**Assessment Overview-**

 

**Metal Foundry Manufacturer**

A team of students & faculty from the

**Applications**

**The assessment personnel of the program identified and evaluated opportunities to conserve energy, minimize waste and improve productivity. In this case important opportunities for energy savings were found in space heating.**

IAC at the University of Delaware performed an industrial assessment for The Buck Company, Inc. The assessment was sponsored by the Department of Energy and was led by Center Director Dr. Keith Goossen, a faculty member in the Department of Electrical and Computer Engineering. On February 3rd, 2011 the IAC team employed a comprehensive assessment methodology that considered energy, waste, & process-related

improvements. The team examined all large energy-consuming equipment &systems for potential savings. They compiled a waste inventory & investigated the potential for waste reduction or improved disposal/recycling methods. The team also examined manufacturing processes for potential improvements, & emerging technologies were assessed for potential contributions to efficiency improvements.

**Summary**

**Assessment At A Glance**

-Implemented 2/6 of recommendations to save an estimated $132,600/year

-Implemented recommendations to reduce cold air infiltration, and to return exhausted air from a dust collector to reduce ventilation of heated air

-Payback periods of implemented recommendations range from 1 to 19 months, 13.5 months overall.

Through the Department of Energy’s Industrial Assessment Center (IAC) located at University of Delaware, an extruded thermoplastics manufacturer was able to realize a reduction in natural gas usage, resulting in a 5.3% overall utility cost reduction.

**Company Background**

The Buck Company, produces casted metal parts. The facility in Quarryville, PA employs about 320 workers to produce millions of metal parts per year. The production area covers 220,000 square feet, and when assessment took place, the plant consumed 27,450,000 kWh and 18,970 MMBTU propane per year.

The Buck Company is a foundry capable of producing medium and long run casting orders in ferrous and non-ferrous metals. The foundry can cost-effectively convert forgings to casted metal parts, producing about one million metal parts per year.



**Recommendations Implemented**

The table below summarizes specific

recommendations that were made

during the assessment and were

implemented or will be implemented

in the near future. These projections of savings & capital costs identified during the assessment have been established through engineering analyses and research. As a result, two recommendations were implemented by the company and are listed below.

**Pending Implementation**

Recommendations still under consideration include waste heat recovery from their water cooling system. The electric ferrous furnaces develop the equivalent heat of 17,800 MMBTU or 193,000 gallons of propane. Unfortunately, the water temperature developed is only 100°F. Thus, while substantial heat is conveyed by the system, it is at a low temperature and thus of limited utility. It was recommended to try extending the loop to the office areas of the plant to offset space heating. However, it was determined by plant personnel that it would offset insufficient space heat.

**Points of Interest**

Interestingly for this metal foundry, opportunities were found for reduction of space heating. The facility area is actually dominated by the casting operations, while the furnaces occupy a small part of the plant. Above the furnaces are large exhaust fans. These tended to draw air from the rest of the facility, causing cold air infiltration in winter and requiring more space heat. By improving the ventilation near the furnaces with a makeup air unit, the company was able to restrict air draw of the exhaust fans to the area near the furnaces, and greatly reduce air infiltration in the rest of the plant and associated additional space heating costs. In addition, one dust collector’s exhaust was returned to the plant, also reducing plant negative air pressure and associated air infiltration and space heating requirements. These actions resulted in a 32.2 % reduction in plant propane consumption.

Implemented Recommendations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Assessment  | Annual | Total  | Implementation | Simple  |
|  Recommendations | Resource | Annual |  Costs | Payback |
| (AR) | Savings | Savings |   |   |
| Improve ventilation near the ferrous furnaces to avoid negative air pressure in rest of plant and cold air infiltration |   | $96,600-$3,100 | $149,346  | 19 months |
| 4,550 MMBtu-39,800 kWh |
|   |
| Return exhaust of dust collector to avoid ventilation of heated air |   | $36,000  | $1,000  | 1 month |
| 1,660 MMBtu |
|   |
| TOTAL |   | $132,600  | $150,346  | 13.5 monthsoverall |
| 6,110 MMBtu |
|   |

