Identifying Process Energy Efficiency Opportunities at Facilities

Minnesota Technical Assistance Program

UNIVERSITY OF MINNESOTA

Driven to Discover℠

What to expect

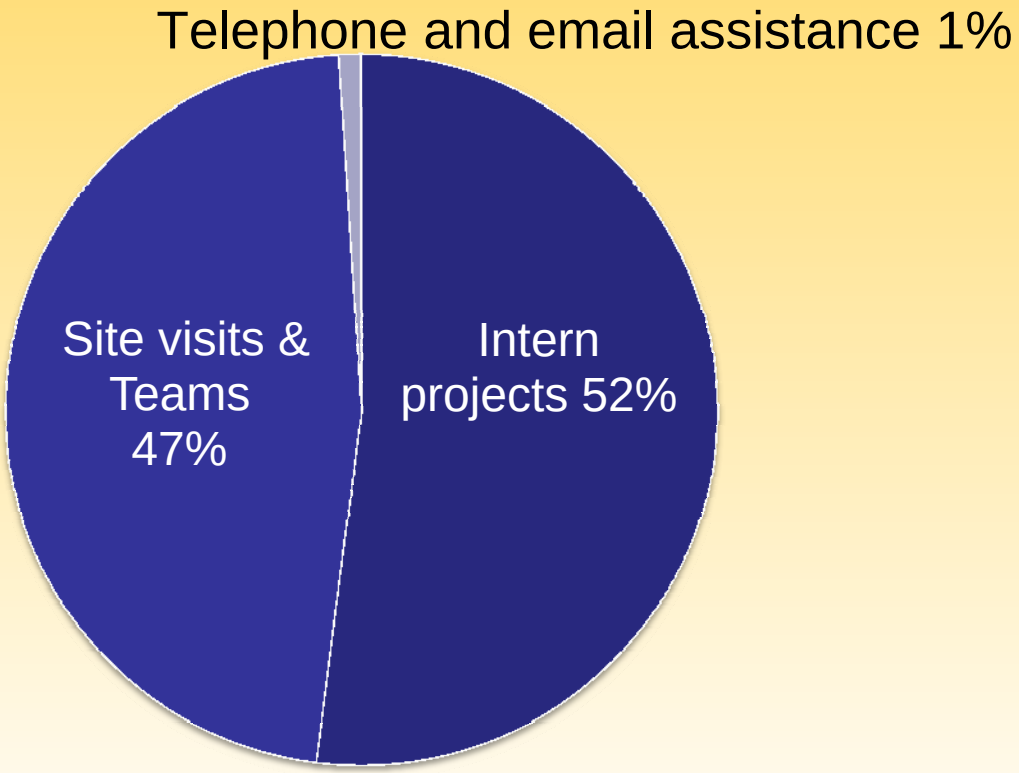
- …integrating energy efficiency (E2) practices into pollution prevention (P2) planning practices
- …discuss their experience working with facilities to identify operational improvements and other opportunities to become more energy efficient

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

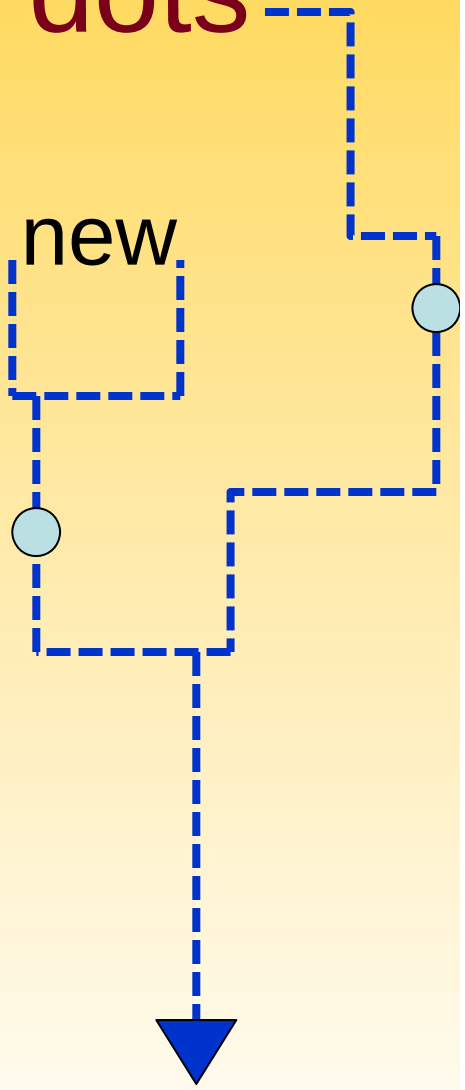
MnTAP at a glance

- Cost savings achieved



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



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?

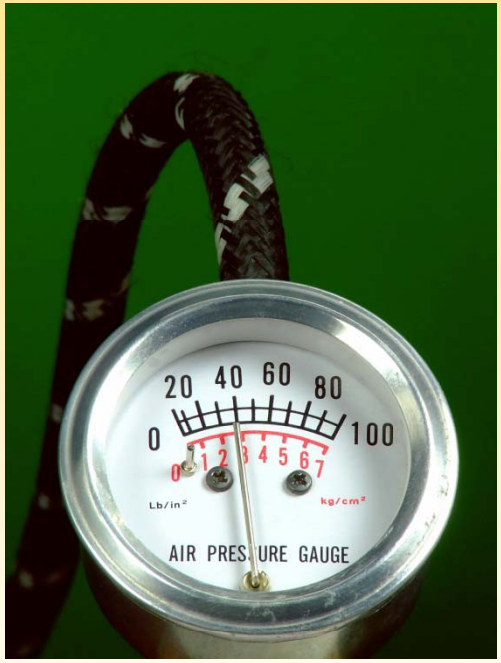
- Important to understand and analyze the entire process, not an individual, isolated piece of equipment
  - Why this equipment?
  - How is this related to that?
  - Why this speed, pressure, flow rate?
  - Where does this piping go?
  - If you improve this step, do you need to do that step?

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

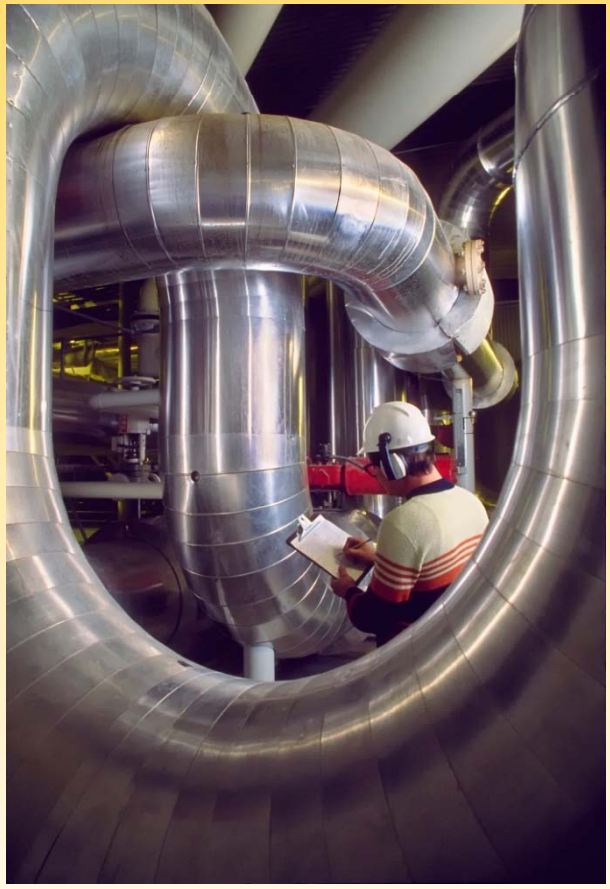
Operations we concentrate on

- 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

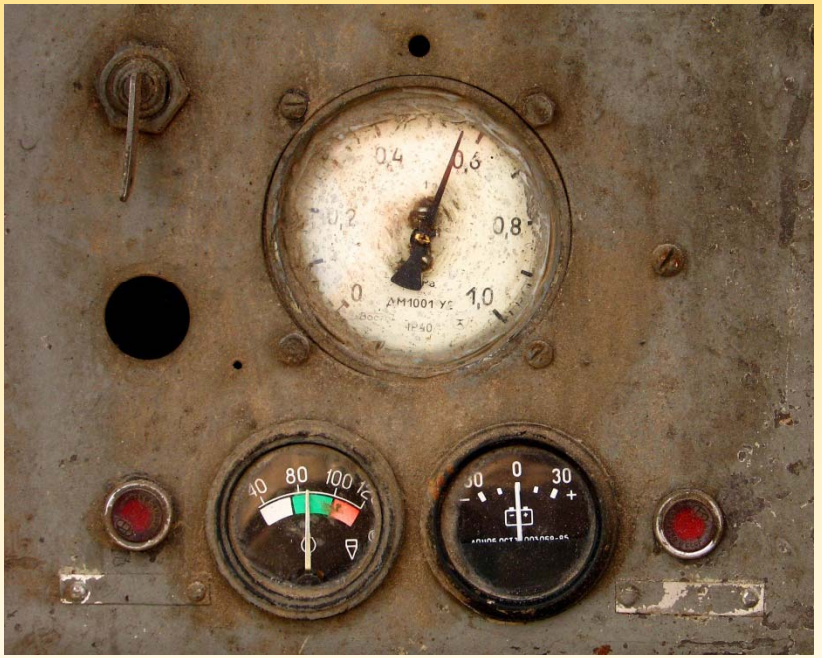


Needed expertise

- 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 of water
  - $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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