Benefits of High Performing Buildings

Getting the Bang for Your BTUs

Ron Willhite, Director
KSBA-SEMP

Kentucky High Performance Public Facilities Workshop

Hazard, KY

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High-Performance Building

- Building that integrates and optimizes all major high-performance building attributes (**Energy Policy Act of 2005)**

- Building that integrates and optimizes on a life cycle basis all major high performance attributes (**Energy Independence and Security Act of 2007)**

  - Energy efficiency
  - Cost-Benefit
  - Durability
  - Occupant productivity
  - Operational
  - Sustainability
  - Functionality
  - Security
  - Safety
  - Accessibility

Statutory Requirements
(2008 and 2010)

- **KRS 160.325 – School Energy Management**
  - Develop & Implement Energy Management Plan
  - Annual Report to Board & Legislative Research Commission

- **KRS 157.455 – Highly Efficient Buildings**
  - Meet or Exceed Efficiency Standards
  - Use Life-Cycle Analysis in Proposal Evaluation
  - Consider Net-Zero Construction

Wasted Energy = Money on the floor waiting to be picked up

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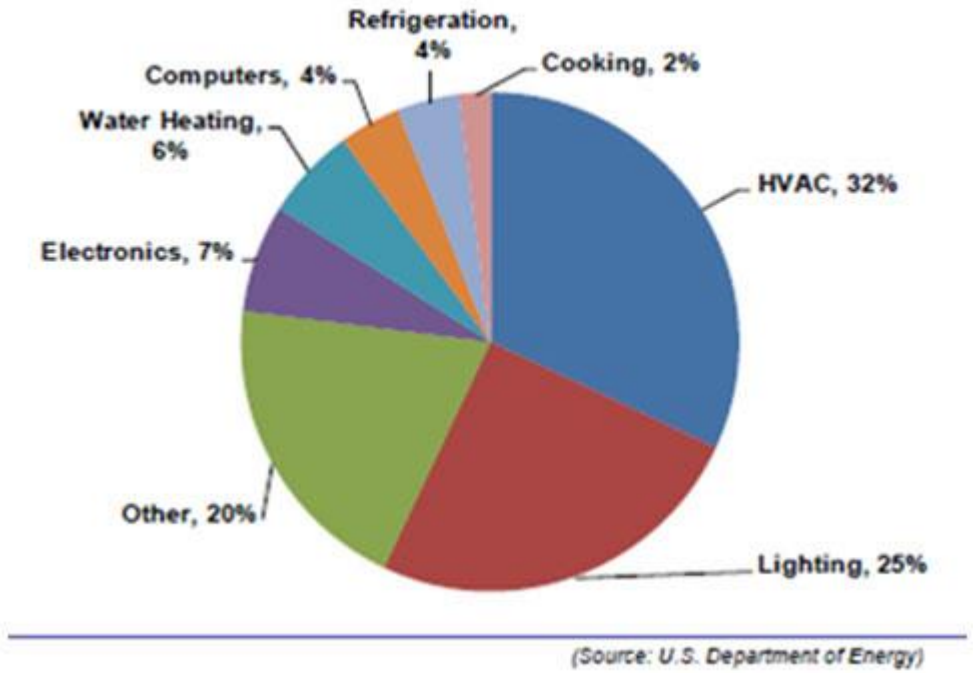
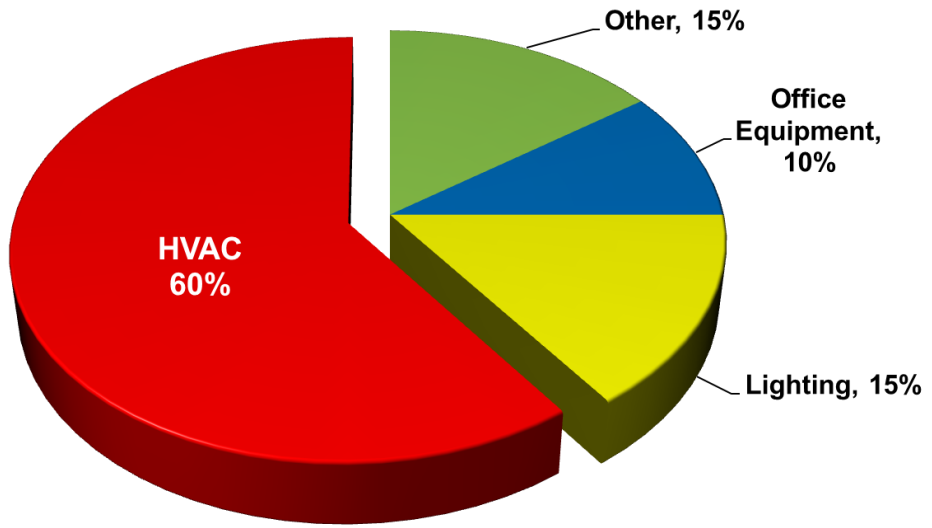
Typical Building Energy Usage

COMMERCIAL BUILDING



(Source: U.S. Department of Energy)

SCHOOL



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Energy Efficiency Triangle

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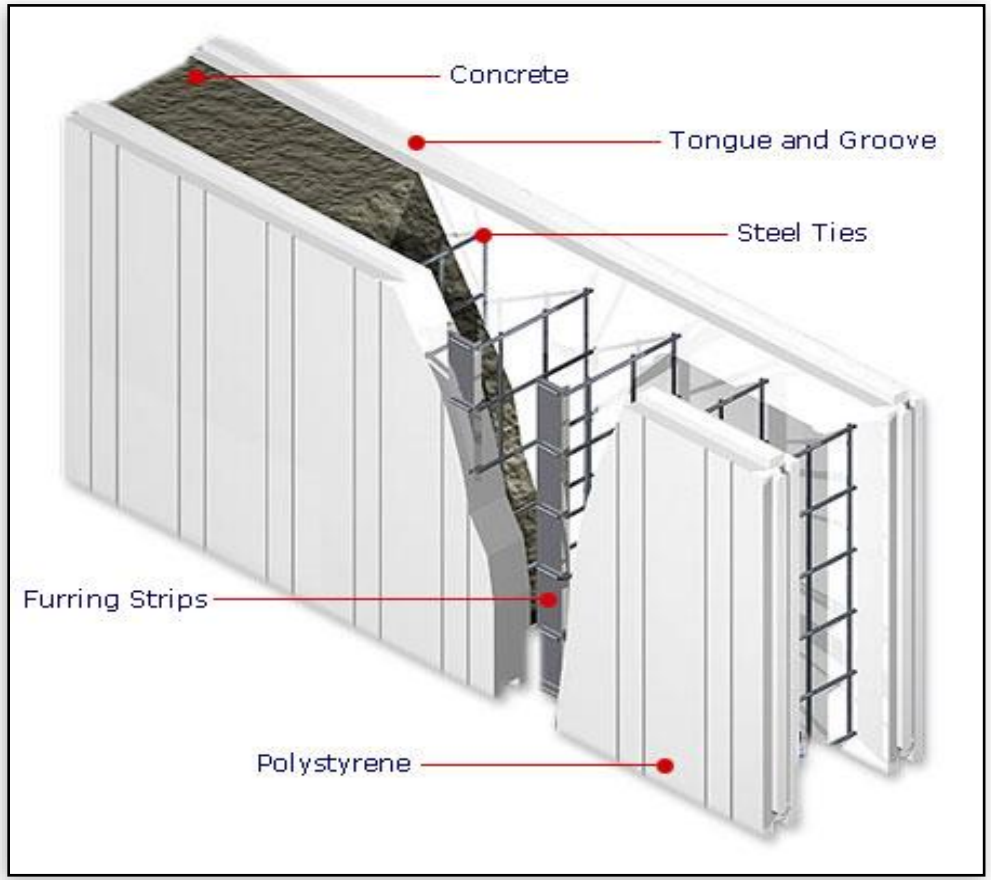
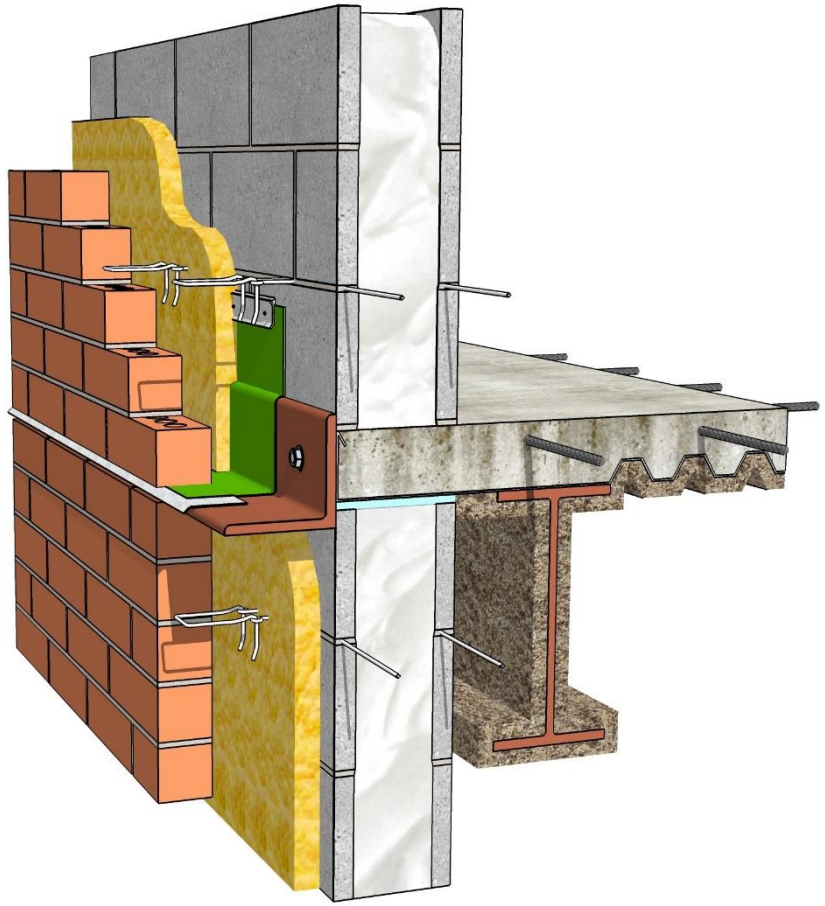
Energy Construction and Renovation

- Are we taking advantage of energy construction and renovation to reduce our long-term operating costs?
- Are we using life-cycle costing as a part of our initial decision-making process?
- Are we building and renovating in a manner that creates a healthy environment for students while saving energy and operational expense?

Insulated Concrete Walls





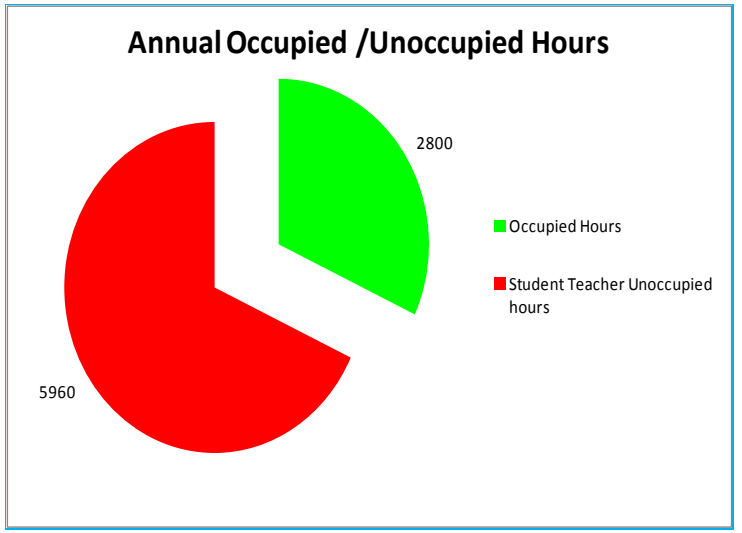
HVAC Best Practice Trends

- Geothermal remains popular for new construction and major renovations
- VRF systems gaining popularity
- Energy Recovery Wheels and CO_2 Sensors on makeup air

High Leverage Technology Changes

Building Automation Systems

- Web-based Digital Control Systems for zone and individual room control
- Integrated Lighting Controls
- Sophisticated Systems that require *training* and *succession*
- Allows optimization of occupied and unoccupied times.



Solar Energy

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Efficient Operations

- Do our daily operations match our policy?
- Do we audit our buildings for energy opportunities?
- What is our prioritized list of energy projects?
- Do we use what we have?

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Energy Manager

- Coordinates Requirements of Energy Policy
- Develops & Implements Energy Management Plan
- Commits to Performance Goals
- Analyzes and Implements ECMs
- Accumulates and Provides Data
- Saves Districts Energy and Dollars

Behavior Opportunities

Why is my room always cold?

Mini Fridge

Coffee Pot

Power Strip

DVD Player

Microwave

Lamp

Thermostat

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Outreach and Communication

- How do we compare Month to Month and YTY? Who knows?
- How does our energy cost/square foot compare with statewide and national data?
- What messages are on our website concerning energy policy?
- Are we communicating our energy efforts and savings?

Recognition

Turkey Foot Middle School Net Zero Ready

- Demand controlled ventilation;
- Insulated concrete form walls;
- 384kw solar panel system;
- Geothermal HVAC; geothermal walk-in cooler and freezer,
- Solar light tubes; natural daylight harvesting; lighting controls system;
- Energy efficient kitchen equipment;
- High efficiency transformers; electrical sub-metering;
- Rainwater catchment tank, vegetative roof, vital signs system,
- Dedicated heat recovery outside air systems
- **23.6/kBtus/sf** without solar

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Richardsville Elementary Net-Zero Energy School

- High Performance Building Envelope:
- Building Orientation:
- Geothermal HVAC:
- Technology Strategies:
- Daylighting:
- Solar Panels:
- Kitchen Strategies:
- Renewable Materials:
- **16.2/kBtus/sf** without solar

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Questions ??????

Ron Willhite

Director School Energy Managers Project
Kentucky School Boards Association

ron.willhite@ksba.org

502.783.0058


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Key Factors for Successful Energy Management Program

- Support from Senior Leadership
- Buy in by building leaders
- Buy in from all staff
- Educate staff/users on saving energy
- Provide weekly and monthly report for competition
- Identify Energy Conservation Measures (ECM's)
- Implement ECM's
- Recognize achievements