



Building Equipment & Processes

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Overview

- General building equipment
- Industrial processes
- Potential ECMs



Building Equipment

- Computer systems
 - Personnel Computers
 - Central equipment - mainframes, Servers, etc.
- Vending machines
- Copiers
- Water coolers
- Coffee makers. etc



ECM – Building Equipment

- Turn off vending equipment in vacated buildings
- Shut down computers and water coolers over night and on week-ends



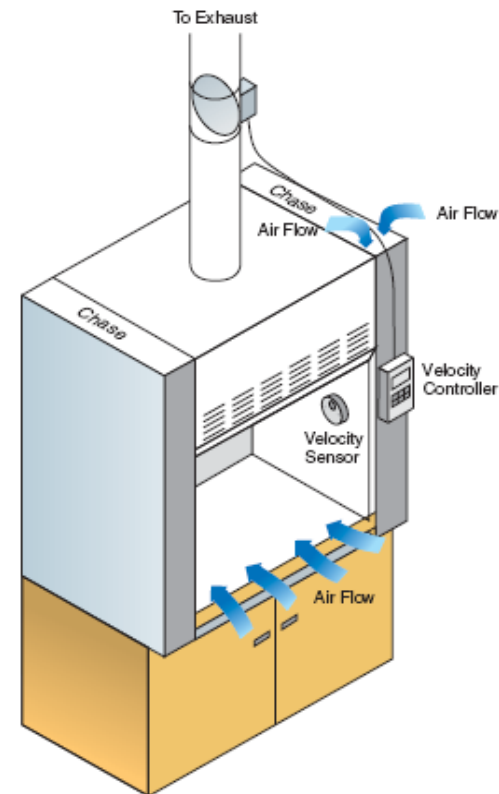
Energy Intensive Building Processes

- Cooking and cleaning – Dining facilities
 - To be discussed in later session
- Laboratory equipment – Health care and Research facilities
- Industrial processes – Maintenance shops and Depot/Arsenal industrial operations

ECM – Laboratory Equipment

Convert Fume Hoods to VAV

- Many lab hoods operate continuously
- Often no activity occurring in hood
- Change controls to VAV exhaust
- Close hood when not using
- When hood is opened exhaust will increase to provide 100 FPM inflow
- Generally limit sash opening height to 24"
- Saves fan Hp & energy to temper make-up air
- Cost per hood \$ 5,000 with 3.2 year payback





ECM – Laboratory Buildings

Cascade Air from Offices to Labs

- Lab areas are ventilated using once-through air and much outdoor air is required
- Utilize some of the office air to make-up the laboratory exhaust air which would be exhausted anyway.
- This saves energy and provides proper air movement from clean spaces in a building to those that are less clean
- Same approach applies to certain spaces in industrial buildings



INDUSTRIAL ENERGY USE

- Industrial facilities use approximately 25% of the energy consumed in the USA
- This economic sector has a high energy intensity
- Energy intensity is declining due to improvements in efficiency and slow growth of the most intensive industry types



INDUSTRIAL PROCESS AND ENERGY OPTIMIZATION ASSESSMENTS

Assessment Goals

- Eliminate waste
 - Poor maintenance
 - Improper system operation
- Improve efficiency
 - Replace existing
 - System upgrade
 - Waste recovery

POTENTIAL INDUSTRIAL PROJECTS

- Industrial Processes
- General Systems
 - HVAC
 - Lighting
 - Motors
 - Compressed air
 - Boilers
 - Chillers

INDUSTRIAL PROCESS PROJECTS

■ Painting Operations

- Reduced air flow when not painting
- Match oven with painting production
- Adequate paint preparation area
- Recycle oven air
- Deliver properly conditioned air
- Balance supply air with exhaust
- Enhance paint booth tightness



INDUSTRIAL PROCESS PROJECTS CONTINUED

- Heat treat operations
 - Heat recovery
 - Natural ventilation
 - Close capture exhaust
 - Production planning



INDUSTRIAL PROCESS PROJECTS CONTINUED

- Plating operations
 - Use tank covers to reduce exhaust
 - Reduce exhaust air flows where possible
 - Production planning for efficient operation



INDUSTRIAL PROCESS PROJECTS CONTINUED

- Welding operations
 - Variable flow exhaust
 - Flexible and easy to use hoods
 - Close capture exhaust



INDUSTRIAL PROCESS PROJECTS CONTINUED

- Part Machining & Assembly
 - Use enclosures
 - Avoid stressful environments
 - Improved efficiency
 - Reduced scrap
 - Employee break reduction



INDUSTRIAL GENERAL SYSTEM PROJECTS

■ HVAC

- High efficiency boilers, chillers
- Heat recovery
- Improved controls
- Local exhaust
- Control building air flow



INDUSTRIAL GENERAL SYSTEM PROJECTS CONTINUED

■ HVAC

- Adjust conditions during unoccupied times
- Use evaporative coolers for heat relief
- Use direct fired gas heating
- Consider thermal storage systems with large chilled systems

INDUSTRIAL BUILDINGS PROJECTS

- Building design goal – to effectively house processes that produce products.
- Building space is programmed to maximize production aided by material handling systems.
- Provide vestibules
- Seal openings
- Utilize cool roofs





Questions?