

# School Energy Managers Project

## Public School Focus on Energy Management

IEEE Meeting  
December 8, 2015

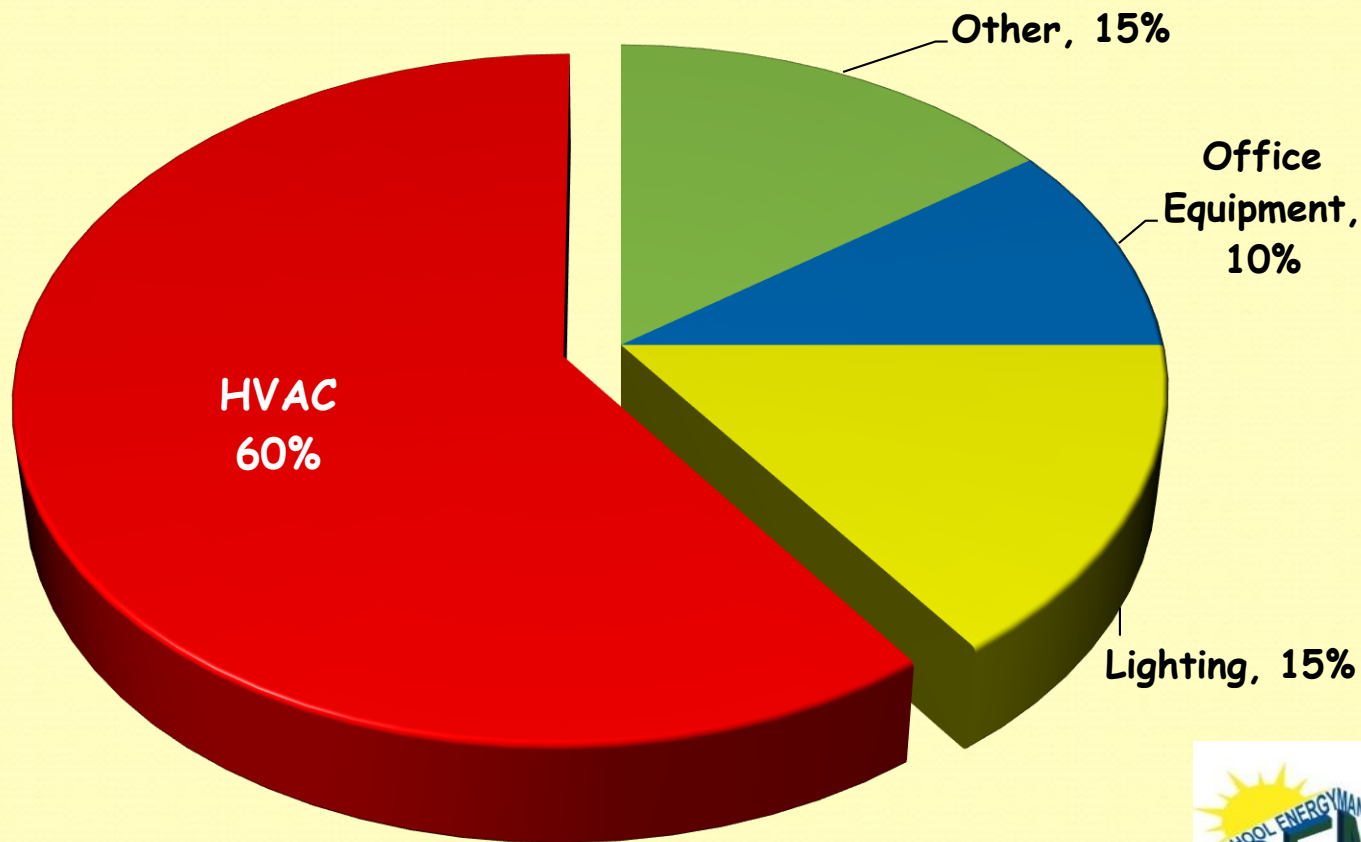


# Kentucky Public Schools

- 173 Districts - Boards
- 675,000 Students
- \$50,428 Average Teacher Salary
- 1233 K-12 Schools
- 109,000,000 Square Feet
- 187 Day School Year



# Typical School Building Energy Usage



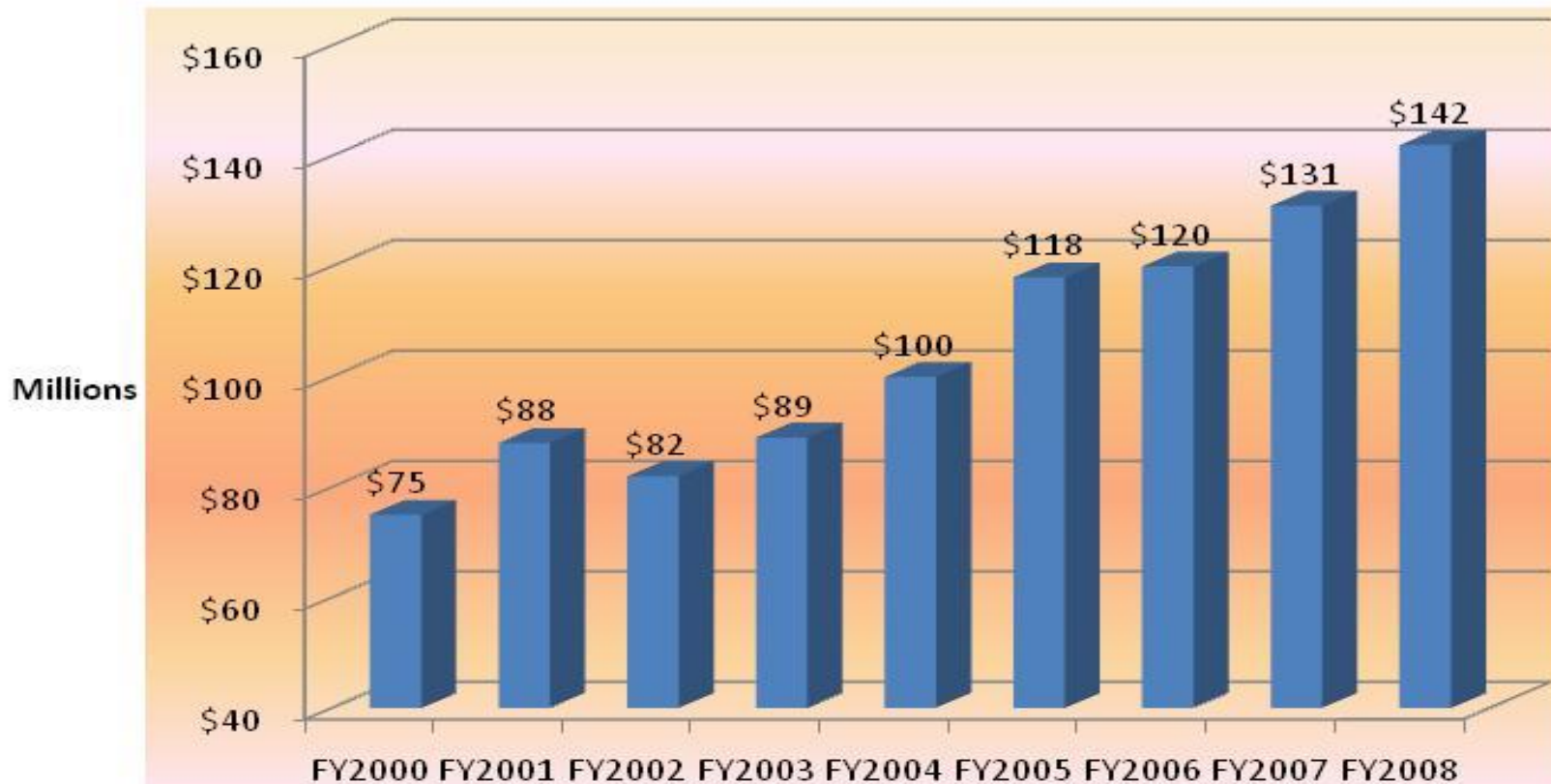
# Where Had Schools Been?

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





# MUNIS K-12 Facility Energy Expenses FY2000 - FY2008



# Statutory Requirements

- KRS160.325 - School Energy Management
  - Develop & Implement Energy Management Plan
  - Annual Report to Board, Legislative Research Commission & Energy Cabinet (July 2008)
- KRS157.455 - Highly Efficient Buildings
  - Meet or Exceed Efficiency Design Standards
  - Use Life-Cycle Analysis in Proposal Evaluation
  - Consider Net-Zero Construction (July 2010)

# Board Policy 05.23 2010

- District Level Committee
  - Develop & Implement Energy Management Plan
  - Track & Monitor Progress towards managing & reducing costs
- Superintendent Annual Reports
  - Energy Cabinet, DEDI, & LRC
  - Board of Education

# Why an Energy Manager?

- Dedicated resource:
  - No priority shuffling
  - Significant ROI
  - Knowledgeable connection to utility companies
- Skilled resource:
  - Evaluates and presents energy saving options
  - Facilitates policy compliance
  - Translates technical information

**“Boots on the Ground”**



# Fundamental Challenge

- Core Business of Schools is Education
  - Difficult to fund non-classroom position
  - Look for grants
- Personnel Background is Education - not finance or energy
  - Fill positions from within district
- "not my money....just pay the bill"

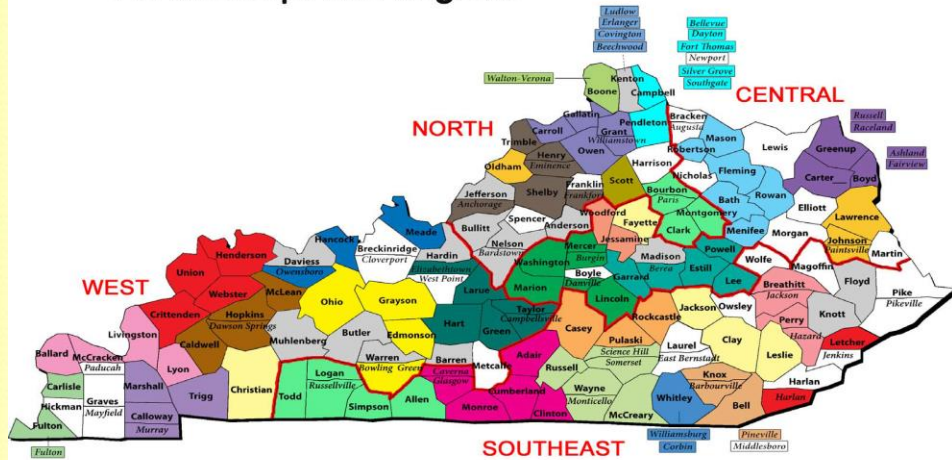


# Energy Utilization Index (EUI) Kbtu per square foot 2010

	<u>2010</u>
National	73
<b>Kentucky</b>	<b>65</b>
ENERGY STAR	35-50
<b>KY'S Best District</b>	<b>43</b>
Net-zero Ready	<25

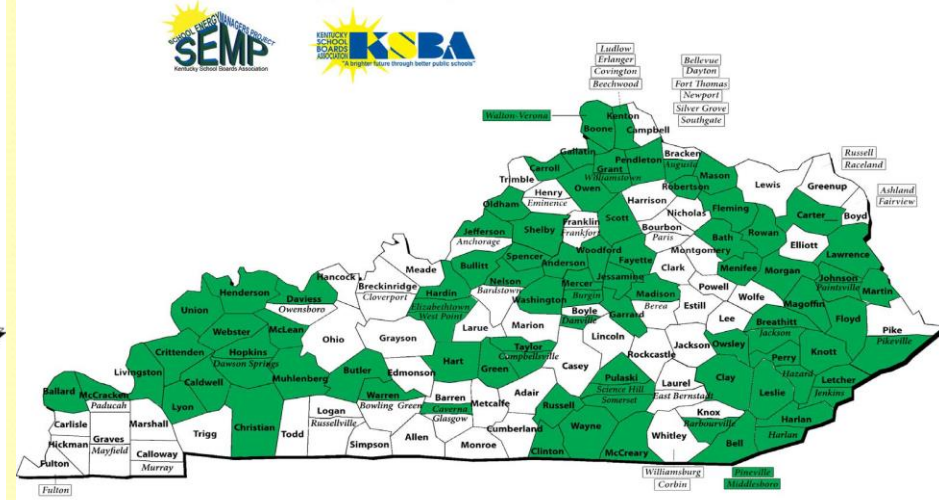
# Participating Districts FY2010 - Now

## School Energy Managers Project Partnerships and Regions



Existing Energy Management district - gray  
Non-participating district - white

## School Energy Managers



District with Energy Manager - green

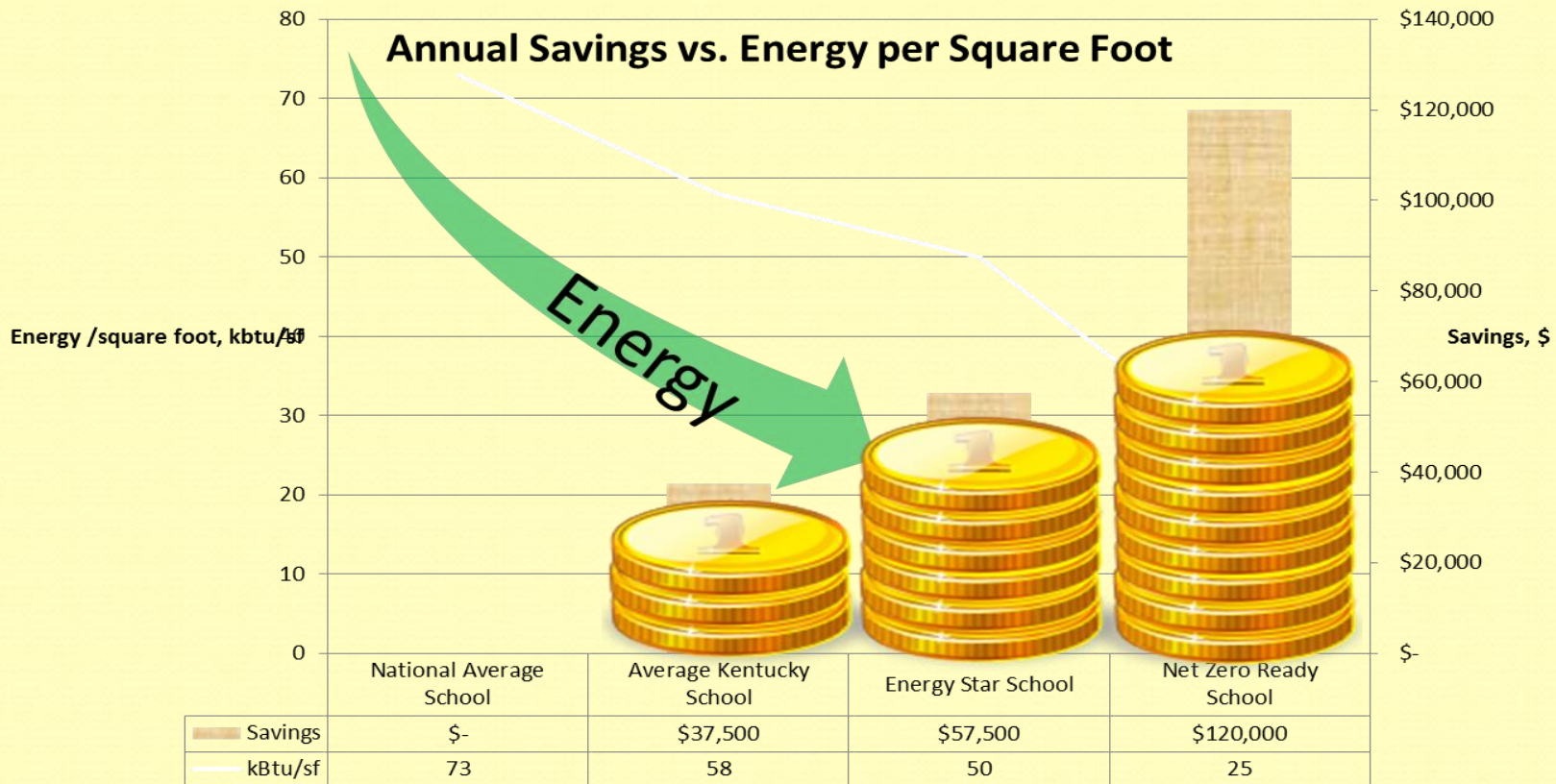
Updated 10/14/15





# Reduced Costs

As Energy Use Comes Down, Savings Go Up



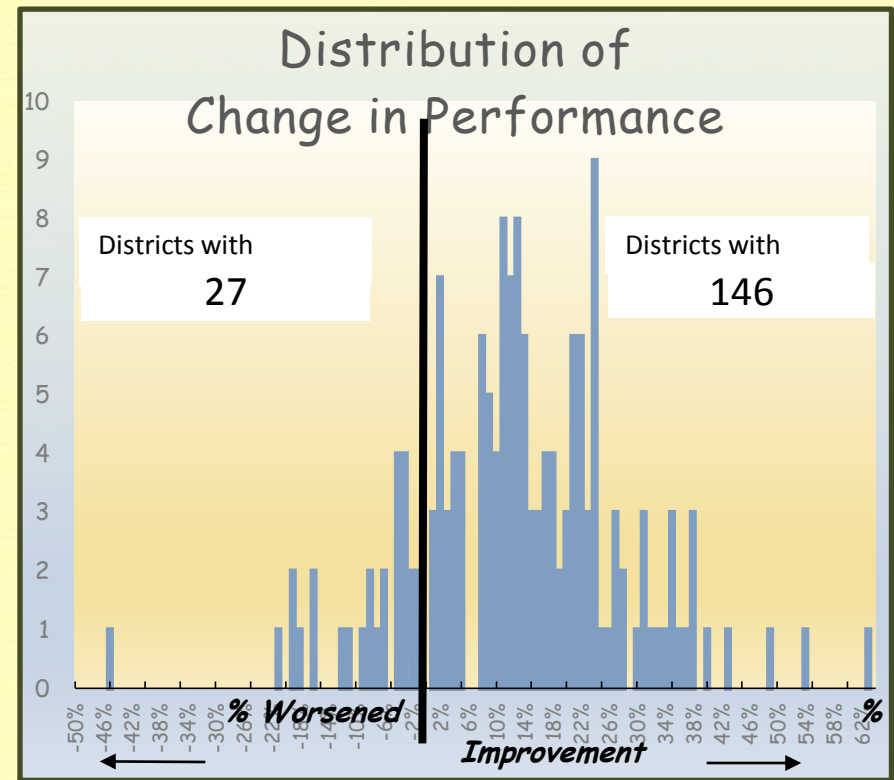
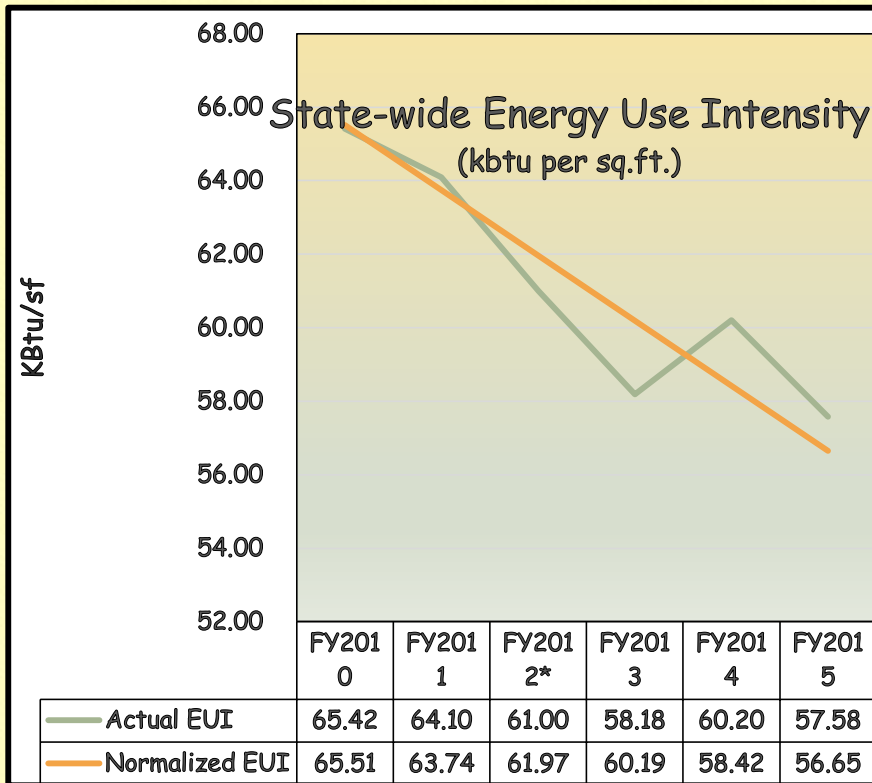
For a 100,000 Square Foot Middle School.



# Best Practice Implementation

- Awareness
- Behavior Focus
- Net-Zero Construction
- Automation Systems
- LED Lighting
- Envelope Improvement
- Computer/Technology Management

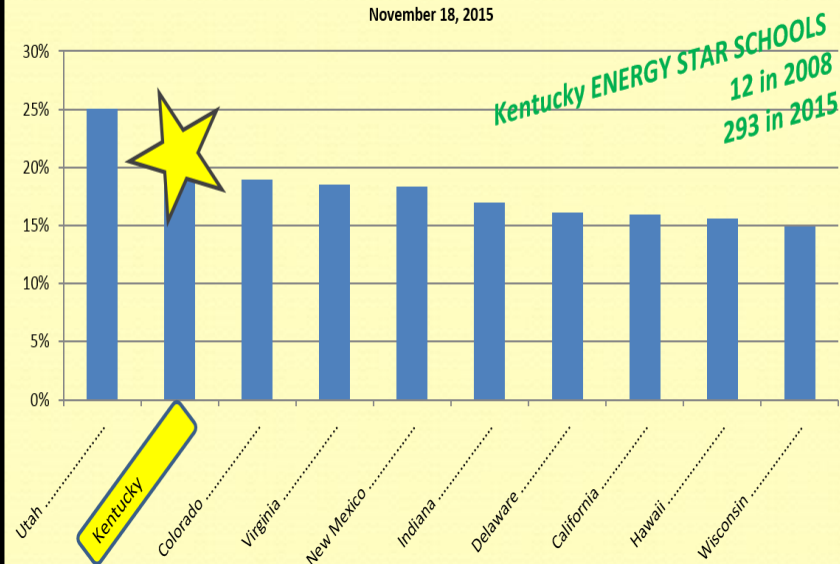
# MOST DISTRICTS BECOMING MORE EFFICIENT



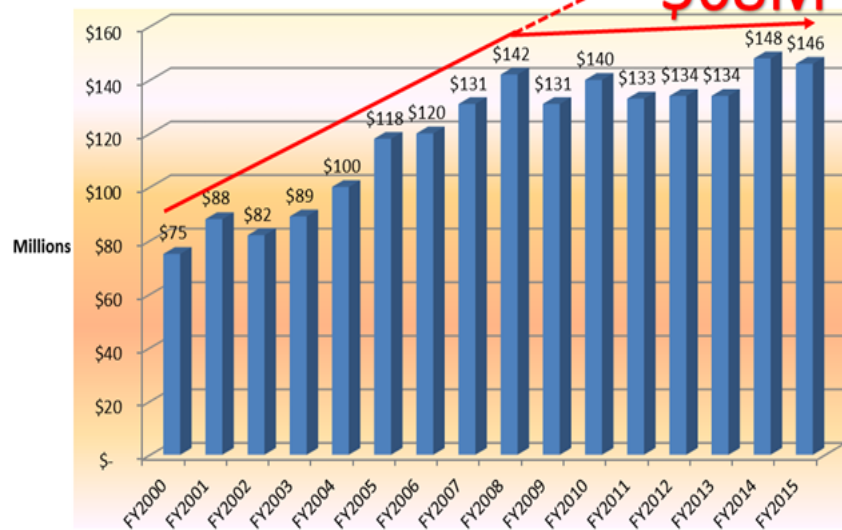
# RESULTS

**Top Ten States: Kentucky Ranks Second for Percentage ENERGY STAR Schools of Total Schools**

November 18, 2015



**Figure 8. MUNIS K-12 Facility Energy Expenditures FY2000 - FY2015**





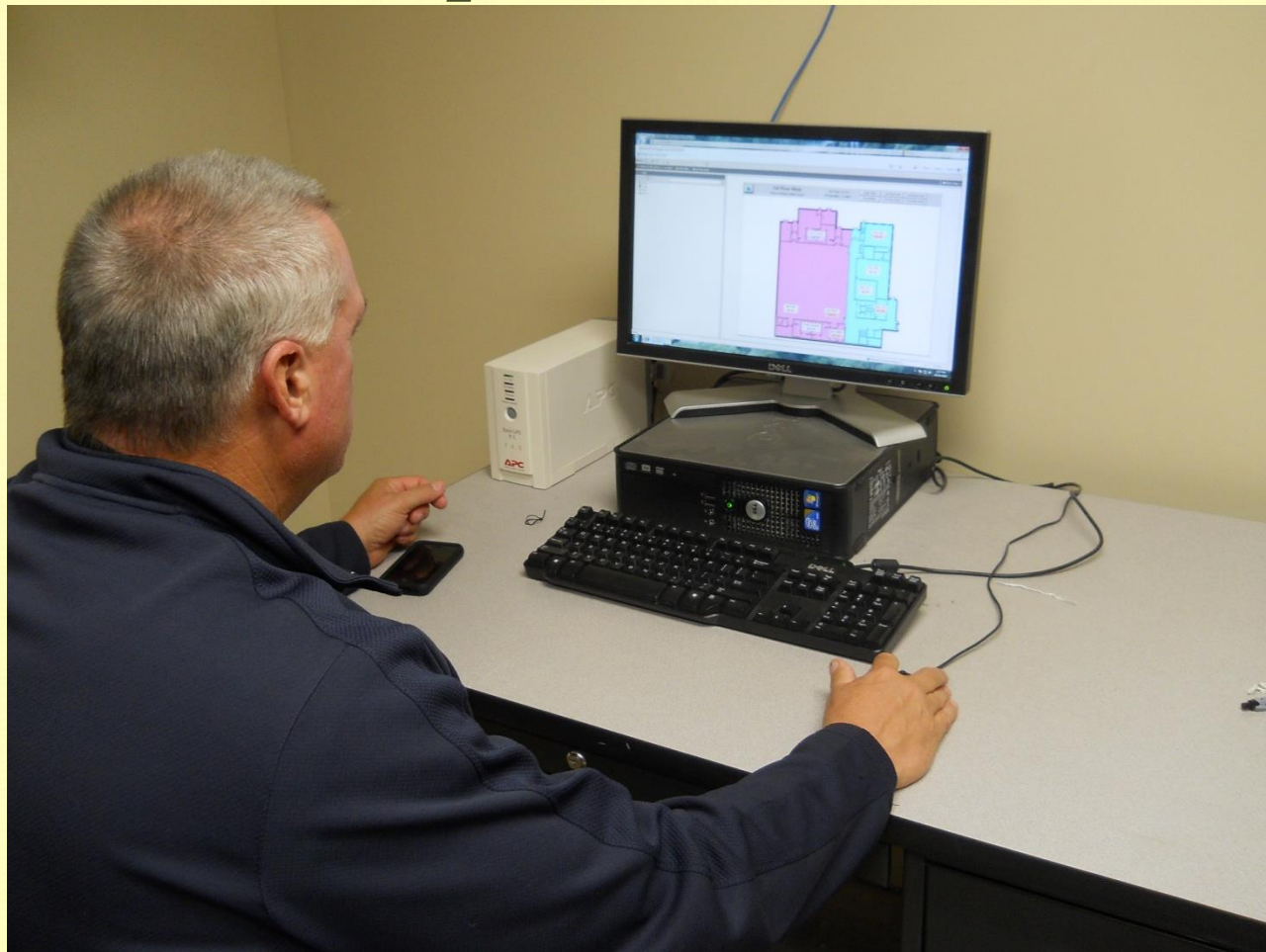


# Energy Utilization Index

(EUI) Kbtu per square foot  
2010 - 2015

	<u>2010</u>	<u>2015</u>
National	73	73
<b>Kentucky</b>	<b>65</b>	<b>57.6</b>
ENERGY STAR	50	50
<b>KY'S Best District</b>	<b>43</b>	<b>32.7</b>
Net-zero Ready	18	18

# Building Automation Systems



# LED Outdoor Lighting





# LED Gym Lighting





# Envelope Improvement



# Construction

Locust Trace



Richardsville



Turkey Foot



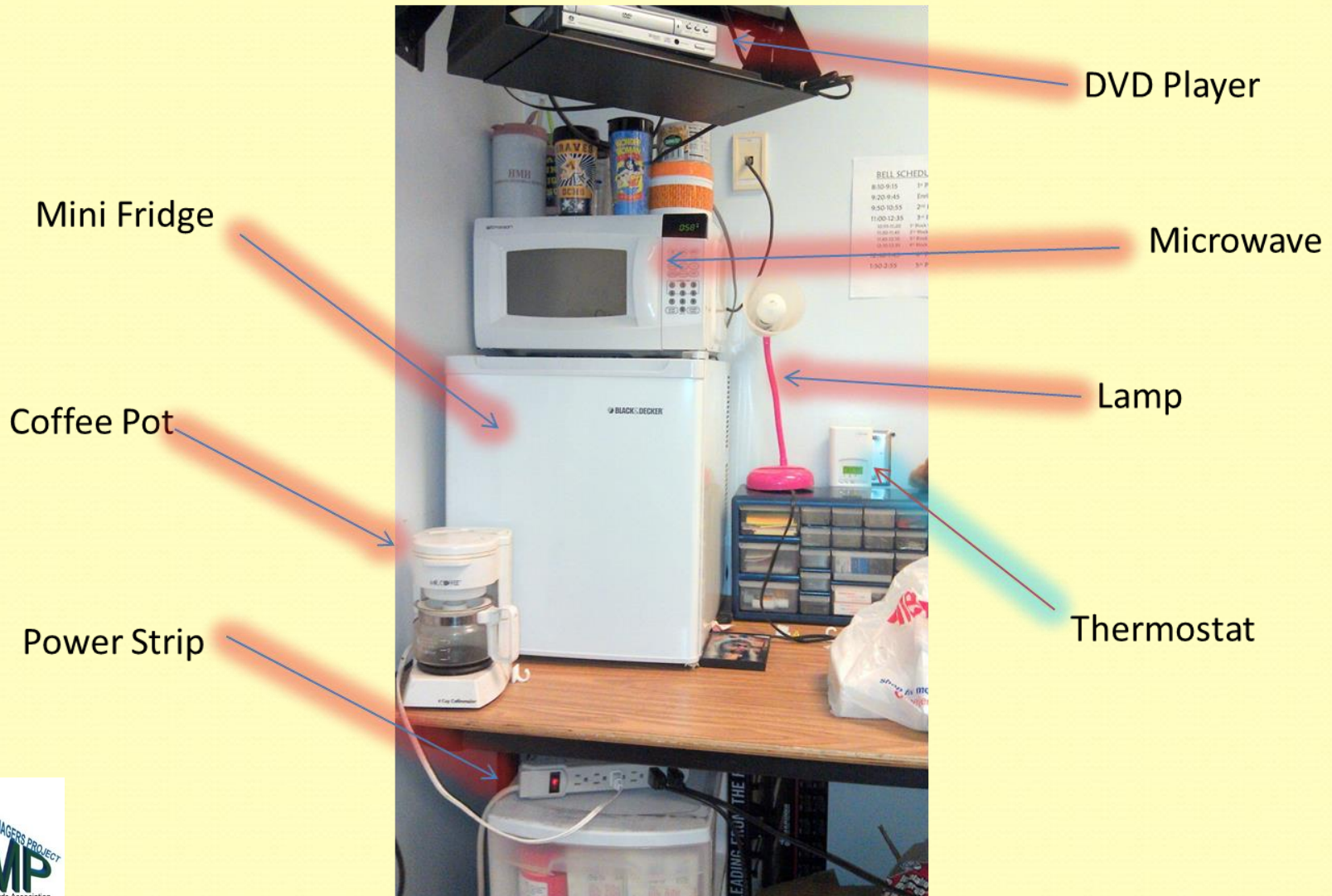


# Computer Management





# Behavior Opportunities



# Student Energy Teams

Owen Co. Schools



Owen Primary School





# School Team Competition





# Why Not Renewables?

Source	2019 Projections		Comments
	Capacity Factor	Levelized Cost/Mwh	
Gas Baseload	87	66.3	
Coal Baseload	85	95.6	
Advanced Nuclear	90	96.1	Safety Concerns
Coal Gasification	85	115.9	
Gas Turbine	30	128.4	
Geothermal	92	47.9	
Wind	35	80.3	Transmission Investment
Hydro	53	84.5	
Solar PV	25	130.0	Transmission Investment
Wind Offshore	37	204.1	Transmission Investment
Source: US DOE and National Renewable Energy Laboratory			

# Kentucky's Changing Electricity Profile

- Competitive advantage of low prices declining
- Forty percent of coal units retired by 2016
- Clean Power Plan limiting replacement options
- Low gas prices driving switch to natural gas without GHG regulations