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New Look! Business Officer Magazine More +

NACUBO National Association of College and University Business Officers

My NACUBO →

CONFERENCES & E-LEARNING ▾ TOPICS ▾ RESEARCH ▾ PUBLICATIONS ▾ ADVOCACY ▾ LEADERSHIP INITIATIVES ▾ MEMBERSHIP ▾ WHO WE ARE ▾

Home > Topics > Facilities & Environmental Compliance

Facilities and Environmental Compliance

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APPA/NACUBO Key Facilities Metrics Survey

Campus Environmental Resource Center (Campus ERC)

Facilities Sustainability Resources

Campus Efficiency Posters

Space and Energy Issues

Sustainability

Webinars/Podcasts on Campus Operations

Facilities Related Business Officer Magazine Articles

Resource Organizations

Glossary of Terms

Contact

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MODERNIZE CAMPUS ENERGY SYSTEMS
 LEARN MORE → **AMERESCO**

The National Association of College and University Business Officers (NACUBO) is a membership organization representing more than 1,900 colleges and universities across the country.

NACUBO specifically represents chief business and financial officers through advocacy efforts, community service, and professional development activities. The association's mission is to advance the economic viability, business practices and support for higher education institutions in fulfillment of their missions.

The collage features several covers of *BUSINESS OFFICER* magazine. The top left cover is titled "BALANCING ACT" and shows a person standing between a plus and minus sign. The top middle cover is titled "Transfer of Power" and shows a building. The top right cover is titled "Going for ZERO" and shows a wreath. The bottom left cover is titled "Pay It Forward" and shows a dandelion. The bottom right cover is titled "Resource Reshuffle" and shows a city map. A screenshot of the *BUSINESS OFFICER* website is also included, showing a "COVER STORY" section with a cityscape on a smartphone.

<https://www.businessofficermagazine.org>

- Energy Savings Contracts - Deferred maintenance
- Green Revolving Funds
- Power Purchase Agreements (PPA)
- Public Private Partnerships (P3)
- Leadership
- Net Zero, Water savings, Safety, and more!

The page is titled "Facilities Sustainability Resources" and is dated 4/06/2018. It features a grid of 12 circular icons representing different sustainability topics: Physical Assets (Buildings), Energy, Water, Food, Waste, Transportation, Landscape, Purchasing, General Operations, and Carbon Climate. Below the grid, there is a section for "Learn how to improve your sustainability efforts and gain insights on issues that pertain to a variety of topics including capital asset management and budgeting. Find out the right questions to ask and explore ideas your colleagues have incorporated."

NACUBO
www.nacubo.org/topics/

NACUBO CURRENT
November 29, 2017

Senate GOP Tax Plan Would Make Big Changes Beyond Higher Education [14]
The Senate GOP tax plan, which will be debated in the Senate later this week, contains numerous changes for nonprofits, corporations, and individuals alike.

Take Action on Tax Reform
Text ACTNOW to 52886 to join the movement to #protecting and ask lawmakers to fix the provisions that create new taxes that will raise operating costs or badly hurt the ability of nonprofits—including colleges and universities—to educate, teach, nourish, and serve our nation. You can also get involved here [14]

Perkins Loan Program Schools Must Report Cash on Hand by December 15
The Department of Education recently announced [15] schools participating in the program that they are to report amount of cash that was on hand and in depository as of October 31, 2017, in their Perkins Loan Reporting Fund. The reporting deadline is Friday, December 15.

There Is Still Time to Complete the Key Facilities Metrics Survey
Quickly gauge your campus' consumption with the 2016-17 NACUBO Key Facilities Metrics Survey [16]. The short questionnaire asks about basic key facilities metrics, and is open through Monday, December 18. Complete two of the five metrics to participate. View past results [16]

What Did I Miss in Washington? November 14-November 29, 2017 [17]
Read for a rundown of political developments NACUBO is following. In this edition: Net neutrality, financial responsibility rules, and more.

Leadership Lessons from the Merger Front [17]
Thursday, January 11, 2018 1:00 PM ET
Planning and implementing a successful merger can be a challenge. This webcast will cover how two nonprofit colleges explored and assessed the full spectrum of possible alliances, from shared facilities or services to a full asset merger. Hear their perspectives.

SPONSOR
The power of SWITCH futures
Using the gender gap + Bank of America
Renard Lynch

LEARN
Upcoming Events
• 2018 Facilities and Administrative Data - Local Campuses
January 29-30, 2018
• 2018 Enrollment and Data Management Forum [17]
February 7-9, 2018
More » [17]

Distance Learning
• Legislative Lunch and Learn
Washington, DC
NACUBO, December 12, 2017
Tuesday, December 12, 1:00 PM ET
More » [17]

Partner Programs
• Jan. External Board Governance
December 4-6, 2017
Orlando, FL
• Executive IT Summit [17]
March 7-9, 2018
Orlando, FL

[Home](#) > [Distance Learning](#) > [NACUBO Podcasts](#)

NACUBO PODCASTS

NACUBO is pleased to offer you audio programming through podcasts that you can listen to any time you want. Subscribe today and join your colleagues in this newly revitalized learning platform.



New episodes of [CBO Speaks](#) are available every two weeks.



New episodes of [NACUBO In Brief](#) are available every two weeks.

SO WHAT IS A PODCAST?

A podcast is essentially a radio show that you can get on the Internet.

HOW DO I LISTEN?

You have two options: you can listen to a podcast through a website like ours (this is called streaming). Or, you can download a podcast, which means you're saving it on your phone, or tablet, or computer, and you can listen to it anytime, even without an Internet connection.

Open to the World!

DISTANCE
LEARNING

41 Presenters on
CBO Speaks: the Role
of CBO/path/stories

24 Presenters on
NACUBO In Brief:
Knowledge sharing -
4 relating directly to sustainability



www.campuserc.org

KEY FACILITIES METRICS CONSUMPTION IMPORTANT



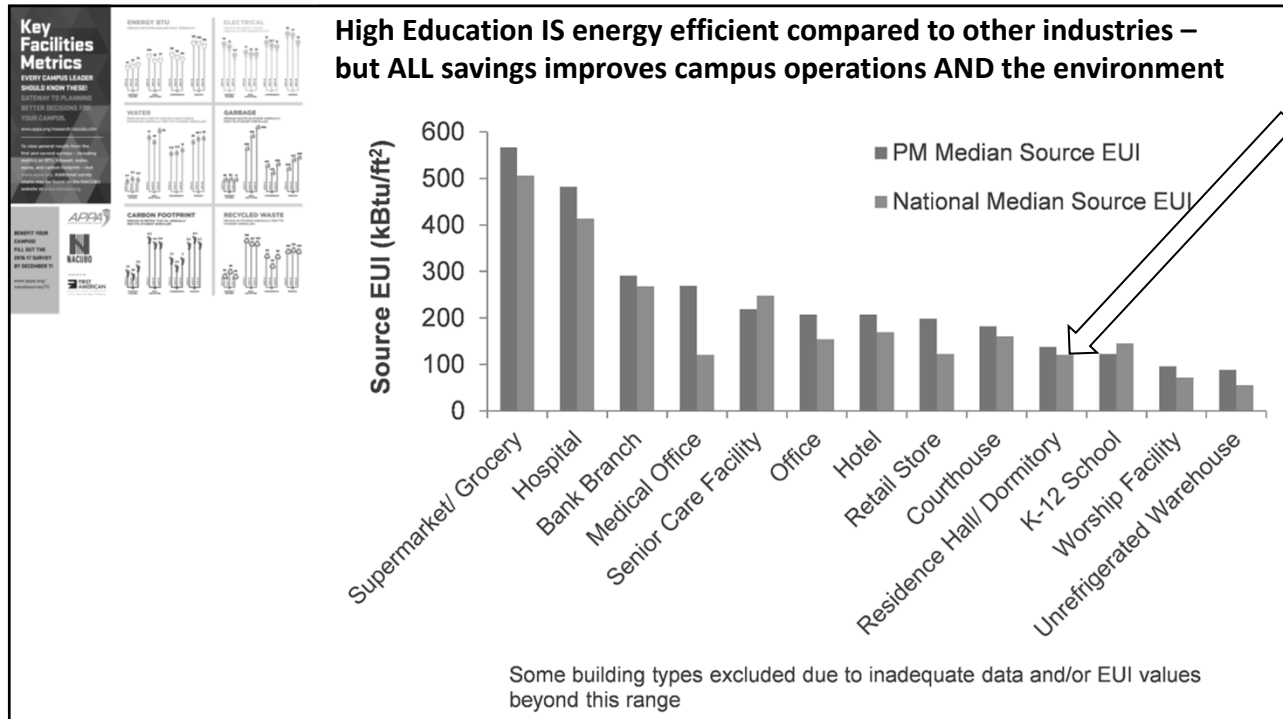
5 billion square feet



\$14 billion in operations/maintenance



\$6-7 billion annually on energy/utilities



Key Facilities Metrics
THAT EVERY BUSINESS OFFICER SHOULD KNOW
THE GATEWAY TO BETTER DECISION MAKING FOR YOUR CAMPUS
www.appa.org/research/nacubo.cfm

GATEWAY “SURVEY” TO START PLANNING AND LEAD TO OTHER ADVANCED SURVEYS THAT IMPROVE YOUR CAMPUS.

- **APPA Key Performance Indicator**
Customized reports based on facilities inventory, ownership costs, operations, management budget, customer satisfaction, staffing component
- **AASHE – STARS**
Academics, Engagement, Operations, Planning and Administration, Innovation
- **APPA/NACUBO Key Facilities Metric**
BTU, Electrical, Water, Waste (Garbage and Recycle) and Carbon



Facilities Performance Indicators (FPI) SURVEY AND REPORT

The APPA Facilities Performance Indicators Survey and Report Will:

- Define essential data points, vastly reducing the number of indicators you need to collect.
- Give you a framework with which to educate campus decision makers about critical asset management realities.
- Make the business case for your facilities' needs.
- Create a balanced performance scorecard based on critical data findings.
- Allow you the simplicity you need for data entry, and packages the data in a framework to help you tell your story.
- Give you the choice as to how much data you need to input.



www.appa.org/research/FPI/index.cfm

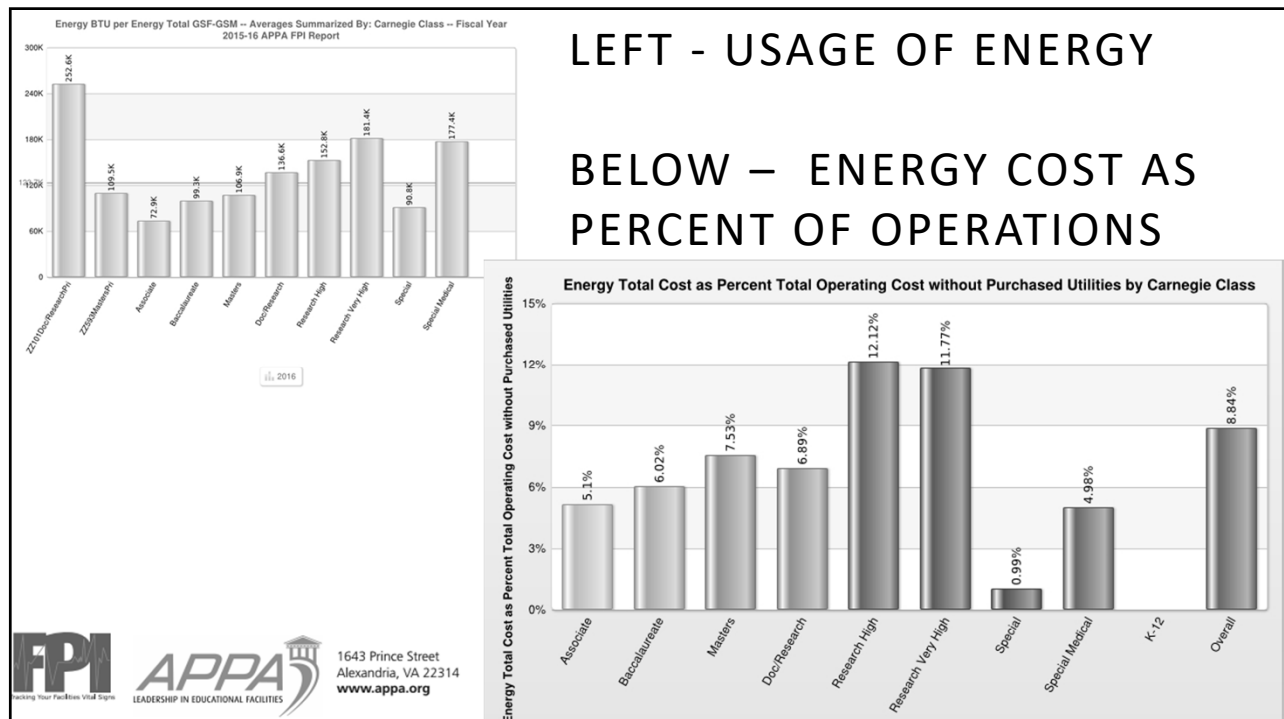





1643 Prince Street
Alexandria, VA 22314
www.appa.org

FPI documents inventory, square footage, ownership *and*;

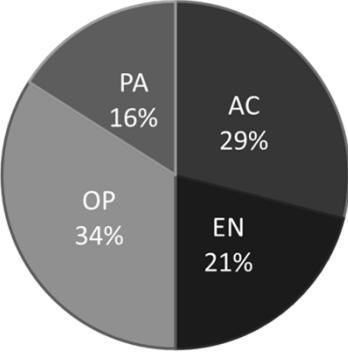
- Verify how efficiently facilities operates
- Facilities alignment with strategic directions/academic focus
- Facilities performance to peers
- Annual budget – verification of adequately funds
- Operating funds spent for desired outcomes
- Analysis of correct investment for existing buildings, infrastructure and academics
- Facilities staff development to sustain excellence
- Campus customer satisfaction with space and services



Sustainability Tracking, Assessment & Rating System (STARS)



STARS 2.0



Category	Percentage
AC	29%
EN	21%
PA	16%
OP	34%

STARS:
2.0 – 4 categories
Approx. 70 credits
Approx. 770 institutions


Academics (AC)

Engagement (EN)

Operations (OP)

Planning & Admin. (PA)

Innovation (IN)





Key Facilities Metrics

...that every business officer should know

www.appa.org/research/nacubo.cfm

SIMPLE KEY METRICS:

1. BTU ANOTHER TERM EUI/SQ FT ENERGY INTENSITY USE
2. KW - ELECTRIC
3. WATER
4. WASTE: RECYCLE/GARBAGE
5. CARBON FOOTPRINT

PER GROSS SQUARE FOOT AND PER SFTE

4TH YEAR RESULTS AVAILABLE WWW.NACUBO.ORG/KEYFACILITIESURVEY

NEXT SURVEY FOR 2017-18 OPEN NOW – CLOSING DEC 17, 2018



AGGREGATE RESULTS:

www.nacubo.org/KeyFacilitiesSurvey

Key Facilities Metrics

EVERY CAMPUS LEADER SHOULD KNOW THESE!
GATEWAY TO PLANNING BETTER DECISIONS FOR YOUR CAMPUS.

www.appa.org/research/nacubo.cfm

To view general results from four years of surveys - including metrics on BTU, kilowatt, water, waste, and carbon footprint - visit <https://www.nacubo.org/topics/facilities-and-environmental-compliance> and www.appa.org.

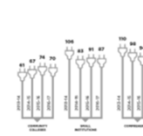
Benefit YOUR campus! Fill out the survey by December 17, 2018, for the 2017-18 academic year. Open to all!

www.appa.org/nacubosurvey18/



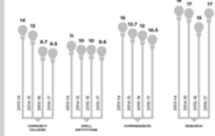
ENERGY BTU/EUI

MEDIAN KBTU/PER SQUARE FOOT ANNUALLY
EUI = ENERGY INTENSITY USE



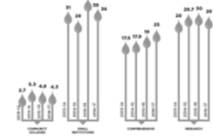
ELECTRICAL

MEDIAN KILOWATT-HOUR ANNUALLY PER SQUARE FOOT



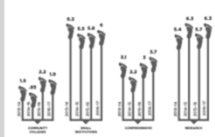
WATER

MEDIAN GALLONS OF USE ON A DAILY BASIS
ESTIMATED ANNUALLY PER FTE STUDENT ENROLLED



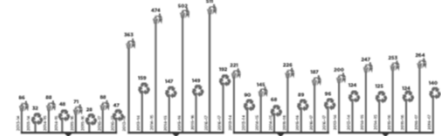
CARBON FOOTPRINT

MEDIAN METRIC TONS CO₂ ANNUALLY
PER FTE STUDENT ENROLLED



GARBAGE/ RECYCLED WASTE

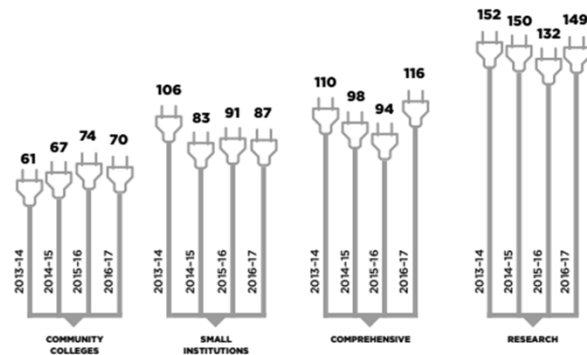
MEDIAN WASTE IN POUNDS ANNUALLY PER FTE STUDENT ENROLLED
MEDIAN IN POUNDS ANNUALLY PER FTE STUDENT ENROLLED



ENERGY BTU/EUI

MEDIAN KBTU/PER SQUARE FOOT ANNUALLY

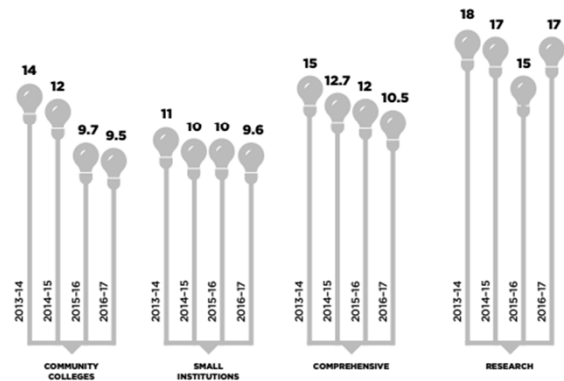
EUI = ENERGY INTENSITY USE



TRENDING - SAVINGS IN ENERGY AND ELECTRICAL- WHERE IS YOUR CAMPUS?

ELECTRICAL

MEDIAN KILOWATT-HOUR ANNUALLY PER SQUARE FOOT





Founded in 1889

660 acres 2.5M sq ft

8,400 students

- 115 kBTU/sq ft 2016-17
- 107 2015-16
- 112 2014-15

Significant Decrease in Electrical!

- 11 kw/ sq ft 2016-17
- 22 kw/sq ft 2015-16
- 32 kw/sq ft 2014-15

ESCO - Energy Savings Contract

\$19 M in 20 years + Rebates with \$1.1 M total annual savings

**\$12.3 Hard Costs includes-
(\$ 3.7 Removal of Deferred Maintenance)
Residential**

**\$ 6.2 M Hard Costs
(\$ 4.6 Removal of Deferred Maintenance)**

2018 SRU GUARANTEED ENERGY SAVINGS AGREEMENT DETAILS

Slippery Rock University of Pennsylvania
EXPERIENCE THE DIFFERENCE
www.SRU.edu
A member of Pennsylvania State System of Higher Education

UNIVERSITY PROGRAM				RESIDENTIAL SUITES PROGRAM			
Energy Savings Measures		Deferred Maintenance Measures		Energy Savings Measures		Deferred Maintenance Measures	
Energy Conservation Measure	Hard Costs	Annual Savings	Project	Hard Costs	Energy Conservation Measure	Hard Costs	Annual Savings
Central boiler plant improvements	\$ 1,580,212	\$ 199,596	Replace chillers	\$ 2,673,273	Fixture-based water conservation	\$ 370,209	\$ 66,375
Lighting retrofits	\$ 3,253,275	\$ 190,442	Central plant software	\$ 48,327	Install utility grade steam metering	\$ 91,682	\$ 66,670
Insulate bare steam/water piping systems	\$ 891,445	\$ 96,727	Windows in 3 buildings	\$ 456,653	Lighting retrofits	\$ 945,410	\$ 43,829
Water conservation	\$ 444,807	\$ 68,513	Replace natatorium AHUs	\$ 201,663	Install cooling tower blowdown meters	\$ 60,100	\$ 8,707
HVAC controls retro-commissioning	\$ 286,540	\$ 32,604	Boiler plant water softener	\$ 94,879	Seal building envelopes	\$ 31,184	\$ 3,660
Replace steam/condensate piping	\$ 918,993	\$ 29,087	Building meters	\$ 254,944	Repair mechanical insulation	\$ 129,440	\$ 14,910
Add kitchen hood controls	\$ 208,000	\$ 24,970			Deferred Maintenance Items	\$ 4,556,975	\$ 79,772
PC power management	\$ 36,405	\$ 21,989					
Replace condensate piping	\$ 518,561	\$ 19,391			Project Total and Summary	\$ 6,185,000	\$ 281,823
Add unoccupied HHW reset schedule	\$ 5,333	\$ 19,507				\$ 12,597	
Seal building envelopes	\$ 235,295	\$ 16,294					
Replace failed/old steam traps in buildings	\$ 111,125	\$ 13,466					
Ozone laundry system	\$ 31,920	\$ 10,020					
Add DVC to remaining auditoriums	\$ 39,280	\$ 5,700					
Add VFD on pool circulating pump	\$ 4,444	\$ 1,824					
Deferred Maintenance Items	\$ 3,759,739	\$ 52,861					
Project Total and Summary	\$12,325,374	\$ 882,641	Deferred Maintenance Total	\$ 3,759,739			
Rebates	\$ 134,652						

UNIVERSITY PROGRAM & RESIDENTIAL SUITES PROGRAM			
Energy Savings Measures		Deferred Maintenance Measures	
Energy Conservation Measure	Hard Costs	Annual Savings	Hard Cost
GRAND TOTAL	\$18,510,374	\$ 1,084,464	\$ 8,316,714
REBATES	\$ 147,249		

- 8 Residential Halls added monitoring devices
- **Student Green Fund Grant and WPPSEF Grant**
 - Programming/graphics/software/computer - approx. \$7,300 each
 - Students use as a competition
 - Serves as general info to advance culture, knowledge, and change behavior
 - Living Learning program component is more advanced from these

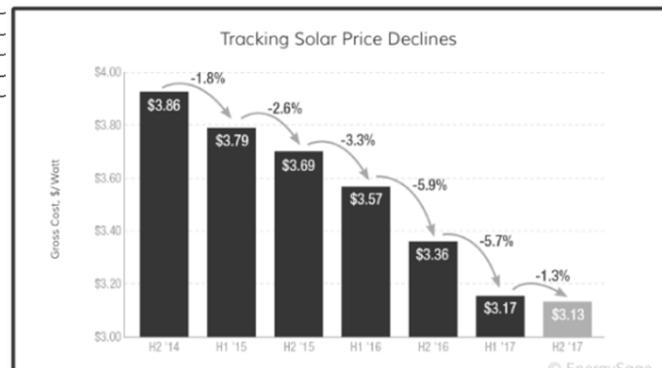
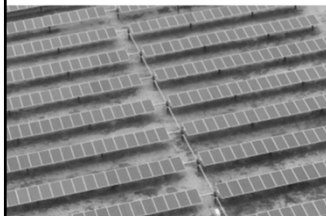


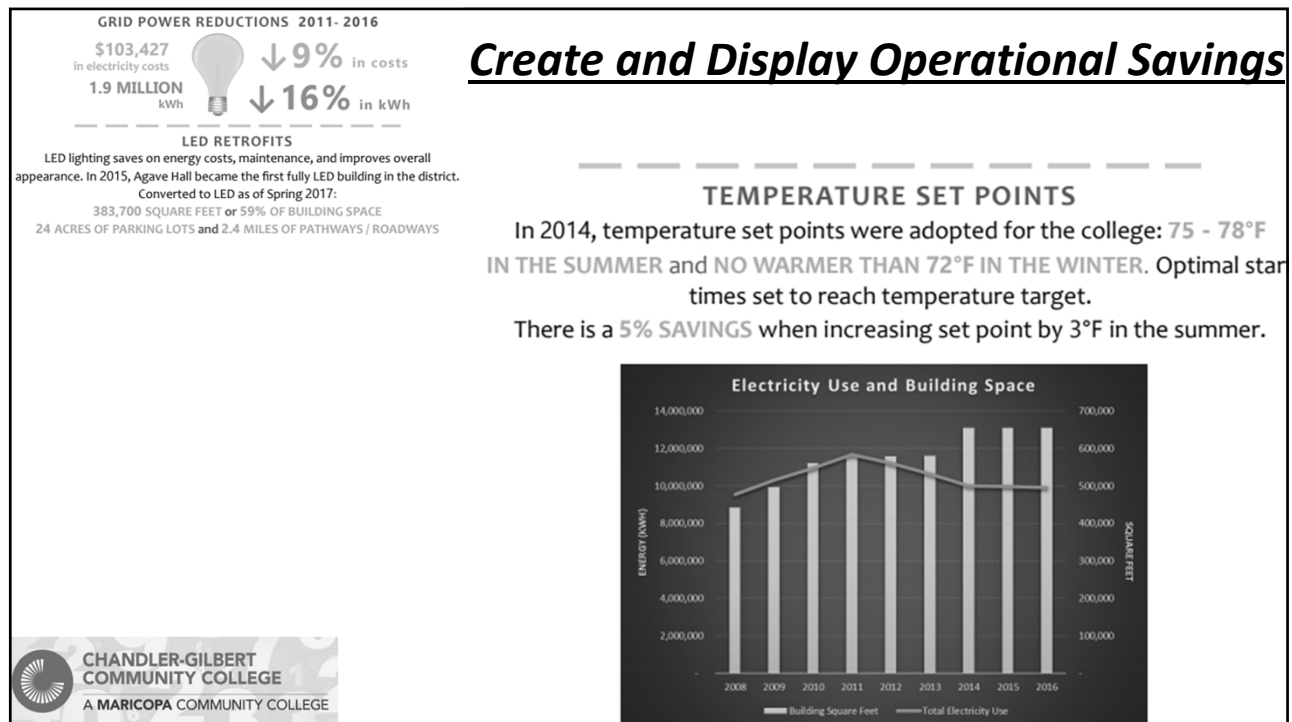
SlipperyRock
University™

Power Purchase Agreement_s

Three partners invested in a 20 year commitment – George Washington University (GW), American University (AU) and George Washington University Hospital created 52 megawatts in 243,000 solar panels on 450 acres offsite that in 2015 generated 21.8 MWh of renewable energy to GW alone.

	Metric tons of carbon dioxide eliminated per year	Equivalence to number of cars taken off the road per year	Equivalence to number of homes that could be powered per year
GW	42,000	8,800	5,700
AU	15,000	3,000	2,000
GWUH	3,000	700	500
TOTAL	60,000	12,500	8,200





Share the Renovation Success Story

- 33,423 Square Foot
- Recently completed major renovation replacing all lights to LED, updated air handling systems and printing press bought new energy efficiency equipment.

kwh Savings:

December 2016 30,400 kwh

December 2017 18, 940 kwh



Behavioral Changes

SHUT IT DOWN- WHEN NOT AROUND

- Prior to major holidays or breaks mass email forwarded to all faculty, staff, and students.
- Shut Down
 - Turn off lights
 - Empty refrigerators
 - Unplug all computers and any other phantom electrical usage
 - Turn down (or up) thermostats
- Changing campus culture
- Receiving positive comments!



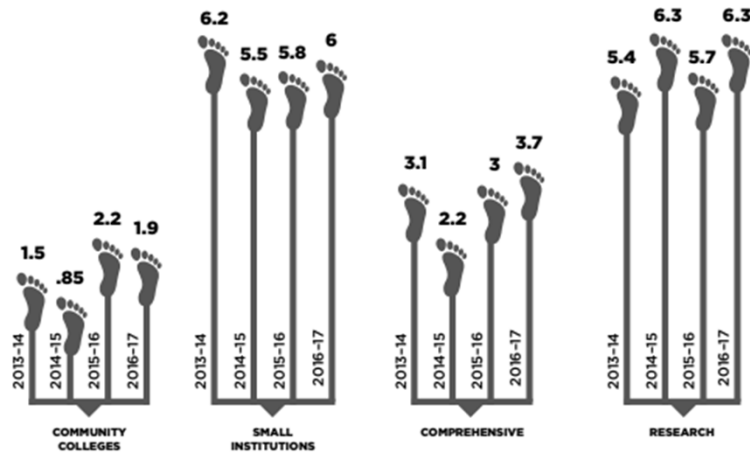
Behavioral Changes

GETTING FACULTY ONBOARD

- Operationally: long break times
- First week of December (finals – no labs) until start of labs second week in Jan.
- Move all chemicals from 64 fume hoods to 8 fume hoods saving thousands

CARBON FOOTPRINT

MEDIAN IN METRIC TON CO₂ ANNUALLY
PER FTE STUDENT ENROLLED



Create Meaningful Analogies

PERFORMANCE OF ENERGY EFFICIENCY UPGRADES AND UTILITY INCENTIVES

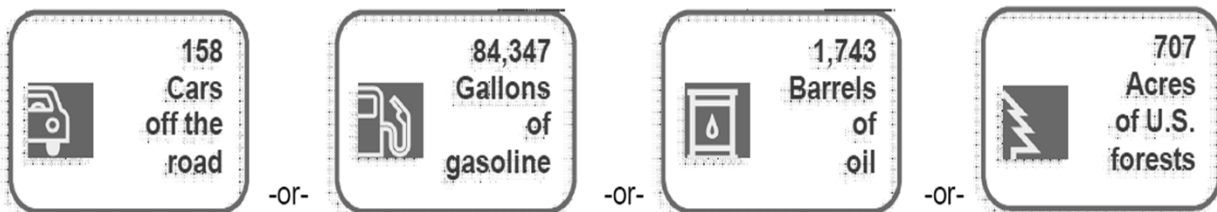
2017 PROGRAM INCENTIVE \$34,858

ESTIMATED KWH SAVINGS 1,066,280

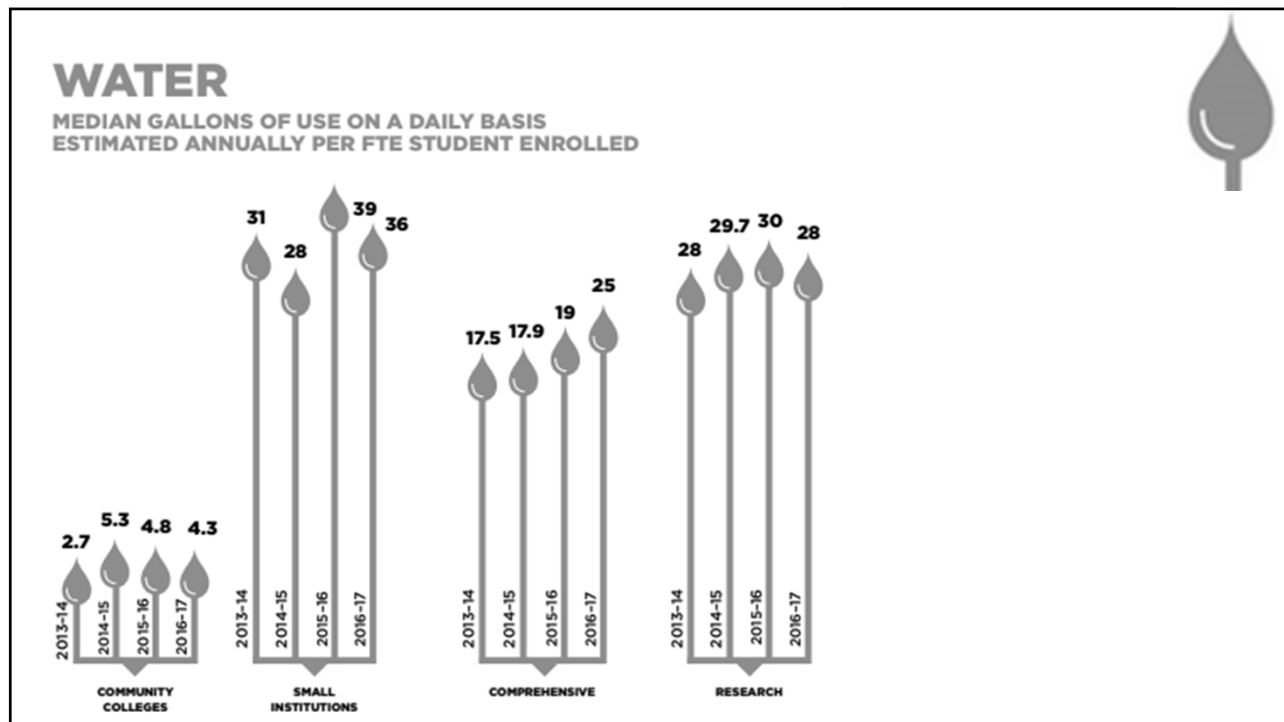
- New Construction, LED Lighting and Lighting Controls
- Efficient Commercial Kitchen Equipment, HVAC Equipment

Annual Carbon Impact*

*Calculated through the Environmental Protection Agency

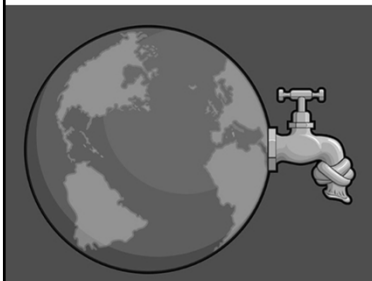


Sam Houston
State University



Communication to Create Behavioral Changes

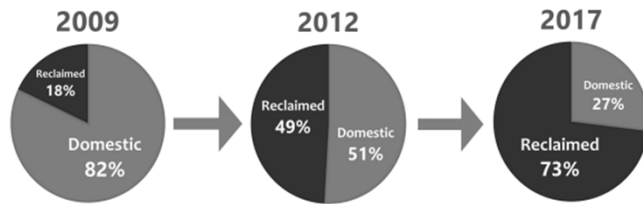
- Evaluation from CFO that water usage was high at 15/gallons per FYE
- **Brought fact to academics**
- Horticulture, culinary and fire suppression **faculty suggested changes**
- **Reduced consumption within one year by 15%**



"If you don't measure it – you can't manage it."

AT PECOS CAMPUS

RECLAIMED WATER is municipal WASTEWATER that has been treated. Instead of discharging into the waterways, it is REUSED by for non-potable use. This practice CONSERVES our limited drinking water supply for the future.



GALLONS SWITCHED TO RECLAIMED IN 2016



COOLING TOWERS
UP TO
10 MILLION
GALLONS



IRRIGATION
UP TO 10
MILLION
GALLONS



\$88,000
SAVINGS

Share the Success Story

667,097 sq ft increase of 11,678 sq ft
yet still saved

40,043,400 gallons from 2015-26 to 2016-17

Huge savings over 14 million gallons!

WATER SAVINGS

WATER BOTTLE REFILL STATIONS

36 STATIONS installed 2014 - 2017

Eliminate waste from **300,000**

DISPOSABLE PLASTIC BOTTLES annually



CHANDLER-GILBERT COMMUNITY COLLEGE

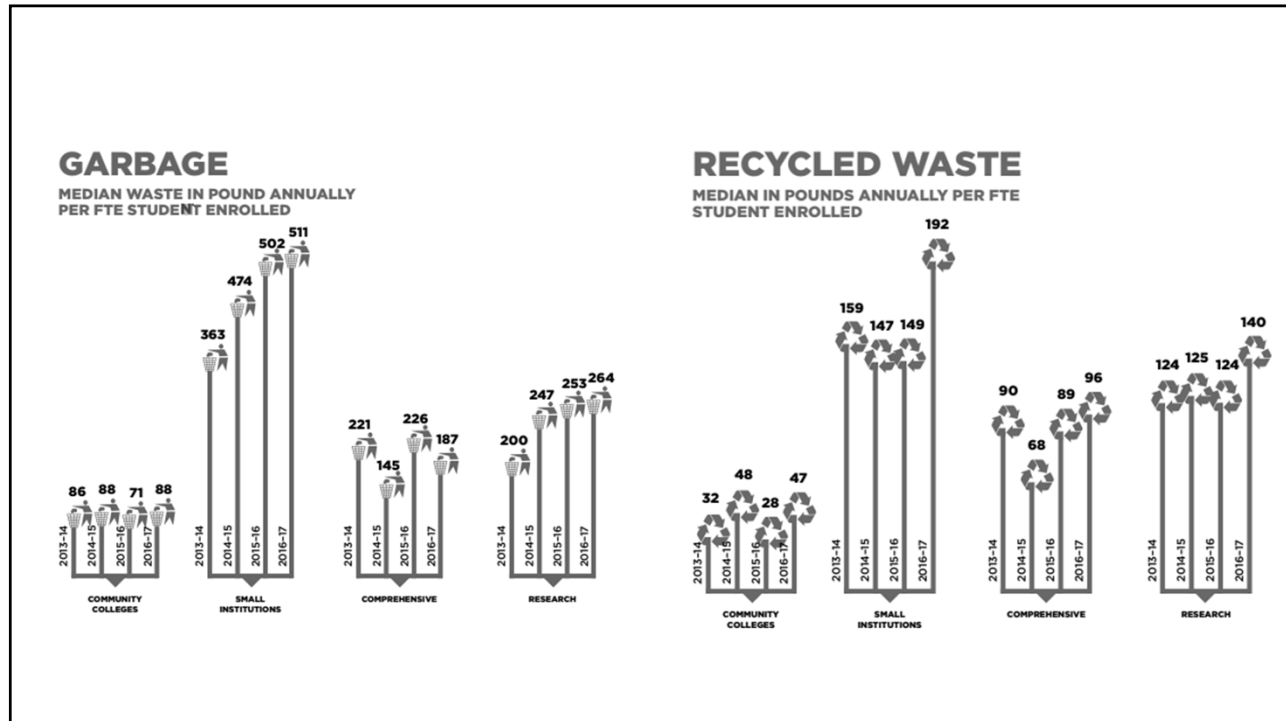



Increase Initial Funding for Overall Return on Investment

WATER CONSERVATION

- Two new buildings: Student Center and Workforce Training Building captured rain water from roof
- 4,000 gallon cistern
- Radiating filter funnels to a 200 gallon tank used to flush toilets
- Cost approx. \$50,000 for tank and operational filets
- Four year payback
- Communicate this issue!









Relatable Graphics – Data to Compel

- **Community College** student – annual per year:
88 pounds garbage and 44 pounds recycle = 132
- **Research University** student – annual per year:
264 pounds garbage and 140 pounds recycle = 404#

WHY DO KEY FACILITIES METRICS SURVEY? HEAR FROM A CAMPUS DIRECTLY!

<https://www.youtube.com/watch?v=mmvEkg12GUo>



Key Facilities Metrics Survey Video

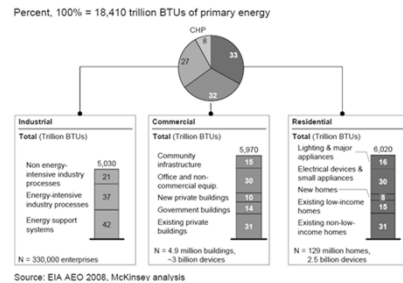


Planning for Efficient Campus Infrastructure

Nate Allen
August 3, 2018
APPA

U.S. DEPARTMENT OF
ENERGY

Problem we are trying to solve



U.S. spends \$600 billion each year to power homes, plants, & buildings

- Great opportunities in residential, commercial and industrial sectors
- 20%+ savings average; cost effective
- Other benefits: Jobs, Environment, Competitiveness

BUT persistent barriers exist....

- Efficiency not integrated into business planning & corporate decision making
- Perceived risk
- Confused by options; lack of unbiased information
- High hurdle rates
- Split incentives /tenant-employee behaviors at odds with efficiency goals
- Not enough/qualified workforce
- Poor understanding of financing options

33

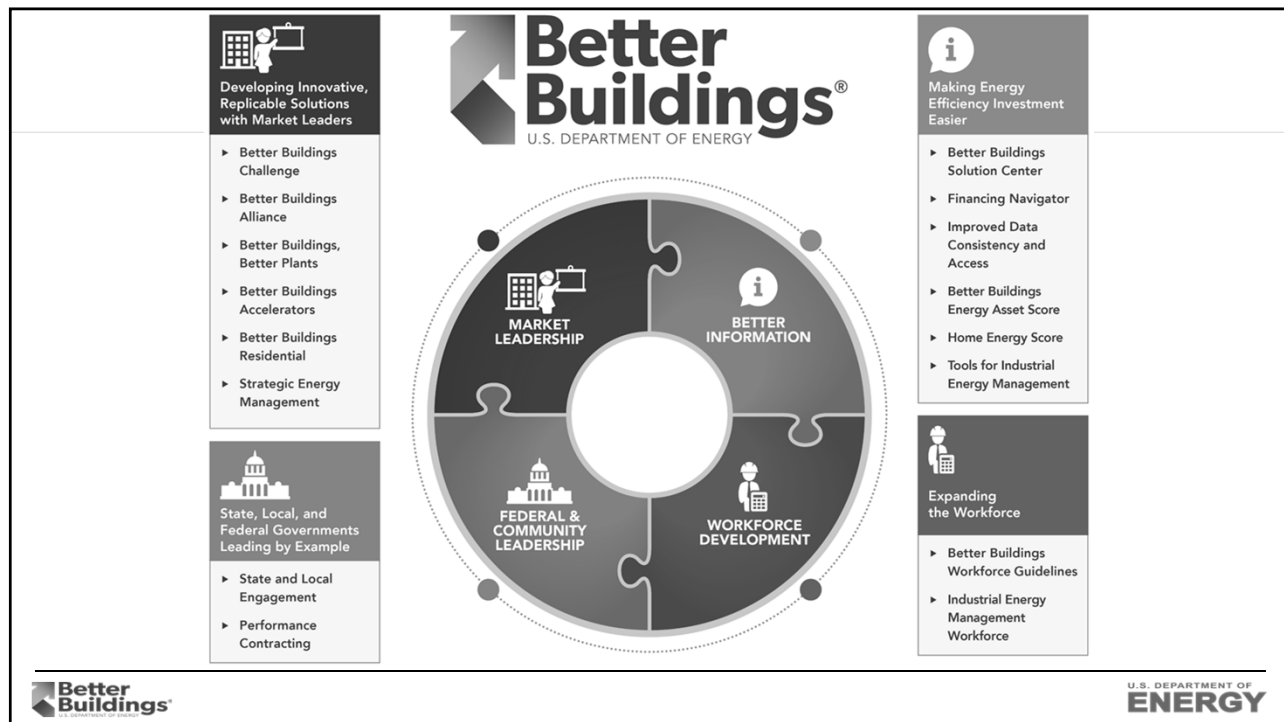
What is Better Buildings?

Initiated in 2011, the Better Buildings Initiative aims to:

- make buildings 20% more energy efficient over 10 years
- accelerate private sector investment in energy efficiency.



34



Better Buildings Challenge

Goals:

- Make buildings 20%+ more efficient in 10 years across the commercial, multifamily, industrial, and public sectors.
- Save \$80B+ for US organizations
- Create American jobs; improve energy security; protect the environment

How:

Leadership - Results - Transparency - Best Practice - Recognition
Catalyzing Action

TODAY:

350+ Partners & Allies

*Commercial – Industrial – Public – Private – Financial – Multifamily
Large and Small
Throughout US*

Results to date

\$3.1 Billion saved

\$12 Billion in financing committed

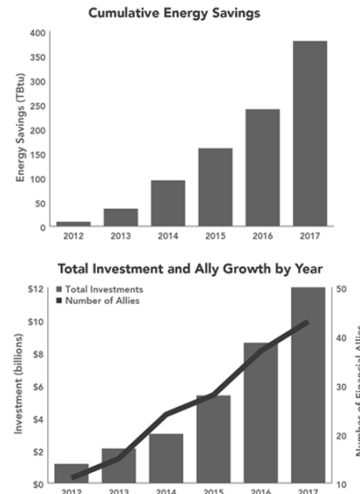
380 Trillion BTUs of energy saved

4.4 Billion square footage covered

6 Billion gallons in water saved

900+ Better Buildings Partners

1,500+ solutions published



37



Better Buildings Partners Are

30

of the Fortune 100 Companies

13%

of all U.S. Commercial Building Space

8

National Laboratories

93

Local Governments

28

State Governments

12

of the Top 25 U.S. Employers

12%

of the U.S. Manufacturing Energy Footprint

38



How can you take advantage of Better Buildings?

- Access publically available resources
 - Technology specifications, guides, case studies
 - Green leasing resources
 - Archived and live webinars
- Join as a partner or participant
 - Access expertise at the National Labs
 - Share ideas with peers via Better Buildings events
 - Earn recognition for your host organization
 - Elevates energy efficiency to senior leadership
 - Third party validation of energy savings
 - Leave a legacy of energy efficiency support



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U.S. DEPARTMENT OF
ENERGY

Better Buildings Solution Center



More than 1,000 solutions are available publicly in the Better Buildings Solution Center

Showcase Projects:

- Large and small buildings
- All sectors
- Specific building types such as schools, hospitals, hotels, grocery stores, universities, civic centers, libraries, offices and labs

Implementation Models (Playbooks):

- Overcome barriers: finance, data, energy management, staff training, community and customer outreach, partnering with utilities, and more
- Multi-faceted and applicable across sectors

Other Resources, Case Studies, Guidance

BETTER INFORMATION

40

Partner Playbooks

- ✓ **FINANCE**
 - Facilities Infrastructure Pool (Ascension)
 - Update Internal Purchasing Systems To Facilitate A Portfolio-Wide Energy Upgrade With Maintenance Funds (Best Buy)
 - Energy Finance Strategy (Kohl's)
 - Building Upgrade Value Calculator (USAA Real Estate Company)
 - On-Balance Sheet, Off-Debt Capacity Performance Contracting (Delaware State University)
 - Internal Green Revolving Fund (University of Utah)
 - Capital Set Aside Fund (3M)
 - Green Initiatives Trust Fund (Los Angeles, CA)
 - Utility Savings Initiative (State of North Carolina)
 - ESA in BAE Facilities Nationwide (Metrus Energy)
 - Commercial PACE Financing at Pier 1 (Clean Fund)
 - On-Bill Financing (Southern California Edison)
- ✓ **DATA/ENERGY MANAGEMENT**
 - Energy Looking Glass Dashboard (HEI Hotels & Resorts)
 - Real-Time Energy Monitoring And Weekly Engagement With Field Staff (Macy's)
 - Accessing Tenant Utility Data in Triple-Net Leased Buildings (Prologis)
 - Data Update and Certification Scorecard (TH Real Estate)
 - Centralized Energy Management And Capital Set-Aside Fund (UPMC)
 - Submetering Initiative and Energy Dashboards (Legrand)
 - Uniform Methodology To Measure Energy Efficiency Improvement (Schneider Electric)
 - Inventory and Tracking Process (Gillette, WY)
 - Designing A Comprehensive Energy Plan (Knoxville, TN)
 - Mass Benchmarking (Pacific Gas and Electric Company)
- ✓ **EMPLOYEE /CUSTOMER ENGAGEMENT**
 - Engaging Clinicians To Reduce Resource Use In Operating Rooms (Cleveland Clinic Foundation)
 - Chasing Quarters With Energy Set-Points (HEI Hotels & Resorts)
 - Student Fellowships To Kickstart In-House Energy Programs (Shorenstein Properties)
 - Eco-Treasure Hunts at Fulfillment Centers (Staples)
 - Leveraging Green Leases To Reduce Energy And Water Use (the Tower Companies)
 - Wyndham Vacation Ownership Green Certification Program (Wyndham Worldwide)
 - Leverage Student-Faculty Research (Allegheny College)
 - Energy Champion Program (Cummins)
 - Operations Management Leadership Program (General Electric)
- ✓ **OVERCOMING ORGANIZATIONAL HURDLES**
 - Enterprise-wide Coordination (Forest City Realty Trust)
 - Good, Better...BEST Standards of Sustainability (Transwestern)
 - Developing an Integrated "Smart Lab" Program (UC Irvine)
 - Integrated Model For Long Term Campus Energy Planning (Michigan State University)
 - Creating a Culture of Energy Efficiency (Poudre School District)
 - Streamlined Tri-resource Efficiency Programs (LADWP)
- ✓ **INTEGRATING EMERGING TECHNOLOGIES**
 - Gallery Walks (New York-Presbyterian Hospital)
 - Lessons Learned from EMIS Pilot & Deployment (Starbucks)
 - Near-Zero Net Energy Retrofits for Low Income Housing (LINC Housing)
 - Smart Meter Resident Energy Savings Program (Balfour Beatty Communities)
 - Using Technology to Meet Portfolio-Wide Energy Reduction Goals (Forest City Realty Trust)

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Education Sector Partners



Better Buildings Water Savings Initiative

- 40+ Partners across sectors
- 8 Goal Achievers
- 6 billion in cumulative water savings
- 100+ proven water saving solutions

Partners with Greatest Water Savings

Savings Since Baseline Year

Shari's Café & Pies*	37%
Staples*	35%
Anthem, Inc.*	31%
United Technologies Corporation (UTC)	19%
Alachua County Public Schools, FL	19%
Tenderloin Neighborhood Development Corporation	17%
Atlanta, GA*	15%
Intuit	13%
State of North Carolina	13%
Hillsboro, OR	11%

*Water goal achiever



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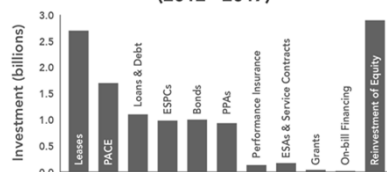
Financial Allies

40+ Financial Allies

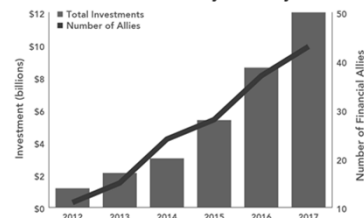
11 types of financial products offered

\$12 Billion in financing extended to date

Total Investment by Financial Product (2012 - 2017)



Total Investment and Ally Growth by Year



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Better Buildings Financing Navigator



BETTER INFORMATION

Why a Navigator?

- Poor market information and education regarding financing solutions
- Dramatic increase in number and complexity of financing options in the market over the last decade
- High upfront project costs

Navigator allows users to...

1. **Explore** basics of the efficiency financing market and
2. **Compare** different financing options
3. **Find** financing options for your project
4. **Connect** with Financial Allies



Navigator part of Better Buildings Solution Center

Goal Achievers as of Spring 2018



Join the Better Buildings Alliance...



**Commercial
Real Estate**



**Food Service, Retail,
and Grocery**



Healthcare



Hospitality



Higher Education

TECHNOLOGY SOLUTIONS TEAMS



Lighting & Electrical



Space Conditioning



Plug & Process Loads



Refrigeration



Energy Management
Information Systems



Renewables Integration



NEW! Building Envelope

MARKET SOLUTIONS TEAMS



Energy Efficiency Project Financing



Leasing and Tenant Build-Out



Energy Data Access



High Performance Property Valuation and Mortgages



BETTER BUILDINGS WEBINAR SERIES

2017/2018 MONTHLY SERIES

Join us September through April to learn about partner success stories you can implement in your buildings to save energy, water, and money. Hurry and register; you won't want to miss this.



Data Tools Overview – Building Energy Asset Score



U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

The Problem

Tons of Data

More building data is being produced than ever before

Lack of Insight

However, this data is decentralized and in varying formats, making data exchange and analysis difficult and leaving huge opportunities for efficiency gains and market activity untapped

No Insight = No Action

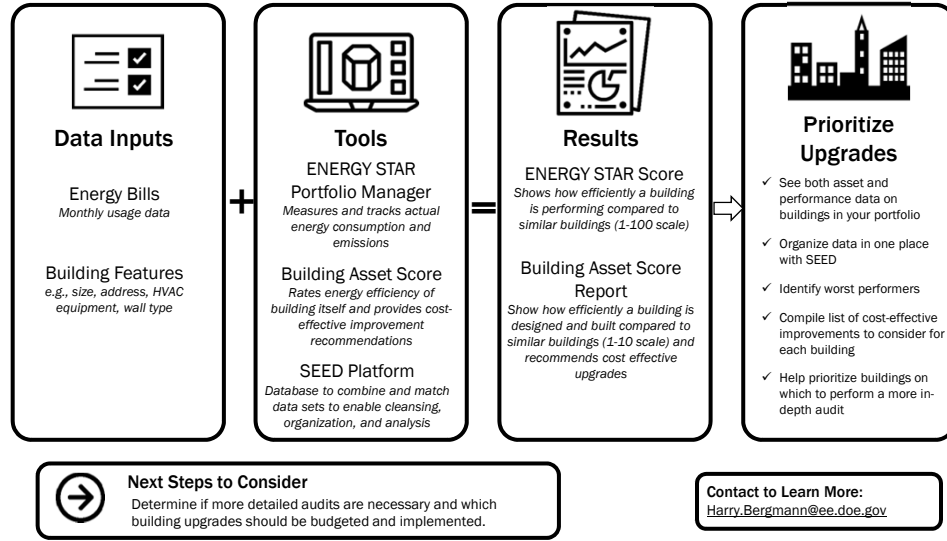
When decision makers understand how buildings use energy and can predict results from upgrades, they can support smarter investments, design better policies, and implement better programs

DOE Data Tools for Cities

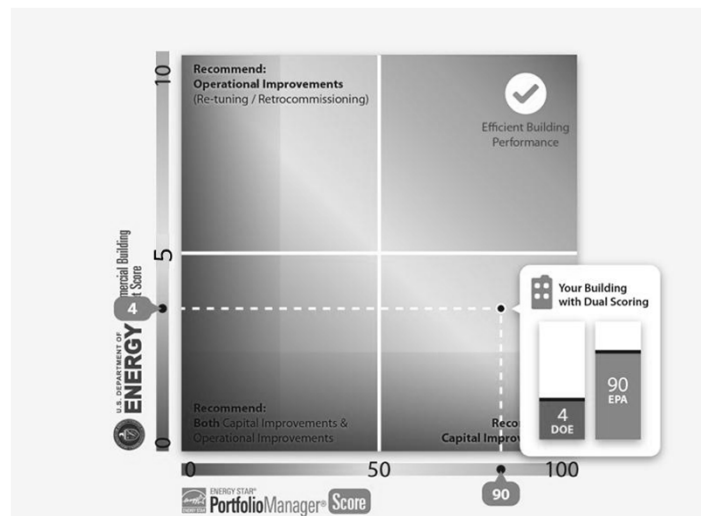


Goal: Prioritize Public Portfolio Building Upgrades

DOE data tools help cities collect, manage, and analyze their building data so they can more strategically identify cost-effective improvement opportunities across their portfolios.



Asset Score + ENERGY STAR Portfolio Manager



Credit: Performance Systems Development

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Types of Buildings

Asset Score evaluates the following *new* and *existing* building types:

- Multifamily (low/high-rise)
- Office
- Retail
- Assisted living
- City hall
- Community center
- Courthouse
- Educational (including K-12 schools)
- House of Worship
- Library
- Lodging
- Medical office
- Parking garage
- Police station
- Post office
- Senior center
- Warehouse (unrefrigerated)
- Mixed-Use (of the above types)
- *More coming soon!*

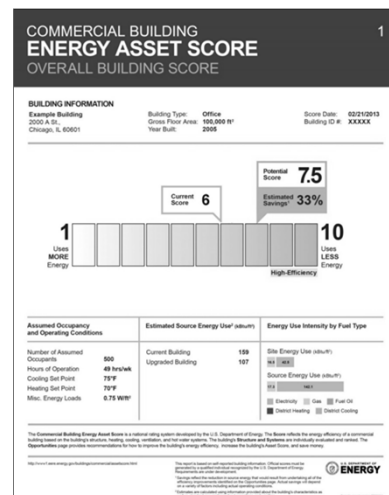
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Asset Score Full

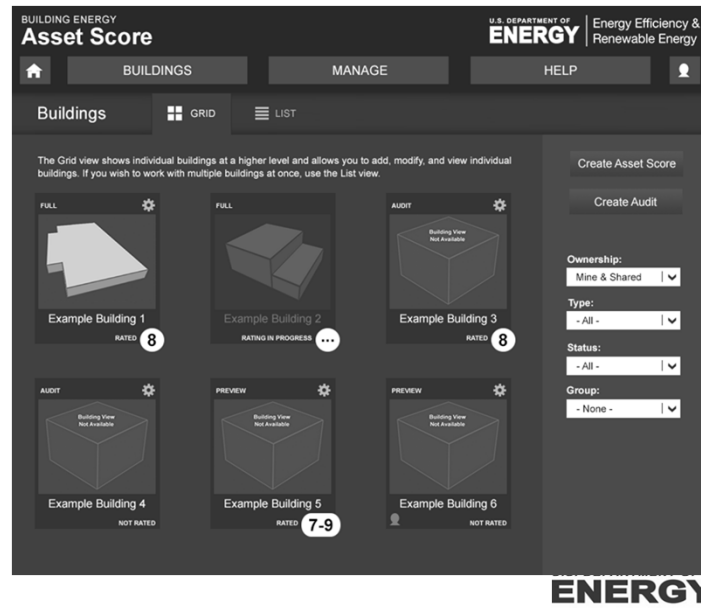
National, free web-based software tool that evaluates the energy efficiency of a building's underlying assets.

- Models structural, mechanical, and electrical building components
- Leverages DOE's EnergyPlus physics engine & the OpenStudio user interface
- Produces a BuildingSync XML file (FEMP CTS compliant submission)
- Data inputs are standardized to both BEDES and ASHRAE 211P



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Inside the Asset Score



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ENERGY | Energy Efficiency & Renewable Energy

Asset Score Report

COST EFFECTIVE UPGRADE OPPORTUNITIES

	Energy Savings ⁴	Cost ⁵
Building Envelope		
• Add roof insulation in Office Learn More	Medium	\$\$
• Upgrade windows in Office with high performance double pane windows Learn More	Medium	\$\$
Interior Lighting		
• Upgrade Fluorescent T8 lighting system in Office to compact fluorescent lighting system Learn More	High	\$
HVAC Systems		
• Upgrade cooling system in Office with high efficiency electric DX cooling system Learn More	High	\$\$\$
• Add supply air temperature reset to HVAC system in Office Learn More	Low	\$
Hot Water Systems		
• Upgrade service hot water system in Office with electric heat pump water heater Learn More	Medium	\$\$

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ENERGY | Energy Efficiency & Renewable Energy

Planning for Efficient Campus Infrastructure

APPA - August 4, 2018

Rachel Petropoulos
Energy Specialist
The University of the South
Sewanee, Tennessee



1,800
students

98%
occupancy rate

1.7 M
square feet

\$2.5 M
utilities

13,000
acres





23,540,913

\$23,540,913

\$23,540,913

2013

\$37,725,000

2023

We reached
a tipping point.

Our governing board
issued our first ever
bond devoted to
recapitalization of our
building assets.

\$14,100,000
25 year-term

Campus Infrastructure
Renewal Program

Campus Infrastructure Renewal Program

CIRP

Campus Infrastructure Renewal Program

Three action-packed
summers

roofs
mechanical systems
building envelopes
fire safety
restrooms
masonry
asbestos removal
sidewalks, lots

...the need for a planned investment program to ensure that facilities will function at levels commensurate with the academic priorities and missions of our institution.

\$2,000,000

annual deferred
maintenance dollars

This was a Board directive that came with approval of the CIRP bond.

It was an easily stated goal, but no plan was in place to fund it.

\$6,700,000

asset reinvestment target after
the predictive phase with
Sightlines.

\$750,000

present annual budget for
capital reinvestment

Stay tuned.

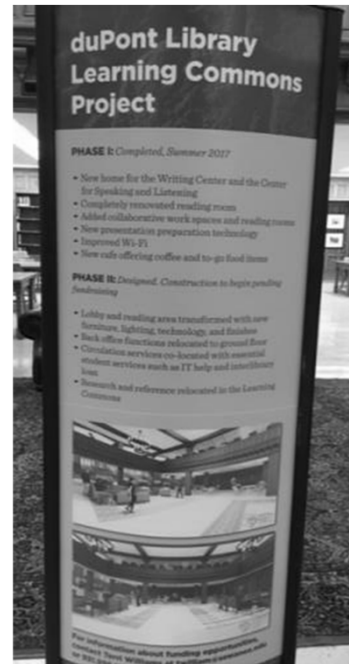
Modernization



125,000 square feet
Built in 1965









Results

kWh therms

dollars

metric tons

EUI

EUI

Energy Use Intensity

EUI

Energy Use Intensity

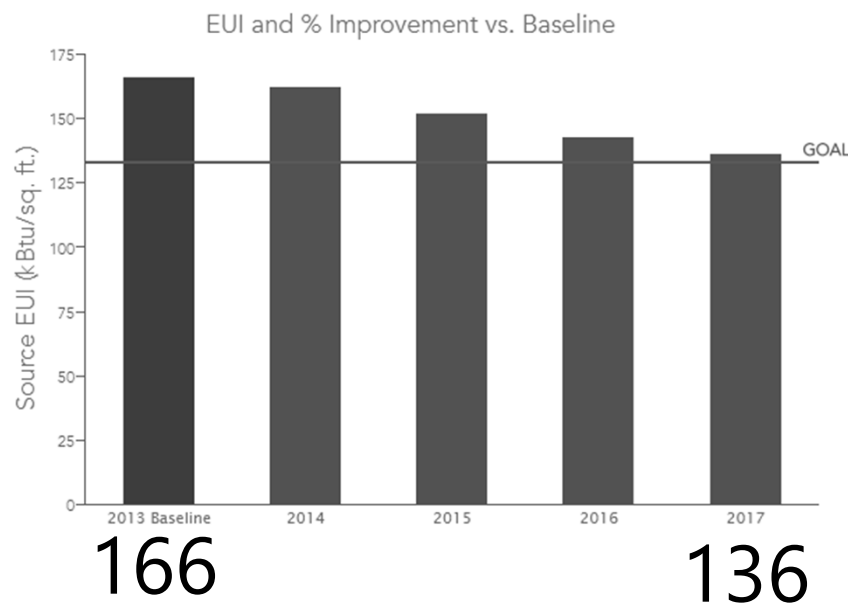
kBtu/square foot

historical utility data

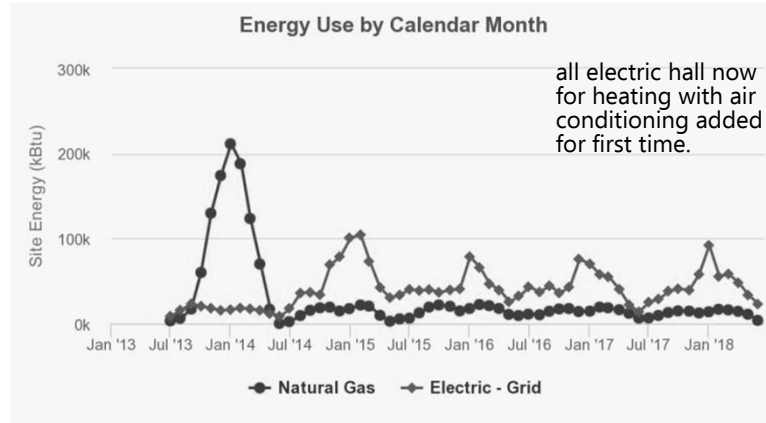
historical utility data
building inventory

historical utility data
building inventory
submetering

historical utility data
building inventory
submetering
measure/verify

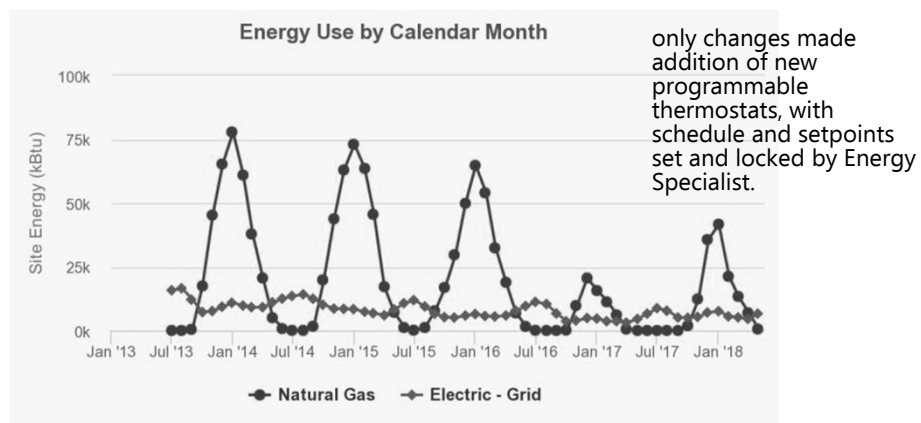


13,000 sq. ft. residential hall, 60 beds



EUI 129 139
 \$15,300 \$20,400

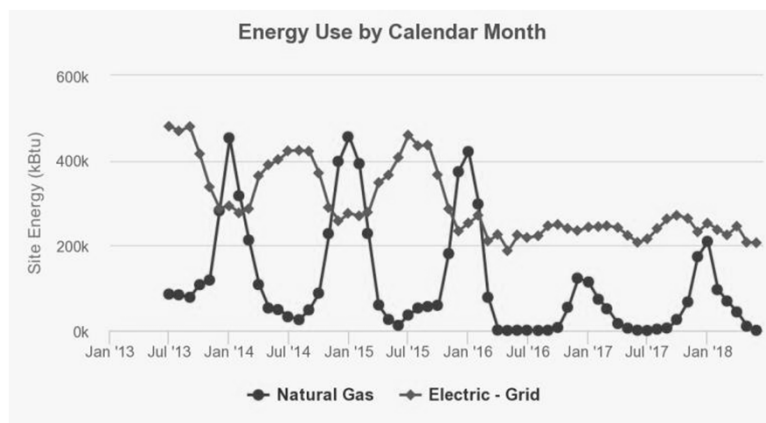
storage building



EUI 56 26
 \$7,500 \$3,900



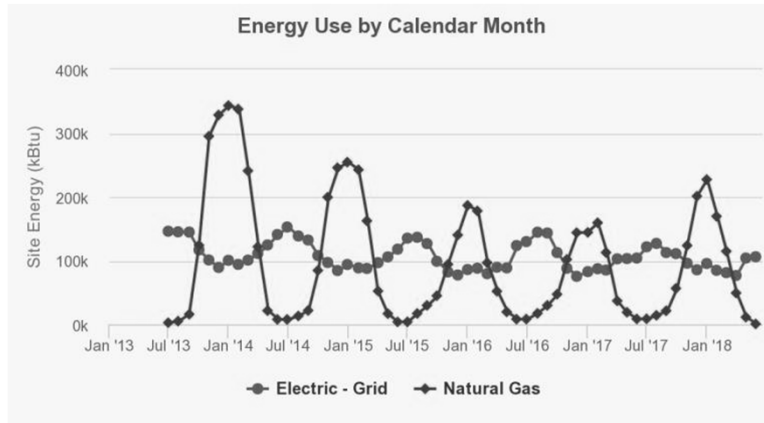
duPont library



EUI 175
\$135,000

134
\$97,000

student union without food 46,000 sq ft



EUI 122
\$56,600

104
\$48,500



Q & A

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 **ENERGY.GOV**

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https://www.youtube.com/watch?v=Ww5ARv_z2oA

