Impact of Energy on Finance

1. Cost Components of Energy
2. Funding Projects From Energy Savings

-- KASBO Conference

Spring 2015

The Case for Change

Questions

- How many 100 watt bulbs make a kilowatt?

  10 bulbs X 100watts/bulb = 1000 watts = 1 kilowatt

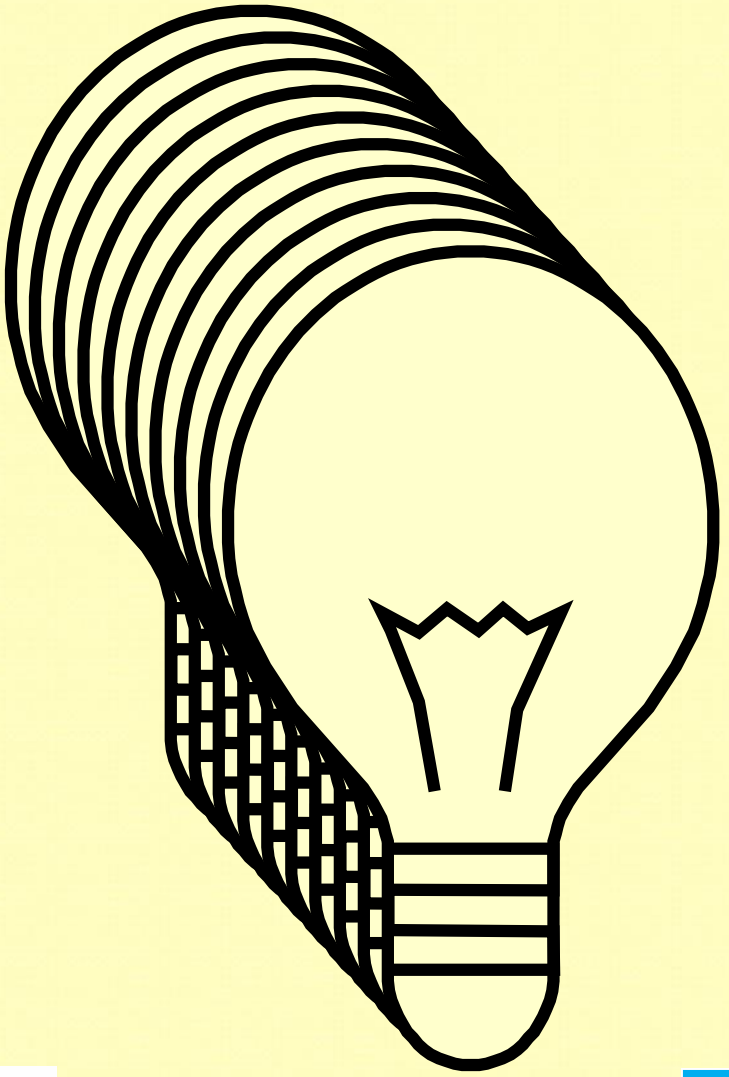
- If I leave those bulbs on for 1 hour what does that equal?

  1 kilowatt hour

- How much does that cost?

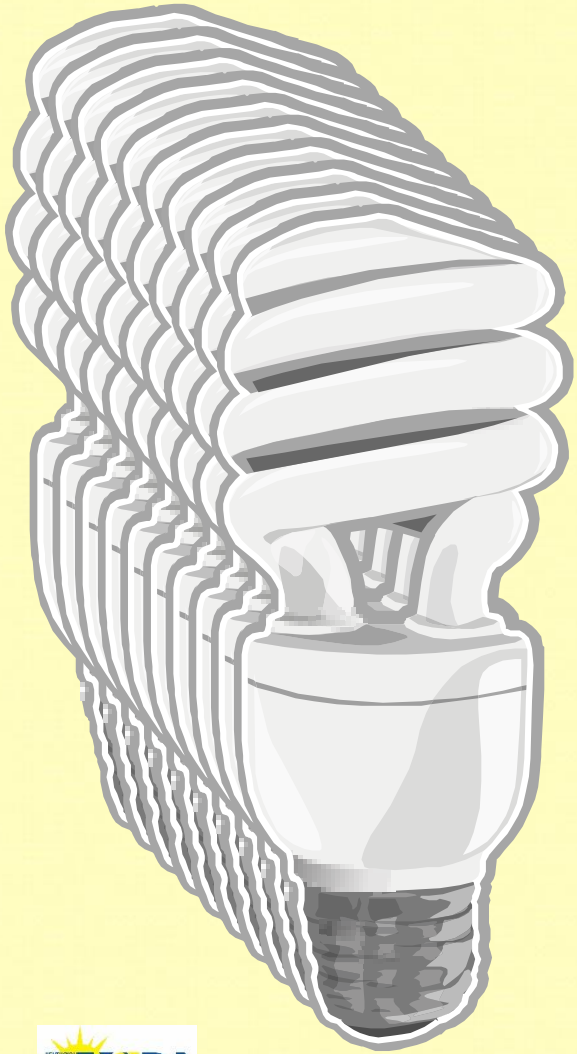
  Approximately 10 cents

Left on for 1 month…



$72.00

Left on for a month…



$17.00

Left on for a month…

X10

$6.19

Mason Jar Savings

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Analogy between Home and School

Home

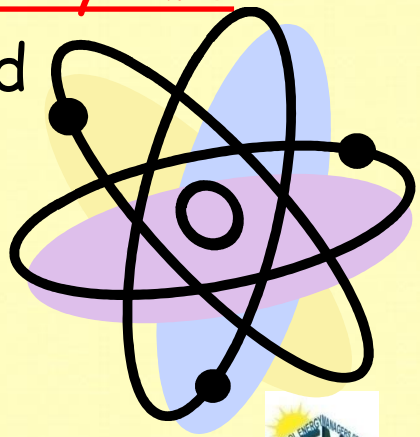
- Incandescent
- CFL
- LED

School

- T12 Fluorescent
- T8/T5 Fluorescent
- LED

Fun Facts to Increase Urgency for Change

- US Dept Of Energy Says
  - Annual Energy Bills for Schools is $6B – more than is spent on textbooks and computers combined
  - Least efficient schools use 3X more energy
  - Top performers are $0.40/sq ft less to operate
  - Energy Costs more than doubled in last 10 years
  - 30% of Energy spent is schools is wasted



"I've been impressed with the urgency of doing. Knowing is not enough; we must apply". -- Leonardo da Vinci

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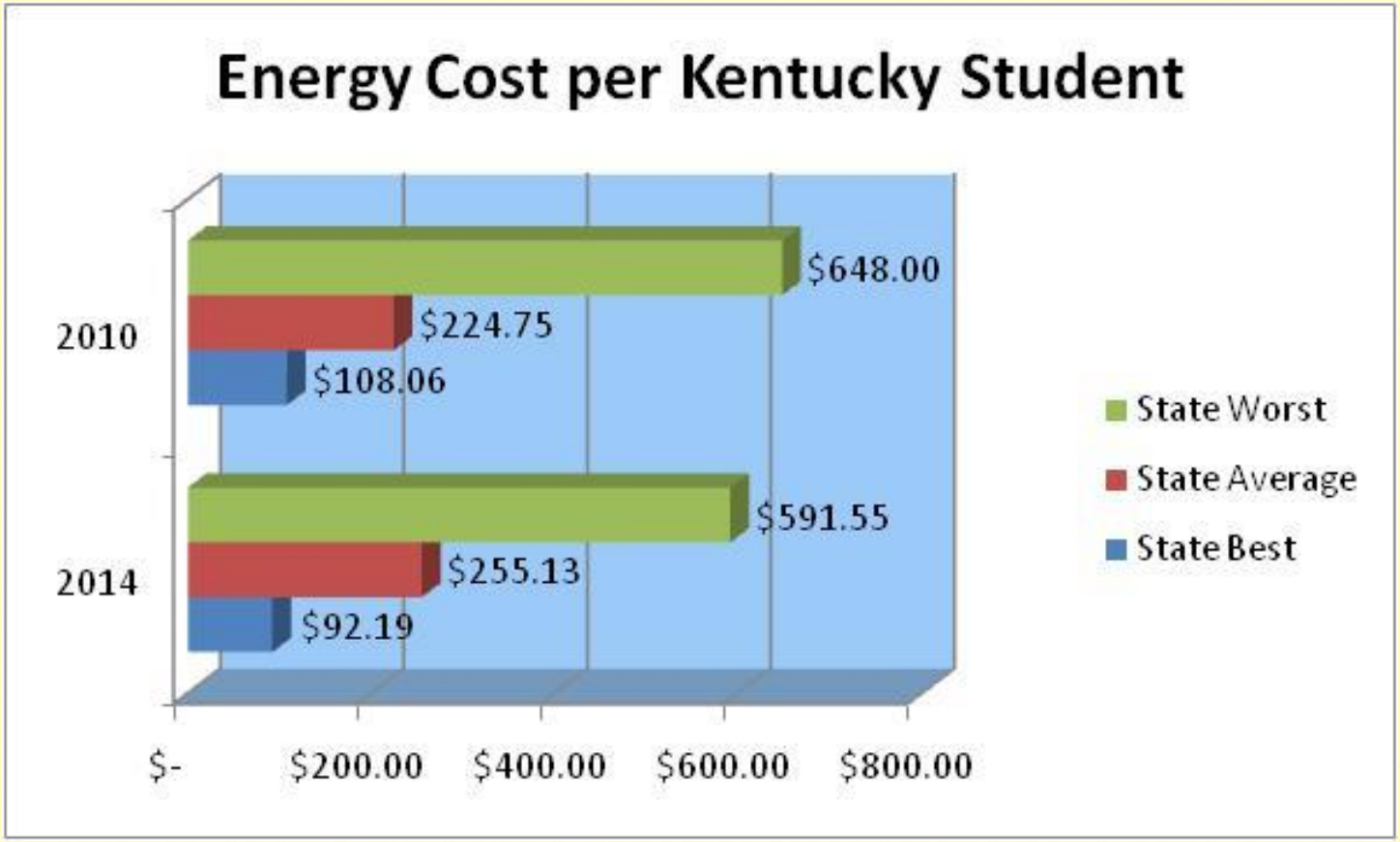
The Case for Change



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The Case for Change

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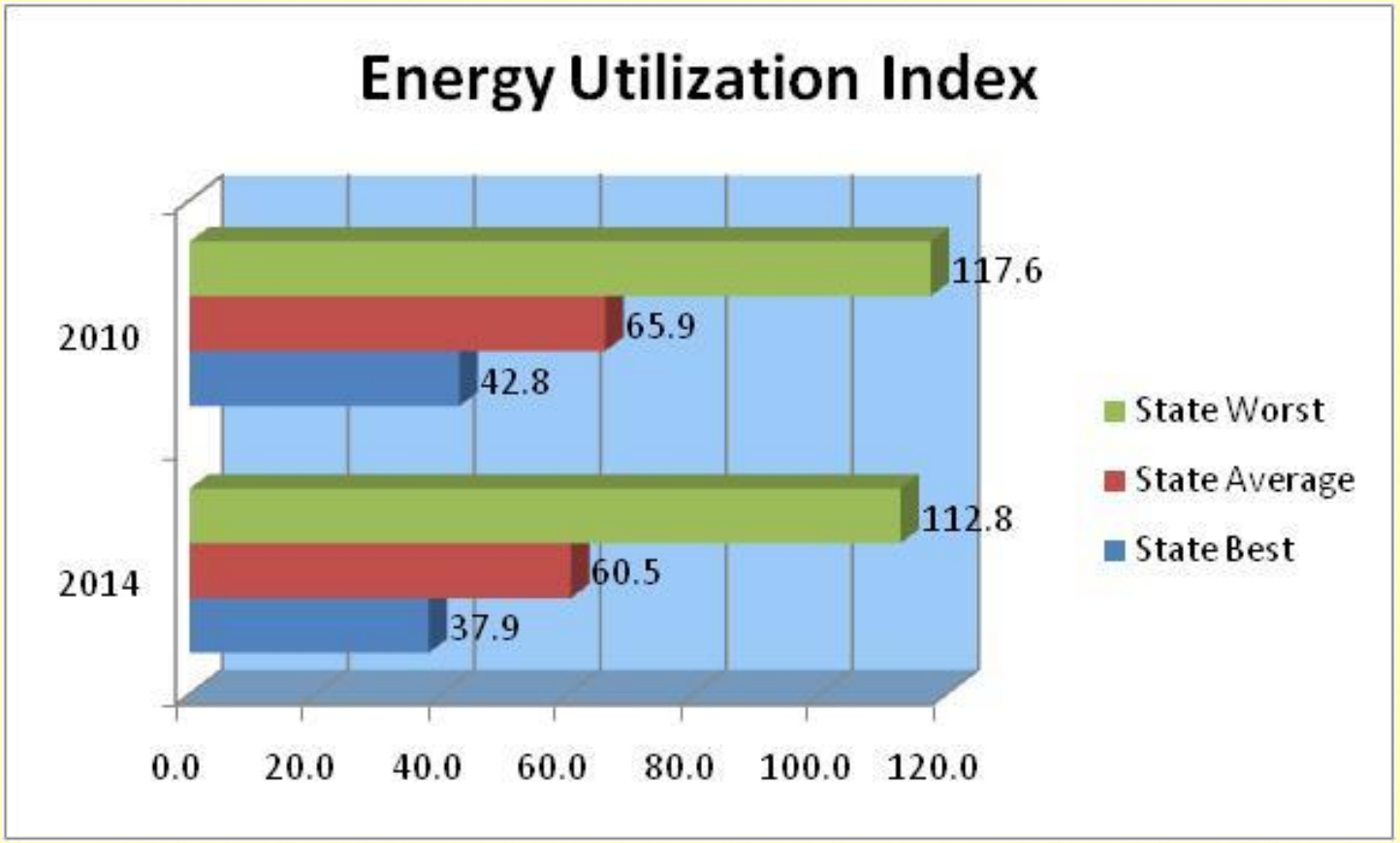
The Case for Change



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Escalating Cost of Energy

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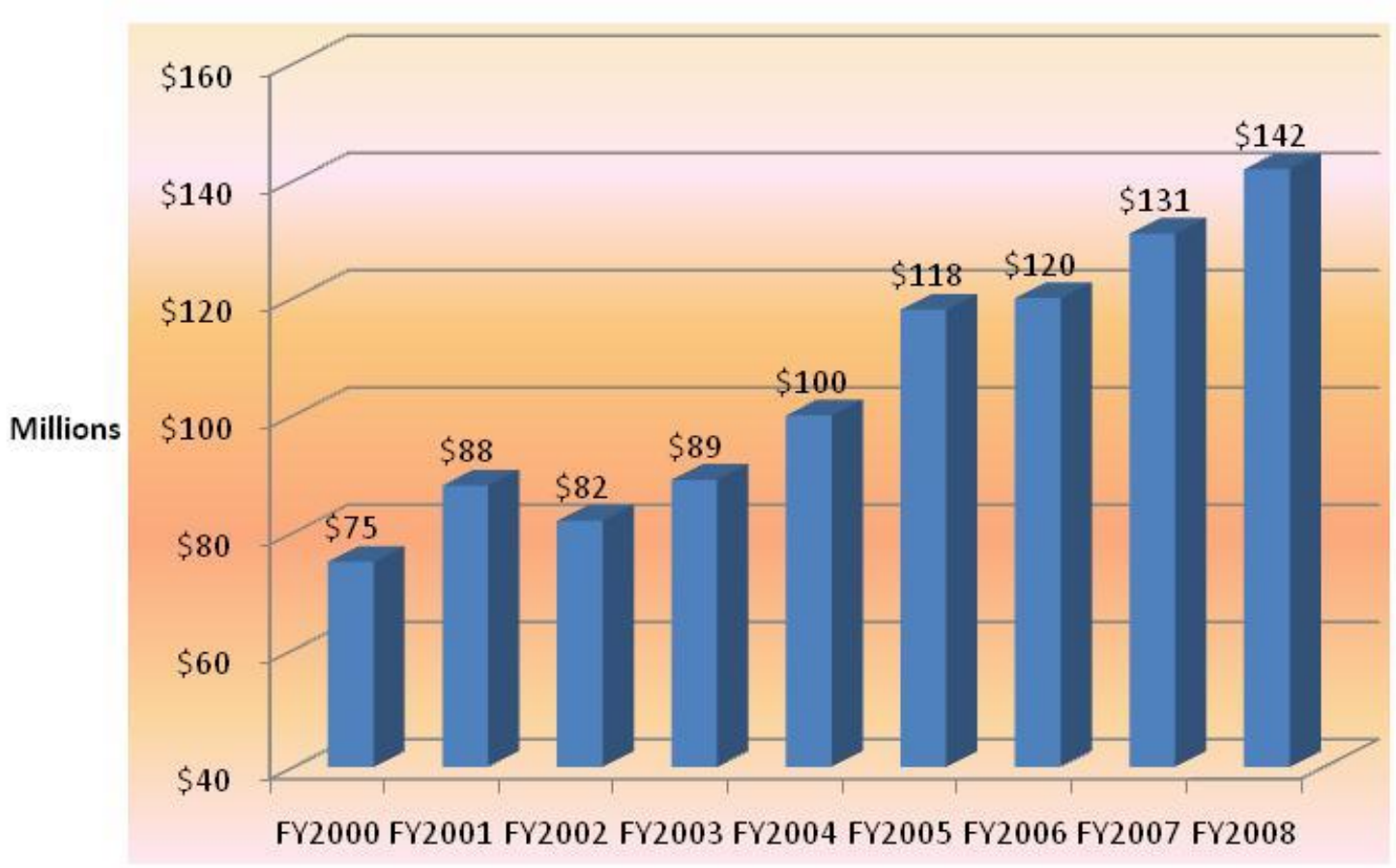
First Significant School Energy Legislation

- KRS160.325 Mandated:
  - that schools must manage and reduce energy expenses
  - that schools participate in now defunct KEEPS
  - that schools report annually on progress (basis for Annual Energy Management Report)

MUNIS K-12 Facility Energy Expenses
FY2000 - FY2008



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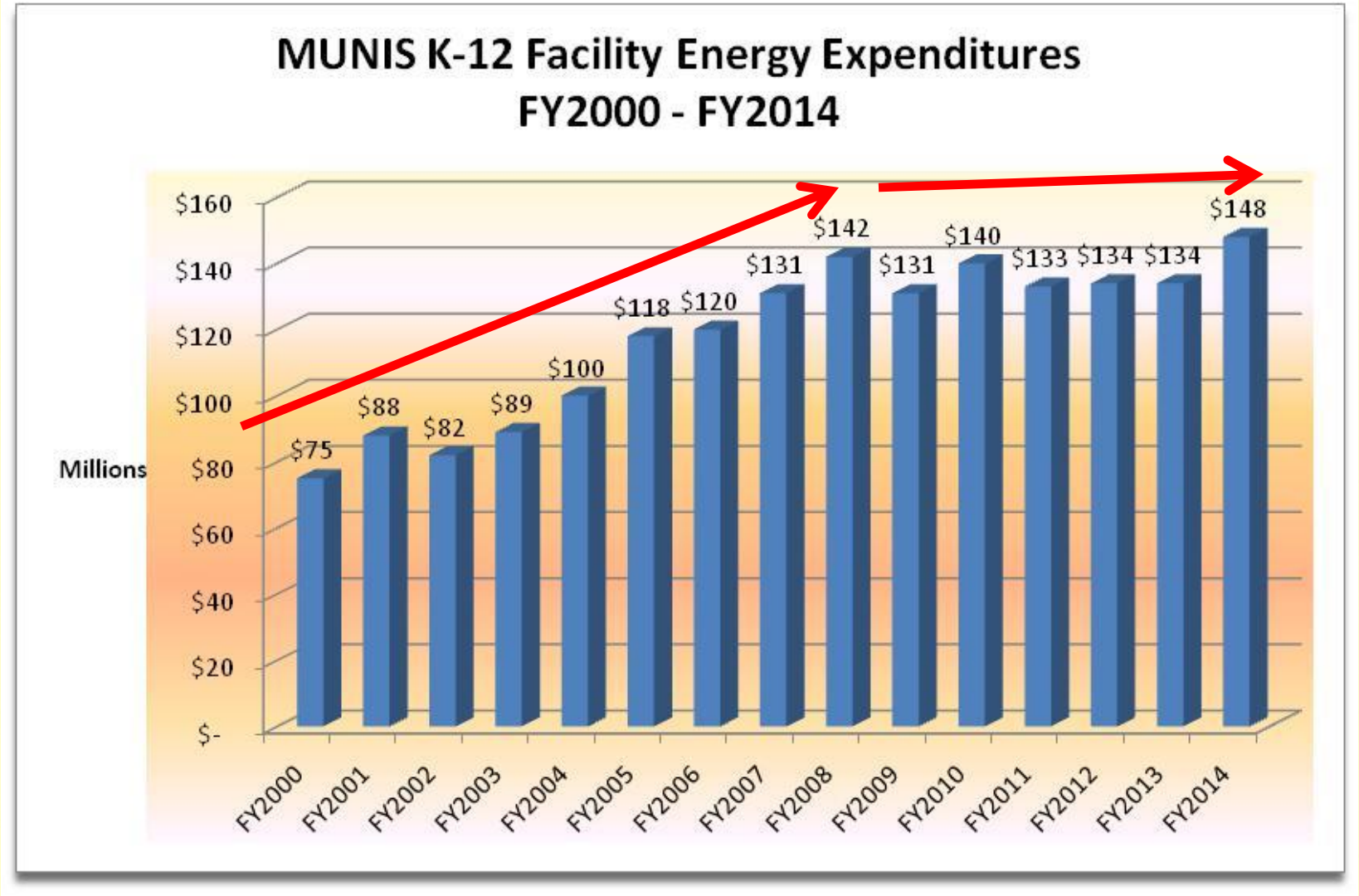
Actions (SEMP) Led to Improvements

- Most Districts Got/Are Getting Better
- Energy Usage Dropped
- Energy Spend Leveled Out
- From 2010 to 2014
  - 114 Districts improved their energy efficiency
- From 2013 to 2014
  - 48 Districts lowered their energy consumption in a very harsh winter.



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Why should You get started?

Let's Bring this Home

Statewide EUI by District

Rank	District	2010 EUI	2014 EUI	Rank	District	2010 EUI	2014 EUI	Rank	District	2010 EUI	2014 EUI	Rank	District	2010 EUI	2014 EUI
1	Owen	62.5	37.9	45	Trigg	60.2	52.3	89	Kenton	64.9	59.2	133	Beechwood	62.6	68.2
2	Butler	42.8	38.3	46	Adair	71.1	52.7	90	Carlisle	46.9	59.5	134	LaRue	55.1	68.4
3	Corbin	51.6	41.0	47	Daviess	53.9	52.7	91	Logan	54.5	59.5	135	Montgomery	70.2	68.7
4	Walton-Verona	44.6	42.5	48	Boyle	65.9	52.8	92	Cloverport	72.7	59.7	136	Danville	64.6	68.9
5	Scott	53.3	42.7	49	Floyd	52.0	52.9	93	Madison	56.4	59.8	137	Carroll	82.9	69.0
6	Anderson	52.3	43.4	50	Silver Grove	69.2	52.9	94	Newport	44.5	60.0	138	Bell	104.3	69.0
7	Burgin	60.5	44.5	51	Woodford	63.5	53.1	95	Harlan County	55.7	60.0	139	Wolfe	DNR	69.1
8	Oldham	45.7	44.9	52	Barren	49.8	53.1	96	Bourbon	65.0	60.1	140	Berea	75.7	69.2
9	Martin	DNR	45.2	53	Jackson Co	57.4	53.3	97	Nelson	43.8	60.2	141	Owensboro	70.1	69.3
10	Casey	49.5	45.3	54	Boyd	81.2	53.4	98	Raceland-Worthington	67.0	60.7	142	Eminence	85.3	69.6
11	Henry	67.7	45.4	55	Knox	64.8	53.5	99	Christian	70.1	60.8	143	Mayfield	60.9	69.6
12	Gallatin	60.0	45.6	56	Grayson	60.0	53.7	100	Dayton	67.4	60.9	144	Campbellsville	76.4	70.4
13	Meade	48.7	45.7	57	Crittenden	57.1	53.8	101	Rowan	72.3	60.9	145	Muhlenberg	68.5	70.4
14	Russell	80.5	46.0	58	Spencer	DNR	54.0	102	Mason	59.2	60.9	146	Boone	74.0	70.5
15	Murray	47.2	46.0	59	South Gate	47.2	54.1	103	Webster	75.5	61.0	147	Fayette	78.2	72.0
16	Bullitt	53.7	46.3	60	Science Hill	56.5	54.1	104	Johnson	78.2	61.2	148	Fort Thomas	72.2	72.6
17	Erlanger	56.9	46.4	61	Carter	59.3	54.3	105	Harrison	61.9	61.2	149	Hickman	67.6	72.9
18	Warren	50.7	46.6	62	Ohio	64.4	54.4	106	Lincoln	70.7	62.3	150	Union	69.1	73.1
19	Shelby	71.6	47.2	63	Knott	DNR	54.4	107	Clark	74.7	62.5	151	Graves	DNR	73.5
20	Hancock	57.8	47.4	64	Williamsburg	54.9	54.6	108	Morgan	116.8	62.7	152	Ludlow	107.9	73.9
21	Dawson Springs	61.0	47.7	65	Fleming	69.8	54.6	109	Franklin	87.3	63.1	153	Hopkins	71.7	74.0
22	Jessamine	50.3	47.8	66	Caldwell	60.7	54.6	110	Clay	63.3	63.2	154	Breckinridge	72.1	74.8
23	Wayne	64.2	47.8	67	Greenup	64.1	54.8	111	Fulton Ind.	69.0	63.2	155	Middlesboro	86.0	75.4
24	Letcher	62.9	48.1	68	Paducah	73.9	55.0	112	Simpson	73.6	63.4	156	Bellevue	68.4	75.4
25	Robertson	114.5	48.5	69	Marion	60.3	55.0	113	Bowling Green	73.6	63.9	157	Marshall	70.9	75.8
26	Hardin	54.3	48.9	70	Russellville	52.5	55.2	114	Fulton Co	69.4	63.9	158	Campbell	70.2	77.3
27	Glasgow	62.6	49.5	71	Cumberland	71.1	55.8	115	Leslie	55.6	64.1	159	Henderson	74.1	77.9
28	Russell ind	70.3	49.6	72	McCracken	62.7	55.9	116	Garrard	51.5	64.4	160	Bath	87.8	78.0
29	Lee	78.3	50.0	73	Augusta	55.6	55.9	117	Grant	70.7	64.8	161	Breathitt	64.0	78.7
30	McLean	45.9	50.1	74	Pulaski	52.4	56.4	118	Pike County	64.9	64.8	162	Covington Ind.	80.5	79.5
31	Paintsville	53.3	50.4	75	Pineville	54.7	56.4	119	Taylor	64.7	64.9	163	Hart	73.5	79.5
32	Trimble	52.3	50.5	76	Frankfort	80.7	56.5	120	Lewis	65.6	65.5	164	Anchorage	73.8	80.2
33	Harlan Ind	52.3	50.5	77	Owsley	DNR	56.6	121	Perry	67.0	65.5	165	Caverna	84.2	81.4
34	Metcalfe	60.9	50.5	78	Whitley	57.7	56.7	122	Bardstown	62.8	66.1	166	Ashland	75.1	82.2
35	Monroe	48.6	50.6	79	Elliott	DNR	57.0	123	Ballard	80.1	66.5	167	Somerset	89.8	82.5
36	Edmonson	58.7	50.6	80	Hazard	87.2	57.0	124	Mercer	78.3	66.5	168	Menifee	90.4	86.2
37	Magoffin	64.7	50.8	81	Bracken	55.0	57.2	125	Elizabethtown	72.9	66.6	169	Fairview	73.0	86.2
38	Livingston	56.9	51.0	82	West Point	DNR	57.6	126	Pikeville	81.9	66.7	170	Powell	97.0	90.4
39	Clinton	53.5	51.0	83	Calloway	56.2	57.8	127	Laurel	DNR	66.8	171	Green	88.2	92.5
40	Lawrence	68.6	51.1	84	Jenkins	DNR	58.2	128	Barbourville	76.8	67.2	172	McCreary	94.8	94.5
41	Allen	57.1	51.3	85	East Bernstadt	DNR	58.2	129	Jefferson	68.2	67.3	173	Jackson Ind	117.6	112.8
42	Estill	53.4	51.5	86	Paris	59.6	58.7	130	Washington	83.5	67.4				
43	Pendleton	55.9	51.6	87	Lyon	53.7	58.7	131	Nicholas	80.7	68.0				
44	Williamstown	63.3	52.2	88	Rockcastle	59.9	59.1	132	Todd	70.0	68.1				

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Three Questions to Ask

- Where do you stand?
- Have you gotten better?
- What have you done that made you better or worse?

What does Energy Utilization Index (EUI) Mean?

- Any of you have these in your schools?

- Typical Middle School has about 100,000 of these.
- Just so happens that this is exactly one square foot.

Matches represent energy

- 1 Match equals 1 BTU (a unit of energy)
- Don't worry just call it energy

Just for fun…

BTU **(abbr. British Thermal Unit)**

It takes about 8000 BTUs (8kBTUs) to cook a pizza.

Two Important Ratios

- Energy per Tile
  - How many matches /tile
  - to heat, cool, ventilate, light, cook, run computers
    - Average Kentucky School uses 60,000 matches per tile --- FOR EVERY TILE IN EVERY SCHOOL!!

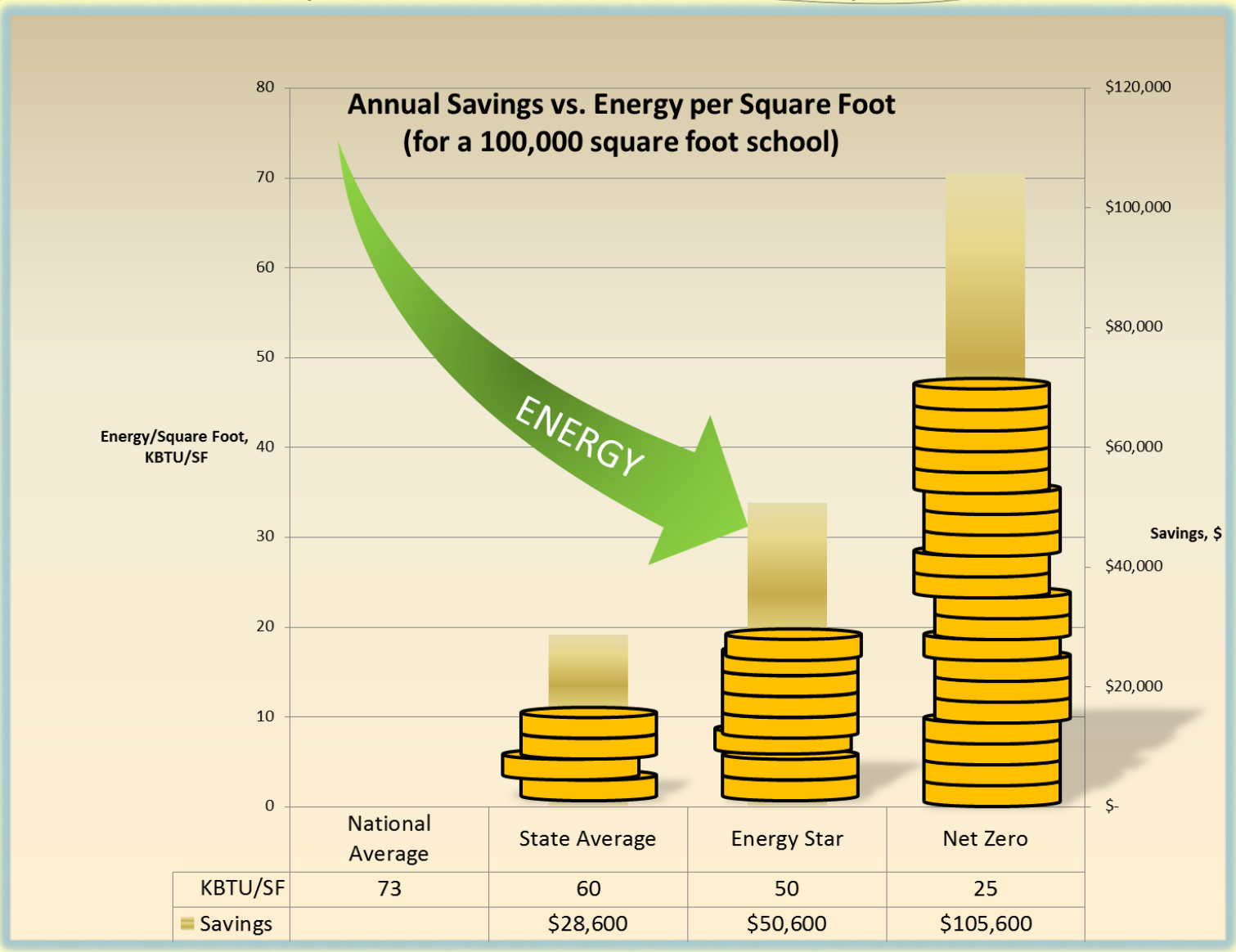
Or we might simplify and say 60k matches per tile
or even 60k matches per square foot
or 60kbtu/square foot

Two Important Ratios (cont)

- Money per Tile
  - How much money per square foot
  - To heat, cool, ventilate, light, cook, run computers
    - Average Kentucky School is about $1.37 per tile

$/Tile or $/square foot

Relationship between Energy and Dollars



	National Average	State Average	Energy Star	Net Zero
KBTU/SF	73	60	50	25
Savings		$28,600	$50,600	$105,600

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Increased Energy Efficiency

Statewide EUI Reduction in Schools

	2010		2014	
National	73	**kbtu/sf/yr**	73	**kbtu/sf/yr**
Kentucky	**65**		**60**	
ENERGY STAR	50		50	
KY'S Best District	**43**		**37**	
Net-zero Ready	25		25	

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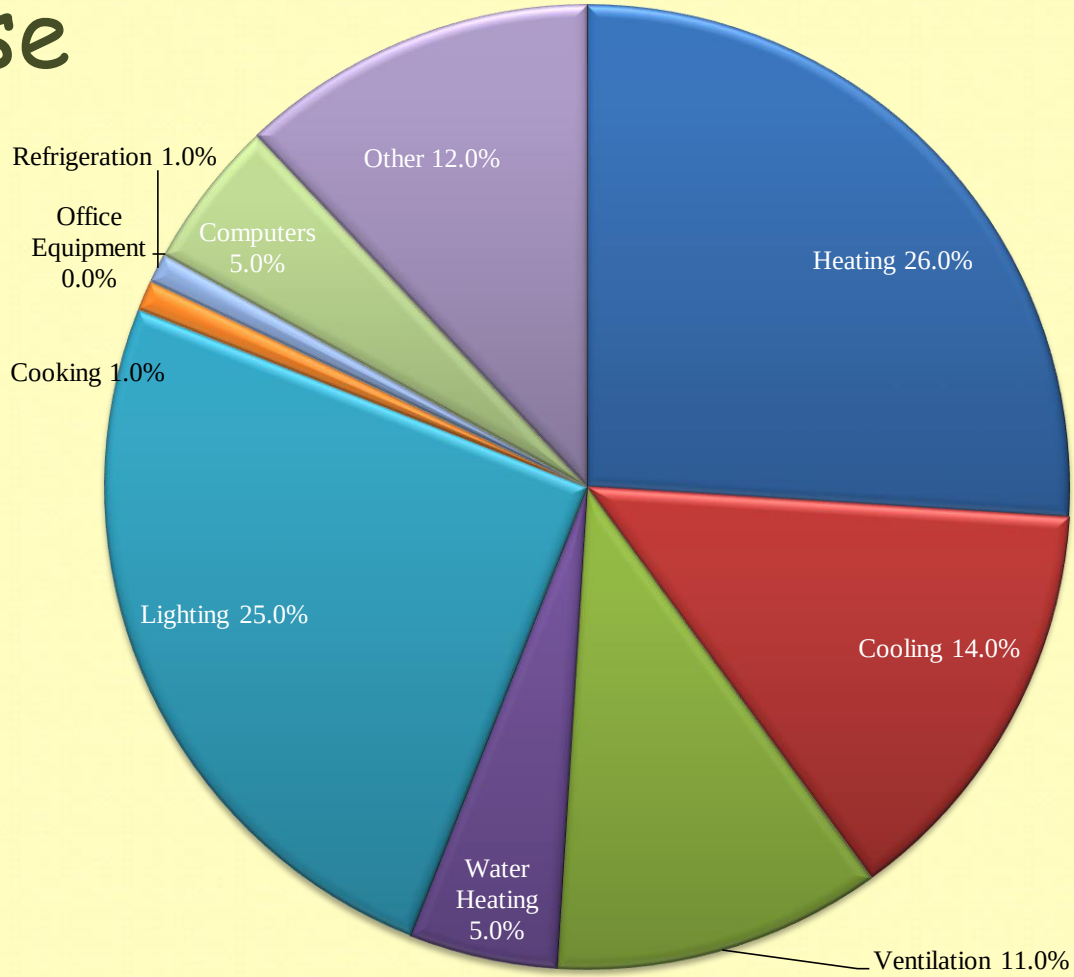
Dollars = Energy on the floor waiting to be picked up

Where do those BTUs Go?

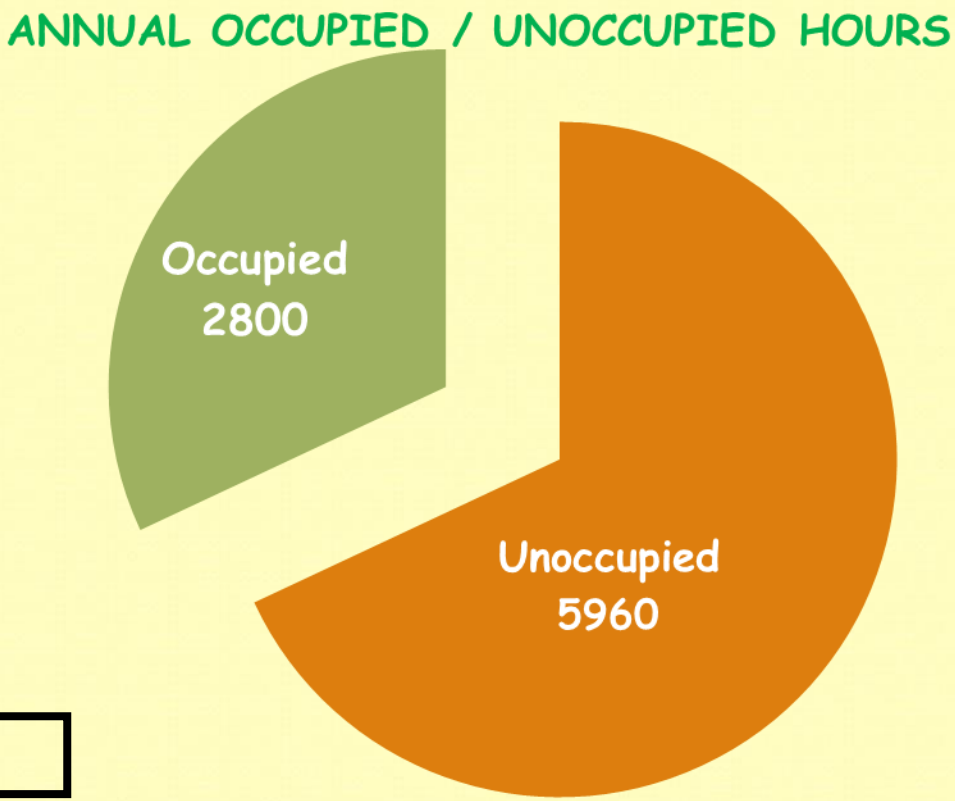
- Note HVAC
- Note Lighting
- Other = Things Plugged In
  - ✓ Space heaters
  - ✓ Coffee Makers
  - ✓ Microwaves
  - ✓ Mini Fridge

- Commercial Building Energy Consumption Survey



CBECS High School Energy Use Profile (2003)

Why Have Setbacks in a School?



8760 hours/year

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How much can you save with setbacks?

- Link to thermostat tool.

Setback Mode is NOT the same as being shut down

Schools are Multipliers

- 10's of Heat Pumps, Chillers, Boilers
- Not One but Thousands of lights
- Hundreds of Computers
- Scores of Smart Boards
- Scores of Projectors

- Point: A little savings or a little waste is greatly multiplied

Understanding the Controllable Costs of Energy

Lower Usage

Correct Rates

Electrical Demand

Minimum Demand

Demand Response

Aggregate Purchasing

Rebates

Suppliers are Partners in this Change

- From a Supplier Perspective
  - Costs $ to make electricity
  - Can only make so much without adding capacity

Q? How can I add customers without adding capacity?

A? Set forth rates and programs to incent customers to reduce demand and consumption.

"Everyone sees drama from his own perspective"
-- Jean-Marie Le Pen

Not everyone pays the same for electricity

- Rates for Consumers, Commercial Accounts and Industrial Accounts based on power and energy requirements.
- Special Rates for Schools, fire Departments, etc.
- If you know and understand your history, you can calculate the best possible rate.

Electric Rates & Rate Changes

- Public Service Commission regulates utilities yet how rates are structured is unique to each provider.
  - Where you live determines your electric provider

- Nearly all commercial rates include
  1. Customer Charges
  2. Energy Consumption Charges (kWh)
  3. Demand Charges

Sample Utility Bill

737

OWEN Electric

A Touchstone Energy® Cooperative

Main Office
8205 Highway 127 N
P.O. Box 400
Owenton, Kentucky 40359-0400
800/372-7612 Fax 502/484 -2661
www.owenelectric.com

Office Hours:
8:00 a.m. - 4:30 p.m. EST
Monday - Friday

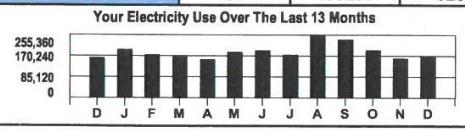
ACCOUNT NUMBER	ACCOUNT NAME	SERVICE ADDRESS	METER NUMBER	BILL DATE
12626003	GRANT COUNTY BOARD OF ED	715 WARSAW RD -HIGH SCHOOL	133721030	01/06/15

SERVICE PERIOD FROM	TO	NO. DAYS	METER READING PREVIOUS	PRESENT	CODE	METER MULTIPLIER	BILLED DEMAND	KILOWATT HOURS	CHARGES
11/30/14	12/31/14	31	2514	2690	R	960		168960	11,000.33
DEMAND							368.640		2,259.76
-0.000237 PER KWH FUEL ADJUSTMENT								168960	-40.04
ENVIRONMENTAL SURCHARGE 12.750%									1,689.79
3 100 WATT O/L EXISTING POLE								120	33.24
LOCAL SCHOOL TAX- 3%									447.30
TOTAL CURRENT BILL DUE 01/24/15									15,390.38
PREVIOUS AMOUNT DUE									14,959.12
THANK YOU FOR YOUR PAYMENT (S)									-14,959.12
TOTAL AMOUNT DUE									15,390.38

NEXT METER READING DATE	01/31/15	SERVICE LOCATION	22219012509	TELEPHONE	(859) 824-3323

COMPARISONS	DAYS SERVICE	TOTAL KWH	AVG. KWH/DAY	CYCLE	
CURRENT BILLING PERIOD	31	168960	5450	900	
PREVIOUS BILLING PERIOD	30	161280	5376	RATE	CLASS
SAME PERIOD LAST YEAR	31	163200	5265	4	65

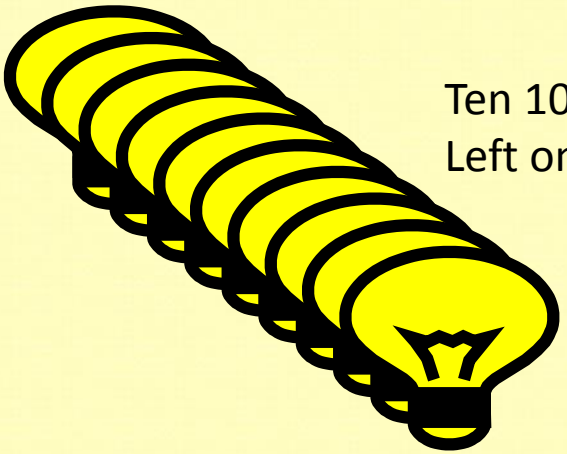
TOTAL ACCOUNT BALANCE	$15,390.38
CURRENT BILL DUE 01/24/15 — BILL IS DELINQUENT AFTER DUE DATE	
AFTER DUE DATE PAY	$16,137.53



HAPPY NEW YEAR FROM OWEN ELECTRIC'S EMPLOYEES AND BOARD OF DIRECTORS - OUR OFFICES WILL BE CLOSED DEC. 31st/JAN. 1st FOR THIS HOLIDAY. THANK YOU.

So What Is Demand?

Demand vs. Energy



Ten 100 watt bulbs = 1000 watts = 1KW (Power or Demand)
Left on for 1 hour = 1KWh (Energy)

Schools don't have incandescent lights,
yet one 3-lamp, 2 X 4 foot fluorescent fixture ≈ 100 watts (slightly less)

An Elementary School may have 500 , 2 X 4 foot fixtures.

DEMAND: 100 watts/fixture X 500 fixtures = 50,000 watts (50KW)
ENERGY : = 50 KWh (on for one hour)
= 10000 KWh (on for 200 hours, 1 mo.)

Cost

Demand Charges are between $7-20/KW
Energy Costs are approx. $0.10/KWh

So monthly lighting costs for this small school are:

Energy: 10000 KWh X $0.10/KWh = $1000
DEMAND: 50KW X$15/KW = $ 750
Total = $1750

What If

a. Turn lights off for all but 15 minutes…

b. Turn lights off for half the time…

a. Demand still equals 50KW, **= $750**

Energy (.25h x 50 KW x $0.10/KWh) = $1.25

Total Cost = $751.25

b. Demand still equals 50KW, **= $750**

Energy (100h x 50 KW x $0.10/KWh) = $500

Total Cost =$1250

DEMAND is measured at the highest 15 minute interval during the entire month. One 15 minute interval sets the demand for the entire month.

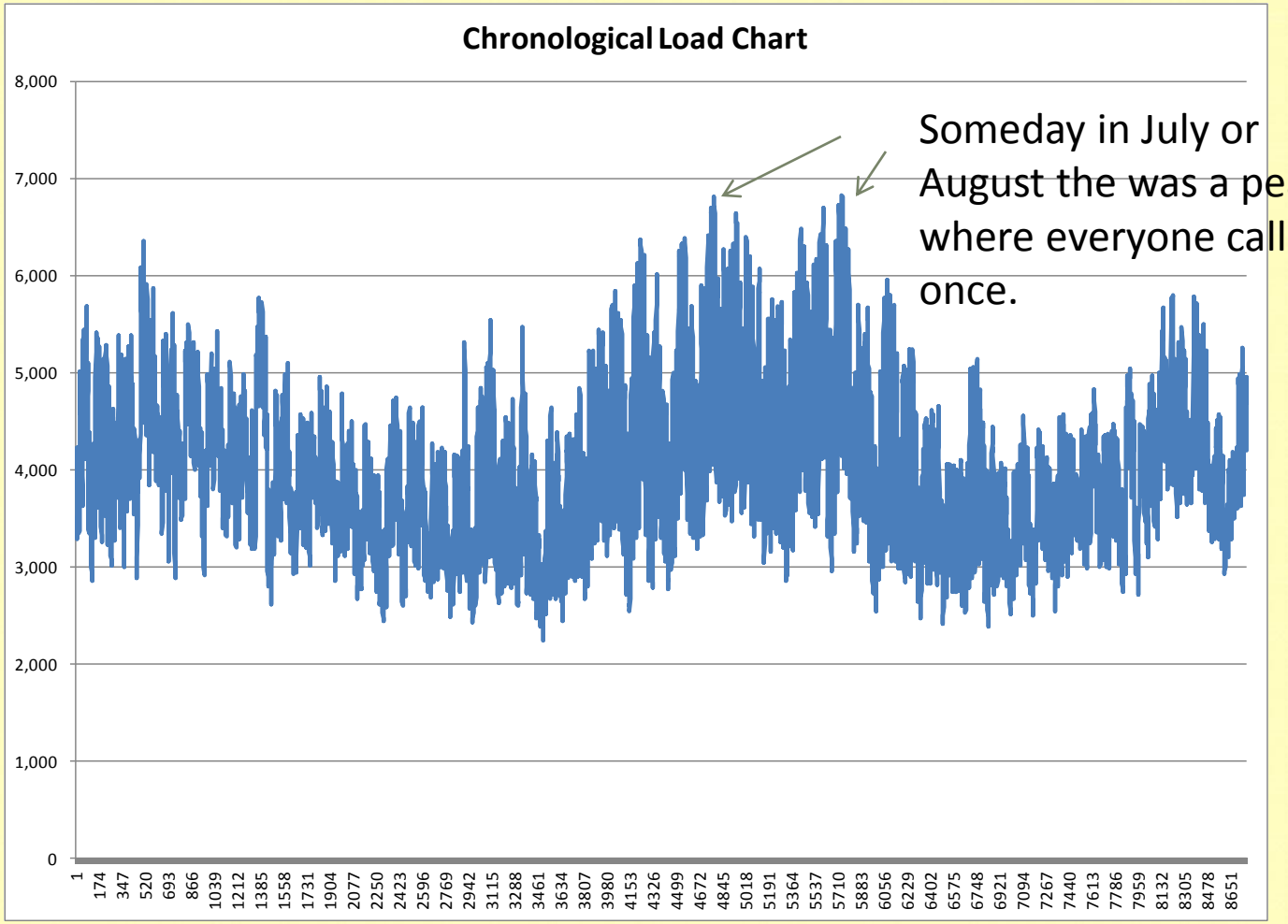
Why is that?

DEMAND is the Power the Utility Company has to reserve for each and every customer on their grid in case all customers "called for power" at the same time.

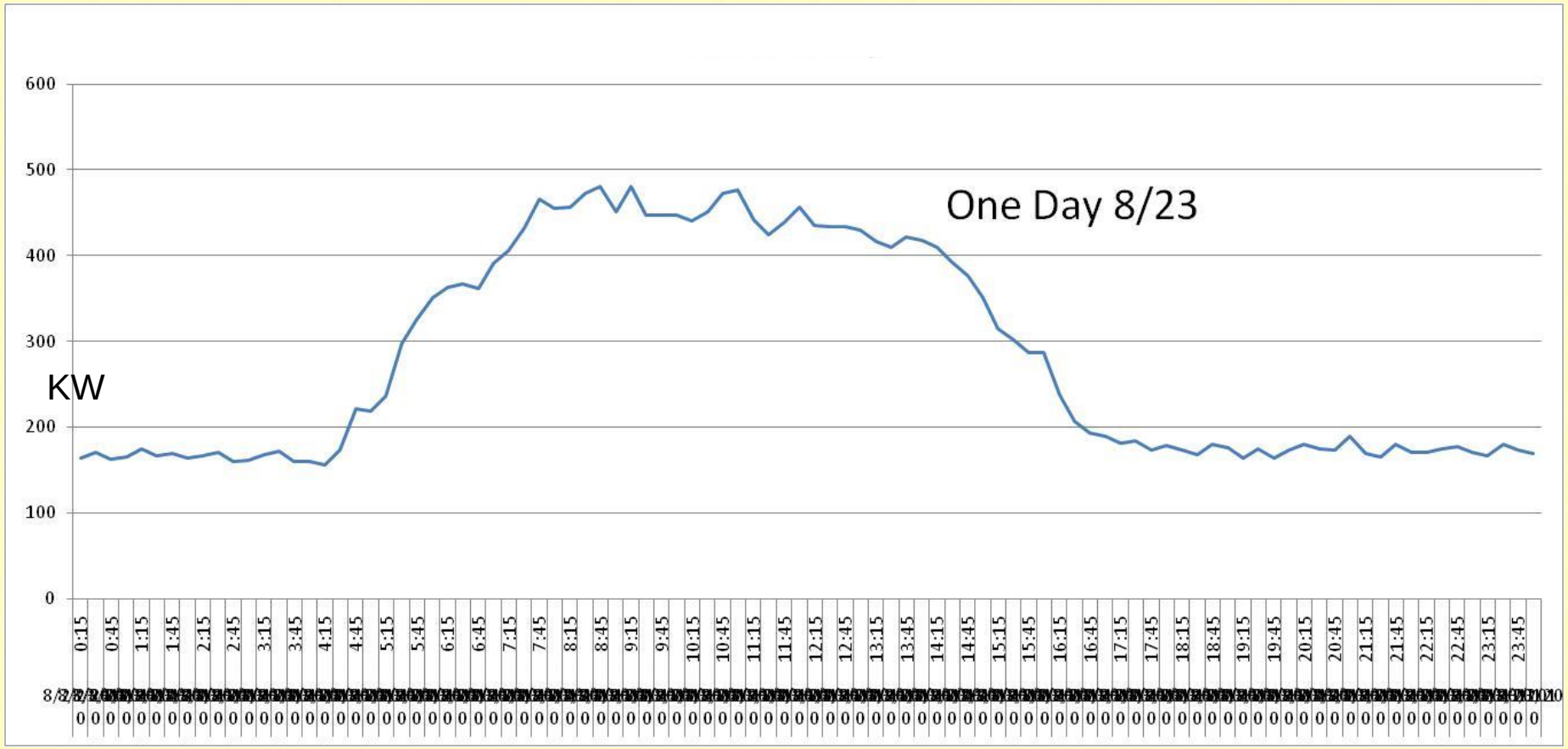
Generation Plants are limited in the amount of electrical power they can generate and transmit.

Does everyone really call for power at the same time? The answer is yes. See the next slide.

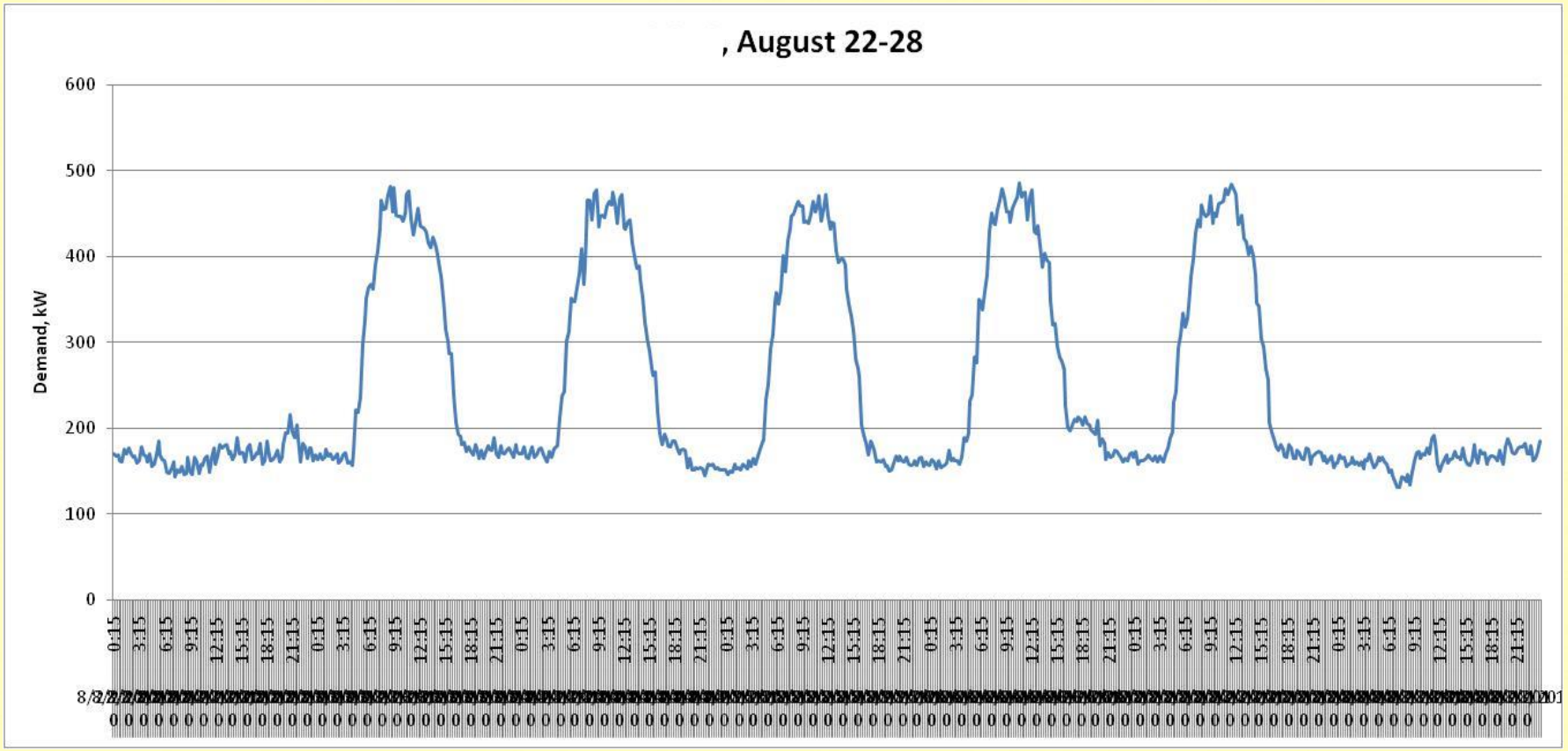
Annual Generation of a Power Plant



What does a Demand Curve look like for a building?



One Week of Intervals



Minimum Demand Charges

Controllable Cost

INSIDIOUS DEMAND RATCHET

- Demand Peak set during one month, resets the peak for the next 11 months (ratchet) whether you reach that peak again or not.

- Usually driven by percentage from 50-85% of peak which becomes the new minimum charge.

Example: Demand hits 500KW in January

For the next 11 months the minimum Demand charge will be 425KW regardless of the actual

Managing Demand

End User

- Manage Startups
- Technology upgrades
  - Lights
  - Equipment
- Demand Limiting
- Demand Shedding
- Energy Management
- Reduce Baseline Load

Utility Company

- Demand Side Management Programs (DSM)
  - Rebates
    - Lights
    - Refrigerators
    - Equipment
  - Demand Limiting /Shedding Incentives
    - ENERNOC
  - Energy Manager Funding
  - Rates

What If?…

- From Previous Example…
- If I had the ability to control those 500 light fixtures and could turn off 20 prior to the demand peak. I could save 2KW ($30/month or $360/year).
- That would be equivalent energy dollar savings of turning off all 500 fixtures for 6 hours/month.
- This is an example of Demand Shedding.

Rates & Rate Changes & Interventions

- Currently intervening in rate cases
  - KU/LGE
  - KP

- Update

Rate Interventions

- Jim Gardner, Vice Chairman Public Service Commission, "If you don't have a seat at the table you won't get heard."

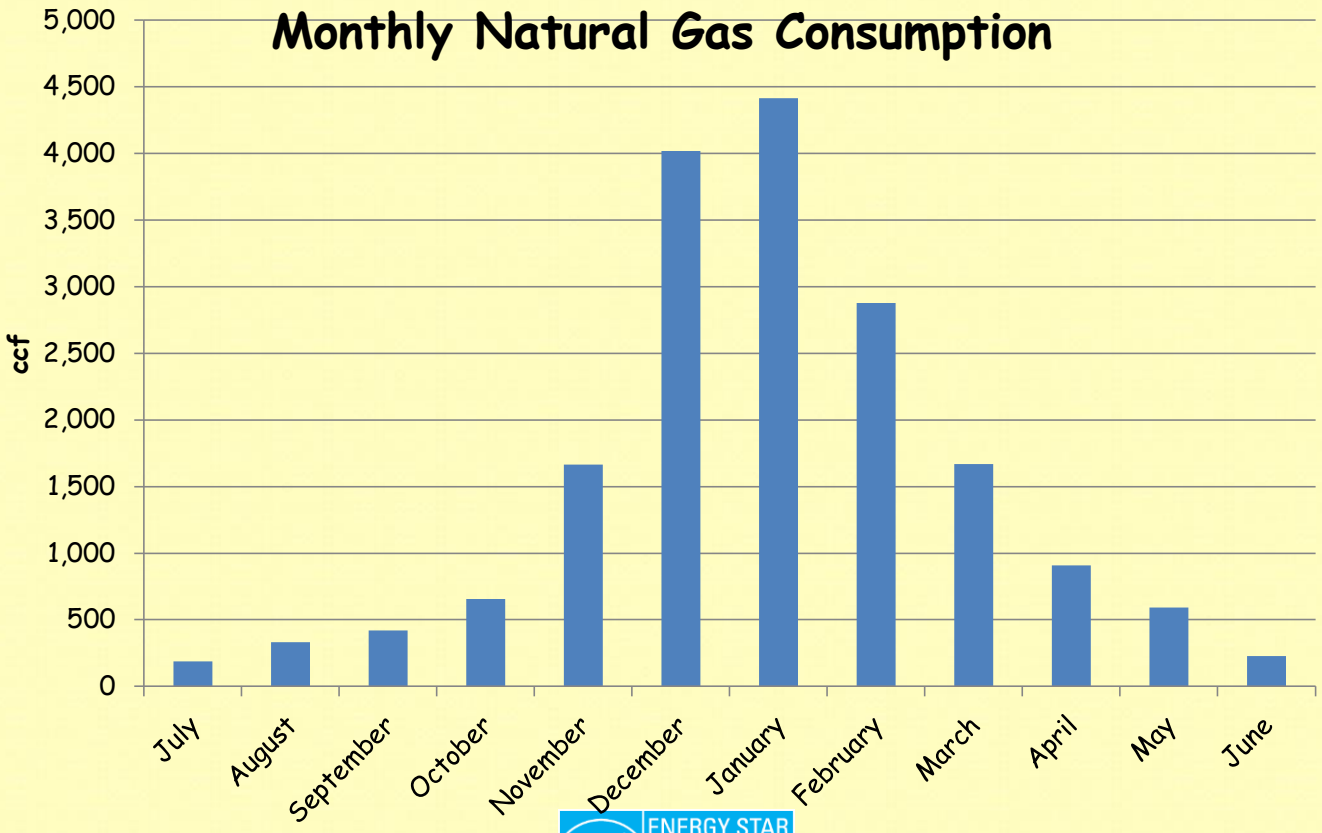
Natural Gas Providers

Natural Gas

- Augments school's heating, water heating, cooking, and greenhouse requirements
- Delivered via pipeline
- Sold in cfs, ccfs, therms, etc.

- Many districts contract their gas supplies.

Typical Gas Consumption by month.



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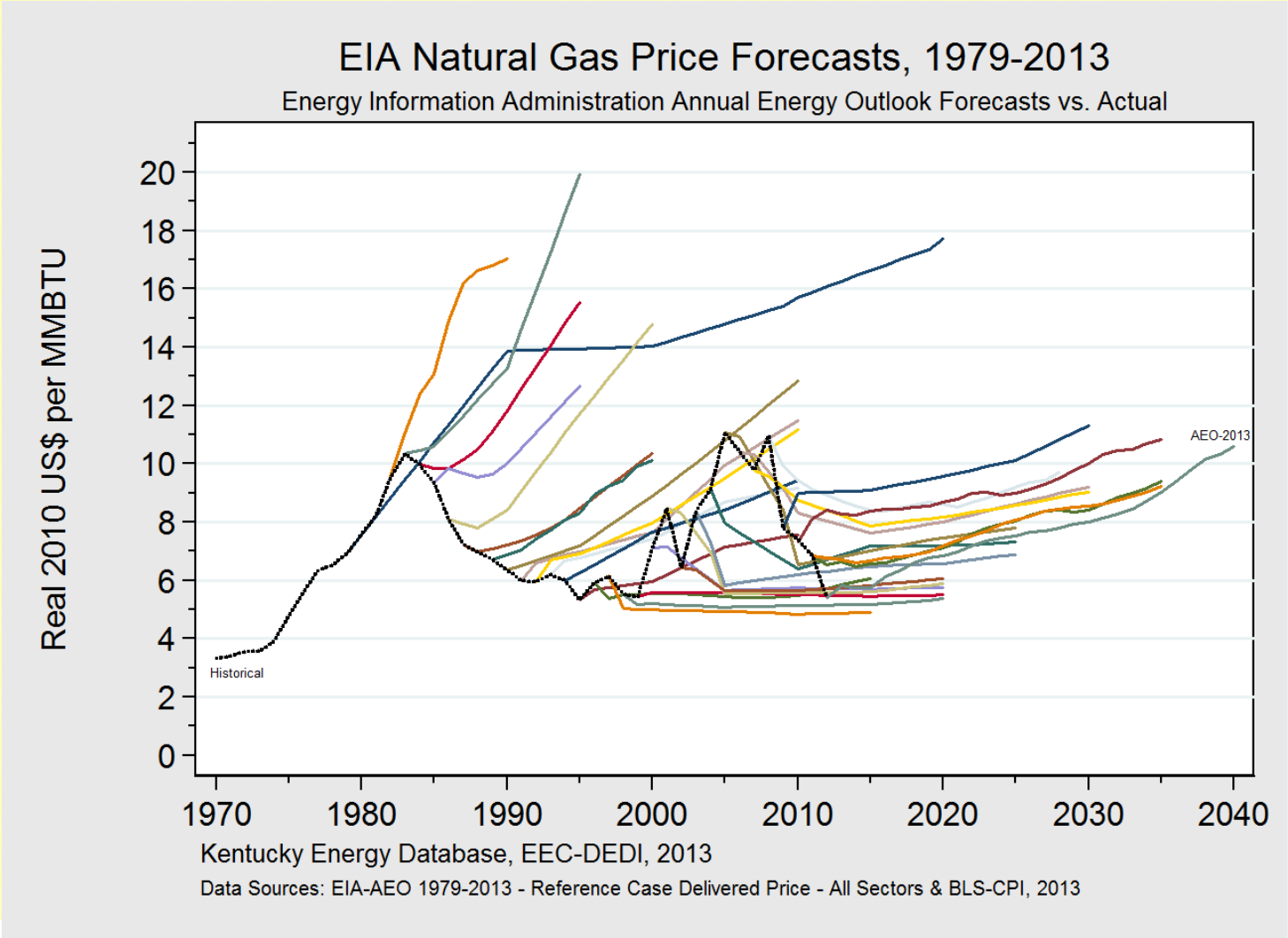
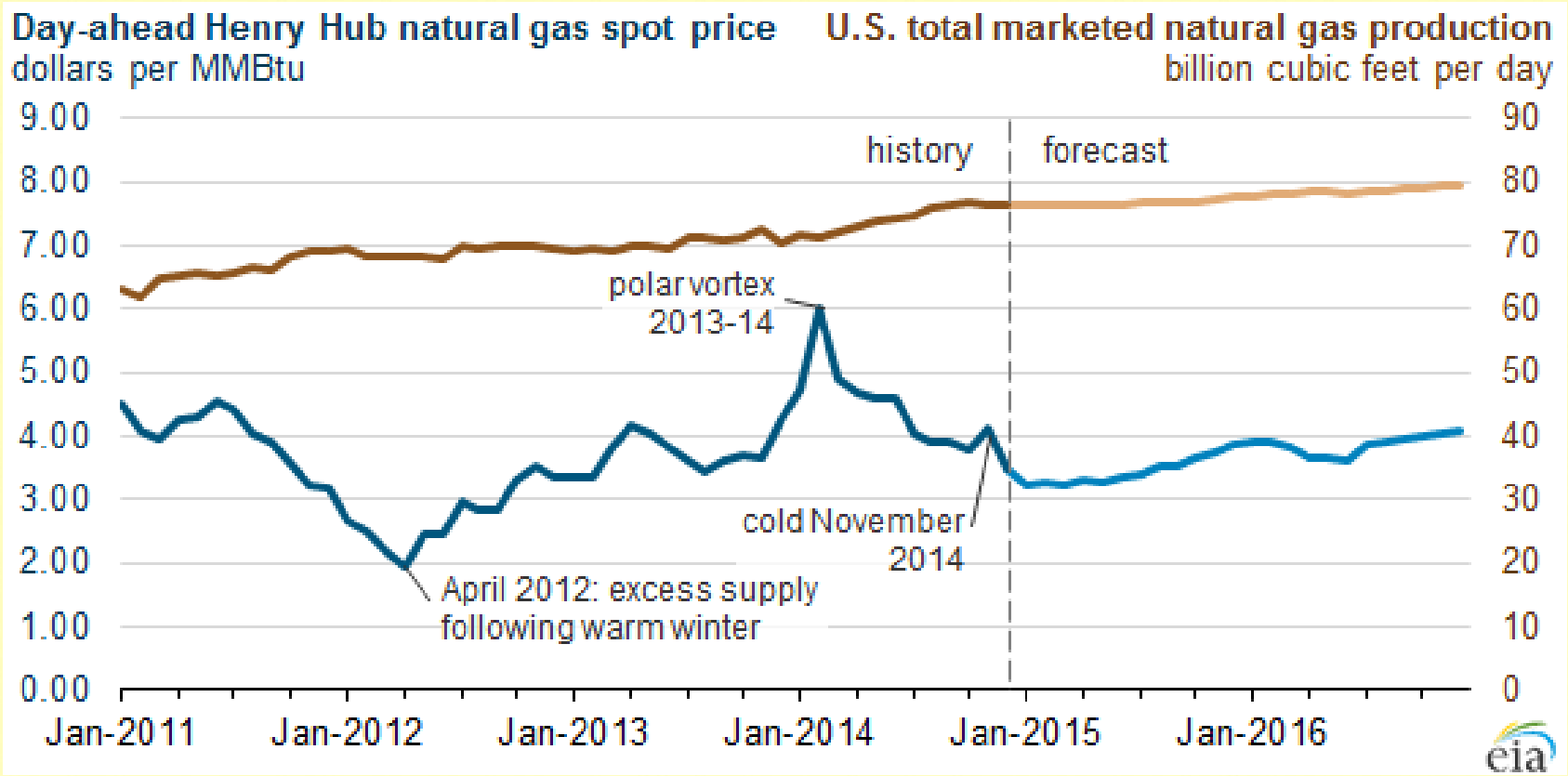
Natural Gas Aggregate Pricing

Natural Gas Price Volatility



NATURAL GAS PRODUCTION RISES



Rebates

- Part of Portfolio of Demand Side Management Programs.
- Offer incentive to reduce Demand during renovation or new construction
  - Value Range from $100 to $213 per KW of reduction

EMR Survey Data Shows

- Nearly $390k last year
- Only districts with funded Energy Managers are doing them.

Energy Financing

Simple Payback

	Watts	life, hours	initial cost
Incandescent	100	2000	$ 0.60
CFL	26	10000	$ 3.00
LED	8.6	25000	$ 10.00

Annual Operating Costs			
	kilowatts	hours	Operating Cost
incandescent	0.1	8760	$ 87.60
CFL	0.026	8760	$ 22.78
LED	0.0086	8760	$ 7.53

Savings	Simple Payback	
N/A		
$ 64.82	0.046	years
$ 80.07	0.125	years

2nd Important School Energy Legislation

- KRS157.455 Suggested
  - Support New Construction and Renovation
    - Healthy Environment
    - Saving Energy
    - Operational Expenses
  - Life Cycle Cost
    - Building Design
    - Operation
    - Maintenance

Life Cycle Cost

	Watts	life, hours	initial cost
Incandescent	100	2000	$ 0.60
CFL	26	10000	$ 3.00
LED	8.6	25000	$ 10.00

Usage Cost for 25,000 hours			
	kilowatts	hours	Operating Cost
incandescent	0.1	25000	$ 250.00
CFL	0.026	25000	$ 65.00
LED	0.0086	25000	$ 21.50

Total Cost for 25,000 hours				
	Bulbs	Bulb Cost	Usage Cost	Total Cost
incandescent	12.5	$ 7.50	$ 250.00	$ 257.50
CFL	2.5	$ 7.50	$ 65.00	$ 72.50
LED	1	$ 10.00	$ 21.50	$ 31.50

Avoided Cost

- $ Avoided = $Old Method - $New Method

- Avoided Cost is really an annuity
  - Rate Changes
  - Energy Conservation Measures
  - Building Automation or Setbacks

Avoided Cost Example

- Your new High School Gym is planning
  - 54 Metal Halide Fixtures (400W)
  - What would be the cost avoidance and energy savings for replacing
    - 6-lamp energy efficient fluorescent fixture
- Assumptions:
  - Demand and Energy Rate
  - The lights are on 2600 hours per year
- Solution:
  - Demand (KW) Savings = 11.2/month
  - KWh Savings = 29120 annually
  - Old Spend = $5238 annually
  - New Spend = $2515 annually
  - Avoided Cost = $2723 annually

Simple Payback & ROI

- Using the Previous Example (annual savings = $2723)
- The Cost of installing the lights was $15,000.
- Rebate (for KW Reduction) equals $2386
- Net cost = $12614

- Simple Payback = 4.63 years

- ROI = 21.6%

Life Cycle Cost (same problem)

- This method compares two possible solutions
  - Fluorescent vs. LED as replacements
  - Assume 75,000 hours as life of project

	Total Cost at 75,000 hours			
	first cost	electric cost	maint cost	total cost
LED	$ 17,023	$28,964.38		$ 45,986.98
T5HO	$ 4,822	$37,302.60	$13,234.59	$ 55,358.79

SEMP Avoided Costs

	FY13FY14	Cumulative
Consumption	$ 10,913,104	$ 37,868,024
Rebates	$ 393,528	$ 1,467,915
Refunds		$ 846,098
Rate Correction	$ 1,852,811	$ 6,081,790
Rate Intervention	$ 350,000	$ 2,032,752
Total		**$ 48,296,579**

ENERGY STAR AWARD 2015
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Funding Capital Projects Through Energy Savings

KENTUCKY SCHOOL BOARDS ASSOCIATION "A brighter future through better public schools"

ENERGY STAR AWARD 2015 PARTNER OF THE YEAR

SEMP Kentucky School Boards Association

Air Leakage vs New Roof

- Your energy manager has identified an air infiltration problem in one of your buildings and estimates the savings will be $15,000 per year but will cost $45,000 to repair.
- You say, "No way, I've got to find $130,000 to repair a roof in another building."
- ?????

Example from Todd Smith

Can you fund the roof repairs from the energy savings?

- Assume the repaired building will last 20 years
- Assume 5% discount rate

- By understanding the Life Cycle Cost and the Time Value of Money, you can determine the Present Value of the $15,000 per year annuity over the next 20 years

Can you fund the roof repairs from the energy savings?

- $15,000 X 12.4622* = $186,933 (Present Value)
- $186,933 - $45,000 = $141,933 (Net Present Value)

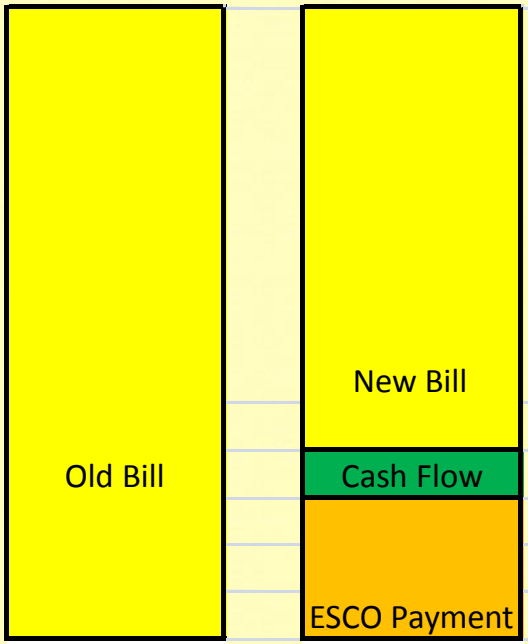
- The NPV of the Energy Savings will fund the Roof Repair!!

*From Interest Tables

Performance Contracting

- For Schools who do not have funds available in house
- Energy Efficient New Equipment Purchased
- Dollar Savings from Energy Efficiency of New Equipment pays for equipment over a set term.

Performance Contracting (Cont)



Energy savings performance contracting (ESPC) is a unique financing mechanism designed so that cost savings generated from energy-efficient upgrades are used to finance capital intensive projects and pay the contractor as demonstrated in the figure below. The contractor, known as an energy service company (ESCO) will obtain the financing for the projects and assumes the risk of the contract including any losses. Payback depends largely upon the size and scope of the project, but usually ranges from 7 to 15 years.

If you did it yourself	w/ ESCO
1. Need financing or cash	1. They finance
2. Payback <4 years, then savings	2. Payback terms as long as 20 years
3. Up to you to justify savings	3. They justify savings

Key Questions

What are the performance measures?

Based on What?

Who gets the Rebates?

How Long do the payments exist?

Recommend an Energy Savings Level or Max Energy based on Degree Days

Performance Contract Example

- Sample Spreadsheet

- May Want to Ask for Detail Design and Open Book Pricing of Equipment.

KISTA Financing

- School Bus Model
- Low Cost Bond
- Requires KDE BG Process

Facility Sustainment

- National data* indicates an investment between 3% of Current Plant Value (CPV) and 1.5% of Plant Replacement Value (PRV) be made to adequately maintain your buildings.

For Sustainment: 3% CPV or 1.5% PRV

For Modernization: 4% CPV or 2% PRV

So for a district with $100 Million in replacement costs, it takes

$1.5 Million to Sustain

or

$2.0 Million to Modernize

*data from National Research Institute, NASA, and ASCE

Borrowed from Derek Scott, Pulaski Co. Arkansas Schools

Why Not Renewables?

Source	2019 Projections		
	Capacity Factor	Levelized Cost/Kwh	Comments
Gas Baseload	87	0.0663	
Coal Baseload	85	0.0956	
Advanced Nuclear	90	0.0961	Safety Concerns
Coal Gasification	85	0.1159	Requires New Technology
Gas Turbine	30	0.1284	
Geothermal	92	0.0479	
Wind	35	0.0803	Transmission Investment
Hydro	53	0.0845	
Solar PV	25	0.1300	Transmission Investment
Wind Offshore	37	0.2041	Transmission Investment
Source: US DOE and National Renewable Energy Laboratory			

Best Fuel Source – Energy Efficiency

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

As a Finance Director You Should…

- Require a District Energy Plan
- Ask for a 5 Year Energy Upgrade Plan which lays out all potential energy efficiency/cost measures
  - Prioritize this list or ask for prioritization based on Life Cycle Cost.
- Fund Priorities through budgets or LPC activities
- Monitor Progress in the District EUI
- Ensure a dedicated resource is available for energy management

What Can Districts Do?

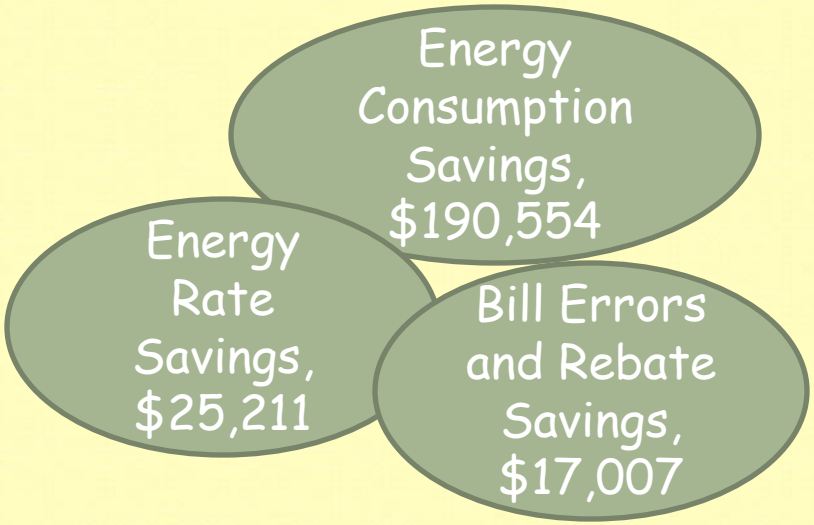
- USE WHAT YOU HAVE!!!
  - Thermostats
  - Doors
  - Windows
  - Control Systems
  - District Plan
  - Dress Appropriately
- UPGRADE per KRS157.455 WHEN YOU HAVE THE CHANCE TO IMPROVE
  - train appropriately so your investment in technology is not wasted

Get an Energy Manager

- Dedicated Resource
  - No priority shuffling
  - Significant ROI (This 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

Investment vs. Expense?



District Expense
< $7,000

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Thanks

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