

Understanding Your Energy Costs The Power to Take Control Kentucky's K-12 Success Story

*West Virginia Workshop
High Performance School Buildings Day*

September 12 & 13, 2017

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Kentucky School Boards Association-School Energy Managers Project



Kentucky School Profile



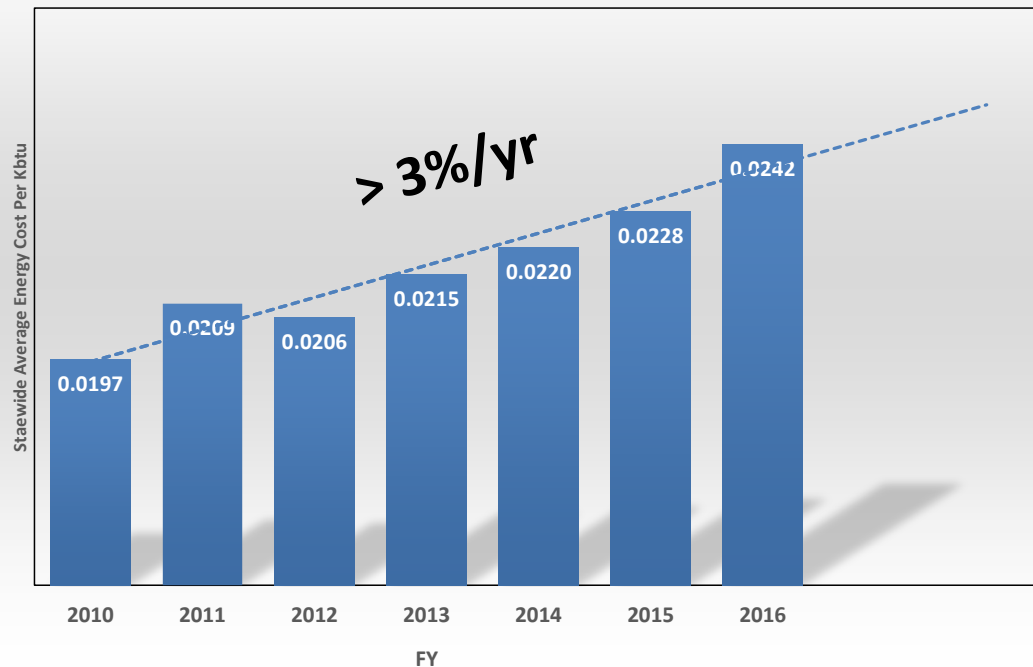
- 173 Districts - Boards
- 675,000 Students
- \$50,428 Average Teacher Salary
- 1233 P-12 Schools
- 110,000,000 Square Feet
- 187 Day School Year

The Average School District in Kentucky

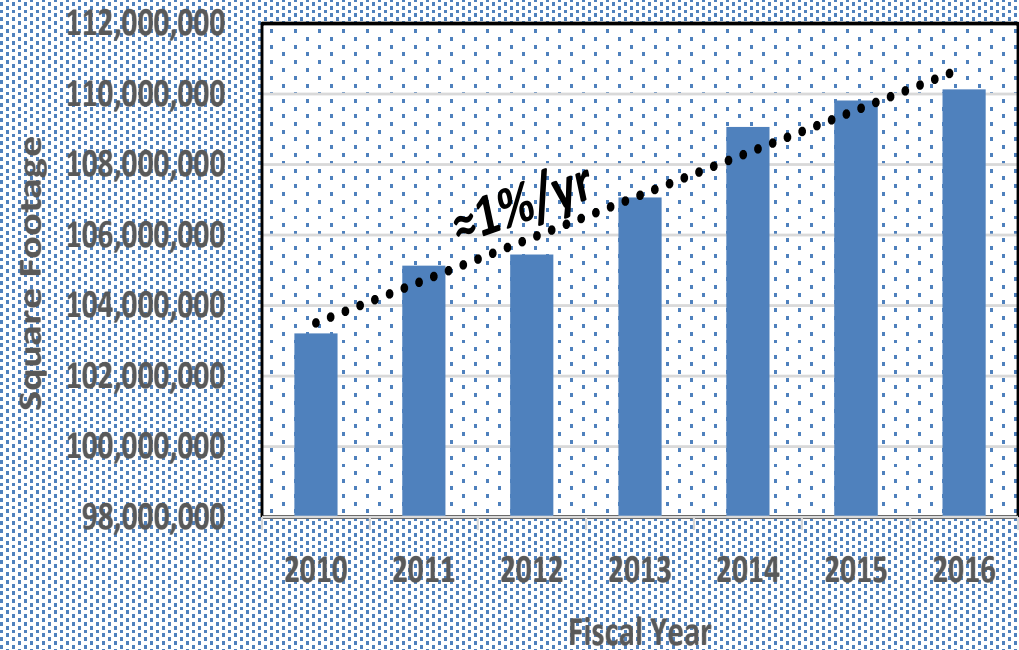
	Entire State	Less Fayette & Jefferson Counties
Elementary Schools	4.0	3.4
Middle and High Schools	2.5	2.2
TOTAL	6.5	5.5
Energy Consumption, MMBTU	33,000	26,000
Energy Spend, \$	\$799,5000	\$639,000
Conditioned Square Footage	637,000	518,000

Utility Cost and Space Increases

Figure 4, Cost of School Energy per KBtu by Fiscal Year

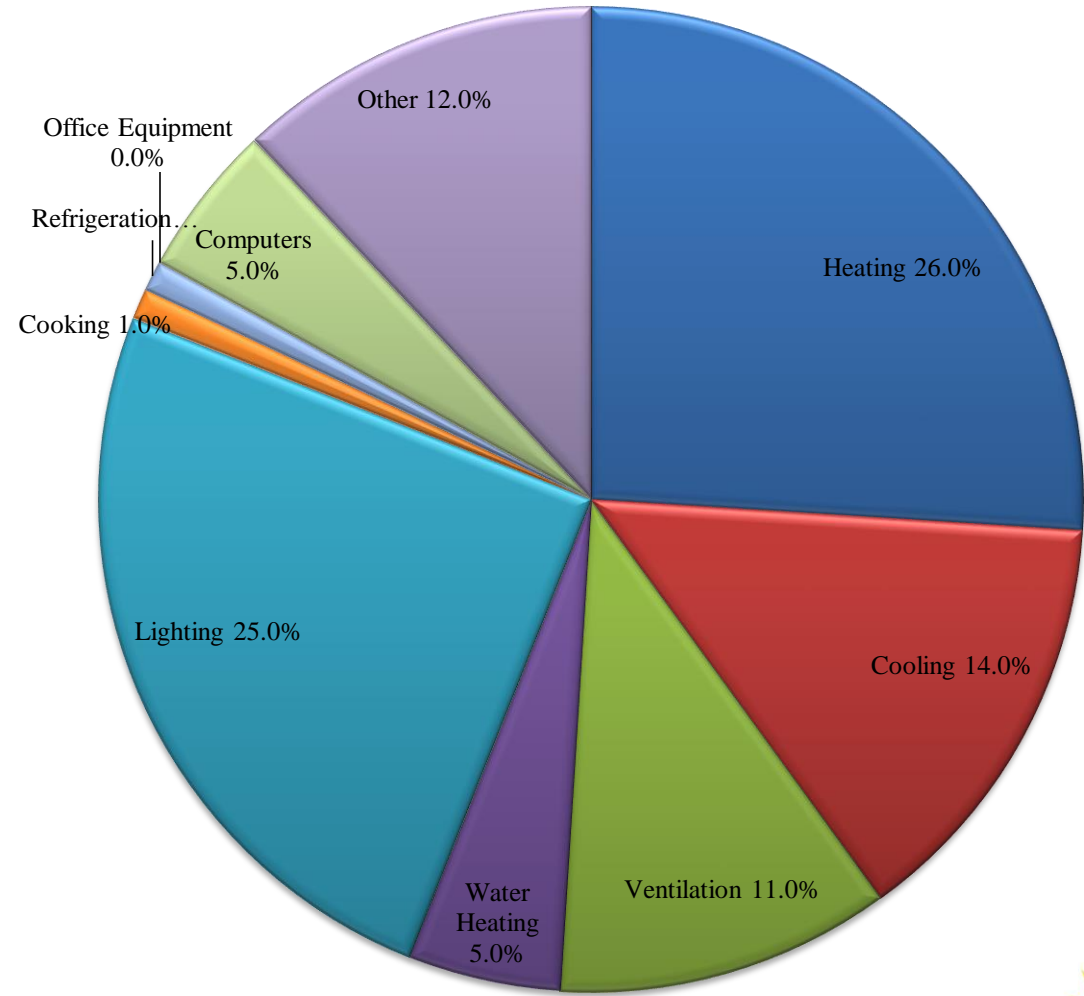


Conditioned Square Footage



Where do those BTUs go?

- Note HVAC
- Note Lighting
- Other = Things Plugged In
 - ✓ Space heaters
 - ✓ Coffee Makers
 - ✓ Microwaves
 - ✓ Mini Fridge



Behavior Opportunities



DVD Player

Microwave

Lamp

Thermostat

Mini Fridge

Coffee Pot

Power Strip

School Culture

- School administrator and personnel focus = education
- Background is education – not finance or energy
 - Default: “just pay the bill”
- Contrary to a business, schools have multiple decision makers
 - Each teacher can bring items (portable heaters, refrigerators, additional lights, and microwaves) and, in many cases, have control over the temperature of their room.

School Culture (continued)

- Energy Initiative Funding Challenge
 - Energy Projects: Cash and bonding capacity limitations
 - Energy Practitioners: non-classroom position is a problem
- Energy Technology in Buildings is Sophisticated
 - Educators have learned “occupied” and “unoccupied”.
 - Control Systems for HVAC and Lighting are complex
 - Succession training required
 - Energy Manager Oversight or Control
- Energy Success Stories - Now Classroom Lessons

Where had schools been?

- \$140 Million Annually on Utilities
- No Comprehensive Energy Plan
- Reliance on Mechanical Systems
- 12 ENERGY STAR Labeled Schools
- HOW ABOUT THE STUDENTS????

Wasted Energy = Money on the floor waiting to be picked up



Statutory requirements

- KRS 160.325
 - School Energy Management Plans Required
- Governor's Strategy
 - Intelligent Energy Choices For Kentucky's Future
- KRS 278.455
 - Highly Efficient Buildings

Management Support Statutory & Policy Drivers

- HB2 (2008) to KRS160.325 to Board Policy 05.23
 - Develop/ Implement/Monitor Energy Management Plan
 - Track & Monitor Progress Managing & Reducing Costs
 - District/Superintendent Annual Reporting
 - KSBA Collects, Verifies and Reports to DEDI & LRC

School Energy Managers Project

- Originated March 2010
- Funded Initially by \$5 Million - ARRA
 - Matching Funds to Employ Energy Managers
 - 49 Energy Managers – 144 Districts
- Energy Cabinet - \$800,000 - FY2012 to FY2016
- Utility DSM Funding - 2013 forward
 - \$4.4 Million
 - 52 Energy Managers – 109 Districts

KSBA - SEMP's Message

Best Fuel Source – Energy Efficiency

- Doesn't require new technology
- Can do it today
- Reduces Greenhouse Gas
- Lowers Cost

More – with less resources

- Partnerships
- Process Improvements
- Life-cycle analysis
- Bridge Technology-Operations
- Net Zero Ready Construction

Key Factors for Successful Energy Management Program

- Support - School Board & Superintendent
- Buy in - All Principals (Building Leaders)
- Buy in - All Faculty and Staff
- Educate Students on Saving Energy
- Competition - Weekly and Monthly Reports
- Identify Prioritize & Implement ECM's
- Recognize achievements



NO Involvement = NO commitment

- If you want people committed, you have to get them involved
- How do you get people Involved?
 - Communication
 - Teams
 - Contests
 - State Rankings



What have schools done



- Employed Energy Managers
- Facility & Operation Audits
- Behavior - Staff/Student Involvement
- Implemented Efficiency Measures
 - Adjusted HVAC temperature set points
 - Building Automation Systems
 - Equipment Upgrades
 - Lighting Retrofits
- Demand Response
- Performance Contracts



Energy Manager



- Dedicated Resource
 - No Priority Shuffling – Boots on the Ground
 - Significant ROI (NON Classroom Position Saves Multiple Classroom Positions)
 - Knowledgeable Connection to Utility Companies
- Skilled Resource
 - Evaluates and Presents Energy Saving Options
 - Facilitates Policy Compliance
 - Translates Technical Information

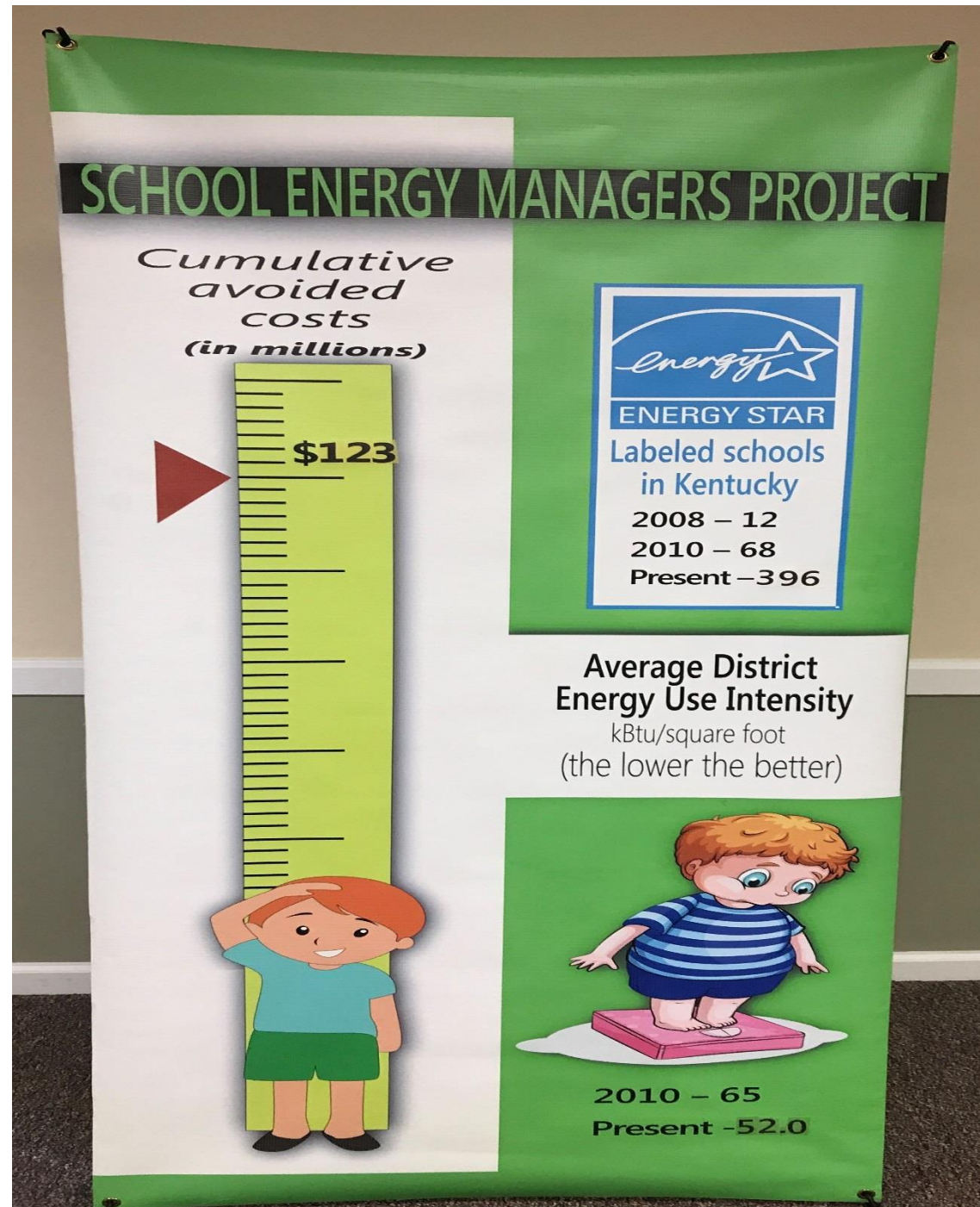
KSBA Functions

- Funding & Technical Support
- Energy Manager Training
- Utility Billing and Service Issues
- Data Tracking and Reporting Assistance
- Stakeholder Collaboration
- Rate Case Intervention

Key Metrics

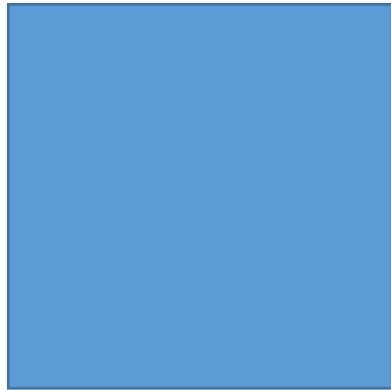
- Dollars
- Grading Scale
- Achievement
- Recognition

DOLLARS Avoided Costs . . .



Grading Scale

ENERGY UTILIZATION INDEX (EUI)
Btu per Square Foot



ENERGY STAR

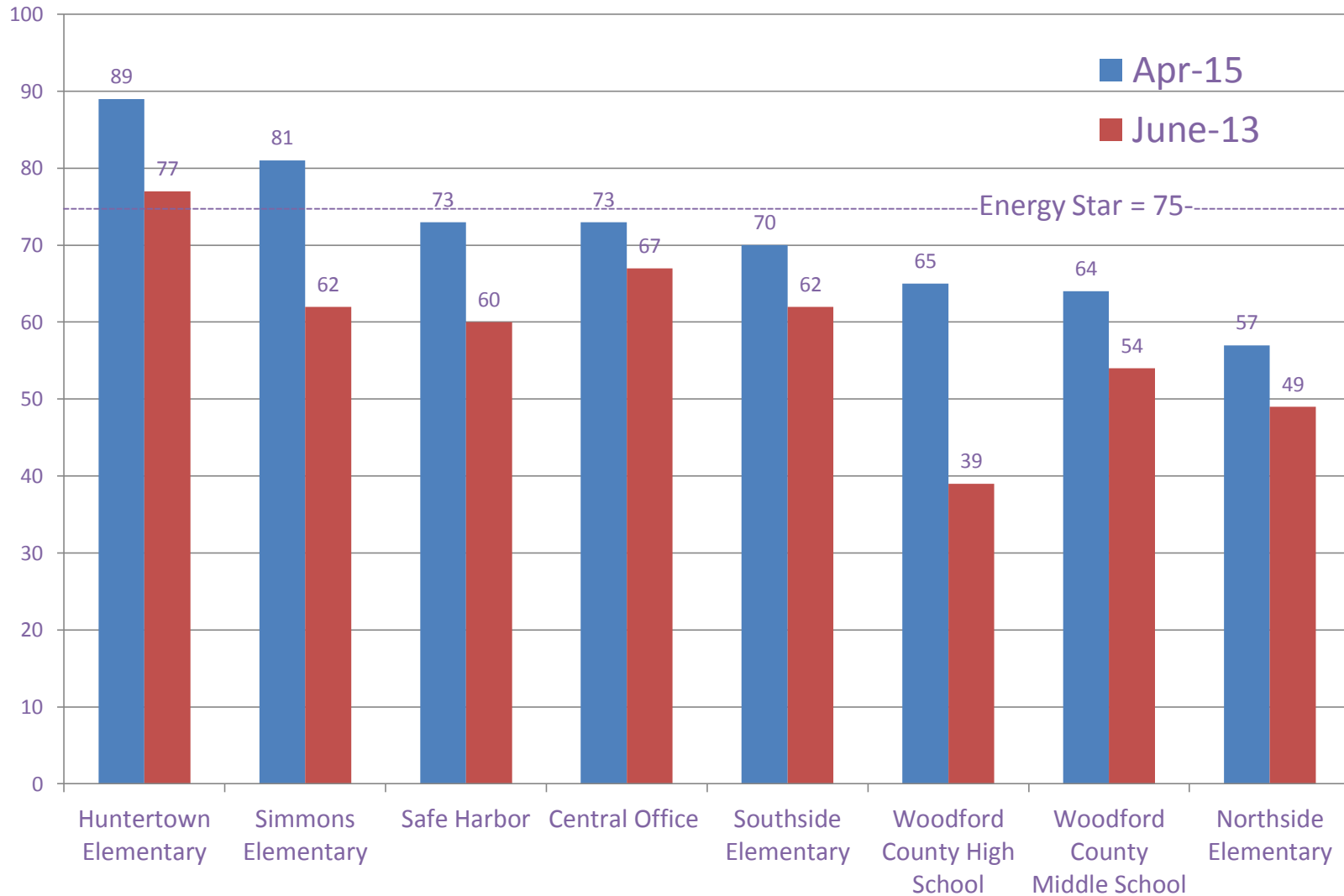
Portfolio Manager Ratings

Facility Name	Rating (1-100) March-13	Baseline (1-100) Jun - 10	Adjusted Change From Baseline(%)	Energy Use kbtu/sq ft	Energy Star
Stamping Ground Elementary	95	91	-9.6%	33.3	Yes
Elkhorn Crossing School	93	82	-18.8%	28.4	Yes
Royal Spring Middle School	92	74	-25.0%	27.9	Yes
Eastern Elementary	91	80	-18.7%	35.8	Yes
Georgetown Middle School	90	77	-19.4%	33.5	Yes
Garth Elementary	88	89	1.4%	39.4	Yes
Southern Elementary	87	80	-9.3%	35.4	Yes
Northern Elementary	84	33	-39.8%	40.6	Yes
Anne Mason Elementary	81	52	-24.4%	38.4	Yes
SCHS/9th Grade/SCMS Campus	80	69	-12.0%	50.7	Yes
Western Elementary	72	48	-19.7%	43.1	
Preschool	N/A	N/A	-9.2%	43.7	*
Central Office/Misc	N/A	N/A	-3.0%	79.9	
Group Total	85	71	-15.4%	42.1	

* Energy Star Does Not Award Energy Star to Preschool Facilities at this time

Woodford County Schools

Energy Star Portfolio Manager Rating



Achievement



Recognition





Kentucky's Battle of the School Buildings



An ENERGY STAR® Battle of the Buildings™ Competition

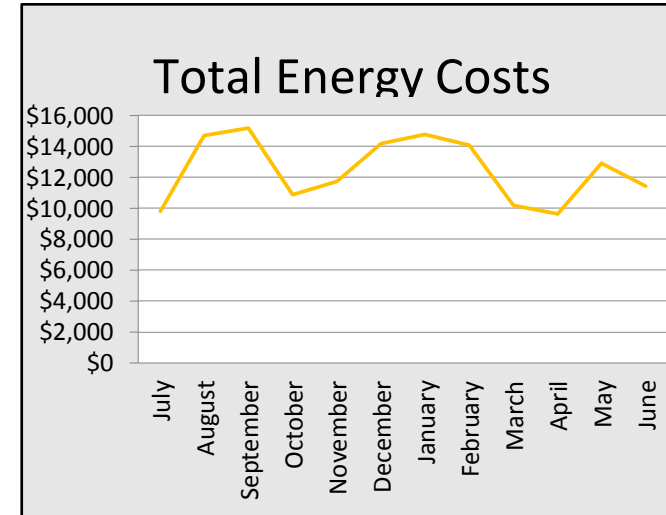
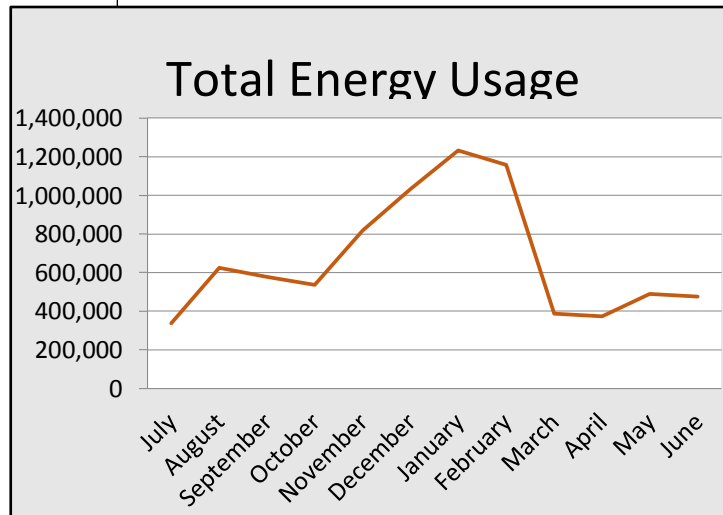


Utility Tracking

Utility Tracking

Utility Tracking Spreadsheet
 ABC County Schools
 Tracking Year: FY 2011-2012

Month	Usage in Billing Units							Costs by Fuel Type				Usage in kBTU				Totals	
	Electric Demand (kW)	Metered Electricity (kWh)	Unmetered Electricity (kWh)	Total Electricity (kWh)	Natural Gas (ccf)	Propane (gal)	Fuel Oil (gal)	Electricity	Natural Gas	Propane	Fuel Oil	Electricity	Natural Gas	Propane	Fuel Oil	Total Energy Usage (kBTU)	Total Cost
July	77	89,516	1,443	90,959	269			\$9,550	\$246			310,352	27,711			338,063	\$9,797
August	112	168,420	1,535	169,955	436			\$14,352	\$360			579,886	44,860			624,747	\$14,711
September	134	151,523	1,784	153,307	530			\$14,758	\$427			523,083	54,501			577,584	\$15,185
October	115	106,329	1,873	108,202	1,612			\$9,712	\$1,175			369,185	165,860			535,045	\$10,887
November	81	83,189	1,904	85,093	5,137			\$8,066	\$3,674			290,337	528,556			818,893	\$11,739
December	90	96,513	2,320	98,833	6,760			\$9,454	\$4,737			337,218	695,639			1,032,857	\$14,192
January	66	97,911	2,418	100,329	8,650			\$8,941	\$5,838			342,323	890,121			1,232,444	\$14,779
February	67	102,971	2,107	105,078	7,781			\$8,945	\$5,130			358,526	800,653			1,159,179	\$14,074
March	110	92,684	1,860	94,544	619			\$9,610	\$560			322,584	63,656			386,240	\$10,169
April	87	86,272	1,786	88,058	697			\$9,199	\$431			300,454	71,686			372,140	\$9,630
May	107	131,295	1,615	132,910	355			\$12,641	\$252			453,489	36,569			490,058	\$12,894
June	85	129,908	1,565	131,473	251			\$11,225	\$198			448,586	25,829			474,415	\$11,422
Average	94	111,378	1,851	113,228	2,758	#DIV/0!	#DIV/0!	\$10,538	\$1,919	#DIV/0!	#DIV/0!	386,335	283,803	#DIV/0!	#DIV/0!	670,139	\$12,457
Total	N/A	1,336,531	22,210	1,358,741	33,097	0	0	\$126,453	\$23,027	\$0	\$0	4,636,024	3,405,641	0	0	8,041,665	\$149,480





Scott County Schools Energy Management Report June 2015

School Facility	June					2014 - 2015 YTD Results				
	2014 Actual Kwh	2015 Actual Kwh	% Reduction	Position	\$ Cost Change	2013-14 Actual Kwh	2014-15 Actual Kwh	% Reduction	Overall Position	YTD \$ Cost Change
GMS	58,400	54,040	7.5%	5	-\$401	1,057,200	1,055,080	0.2%	14	-\$182
RSMS	77,080	74,160	3.8%	9	-\$268	1,215,840	1,271,200	-4.6%	17	\$4,753
AME	73,316	58,060	20.8%	1	-\$1,403	982,539	931,666	5.2%	6	-\$4,367
Eastern	27,181	22,402	17.6%	2	-\$439	517,031	462,757	10.5%	3	-\$4,659
Garth	68,331	59,542	12.9%	4	-\$808	702,431	649,422	7.5%	4	-\$4,551
Northern	41,200	34,000	17.5%	3	-\$662	622,800	513,200	17.6%	1	-\$9,409
Southern	48,480	45,440	6.3%	7	-\$279	789,440	776,960	1.6%	11	-\$1,071
Stamping Ground	42,960	43,120	-0.4%	11	\$15	577,040	556,270	3.6%	8	-\$1,783
Western	55,200	66,800	-21.0%	17	\$1,066	971,600	924,400	4.9%	7	-\$4,052
Central Office/Misc	54,912	58,975	-7.4%	13	\$374	777,328	751,434	3.3%	9	-\$2,223
Preschool	15,941	15,627	2.0%	10	-\$29	274,827	266,633	3.0%	10	-\$703
SCHS	183,274	170,053	7.2%	6	-\$1,215	3,065,514	2,674,873	12.7%	2	-\$33,537
SCMS	55,920	62,400	-11.6%	15	\$596	1,087,680	1,080,000	0.7%	12	-\$659
ATC	4,248	4,022	5.3%	8	-\$21	147,306	146,641	0.5%	13	-\$57
9th Grade/Cardinal Acad.	36,000	40,800	-13.3%	16	\$441	566,400	590,160	-4.2%	16	\$2,040
ECS	39,200	40,800	-4.1%	12	\$147	560,400	568,400	-1.4%	15	\$687
Lemons Mill	43,615	47,616	-9.2%	14	\$368	1,000,531	929,711	7.1%	5	-\$6,080
Total	925,258	897,857	3.0%		-\$2,519	14,915,907	14,148,807	5.1%		-\$65,856

Outreach and Communication





Outreach and Communication

- How do we compare Month to Month and YTY? Who knows?
- How does our energy cost/square foot compare with statewide and national data?
- What messages are on our website concerning energy policy?
- Are we communicating our energy efforts and savings?

Goals of District Communication

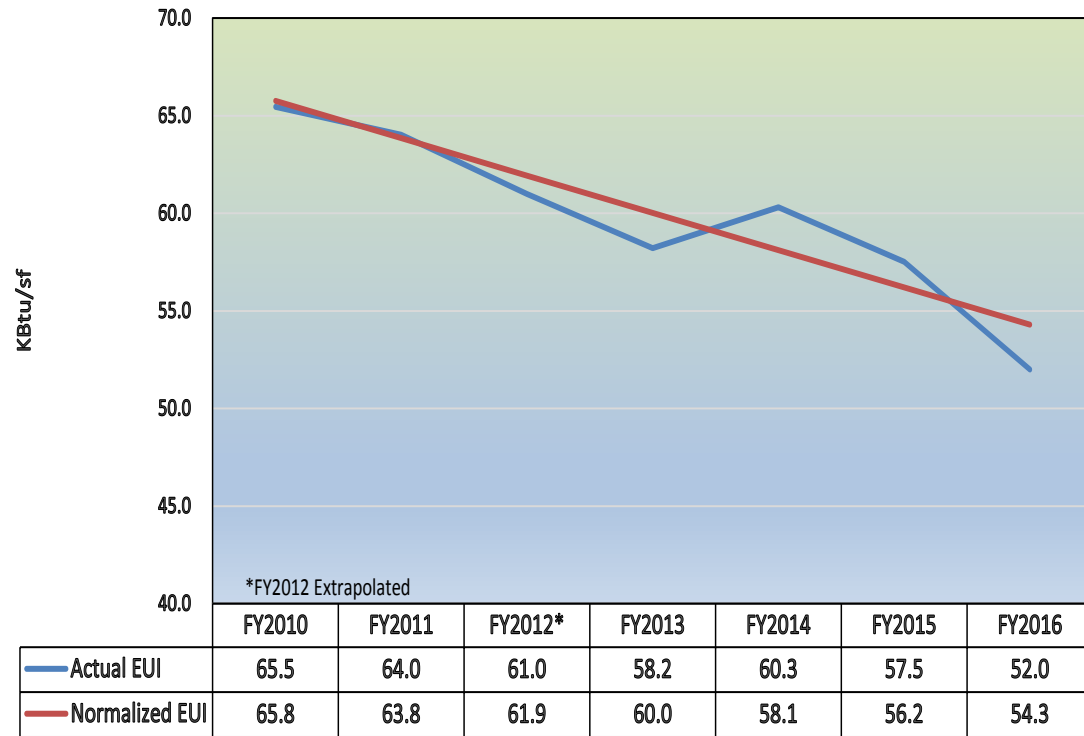
- Keep all stakeholders up to date on progress of Energy Management Program
- Each school to constantly find ways to improve
- Allow each school to compare to last year
- Keeps everyone engaged in saving energy and money

Kentucky's Report Card

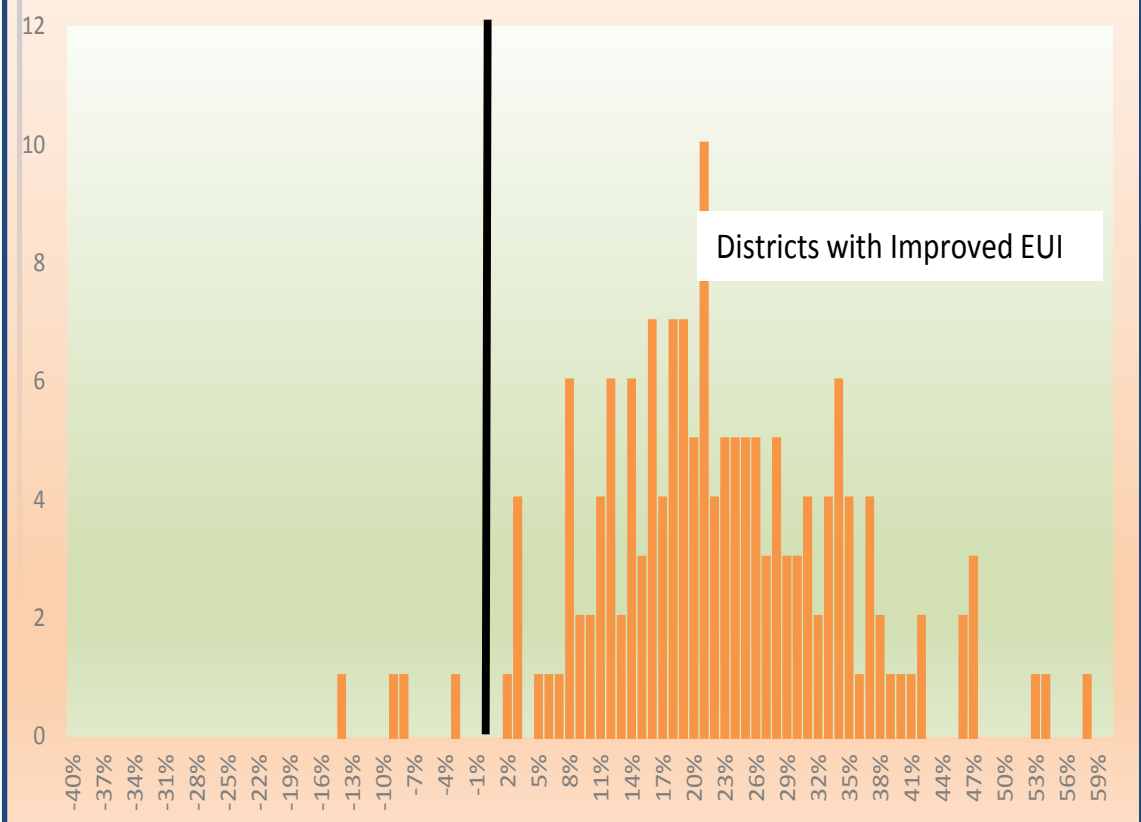


Most Districts Becoming More Efficient

Figure 7,
Energy Use Intensity
by Fiscal Year



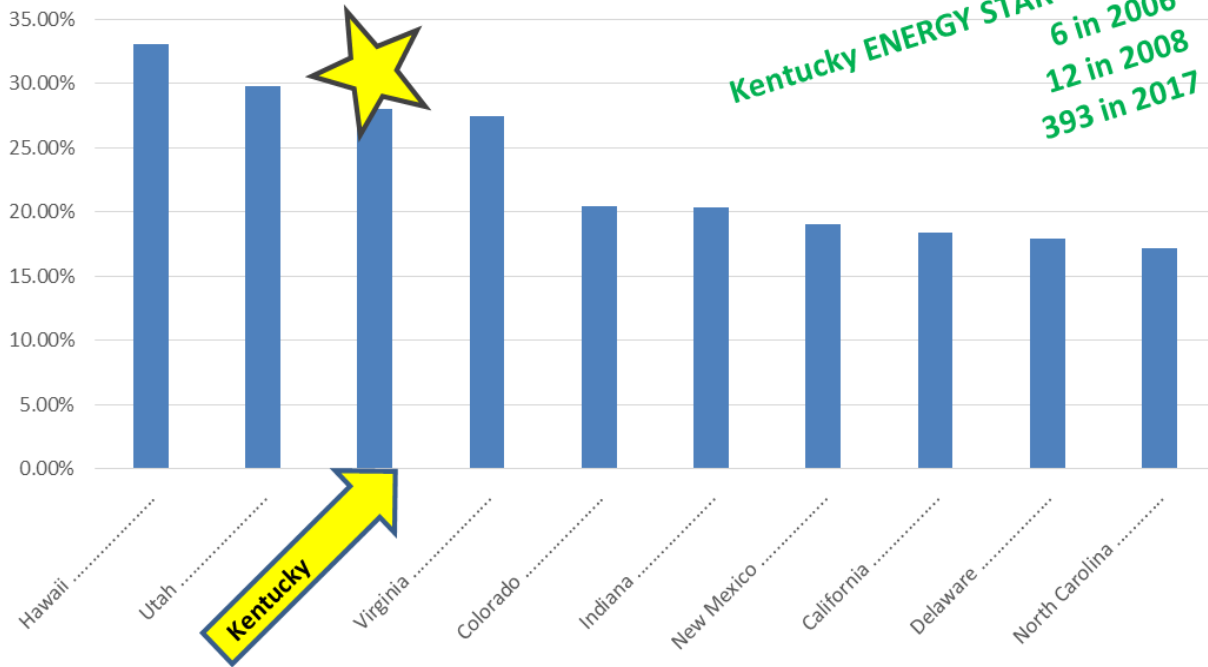
% Change in EUI



Results

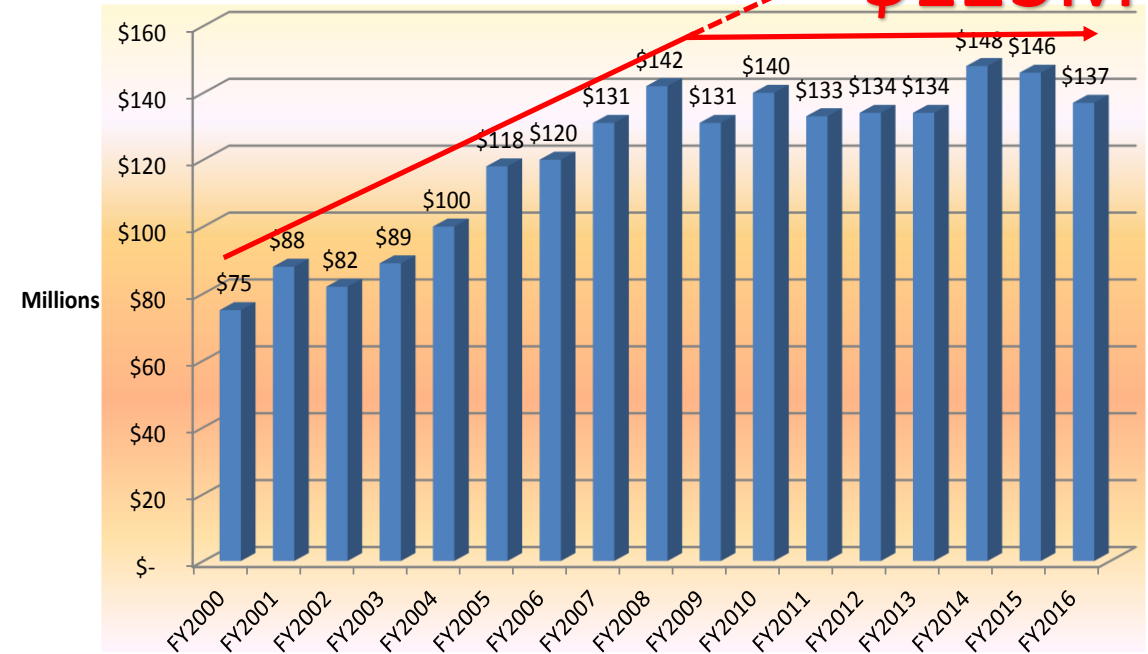
Top Ten States: Kentucky Ranks Third for Percentage ENERGY STAR

August 8, 2017



Kentucky ENERGY STAR Schools
 6 in 2006
 12 in 2008
 393 in 2017

Figure 8. MUNIS K-12 Facility Energy Expenditures FY2000 - FY2016



\$123M

ENERGY STAR Schools



Questions ??????

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