

Question / Suggestion: What is the Carroll County Public School System doing to reduce/control utility costs?

Response: This is a complex area and there are a number of strategies in use throughout the system. A number of them are discussed below.

Locking-in Utility Costs:

The school system continues to engage in long term contracts for electric use in order to lock-in electric prices with more competitive electricity suppliers when market conditions are favorable rather than buy electric from the electric service company. This strategy is believed to have provided a savings of \$880,913 in FY 2009, a savings of \$797,717 in FY 2010, and a savings of \$442,464 in FY 2011. Although the savings in FY 2012 is not anticipated to be as large as previous years due to more stabilized and reduced electric generation costs across the board, anticipated electric cost savings in FY 2012 are still expected to total in excess of \$100,000.

Natural gas is being similarly procured. By competitively bidding our natural gas requirements to the open market, it is believed a savings of \$78,853 was realized in FY 2009 and a savings of \$382,887 was realized in FY 2010. An overall across-the-board decrease in the market price for the cost of natural gas during FY 2011 offset any anticipated additional savings expected to result from engaging in a locked-in contract price during FY 2011. However a new natural gas supplier contract negotiated by CCPS Purchasing is expected to yield over \$35,000 in savings during FY 2012.

Futures for heating oil purchased in FY 2010 yielded a savings of \$125,000 over the regular cost of purchasing fuel oil on the open market, oil futures purchased in FY 2011 yielded a cost savings of \$45,000. Fuel oil futures have not as yet been purchased in FY 2012 due to the volatility of the fuel oil market and high cost of fuel oil futures when compared to open market prices.

Efficient Climate Control (HVAC) Systems:

When feasible, the school system is installing geothermal HVAC systems in its schools. Ebb Valley Elementary School (opened fall 2008) was constructed with geothermal features that consume an average of 39% less energy than a similarly-sized school with a conventional HVAC system. Manchester Valley High School (opened in fall 2009) was also constructed with a geothermal HVAC design and uses an average of 38% less energy than a similarly-sized school with a conventional HVAC system. From December 2009 through June 2011 Manchester Valley cost \$114,357 less to operate than with a conventional HVAC system. Additionally, a replacement HVAC project at Westminster High School has just recently been completed and a hybrid geothermal system has been placed on-line that is expected to generate significant savings over the previous all-electric heating and conventional cooling system that had been in service at the school.

Energy Management:

Johnson Controls has been brought in to implement energy management solutions including retrofitting light fixtures and installing intelligent HVAC controls. In the short term, these

improvements are partially offset by the cost of procuring the improvements, but the initial installation period (2004 – 2007) and the first year’s performance period generated a cost avoidance totaling \$1,619,756, which exceeded the guaranteed savings of \$852,734 by \$767,022. Cost avoidances realized from this project in FY 2009 totaled \$559,977 and in FY 2010 \$795,261, and exceeded the guaranteed savings in FY 2009 by \$7,111 and by \$194,908 in FY 2010.

Other/Total Electrical Use Reductions:

Following a system-wide effort to reduce electric use in FY 2009 by turning off lights, equipment, teaching aids, etc. when not in use, overall electric consumption/square foot in FY 2009 was reduced by 3.6% when compared to FY 2008 usage/square foot of schools in operation at that time. FY 2010 electric consumption/square foot was reduced by 6.2% when compared to usage/square foot in FY 2008, and 2.7% when compared to the electrical usage/square foot in FY 2009. Electric consumption/square foot in FY 2011 remained essentially at the same level as in FY 2010.

Technology:

Telephony: Conversion to VoIP (Voice over Internet Protocol) phone systems utilizing the fiber-optic Carroll County Public Network capacity allows for reduced telephone charges and increased connectivity between central office and individual school buildings. Central Office and 28 locations are now operating in this new manner, and all school system facilities are expected to be converted by the end of 2013. Annual savings are expected to be over \$300,000.

Idle Desktop Computer Up-time: Using the fiber-optic Carroll County Public Network capacity and new network operating framework (software) to manage desktops (including frequent software/security updates) allows for individual desktop computers to be remotely powered up, updated, and powered down again. Also, each computer is now configured with energy savings settings.

Monitors: CCPS has been only deploying LCD (liquid crystal display) computer monitors for the past four years and will continue to replace older style CRT monitors on an annual basis. Currently, approximately 80% of the monitors are LCD. An LCD monitor has a longer lifespan than a CRT. LCDs can be used 30-50 thousand hours before reaching half-brightness, while a CRT will last 10-20 thousand hours. The average LCD monitor uses 57% less electricity than a comparable CRT (traditional) monitor, and there is also 55% less heat given off, which reduces cooling costs.

Servers: One of the major initiatives CCPS has undertaken over the past several years is to “virtualize” servers. The concept of virtualization is where multiple servers operate on one larger piece of hardware. It is similar in concept to “thin clients” on the desktop computer side. There are several advantages to using this technology but cost reductions and energy savings are two of the biggest. Running what has been done over the past several years through a “green calculator” came up with the following results, which are an estimate but still informative.

GREEN CALCULATOR

Reduce Energy Cost & Environmental Impact with Virtualization



How many servers* do you plan to virtualize? servers 

*Calculations are based on the power consumption of a standard 2 CPU server

	Physical	Virtualized	Savings
Energy Savings:			
Annual Server & Cooling Energy Usage (kWh)	1,458,212	182,276	1,275,935
Cost Reduction:			
Physical Hardware ¹	\$ 772,000.00	\$ 115,800.00	\$ 656,200.00
Annual Energy Cost ²	\$ 145,821.00	\$ 18,228.00	\$ 127,594.00
Environmental Impact:			
	Planting Trees	Cars off the highway ³	Annual CO2 Emission(lbs/kg) ⁴
These savings are equivalent to	3,028	171	2,019,805 lbs
			916,168 kg

¹ Assumes transition from 2CPU dual core to 2CPU quad core at \$4000 per server and \$6000 per server, respectively.

² Assumes \$0.10/kWh, and operating power of 375 Watts per Physical Server and 469 Watts per Virtualized Host Server. Cooling power multiple of 1.3x operating power.

³ Assumes 12,000 miles per year and 20 mpg.

⁴ Assumes 1.583 lbs CO2 emission per kWh.



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