

LEVERAGING RESOURCES TO FORTIFY PILLAR I

USGBC Healthy and High Performing Schools Symposium Friday, April 8, 2016

The Source On Energy Efficiency

Introductions



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Midwest Energy Efficiency Alliance (MEEA)

- MEEA is a nonprofit membership organization with 150+ members, including:
 - Electric and Gas Utilities
 - State and local governments
 - Manufacturers and retailers
 - Academic and research institutions
 - Energy service companies and contractors
- Since 2000, MEEA has been the leading source for raising awareness and advancing sound energy efficiency policies and programs in the Midwest
- MEEA balances the diverse interests of its members and network across the public and private sectors, creating a common ground to affect positive change for energy efficiency in the Midwest.



Learning Objectives

Leave the session with a better understanding of how to:

- Measure, benchmark and improve facility energy usage
- Benchmark other sustainability metrics
- Find funding for energy efficiency improvements
- Access resources to aid implementation
- Tie sustainability efforts into education

Facility Energy Use

Three Routes to EE Savings

*Adapted from Powering Down

The Source On Energy Efficiency

Understanding Resource Use to Create Efficiency Cycle

*Adapted from SEDAC

The Source On Energy Efficiency

Benchmark

- Evaluate or check energy & sustainability metrics by comparison
 - Compare to property type, your buildings, past & target performance
- Review energy consumption vs. climate
 - Use your benchmarking tool
 - By hand: use at least a year of data and plot monthly energy consumption to compare heating degree days & cooling & look for anomalies*
 - www.degreedays.net/
- Free tools

*from SEDAC

ComEd Business Energy Analyzer (BEA)

- Your actual energy usage data
- BEA pinpoints high use periods
- Suggests efficiency solutions
- Compare to your previous years or to others
- Need Smart Meter

ComEd Business Energy Analyzer (BEA)

Benchmark Analysis

od Benchmark Analysis for 4/7/2014 - 5/6/2014

EPA Portfolio Manager

- Energy performance
- Water efficiency
- Carbon emissions
- Minimal upkeep, can connect to utility
- Gives Energy Use
 Intensity (EUI) score
- Compare to property type, your portfolio, past & target performance, <u>The</u> <u>Sustainable Buildings</u> <u>Checklist</u>

Get started

Portfolio Manager DataTrends: Energy Use in K-12 Schools

 Short report based on Portfolio Manager data across the country.

	R	ange of Va	lues
Property Characteristic	5th percentile	Median	95th percentile
Square Feet	23,211	74,519	284,599
Computers per 1,000 ft ²	0.7	2.1	5.2
Walk-in Refrigeration Units per 1,000 ft ²	0.00	0.01	0.04
Cooking Facilities?		79% say yes	
High School?		19% say yet	(
Heating Degree Days	1,021	4,710	7,650
Cooling Degree Days	227	1,108	3,432

Benchmarking to Audit

- When reviewing utility information consider (leading to audit):
 - Current building operation
 - Energy end uses
 - Overall performance

Audit Energy Use

- Review current building use through benchmarking work
- Energy Audit
 - Internal: End-use estimates can be based on the following:*
 - Detailed measurements over time
 - Spot measurements with est. of run times on an annual basis
 - Detailed calculation or hourly simulations based on building drawings and specifications (calibrated model)
 - Assumption of typical end-use densities (<u>CBECS</u>, etc.)
 - <u>ENERGY STAR Treasure Hunt Guide: Simple Steps to Finding</u> <u>Energy Savings</u>: two- to three-day event that engages employees in identifying low-cost energy savings opportunities from behavioral, operational, and maintenance actions
 - Trade Ally
 - Free or low-cost audit through The Department
 - May provide roadmap

*from SEDAC

Building Systems: Remember 3 Parts

- Energized system
- Non-energized system
- Human system

ComEd Energy Insights Online

- Energy Insights Online monitors your electricity consumption via special recording meters and converts this data into simple, easy-to-understand usage graphs and reports that you can access online.
- Enhance energy data access & visibility with Green Button Connect My Data (GBC).

Determine Next Steps

• Create roadmap to guide your efficiency cycle

Efficiency Roadmap

- Consider:
 - Timing during the year
 - Financial analysis (tools on following slide)
 - Energy cost breakdown can provide some guidance
 - Focus on areas that show the most promise first (spend on natural gas vs. electric, large power draws show by software, metering or age/condition of equipment)
 - Balance with no cost/ low cost solutions
 - How to communicate to your business team
 - DOE resources
- Resources:
 - USGBC Green Schools <u>Roadmap to a Green Campus</u> <u>Guide</u>

Tools to Determine Next Steps

- <u>SEDAC's Economics Calculator</u>
 -->
- DOE <u>Cash Flow Opportunity</u> <u>Calculator</u>
 - How much new energy efficiency equipment can be purchased from the anticipated savings?
 - Should this equipment purchase be financed now or is it better to wait and use cash from a future budget? (avoid paying interest)
 - Will we lose money by waiting for a lower interest rate?
- SEDAC Audit to rank
 opportunities

Energy Project Economics Calculate	or -
	Required Fields
First Cost (\$)*	
Annual Savings (\$/year)*	
Discount Rate (%)	
Life of Measure (years) *	
Financing Interest Rate (%)	
Loan Period (years)	
Calculate	
Simple Pay Back (years)	
Internal Rate of Return (%)	
Net Present Value (\$)	

Free & Low-Cost Options

No-Cost Energy Cost Reduction Measures (ENERGY STAR®)

- Adjust thermostats when space is unoccupied.
- Turn off lights when rooms are not occupied.
- Take advantage of winter daylight by leaving window blinds open.
- Disconnect unnecessary or unused equipment.

Low-Cost Energy Cost Reduction Measures

- Install programmable thermostats.
- Install occupancy sensors.
- Replace incandescent light bulbs with LEDs or CFLs.
- Install awnings, window shades, or window films to keep out the summer sun and lower airconditioning costs.
- Purchase ENERGY STAR office equipment that you can take with you if you move to another location.
- Caulk and weather-strip windows and doors.
- Fix leaky faucets and toilets to conserve water.

Sustainability Metrics

Thinking more efficiently: Knowing your metrics can help you make informed decisions and tell your efficiency story!

Water

- Back to <u>Portfolio Manager</u>
- Colorado Waterwise <u>Water Conservation</u>
 <u>Assessment Toolkit</u>
- Learning Gate Community School case study & water conservation toolkit

Waste & Recycling

- EPA Waste Reduction Model (WARM) →Waste Reduction Model (WARM) to help solid waste planners and organizations track and voluntarily report greenhouse gas (GHG) emissions reductions from several different waste management practices
- The Food Waste Management <u>Calculator</u> estimates the cost competitiveness of alternatives to food waste disposal, including source reduction, donation, composting, & recycling of yellow grease.
- EPA Food Recovery Challenge
- EPA Food Waste Assessment Guidebook
- <u>EPA Food and Packaging Waste Prevention</u> <u>Tool</u> automatically creates graphs & data summaries to identify patterns of waste (2 wks min., .xlsm which is an Excel format with Macros enabled.)

		Baselin	e Scenario		
Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Generated
Aluminum Cans				N/A	0
Aluminum Ingot				N/A	0
Steel Cans				N/A	0
Copper Wire				N/A	0
Glass				N/A	0
HDPE				N/A	0
LDPE	N/A			N/A	0
PET				N/A	0
LLDPE	N/A			N/A	0
РР	N/A			N/A	0
PS	N/A			N/A	0
PVC	N/A			N/A	0
PLA	N/A				0
Corrugated				N/A	0

Steps 1 and 2. Baseline and Alternative Scenarios

Carbon Footprint - Power Pofiler

- EPA Power Profiler
 estimates emissions
 from electricity use
- Enter your ZIP code & electric utility to:
 - Compare the fuel mix & air emissions rates of your region's electricity
 - Determine the air emissions impacts of your electricity use

EPA - Greenhouse Gas Equivalencies Calculator

- KWh
- Therms
- Gallons gasoline
- Passenger vehicles into

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

Greenhouse gas emissions from

0.69 Metric Tons

Funding

The Department of Commerce & Economic Opportunity's Illinois Energy Now program is a portfolio of electric and natural gas efficiency programs administered by the State that includes incentives and services to save energy.

Illinois Department of Commerce & Economic Opportunity Bruce Rauner, Governor

A word from our lawyers...

- We are still awaiting confirmation about whether the following programs will be available in this or coming years.
- Please use this information as a guideline (rather than a guarantee) for what may be available in the future.

Snapshot of Energy Efficiency Programs for Schools:

- Trade Allies
- Standard & Custom Incentives
- New Construction
- Retro-Commissioning
- Natural Gas Boiler System Efficiency
- Combined Heat and Power
- Data Center
- Savings Through Efficient Products

Trade Ally Program

- Connects schools and other public facilities with qualified contractors and suppliers (e.g., mechanical and lighting contractors, engineers, architects, energy service companies, wholesalers, distributors, and retailers) who are familiar with state incentives and programs.
- Trade allies help schools navigate the system and ensure maximum incentives.

Standard Rebates

The Standard Incentive Program provides set incentive (\$/product) levels for common retrofits for:

- Lighting
- HVAC
- Variable Speed Drives
- Demand-Controlled
 Ventilation
- Water Heaters
- LED Traffic Signals
- Kitchen Equipment

Custom Rebates

Incentives (\$/kWh or \$/therm) for approved energy efficiency improvements not listed in the Standard Incentive Program.

- \$0.12 per kWh reduced for electric savings
- \$2.50 per therm reduced for natural gas savings.

How to Apply

- Public entities can submit a Pre-Approval Application which will estimate the incentive level.
- For program guidelines, application forms and equipment specifications please download the <u>2015-2016 Public Sector</u> <u>Standard and Custom Incentive Program Guidelines and</u> <u>Application Forms</u>.
- This school year's applications were accepted on a rolling basis until April 1, 2016. A new year begins June 1, 2016.

Retro-Commissioning

- Provides funding to identify and implement low cost tune-ups and adjustments that improve the efficiency of existing public buildings' operating systems.
- Returns them to intended operation or design specifications, with a focus on building controls and HVAC systems.
- Delivered through a network of commissioning providers that have been trained in program protocols and participation processes.

Natural Gas Boiler System Efficiency

- Provides cash incentives to encourage the owners of natural gas boilers to invest in a Boiler Tune-Up conducted by a qualified contractor.
- Up to 6% efficiency gain (expected pay back: 6 months).
- Incentives include:
 - Boiler Tune-Up
 - Pipe Insulation new/repair
 - Steam Trap new/repair
 - Boiler Reset Controls
 - Parallel Positioning Control System

Data Center

- Schools with server closets or data centers can receive a free engineer walk-through audit and consultation
- Receive assistance applying for custom incentives
 - \$0.12/kWh saved

Savings Through Efficient Products (STEP)

- STEP offers qualified public facilities free, high quality, energy saving products.
- Participation Process
 - Schedule and participate in a free onsite facility walkthrough assessment to gather product counts
 - Install the free products shipped to your facility within three months of delivery and begin saving energy, money and maintenance time
 - Complete the Installation Verification Form detailing where products were installed
 - Discover additional incentives, rebates, programs and educational opportunities available in Illinois via a customized report

Savings Through Efficient Products (STEP)

FACTS

- GOALS Reduce energy use
- **PROCESS** Free & simple process:
 - Participate in walkthrough
 - Free plug-and-play products provided
 - Install products
 - Receive savings report with more opportunities
- TARGET Public facilities
- FUNDING Dep't Commerce
- WEB illinoisSTEP.org

STATS

- 500+ facilities
- Provided
 28,000+
 products to
 public facilities

Savings Through Efficient Products

STEP: Savings Through Efficient Products

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Step 1. Recruitment – Trade Allies

Step 1. Recruitment – Direct Mail

Step 2. Administer wait list

Savings Through Efficient Products Partnering with Public Facilities to Reduce Energy Use
Wait List Form We have completed STEP walkthrought for this program year. Please fill suit this form to add your Itenas public facility to the 2014 wait list. Facility Type
Facility Name(x) Primary Address
City

Step 3. Engineer-led walkthrough

Step 3. Engineer-led walkthrough

Facility Type	
Facility Name(s)	
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Step 4. Ship products

DOED ILLINOIS ENERGY NOW

Dear Illinois Public Facility,

Welcome to Savings Through Efficient I programal The Illinois Department of Co to partner with you in the coming month additional ways to enhance your facility

A STEP representative will be reaching o point in the process you have questions information below.

Everything you need to get started is in outlining the products you have received instructions for the self-installation verifi an order confirmation outlining the proreturning any extra, incorrect, or damag Energy Efficiency Alkance (MEEA).

Timeline: Your facility will have three m and one month thereafter to complete

Self-verification process: The self-verifi success of our program. 1) Once all rec attached verification form with the local of installed product to the self-verification

Learn more about Illinois Energy Now's

Best Regards. athin

Catherine Krasner, Senior Program Assoc Midwest Energy Efficiency Alliance step@mwallance.org

DOED ILLINOIS ENERGY NOW Savings Through Efficient Products

STEP Product Installation Tips & Tricks

AFRATORS 6

- 1. Unscrew the old service by hand, using pliers or a wrench if necessary. Avoid damaging the delicate threads by unscessing gently.
- 2. If supplied, put the rubber washer inside the end of the aerator and screw it into the fauset by hand. 3. Run water to test the seal. If any water leaks, tighten by hand or use pliers inote: to protect the aerator, put a cloth around it before tightening with any tools. Take care not to over-tighten the aerator).
- PRO TIP 1 STEP aerators are duel-throaded, which means they can fit faucets with either "female" or "male" threading. To partich from one to the other, simply remove the internal foam gasket from the aerator and screw it into place.
- ÷. PRO TIP 2: If the serator does not fit, compare the faucet's diameter to a quarter and a nickel. If it matches the quarter, request the standard size. If it matches the nickel, request a junior aerator.
- PRO TIP 3: STEP also offers "Chicago-style" aerators. Tamper-proof Chicago aerators come with a key needed for installation; keep the key in a safe place for future needs.

COMPACT FLUORESCENT LIGHTBULBS (CFLs)

- 1. Gently unscrew the old lightbulb by hand and dispose as appropriate
- 2. Initial the CFL just as you would an incardescent bulb. Remove the CFL from its package and screw it into the light socket in a clock-wise direction.
- 3. If any CPLs break in the process, follow the EPA's recommended steps for safe clean-up here: http://www7.epa.gov/cfl/cleaning-broken-cfl.
- PBO TIP I: STEP CFLs are not dimmable; do not attempt to install them in a dimmable socket.
- PRO TIP 2: STEP CPLs use only 13 watts each and have a similar brightness to 60-watt incandescent bulbs lapprox, 900 kamenal
- PRO TIP & STEP CFLs do not perform as well in cold weather; they are recommended for indoor use only.

EXIT SIGNS

- Follow the manufacturer's instructions to install new LED exit signs or retrofit kits. PRO TIP 1: New LCD exit signs are customizable; the directional arrow plates can be easily removed and
- reinserted
- PRO TIP 2. The LED retrofit kits feature an easy-to-install har of LEDs on a circuit board, hardwire the heard to the sign (note: there are no pins involved).

Please the the page for more tips?

www.lienergynow.org

MEEA

Step 5. Facility staff self-installs products

Step 6. Collect photos of installed products

Step 7. Issue facility reports & certificates

Savings Through Efficient Products		
Certificate of Achievement		
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	FACILITY REPORT &	
	RECOMMENDATIONS	

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Case Study – Elementary & Middle School District

District Blitz

STATS

- GOALS Address incandescent exit signs & occupancy sensors in restrooms & offices
- ABOUT Scheduled all walkthroughs in a row
- PRODUCTS 49 occupancy sensors, 370 new LED exit signs, aerators & vending machine controls

- 28 facilities
- 390,000 kWh est. annual savings
- 11,000 therms est. annual savings

facilities

Case Study – Elementary & Middle School District

SALAN AND SHARE SHARE AND SHARE AND

Case Study – Small School District

Small District

STATS

- GOALS Provide all qualified products to facilities
- ABOUT Walkthrough of K-12 facility
- PRODUCTS 25 occupancy sensors, 32 LED exit sign retrofit kits, 6 aerators & 1 vending machine control

- 1 facility
- 26,675 kWh est. annual savings
- 530 therms est. annual savings

facility

Case Study – Small School District

www.ilenergynow.org

Other Funding Sources

Illinois Utility Programs

NORTH SHORE GAS"

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Other Sources of Funding & Assistance

- Illinois Clean Energy Community Foundation (ICECF)
- Illinois Association of County Board Members (IACBM)
 - free application assistance to Public Sector
- Metropolitan Mayors Caucus (MMC)
 - direct incentives and help with purchasing.
- DSIREUSA.org
 - website listing all known energy programs by state
- Performance Contracting
 - innovative arrangement for designing, installing and financing energy improvement projects where the savings achieved by the project are guaranteed to amortize the cost of the project over the term of the agreement. <u>More info and help online</u>.
 - USGBC Resource: Paid-From-Savings Guide to Green Existing Buildings <u>Download</u>

Resources

Information Resources

Alliance to Save Energy

- PowerSave Schools (Link)

EPA ENERGY STAR

- ENERGY STAR Score (Link)
- K-12 Building Upgrade Manual (Link)

Department of Energy

- Commercial Buildings Resource Database:
 - Financing Energy Upgrades for K-12 School Districts (Link)
 - Advanced Energy Retrofit Guide for K-12 Schools (Link)
 - Advanced Energy Design Guide for K-12 Schools (Link)
 - Achieving 50% Energy Savings in New Schools (Link)

Recognition

Green Ribbon Schools

- Each authority is permitted as many as five nominations. Learn how to nominate online.
- Criteria:
 - Reduced Environmental Impact and Costs
 - Improved Health and Wellness
 - Effective Environmental and Sustainability Education

ENERGY STAR

- Depending on your achievement levels, you can apply for recognition for your building or your organization. <u>Learn more.</u>
 - 20-percent recognition through the ENERGY STAR National Building Competition
 - ENERGY STAR certification for your building
 - ENERGY STAR Partner of the Year Award for your organization

Illinois Governor's Sustainability Awards

- Recognizes an elite group of leaders reducing environmental impact, contributing to the growth of a more sustainable Illinois economy.
- Applications for the <u>2016 Illinois Governor's Sustainability Award</u> are now being accepted!

Education

Student Research Examples

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 Palos South Middle School Students do EE research & present ideas for EE improvements as part of their 8th grade capstone.

 <u>*Sacramento School District</u> featured 15 student teams guided by teachers to audit their school & find solutions. They then presented to community experts determining improvements.

- *The <u>Academy for Global Citizenship</u> in Chicago uses their school as an extended classroom & taps in to out of classroom staff expertise to help students connect with their building as a system.
 - *Featured: The Center for Green School<u>'s The Whole-</u> School Sustainability Framework

Behavior Change

- Powering Down is a USGBC National guide to Behavior-Based Energy Conservation in schools that was developed by a <u>Resource Manager</u>
 - Report examines 5 public schools & finds they reduce electricity use by 20-37% through behavior change.

Environmental or Green Clubs

- You can use a student club or parent green team to help with your material & benchmarking use studies or for stakeholder surveys as well as to increase buy-in & create educational opportunity.
- Resources:
 - Chicago Conservation Corps: environmental service club for 6th-12th grade CPS students
 - Great resources for any club or classroom: <u>http://chicagoconservationcorps.org/club-network-resources/</u>

Lights for Learning

Presentation feature age-appropriate information about electricity, energy efficiency, peak/off peak time, load shifting, & energy conservation. These presentations can be offered at school-wide assemblies or to individual classrooms or clubs.

Saving Energy Through Education and Fundraising

ComEd Education Programs

Field Trips

Take an interactive field trip to ComEd's Discovery Lab in Rockford or the Smart Energy Hub in Chicago's Bridgeport neighborhood.

School Visits & Career Fairs

A ComEd engineer can visit your classroom or school for presentations on energy, safety, technology and more.

\$10,000 Earth Month Challenge

Elementary school students learn about energy management and compete for cash and prizes. Apply for the next Challenge!

Super Savers

Super Savers help educate students and their families

Examples of Engagement through <u>Contests</u>

Lights for Learning WINNING STUDENT POSTER (2015)

Lights for Learning WINNING STUDENT VIDEO (2015)

We CAN do something

++ () 0.28/101

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