

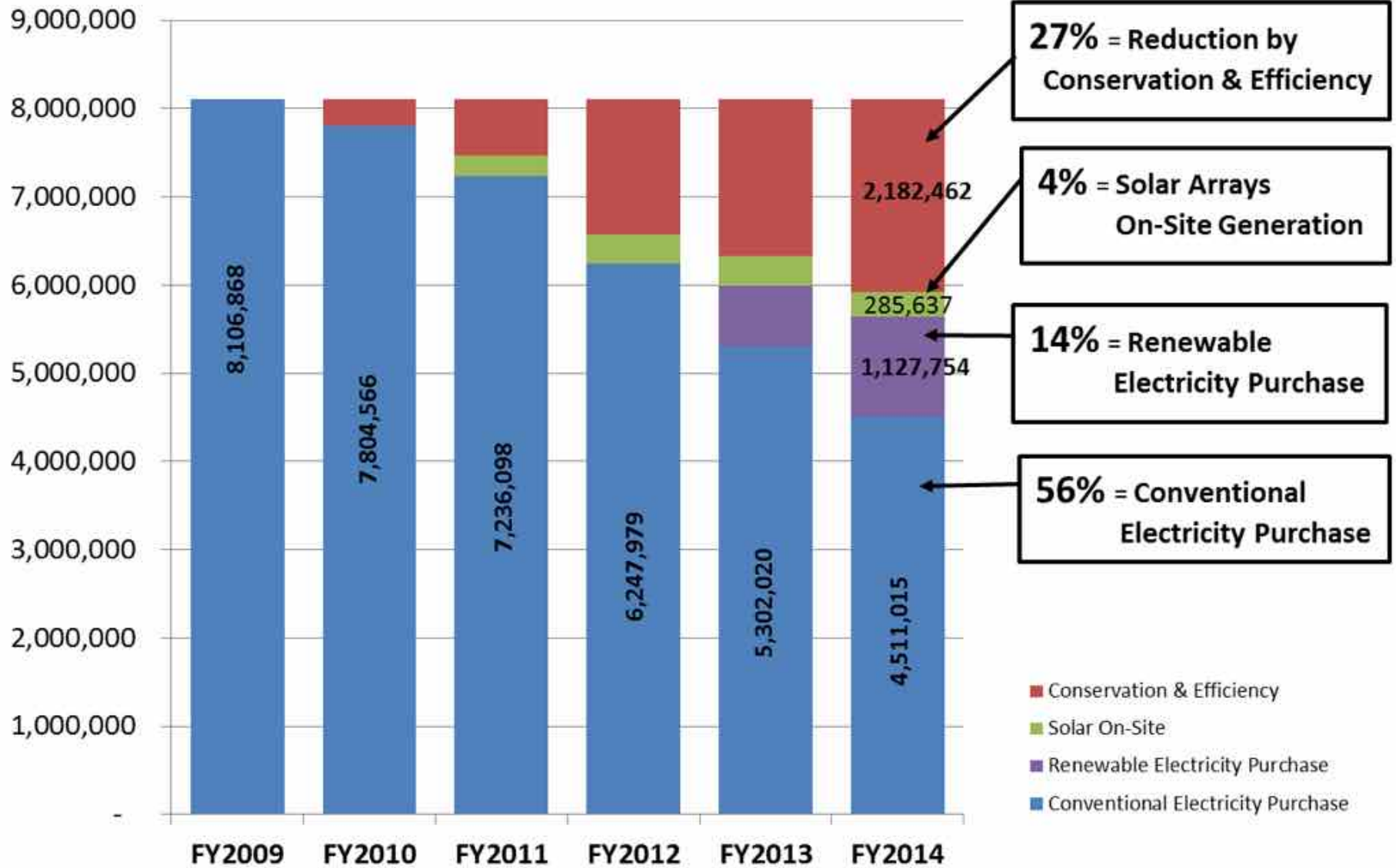
# Acton-Boxborough Regional School District POWERING DOWN



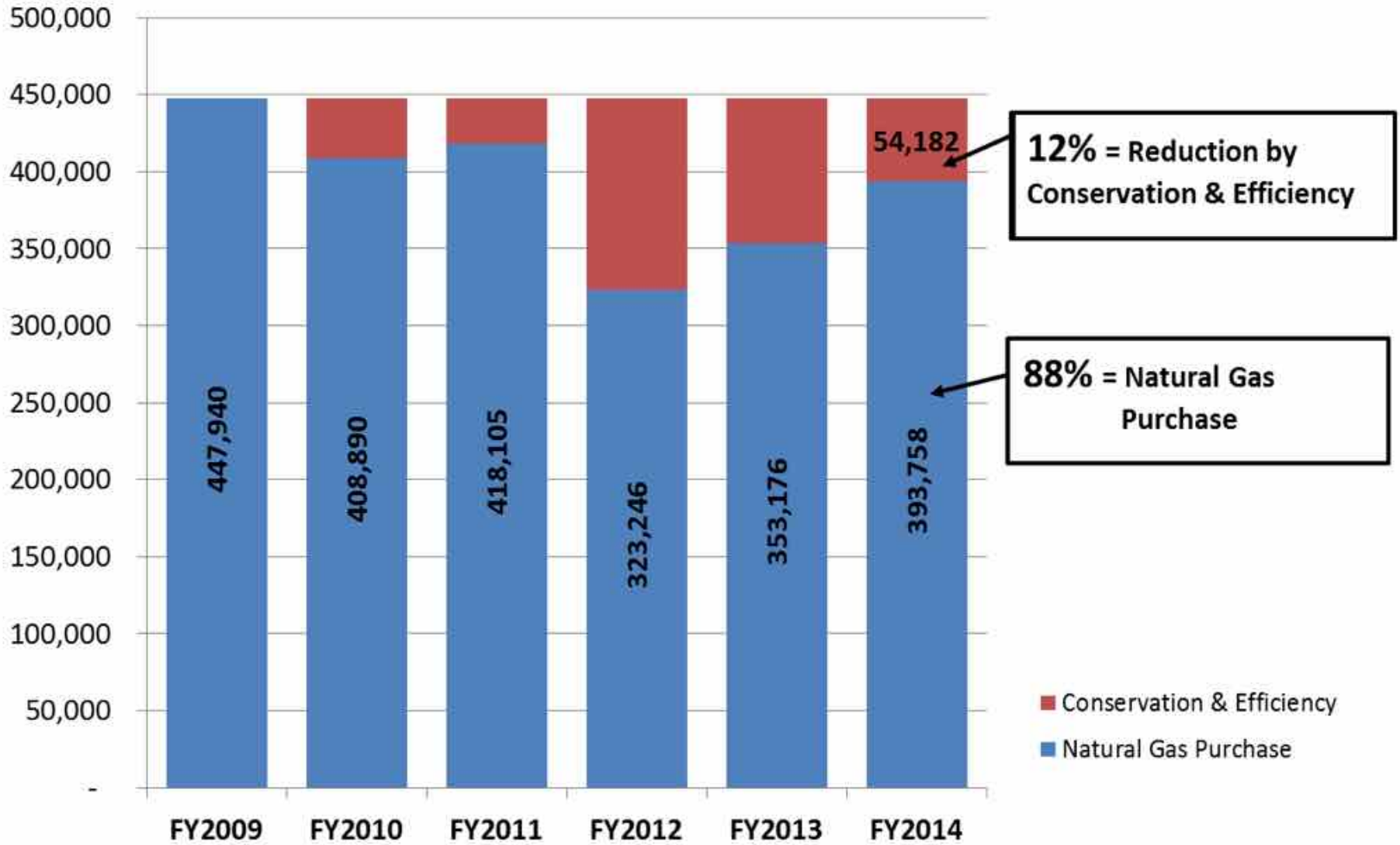
## Kate Crosby

- ❖ Energy Manager, Acton-Boxborough Regional School District
- ❖ Lead Author, *Powering Down: A Toolkit for Behavior-Based Energy Conservation in K-12 Schools*

## ABRSD ELECTRICITY (kWh)



## ABRSD NATURAL GAS (therms)



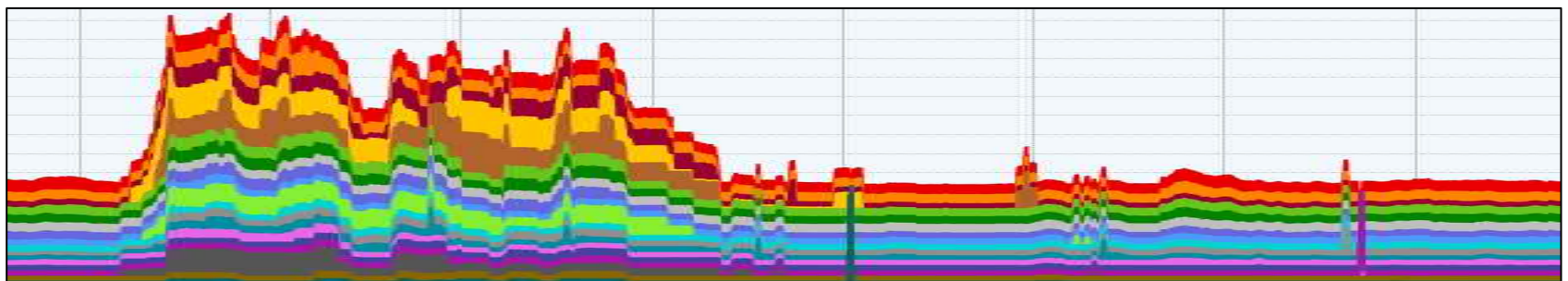
# GREEN COMMUNITIES PROGRAM

- 2010: Town of Acton certified as a Green Community
- Regional School District included in Town of Acton footprint
- Energy data benchmarked for all school and municipal buildings
- Three rounds of energy efficiency grant funding received - now planning application for #4



# MECHANICAL & LIGHTING PROJECTS

- Interior lighting retrofits (high-efficiency T8, LED)
- Exterior lighting retrofits (induction, LED)
- Condensing boilers
- Recommission RTU's, univents
- CO2 sensing, VAV, VFDs
- Weatherization/air sealing
- Exhaust fans tied to BMS
- Real-time granular energy data analysis at BMS level & circuit level



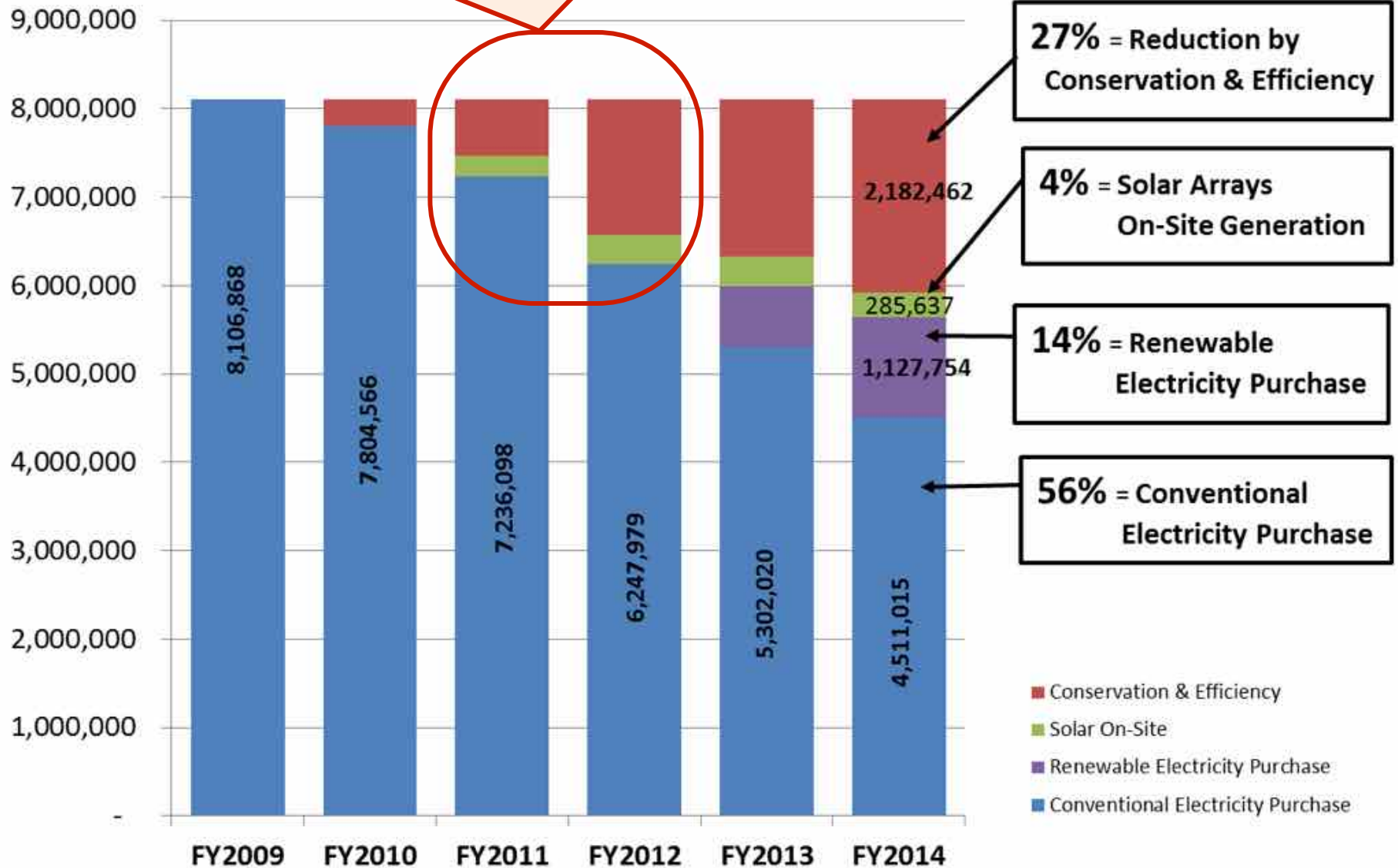


# RENEWABLES

- 280 kW of on-site solar installed 2010
- 20% of electricity purchase from renewable sources (supplier contract)
- Owners Agent Technical Assistance (OATA) grant received from DOER to assess additional on-site generation or off-site net metering



**BEHAVIORAL STRATEGIES:  
13% drop in 2 years**



# POWERING DOWN:



A TOOLKIT FOR BEHAVIOR-BASED  
ENERGY CONSERVATION IN  
K-12 SCHOOLS

**THE CENTER**  
FOR GREEN SCHOOLS



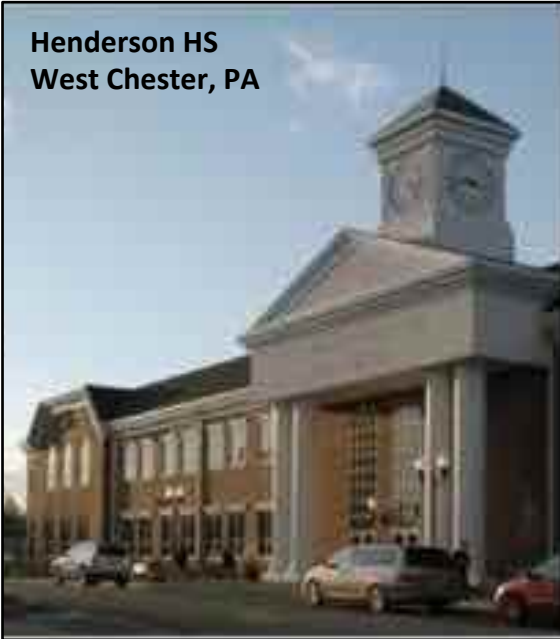
**U.S. GREEN BUILDING COUNCIL**

[http://www.centerforgreenschools.org/Libraries/Resources\\_Documents/Behavior-based\\_Efficiency.sflb.ashx](http://www.centerforgreenschools.org/Libraries/Resources_Documents/Behavior-based_Efficiency.sflb.ashx)



# CASE STUDY SCHOOLS

Henderson HS  
West Chester, PA



John Jacobs ES  
Phoenix, AZ



Laguna Creek HS  
Elk Grove, CA



Holston MS  
Knoxville, TN



Rosa Parks ES  
Lexington, KY



# DROP IN ELECTRICITY USE DUE TO BEHAVIOR-BASED STRATEGIES

School	Annual Reduction in Electricity Usage vs. Baseline Year		Annual Cost Savings vs. Baseline Year		Length of Data Set	Baseline Year
	%	kWh	%	\$		
Holston MS <i>Knoxville, TN</i>	<b>-37%</b>	<b>-848,929</b>	-12%	-\$19,816	<b>6 years</b>	Fiscal Year 2007
Rosa Parks ES <i>Lexington, KY</i>	<b>-36%</b>	<b>-645,900</b>	-20%	-\$24,500	<b>4 years</b>	Fiscal Year 2009
Laguna Creek HS <i>Elk Grove, CA</i>	<b>-30%</b>	<b>-663,232</b>	-19%	-\$47,704	<b>4 years</b>	Fiscal Year 2009
Henderson HS <i>West Chester, PA</i>	<b>-30%</b>	<b>-1,359,672</b>	-27%	-\$119,491	<b>5 years</b>	Calendar Year 2008
John Jacobs ES <i>Phoenix, AZ</i>	<b>-20%</b>	<b>-250,797</b>	-10%	-\$12,463	<b>5 years</b>	Mar., 2007 - Feb., 2008

# THREE COMPLEMENTARY AVENUES TO ENERGY SAVINGS IN SCHOOLS:

- Raising awareness among faculty, staff, students
- Managing building operations
- Upgrading mechanical equipment and controls

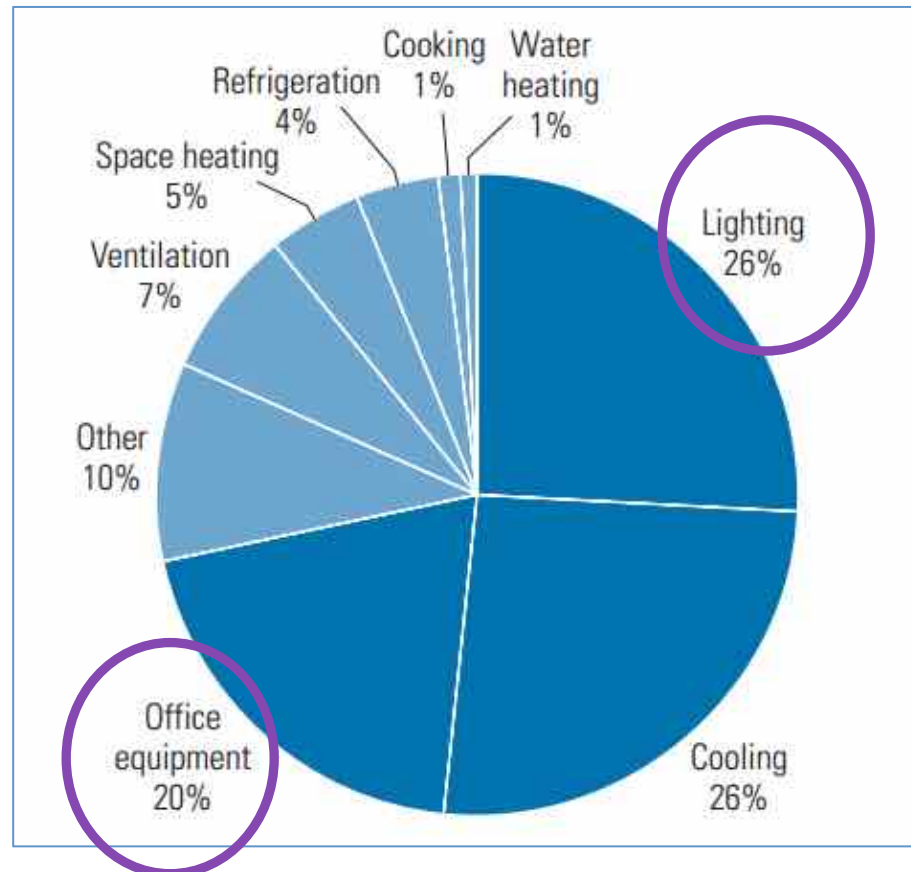


Multiple sources, incl. Cross, *Shifting Organizational Culture - Innovation for Energy Conservation*; Foraker interview; Pierce interview.

# ENERGY USE IN SCHOOLS AND OTHER “COMMERCIAL” BUILDINGS:

- HVAC
- Lighting (25-50% of electricity)
- Plug load (as much as 25% of electricity)

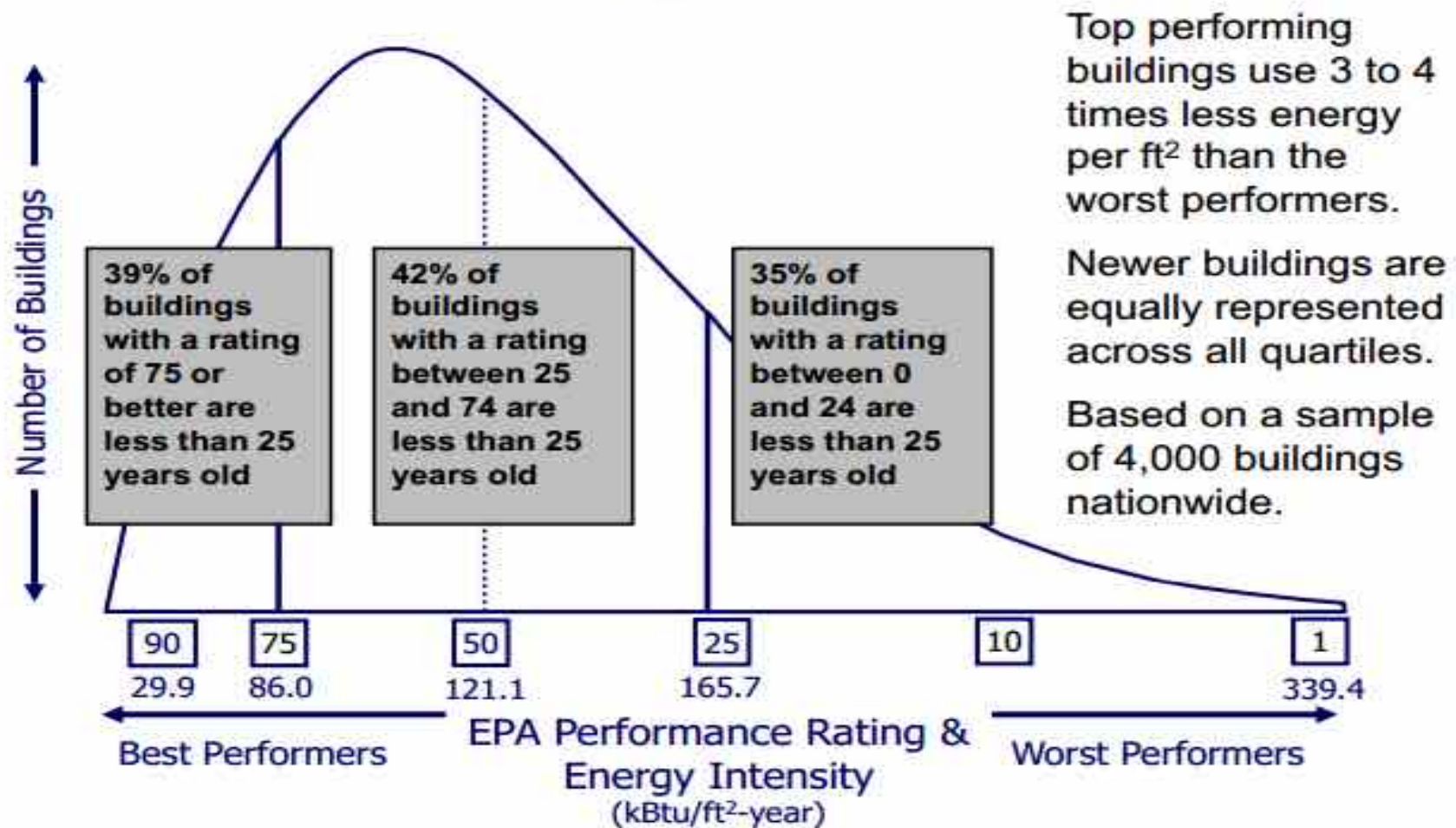
The chart shows a sample profile of electricity use within a school. Actual data will differ depending on location & climate.



Source: US EPA, Energy Star Building Upgrade Manual (2008)



# “New” Doesn’t Always Mean “Efficient”



Older buildings can sometimes be very energy efficient – the way in which a building is managed has a big influence on how it stacks up.



# BENEFITS OF BEHAVIOR-BASED PROGRAMS

- Significant cost savings
- Reduced environmental impact
- Students: learning, leadership, efficacy
- Beyond the school community



# SCHOOL DYNAMICS

- **Faculty/staff:** committed leaders
- **Principal:** essential support
- **Students:** engagement → energy, creativity, positive focus
- **Custodial staff:** engagement → insights, collaboration
- **District support:** tracking energy use → provide feedback



Credit: Washington Elementary School District



Credit: Acton-Boxborough Regional School District

# MOMENTUM

- **Energy data** compelling and strongly motivating – cited repeatedly by faculty/staff
- **Cost savings** highly valued → direct reallocation to educational resources
- **Recognition** highly valued



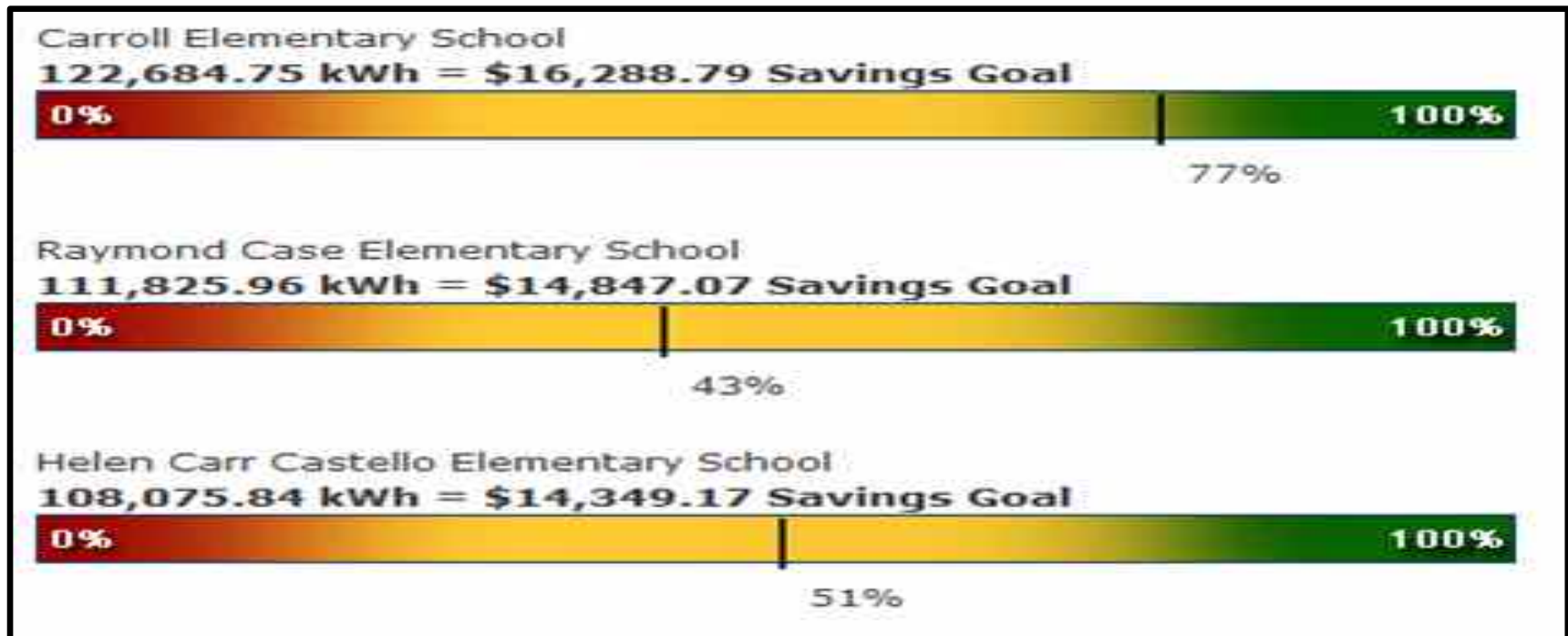
Credit: Elk Grove Unified School District



Credit: Fayette County Public Schools

“Once [Facilities] was putting out the graphs, I think that was really key. People could see that last month we went down \$12,000 from the previous year, and all that we’re doing is turning our lights out when we leave the room. It made a big difference that people could see the changes.”

*-Faculty member, Laguna Creek HS*



Elk Grove Unified School District: [www.egusd.net/energy/savings.html](http://www.egusd.net/energy/savings.html)



## POWERING DOWN TOOLKIT STEPS

**STEP 1.** FIGURE OUT WHO'S ON THE TEAM

**STEP 2.** GATHER INFORMATION AND IDENTIFY PRIORITIES

**STEP 3.** CREATE MOMENTUM

**STEP 4.** CELEBRATE SUCCESS AND PROVIDE RECOGNITION

Framing the initiative as an emerging “**social norm**” within the school is a powerful tool for increasing participation.

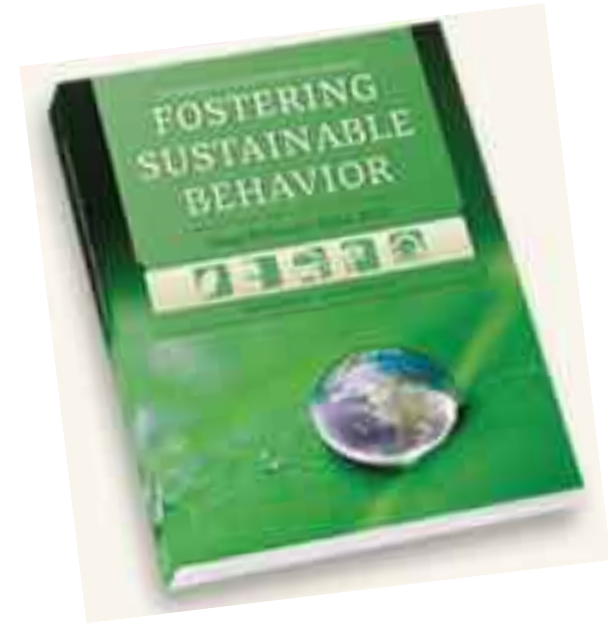
Analyze the specific **barriers** that make a change difficult and look for solutions.

Emphasize **personal contact** in getting the message out... information is not enough to create a shift in behavior.



# COMMUNITY-BASED SOCIAL MARKETING

1. Select behavior
2. Identify barriers
3. Develop strategy
4. Pilot test
5. Implement broadly and evaluate



Fostering Sustainable Behavior:

An Introduction to Community-Based Social Marketing

~Douglas McKenzie-Mohr

[www.cbsm.com](http://www.cbsm.com)

# OTHER RESOURCES

## **Greening Work Styles: An Analysis of Energy Behavior Programs in the Workplace**

**By Shui Bin**

<http://www.aceee.org/research-report/b121>

## **ACEEE Field Guide to Utility-Run Behavior Programs**

**By Susan Mazur-Stommen**

<http://www.aceee.org/research-report/b132>

**BuildingEnergy** conference - NE Sustainable Energy Ass'n

March 3 – 3 hour workshop by **Mazur-Stommen**

March 4 – 90 minute workshop by **Mazur-Stommen**

**City of Cambridge – GreenSense program**

<http://www.cambridgema.gov/theworks/greenliving/cambridgegreensense.aspx>



## Cambridge GreenSense

City of Cambridge DPW

Kelly Dunn, Community Relations

Ellen Katz, Fiscal Director

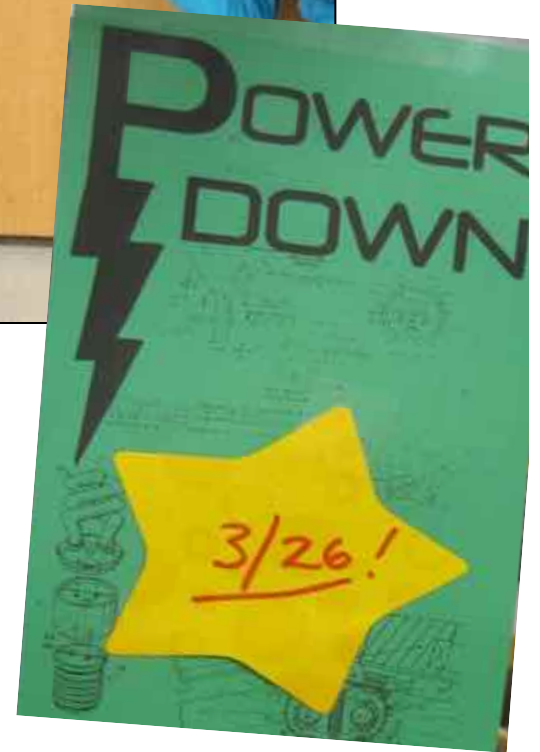
<http://www.cambridgema.gov/theworks/greenliving/cambridgegreensense.aspx>

<http://www.mass.gov/eea/docs/doer/green-communities/pubs-reports/behavioral-ee-slides.pdf>





Hi! The Power Down  
Team stopped by and  
we loved how everything  
was turned  
off!!  
You put  
School e  
which is  
You so  
work!  
put into  
PRIZE














ints!  
or participating -




DATE: 4/11/13

COACH: Tamara Manna  
12. Mangat (what's that?)

Comments
The printer and the microwave are off we will come back Thursday
For urgency of previous note
We will email you on Friday.

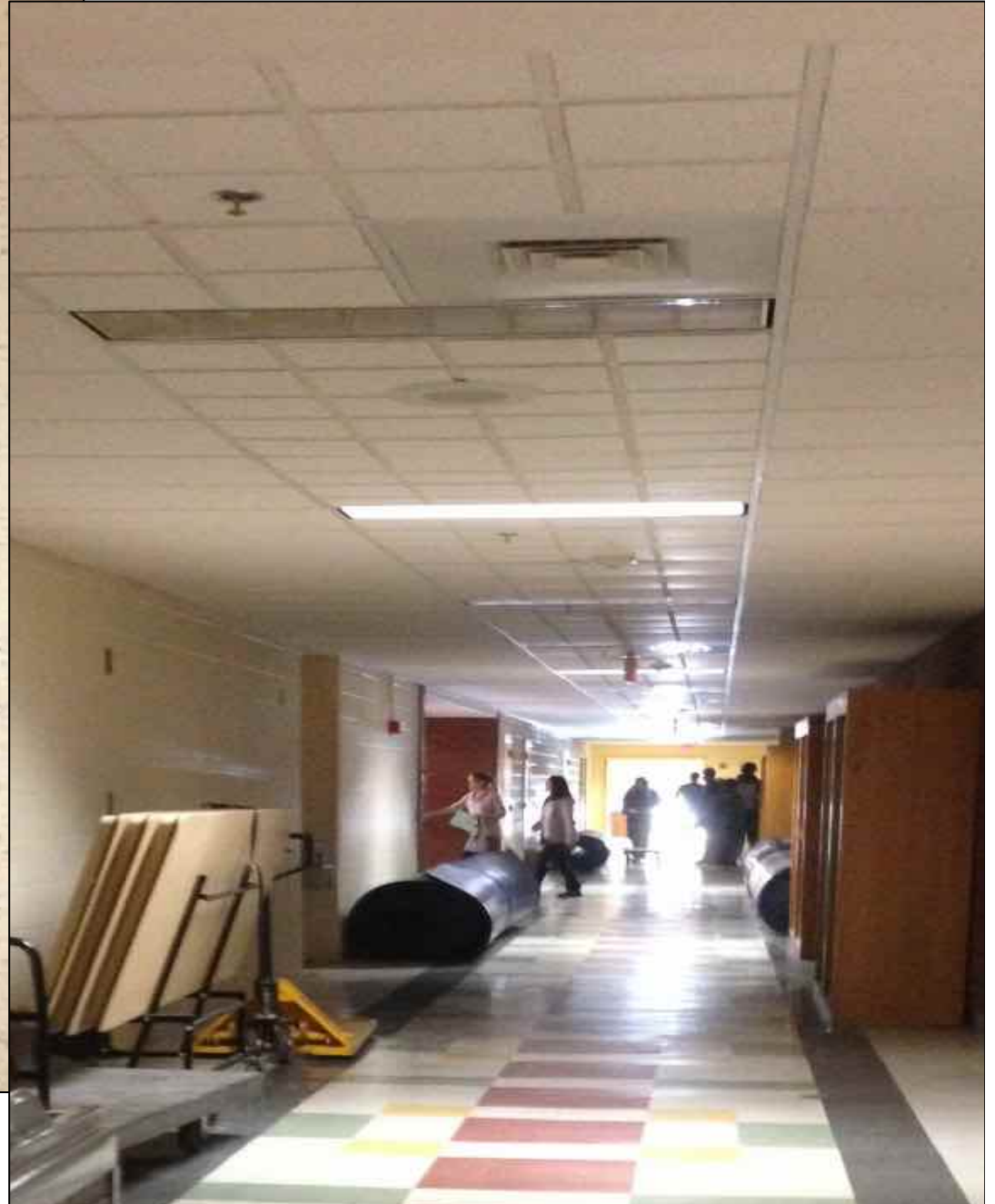
We loved all your little signs!!  
THANK YOU SO MUCH!!





Credit: Acton-Boxborough Regional School District





Credit: Acton-Boxborough Regional School District





Credit: Acton-Boxborough Regional School District



QUESTIONS?

Kate Crosby

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Acton-Boxborough Regional School District