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
27% = Reduction by Conservation & Efficiency
4% = Solar Arrays On-Site Generation
14% = Renewable Electricity Purchase
56% = Conventional Electricity Purchase

Conservation & Efficiency
Solar On-Site
Renewable Electricity Purchase
Conventional Electricity Purchase
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

27% = Reduction by Conservation & Efficiency
4% = Solar Arrays On-Site Generation
14% = Renewable Electricity Purchase
56% = Conventional Electricity Purchase
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
CASE STUDY SCHOOLS

Henderson HS
West Chester, PA

John Jacobs ES
Phoenix, AZ

Laguna Creek HS
Elk Grove, CA

Rosa Parks ES
Lexington, KY

Holston MS
Knoxville, TN
## DROP IN ELECTRICITY USE DUE TO BEHAVIOR-BASED STRATEGIES

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

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
MOMENTUM

• **Energy data** compelling and strongly motivating – cited repeatedly by faculty/staff
• **Cost savings** highly valued → direct reallocation to educational resources
• **Recognition** highly valued
“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
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
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
Cambridge GreenSense
City of Cambridge DPW
Kelly Dunn, Community Relations
Ellen Katz, Fiscal Director

Hi! The Power Down Team stopped by and we loved how everything was turned into the room!! you put School e which is you so work!! put into PRIZE
POWER DOWN!

PLEASE REMEMBER TO...

TURN OFF LIGHTS!

TURN OFF COMPUTERS!

UNPLUG AV UNITS!

TURN OFF PRINTERS!

AND TURN ME OVER!

I AM POWERED DOWN!

THANK YOU!
We have added a new feature to our school district. We will be running a gratitude club where students can recognize and thank others for their kindness and support.

The club will meet once a week to discuss gratitude and how to express it. We will start by reading the gratitude club guidelines and discussing how to implement them in our lives.

Some students have already shared stories of how they have been touched by others' kindness. We plan to include these stories in our club meetings and encourage others to share their own experiences.

We hope to see everyone at the next meeting on Thursday.

Thank you for participating.
Credit: Acton-Boxborough Regional School District
QUESTIONS?

Kate Crosby
kcrosby@abschools.org
Acton-Boxborough Regional School District