Identifying Process Energy Efficiency Opportunities at Facilities

Minnesota Technical Assistance Program

University of Minnesota
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What to expect

• …integrating energy efficiency (E2) practices into pollution prevention (P2) planning practices
• …discuss their experience working with facilities to identify operational improvements and other opportunities to become more energy efficient
MnTAP at a glance

• A continuum of learning, adapting, and applying
  – On-site assistance
    • Site visits, interns, company teams
    • Demonstrations and research projects
  – Minnesota Materials Exchange
  – Communications and outreach
    • Web site and social media
    • Fact sheets and case studies
MnTAP at a glance

- Cost savings achieved

- Telephone and email assistance: 1%
- Site visits & Teams: 47%
- Intern projects: 52%
MnTAP: Connecting the dots

- Legislation to help business with new hazardous waste regulations
- Legislation to integrate pollution prevention into assistance
- Staff with relevant backgrounds
  - Adaptability
  - Immersion
  - Training

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www.mntap.umn.edu

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MnTAP: connecting the dots

- Identify with the pulse of Minnesota business concerns
  - Process efficiency
  - Related process energy costs
  - Business priorities (quality, waste, and energy)
- Energy legislation obliges utilities to conserve
Integrating E2 practices

• What
  – P2 plans since early 1990s

• How
  – Step 1: Getting started
  – Step 2: Use a team
  – Step 3: Determine a baseline
  – Step 4: Determine and analyze alternatives

• Why
  – Step 5: Set objectives for implementation
Energy efficiency strategy

- Why we concentrate on *process* energy?
  - Familiarity and experience
  - Targeted: likely the major contribution to energy load at a facility
  - Partnerships with utilities
  - Helps to frame utility custom rebate opportunities
Why process energy?

- Energy efficiency is integral to traditional pollution prevention impacts
  - Process efficiency
  - Defects
  - Waste generation
- A productive outgrowth of multimedia cross-training
Why process energy?

• We tend to look at how equipment is used in the process at least as much as the equipment itself
Why process energy?

• Important to understand and analyze the entire process, not an individual, isolated piece of equipment
  – Why this equipment?
  – How is this related to that?
  – Why this speed, pressure, flow rate?
  – Where does this piping go?
  – If you improve this step, do you need to do that step?
Operations we concentrate on

- Department of Energy emphasis topics
  - Energy intensive
  - Aging yet robust infrastructure
  - Old technology
  - Built and installed when energy costs were not as important
  - Overlooked as overhead
  - High replacement cost
  - Complex systems
Operations we concentrate on

• Compressed air
  – In wide use across most industries
  – Inherently inefficient
  – Uncontrolled
  – Free
  – Misused and abused
Operations we concentrate on

• Process heat
  – Boilers, steam
  – Furnaces and ovens
  – Wasted heat

• Fans and pumps
  – Baghouses
  – Wastewater treatment plants

• Motors
  – Multiple applications
Needed expertise

• Industrial process refrigeration knowledge is currently a need
  – Interest group forming
    • Contact Jamey Evans
    • Golden Field Office (U.S. DOE)
    • Energy Efficiency & Renewable Energy
    • 303-275-4813
How we identify opportunities

• Analyze the process
  – Speeds
  – Pressures
  – Temperatures
  – Flows
  – Cycle times
How we identify opportunities

- Measure with data logging
  - Operational nuances
  - Record of performance
  - Before and after perspective

- Discover the best efficiency point
How we identify opportunities

- Overlay best practices
  - Heat recovery
  - Automation and process control
  - Predictive and preventive maintenance
  - Standardization
  - Close loops
Project: Researching energy conservation potential

- Initiated statewide roadmap for industrial energy efficiency
- Identified savings potential
  - 25 million therms
  - 271 million kWh

Sponsor: Minnesota Department of Commerce
Project: P2 and E2 in metal fabrication facilities

- 40 facilities affected
- Significant implementation
  - 11,500 lbs of waste
  - 4.6 million gallons of water
  - 1.3 million kWh
  - 4,000 therms
  - $90,000

Sponsor: U.S. EPA Region 5
Project: Energy efficiency program for Minnesota businesses

- 3 trainings, 24 assessments, 3 tech demos

- Implemented savings
  - 1,672,150 kWh
  - 158,100 therms
  - $197,000

- 2 - 2011 intern projects

- State-wide reach

Sponsor:
U.S. Department of Energy through Minnesota Department of Commerce
Impact: Meat processor

- DOE energy assessment
- Team with MnTAP assistance
- Implemented changes
  - 88,000 therms
  - 11 million gallons
  - $75,000
So- what makes sense

• …integrating energy efficiency (E2) practices into pollution prevention (P2) assistance
• …working to identify operational improvements leading to both waste reduction and energy efficiency
Comments/questions?

Thank you for your attention

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