

Energy Efficiency in West Virginia's Schools

Background

Nationally, k-12 schools spend about \$8 billion per year on energy; energy is usually the second biggest expense in a school system – after salaries.¹ About 25% of this energy is wasted.

Money saved through improving energy efficiency is money that can be better spent on teachers, text books, and learning. Energy efficiency is especially important given that West Virginia's electric rates have risen more than 40% in the past five years; schools can no longer afford to overlook efficiency.

Harrison County Schools have saved over \$1 million since starting their energy management program in 2009. According to a 2011 audit of Harrison County Schools, the county has the potential to reduce the total utility bill of the school system by 25%, which would save the school system \$450,000 each year.²

Improving energy efficiency is not just about saving money. Some schools with old HVAC equipment have had to let students out early on hot days because it is too hot to conduct class.³ Energy efficiency measures can alleviate such problems, improving comfort and indoor air quality. This has been shown to reduce absenteeism and improve students' performance and ability to pay attention.

West Virginia schools spent \$66 million on energy – electricity and heating fuels – in 2010. **According to our analysis, West Virginia schools could save \$20 million per year through energy efficiency.**

Case Study: Wyoming County Schools

Wyoming County has one of the most efficient school districts in the state. Ten schools are EnergyStar certified and the others are eligible for certification. The cost to operate Wyoming County's schools is \$0.94/sq ft., far less than the national average of \$2/sq ft.

Wyoming County has pursued a comprehensive and holistic approach to efficiency since the early 2000s. The county hired a full-time energy manager to monitor and track energy use and identify opportunities for savings. The county has a sophisticated energy management system that allows for easier scheduling so that an entire school doesn't have to be heated when only a couple rooms are in use on a weekend, for example. Temperature, humidity, and CO₂ levels in each room of every school can be monitored remotely for easier control and diagnosing problems.

The county cut energy use in one middle school more than 60%, largely by replacing a 1940s-era central boiler with individual room heat pumps, which are much more efficient, easier to maintain, and allow teachers more control over the comfort of their classrooms. The county has implemented a district-wide lighting upgrade, educational and behavioral programs, and installed better sensors and controls.

¹ US EPA, "Energy Efficiency Programs in K-12 Schools," 2011: http://www.epa.gov/statelocalclimate/documents/pdf/k-12_guide.pdf

² MGT of America, Inc., "Educational Efficiency Review of Harrison County Schools," Dec 29, 2011.

³ A. Marra, "School start date sparks public debate," Charleston Daily Mail, July 7, 2011.

Methodology

To estimate the potential energy efficiency savings in West Virginia schools, we used data publicly available through each county's Comprehensive Educational Facilities Plans. For most counties, these plans provided data on the square footage and energy consumption of each school; data was not available for all schools in all counties. We then compared this data to county-level fuel expenditure data and weeded out those counties which listed fuel expenditures but failed to report consumption of certain fuels in their CEFPs. Ultimately, 37 counties provided data for at least half of their facilities, and these counties were included in our analysis.

We calculated the energy use per square foot (BTU/square foot) for each county and found that, on average, counties use 78,000 BTU per square foot, with the best-performing counties using 53,000 BTU per square foot and the worst county reporting 280,000 BTU per square foot. Benchmarking all counties against the top performers, we found a potential for savings of 30% or \$14 million per year. Extrapolating this to the 18 counties that were not included, we estimate the potential for statewide savings at \$20 million per year.

Recommendations:

To realize this potential savings, the following best practices should be adopted:

- ⤴ School districts should track energy use through the free EnergyStar Portfolio Manager or a similar tool that allows schools to be benchmarked against the national average. This will allow counties to prioritize which schools have the greatest potential for savings and perform audits of those facilities.
- ⤴ Energy management systems should be used to monitor temperature, air flow, humidity and other variables. In addition to allowing proper scheduling of facilities, such systems also allow for easier identification of problems and equipment that needs to be recalibrated.
- ⤴ School districts should hire full-time or part-time energy managers to be responsible for achieving efficiency goals. Such positions should more than pay for themselves from savings.
- ⤴ School districts should investigate entering into performance contracts with energy service companies to guarantee savings. According to the 2012 Educational Efficiency Audit of West Virginia's schools, only 12 of 55 counties have explored energy performance contracting for their school districts.⁴
- ⤴ A list of resources available to West Virginia schools is available at www.eewv.org/links/resources-for-schools

Most Energy Efficient School Systems

Barbour*	Putnam
Braxton*	Roane
Marshall*	Upshur*
Ohio	Wetzel*
Pocahontas	Wyoming

* Data was not available for all schools in these counties.

Counties not included in analysis:

Cabell	Lincoln	Pendleton
Grant	Logan	Raleigh
Greenbrier	McDowell	Summers
Hampshire	Mercer	Tucker
Hancock	Morgan	Wayne
Hardy	Nicholas	Webster

⁴ Public Works LLC, "Education Efficiency Audit of West Virginia's Primary and Secondary Education System," Jan 3, 2012.