Energy Usage Reduction Program
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Earth Recycle Image Source: http://www.pfbsustainability.com/objectives.html
Columbus Castings History

• First batch of steel melted from Parsons Avenue location in 1902
• Largest steel foundry in one location in the United States
• Energy Policy: Columbus Castings is committed to a more focused approach toward managing our energy resources, and have an overall goal to reduce our energy use 10% annually.
Energy Usage Reduction Program

• Program created May 2012 to help reduce natural resource consumption

• Program Highlights:
  ▫ Cross-sectional energy team
  ▫ Energy usage data tracking
  ▫ Multi-variable energy usage calculation formula
  ▫ Energy reduction action items including theoretical savings calculations
  ▫ Usage savings analysis
  ▫ Focus on low/no cost energy savings
Energy Team

- Energy Champion
- Executive Sponsor
- Team members
  - Manufacturing Engineer/Maintenance Coordinator
  - Facilities/Electrical Engineer
  - Melt Shop Supervisor
  - General Plant Supervisor
- Employee engagement built from the shop floor up
Energy Usage Data Tracking

• Electric and Gas Metering
  ▫ Sub-meters installed for each department
  ▫ Additional sub-meters installed on high energy use equipment
  ▫ Daily usage tracking

• Multi-variable energy usage tracking
  ▫ System built off all variables involved in energy usage (equipment run times, hours of operation, products produced, sub-meter usages etc.)
  ▫ Baseline data collected as long as possible prior to efficiency upgrades
Completed Items - EAF

- Reduce pre-heat temperature for “on-deck” ladles
- Utilize slag heels in electric arc furnace
- Minimize overheating of molten steel
- Reduce unnecessary usage of fume collection systems
Completed Items - Annealing

- Process organization – Maximize parts per load
- Leak repairs – Minimize wasted natural gas
- Burner tuning – Maximize burner efficiency
- New insulation – Minimize heat loss
Completed Items - Leak Repair

- Leak detection and repair program

**Compressor Analysis**

**Total Compressor Usage**
Completed Items - Shutdowns

- Implementation of standardized department shutdown checklists

**Electric Usage**

**Natural Gas Usage**

Start of weekend shutdowns
Completed Items - Misc.

- Minimize unnecessary usage of dust collection systems
- Restore cooling tower efficiency and readjust temperature set points
- Minimize unnecessary usage of equipment
- Employee engagement
Future Energy Savings

- Replace 1000 watt sodium lights with high efficiency LED lights with motion detection – 7,000,000 kWh/year savings estimate
- Replace old compressors with new high efficiency compressors – 4,000,000 kWh/year savings estimate
- Use reciprocating compressor as trim compressor – 300,000 kWh/year savings estimate
- Pressure set-point reduction – 600,000 kWh/year savings estimate
- Continuation of leak tag/repair program
Project Limitations

• Return on Investment – projects will not receive funding if the return on investment is not low enough to include in future budgeting
• Man power/Time – Having enough employees to complete timely efficiency repairs while keeping up with daily tasks
• Financing – Large capital projects tend to get pushed to the side
  ▫ Use of financial institutions to purchase new equipment on a leasing plan with minimal buyout
• Employee’s lack of willingness to change
Benefits of Energy Reduction

- Decreased run-time of equipment promotes longer equipment life
- Lower utility bills reduce bottom line costs
- Decreases impact on the environment through the generation, transmission, and consumption of natural resources
- Process improvements can have positive impacts on quality of product produced
Energy Savings

**Electric**

- Annual Usage (kWh) 68,000,000
- 1 Year Reduction 6,869,608 10.1%
- Total Reduction 6,953,685

**Natural Gas**

- Annual Usage (DTH) 394,748
- 1 Year Reduction 36,234 9.2%
- Total Reduction 44,083

**Oxygen**

- Annual Usage (SCF) 108,637,638
- 1 Year Reduction 15,502,861 14.3%
- Total Reduction 19,742,935
Reduction of Natural Resource Consumption for a Better World

Questions

Image Source: http://editionstv.com/series-topics/energy-saving-solutions/