# WELCOME!

# TO THE COMMUNITY CONVERSATION ON ENERGY CONSERVATION

October 20, 2015





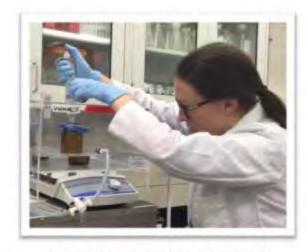
# MADHU KHANNA, ASSOCIATE DIRECTOR FOR EDUCATION AND OUTREACH



# **EVAN DELUCIA**, ISEE DIRECTOR



# ABOUT ISEE



**ACTIONABLE RESEARCH** 



**CAMPUS SUSTAINABILITY** 



**EDUCATION & OUTREACH** 







# Teaming to Use Sustainability to Drive Economic Growth



# PRAIRIE RESEARCH INSTITUTE

Mark Ryan
Executive Director

Geoff Levin
Natural History Survey

Tom Emerson State Archaeological Survey

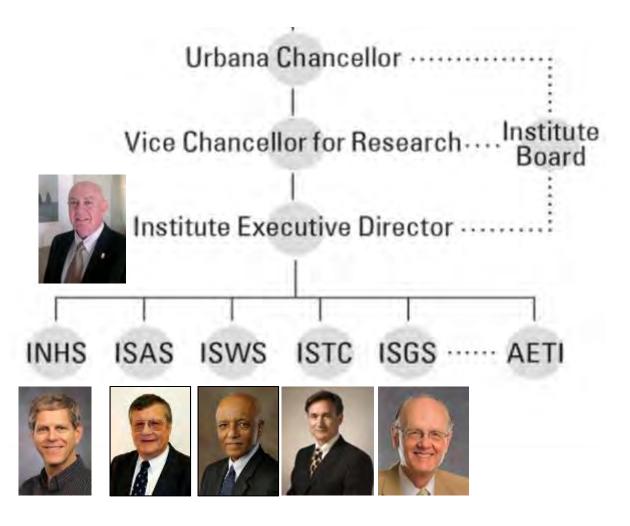
Mike Demissie State Water Survey

Kevin O'Brien
Sustainable Technology Center

Dick Berg
State Geological Survey

Steve Whittaker

Advanced Energy Technology Initiative







# Prairie Research Institute: Illinois-focused Resource Research and Service

Addressing societal challenges that impact Illinois and the global community

















# Illinois Sustainable Technology Center

Interface between Illinois natural resources and Illinois industry









# **Sustainability and The Triple Bottom Line**

Actions must account for impact on planet and people as well as profit



**Triple Bottom Line** 

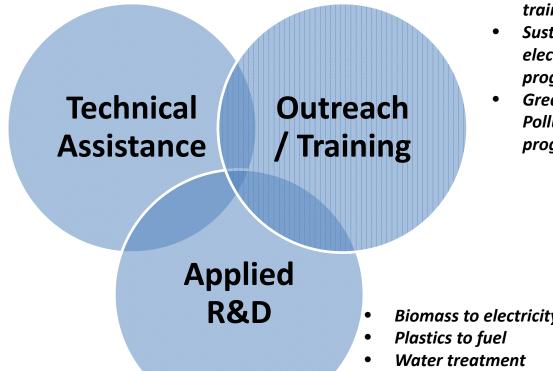




# **ISTC: Driving Economic Growth Through Sustainability**

Catalyze job growth, improve quality of life, while preserving natural resources

- Reduced operational & maintenance costs
- Pollution prevention
- Industrial "best practices" in sustainability



- Energy efficiency training
- Sustainable electronics programs
- **Great Lakes Pollution Prevention** program

Biomass to electricity

*Indoor health and safety* 

#### **ISTC Product**

#### Service we provide to Illinois

- Curator's of Illinois' sustainability knowledge base and skill in using information to drive economic growth.
- Services include:
  - Identify major themes that impact people, planet, and profit
  - Bring together relevant stakeholders for projects built around these themes and manage the subsequent projects
  - Resolve issues at the local, regional, state, and national level that act as barriers to the successful implementation of these issues
  - Barriers we address include one of more of the following needs:
    - Technology
    - Funding
    - Education / outreach
    - Training

#### **Sustainability Can Drive Economic Growth**

# **PROJECT PORTFOLIO**

# **Checklist for Potential Projects**

Tool for engaging PRI / ISTC in economic development activities

Regional Aspects / Needs	Model Project	Potential Impact
Manufacturers / Municipalities / Transportation Facilities	Zero Waste	Reduce costs; enable expansion; facilitate Green Enterprise Zone
Former industrial / mining site and /or waterway / lake	Mud to Parks	Aids in re-development of site; Restore aquatic habitat; enable commerce; reduce costs
Large industrial users / municipalities	One Billion Gallon Challenge	Reduce water costs through demand reduction and T&D loss reduction
Financial Institutes / Manufacturers / Education	Green Office Challenge	Reduce overhead costs; step in qualifying thru Illinois Green Business Association
Manufacturers	E3 Assessments	Reduce costs & improve revenue through process analysis
Agricultural industry / Saline sources	Marine Aquaculture	Promotes local sourcing of foods; creates rural Jobs
Waste water treatment facilities / local biomass	Distributed Generation	Combined heat and power to reduce operating costs; uses local biomass
Residential contractors / low income residents	Energy Savings / Indoor Air Quality	Enhance quality of life for residents

#### **Enhancing Indoor Health and Energy Efficiency**

**Providing service to low income residents** 

National weatherization evaluation project – energy savings and indoor air quality







One of only 15 centers accredited in the US for this service

#### **Profile of Residents**

- Low incomes families (e.g. < \$4,000 / mo. Gross Income Annually for four person family)
- Includes unemployed and retirees
- Issues with no furnace, poor furnace, poor ventilation

#### **Solution**

- Train 60 people annually to inspect and perform work
- Provide nearly 7,000 hours of training annually

#### **Impact**

- Service 300 homes per year
- On average provide \$5,500 in labor and materials per home
- On average 18% savings in fuel charges
- Improved comfort, health, and safety
- Savings contributes to healthier life style

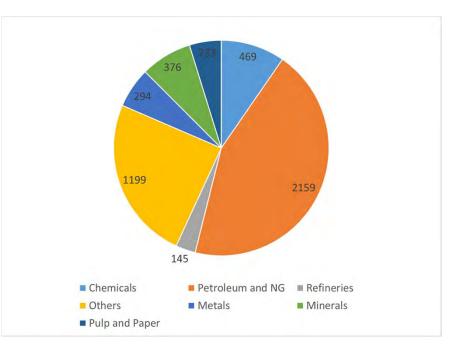
### **Reducing Emissions from Manufacturing Facilities**

Need for energy efficiency and improved process control systems



# 103 150 Chemicals Petroleum and NG Refineries Others Metals Minerals

#### **Facilities**



4,875 facilities account for 812 MMT CO2e in the USA in 2013.

From: EPA 2013 Greenhouse Gas Emissions from Large Facilities <a href="http://ghgdata.epa.gov/ghgp/main.do">http://ghgdata.epa.gov/ghgp/main.do</a>

# Illinois Governor's Sustainability Award

Recognizing sustainability related achievements of organizations and communities

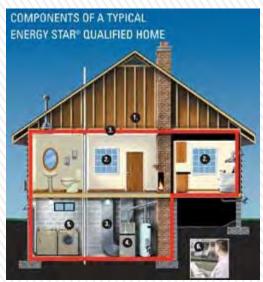






- » Certified Single Family Residences
- » Certified Commercial Buildings







# Three Parts

- » New
- » Existing



# ENERGY STAR Buildings



# DESIGNED TO EARN THE ENERGY STAR

The estimated energy use for this design meets strict U.S. EPA ENERGY STAR® criteria. Post-construction verification is required to earn ENERGY STAR certification.

www.energystar.gov

# ENERGY STAR New

Buildings





# ENERGY STAR

# Existing Buildings





# ENERGY STAR

Portfolio Manager





# ENERGY STAR Buildings

# » Friendly Competition

- > Benchmark
- > Track
- > Improve
- > Certify
- » Utilizes EPA's free ENERGY STAR Portfolio Manager used by 267,000 commercial buildings nationwide

# U-C ENERGY STAR

# Challenge



# U-C ENERGY STAR

# Challenge















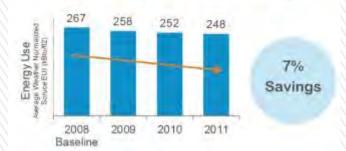
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN





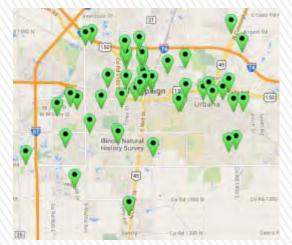


#### Energy Savings in Portfolio Manager









Why



# ucenergychallenge.com >28

# **Ameren Illinois Energy Efficiency Programs**

Tuesday, October 20, 2015

John Beintema, LEED® Green Associate Market Segment Coordinator Leidos Engineering, LLC



#### Ameren Illinois Energy Efficiency Programs

Provide cash incentives to help cover a portion of the cost of energy efficiency projects – which in turn helps save money on future utility bills.

- Program started in June 2008
  - State mandated program –
     Rate Relief Act (SB 1592 passed in 2007) by Illinois Legislature
  - Program Year 8
     (June 1, 2015 to May 31, 2016)





### Who Qualifies for Ameren Illinois Energy Efficiency Programs?



- •Ameren Illinois Electric and/or Gas Business Customers (those paying into the program)
  - •Funded by Ameren Illinois Business Customers
  - •Rider charge on monthly gas and/or electric bills
- Commercial Businesses, Non-Profits, and Private Schools

Ameren Illinois Service Territory



# Ameren Illinois Energy Efficiency Achievements

Since 2008, Ameren Illinois Energy Efficiency programs have helped thousands of businesses:

#### > Offset Project Costs

Over \$70 million dollars in cash incentives for Illinois businesses



# > Reduce Energy Costs

Over \$265 million dollars in energy savings for Illinois businesses







### Incentives



















#### Two Types of Incentives

- Standard or Prescriptive predetermined incentive
- Custom anything not Standard (1 10 year payback)

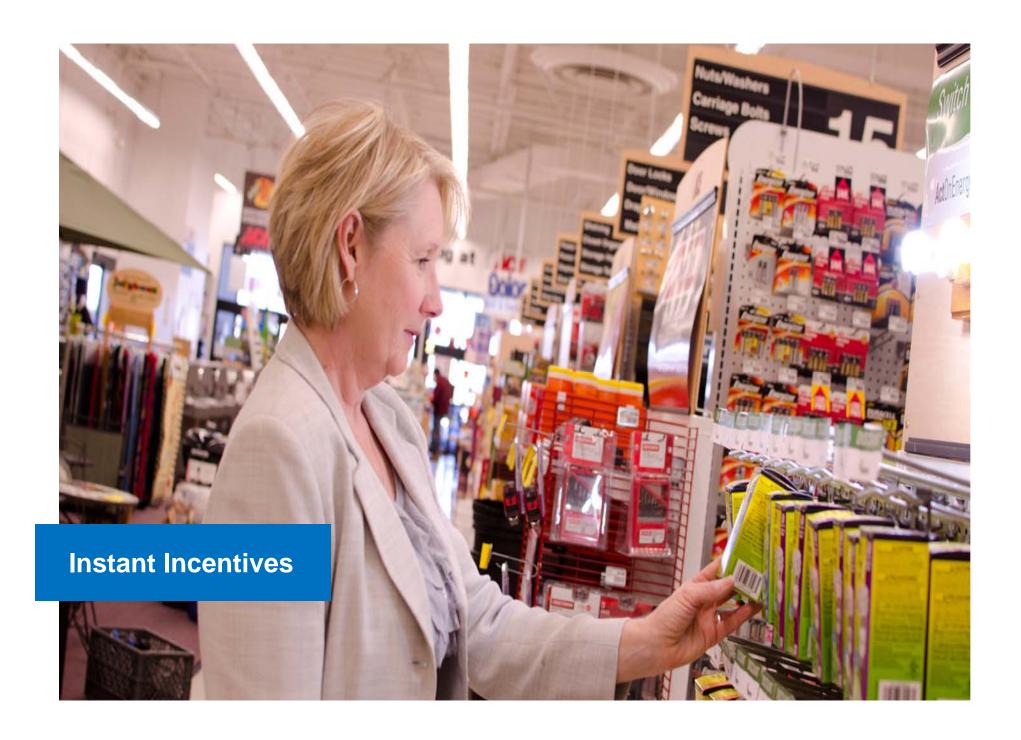
#### Pre-Approval

- Under \$10,000 incentive NO
- Over \$10,000 incentive YES

#### **AND**

 All Custom, Retro-Commissioning and New Construction Projects require pre-approval







#### **Instant Incentives**

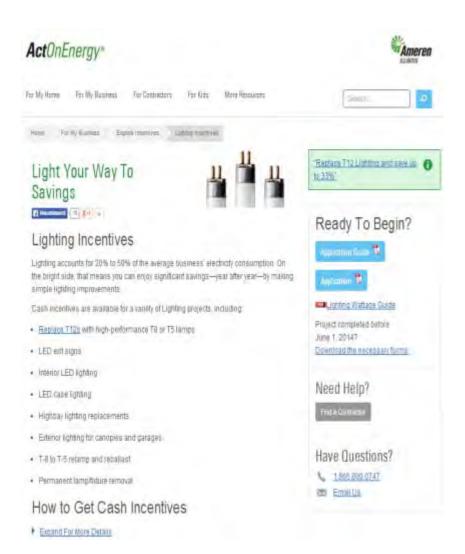
- No lengthy participant application
- Instant discount at point of purchase Participating Distributors
- Includes CFLs, LEDs, Linear Tube (T8), & some occupancy sensors
- Customer eligibility remains the same
- Product eligibility remains the same
- No purchase limits, though only available until funds run out
- Up to 80% off retail pricing
- ActOnEnergy.com, click on Instant Incentives or check out our On-line Store





### ActOnEnergy.com

- Website always has the most upto-date information
- Find applications, application guides, and other necessary forms
- On-line Store
- Review how-to videos, case studies, and other educational content









For My Home

For My Business

For Contractors For Kids

More Resources

Search Site Go

#### Program Allies Are Here To Help





#### Find a Contractor who is an ActOnEnergy® Program Ally

Searching for a contractor to help with your energy efficiency improvements?

Our ActOnEnergy® Program Ally database makes it easy to find a qualified contractor in your area. This database allows you to search for Program Allies by geographic region or type of service. Program Allies are contractors who have registered with ActOnEnergy and receive training and updates on our programs. These Program Allies will help you find the best solution for your energy efficiency needs.

Businesses participating in ActOnEnergy programs can also choose to install upgrades themselves or use other local contractors not registered with the ActOnEnergy business programs. However, because of their familiarity with the programs, Program Allies are well equipped to make your energy efficiency projects a success.

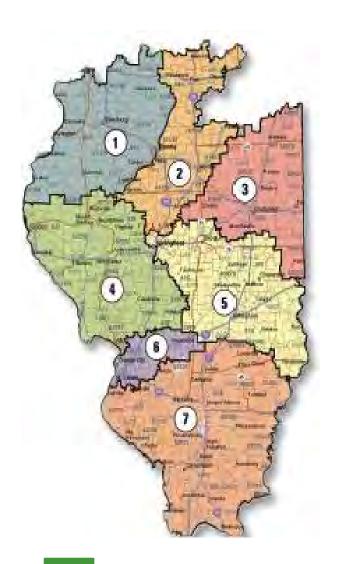


## **Program Allies**

- Contractors who have registered and receive training from ActOnEnergy.
- Familiar with application forms and processes.
- Help customers complete energy efficiency projects.
- Look for a Program Ally by visiting ActOnEnergy.com and click on "Find a Contractor"



# **Energy Advisors**



#### **Territory 3**

Rod Rhoads Rod.Rhoads@gdsassociates.com 217.649.8897



#### Champaign's Sustainability Initiative - Champaign Growing Greener



- City of Champaign set aside \$100,000 to make homes for energy efficient.
- City of Champaign will cover cost of Home Energy Audit
  - \$50 value
  - 20% bonus incentive to add attic and wall insulation
     & seal air and duct leaks
  - www.GreenChampaign.com
  - Must be a city of Champaign Resident

#### **Real Results**

- Terry, Champaign Resident
  - Home Audit by Ameren Illinois Energy Efficiency Program
  - Installed EE lighting and insulation attic and walls
  - Paid 20% project cost
  - Saving \$679 each year in energy costs



## **ILLINOIS ENERGY NOW**











### WHAT WE DO

# High School - Electricity Consumption 600,000 400,000 400,000 200,000 100,000 100,000 100,000 100,000 100,000 100,000 100,000 100,000 100,000 100,000

#### **SEDAC Free Services**

- Outreach and Training
- Energy Assistance and Assessments
- New Construction Design Assistance
- DCEO Program Support
- Retro-Commissioning (Public Sector)
- Pilot Projects—Dashboards, Mini-RCx







# MORE ILLINOIS ENERGY NOW SPECIAL PROGRAMS

- Energy Efficiency Aggregation Program
- Application Assistance
- Savings Through Efficient Products (STEP)
- Natural Gas Boiler System Program
- Combined Heat and Power
- Energy Performance Contracting
- Low Income Incentive Programs/PHA
- Lights for Learning
- Waste Water Treatment Facilities
- Trade Ally Program











#### OTHER FUNDING OPPORTUNITIES

- Non-EEPs Incentives IMEA for municipalities and coops
- Illinois Clean Energy Community Foundation (ICECF) programs for gov't buildings, non-profit community centers, and non-EEPs. Lighting, innovative energy, green buildings, design and commissioning, and more!
- Illinois State Board of Education (ISBE) Illinois School Board Association Energy Efficiency Grants. DCEO may provide matching grant up to \$250,000
- Illinois Association of County Board Members (IACBM) free application assistance to Public Sector
- Metropolitan Mayors Caucus (MMC) direct incentives and help with purchasing for local governments in the Chicago-area and collar counties
- Performance Contracting assistance with RFPs and contracting
- DSIREUSA.org website listing all known energy programs by state



# TOP TEN ENERGY STRATEGIES



#### Loads

- 1. Lighting
- 2. Plug Loads (computers, heaters)

#### Heating, Ventilating, & Air Conditioning

- 3. Ventilation (reduction, heat recovery)
- 4. Heating, Cooling (condensing boilers)
- 5. Motors & Pumps (VFDs, turn off)
- 6. Building Automation
- 7. Commissioning

#### **Building Envelope**

- 8. Air Sealing
- 9. Insulation (roof deck, walls unlikely)
- 10. Windows (likely very expensive)

#### **EXTRA CREDIT:**

After implementing all of these, consider renewables such as solar and wind.





# **ELEMENTARY SCHOOL**

#### What they did...

- Replaced existing boiler and chiller
- New windows
- Retrofit lighting
- Occupancy sensors
- Air sealing



Elementary School	
Building Type	K-5 School
Energy Measures	HVAC, lighting, windows, occ sensors, controls
Annual Energy Savings	\$16,933
Total DCEO Incentives	\$29,800
Total Project Cost	\$138,801
Payback	6.4 years



### **ELEMENTARY SCHOOL**



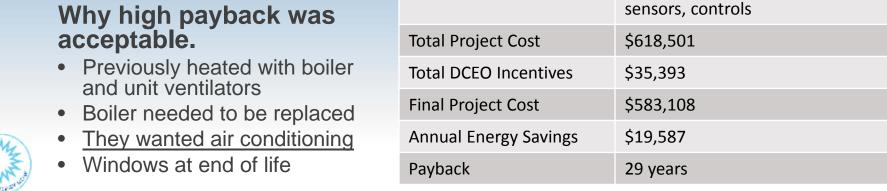
- **New Geothermal**
- **New windows**
- Retrofit lighting
- Occupancy sensors
- Air sealing (not completed yet)

K-5 School

HVAC, lighting, windows, occ

**Elementary School** 

# Why high payback was



**Energy Measures** 



# WALL TO ROOF JUNCTION AIR SEALING

#### PRE-RETROFIT



From SEDAC report

#### POST AIR SEALING



**Current condition** 



# CASE STUDY NEW CONSTRUCTION: RECREATION CENTER

Park District	
Building Type	Recreation Center
Energy Measures	Lighting, HVAC, envelope, DHW
Annual Energy Savings	\$10,643
Incremental Cost	\$57,152
Total DCEO Incentives	\$77,467
Simple Payback	5.3 years

#### What they did...

New 39,100 sf recreation center

- Increased roof and wall R-values
- Reduce lighting power density by almost 0.3 W/sf
- High Efficiency GSHP

#### What they got...

- Prescriptive Incentive for individual measures.
- They did not model the building due to costs constraints





# **THANK YOU**



# Illinois Energy Now | 1-800-214-7954 www.lLenergynow.org



http://smartenergy.illinois.edu/index.html



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# Renewable Energy



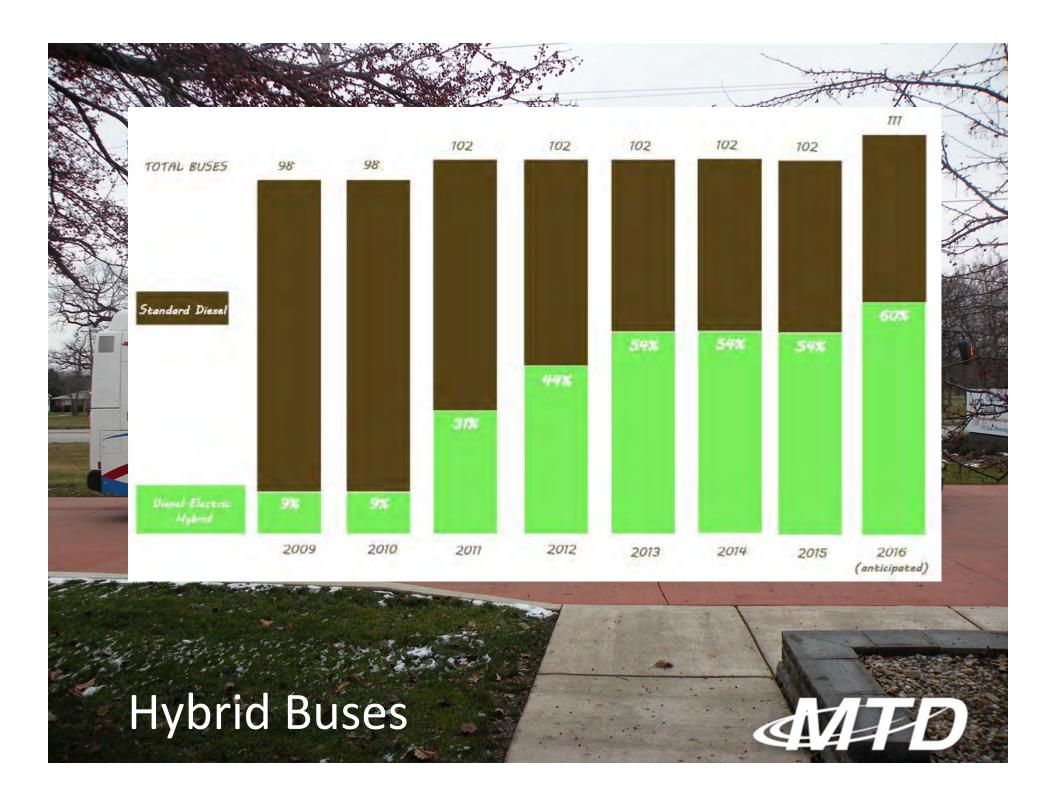






# **Energy Conservation**













# Participation & Recognition















# **Energy Efficiency: the**Business Case

# Why Invest in Energy Efficiency?

- Regulatory environment
- Legal issues
- Moralization of sustainability
- Meet customer/stakeholder demands
- Build customer/stakeholder value
- Improve profitability/reduce cost

# What we are doing:

- U of I is funding an number of energy conservation initiatives:
  - Retro-Commissioning
  - Energy Performance Contracting
  - Energy Efficiency
  - Retrofitting lighting fixtures to higher eff.
  - Wind/Solar

# The Business Case

- System cost Vs. Life Cycle cost
- Example:
  - Incandescent 60 W Light Bulb \$1.15 each
  - LED 60 W Equiv Light Bulb \$4.00 each
  - Electricity rate of \$0.08 per kilowatt-hour



# The Business Case

- But then...
- Don't LED's last longer than regular bulbs?



# LED Lightbulbs

- LED Lightbulb Cost \$4.00/Bulb
- Lifespan 18.3 Years
- Cost/Year 22 cents/year
- Annual Operating Costs \$1.03/Year
- Lifecycle cost (Bulb + 18.3 years operating cost)
- =\$22.85/bulb/Lifecycle + t

# Incandescent Bulbs

- Incandescent Cost per bulb \$1.15 ea
- Lifespan 1,000 hours (6 months) (2 bulbs per year)
- Cost per year \$2.30
- Annual Operating Costs (120Kwh @\$0.08/Kwh) = \$9.60/year
- Over the equivalent 18.3 years, lifecycle cost = [Bulb Cost+ Operating)]=\$218 +2\*18.3t
- Almost 10x the cost of LED's for the same fixture



## Serving Campus & Community



» Greatest Improvement of ENERGY STAR Score

University of Illinois Employees Credit Union – First Street Branch – From 6 to 14



Awards

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