



Bullitt County Public Schools  
Energy Management Program  
2010/2011 Year End Report

*Summary*

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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 2010/2011 fiscal year. Actions used for energy savings are included as well as goals for the upcoming year. Total district electric consumption was **20% less** than the baseline usage resulting in a cost avoidance of approximately **\$226,500**. Natural gas usage was **51% less** resulting in cost avoidance of approximately **\$114,600**. Propane for heating and cooking has been eliminated (replaced with electric or natural gas), resulting in a cost avoidance of approximately **\$45,000**. Had we not reduced our electric, gas and propane usage by these amounts, given today's rates, we would have spent approximately \$386,100 more on our utility bills. These numbers include the added cost of the new Roby, Brooks and Overdale Elementary Schools. Adjusting for this increase in square footage, our savings for 2010/2011 are **\$404,900**.

The cost of the district's energy management program in 2010/2011 was \$71,000 for the energy manager budget and salary and \$328,778 for the ESPC bond repayment. This leaves a net savings of \$10,200. 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.

In addition to our avoided costs, the district also received **\$13,589 in rebates** from LG&E for implementing energy conservation measures.

The total avoided utility cost since BCPS began the energy management program in 2006 is approximately **\$1,300,000**. 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 \$384,900 leaving a net cost avoidance of approximately \$586,600.

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

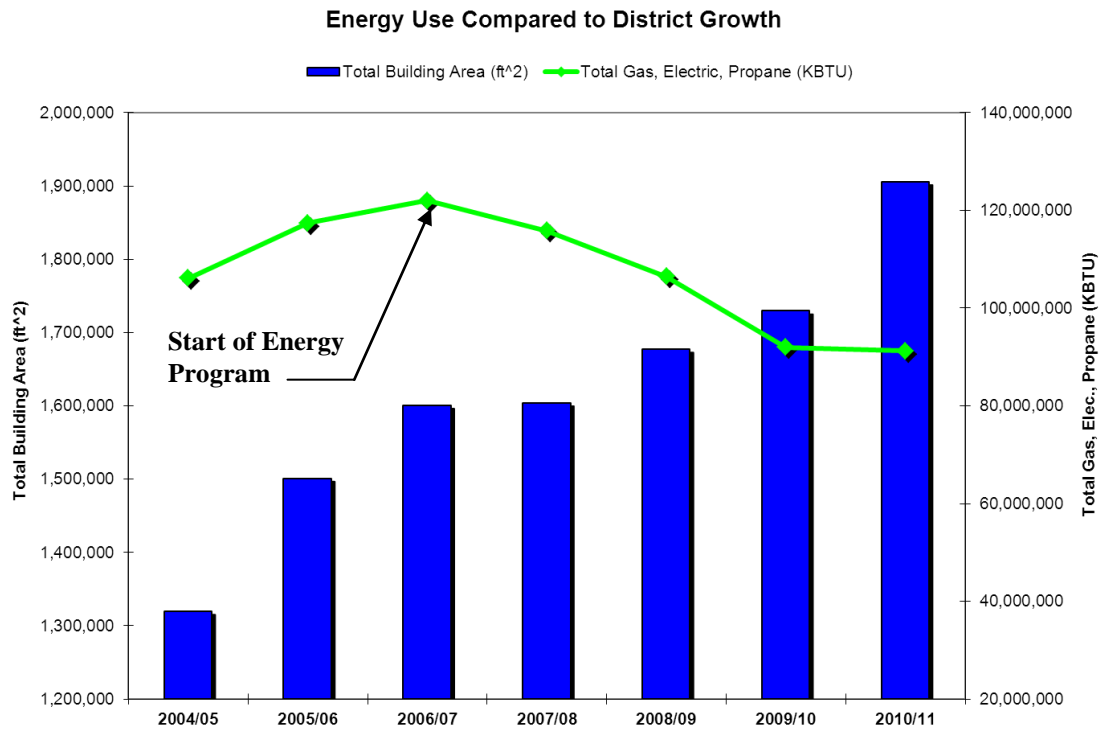


Figure 1--Energy Use Compared to District Growth

### Projects

Energy saving measures that were in place during the 10/11 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 13 schools during the 10/11 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:

- Received \$53,100 in grant money which allowed us to purchase
  - 16 energy education kits from the National Energy Education Development (NEED) Project
  - New utility database software, Utility Manager. The software resides on our server which means we will no longer have to pay an annual fee for the internet service.
  - A thermal imaging camera
- Received \$13,589 back from LG&E through their Commercial Rebate Program
- 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)
  - Maintenance Garage (MB-3)
- Using Energy Star Benchmarking tool (Portfolio Manager.) In 2010/11, we added Roby Elementary and Overdale Elementary to our list of facilities that are Energy Star Rated.

School	Energy Star Ranking
Bullitt Lick Middle	82
Eastside Middle	80
Freedom Elementary	80
Maryville Elementary	78
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*

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Planned projects for next year (2011/12) include:

- Continuation of student energy team program. There are 21 schools that have signed up to participate in the program for the 2011/12 school year.
- Installation of lighting controls (occupancy sensors).
- Apply for the Energy Star Leader’s award.
- Apply for Energy Star Award for additional schools that meet criteria.
- Use our new thermal imaging camera to evaluate our buildings to identify areas that may need insulation or winterization. We will also use the camera for preventative maintenance on electric panels and pump motors.
- Grant funds from KSBA continue for the 2011/12 school year. With these funds we will continue to provide materials and incentives for student energy teams, provide energy related professional development for teachers and training for facilities staff.
- Add new schools to the Trane EcoRate energy monitoring program.

## *Energy Usage Information*

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

**Table 1--Yearly Utility Use and Cost**

<b>Utility Type</b>	<b>2004/2005</b>	<b>2005/2006</b>	<b>2006/2007</b>	<b>2007/2008</b>	<b>2008/2009</b>	<b>2009/2010</b>	<b>2010/2011</b>
Electric (kWh)	20,238,383	23,968,514	25,286,477	23,731,788	21,368,945	20,188,729	21,702,211
Natural Gas (CCF)	344,412	324,933	328,762	317,432	301,614	223,715	168,058
Propane (Gal)	18,307	24,547	24,321	26,067	22,637	738	726
<b>Total Energy (kBtu)</b>	<b>106,193,736</b>	<b>117,482,446</b>	<b>122,353,157</b>	<b>116,040,454</b>	<b>106,037,049</b>	<b>91,993,746</b>	<b>91,423,984</b>

<b>Water/Sewer (Gal)</b>	<b>31,983,000</b>	<b>30,180,000</b>	<b>28,696,410</b>	<b>27,645,360</b>	<b>22,885,080</b>	<b>18,335,600</b>	<b>19,310,020</b>
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<b>Utility Type</b>	<b>2004/2005</b>	<b>2005/2006</b>	<b>2006/2007</b>	<b>2007/2008</b>	<b>2008/2009</b>	<b>2009/2010</b>	<b>2010/2011</b>
Electric Cost	\$ 1,347,257	\$ 1,731,618	\$ 1,878,962	\$ 1,874,410	\$ 1,888,880	\$ 1,841,316	\$ 2,052,474
Natural Gas Cost	\$ 361,814	\$ 500,245	\$ 326,271	\$ 359,626	\$ 413,207	\$ 182,260	\$ 155,724
Propane Cost	\$ 22,543	\$ 36,697	\$ 40,337	\$ 63,841	\$ 52,343	\$ 1,497	\$ 1,405
<b>Total Energy Cost</b>	<b>\$ 1,731,614</b>	<b>\$ 2,268,560</b>	<b>\$ 2,245,570</b>	<b>\$ 2,297,877</b>	<b>\$ 2,354,430</b>	<b>\$ 2,025,073</b>	<b>\$ 2,209,602</b>

<b>Water/Sewer Cost</b>	<b>\$ 174,520</b>	<b>\$ 161,663</b>	<b>\$ 166,568</b>	<b>\$ 177,149</b>	<b>\$ 159,270</b>	<b>\$ 131,292</b>	<b>\$ 159,127</b>
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<b>Total Building Area (ft<sup>2</sup>)</b>	<b>1,319,733</b>	<b>1,501,305</b>	<b>1,600,859</b>	<b>1,604,359</b>	<b>1,677,440</b>	<b>1,729,599</b>	<b>1,906,093</b>
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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 2010/11 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 \$
Bernheim	968,377	1,047,950	642,716	-325,661	-405,234	-34%	-39%	\$ (27,052)
Bullitt Central	1,749,023	1,884,683	1,654,761	-94,262	-229,922	-5%	-12%	\$ (15,366)
Bullitt East	2,058,205	2,225,365	1,694,233	-363,972	-531,132	-18%	-24%	\$ (24,347)
Bullitt Lick	1,195,205	1,241,799	678,360	-516,845	-563,439	-43%	-45%	\$ (27,251)
Cedar Grove	594,405	637,867	864,781	270,376	226,914	45%	36%	\$ 14,492
Central Office	438,922	455,425	419,360	-19,562	-36,065	-4%	-8%	\$ (2,537)
Eastside	1,678,209	1,745,966	1,292,352	-385,857	-453,614	-23%	-26%	\$ (30,050)
Freedom	1,196,862	1,289,031	800,800	-396,062	-488,231	-33%	-38%	\$ (15,808)
Hebron	1,364,982	1,462,162	1,148,000	-216,982	-314,162	-16%	-21%	\$ (10,056)
Lebanon Junction	474,697	510,234	674,400	199,703	164,166	42%	32%	\$ 11,531
Maryville	847,754	877,651	586,560	-261,194	-291,091	-31%	-33%	\$ (21,227)
MW Elementary	1,293,255	1,396,625	661,440	-631,815	-735,185	-49%	-53%	\$ (49,034)
MW Middle	1,357,261	1,463,505	883,400	-473,861	-580,105	-35%	-40%	\$ (15,980)
Nichols	212,232	229,113	466,080	253,848	236,967	120%	103%	\$ 20,992
North Bullitt	2,494,791	2,695,850	1,775,600	-719,191	-920,250	-29%	-34%	\$ (24,066)
Old Mill	625,863	663,723	580,920	-44,943	-82,803	-7%	-12%	\$ (5,833)
Pleasant Grove	1,173,670	1,270,991	718,272	-455,398	-552,719	-39%	-43%	\$ (38,342)
Riverview/DT	391,633	418,137	356,640	-34,993	-61,497	-9%	-15%	\$ (4,098)
Shepherdsville	1,065,968	1,112,288	841,668	-224,300	-270,620	-21%	-24%	\$ (7,352)
Transportation	197,383	209,320	227,760	30,377	18,440	15%	9%	\$ 1,258
Zoneton	1,453,799	1,501,373	1,240,200	-213,599	-261,173	-15%	-17%	\$ (18,871)
<b>Total</b>	<b>22,832,495</b>	<b>24,339,060</b>	<b>18,208,303</b>	<b>-4,624,192</b>	<b>-6,130,757</b>	<b>-20%</b>	<b>-25%</b>	<b>\$ (288,994)</b>
Brooks*	467,298	504,905	840,640	373,342	335,735	80%	66%	\$ 22,309
Overdale*	382,020	410,481	616,080	234,060	205,599	61%	50%	\$ 14,928
Roby*	447,979	482,741	840,800	392,821	358,059	88%	74%	\$ 25,222
<b>Revised Total</b>	<b>24,129,792</b>	<b>25,737,188</b>	<b>20,505,823</b>	<b>-3,623,969</b>	<b>-5,231,365</b>	<b>-15%</b>	<b>-20%</b>	<b>\$ (226,536)</b>

	2010/11 Use (kWh)	2010/11 Cost
Crossroads**	103,875	\$ 71,995

\*Comparing to old building

\*\*New school, no baseline use

**Table 3--Natural Gas and Propane Cost Avoidance Report**

Natural Gas Consumption 2010/2011 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 \$
Bernheim	19,306	19,744	7,064	-12,242	-12,680	-63%	-64%	\$ (8,439)
Bullitt Central	42,687	44,996	38,149	-4,538	-6,847	-11%	-15%	\$ (4,720)
Bullitt East	35,307	35,424	15,090	-20,217	-20,334	-57%	-57%	\$ (14,017)
Bullitt Lick	9,001	9,295	7,106	-1,895	-2,189	-21%	-24%	\$ (1,509)
Cedar Grove	22,476	23,037	5,358	-17,118	-17,679	-76%	-77%	\$ (12,341)
Central Office	244	263	97	-147	-166	-60%	-63%	\$ (114)
Eastside								
Freedom	11,448	11,286	4,312	-7,136	-6,974	-62%	-62%	\$ (4,807)
Hebron	19,885	20,315	0	-19,885	-20,315	-100%	-100%	\$ (13,386)
Lebanon Junction	25,234	25,846	7,296	-17,938	-18,550	-71%	-72%	\$ (12,886)
Maryville	3,894	3,894	2,328	-1,566	-1,566	-40%	-40%	\$ (1,133)
Mt. Washington ES	7,831	8,204	7,074	-757	-1,130	-10%	-14%	\$ (783)
Mt. Washington MS	13,549	13,863	14,931	1,382	1,068	10%	8%	\$ 329
Nichols								
North Bullitt	12,371	13,011	17,771	5,400	4,760	44%	37%	\$ 3,556
Old Mill	10,468	11,032	9,327	-1,141	-1,705	-11%	-15%	\$ (1,360)
Pleasant Grove	8,412	8,708	8,154	-258	-554	-3%	-6%	\$ (395)
Riverview/DT	8,784	8,976	9,849	1,065	873	12%	10%	\$ 551
Shepherdsville	3,006	3,008	3,305	299	297	10%	10%	\$ 333
Transportation	3,159	3,312	3,603	444	291	14%	9%	\$ 192
Zoneton								
<b>Total</b>	<b>257,062</b>	<b>264,214</b>	<b>160,814</b>	<b>-96,248</b>	<b>-103,400</b>	<b>-37%</b>	<b>-39%</b>	<b>\$ (70,929)</b>
Crossroads								
Brooks*	17,875	18,274	0	-17,875	-18,274	-100%	-100%	\$ (12,596)
Overdale*	23,174	23,174	2,656	-20,518	-20,518	-89%	-89%	\$ (13,794)
Roby*	24,146	24,942	31	-24,115	-24,911	-100%	-100%	\$ (17,259)
<b>Revised Total</b>	<b>322,257</b>	<b>330,603</b>	<b>163,501</b>	<b>-158,756</b>	<b>-167,102</b>	<b>-49%</b>	<b>-51%</b>	<b>\$ (114,578)</b>

Propane Consumption 2010/11 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 \$
Cedar Grove	1,180	1,180	0	-1,180	-1,180	-100%	-100%	\$ (2,902)
Nichols	19,421	19,893	0	-19,421	-19,893	-100%	-100%	\$ (40,004)
Lebanon Junction	841	841	0	-841	-841	-100%	-100%	\$ (2,164)
<b>Total</b>	<b>21,442</b>	<b>21,914</b>	<b>0</b>	<b>-21,442</b>	<b>-21,914</b>	<b>-100%</b>	<b>-100%</b>	<b>\$ (45,070)</b>

	2010/11 Use (ccf)	2010/11 Cost
Crossroads**	no gas service	

\*Comparing to old building  
\*\*New school, no baseline use

**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. Overdale, Brooks and Roby data is compared to their previous building's usage.



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

Month	Total Energy Use (kBtu)			Weather Data			
	2010/2011	Baseline	% Change	2010/11		Baseline	
				CDD	HDD	CDD	HDD
July	5,331,107	7,717,477	-31%	561	0	429	0
Aug	8,100,210	8,593,958	-6%	560	0	389	5
Sept	7,519,373	9,771,096	-23%	311	2	218	17
Oct	6,844,064	8,187,407	-16%	63	115	47	167
Nov	6,643,314	9,806,073	-32%	5	450	4	436
Dec	10,317,633	13,451,532	-23%	0	1053	0	910
Jan	10,632,938	12,456,528	-15%	0	1051	0	725
Feb	8,927,474	12,191,309	-27%	0	641	0	702
March	7,668,371	10,819,003	-29%	16	481	0	595
April	6,076,630	7,999,518	-24%	57	140	45	171
May	6,431,015	8,339,288	-23%	183	86	93	97
June	5,157,056	7,849,763	-34%	256	0	317	0
Total YTD	84,492,127	109,333,190	-23%				

\*Includes Crossroads Use

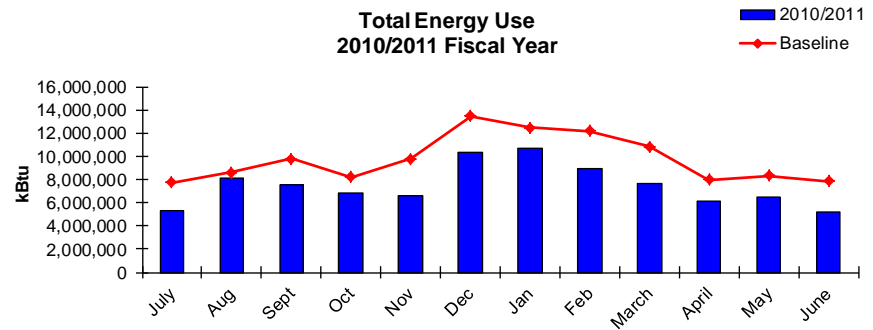


Figure 3--Non-Adjusted Electricity Use

Month	Total Electricity (kWh)			Weather Data			
	2010/2011	Baseline	% Change	2010/11		Baseline	
				CDD	HDD	CDD	HDD
July	1,499,215	2,107,177	-29%	561	0	429	0
Aug	2,285,254	2,316,121	-1%	560	0	389	5
Sept	2,080,033	2,594,964	-20%	311	2	218	17
Oct	1,855,969	2,042,688	-9%	63	115	47	167
Nov	1,545,851	1,966,956	-21%	5	450	4	436
Dec	1,883,499	1,910,315	-1%	0	1053	0	910
Jan	1,938,960	1,972,321	-2%	0	1051	0	725
Feb	1,754,517	1,928,518	-9%	0	641	0	702
March	1,755,504	1,878,577	-7%	16	481	0	595
April	1,578,430	1,824,792	-14%	57	140	45	171
May	1,726,519	2,061,289	-16%	183	86	93	97
June	1,435,223	2,096,022	-32%	256	0	317	0
Total YTD	19,903,751	22,603,716	-12%				

\*Includes Crossroads Use

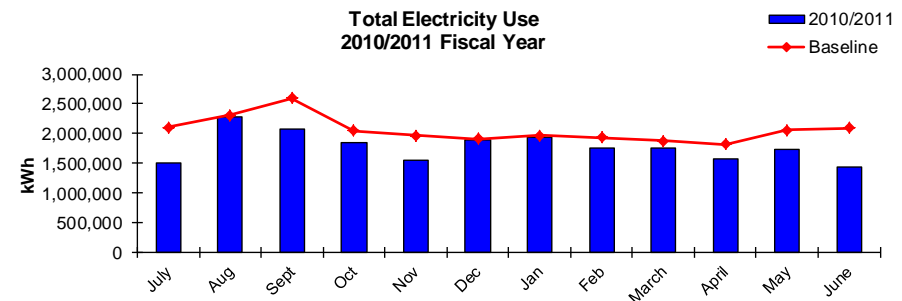


Figure 4--Non-Adjusted Natural Gas Use

Month	Total Natural Gas Use (ccf)			Weather Data			
	2010/2011	Baseline	% Change	2009/2010		Baseline	
				CDD	HDD	CDD	HDD
July	2,095	5,182	-60%	561	0	429	0
Aug	2,941	6,517	-55%	560	0	389	5
Sept	4,100	8,548	-52%	311	2	218	17
Oct	4,966	11,664	-57%	63	115	47	167
Nov	13,290	29,888	-56%	5	450	4	436
Dec	37,778	67,102	-44%	0	1053	0	910
Jan	39,002	55,439	-30%	0	1051	0	725
Feb	28,554	54,315	-47%	0	641	0	702
March	16,297	42,727	-62%	16	481	0	595
April	6,709	17,137	-61%	57	140	45	171
May	5,244	12,500	-58%	183	86	93	97
June	2,525	6,710	-62%	256	0	317	0
Total YTD	163,501	317,726	-49%				

