



2013 Efficiency Forum - Sector Breakout I Higher Education

May 29, 2013

11:00am-12:30pm MT



Agenda: Breakout Session I

- ❖ 11:00 Welcome and Introductions
- ❖ 11:10 Market Solutions Segment -- *Andrew Schulte, ICF International*
- ❖ 11:20 **Better Buildings Challenge Showcase Project Panel**
 - *Lynda Boomer, Michigan State University*
 - *Eric Pallant, Allegheny College*
 - *Jeff Wrigley, University of Utah*
 - *Wendell Brase, University of California, Irvine*
- ❖ 12:00 Information Layer -- *Enabling ongoing monitoring, maintenance, and performance*
- ❖ 12:10 Open Forum & Discussion
- ❖ 12:20 Interest in Establishing a Renewable Energy Project Team
- ❖ Adjourn

Welcome Better Buildings Alliance Members!

22

Member organizations from the higher education sector

7

Better Buildings Challenge partners

200 million

Square feet of building space owned and managed

Around the table... introductions



Market Solutions



Key Activity Areas

▶ Overcoming the Split Incentive

▶ Financing

▶ Training & Workforce Development

▶ Data Access and Benchmarking

▶ Appraisals and Valuation

Business Case
Development

Coordination with
Project Teams

Dissemination of
Implementation Models

How Can the Higher Education Sector Engage with the Market Solutions Team?

- ▶ Data management
- ▶ Financing strategies
- ▶ Workforce development and training needs
- ▶ Split incentive: procurement vs. operations

Upcoming Market Solutions Breakout Sessions at Efficiency Forum

- ▶ Wednesday, 1:30 – 2:45 PM
 - Update on “Green” and Energy-Aligned Leasing
- ▶ Wednesday, 3:00 – 4:15 PM
 - Successful Strategies for Engaging Tenants to Improve Energy Efficiency
- ▶ Thursday, 10:15 – 11:45 AM
 - Overcoming Obstacles to Data Access: Who, What, Where and How?
- ▶ Thursday, 1:15 – 2:30 PM
 - Implementation Models from DOE’s Better Buildings Challenge

Goals:

- Launched in 2011 with goal to make buildings 20% more efficient by 2020
- Save more than \$40 billion annually
- Create jobs in the USA

How:

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



Better Buildings Challenge to date:

110+ Partners (Commercial, Industrial,
Public, Private)
2 Billion Square Feet
Nearly \$2 Billion Private Sector Financing
300 Manufacturing Plants
\$2 Billion Federal Commitment



- ▶ Showcase project: [Richard J. Cook Center for Environmental Science](#)



- ▶ Showcase project: [Anthony Hall: Advancing Energy Efficiency](#)



- ▶ Showcase project: [Dumke Health Professionals Education Building](#)



- ▶ Showcase project: [Smart Labs Initiative/Natural Sciences II](#)



- ▶ Showcase project: Commonwealth Energy Mgmt & Control System (identified)



- ▶ Showcase project: Campus Wide Energy Efficiency Upgrade (identified)



- ▶ Showcase project: Kuykendall Hall (identified)



ANTHONY HALL-ADVANCING ENERGY EFFICIENCY Showcase Project: Michigan State University

LOCATION
East Lansing, MI

PROJECT SIZE
317,200 Square Feet

FINANCIAL OVERVIEW
Project Cost \$7 Million

Annual Energy Use^(Source EUI)



Expected Energy Savings: **34%**

Annual Energy Cost



Expected Savings: **\$536,000**



Consistently innovative in responding to the challenge

▶ SOLUTIONS:

- Variable-speed drives on cooling tower fans
- Air-flow monitoring and repairing economizer damper controls
- Demand-ventilation control strategies in auditoriums
- Air-quality sensors in laboratories
- Heat-recovery unit in the exhaust air stream
- Connecting heat recovery to refrigeration units
- Converting multiple building reheat systems to variable-speed systems
- Upgrading lighting and installing lighting controls
- And more....

▶ OTHER BENEFITS:

- Anthony Hall will be the first building at MSU to undergo this complete upgrade process, setting the blueprint for future energy efficiency improvements in MSU's aging building portfolio

Better Buildings Challenge Showcase Projects



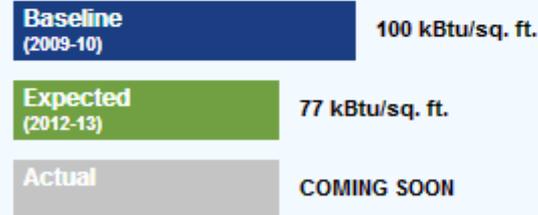
RICHARD J. COOK CENTER FOR ENVIRONMENTAL SCIENCE Showcase Project: Allegheny College

LOCATION
Meadville, PA

PROJECT SIZE
21,000 SF renovation
within 47,500 SF Carr Hall

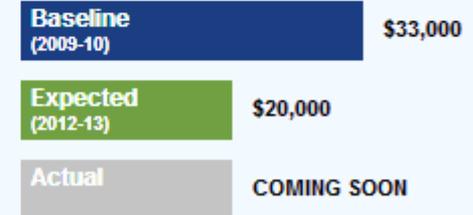
FINANCIAL OVERVIEW
Project Cost \$784,000

Annual Energy Use



Expected Energy Savings: **23%**

Annual Energy Cost



Expected Savings: **\$13,000**

A home for Allegheny College's Environmental Science & Studies department

▶ SOLUTIONS:

- Lighting retrofits and sensors are 55% more efficient than the baseline lighting system
 - LED 2x2 and 28w T5 fixtures, occupancy sensors in all renovated areas, daylight sensors in areas with solar tubes, dimmable controls
- Envelope improvements and exhaust heat recovery reduce natural gas heating needs by 9%
- CO2 monitoring moderates interior ventilation to be 45% more efficient than the baseline system
- The addition of cutting edge laboratories for aquaponics, GIS and more.
- Inclusion of sustainability features that can be used as teaching tools

▶ OTHER BENEFITS:

- Allegheny College achieved LEED Gold certification under the Commercial Interiors Rating System

Better Buildings Challenge Showcase Projects



DUMKE HEALTH PROFESSIONS EDUCATION BUILDING HVAC SYSTEM UPGRADES Showcase Project: University of Utah

LOCATION
Salt Lake City, UT

PROJECT SIZE
52,000 square feet

FINANCIAL OVERVIEW
Project Cost \$1,325,000

Annual Energy Use (Source EUI)



Expected Energy Savings: **22%**

Annual Energy Cost



Expected Savings: **\$30,500**

A mixed use facility with classrooms, office space and labs

▶ **SOLUTIONS:**

- Comprehensive improvements to the HVAC system
 - Premium efficiency motors and variable frequency drives for relief fans, air handlers and pumps
 - All variable air volume (VAV) terminal units and many other components were replaced
- New high efficiency boilers and a DDC controls system were installed

▶ **OTHER BENEFITS:**

- Total corrective maintenance work orders have been reduced in the building by 48%
- HVAC-specific corrective maintenance work orders have dropped from an average of 6.9 per month to 2.6 per month, a reduction of 63%



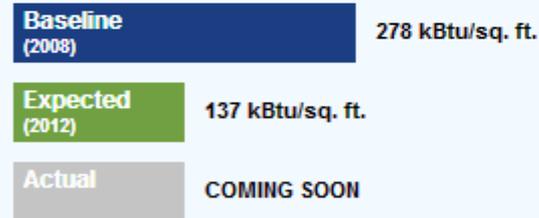
SMART LABS INITIATIVE/NATURAL SCIENCES II Showcase Project: University of California, Irvine

LOCATION
Irvine, CA

PROJECT SIZE
NS II: 146,000 SF

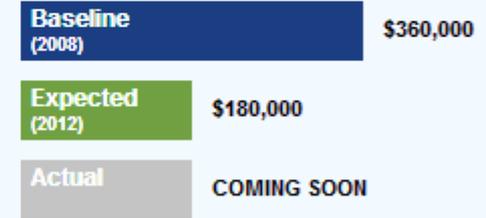
FINANCIAL OVERVIEW
Project Cost NS II: \$829,864,
with utility incentive of \$416,442

Annual Energy Use (Source EUI)



Expected Energy Savings: 51%

Annual Energy Cost



Expected Savings: \$180,000

Savings based on data from four energy retrofit measures in Natural Sciences II (NS II), with measures implemented annually.

Making already energy-efficient buildings even more efficient

▶ SOLUTIONS:

- Natural Sciences Unit 2 / Smart Labs
 - Centralized demand controlled ventilation
 - State-of-the art air quality sensing
 - Exhaust stack discharge velocity reduction
 - Sharply reduced lighting power-density
 - Efficient heat exhaust for equipment
 - Elimination of energy-robbing HVAC acoustic attenuators
 - Office wing static pressure reset
 - Lighting retrofit and high-bay lighting retrofit

▶ OTHER BENEFITS:

- Deferred maintenance
- Commissioning and improved occupant health



- ▶ **Information Layer** – A Smart Lab creates a rich “information layer” that facilitates active building management and allows for granular data tracking. This layer:
 - Makes the working environment safer by providing air quality data to users
 - Sends text messages to technical staff whenever a zone triggers high ACH
 - Provides a detailed, zone-specific record of air quality and system performance
 - Enables reports and dashboards with which staff can identify failed components and single out the aspect of the operation that is driving energy use.
 - Thus, a Smart Lab with these essential features is significantly safer than prior designs.

Although a Smart Lab includes many sensors and controls that require sophisticated maintenance, these same features provide self-diagnostics that enable ongoing monitoring, maintenance, and performance.

- ▶ Discussion topics:
 - Questions from the Panel Moderator
 - Questions from the Audience
 - Additional (time permitting)
 - Most useful elements of the Better Buildings Alliance membership
 - Best way to provide program-wide Alliance communications (webinar blasts, etc.)





Interest in Establishing a Renewable Energy Project Team



DOE is gauging interest in establishing a Renewables Project Team.

- ▶ Strategic use of renewables can help businesses reduce energy costs and environmental footprint
- ▶ A renewables project team can provide *unbiased advice and shared experience* to help BBA members navigate complex regulations, business models, and utility policies
- ▶ Who might be interested:
 - Anyone with large real estate holdings and/or high electricity costs
 - Businesses in areas with strong financial, utility, state, or other incentives for renewables
 - Organizations with sustainability goals
- ▶ Potential target technologies:
 - Solar PV, solar thermal systems and hybrid PV/Thermal
 - Biofuels and biogas
 - Small scale wind
 - Fuel cells?



Examples of Potential Projects

Solar Decision Guide and Support Services

- ▶ Businesses considering solar may encounter:
 - Widespread geographic differences regarding:
 - Utility Incentive structures (buy-down incentives, performance based incentives, Feed-in tariffs, etc.)
 - Utility policies (net metering, interconnection requirements)
 - Regulatory structures
 - Permitting requirements
 - Uncertainty about how to assess the different ownership structures (PPA, lease, own, etc.)
- ▶ The Solar Decision Guide and associated support services can help companies navigate this complex environment to determine if investing in solar makes financial sense and identify the regions that offer the most promising returns on solar investment.



Biogas Guide and Support Services

- ▶ Converting food waste to biogas can help supermarkets and foodservice establishments reduce energy and waste disposal costs

Before a renewables project team is established, we need to address several questions.

- ▶ Are members considering implementing renewables projects but struggling with certain issues associated with renewables? If so, what are the key concerns?
- ▶ Do members perceive significant value in establishing such a project team? Why?
- ▶ Which members would be interested in participating and/or leading such a team?
- ▶ What would be the priority issues to address?
 - Technologies: Solar PV, solar thermal systems and hybrid PV/Thermal, biofuels, other?
 - Regulatory issues
 - Utility incentives



▶ Thank You!

Common Sector Barriers

- ▶ Lack of credible information about savings options
- ▶ Lack of access to consistent and transparent building performance data
- ▶ Lack of centralized information for data analysis and display
- ▶ Insufficient access to capital, particularly for public institutions
- ▶ Lack of full organizational buy-in and resistance to change among stakeholders
- ▶ Unorganized and/or compartmentalized energy management approach
- ▶ Difficulty attracting ESCOs for long-term projects due to low energy prices or low ROI projects
- ▶ Strong focus on research among research institutions, with laboratories being high energy users
- ▶ Increase in campus infrastructure and student/staff populations
- ▶ Split incentive problem among procurement staff



2013 Efficiency Forum - Sector Breakout II Higher Education

May 30, 2013

2:45pm-3:30pm MST



Agenda: Breakout Session I

- ❖ 2:45 Welcome and Introductions
- ❖ 2:55 Barriers and Solutions
- ❖ 3:00 Available Resources
- ❖ 3:30 Adjourn

Presenters



Dave Newport

*Representing The Association
for the Advancement of
Sustainability in Higher
Education (AASHE)*



Stephanie Gripne

*Representing the
Sustainable Endowments
Institute*

**THE CENTER
FOR GREEN SCHOOLS**



Kristin Ferguson

*Representing the U.S. Green
Building Council (USGBC)*

- ▶ Common Barrier 1: **Lack of credible information about savings options**
 - Hesitancy to make substantial investments in energy efficiency without first seeing demonstrated evidence that there is a business case for doing so.
 - Simple technology specifications and materials from efficiency equipment vendors are often insufficient for this purpose.
 - Decision-makers prefer concrete examples of achieved savings at similar institutions.

- ▶ Common Barrier 2: **Lack of access to consistent and transparent building performance data**
 - Data collection—particularly the sub-metering of individual facilities—is often costly or a low priority.
 - The majority of higher education institutions do not use sub-metering to track building energy performance data.

- ▶ Common Barrier 3: **Insufficient access to capital, particularly for public institutions**
 - Institutions often struggle to obtain financing due to a variety of political, logistical, and financial reasons.
 - This problem is particularly pronounced at public institutions and private institutions with small endowments, but many wealthy universities also report problems with this barrier due to internal politics or a laborious financing process.
 - Many institutions struggle to understand the complex landscape of both internal and external financing options.

- ▶ USGBC: [Establishing a Culture of Performance on Your Campus: Campus Implementation Workbook](#)
- ▶ USGBC: [Paid-from-Savings Guide to Green Existing Buildings](#)
- ▶ USGBC: [Roadmap to a Green Campus](#)
- ▶ USGBC: [Hands-On LEED: Guiding College Student Engagement](#)
- ▶ SEI: Comprehensive Implementation Guide (to be released early this summer)
- ▶ AASHE: Resource Books
- ▶ The President's Climate Commitment: [Financing Page](#)
- ▶ The President's Climate Commitment and Clinton Climate Initiative: [Energy Performance Contracting Financing Options](#)
- ▶ NACUBO: [Financing Sustainability](#)
- ▶ ACUPCC: [Reporting System](#)
- ▶ tSN and McGraw-Hill: [Green Building Growth in the K-12 and HE sector](#)
- ▶ Clean Air Cool Planet: [Campus Carbon Calculator](#)

▶ Thank You!

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