



## **Bullitt County Public Schools Energy Program 2008/2009 Year End Report**

### **Summary**

BCPS began our energy conservation program officially 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 a performance contract with Harshaw Trane and began implementing energy conservation measures such as new controls, lighting, domestic water heater replacement and boiler replacement.

This report summarizes the energy usage for the 2008/2009 fiscal year. Actions used for energy savings are included as well as goals for the upcoming year. District wide, electric consumption has been **reduced by 18%** compared to the baseline usage resulting in a cost avoidance of approximately **\$226,000**. Natural gas usage has been **reduced by 11%** resulting in cost avoidance of approximately **\$45,800**. Propane usage has decreased by 15% resulting in a cost decrease of approximately **\$8,000**. (The reduction in propane usage is partly due to services being removed as a part of the new construction projects.) Had we not reduced our electric, gas and propane usage by these amounts, given today's rates, we would have spent approximately \$279,800 more on our utility bills.

We were able to accomplish these savings in spite of the fact that we increased the square footage of North Bullitt and Bullitt East. Capital improvements from the Performance Contract were not completed until January of 2009 so our savings next year should be much greater.

Last year (2007/2008) the total avoided costs were \$246,000. **The total avoided costs since BCPS began the energy management program are approximately \$525,800.** The cost of the district's energy management program has averaged approximately \$73,000 annually.

### **Energy Usage Information**

The charts located in Appendix A show the energy usage per school compared to their respective baseline. Energy savings 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). The graphs in Appendix B show the district's non-adjusted energy profile per month as compared to weather trends.

### Baseline Explanation

The baseline for the majority of facilities is the average use of calendar years 2005 and 2006 which are the two years just prior to the start of the program. When data was available from 2004 it was also used to determine the baseline. Schools such as Eastside Middle, Zoneton Middle and Shepherdsville Elementary were constructed mid 2005, therefore 2006 is the only year used for their baseline. Maryville Elementary had roof top heat pump replacements in 2005; therefore 2006 was used as the baseline for electricity. Old Mill Elementary had a building addition in 2005 so 2006 was also used for their baseline.

The implementation of Phase I of the performance contract during the 2<sup>nd</sup> half of the year has helped drive the increased energy savings. The following schools have had completed upgrades through the performance contract. These schools are highlighted on the chart in Appendix A.

- Bernheim Middle
- Bullitt East High School
- Bullitt Lick Middle
- Freedom Elementary
- Mt. Washington Elementary
- Maryville Elementary
- North Bullitt High School

Phase II and III of the performance contract will include:

- Cedar Grove Elementary
- Lebanon Junction Elementary
- Nichols Elementary
- Pleasant Grove Elementary
- Shepherdsville Elementary
- Hebron Middle
- Mt. Washington Middle
- Zoneton
- Bullitt Central
- Riverview

Savings from these renovations will be realized in the 09/10 fiscal year.

One of BCPS' goals is for our facilities to earn the EPA's Energy Star Award. The new Overdale and Brooks Elementary Schools have both earned the "Designed to Earn the Energy Star" designation. After one year of operation, if the facilities earn a rating of 75 points or higher we will be able to apply for the Energy Star Award.

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.

The following chart summarizes the current rating of each of our existing schools. The schools that are highlighted are those that have the potential within this next year to meet the criteria for the Energy Star Award.

Facility Name	Baseline Energy Period Ending Date	Current Energy Period Ending Date	Baseline Rating (1-100)	Current Rating (1-100)
Bernheim Middle School	7/31/2006	5/31/2009	33	53
Brooks Elementary	6/30/2005	4/30/2009	68	63
Bullitt Central High School	7/31/2006	5/31/2009	51	62
Bullitt East High School	7/31/2006	5/31/2009	8	44
Bullitt Lick Middle School	7/31/2006	6/30/2009	26	63
Cedar Grove Elementary	6/30/2006	1/31/2009	58	72
Eastside Middle School	2/28/2007	5/31/2009	25	69
Freedom Elementary School	6/30/2006	6/30/2009	19	69
Hebron Middle School	6/30/2006	5/31/2009	4	8
Lebanon Junction Elementary	6/30/2006	1/31/2009	50	73
Maryville Elementary School	7/31/2007	5/31/2009	41	66
Mt. Washington Elementary	6/30/2006	5/31/2009	8	37
Mt. Washington Middle School	7/31/2006	5/31/2009	37	55
Nichols Elementary School	6/30/2006	2/28/2009	64	67
North Bullitt High School	6/30/2006	5/31/2009	9	38
Old Mill Elementary School	6/30/2006	5/31/2009	70	80
Pleasant Grove Elementary School	7/31/2006	5/31/2009	31	42
Riverview/Daytreatment	6/30/2005	4/30/2009	55	54
Roby Elementary	6/30/2005	1/31/2009	48	56
Shepherdsville Elementary	3/31/2007	5/31/2009	55	61
Zoneton Middle School	3/31/2007	6/30/2009	45	68

Note: Portfolio manager only allows for one year to be used for the baseline.

By further reducing HVAC system operating hours (which we will be able to do better with the new controls) and conserving energy at the building level with lighting and equipment we should be able to achieve the 75 or higher rating.

### Actions Used for Energy Savings

Energy saving measures currently in place are:

- Energy manager is tracking utility usage and costs monthly.
- Non-school hour energy efficiency HVAC procedures including:
  - Shutdowns over long breaks
  - Temperature Setbacks
  - Outside air units only operating during school hours
- Rate schedule evaluations.
- Replacement of incandescent bulbs with compact fluorescent.
- Replacement of fluorescent and incandescent exit signs with LED exit signs.
- Staff education and awareness such as:
  - Turning off lighting when leaving a room
  - Turning off manually switched exhaust fans
  - Turning off computer monitors at the end of the day
- Student energy teams active in 10 schools.
- Energy Star Benchmarking tool (Portfolio Manager)
- Regular school walkthroughs to monitor energy use behaviors and equipment operation.
- Daily monitoring of HVAC control systems to ensure proper equipment operation and scheduling.
- Monitoring of indoor air quality (IAQ)—temperature, relative humidity, and carbon dioxide.

Planned projects for next year (2009/10) include:

- Monthly meetings with maintenance staff to ensure efficient operation of facilities and to identify potential areas where energy can be conserved.
- Continued staff education and awareness and increased student participation.

- Use Trane's Intelligent Services Energy Star Reports to provide monthly usage updates to schools' energy teams.
- Implementation of Phase II and III of Performance Contract
- Installation of Lighting Controls (occupancy sensors)
- Further reduction in hours of operation of HVAC systems.
- Address water usage and expand water conservation program.
- Apply for the Energy Star Leader's award
- Apply for Energy Star Award for schools that meet criteria.
- Apply for utility rebates through E.ON's Commercial Rebate Program.

## Appendix A

### Cost Avoidance Report

Electric Consumption 2008/2009 Compared to Baseline								
Building	Base Year Actual (kWh)	Base Year Weather Adjusted (kWh)	Evaluation Year Actual (kWh)	Use Avoidance Non- Adjusted (kWh)	Use Avoidance Weather Adjusted (kWh)	Change Non- Adjusted %	Change Weather Adjusted %	Cost Avoidance Weather Adjusted \$
MW Elementary	1,371,332	1,404,286	875,712	-495,620	-528,574	-36%	-38%	\$ (27,047)
Bullitt Lick	1,178,562	1,195,394	819,280	-359,282	-376,114	-30%	-31%	\$ (27,346)
Eastside	1,698,510	1,756,037	1,214,016	-484,494	-542,021	-29%	-31%	\$ (27,735)
Freedom	1,170,140	1,224,227	869,200	-300,940	-355,027	-26%	-29%	\$ (9,388)
Maryville	964,054	985,272	704,880	-259,174	-280,392	-27%	-28%	\$ (19,986)
Lebanon Junction	481,697	491,772	368,880	-112,817	-122,892	-23%	-25%	\$ (6,706)
MW Middle	1,425,694	1,504,431	1,183,200	-242,494	-321,231	-17%	-21%	\$ (8,596)
Zoneton	1,532,039	1,592,368	1,271,800	-260,239	-320,568	-17%	-20%	\$ (22,822)
North Bullitt	2,523,532	2,614,444	2,092,400	-431,132	-522,044	-17%	-20%	\$ (13,817)
Bernheim	1,015,324	1,049,440	857,200	-158,124	-192,240	-16%	-18%	\$ (9,837)
Bullitt Central	1,806,070	1,854,370	1,536,000	-270,070	-318,370	-15%	-17%	\$ (16,291)
Cedar Grove	610,262	625,088	527,222	-83,040	-97,866	-14%	-16%	\$ (5,732)
Bullitt East	2,144,614	2,222,817	1,900,800	-243,814	-322,017	-11%	-14%	\$ (16,478)
Roby	452,298	462,789	398,880	-53,418	-63,909	-12%	-14%	\$ (3,488)
Pleasant Grove	1,208,508	1,255,476	1,135,296	-73,212	-120,180	-6%	-10%	\$ (6,558)
Nichols	228,258	233,101	212,320	-15,938	-20,781	-7%	-9%	\$ (1,519)
Riverview/DT	397,545	404,476	375,200	-22,345	-29,276	-6%	-7%	\$ (1,498)
Hebron	1,378,440	1,417,933	1,315,840	-62,600	-102,093	-5%	-7%	\$ (2,777)
Old Mill	607,153	638,073	596,160	-10,993	-41,913	-2%	-7%	\$ (2,287)
Shepherdsville	1,034,202	1,072,378	1,006,400	-27,802	-65,978	-3%	-6%	\$ (1,774)
Transportation	205,122	210,802	199,320	-5,802	-11,482	-3%	-5%	\$ (617)
Brooks	472,889	482,062	464,000	-8,889	-18,062	-2%	-4%	\$ (986)
Overdale	389,816	403,700	407,760	17,944	4,060	5%	1%	\$ 154
Central Office	444,462	454,791	549,520	105,058	94,729	24%	21%	\$ 6,925
<b>Total</b>	<b>24,740,521</b>	<b>25,555,526</b>	<b>20,881,286</b>	<b>-3,859,235</b>	<b>-4,674,240</b>	<b>-16%</b>	<b>-18%</b>	<b>\$ (226,206)</b>

Natural Gas Consumption 2007/2008 Compared to Baseline								
Building	Base Year Actual (ccf)	Base Year Weather Adjusted (ccf)	Evaluation Year Actual (ccf)	Use Avoidance Non-Adjusted (ccf)	Use Avoidance Weather Adjusted (ccf)	Change Non-Adjusted %	Change Weather Adjusted %	Cost Avoidance Weather Adjusted \$
Freedom	17,749	19,027	4,483	-13,266	-14,544	-75%	-76%	\$ (18,709)
Bernheim	19,321	20,233	7,683	-11,638	-12,550	-60%	-62%	\$ (15,636)
Bullitt East	30,557	32,192	17,787	-12,770	-14,405	-42%	-45%	\$ (17,278)
Overdale	22,995	25,248	16,326	-6,669	-8,922	-29%	-35%	\$ (11,121)
Maryville	3,184	3,184	2,740	-444	-444	-14%	-14%	\$ (551)
Pleasant Grove	8,465	9,021	7,942	-523	-1,079	-6%	-12%	\$ (1,360)
Old Mill	10,275	11,058	9,762	-513	-1,296	-5%	-12%	\$ (1,650)
Bullitt Lick	9,199	9,705	8,647	-552	-1,058	-6%	-11%	\$ (1,219)
Transportation	3,106	3,468	3,101	-5	-367	0%	-11%	\$ (450)
Lebanon Junction	23,309	24,354	22,126	-1,183	-2,228	-5%	-9%	\$ (2,561)
Hebron	18,747	19,727	18,742	-5	-985	0%	-5%	\$ (946)
Cedar Grove	21,423	22,575	21,621	198	-954	1%	-4%	\$ (1,471)
Mt. Washington ES	6,539	6,975	7,452	913	477	14%	7%	\$ 707
Bullitt Central	43,053	46,318	49,708	6,655	3,390	15%	7%	\$ 4,007
Mt. Washington MS	11,958	13,005	14,229	2,271	1,224	19%	9%	\$ 1,484
Riverview/DT	8,843	9,348	10,343	1,500	995	17%	11%	\$ 1,242
Roby	22,488	23,585	26,621	4,133	3,036	18%	13%	\$ 4,088
Shepherdsville	3,380	3,445	3,925	545	480	16%	14%	\$ 597
Brooks	17,738	18,810	21,785	4,047	2,975	23%	16%	\$ 3,657
North Bullitt*	11,714	12,432	21,338	9,624	8,906	82%	72%	\$ 10,997
Central Office	71	85	344	273	259	382%	307%	\$ 318
Eastside								
Nichols								
Zoneton								
<b>Total</b>	<b>314,114</b>	<b>333,793</b>	<b>296,705</b>	<b>-17,409</b>	<b>-37,088</b>	<b>-6%</b>	<b>-11%</b>	<b>\$ (45,855)</b>

\*Added equipment contributed to increase at NBHS.

Propane Consumption 2007 Calendar Year Compared to Baseline								
Building	Base Year Actual (gal)	Base Year Weather Adjusted (gal)	Evaluation Year Actual (gal)	Use Avoidance Non-Adjusted (gal)	Use Avoidance Weather Adjusted (gal)	Change Non-Adjusted %	Change Weather Adjusted %	Cost Avoidance Weather Adjusted \$
Roby*	3,198	3,198	0	-3,198	-3,198	-100%	-100%	\$ (3,971)
Cedar Grove	1,137	1,137	782	-356	-356	-31%	-31%	\$ (559)
Nichols	20,354	21,603	21,239	884	-364	4%	-2%	\$ (2,647)
Lebanon Junction	841	841	617	-224	-224	-27%	-27%	\$ (901)
<b>Total</b>	<b>25,531</b>	<b>26,779</b>	<b>22,637</b>	<b>-2,893</b>	<b>-4,142</b>	<b>-11%</b>	<b>-15%</b>	<b>\$ (8,078)</b>

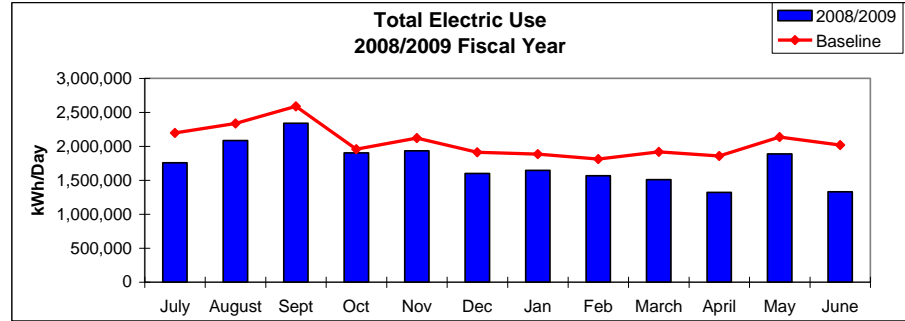
\*Service removed when PE building was demo'd

Note: Cedar Grove, Roby, and Lebanon Junction use propane for cafeteria equipment and some water heating and is not affected by weather.

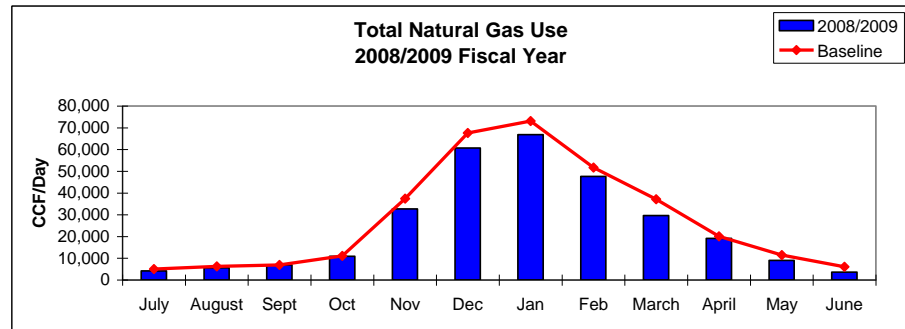
## Appendix B

### Actual Monthly Usage Data Compared to Weather

Month	Total Electric Use/Day (kWh)			Weather Data			
	2008/09	Baseline	% Change	2008/09		Baseline	
				CDD	HDD	CDD	HDD
July	1,757,318	2,198,246	-20%	466	0	437	0
August	2,084,712	2,336,741	-11%	430	0	400	3
Sept	2,339,761	2,587,623	-10%	273	0	178	18
Oct	1,903,102	1,957,528	-3%	55	216	41	215
Nov	1,931,983	2,120,263	-9%	0	586	3	447
Dec	1,601,248	1,911,257	-16%	1	852	0	830
Jan	1,644,632	1,884,283	-13%	0	1086	0	781
Feb	1,567,740	1,811,715	-13%	0	695	0	721
March	1,509,502	1,919,142	-21%	1	455	6	543
April	1,322,127	1,859,056	-29%	62	266	44	184
May	1,887,545	2,135,180	-12%	107	53	144	78
June	1,331,616	2,019,486	-34%	321	7	324	0
Total	20,881,286	24,740,521	-16%	1716	4216	1577	3819



Month	Total Natural Gas (CCF)			Weather Data			
	2008/09	Baseline	% Change	2007/08		Baseline	
				CDD	HDD	CDD	HDD
July	4,138	5,013	-17%	466	0	437	0
August	5,627	6,290	-11%	430	0	400	3
Sept	6,898	6,903	0%	273	0	178	18
Oct	10,912	11,095	-2%	55	216	41	215
Nov	32,701	37,384	-13%	0	586	3	447
Dec	60,663	67,619	-10%	1	852	0	830
Jan	66,800	73,118	-9%	0	1086	0	781
Feb	47,642	51,663	-8%	0	695	0	721
March	29,660	37,093	-20%	1	455	6	543
April	19,123	20,115	-5%	62	266	44	184
May	8,951	11,467	-22%	107	53	144	78
June	3,590	6,032	-40%	321	7	324	0
Total	296,705	333,793	-11%	1716	4216	1577	3819



Month	Total Propane Delivery (Gallons)			Weather Data			
	2008/09	Baseline	% Change	2007/08		Baseline	
				CDD	HDD	CDD	HDD
July	270	183	48%	466	0	437	0
August	140	531	-74%	430	0	400	3
Sept	400	1,018	-61%	273	0	178	18
Oct	1,135	1,390	-18%	55	216	41	215
Nov	1,769	4,229	-58%	0	586	3	447
Dec	5,130	4,051	27%	1	852	0	830
Jan	4,217	4,977	-15%	0	1086	0	781
Feb	5,363	3,456	55%	0	695	0	721
March	1,460	2,996	-51%	1	455	6	543
April	2,323	2,510	-7%	62	266	44	184
May	260	1,175	-78%	107	53	144	78
June	170	263	-35%	321	7	324	0
Total	22637	26779	-15%	1716	4216	1577	3819

