



ANTHONY HALL – ADVANCING ENERGY EFFICIENCY

Showcase Project: Michigan State University (MSU)

LOCATION

East Lansing, MI

PROJECT SIZE

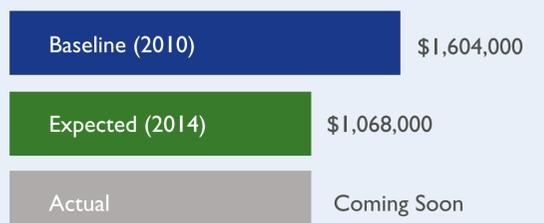
317,200 Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **34%**

Annual Energy Cost



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

BACKGROUND

- MSU has more than 550 buildings on its campus.
- USDA-inspected teaching, research, and outreach facility featuring high energy intensity lab space.
- MSU expects a payback of approximately 7 to 10 years.

BENEFITS

- The retrofits set the blueprint for future energy efficiency improvements in MSU's aging building portfolio.
- The project receives high-level support from senior leadership, including the President and the Board of Trustees, and Vice President for Finance and Operations.
- Prioritization of the university's Energy Transition Plan and commitments such as the Better Buildings Challenge make energy efficiency projects possible at MSU.

SOLUTIONS

Anthony Hall benefitted from MSU's five-step existing building commissioning process:

- Step 1. A campus-wide building profiling system identified Anthony Hall as a prime candidate for retrofits.
- Step 2. MSU performed an energy audit to identify energy conservation measures.
- Step 3. All building systems were evaluated and adjusted to ensure optimal operation.
- Step 4. The energy conservation measures implemented include lighting and lighting controls, HVAC system efficiency retrofits and controls, and laboratory efficiency measures.
- Step 5. Anthony Hall will be "continuously commissioned" to sustain efficiency.



KOHL'S NILES, OH STORE

Showcase Project: Kohl's Department Stores

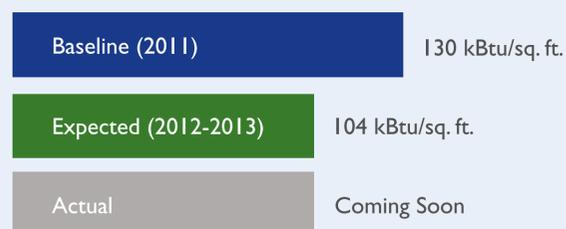
LOCATION

Warren, OH

PROJECT SIZE

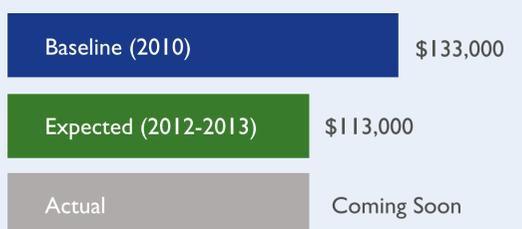
87,300 Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **20%**

Annual Energy Cost



Expected Savings: **\$20,000**

BACKGROUND

- Conducted an ENERGY STAR® rating analysis of 1,100 locations.
- Identified ways to substantially improve the energy performance of the Niles, OH store.
- Project began in September 2011 and was completed in November 2012.

SOLUTIONS

- Replacement of old RTUs with high efficiency, sub-metered RTUs.
- Sub-metering for all electrical systems, including plug loads and lighting.
- Re-commissioning of the control systems.
- Comprehensive lighting upgrade for sales floor, stockrooms, office space, and building exterior.

OTHER BENEFITS

- Apply lessons learned to address energy efficiency discrepancies in several nearby stores.
- Niles store expected to achieve an ENERGY STAR rating of 75 – a 12 point increase – and become eligible for the ENERGY STAR label.
- Potentially add store to Kohl's LEED for Existing Buildings volume certification.



RICHARD J. COOK CENTER FOR ENVIRONMENTAL SCIENCE

Showcase Project: Allegheny College

LOCATION

Meadville, PA

PROJECT SIZE

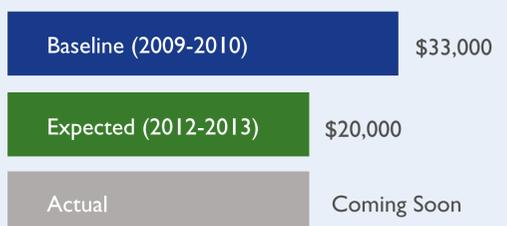
21,000 SF renovation
within 47,500 SF Carr Hall

Annual Energy Use (Source EUI)



Expected Energy Savings: **23%**

Annual Energy Cost



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

BACKGROUND

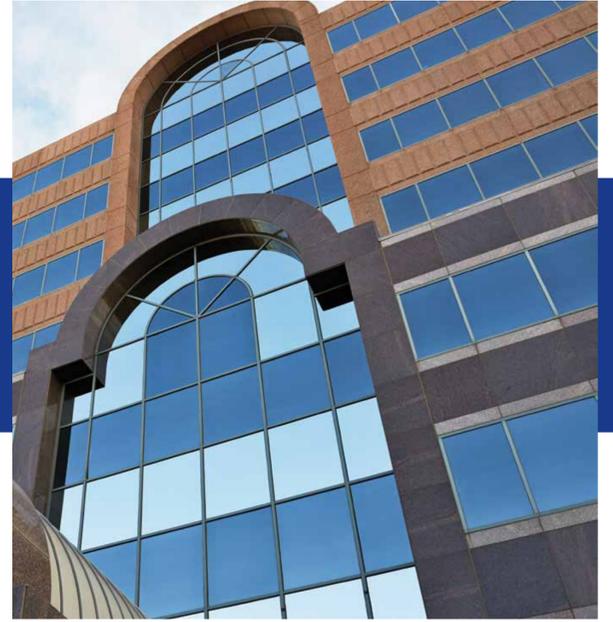
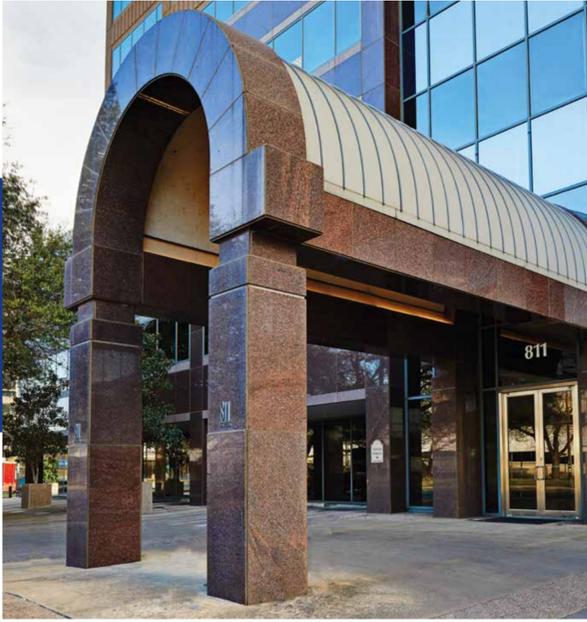
- The Richard J. Cook Center for Environmental Science is named for Allegheny's previous president and occupies the renovated portion of Carr Hall.
- Project began in May 2011 and opened to students in August 2012.

SOLUTIONS

- Efficiency measures include:
 - Lighting retrofits and sensors
 - Envelope improvements exhaust heat recovery
 - CO₂ monitoring to control interior ventilation.
- Established college committee to work with architects and contractor to transform the building to meet the new occupants' needs.

OTHER BENEFITS

- LEED Gold certification achieved under the Commercial Interiors Rating System.
- Spurred additional efficiency efforts across the college: building envelope improvements, lighting and boiler retrofits.
- \$500,000 annually until 2020 is committed by the college in support of its climate neutrality goal.



811 BARTON SPRINGS ROAD

Showcase Project: TIAA-CREF

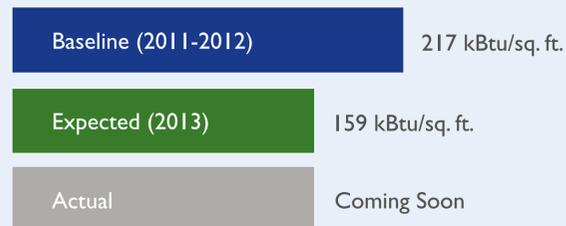
LOCATION

Austin, TX

PROJECT SIZE

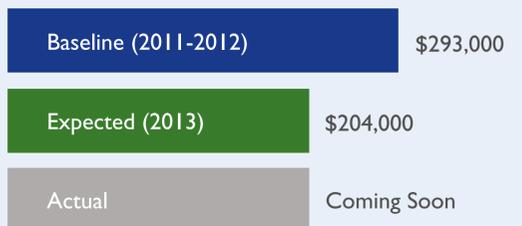
158,000 Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **27%**

Annual Energy Cost



Expected Savings: **\$89,000**

BACKGROUND

- 811 Barton Springs Road is an efficient suburban office building.
- Project began in May 2011 and was completed in December 2012.
- Between 2007 and 2011, TIAA-CREF's office portfolio achieved a 15% percent reduction in energy use.

OTHER BENEFITS

- TIAA-CREF's efforts are expected to increase the building's ENERGY STAR® rating from 92 to 98.

SOLUTIONS

TIAA-CREF continuously identifies no-cost/low-cost opportunities across its real estate portfolio. The following energy efficiency measures/procedures were completed:

- Weekend and holiday operating hours reduced.
- Lighting retrofits to lower wattage T8 and 2W LED bulbs.
- Energy management system temperature set points.
- Pneumatic thermostats upgrade to direct digital controls.
- Inefficient chiller equipment retrofit with new variable speed drive chillers.
- Roof upgrade including insulation and a white reflective roofing system.
- Ultra-low flow toilets and urinals.



MARRIOTT LA JOLLA

Showcase Project: HEI Hotels & Resorts

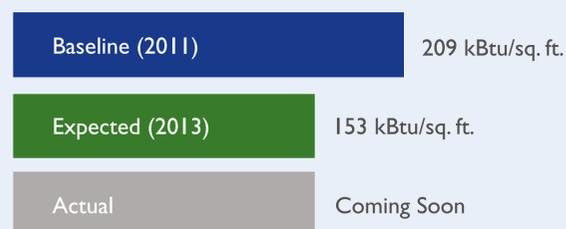
LOCATION

San Diego, CA

PROJECT SIZE

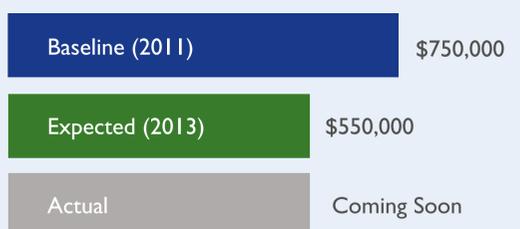
325,000 Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **27%**

Annual Energy Cost



Expected Savings: **\$200,000**

BACKGROUND

- In 2012, energy conservation operational programs and capital projects investments in Marriot La Jolla reduced electrical costs 8% and gas costs 6%. In the first quarter of 2013, electrical savings have increased to 26% year-to-date.

OTHER BENEFITS

- Received \$63,000 as part of the State of California's demand side management rebate program.
- Joined the EPA's ENERGY STAR® National Building Competition.

SOLUTIONS

- Energy conservation operational programs include:
 - Energy Looking Glass dashboard, an internal energy management tracking tool.
 - Operational set points for hot and chilled water systems.
 - BUZZ Committee to coordinate conservation activities.
- Equipment upgrades include:
 - Lighting fixtures
 - Motion detectors
 - Chiller and boiler plants
 - Energy management system enhancements
 - Peak load control system
 - Variable frequency drives



PENNZOIL PLACE

Showcase Project: Transwestern

LOCATION

Houston, TX

PROJECT SIZE

1.8 Million Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **19%**

Annual Energy Cost



Expected Savings: **\$910,000**

BACKGROUND

- Two office towers of 34 and 36 floors, joined by a large atrium.
- Originally constructed in 1973; in 2009, the owner, Metropolis, contracted with Transwestern to manage the building.
- Project began January 2010 and was completed at the end of 2012.

SOLUTIONS

Energy efficiency measures in the two-phase retrofit included:

- Cooling tower rebuild to repair corrosion.
- Installation of new efficient chillers.
- Lighting retrofit.
- HVAC system replacement and control system upgrade.

OTHER BENEFITS

- Increased the building ENERGY STAR[®] score from 63 to 84, and supported achievement of a LEED for Existing Buildings: Operations and Maintenance v2009 Gold certification in April 2011.
- Increased tenant comfort, lowered operating costs, and increased market prominence.



SMART LABS INITIATIVE/NATURAL SCIENCES II

Showcase Project: University of California, Irvine

LOCATION

Irvine, CA

PROJECT SIZE

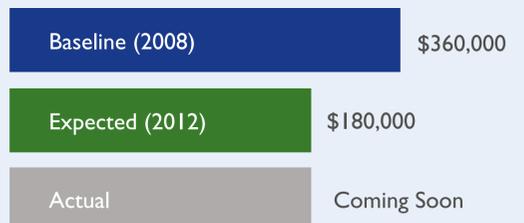
NS II: 146,000 Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **51%**

Annual Energy Cost



Expected Savings: **\$180,000**

BACKGROUND

- Laboratories account for two-thirds of the energy consumed within academic core at UC Irvine.
- Smart Labs Initiative began in 2008 with goal of 50% energy savings over code without compromising safety.
- Smart Labs is funded through \$23.4 million in Energy Bonds and \$5.8 million in utility incentives; energy bonds repaid with savings from the utilities budget.
- University of California's policy goal is to reduce GHG emissions system-wide to 2000 levels by 2014 and to 1990 levels by 2020.

SOLUTIONS

- Main techniques are to reduce the energy required to exhaust air and provide HVAC.
- Natural Sciences II building implemented the following measures to reduce electric usage by 50% and therms by 62%:
 - Office wing static pressure reset.
 - Exhaust stack discharge velocity reduction.
 - Centralized demand controlled ventilation.
 - Lighting retrofit to reduce lighting power-density.
 - High-bay lighting retrofit.

OTHER BENEFITS

Several major benefits of the Smart Labs Initiative are:

- Replacing aging equipment saves on maintenance and increases reliability.
- Dashboards and data monitoring enable real-time commissioning and improved safety monitoring.
- Sue and Bill Gross Hall (a Smart Labs project) received a LEED Platinum rating for New Construction in December 2011.



SOUTH BAY GALLERIA – ENERGY REDUCTION PROJECT

Showcase Project: Forest City Enterprises

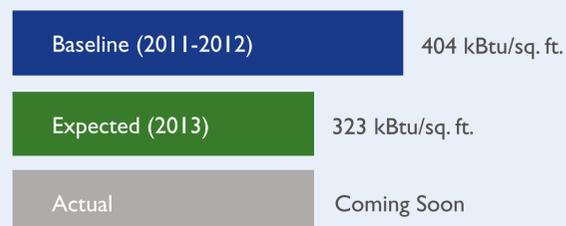
LOCATION

Redondo Beach, CA

PROJECT SIZE

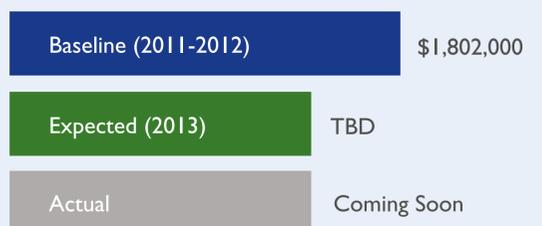
390,000 Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **20%**

Annual Energy Cost



Expected Savings: **TBD**

BACKGROUND

- Forest City's South Bay Galleria, a 900,000-square-foot three-story shopping center, is expected to use 20% less electricity and realize reduced operating costs.
- Forest City is implementing a broad and aggressive program to prioritize energy efficiency, incorporating eight different measures.
- Because the shopping center is located close to the ocean, one notable equipment maintenance challenge is the highly corrosive effect of intake of fresh salt air.

SOLUTIONS

Chilled air delivery system improvements are reducing operating costs through:

- Installation of variable speed centrifugal chillers that operate efficiently at full load and part load conditions.
- Upgrade of central plant actuators from pneumatic to direct digital controls.
- Retrofit of variable frequency drives on all condenser water pumps and air handlers.

OTHER BENEFITS

- Multi-dimensional smart building controls, and an improved energy management system with new backbone, controls, BACnet interface, and web-enabled control, will reduce electric costs while promoting grid stability and powering affordability in the community.
- Improvements allow Forest City to participate in Southern California Edison's Auto Demand Response program, a partnership with local utilities and grid operators to reduce power needs during peak periods.



STAPLES ORLANDO FULFILLMENT CENTER #4895

Showcase Project: Staples

LOCATION

Orlando, FL

PROJECT SIZE

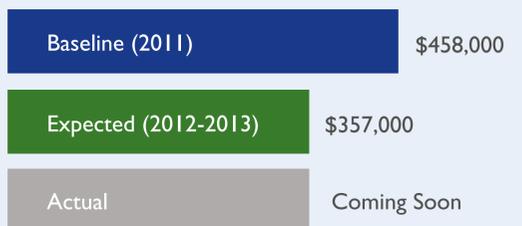
550,000 Square Feet

Annual Energy Use (Source EUI)



Expected Energy Savings: **22%**

Annual Energy Cost



Expected Savings: **\$101,000**

BACKGROUND

- Fully air-conditioned warehouse facility, built in 1990.
- Employs 266 Staples associates and operates 120 hours each week.
- Project began in May 2011 and was completed in June 2012.

OTHER BENEFITS

- Implementing the program across Staples' remaining fulfillment centers.
- Expects ENERGY STAR® performance rating to move from 41 to 61.

SOLUTIONS

- Took a comprehensive approach in identifying and implementing a host of energy efficiency measures through the GE eco-Treasure Hunt program.
- Energy reduction opportunities identified by a team of GE representatives, members of the Staples energy reduction team, and the on-site facilities team.
- Energy efficiency upgrades included:
 - Lighting retrofits: warehouse, office, and exterior parking areas with high-bay T5 lamps, new office lighting, and LED lighting in dock areas.
 - Occupancy sensors on warehouse fans.
 - Vending machine sensors.
 - HVAC energy management system and variable frequency drives on rooftop units.
 - New battery management system.



WYNDHAM SUPER 8 UKIAH HOTEL

Showcase Project: Wyndham Worldwide

LOCATION

Ukiah, CA

PROJECT SIZE

19,000 Square Feet

Annual Energy Use (Source EUI)

Baseline (2011) 137 kBtu/sq. ft.

Actual (2012) 120 kBtu/sq. ft.

Energy Savings: **13%**

Annual Energy Cost

Baseline (2011) \$30,100

Actual (2012) \$26,300

Savings: **\$3,800**

BACKGROUND

- A franchised property and member of the Wyndham Hotel Group Green Advisory board.
- The hotel holds weekly employee sustainable practices training; guests are encouraged to participate in green initiatives.

SOLUTIONS

- Added new HVAC systems, insulation, and upgraded 60 doors and frames since 2005.
- Electric vehicle charging station is the first charging station for hotel guests in Ukiah/Mendocino County.
- ENERGY STAR® appliances, and all interior lighting has been upgraded to CFLs.
- Exterior metal halide lights retrofitted with 40/80w induction bulbs, taking advantage of a 60% rebate from the utility company.

OTHER BENEFITS

- ENERGY STAR score increased from 56 in 2006 to 85 in 2011; received the ENERGY STAR label in 2012.
- Awarded TripAdvisor GreenLeader at the Silver level.
- Green Business Bureau platinum certification, and listed on AAA's green hotel listings.