Energy Efficiency Opportunities

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Overview

• Introduction – A Little About SEDAC
• Technologies for Energy Efficiency
• Getting Technical Assistance
SEDAC Background

- Since starting in 2005 SEDAC has completed over 700 Energy Assessments.
- 55 million sf of buildings audited, 8 million sf of audit projects on the books currently.
- About 25-30% energy cost savings on average.
- Have audited a wide variety of building types.
All Types of Buildings
Typical SEDAC L3 Service

• Design Review and/or Site Inspection
• Computer Modeling of Base Case and Alternatives with ECRMs
• Energy Savings Analysis
• Life Cycle Cost Analysis
• Final Report with Recommendations
Energy Efficiency Opportunities
Benchmarking (Is it a Hog?)

• Use your energy bills to estimate:
  • $/sf per year (quick and dirty use with caution)
    ▫ < $1.50/sf = Good
    ▫ $1.50 to $2/sf = Fair to slightly poor (typical)
    ▫ $2 to $3/sf = Room for improvement
    ▫ $3/sf and above = Oink (unless there is a process)
  • kBtu/sf per year – more accurate than dollar metric – can use TargetFinder
ENGLISH LEADERSHIP ADDS VALUE TO YOUR BOTTOM LINE AND CORPORATE REPUTATION

TARGET FINDER

Save Energy, Money, and Time

- Determine an annual energy target for your building design
- Compare energy use from simulations with your target
- Monitor your design's energy performance as building plans progress
- Evaluate the cost effectiveness of energy efficiency measures
- Minimize potential greenhouse gas emissions associated with your building design

EPA's energy performance target rating uses a 1-100 scale. Lower energy use yields a higher rating.
Illinois School Benchmarks (K-12)

SEDAC Illinois K-12 School Energy Use Intensities

Electric kBtu/sf
Gas kBtu/sf
$/sf
SEDAC Experience with Energy Opportunities

• Data from 434 existing buildings show:
  ▫ 24-31% energy savings.
  ▫ 25-30% energy cost savings.
  ▫ Typical savings range of $17-48k per year.

• Data from 44 new building designs show:
  ▫ 33-41% energy savings.
  ▫ 41-38% energy cost savings.
  ▫ Typical savings range of $8-56k per year.

Typical existing building uses $1.96/sf and can save $0.47/sf. Typical new building uses $1.45/sf and can save $0.51.
Trouble Shooting with Bills

Therms


Actual
Comparing the Bills and the Computer Model

![Graph comparing actual, base model, and worst case therms from Jan-07 to Dec-07.]
Small versus Large Buildings

• Envelope dominated versus internal gain dominated.

• Smaller Buildings (envelope dominated):
  ▫ Envelope very important
  ▫ Systems important
  ▫ Lighting important
  ▫ Plug loads less important

• Larger Buildings (internal gain dominated):
  ▫ Envelope less important
  ▫ Systems very important (ventilation)
  ▫ Lighting very important
  ▫ Plug loads important
Where Do I Start?

- **New Designs:**
  - Loads (envelope and lighting)
  - Systems (HVAC types, sizing, and ventilation)
  - Controls (operating parameters)

- **Existing Buildings:**
  - Controls (operating parameters)
  - Loads (envelope and lighting)
  - Systems (HVAC types, sizing, and ventilation)
The SEDAC Top 10 Energy Measures

- Lighting:
  - Choose efficient lighting sources and vacancy controls using high output T8 (or T5) fluorescent lamps with appropriate electronic ballasts, compact fluorescent lamps, and LED exit signs.
  - Existing buildings also need controls.
  - New designs benefit from more efficient fixtures, better layouts, & motion detectors.
The SEDAC Top 10 ECRMs

- Building Envelopes (beyond code):
  - Insulate beyond code: walls to at least R-13 plus R-11 continuous, and roofs to R-49 or R-25 continuous.
  - Perform air sealing at all joints, penetrations, windows, and doors.
  - Use low-E, gas-filled windows with U-values equal to or less than 0.33.

The SEDAC Top 10 ECRMs

- Heating, Ventilating, & Air-Conditioning:
  - Use sealed combustion high efficiency boilers and furnaces (92% AFUE or better).
  - Consider geothermal heat pumps or PTHPs.
  - Install programmable thermostats for setback/set-up.
  - Demand control ventilation (schedules, CO₂ sensors)
The SEDAC Top 10 ECRMs

• Heating, Ventilating, & Air-Conditioning:
  ▫ Use high efficiency (SEER 14+, EER 11.5+) Air-Conditioning units with outdoor air economizers.
  ▫ Use variable frequency drives on electric motors with variable loads.
The SEDAC Top 10 ECRMs

- Use ventilation heat recovery systems
- Modulate ventilation rates based on occupancy schedule or use demand control ventilation (CO₂).
To Apply for SEDAC Assistance

Illinois Smart Energy Design Assistance Center

Web site: www.sedac.org
Contact: info@sedac.org
1-800-214-7954
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