

GREEN "ENERGY" RETROFITS

Presenters

Tim Michels

Energy Solutions, Inc
7584 Olive, Ste 208
Saint Louis, MO 63130
314 644-2629
timm@energysolutions-stl.com

Bernard Thompson

Missouri Department of
Natural Resources
P.O. Box 176
Jefferson City, MO 65102
573 751-7466
bernard.thompson@dnr.mo.gov



Overview and Experience

- The State Energy Loan Program is directed to:
 - K-12 Public Schools
 - Institutions of Higher Learning
 - Municipal/County Entities
- ESI has participated in loans for
 - Missouri Botanical Garden (3)
 - Webster School District
 - St. Louis County (2)
 - Southeast Missouri State (2)
 - School District of University City



Two Case Studies

Energy Efficiency Retrofits at Educational Institutions

Funded by Missouri's Revolving Energy Loan Program



Energy Retrofits Summaries

School District of University City

Project Cost: \$6.2 MM
Project Loan: \$4.5 MM

Documented Savings:
\$350,000

- Renovated over 800,000 SF in 10 Buildings
- Lifecycle replacement point for heating plants
- 1 year planning program
- 2 year implementation program



Energy Retrofits Summaries

South East Missouri State: Sikeston

Project Cost: \$690,000
Project Loan: \$535,000

Projected Savings:
\$50,000



- Building was constructed in 2 phases. Had major HVAC problems.
- Early Lifecycle replacement point for cooling plant (4 yrs)
- 1 year planning program
- Implemented Spring '08 (3 months)



Steps to Success

1. Create a Energy Master Plan
2. Establish a Baseline of Energy Consumption
3. Establish an Energy Use Index of Facilities
4. Audit Physical Plant and Equipment
5. Identify Opportunities for EE Upgrades
6. Apply for Funds from Missouri DNR's Energy Loan Fund
7. Implement Upgrades
8. Monitor and Verify Project Performance

Energy Master Planning

- Set an institutional policy for guiding investments in energy efficiency. Criteria should include:
 - Required Payback or ROI
 - Lifecycle Considerations
 - Timing to match remodeling or expansion projects



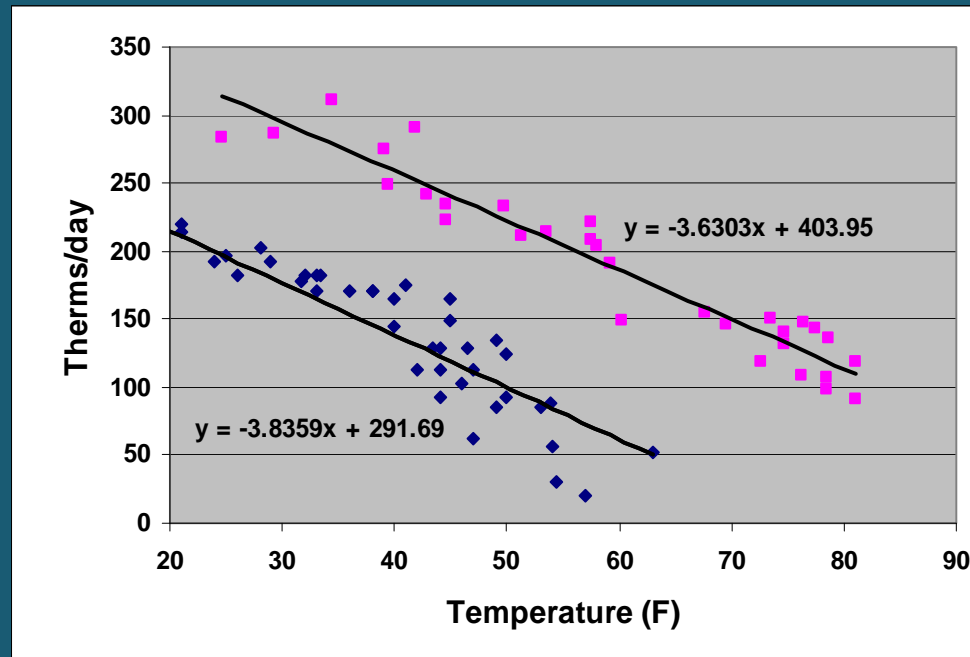
UCSD and SEMO set their project guidelines according to the paybacks required by the Missouri Energy Loan Fund:

11-12 year payback or better

Can't Manage What You Don't Measure

Establish a Baseline of Energy Consumption

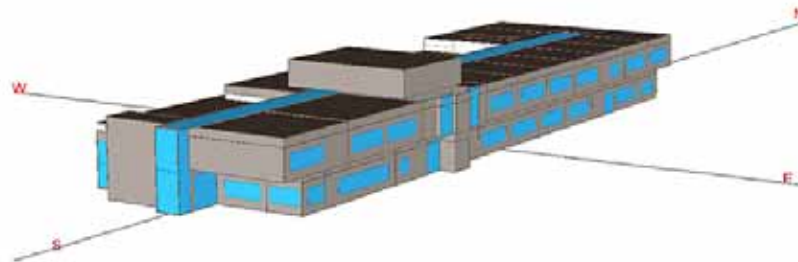
- Measurement shows the size of the goldmine
- A Baseline is required for accurate documentation of savings



Computer Modeling May Be Required

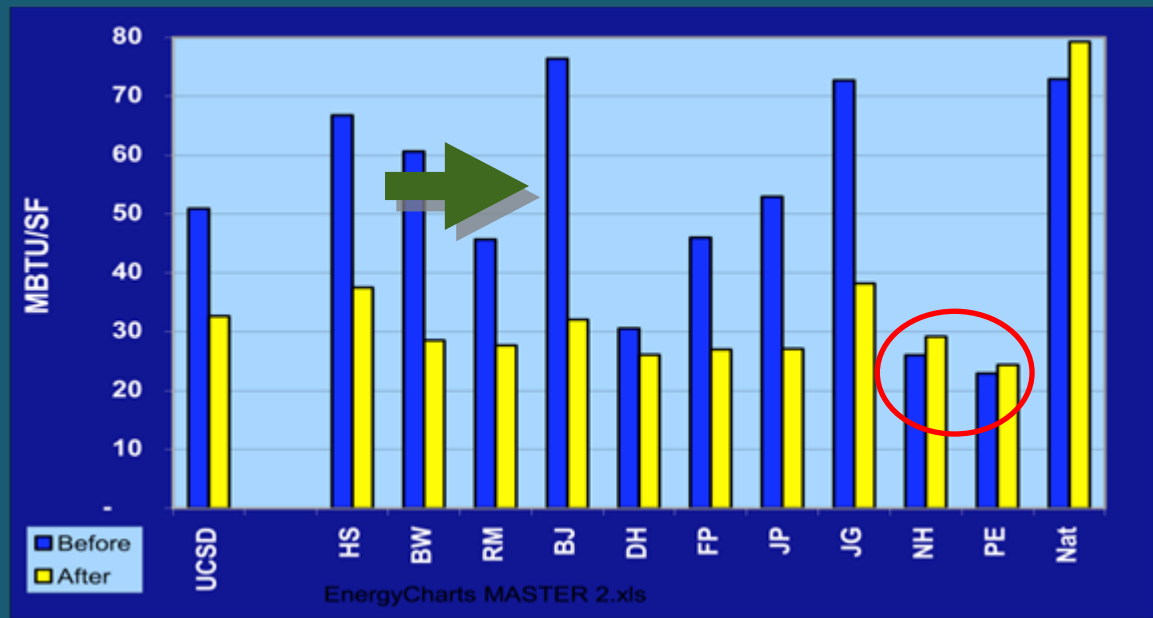
- If accurate meter data are not available
- For loan documentation for TAR
- For tax benefits under federal programs
- For LEED EA Credits

Computer Generated Block Model of the SAHEC



Establish Facilities' Energy Use Index

- Target the hogs (Steam vs. Hot Water heating)
- Should also establish sub-systems life cycle index and building functionality index



Energy Efficiency Upgrades: UCSD



Steam to Hot Water Boiler Conversion



Insulated Attics

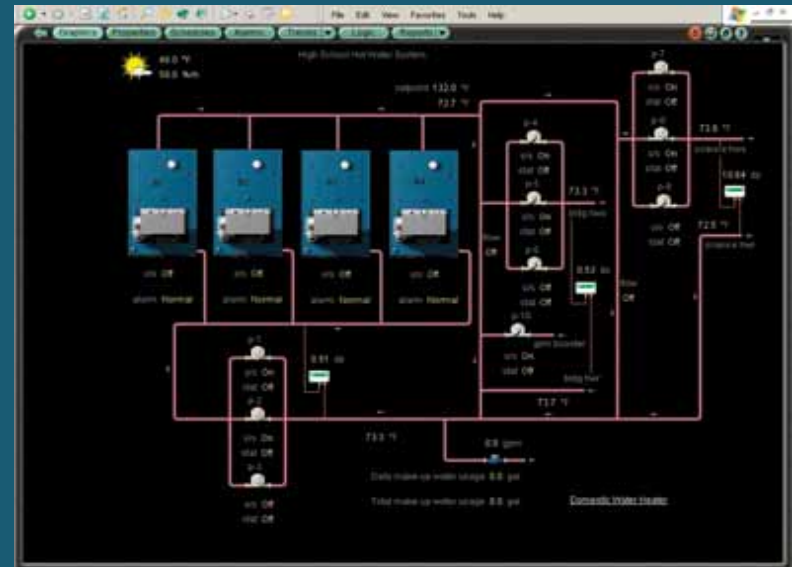


Lighting:

- T8s, CFLs,
- Occupancy Sensors,
- Day-Lighting Sensors



- T5HO High Bays



Upgraded Controls:

1. Installed Web-based Building Automation System,
2. Commissioned Equipment

Energy Efficiency Upgrades: SEMO



1. Change Air Cooled to Water Cooled Compressors (60+% Savings)
2. Upgrade boilers to higher efficiency
3. Redesign system OA and air distribution and rebalanced
4. Energy Recovery from toilet exhaust

Energy Efficiency Benefits

- Direct Benefits
 - Saves Energy and Money
 - Buffers Budgets Against Utility Rate Hikes
 - Reduces Maintenance (saves more \$)
 - Improves Occupant Comfort
 - Increases Property Value
 - Improvements *Pay for Themselves*
 - Invest in yourself: stop paying utility companies
- Indirect Benefits
 - Improves the Environment
 - Building can be teaching opportunity for sustainability
 - Reduces Energy Imports to Missouri
 - Reduces Demand, helps control costs

Issues

- The Energy Loan program is a phenomenal asset for the State at large. However:
 - It needs our help to be a regularly scheduled program – which requires more funding
 - It is under funded relative to the benefits it can secure for the State of Missouri tax payers.
 - Contact your State Representatives and Senators and have them triple the budget for the next five years (\$25 MM = 0.1% of State Budget ~ \$23B).
 - This will provide ongoing, recycled loan funds for the foreseeable future, generating an ROI for the State for decades.

