# Process & Energy Optimization Revitalizes Energy Management at Eastman

Kevin H. McGuire
PEO Project Manager
Eastman Chemical Company

# Eastman-Texas Operations

- Located in Northeast Texas
- Began production in 1952
- Over 60 different products made primarily from ethane and propane
- 2200 acres under-plant
- ~1700 employees

# Eastman-Texas Operations

- Products
  - Olefins
  - Polyolefins
  - Solvents
  - Waxes
  - Resins

# Eastman-Texas Operations

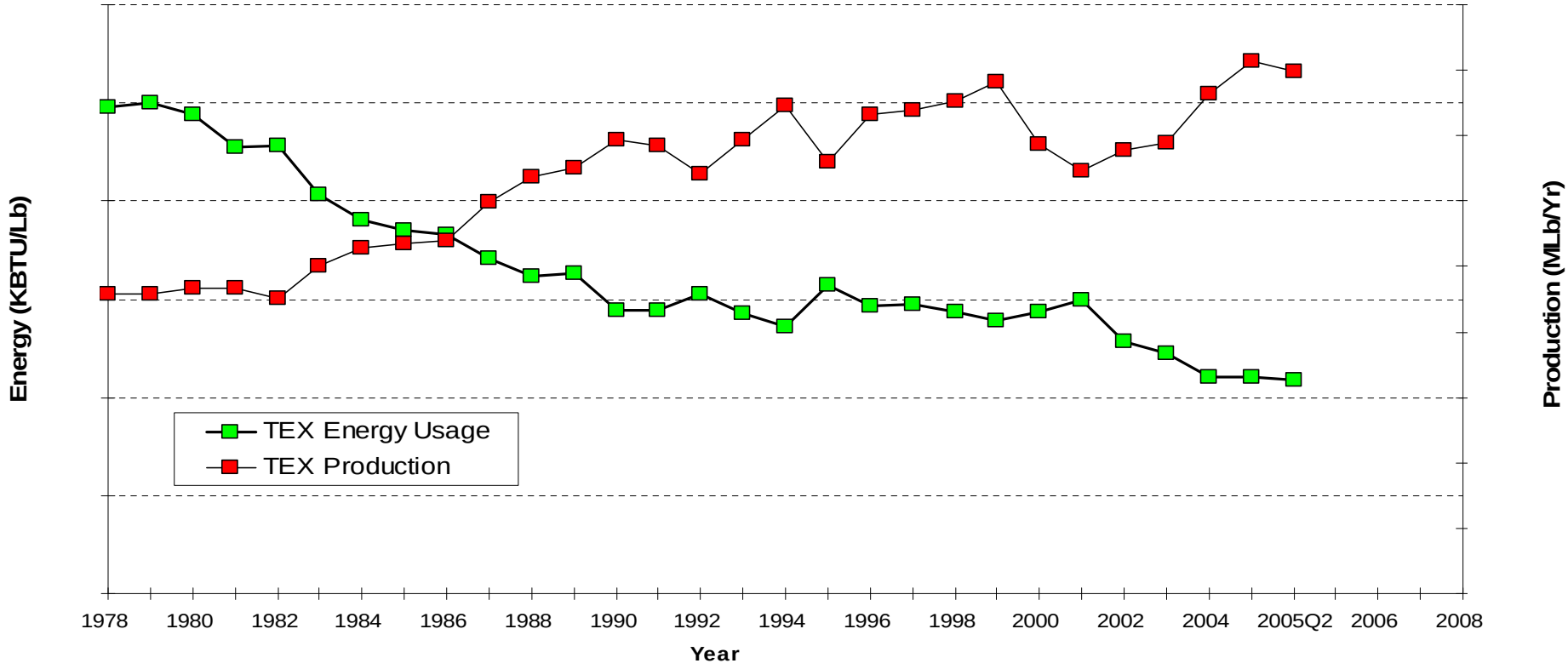
- Utilities
  - Natural Gas
  - Electricity
  - Steam
  - Cooling Water
  - Nitrogen
  - Compressed Air

# TEX Energy Structure

- For years, Eastman's natural gas price was <$1/MMBTU
- Cheap gas = Cheap steam = lots of thermal driven and fired equipment
- Current site has 11 operating boilers and one 440 MW Cogeneration facility
- Cogen came on-line in 2001; Eastman purchased Cogen in 2003

# TEX Energy Management

- Limited "energy" projects before 2003, but site continued to drive energy costs lower



# TEX Energy Management

- Rising energy prices and site's energy intensity forced the Energy Management Team into high gear
- Needed a site-wide energy optimization project – but how?
- Chose a hybrid project
- Goal was to reduce the site's energy intensity and provide benefits of ≥10% of energy bill

# Site PEO Project Development

- Developed a core PEO team
- Performed assessments of operating areas to identify energy related issues/problems
- Developed understanding of site-wide energy usage and costs
- Set PEO project milestones and goals
- Gained upper management support

# PEO Study Process at TEX

- For each PEO study area, the core team developed:
  - Specific study area teams
  - Utility usage by equipment
  - Cost basis of savings – utilities, raw materials, products, etc.
  - Process Flow Diagrams of the processes to be studied

# PEO Study Scope

- Review process energy and production issues using the PEO process developed by ETSI
- Brainstorm money saving or money making opportunities related to energy, production, etc.
- Rank opportunities
- Develop potential, short-term payback solutions
- Review and prioritize projects with management
- Add projects to PEO database for reporting and tracking

# PEO History at TEX

- 2005
  - Performed PEO studies for seven departments
  - Identified >600 potential energy and production improvement opportunities
  - Added ~200 documented projects to the PEO database
  - Completed 11 projects worth >$1M/yr
  - Committed to pursuing >50 projects in 2006 with a savings goal of >$12M/yr

# PEO History at TEX

- 2006
  - Performed PEO studies for two departments
  - Identified >200 additional potential energy and production improvement opportunities
  - PEO database now houses >300 documented projects
  - Have completed ~30 projects as of 10/31/06 with current annualized savings of >$13M/yr

# Examples of PEO Projects

- Purge Dryers with Hydrogen vs. Nat Gas
- Improve BFW Pump Operation at Cogen
- Eliminate Steam Jets for Cooling Tower Pump Priming
- Improve 1550# Steam Production and Letdown
- Enhance TEX Utilities Leak, Trap, and Insulation Program
- Decommission Underutilized Steam Distribution Piping
- Reduce Steam Usage at Incinerator
- Replace Nat Gas Engines with Elec Motors on Cooling Towers
- Advanced Controls and Heat Integration
- Improved Modeling and Use of Idled Equipment

# 2007 PEO Plans

- ~40 projects will be pursued in 2007
- Estimated ACS Goal = ~$4M/yr
- Continue Utility Leak, Steam Trap, and Insulation program focus

# PEO Project Summary

- 2005
  - Benefits = $1.3M/yr
  - Projects Completed = 11
- 2006
  - Benefits = $13.0M/yr
  - Projects Completed = 30
- 2007
  - PEO Goal = $4M/yr
  - Projects to Pursue = 40, with many more in the hopper!
  - Challenges – Resources and focus

# Benefits of the PEO Project

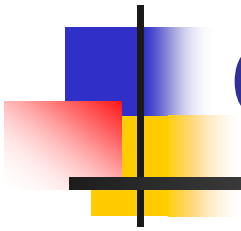
- Revitalized the Energy Management Team
- Re-focused the entire site on energy management
- Identified opportunities to debottleneck processes using the PEO process
- Improved site wide cooperation on addressing energy issues
- Provided a solid understanding of utility costs and energy issues site-wide

# Keys to a Successful PEO Project

- Upper management support
- Knowledgeable and motivated PEO teams
- Accurate and thorough process data
- Communication and cooperation
- Documentation, project tracking, and reinforcement

# EMT Path Forward

- Continue the PEO progress at TEX
  - Aggressively initiate and complete projects
  - Reload project lists from existing backlog
  - Keep the site "energy-focused"
  - Champion PEO projects at all levels
  - Using internal programs, have accountability for PEO projects at all levels



# Questions