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## Challenges

- ⦿ **Energy – cost and availability**
- ⦿ **Food – cost and availability**
- ⦿ **Protecting the environment**



# ASHRAE

- ◎ **52,000 members in 130 countries**
- ◎ **170 chapters in 24 countries**
- ◎ **Associate Societies in 32 countries**
- ◎ **2500 members active on committees**



## Energy

- ◉ **Cost and availability**
- ◉ **End use in developed economies**
  - ◉ **Buildings – 40%**
  - ◉ **Transportation 28%**
  - ◉ **Industry 32%**
- ◉ **Coal and oil primary energy sources**
- ◉ **50% Growth between 2005 and 2030**



## Food

- **Cost**
  - Energy driven costs
  - Spoilage
- **Availability**
  - Cost and spoilage
  - Foodstock diversion
- **Refrigeration – large energy consumer**



## Environment

- ⦿ **Buildings use 70% of electricity**
- ⦿ **Extensive emissions from generation**
- ⦿ **Water use for generation**



# ASHRAE Strategic Plan

- ⦿ **Strategic Direction # 1**
  - ASHRAE will lead the advancement of sustainable building design and operation*
- ⦿ **2007-2008 Focus on design**
- ⦿ **2008-2009 Focus on operation**



# Energy Waste

*A Real Problem... A Real Opportunity*



# Sustainability for ASHRAE

**Energy Efficiency**

***And***

**Healthy and Productive Indoor  
Environments**



# Improved Operating Strategies

- ⦿ **Energy Systems Lab - Texas A & M**
  - Save 10% to 40% energy
- ⦿ **Not product centered**
- ⦿ **Software and expert knowledge focused**
- ⦿ **Limited knowledge distribution**



# Improved Operating Strategies

- ⦿ **Lack of standardization**
- ⦿ **Minor changes use major energy**
- ⦿ **Wrong incentives for operators**
- ⦿ **No training programs**



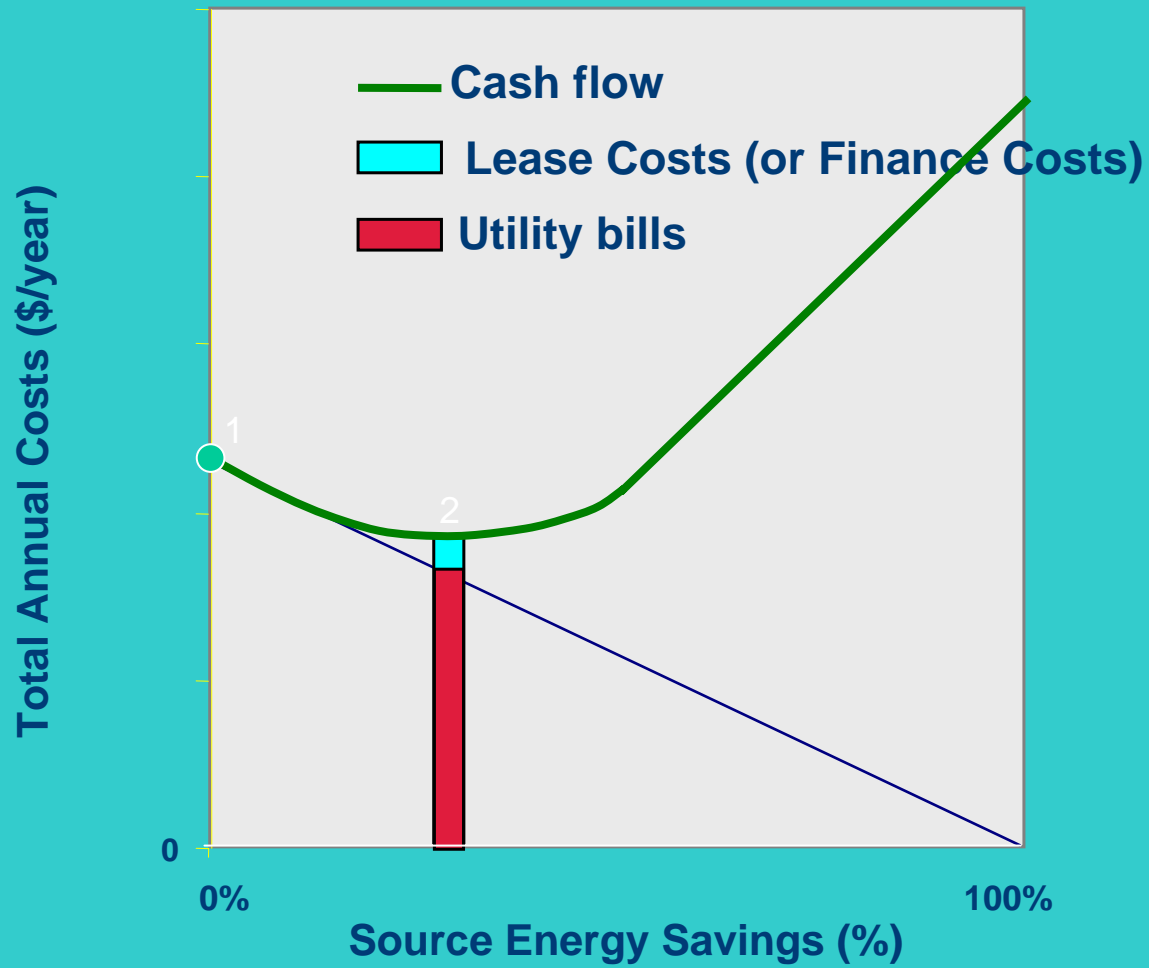
# Sustainability Challenge

- ⦿ **Six of top ten energy measures under control of architects**
- ⦿ **Integrated Building Design process essential**
- ⦿ **Communication - collaboration**
- ⦿ **“First Cost” mentality**
- ⦿ **Engineers: evil enablers**



## Owner Issues

- ⦿ **Life Cycle Costing**
- ⦿ **Equipment room sizing**
- ⦿ **Engineers need to deliver energy message**
- ⦿ **Energy cost implications**
- ⦿ **Building Commissioning**





## Owner Organizations

- ⦿ **Building Owners and Managers Association**
- ⦿ **International Facility Management Association**
- ⦿ **APPA – The Association of Higher Education Facility Executives**



# Operator Training

- ⦿ **Local chapter program**
- ⦿ **HVAC fundamentals**
- ⦿ **High performance products and systems**
- ⦿ **1980's training produces 1980 results**



# High Performance Building Design

**Energy Modeling  
Building Narrative**



# High Performance Building Design

**A larger budget for planning and  
design produces lower  
construction costs and lower  
operating costs**



# The Cost of Owning HVAC

- ⦿ **Capital costs**
- ⦿ **Utility costs**
- ⦿ **Repair costs**
- ⦿ **Replacement costs**
- ⦿ **Maintenance costs**



# Maintenance Plans

- ⦿ **ASHRAE Guideline 4 – 2008**
  - ⦿ **Preparation of Operating and Maintenance Documentation for Building Systems**
- ⦿ **CIBSE Guide M – 2008**
  - ⦿ **Maintenance Engineering and Management**
- ⦿ **Must include energy budgets and energy reporting**
- ⦿ **It's simple: keep it clean**



# The Buildings Business

- ⦿ **Largest user primary energy**
- ⦿ **Improved building operations**
  - ⦿ **10% to 40% energy savings**
- ⦿ **Local educational programs by ASHRAE chapters**
- ⦿ **Keep our green buildings green**



# Global CO2 Emissions

- ⦿ **2008: 30 Billion Metric Tons**
- ⦿ **2030: 42 Billion Metric Tons**



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## ASHRAE's Role

- ⦿ **Net zero design guidance by 2015**
- ⦿ **Building Energy Labeling**
- ⦿ **Reduce energy in existing buildings**
- ⦿ **Affordable and maintainable refrigeration systems**
- ⦿ **Efficient refrigeration systems**



# ASHRAE Chapter Actions

- ⊙ **Schedule a meeting with local owner organizations**
  - ⊙ **Integrated Building Design**
  - ⊙ **Keep your Green Buildings Green**
- ⊙ **Get comfortable with building energy benchmarks:**  
*“What’s your EUI?”*
- ⊙ **Walk the talk – how is your building being operated?**