



Bullitt County Public Schools
Energy Management Program
2011/2012 Year End Report

Summary

Bullitt County Public Schools began an energy conservation program in November 2006 through the Kentucky Energy Efficiency Program for Schools (KEEPS). Through the program, basic steps were taken to establish an energy program by hiring an energy manager, creating an energy plan, promoting energy conservation and making low/no-cost changes to reduce energy consumption. In 2008 the district entered into an energy saving performance contract (ESPC) with Harshaw Trane and began implementing facility improvements such as new HVAC controls, lighting, domestic water heater replacement and boiler replacement.

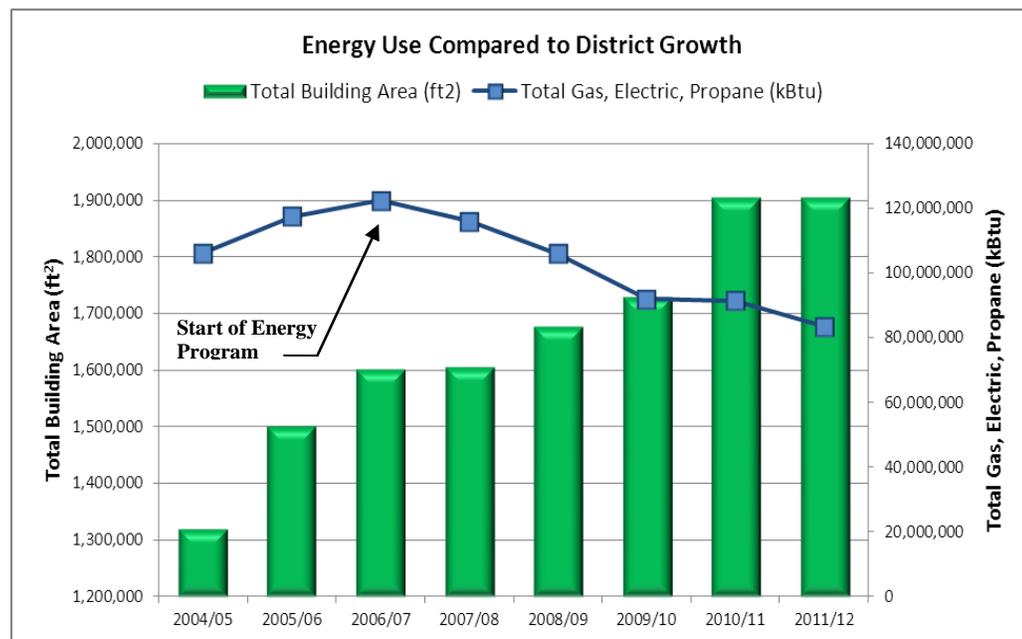
This report summarizes the energy usage for the 2011/2012 fiscal year. Actions used for energy savings are included as well as goals for the upcoming year. Total district electric consumption was **21% less** than the baseline usage resulting in a cost avoidance of approximately **\$327,694**. Natural gas usage was **58% less** resulting in cost avoidance of approximately **\$114,754**. Propane for heating and cooking has been eliminated (replaced with electric or natural gas), resulting in a cost avoidance of approximately **\$41,373**. Had we not reduced our electric, gas and propane usage by these amounts, given today's rates, we would have spent approximately **\$483,821** more on our utility bills. (Note: Adjustments were made to initial findings due to electric rate increase in February 2012.)

The cost of the district's energy management program in 2011/2012 was approximately \$71,000 for the energy manager budget and salary, and \$397,856 for the ESPC bond re-payment. This leaves a net savings of \$14,965. The district's investment through the ESPC not only provides energy savings, but also improves the learning environment for our students through increased reliability of lighting and HVAC systems and added comfort to our building occupants.

The total avoided utility cost since BCPS began the energy management program in 2006 is approximately **\$1,783,800**. The cost of the district's energy management program has averaged approximately \$71,000 annually, or \$328,500 since the program began. The bond re-payment for the performance contract project (since 2009/2010) has been a total of \$782,756 leaving a net cost avoidance of approximately \$672,544.

Figure 1 shows our district's energy use compared to our increase in square footage since 2004/05.

Figure 1--Energy Use Compared to District Growth



Projects

Energy saving measures that were in place during the 11/12 school year include:

- Energy manager tracking utility usage and costs monthly
- Non-school hour energy conservation HVAC procedures including
 - Shutdowns over long breaks
 - Temperature Setbacks
 - Outside air units only operating during school hours
- Staff education and awareness such as
 - Turning off lighting when leaving a room
 - Turning off computer monitors at the end of the day
- Student energy teams active in 12 schools during the 11/12 school year
- School walkthroughs to monitor energy use behaviors and equipment operation.

- Daily monitoring of HVAC control systems to ensure proper equipment operation and scheduling.

Other associated activities:

- Rate schedule evaluations
- Monitoring of indoor air quality (IAQ)—temperature, relative humidity, and carbon dioxide.
- The following buildings have had completed upgrades through the performance contract.
 - Bernheim Middle
 - Bullitt East High School
 - Bullitt Lick Middle
 - Freedom Elementary
 - Mt. Washington Elementary
 - Maryville Elementary
 - North Bullitt High School
 - Pleasant Grove Elementary
 - Shepherdsville Elementary
 - Mt. Washington Middle
 - Nichols Elementary
 - Bullitt Central
 - Cedar Grove Elementary
 - Hebron Middle
 - Lebanon Junction Elementary
 - Riverview/ Day Treatment Campus
 - Central Office
 - Maintenance Office (MB-1)
- As of 2011/2012, using Energy Star's® benchmarking tool (Portfolio Manager), the district has 13 Energy Star rated buildings.

School	Energy Star Rating
Brooks Elementary	93
Bullitt Lick Middle	83
Cedar Grove Elementary	78
Crossroads Elementary	94
Eastside Middle	80
Freedom Elementary	80
Lebanon Junction Elementary	81
Maryville Elementary	78
Nichols Elementary	79
Roby Elementary	82
Overdale Elementary	97
Shepherdsville Elementary	79
Zoneton Middle	78

EPA's energy performance rating system, based on source energy, accounts for the impact of weather variations as well as changes in key physical and operating characteristics of each building. A rating of 75 means that, from an energy consumption standpoint, the building performs better than 75% of all similar buildings nationwide.

Planned Projects

Planned projects for next year (2012/13) include:

- Continuation of student energy team program. There are 14 schools that have signed up to participate in the program for the 2012/13 school year.
- Installation of lighting controls (occupancy sensors)
- Energy Star[®] re-certification for eligible buildings
- Apply for the Energy Star[®] Leader's award
- Add new schools to the Trane EcoRate energy monitoring program
- Continued monitoring of utility bills, utility rates, and building automation systems
- Continuation of building awareness throughout the district about energy savings opportunities

Energy Usage Information

The following table shows the district's utility use and cost for each year since 2004/2005.

Table 1--Yearly Utility Use and Cost

Utility Type	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012
Electric (kWh)	20,238,383	23,968,514	25,286,477	23,731,788	21,368,945	20,188,729	21,702,211	20,684,107
Natural Gas (ccf)	344,412	324,933	328,762	317,432	301,614	223,715	168,058	124,929
Propane	18,307	24,547	24,321	26,067	22,637	738	726	264
Total Energy (kBtu)	106,193,736	117,482,446	122,353,157	116,040,454	106,037,049	91,993,746	91,423,984	83,466,042
Water/Sewer (Gal)	31,983,000	30,180,000	28,696,410	27,645,360	22,885,080	18,335,600	19,310,020	19,069,729
Utility Type	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012
Electric Cost	\$ 1,347,257	\$ 1,731,618	\$ 1,878,962	\$ 1,874,410	\$ 1,888,880	\$ 1,841,316	\$ 2,052,474	\$ 2,116,981
Natural Gas Cost	\$ 361,814	\$ 500,245	\$ 326,271	\$ 359,626	\$ 413,207	\$ 182,260	\$ 155,724	\$ 124,768
Propane Cost	\$ 22,543	\$ 36,697	\$ 40,337	\$ 63,841	\$ 52,343	\$ 1,497	\$ 1,405	\$ 764
Total Energy Cost	\$ 1,731,614	\$ 2,268,560	\$ 2,245,570	\$ 2,297,877	\$ 2,354,430	\$ 2,025,073	\$ 2,209,602	\$ 2,242,513
Water/Sewer Cost	\$ 174,520	\$ 161,663	\$ 166,568	\$ 177,149	\$ 159,270	\$ 131,292	\$ 159,127	\$ 185,462
Total Building Area (ft²)	1,319,733	1,501,305	1,600,859	1,604,359	1,677,440	1,729,599	1,906,093	1,906,093

*The only Propane purchases that Bullitt County Public Schools continues to make are for the generator at Hebron Middle School.

Tables 2 and 3 show the energy usage per school compared to their respective baseline. Energy savings and cost avoidance calculations account for changes in the number of days in the billing period, current costs, and heating degree days and/or cooling degree days (weather corrections). Figures 2 through 4 show the district's non-adjusted energy profile per month as compared to weather trends.

Table 2—Electricity Cost Avoidance Report

Electric Consumption									
2011/2012 Compared to Baseline									
Building	Base Year	Base Year	Evaluation	Use	Use	Change	Change	Cost	Cost
	Actual	Weather Adjusted	Year Actual	Avoidance	Avoidance	Non-Adjusted	Weather Adjusted	Non-Adjusted	Weather Adjusted
	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	%	%	\$	\$
Bernheim	88,268	150,910	55,213	-33,055	-95,697	-37%	-63%		-\$22,596
Bullitt Central	148,979	254,707	151,043	2,064	-103,664	1%	-41%		-\$6,387
Bullitt East	171,277	292,829	161,441	-9,836	-131,388	-6%	-45%		-\$606
Bullitt Lick	101,338	136,866	56,320	-45,018	-80,546	-44%	-59%		-\$3,692
Cedar Grove	51,143	87,438	59,280	8,137	-28,158	16%	-32%		-\$2,374
Central Office	41,629	41,629	35,200	-6,429	-6,429	-15%	-15%		-\$1,781
Eastside	134,095	148,965	110,784	-23,311	-38,181	-17%	-26%		-\$2,352
Freedom	96,491	164,968	46,400	-50,091	-118,568	-52%	-72%		-\$4,056
Hebron	117,905	201,580	79,812	-38,093	-121,768	-32%	-60%		-\$19,211
Lebanon Junction	38,206	65,319	48,120	9,914	-17,199	26%	-26%		-\$1,125
Maryville	67,076	70,106	37,200	-29,876	-32,906	-45%	-47%		-\$2,711
MW Elementary	117,444	200,791	52,032	-65,412	-148,759	-56%	-74%		-\$9,165
MW Middle	117,763	201,337	61,000	-56,763	-140,337	-48%	-70%		-\$20,340
Nichols	17,539	29,985	27,840	10,301	-2,145	59%	-7%		-\$185
North Bullitt	204,817	366,353	168,737	-36,080	-197,616	-18%	-54%		-\$6,760
Old Mill	52,257	82,231	56,280	4,023	-25,951	8%	-32%		-\$1,697
Pleasant Grove	104,057	177,905	61,056	-43,001	-116,849	-41%	-66%		-\$7,643
Riverview/DT	29,042	49,652	27,360	-1,682	-22,292	-6%	-45%		-\$1,373
Shepherdsville	88,800	139,734	61,603	-27,197	-78,131	-31%	-56%		-\$2,673
Transportation	14,451	24,707	12,960	-1,491	-11,747	-10%	-48%		-\$768
Zoneton	122,838	136,459	68,600	-54,238	-67,859	-44%	-50%		-\$5,592
Brooks	60,960	70,953	59,360	-1,600	-11,593	-3%	-16%		-\$714
Overdale	53,040	90,681	51,600	-1,440	-39,081	-3%	-43%		-\$6,514
Roby	75,360	80,891	68,000	-7,360	-12,891	-10%	-16%		-\$843
Crossroads	61,673	66,199	63,018	1,345	-3,181	2%	-5%		-\$109
TOTAL	2,176,447	3,333,194	1,680,259	-496,188	-1,652,935	-21%	-50%		-\$327,694

Table 3--Natural Gas and Propane Cost Avoidance Report

Natural Gas Consumption 2011/12 Compared to Baseline									
	Base Year	Evaluation	Use Avoidance	Use Avoidance	Change	Change	Cost Avoidance	Cost Avoidance	
Building	Base Year Actual (ccf)	Weather Adjusted (ccf)	Year Actual (ccf)	Non-Adjusted (ccf)	Weather Adjusted (ccf)	Non-Adjusted %	Weather Adjusted %	Non-Adjusted \$	Weather Adjusted \$
Bernheim	19,202	17,948	4,402	-14800	-13546	-77%	-75%		-\$10,003
Bullitt Central	41,767	37,684	31,171	-10596	-6513	-25%	-17%		-\$4,490
Bullitt East	35,419	34,668	10,507	-24912	-24161	-70%	-70%		-\$16,314
Bullitt Lick	9,001	8,533	4,668	-4333	-3865	-48%	-45%		-\$2,615
Cedar Grove	22,476	21,242	2,656	-19820	-18586	-88%	-87%		-\$13,545
Central Office	244	210	66	-178	-144	-73%	-69%		-\$98
Eastside									
Freedom	11,448	10,826	4,401	-7047	-6425	-62%	-59%		-\$4,272
Hebron	19,885	19,134	0	-19885	-19134	-100%	-100%		-\$12,372
Lebanon Junction	25,234	23,793	3,379	-21855	-20414	-87%	-86%		-\$13,849
Maryville	3,894	3,894	2,621	-1273	-1273	-33%	-33%		-\$846
Mt. Washington ES	7,831	7,309	5,083	-2748	-2226	-35%	-30%		-\$1,520
Mt. Washington MS	13,549	13,349	10,717	-2832	-2632	-21%	-20%		-\$1,811
Nichols									
North Bullitt	12,371	11,641	14,065	1694	2424	14%	21%		\$1,626
Old Mill	10,468	10,200	7,745	-2723	-2455	-26%	-24%		-\$1,663
Pleasant Grove	8,412	8,106	5,862	-2550	-2244	-30%	-28%		-\$1,525
Riverview/DT	8,784	8,334	6,870	-1914	-1464	-22%	-18%		-\$978
Shepherdsville	3,201	3,199	2,255	-946	-944	-30%	-30%		-\$637
Transportation	3,159	2,930	2,651	-508	-279	-16%	-10%		-\$184
Zoneton									
Crossroads									
Brooks	17,875	16,826	0	-17875	-16826	-100%	-100%		-\$11,598
Overdale	23,174	23,174	2,656	-20518	-20518	-89%	-89%		-\$13,912
Roby	6,165	6,164	46	-6119	-6118	-99%	-99%		-\$4,147
TOTAL	303,559	289,163	121,821	-181738	-167342	-60%	-58%		-\$114,754
Propane Consumption 2011/2012 Compared to Baseline									
	Base Year	Evaluation	Use Avoidance	Use Avoidance	Change	Change	Cost Avoidance	Cost Avoidance	
Building	Base Year Actual (gal)	Weather Adjusted (gal)	Year Actual (gal)	Non-Adjusted (gal)	Weather Adjusted (gal)	Non-Adjusted %	Weather Adjusted %	Non-Adjusted \$	Weather Adjusted \$
Cedar Grove	1,180	1,180	0	-1,180	-1,180	-100%	-100%		-\$2,242
Nichols	19,421	18,527	0	-19,421	-18,527	-100%	-100%		-\$36,202
Lebanon Junction	841	841	0	-841	-841	-100%	-100%		-\$1,597
Roby	1,890	1,890	0	-1,890	-1,890	-100%	-100%		-\$2,332
TOTAL	23,332	22,438	0	-23,332	-22,438	-100%	-100%		-\$41,373

BASELINE EXPLANATION

The baseline for the majority of facilities is the average use of fiscal years 2004/05 and 2005/06 which are the two years just prior to the start of the program. Schools such as Eastside Middle, Zoneton Middle and Shepherdsville Elementary were constructed mid 2005, therefore 2006/07 is the only year used for their baseline. Maryville Elementary had roof top heat pump replacements in 2005; therefore 2006/07 was also used as their baseline. Old Mill Elementary had a building addition in 2005 so 2005/06 was used for their baseline. The Central Office added numerous computer servers added as well as a new air conditioning unit installed for their server room prior to 2006; therefore, 2006/2007 is used for their baseline. With newly constructed buildings such as Brooks and Overdale, has now been set as their first full year of energy

Figure 2—Total, Non-Adjusted Energy Use (Electric, Gas and Propane)

Month	Total Energy Use (kBtu)				Weather Data			
	2010/2011	2011/12	Baseline	% Change from Baseline	2011/12		Baseline	
					CDD	HDD	CDD	HDD
July	5,134,269	5,549,307	8,005,849	-31%	577	0	429	0
Aug	7,697,730	8,041,060	9,272,785	-13%	395	0	389	5
Sept	7,209,586	7,394,509	10,158,670	-27%	163	71	218	17
Oct	6,643,876	6,418,903	8,553,459	-25%	55	278	47	167
Nov	6,448,770	6,756,248	9,765,787	-31%	13	406	4	436
Dec	9,982,553	7,743,161	12,996,422	-40%	0	687	0	910
Jan	10,320,976	9,018,523	12,105,100	-25%	0	798	0	725
Feb	8,690,092	8,491,536	11,871,489	-28%	1	658	0	702
March	7,404,280	6,870,887	10,630,920	-35%	82	252	0	595
April	5,870,023	5,500,045	8,206,387	-33%	66	226	45	171
May	6,220,040	6,114,046	8,539,969	-28%	258	28	93	97
June	4,988,197	4,498,074	7,989,551	-44%	367	19	317	0
Total YTD	75,402,155	71,784,179	101,566,866	-29%				

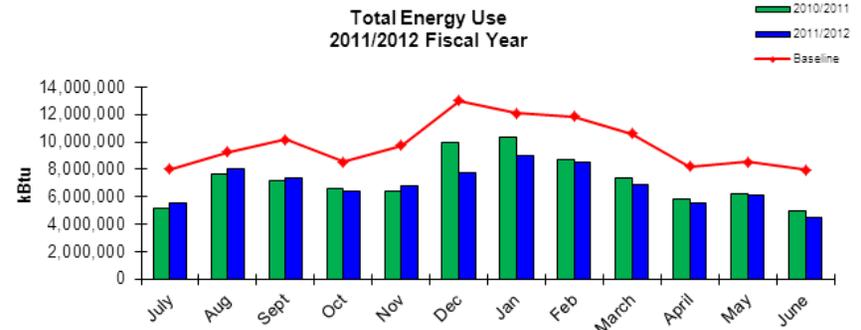


Figure 3--Non-Adjusted Electricity Use

Month	Total Electricity (kWh)				Weather Data			
	2010/2011	2011/12	Baseline	% Change from Baseline	2011/12		Baseline	
					CDD	HDD	CDD	HDD
July	1,441,495	1,567,060	2,196,237	-29%	577	0	429	0
Aug	2,167,294	2,255,632	2,519,798	-10%	395	0	389	5
Sept	1,989,753	2,027,076	2,734,260	-26%	163	71	218	17
Oct	1,794,369	1,699,755	2,172,748	-22%	55	278	47	167
Nov	1,486,811	1,619,492	2,074,133	-22%	13	406	4	436
Dec	1,802,379	1,585,642	2,031,215	-22%	0	687	0	910
Jan	1,854,080	1,837,532	2,094,100	-12%	0	798	0	725
Feb	1,686,997	1,779,500	2,045,735	-13%	1	658	0	702
March	1,684,624	1,711,866	2,008,397	-15%	82	252	0	595
April	1,518,390	1,462,784	1,942,129	-25%	66	226	45	171
May	1,665,199	1,680,351	2,161,402	-22%	258	28	93	97
June	1,385,703	1,257,150	2,150,742	-42%	367	19	317	0
Total YTD	15,907,802	16,083,555	19,876,621	-19%				

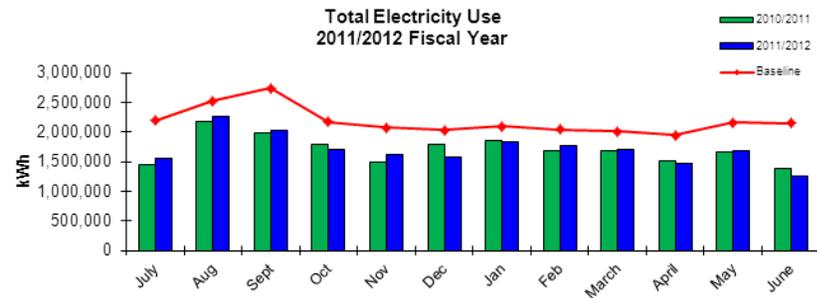


Figure 4--Non-Adjusted Natural Gas Use

Month	Total Natural Gas Use (ccf)				Weather Data			
	2010/2011	2011/12	Baseline	% Change from Baseline	2011/12		Baseline	
					CDD	HDD	CDD	HDD
July	2,096	1,966	4,881	-60%	577	0	429	0
Aug	2,941	3,348	6,138	-45%	395	0	389	5
Sept	4,083	4,642	6,872	-32%	163	71	218	17
Oct	5,063	6,013	10,210	-41%	55	278	47	167
Nov	13,357	11,947	23,829	-50%	13	406	4	436
Dec	37,212	22,650	54,793	-59%	0	687	0	910
Jan	38,785	26,688	44,735	-40%	0	798	0	725
Feb	28,486	23,494	44,925	-48%	1	658	0	702
March	16,081	10,000	33,613	-70%	82	252	0	595
April	6,692	4,942	13,540	-64%	66	226	45	171
May	5,227	3,696	10,162	-64%	258	28	93	97
June	2,526	2,026	6,069	-67%	367	19	317	0
Total YTD	148,104	110,748	229,994	-52%				

