



Net Zero's Net Worth: How Renewable Energy Is Rescuing Schools from Budget Cuts

Educators across the country are finding millions of dollars in savings through cheap and simple forms of renewable energy.

by Erin L. McCoy

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Classrooms at Richardsville Elementary School feature a daylight “clerestory,” light shelves, and a blue “learning wall,” which combine to deliver an optimum learning environment at minimum energy consumption. Photo by Sherman Carter Banhart.

As the new Richardsville Elementary School rose from its foundations on a rural road north of Bowling Green, Ky., fourth-grader Colton Hendrick was watching closely.

He would climb to the top of the playground equipment across the street and watch construction crews hauling in bamboo flooring and solar panels.

“He wants to be an architect some day,” recalled Manesha Ford, elementary curriculum coordinator and leader of the school’s energy team. “He would sit and draw, draw all the different aspects.”

Richardsville Elementary actually earns \$2,000 a month selling excess energy to the local power company.

But Richardsville Elementary would not only capture Hendrick’s imagination—it would come to inspire his classmates and school districts around the world. When Richardsville opened its doors in fall 2010, it was the first “net zero” school in the nation, meaning that the school produces more energy on-site than it uses in a year.

Solar tubes piping sunlight directly into classrooms eliminate much of the school's demand for electric light, while a combination of geothermal and solar power cut down on the rest of the energy bill. Concrete floors treated with a soy-based stain don't need buffing. The kitchen, which in most schools contributes to 20 percent of the energy bill, houses a combi-oven that cooks healthier meals and eliminates frying. This means an exhaust fan doesn't pipe the school's temperature-controlled air to the outdoors all day long. Meanwhile, "green screens" in the front hall track the school's energy usage so kids can see the impact of turning off a light in real time.

These and other innovations make Richardsville better than net zero. It actually earns about \$2,000 a month selling excess energy to the Tennessee Valley Authority.

But building a green school isn't enough, according to architect Philip C. Gayhart, principal in the architecture firm Sherman Carter Barnhart, which built Richardsville and has helped the Warren County School District achieve Energy Star ratings for 17 of its 24 schools.

Three factors are essential to making a green school work: First, you need the participation of the community and the local power company; second, you can't forget that a school is a dynamic learning environment; and third, you need to speak the language of money.

Green by necessity

Since the economic recession began in 2008, school districts have suffered. Local tax bases were shaken as property values plummeted, and states have cut back on funding to districts, which were pushed to cut funds wherever they were able. Addressing energy use made a lot of financial sense.

Few states have been harder hit than Arizona, where the 21.8 percent decrease in per-pupil spending was the highest in the nation.

By the end of the first year, energy use had been cut by 15 percent district-wide.

Sue Pierce, director of facility planning and energy with the Washington Elementary School District in Phoenix, watched as teacher positions were cut, furlough days were scheduled, and \$6 million in annual facilities funding disappeared.

"We saw that energy was really an area where we could perhaps save money by simply changing behavior," Pierce said. "I approached the superintendent and asked permission to develop a program."

The district's new energy policy aimed to cut energy consumption district-wide by 10 percent in the first year and 40 percent over the next five years. As part of the program, Pierce began to distribute monthly reports on energy usage, which included every school in the district.

Some schools took to the program more quickly than others.

"Just by changing behaviors, they were showing 10 and 15 percent reduction the first or second month," she said. The reports then fueled a competition between schools, and by the end of the first year, energy use had been cut 15 percent district-wide.

Since that time, the district has hosted a pilot program that, for the first time, demonstrated the feasibility of geothermal power in Arizona. Another pilot used smart water sensors to cut outdoor water use, and was so successful that the cost of the sensors was recouped in less than three months. The district even won funding to build two "green schoolhouses."

Including grants the district has won, Pierce concludes the district has saved more than \$15 million.

And while the district's commitment to environmental consciousness has never been stronger, Pierce thinks that broaching the issue as a financial concern, rather than an environmental one, was the smartest approach.

The school district initially adopted the changes "as a way to save money, to save jobs for teachers," she said. "What started out as a way to save money for the district—and it has—has evolved into a commitment to sustainability."

A foundation without a footprint

While Washington Elementary School District and many others like it were just kicking off their energy programs in 2008, Richardsville Elementary and the rest of the Warren County School District were already five years ahead of the game.



Richardsville Elementary School student Colton Hendrick works at a station about recycling. Students completed their activities after reading “The Lorax” by Dr. Seuss. Photo by Manesha Ford.

The district had kicked off its district-wide energy campaign in 2003 under the direction of a forward-thinking superintendent, according to district Public Relations Coordinator Joanie Hendricks. The district was growing by about 400 students per year, and construction projects seemed to be always on the agenda.

So Warren County became one of the first districts in Kentucky to hire an energy manager and was able to save \$560,499 in the first year by making small changes.

That first year of savings inspired the ambitious plans that came next, Hendrick said. “When you save half a million dollars in just changing your mindset, it just becomes a simple idea.”

Since 2003, the district has offset more than \$7 million in energy costs. That equates to 45 teaching positions. It’s a number that really speaks to people.

“It makes you think twice when you’re going out the door to turn around and turn the light switch off,” Hendrick said, “when you know that could save somebody’s job.”

By the time Warren County decided to focus on greener schools, the architects at Sherman Carter Barnhart had been incorporating newer and greener materials in their plans for years.

“The perception is—and it’s not all wrong—is that it’s more costly, and we think if it’s done correctly it’s not really more costly,” Gayhart said. “I think the real ‘green’ is the dollars you can save the client in the life of the building. That’s the legacy you want.”

Learning gets greener

In 2005, Alvaton Elementary in Warren County opened using 36 kBtus of energy per square foot annually. That’s less than half the national average for schools, which is 73 kBtus. A few years later, Plano Elementary was using 28 kBtus, and today, Richardsville and two net zero-ready schools in the district use only 18 kBtus per square foot.

Net zero-ready schools have everything a net zero school has, minus the solar panels, which Richardsville was able to afford with the help of federal stimulus grants that have since run dry. Bardstown City Schools Finance Director Pat Hagan said although his district is implementing energy-saving measures, the up-front cost of solar doesn't make financial sense right now.

Bardstown, situated in north central Kentucky, has two schools with geothermal systems.

"When they built [Bardstown] High School in '59 I don't think anybody thought about energy at all," Hagan said.

"They're a little more expensive to put in but you get your money back pretty quickly," Hagan said.

Still, all options are on the table for a new school in the planning stages for Bardstown, which expects to see a bid from Sherman Carter Barnhart.

"When they built [Bardstown] High School in '59 I don't think anybody thought about energy at all," Hagan said. "Nobody thought about it even from a cost or environmental view. Now, that's the first two things you ask."

For the next generation, this outlook may become a way of life. The schools described in this article have all integrated environmental and sustainability components into their curriculums, and students have adopted these issues passionately.

"For the students, it's the learning opportunity" said Ford, leader of Richardsville's energy team. "It's something that's going to be a part of their life for a long time, so we're teaching them and we're having them become the teachers."

That energy team leads visitors from schools around the world on tours of Richardsville, and has audited just about every appliance in the building.

"They'll leave a note that says, 'Mrs. Jones, you have a cell phone charger plugged in and you're not using it. That's going to cost us \$5 a week,'" Joanie Hendricks laughed, "and you know, there's nothing more powerful than getting a note from a kid."

Erin L. McCoy wrote this article for YES! Magazine, a national, nonprofit media organization that fuses powerful ideas and practical actions. Erin worked as a newspaper reporter and photographer in Kentucky for almost two years. She is now a Seattle-based freelance writer specializing in education, environment, cultural issues, and travel, informed by her time teaching English in Malaysia and other travels. Contact her at [elmccoy \[at\] gmail \[dot\] com](mailto:elmccoy@gmail.com) or on Twitter [@ErinLMcCoy](https://twitter.com/ErinLMcCoy).

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