a company that had single-stream recycling ability. In other words, we were able to throw any and all recyclable items (paper, plastic, glass, and metal) into the same receptacle. We bought "blue bins" for all the classrooms and offices and large bins on wheels (toters) for every floor of every building. The students and teachers empty the smaller bins into the big bins; the maintenance crew empties the big bins into a compactor at the back of campus. When the compactor is full, the recycling company takes it to their facility. (We conduct fieldtrips with our students to the facility so they can see the machinery that separates all of the different items. This is very educational and provides a huge incentive to actively participate in the program.)

- Our annual savings are about \$7,000/year in reduced waste hauling fees. We lowered our trash-hauling bill from \$1,200/month to \$580/month – a 52 percent savings.
- We recycle about one ton/week of combined recyclables (mostly cardboard and paper) (about 50 tons/year).
- In good months we've earned \$200 on the recyclables; in other months we've lost up to \$100. The income from recycling varies according to how well we do at keeping trash out of the recycling bins and also how well we pack the compactor. The average return for the actual recyclables is about \$40/month (\$500/year).
- We pay \$250/month for the compactor (\$3,000/year) and \$100/month pick-up fee (\$1,200/year).

- The blue bins (small, medium, and large) for the entire campus cost about \$5,000 so we had a two-year payback on those.
- Our recycling costs are up a bit this year (2008-09), but we are still saving money.

One simple idea has made our campus more financially and environmentally sustainable – no small feat in these tough economic times. To top it off, the educational value of the program is truly priceless.

### Energy Savings from Changes in Behavior

#### 4- Lights Out: California State University, Fresno (CA)

Dick Smith, Utility Manager, [dicks@csufresno.edu](mailto:dicks@csufresno.edu)

In the summer of 2000, California faced an energy crisis. Pacific Gas and Electric Company (PG&E) started requesting that customers reduce their demand for power on short notice. At Fresno State, Facilities Management decided to hire four students to walk the campus each day during the peak demand hours of noon to 6pm turning out lights and non-essential equipment (computer, copiers, coffee pots, etc.) from mid-May to mid-August (the campus student population drops from 22,000 during the academic year to 4,000 during the summer). The results were surprising and unexpected: the students reduced the electricity bill by \$35,000 in just one month. They soon came to be known as the “Energy Bulldogs.”

Another unexpected result was a general shift on campus toward a culture of energy conservation. Within a couple of days after they started, the Bulldogs complained that students and staff were thwarting their efforts and turning lights and equipment back on after the Bulldogs left. They were urged by the utility manager to keep doing the same thing and see what happened. Within days the campus community started supporting the Bulldogs and even turning off lights by themselves. Eventually the Bulldogs started serving primarily as reminders rather than enforcers of appropriate behavior.

The Energy Bulldogs, who wear special golf shirts to identify themselves, have continued their work on campus every summer since. The students work in male-female pairs. One pair roams the campus from 10am to noon; two pairs from noon to 6pm; and one pair from 6 to 8pm. The program has expanded to include educating faculty, staff, and students with energy tips for both campus and home. The bulldogs also check for burned out lights, and they have done inventories of occupancy sensors and exit lights.

*Savings:* \$105,000 in energy savings in one summer (three months), which is about 8 percent of the \$5 million annual energy bill.

### Energy Savings from Retrofits and New Technologies

#### 5- Reducing Energy Costs and Carbon Footprint: The Colorado Springs School (CO)

Kevin Reel, head of school, [kreel@css.org](mailto:kreel@css.org) (NAIS Institute for Leadership in Sustainability faculty)

As schools and businesses now embark on their quest to “go green,” Colorado Springs School (CSS) is already a veteran. More than five years ago, CSS began implementing “green” measures throughout our campus. In an effort to reduce energy costs and eliminate excessive use of natural resources, CSS has reduced its average natural gas, water, and electrical usage by more than 20 percent annually since 2004. As a member of the Green Schools Alliance and annual participant in the Green Cup Challenge, CSS continues to explore additional ways to reduce its carbon footprint and save money along the way. The school’s return on investment has been outstanding. With an average annual

investment of \$4,000, CSS reduced energy costs by more than \$25,000 each year for the past four years. Listed below are various measures and their impact on energy use and cost savings.

*Electrical Measures Implemented:*

- 1) Installed programmable thermostats [A/C units] throughout school year in three buildings [Qty=15]. *Annual savings* = \$5,660
- 2) Shut down buildings when not in use: Implemented plan to reduce electrical and heating costs by managing energy usage during summer months. *Savings* = \$3,847
- 3) Replaced Exit lights with newer LED fixtures campus-wide [Qty=58]. *Savings* = \$140
- 4) Replaced fluorescent light fixtures with lower wattage T-8 bulbs and ballasts where possible campus-wide [Qty=12 fixtures/250 bulbs]. *Savings* = \$45
- 5) Installed photo-sensor lights on lower campus to ensure lights on during darkness. *Savings* = unknown
- 6) Installed manual timer for upper campus lights operating per schedule set by facilities. *Savings* = \$936
- 7) Where possible, replace fluorescent lights with non-hazardous lights. All bulbs were ALTO environmental friendly – eliminate disposal costs. *Savings* = \$120
- 8) Change to all LCD monitors [60 percent complete]. *Savings* = \$535

*Heating/Natural Gas Measures Implemented:*

- 1) Installed programmable thermostats [Heating units] throughout school year in 3 buildings [Qty= 15]. *Savings* = \$3,337
- 2) Shut down buildings when not in use: Implemented plan to reduce electrical & heating costs by managing energy usage during winter months. *Savings* = \$2,055
- 3) Adjust water heater temperatures to 120 degrees in selected buildings on campus. *Savings* = \$230
- 4) Installed 12 steam heating controls in one building and repaired/replaced steam controls in another – increased comfort for employees/students [Total campus wide = 52 controls]. *Savings* = \$125
- 5) Lower level heaters were replumbed to increase steam flow in one building and level out temperature swings. *Savings* = \$150
- 6) Adjust unoccupied temperature settings down 10 degrees. *savings above*
- 7) Perform regular scheduled maintenance on all HVAC systems to improve efficiencies. *savings above*

**6- Computer Monitor Power Management: Phillips Exeter Academy (NH)**

Jennifer Wilhelm, sustainability coordinator, [jwilhelm@exeter.edu](mailto:jwilhelm@exeter.edu)

In September 2007, Information Technology Services (IT) at Exeter implemented EPA's free EZ Save Monitor Power Management (EZ Save) on 95% of the 900 school computers it manages. EZ Save, then a feature of EPA's Energy Star Program, runs via a login script and shuts down computer displays after five minutes of idle time. Once installed it ensures that everyone is participating in the program whenever they log into an Academy owned computer. An exception was made for faculty because of their use of projection in class – they didn't want their displays going out every five minutes.

Exeter began making the transition to 40-watt liquid crystal displays (LCDs) about 5 years ago, and has swapped out almost all of our 85-watt cathode-ray tube displays (CRTs). Currently at Exeter we have a 600/300 desktop/laptop split. (Laptop numbers have been steadily climbing over time. Clearly laptops are a more energy efficient choice than the traditional desktop and display. But the higher price tag and shorter lifespan can offset these savings.) The following calculations are for Exeter's 600 LCD displays, since energy use by laptop screens is small and difficult to estimate.

*Computer hours of use:* 10 hours/day, 5 days/week

*Cost of electricity:* ~ 11 cents/kWh

*Cost of running 600 LCDs without EZ Save:* 2600 hours x .04 kWh x .15 = \$11.44 per display/year x 600 = \$6,864

*EPA predicted savings with EZ Save = ~50% or \$3,432*

This technology is not an exact science, but it does demonstrate how savings can add up when running a large number of computers. Since Exeter implemented EZ Save, the school is doing more with computer power management in its public labs, such as shutting them off at night and turning them on in the morning. This is a good start, but we have a ways to go. NOTE: The EZ Save application is no longer available for download from the EPA web site. There are other options available.

### **7- Lighting Replacements: Millbrook School (NY)**

**Barry Schnoor, director of physical plant, bschnoor@millbrook.org**

Here is an example of a simple idea paying off with multiple benefits. Our retrofit efforts described below have ended up saving energy, reducing our carbon footprint, saving thousands of dollars, and giving us better quality lighting, thus immediately improving our quality of life.

In 2006, Millbrook replaced:

- forty 455-watt Metal Halide ice rink lights with four-lamp T-5 (234 watt) fixtures
- twenty-four 275-watt gym fixtures with T-5s
- thirty-six 25-watt incandescent step lamps in the theater with 3-watt LEDs
- more than 400 60- and 100-watt incandescent bulbs with compact fluorescent light bulbs (CFLs)

*Total initial cost for all 64 fixtures* (including cost/fixture of about \$150 and lift rental; not including staff time, which was about 3-4 person-days at \$18/hour) = less than \$9,000

*Savings in electrical costs with ice rink lights:* about \$3,500/year (approximately 32,000 kWh/year) at a rate of just over \$.11/kWh, including demand charges

*Savings with gym lights:* about \$400/year

*Payback for this project:* Less than three years

*Payback for LED replacement:* Less than five years (the LEDs are expensive), but we're saving significant time not changing these bulbs every 90 days.

*Cost of 3-watt LEDs =* about \$15 each for amber bulbs (from company called Watt Man in Charlottesville, VA); preferred over white LEDs, which cost about \$11 each.

*Payback for CFL replacement:* has not yet been calculated, but we got a good price on the new bulbs and they last longer and save maintenance time in replacing bulbs.

*Cost of CFLs =* about \$2 each (purchased from Sun Park in California); good lamps with good color and instant-on ability; work pretty well down to about zero degrees Fahrenheit.

*Disposal:* Step lamps and incandescents were thrown out.

*Donations:* 12 gym fixtures donated to nearby horse farm.

*Dismantling and selling:* Other 12 gym fixtures dismantled and sold as copper and aluminum scrap.

*Recycling:* Lamps and ballasts sent to ALR – American Lamp Recycling – out of Wappingers Falls, NY. ALR charges us for disposal, but it was roughly balanced, or at least offset, by the copper and aluminum we sold as scrap.

*Recommendation:* Stop buying incandescent bulbs (except for special applications that need dimming). There are dimmable CFLs, but they are quite expensive. Replace, by attrition, incandescents with CFLs. Replace your long-burning bulbs, and lastly, replace out-of-the-way bulbs, like closets. Note: CFLs do contain small amounts of mercury, thus responsible disposal is important. LEDs are worth the investment in some cases, especially in out of reach areas, and areas where that



LED light quality is satisfactory.

### **8- Lighting Replacements: Ithaca College (NY)**

Marian Brown, sustainability coordinator, mbrown@ithaca.edu

#### *Fitness Center:*

In an effort to save energy, go green, and save green, Ithaca College replaced the lighting in our fitness center. The old fixtures were sodium vapor lamps: 48 light fixtures @ 400 watts each for a total of 19,200 watts an hour. These lights were on roughly 100 hours per week, 52 weeks a year, which equals 99,840 kWh. At a rate of \$0.12 per kWh, our old operating cost equaled about \$11,980.80 per year.

The new light fixtures in the fitness center are T-5 fluorescent lamps. We installed one for every two old fixtures that we removed. (Note: New lamps have twice the lumen output per lamp than previous fixtures, plus new lamps have an “instant-on” feature the old “slow-start” lamps lacked.) These extra capabilities meant we only had to add 24 new light fixtures @ 324 watts each for total of 7,776 watts an hour. Lights are still on roughly 100 hours per week, 52 weeks a year, which equals 40,435 kWh.

*New operating cost:* \$4,852.22 per year

*Savings:* \$7,128.58 per year (60%)

The purchase price for the light fixtures was \$5,200.00, plus 72 hours of labor to complete the work (our own electricians did the work).

*Payback:* roughly one year and a \$7,128.58 savings every year after that.

#### *Ben Light gymnasium:*

At our Ben Light gymnasium (four different connected gyms) in Hill Center, we replaced the old metal halide 400-watt fixtures with T-5 four-lamp fluorescents that only use 216 watts of energy. This included roughly 120 fixtures that are on an average of 16 hours a day. This change saves 22kw an hour or 128,947kWh a year in energy. An unexpected benefit: after eliminating that amount of watts, they still doubled the light lumens in the gym.

*Savings:* \$15,473.66 per year

### **9- Green Cup Challenge™: Northfield Mount Hermon School (MA)**

Becca Leslie, environmental science teacher and sustainability coordinator, bleslie@nmhschool.org (NAIS Institute for Leadership in Sustainability faculty)

The Green Cup Challenge™ is an annual interscholastic competition to reduce electricity usage during the month February. The first Green Cup Challenge (GCC) was launched in 2006 between Phillips Exeter Academy (NH), Northfield Mount Hermon (NMH), and the Lawrenceville School (NJ). The program has been expanding ever since. Now hosted by the Green Schools Alliance, the GCC included over 150 boarding and day schools in 2009. (See [www.greenschoolsalliance.org/greencup/index.html](http://www.greenschoolsalliance.org/greencup/index.html) for more information.)

#### *Savings through behavioral and infrastructure changes:*

In February 2006, the NMH dorms competed with each other, which was a significant motivator for many of the students who would not have otherwise been involved. Students spent the month religiously turning off computers and lights when not in use. In addition, facilities converted the lighting in the Dining Hall and Chapel from incandescent to compact fluorescent. The path lights on campus were also modified to include more efficient ballasts and lighting and aimed down to reduce light pollution. While this started as a month long competition, its impact was felt throughout the year and beyond. With this annual competition, NMH is educating its entire community – students, families, and staff – to reduce its carbon footprint. It is difficult to estimate the long-term impact these changes in behavior will have at school, at home, and beyond.

*Savings:*

NMH saved approximately \$5,643.89 in February 2006 at a rate of \$0.12/kWh. NMH saved 45,960 kWh (10.73 percent) in electricity consumption compared with January of that year. (As of 2007, all schools compare their February energy consumption with that of the previous February.) At 1.55 lbs CO<sub>2</sub>/kWh (national average), this translates to about 71,238 lbs. of CO<sub>2</sub> prevented by NMH.

### **10- Saving Energy with Virtual Servers: Auburn University**

Jeff Stallworth, office of information technology manager, [stalljb@auburn.edu](mailto:stalljb@auburn.edu)

In early 2000, the Auburn University Office of Information Technology (OIT) began the virtualization of Auburn's computer systems. Virtualization is a technology that enables a reduction in materials and space required for computers, and a reduction in energy usage by up to 80 percent. Since computers utilize, on average, only 8 to 15 percent of their computing capacity, virtualization uses software to enhance efficiency by allowing several operating systems to run virtually on a physical host computer.

#### *Savings:*

- We have replaced approximately 140 servers with a seven-server virtual cluster. It's possible to run up to 20 virtual servers within one physical server. It takes more energy to cool a computer than to operate it, so by replacing 20 servers with one, cooling costs have dropped dramatically. The use of virtualization is growing rapidly in other departments on campus.
- We have reduced our materials use, transportation costs, and housing space. At the other end of the cycle, when the servers eventually need to be replaced, there is less material to be disposed of.
- An average server cost about \$150.00/per year to power (An average server has two 500-watt power supplies and runs at approx 270-300w/hour. 300w/hr x 24 x 365 = 2628 kWh. We pay about .05-.06/kWh, so about \$150.00 per year. This is cheap power – California is about 12 cents/kWh.) Using virtualization and a conservative consolidation ratio of 15:1 (15 virtual servers running on 1 slightly larger server), this translates to a savings of about \$2,050.00 per cluster (instead of 15 x \$150.00, you use approximately 1 larger server @ \$200.00/per year), or \$14,350 for seven clusters.

#### *Additional benefits include:*

- For the user, virtualization provides a more reliable service and for OIT more flexibility and ease of management: an expansive computer system like Auburn's can employ cloud computing, a technology that has been used for years by companies like Google in which there is little or no centralized infrastructure. This means, there is less danger of a centralized server crashing and information being lost — instead, information can be moved around and stored in a decentralized cloud of computers.
- From a sustainability point of view, when a broad system like Auburn's is in low demand, say between 2:00 – 5:00 AM, the system can consolidate processing on to fewer servers and place unused servers in a low power mode while they are not needed, saving even more energy.

#### *Virtualization Software*

There are a number of virtualization software packages available, both commercial and open source. Examples include: VM Ware, for PCs and Macs; Microsoft Hyper-V; Xen open source; and Parallels Desktop for Mac.

### **Energy Purchasing**

#### **11- Managing Costs via Energy Purchasing: Temple Shalom (MD)**

Craig Schultz, president, Energy Buying Strategies, Inc., [craig@buyingenergy.com](mailto:craig@buyingenergy.com)

Temple Shalom, which includes a religious school in its 20,000 square foot building, has stabilized its electricity costs over the past several years by managing its competitive pricing choices.

*Background:*

In Maryland as in other “competitive electric” markets, electricity costs are divided into two parts – (1) moving power within the local utility systems, and (2) generating the electricity and transmitting it to the edge of the local utility systems. The latter category, accounting for about two-thirds of total costs in Maryland, is “competitive,” meaning that buyers can select from competing licensed suppliers or simply accept the default auction rate. The default auction rate now changes every three months for users in the Temple’s rate class. No matter their choice, the local utility provides the service to buildings through its own wires so that physical reliability is unaffected.

While each state or utility territory tends to have its own market rules, the following example may be useful to schools purchasing electricity and natural gas in areas with open, competitive markets. The competitive electric markets tend to be concentrated in parts of the Northeast U.S. and Texas, while competitive natural gas options tend to be somewhat more widely available.

*Competitive contract:*

In mid-2006, Temple Shalom contracted with a competitive supplier for a two-year term at a fixed price, rather than doing nothing, which would have placed it on the default auction rate. The auction rate was about 30 percent (or \$750 per month) higher than the fixed rate for the first few months. The two-year fixed price also offered much more budget certainty to the Temple than the default auction rate, which would change many times over those two years. When its two-year contract expired in mid-2008, Temple Shalom chose the default auction service because it was less expensive than competing offers at that time. By late 2008, competitive offers had declined relative to default auction rates so the Temple switched back to competitive supply under another two-year, fixed-price contract. In making its choices, the Temple weighed heavily the experience and financial strength of competitive suppliers and carefully read their contracts.

*Summary:*

By knowing the basic pricing offers available to it, Temple Shalom was able to make informed decisions on three occasions over the past two and a half years that significantly stabilized its year-over-year electricity costs. While its decisions also happened to lower its total electricity costs, there was no guarantee that it would do so beyond the three-month auction prices known at any time.

**12- Cost-Effective Solar Power via Lease: Montgomery County Public Schools (MD)**

Craig Schultz, president, Energy Buying Strategies, Inc., [craig@buyingenergy.com](mailto:craig@buyingenergy.com)

The Montgomery County Public Schools district was able to achieve several worthwhile goals:

- lowering its electricity costs,
- stabilizing those costs over the long term,
- providing hands-on education in sustainability, and
- promoting large-scale renewable projects within its state,

by allowing a solar power company to install sizable rooftop solar arrays on four of its schools and executing a 20-year lease to buy the power from those arrays.

*Power Purchase Agreement:*

The school district’s contract is called a Power Purchase Agreement (PPA). Under a PPA, the solar company finances, builds, owns, and operates the installations and sells the electricity output to the school district at a fixed per unit rate. The starting rate in 2008-09 is well below the school district’s current cost for utility power and should save \$100,000 per year. In addition, the solar lease rate is set to increase only 3.5 percent per year, providing price and budget stability to the school district over the 20 years of the lease.

*Request for Proposal (RFP) process:*

The school district went through a competitive RFP process to obtain the PPA. The economics of the lease were also helped by a Maryland regulation that requires all energy suppliers in the state to obtain a certain percentage of their energy from solar sources. Solar installations tend to occur most frequently in states such as California, Hawaii, Colorado, Massachusetts, Connecticut, New Jersey, and Maryland where good renewable incentives and/or high utility rates make solar a better financial proposition. No matter the state, there are sizable federal incentives that can apply to certain solar installations. For many schools, a lease arrangement like the PPA may be an attractive alternative to the capital outlays required to buy a renewable installation outright.

## Sustainable Food Programs

### 13- Promoting Sustainable and Local Food: The Unquowa School (CT)

Sharon Lauer, head of school, [slauer@unquowa.org](mailto:slauer@unquowa.org) and John Turenne, president and founder, [Sustainable Food Systems, \[jturenne@sustainablefoodsystems.com\]\(mailto:jturenne@sustainablefoodsystems.com\)](http://SustainableFoodSystems.com)

The Unquowa School launched a sustainable dining program in 2005 with the goals of improving nutrition, reducing waste, and supporting the local economy. Working with an outside consultant, school staff met with local farmers and vendors, developed a mission statement, and worked with the school community and parents to raise awareness and gain buy-in. To date, Unquowa's family style dining program achievements include reduction in waste, creation of a kitchen garden, a composting program, better food quality and freshness (with organic milk, vegetables, and local cage-free eggs), and incorporation of food awareness and hands-on work into the curriculum.

#### *Cost per meal:*

- \$1.70 per meal while increasing local and organic purchasing to a level of approximately 45 percent. Note: Many schools running conventional programs are paying \$1.95 or more per meal.

#### *Factors contributing to cost savings:*

- Change in packaging from individual to bulk (for example, serving organic milk from gallon containers rather than regular milk from individual-sized containers; morning snacks in large rather than individual bags).
- Direct purchasing of a few items (such as beef) that control the chance of mark-up from a distributor.
- Scratch cooking, utilization of all ingredients.
- Annual sustainable foodservice strategic planning session of the entire team: chefs, head of school, finance, and faculty liaison.
- Strong implementation of weekly and financial operating and production systems (invoice, inventory, and operating reports), which allows better control and monitoring of financial performance by constantly comparing weekly results against forecasted plan, and adjusting as we go.

#### *Additional improvements to the program:*

- Menu structure hasn't changed in terms of number of entrees. Salad bar choices have increased.
- Addition of a floor mixer to make bread dough for homemade bread and pizza dough.
- Biggest financial investments have been in staffing:
  - Hiring of an experienced, scratch-cooking chef.
  - Addition of a full-time similarly experienced cook.

Unquowa's sustainable food program is an example of breaking even financially while improving the health and quality of our food and enhancing the education of children, faculty, and staff. Where we save money in some areas, we reinvest it in others to improve the program and instill lifelong habits of good stewardship.

### 14- Going Trayless in the Cafeteria: St. Paul's School (NH)

Maura Adams, environmental stewardship manager, madams@sps.edu and Kurt Ellison, food services director, kwellison@sps.edu

In an effort to combat the problem of food waste, St. Paul's School experimented with trayless foodservices for three weeks during their five week Summer Program in 2007. We carefully considered the pros and cons and felt that the pros far outweighed the cons.

*Cons:*

- Convenience – One must walk more.
- Time consumption – One must walk more.
- Table condition – Without the tray to catch spills, tables can get messy.
- Parents with small children – Will most likely have difficulty navigating without trays; must make sure they are available.

*Pros:*

- Waste reduction – This was greater than expected.
- Food purchasing, kitchen production reduction – Reduction in waste directly impacted food purchases and kitchen production.
- Dish room labor reduction – Going trayless has freed up one person.
- Water and chemical reduction – Trays alone account for one-third of the water and chemical use.
- People eat less – If you don't have it in front of you, you're not as tempted to eat it.

*Lessons learned:*

- Total faculty and staff support is necessary before beginning the initiative.
- The first year we made it optional for the students, however, we had about 95 percent participation from the student body. Only the older boy athletes insisted on using a tray. The second year we required full participation and only had trays available for parents with small children and for injured students who had friends helping them with their meals.
- We also learned that the correct placement and abundance of silverware is critical.
- Water should be provided in the dining room for beverage replenishment, either with pitchers, Poland Spring dispensers, or plumbed water bubblers.
- More attention needs to be paid to cleaning the tables during the meals.

*Savings:*

In the first 12 weeks of trayless dining,

- We saved nearly \$16,000 in food purchases as compared to the same period the year before. The savings in milk totaled 685 gallons or nearly 11,000 glasses. We saved more than 1,300 gallons of juice or the equivalent of 21,000 glasses. Total for all beverages was 11,093 gallons or 177,500 glasses. The savings in cereal amounted to 43 cases or 5,700 bowls, and we used 8,200 fewer eggs for a savings of 690 dozen.
- We saved about 1,100 gallons of water per day, which is over 261,000 gallons in a school year or more than 4 million glasses of water.

*Reinvestment and improvement:*

Savings from the reduction of food waste has been totally reinvested in the dining program. We've added three stir-fry stations to the dinner meal seven nights a week as well as a smoothie bar seven mornings a week. Except for these and a few other additions, the beverage and menu choices have remained the same. For St. Paul's School, going trayless has been a win-win decision.

## **Water Conservation**

### **15- Saving Water, Saving Money: The Colorado Springs School (CO)**

Kevin Reel, head of school, kreel@css.org (NAIS Institute for Leadership in Sustainability faculty)

Colorado water law does not allow us to retain water when it lands on our ground or flows through the campus, but we can focus on using less water from the local utility. Like our cost effective energy-saving action steps, those that reduce our water consumption are not necessarily high-profile. However, these actions help us use the water we need, and not purchase water that would provide little benefit. They include:

*Water Measuring Devices:*

- 1) Installed rainwater sensors on sprinkler system (shuts down system if ¼ inch of water is present). *Savings* = \$3,360
- 2) Adjusted sprinkling times to late evenings and reduced sprinkling times to meet restriction guidelines. *Savings* = \$3,050
- 3) Installed circular pump in steam boiler. *Savings* = \$120
- 4) Installed separate meters in two buildings to measure water flow from buildings better estimate wastewater usage. *Savings* = \$200

**16- Waterless Urinals: Collegiate School (VA)**

Robert Sedivy, vice president for finance (retired), [bsedivy@collegiate-va.org](mailto:bsedivy@collegiate-va.org)

Bob Sedivy and the facilities staff at Collegiate decided in 2003 to design a test installation of waterless urinals in the Collegiate middle school boys' restroom. Aside from saving water, such fixtures seemed to be resistant to the efforts of some students to jam wads of paper into plumbing fixtures to get them to overflow and flood the room. The assumption was that if waterless urinals could survive a middle school boys' restroom they would probably work anywhere. The middle school division head agreed to the experiment and we implemented the plan over the summer.

The experiment was a success. Not only did the urinals save a lot of water and emit no odors, but there was no vandalism. Facilities staff learned the life of the chemical cartridges that make the waterless urinals work and housekeeping staff adapted to a new cleaning routine.

Collegiate steadily expanded the program and by 2008 had waterless urinals in nearly every men's restroom on campus. Recently we opened a new building with waterless urinals as part of the design. Planning ahead meant they not only save water, but also save on hundreds of feet of copper pipe and its installation.

*Costs and savings:*

*Cost of one waterless urinal:* about \$250 (for Falcon or Sloan brands)

*Installation time and cost:* about three hours (including removing old unit) @ \$33.75 per hour for in-house plumber (\$25 plus an estimate for benefits); total = \$101.25

*Cost of chemical cartridge:* \$45; Cartridges are generally replaced every six months in heavily used areas, like locker rooms, and annually in other areas.

*County dump fee for old unit:* \$2 for an 80 lb. unit

*Estimated annual water savings:* 32,000 gallons per unit per year (conservative estimate for the school; manufacturer's estimate is higher)

*Estimated water cost savings:* \$95.68 per unit, per year

*Estimated sewer cost savings:* \$111.49 per unit, per year

*Payback on replacing an old urinal:* 2 years, 2 months (including cost of in-house labor)

*Possible additional savings:* copper pipe, about \$2.40 per foot, plus fittings, plus installation

*Estimated school-wide savings:* \$8,300 per year and more than 1,250,000 gallons of water (for about 40 units in 13 buildings)

**Green Cleaning**

## **17- Green Cleaning Breaks Even: Harvard University**

Jason Luke, associate director, custodial and support services, [jason\\_luke@harvard.edu](mailto:jason_luke@harvard.edu)

Begun as a pilot program in the fall of 2004, Harvard's Facilities Maintenance Operations (FMO) Green Cleaning Program addresses environmental responsibility and safety in the following critical areas:

- Cleaning Chemicals and Dilution Control Systems
- Floor Care Systems
- Wipers and Dusters – Microfiber™ Technology
- Vacuums and Carpet Care
- Other Mechanized Cleaning Equipment
- Entrance Matting Systems
- Automatic Aerosol Deodorizers and Urinal Blocks
- Hand Soap
- Paper Products
- Plastic Bags
- Implementation Strategy (including Employee Training and Building Occupant Education)

### *Cleaning product selection:*

Green Seal™ principles, certifications, and recommendations are a minimum product selection standard for the FMO Green Cleaning Program. Harvard is testing a variety of products, but mainly using Butchers, a division of Johnson-Diversey, and Bay West paper, made by Wassau Paper.

### *Training:*

The Green Seal Standard for Cleaning Services (GS-42) is used as a guide for providing cleaning services. All FMO custodians have been trained directly by Green Seal in green cleaning procedures and the GS-42 specifications, and FMO plans to become GS-42 certified in 2009.

### *Costs and savings:*

- Program has been largely cost neutral because Harvard has phased it in (rather than buying all new equipment at once), used up old product, etc.
- Case could be made for direct cost savings if a school is transitioning from inefficient dispensing systems to more efficient ones.
- Cost savings can also be achieved by reducing the number of products used.
- Some work processes become more intensive, but there are other procedures that a school may be able to reduce or eliminate as part of a green program (such as only throwing out trash can liners when they are soiled; leaving stone floors natural rather than finishing; doing restorative procedures – stripping and refinishing, carpet extraction – only as needed instead of on fixed schedule).
- Since cleaning is primarily a labor cost-driven business, labor is far more important than product cost. Note: This largely depends on one's starting point and on what appearance results one is trying to achieve.
- Training can be costly if you are losing productive time. Since Harvard is trying to achieve GS-42 certification, which is a training-heavy standard, this will bring extra costs. However, if a school chooses to do the training in-house or rely on free resources (i.e. manufacturers, distributors), training costs can be fairly low.

For more information, go to [www.greencampus.harvard.edu/greenclean/](http://www.greencampus.harvard.edu/greenclean/)

## **18- Going Green for a Healthier Clean: Bright School (TN)**

Paul M. Wildenberg, President/Owner, Advance Paper Company, Inc.,  
[pwildenberg@advancepaperco.com](mailto:pwildenberg@advancepaperco.com)

Two years ago, as part of its "Bright Green" campaign, Bright School extended their green program to include the cleaning products and procedures used in the school. Our company, Advance Paper,

partnered with the school to make the changes necessary to “go green.” Not only did we present a healthier way of cleaning; we also generated cost savings to the school in the process.

After evaluating the products that were currently being used, we made recommendations for green alternatives. The majority of products that we sell in a green program are Green Seal Certified ([www.greenseal.org](http://www.greenseal.org)).

First, we addressed Bright School’s paper usage. Bright was using folded towels and standard toilet tissue. We installed Wausau Paper’s Hands – Free Roll Towel Dispensers and Three- Roll Tissue Dispensers throughout the entire school. Both dispensers are designed to reduce usage and control waste. The paper used in these dispensers is Green Seal Certified, 100% recycled and uses no chlorine or derivatives of chlorine to make the paper white. Of the 100% recycled product, 80% is post consumer waste. By going to controlled systems, we were able to show a 50% decrease in the amount of paper being used, which translates to dollar savings for Bright.

We then replaced Bright’s liquid soap dispensers with a Green Seal foam hand soap system that is manufactured by Kutol Products. By changing from a liquid hand soap to a foam, a 60% savings in usage was realized, as foam creates more volume than liquid soap. The custodial staff found an added bonus in the foam soap as it does not drip and keeps the restrooms looking neater throughout the day.

Our challenge came when we noted all of the cleaning chemicals Bright was using. Our objective was to change their usage from ten to twelve different products to a few Green Seal products. We introduced a product from Spartan Chemical Company called Clean by Peroxy. This is a hydrogen peroxide based product with multiple applications and is highly concentrated. We supplied and installed a dilution system that takes Clean by Peroxy from the concentrated form and dilutes it to ready-to-use form. This product is so versatile that it will clean floors, carpets, glass, hard surface areas, etc. We were able to cut out all of the ready-to-use products that Bright purchased in aerosols and quarts. By allowing Bright to use their own water, we reduced their cost on chemicals and packaging. Purchasing a concentrated cleaning product resulted in a savings to the school of 50-60%.

We have also been converting Bright School to CRI (Carpet and Rug Institute) approved cleaning equipment to address indoor air quality. The vacuums we are selling to the school have the filtration needed to keep dust particles inside the unit.

We look at several areas when taking a school to green products. Environmental benefits include eliminating or greatly reducing volatile organic compounds (VOCs). We do this by getting away from aerosol products and educating staff on a wet dusting procedure. We also greatly reduce many of the odors that standard products produce.

We continue to reinforce the concept of “Cleaning for Health” with the custodial staff. We want them to know that their job is important, that their main objective is to reduce the amount of sick days per student, and that they are using non-hazardous, non-toxic cleaning products. Hands on training is very important and we conduct in-service training sessions to show how to properly use the green products in their facility. We demonstrate the best way to clean a building while moving them away from the standard products and outdated procedures. Once they have gone through an in-service training class we award them a Certificate of Completion.

#### *Costs and Savings:*

##### Paper

Costs somewhat vary by school. However, when doing cost comparisons, we must look at consumption and controlling usage. Cost per sheet may be lower with a folded towel vs. a roll towel. However, when you factor usage reduction into this, your net in-use cost drops. Bright School’s cost on paper has dropped approximately 25%.



### Hand Soap

The same can be said with foam hand soap. The up front cost may be somewhat higher. However, with a 60% reduction in usage, Bright School's cost has dropped approximately 35%.

### Chemicals

A ready-to-use product may cost \$3.50 per quart. When you purchase the same product in the concentrated form you realize a cost savings of approximately .45-.60 cents per quart.

The result speaks for itself: by successfully implementing its "Bright Green" program, Bright School is a cleaner, healthier place to learn.

## **Sustainable Landscaping**

### **19- Small Steps: Woodward Academy (GA)**

Barb Egan, vice president for finance and administration, [barb.egan@woodward.edu](mailto:barb.egan@woodward.edu) (NAIS Institute for Leadership in Sustainability faculty and NAIS Board of Trustees)

Woodward Academy has shown that going green can also mean taking a new perspective on the aesthetics of your campus. In an effort to be more environmentally sustainable, we have implemented the following changes in our landscape:

- Rubber mulch

Woodward now uses rubber mulch on three elementary school playgrounds. The rubber is 100% recycled and costs twice as much as wood-based mulch. However, the rubber mulch lasts at least twice as long and turns out to be safer than the conventional alternative – we have significantly fewer injuries each year. Considered by many to be an environmental preference, we're either saving a little money or breaking even on our investment in rubber mulch.

- Concrete/grass pavers for parking

Nearly half of Woodward's 10 parking lots now consist of porous concrete and grass pavers. They cost about the same as asphalt parking spaces but are considerably more environmentally friendly. Rainwater gets absorbed and recycled. They reduce runoff and filter storm water, which replenishes aquifers and protects streams. Woodward uses two kinds: all grass spaces, requiring minimal upkeep, and concrete honeycomb grids with pebble filler.

- Native perennial and drought resistant plants

Since 2002, Woodward has emphasized native perennial and drought resistant plants in its landscaping. They cost about the same as high-end plants and have reduced the frequency of watering in the warm months from every day to twice a week. In a state like Georgia, where water can be in short supply, this is by far the best environmental choice.

- Drilling non-potable wells for irrigation.

The cost to Woodward for a non-potable well is about \$25,000. Several have been installed and four more are planned. The cost is not as much an issue as availability. In an area that has suffered two multi-year droughts in the last decade, the landscaping has been maintained by using non-potable water sources. The cost of replacing landscaping would have been high. In addition, in the South, drought poses significant risk to large trees. They tend to blow over in high windstorms during or just after drought periods due to weakened root structures. The safety hazard and potential liability in building damage is severe. How does one measure those costs? It's hard to tell. Woodward's

landscaping is not high-maintenance; it emphasizes native plants. However, in the southeast, it is important to be able to maintain some watering capability even for native plants and trees.

## Green Purchasing

### 20- Purchasing Recycled Personal Paper Products: Macalester College

Suzanne Hansen, sustainability manager, [shansen2@macalester.edu](mailto:shansen2@macalester.edu), and Justin Lee, sustainability associate, [jlee@macalester.edu](mailto:jlee@macalester.edu)

During my senior year in the fall of 2007, I was working as a sustainability assistant in the Facilities Services Department at Macalester. My job was to explore green or environmentally friendly alternatives for things/processes that Facilities already used/did. While exploring options online I found recycled paper products and decided what it would cost the College if we used these exclusively. There appeared to be a significant cost savings, so I created a proposal and presented it to the Facilities Director, Mark Dickinson. Mark was intrigued by the potential savings, and suggested that we try it out in an office building to see how people would react to the new toilet paper and paper towel. We decided not to announce the change and see if anyone noticed. Two months later no one had commented on the shift, so we decided to roll it out across campus. By March 2008, we had switched over the entire campus without a single comment about quality difference. The primary reason that Facilities agreed to switch was the cost savings, which are substantial (see below).

We were lucky that our contract with the Associated Colleges of the Twin Cities (ACTC) – a group of 17 private colleges in the area that have formed a purchasing consortium to save costs – was nonbinding so we did not have to negotiate existing contracts in order to make the switch. We decided to use “recycled content” as our primary criterion in determining the “greenness” of various products. The products we eventually chose also happened to be Green Seal Certified ([www.greenseal.org](http://www.greenseal.org)), which was a bonus.

Of note, Macalester’s previous paper contract was negotiated through ACTC. The recycled paper beat out the preferred pricing of the ACTC contract. We have contacted the other schools with this information.

#### Costs and Savings:

##### Standard Annual Order –

Jumbo Toilet Paper: 728 cases (equivalent # of rolls) at \$31.50 each = \$22,932  
Standard Toilet Paper: 104 cases at \$37.61 each = \$3,911  
Paper Towels: 338 cases at \$66.08 each = \$22,335  
Total Annual Cost = \$49,178

##### Green Seal Annual Order –

Jumbo Toilet Paper: 364 cases (equivalent # of rolls) at \$25.99 each = \$9,460  
Standard Toilet Paper: 78 cases at \$39.38 each = \$3,072  
Paper Towels: 416 cases at \$28.49 each = \$11,852  
Total Annual Cost = \$24,384

*Annual Cost Savings:* \$24,795

## We Pay for What We Value: Building a Culture of Conservation, Stewardship and Sustainability for the Long Term

Wynn Calder, NAIS environmental sustainability consultant and principal, Sustainable Schools, LLC, [wynncal@gmail.com](mailto:wynncal@gmail.com) (NAIS Institute for Leadership in Sustainability Chair)

In recognition of every school's need to be financially responsible, particularly in hard economic times, this guide has been written to demonstrate the quick returns on the wise investment of time and money in campus greening projects. As listed in Part 1 and demonstrated in Part 2, there are a host of simple actions that can lessen our environmental impact and also save money. Schools should do everything they can to achieve this.

However in the long run, campus environmental sustainability involves much more than simply reducing environmental impact. A truly environmentally sustainable campus would not take from the environment any more than the environment could replenish on its own. We're certainly not there yet.

While schools should continually address the low hanging fruit, they should also invest in major efficiency improvements to their buildings, as well as green construction and renovation. Beyond this, they should address teaching and learning about sustainability: incorporating environmental and sustainable development issues into their curricula and emphasizing inquiry-based learning and real-world problem solving. Lastly, schools should promote sustainability in their local communities and regions. All of these efforts will in fact pay back over the long term, demonstrate needed leadership, and enhance school effectiveness, reputation, and relevance.

Ultimately, we pay for what we value. If, for example, schools choose to support the car culture, then they justify investing in parking spaces. If, on the other hand, schools say they value stewardship and sustainability, then they are called upon to break old patterns and reallocate money to projects and initiatives that support these values. Fundraising for green projects has proven highly successful for many schools. There are also creative loan opportunities available, such as tax-free bond issues and self-managed revolving loan funds ([www.campusinpower.org/Campus\\_INpower/REVOLVING\\_FUNDS.html](http://www.campusinpower.org/Campus_INpower/REVOLVING_FUNDS.html)), when fund raising is not enough.

How can schools more effectively build cultures of conservation, stewardship and sustainability? Fundamentally this entails raising awareness and empowering "champions" on campus. The following steps will go a long way toward creating the foundation necessary for this critical cultural shift:

- If you don't already have one, form a sustainability or environmental committee with representation from all constituencies. Make sure that the committee reports to the head and has the power to implement projects.
- Suggest making sustainability and environmental stewardship a school theme for the next year or two.
- Hold public events and bring in outside speakers.
- Encourage students to voice their concerns (and get them in front of trustees).
- Speak at division meetings and meet with grade team leaders.
- Work consistently to gain administrative support. Ultimately, the head, trustees, business manager and others must stand behind the school's position on sustainability.
- Have the committee compose a draft sustainability mission statement, and bring it before the school community for feedback and endorsement.
- Incorporate sustainability into your school's strategic planning process.
- Send a team of staff/faculty to a professional development workshop on sustainability.
- Patiently usher families and faculty along with regular communications on progress, new projects and initiatives.
- Pick a few issues (such as waste reduction, recycling improvements, energy saving projects) and document some early successes. (Focusing on energy and recycling can have a big impact and draw in supporters quickly.)
- In addition to a strong focus on campus operations (or "campus greening"), give your sustainability committee a broad mandate, including topics such as mission, planning, teaching

and learning. Ask: how is our school educating for a sustainable future and contributing to a more sustainable society? Don't lose sight of the big picture.

The good news is that increasing numbers of schools are making it clear that they value sustainability both in how they operate and what they teach. Genuine efforts to be more responsible stewards of the planet fulfill both the very missions of most independent schools and their educational obligation to model and teach responsible behavior. That going green can also save money just adds to the rewards.