



Industrial Energy Assessment Yields Energy Savings of 1,411 MMBtu per year

Summary

The Industrial Assessment Center at West Virginia University performed an energy assessment at Burton Metal Finishing, Inc. at Columbus, Ohio. As a result of the assessment, recommendations were made for improvement in several areas. Improvements identified for the compressed air system include repair of leaks, use of synthetic lubricant, and replacement of compressed air use for agitation with a blower system. Recommended improvements for the lighting system include the replacement of T12 fixtures with T8 fixtures with electronic ballasts and reflectors, and the reduction of lighting level in designated areas. The assessment team also recommended the insulation of hot pipes and surfaces, the implementation of a motor management system, and the use of refrigeration oil additive in the chiller. Seven of the 12 recommendations made by the team were implemented, resulting in the reduction of energy consumption by 1,411 MMBtu per year, and an annual saving of \$19,277.

Company Background

Burton Metal Finishing, Inc. specializes in the production of custom metal plated products. The facility is located in Columbus, OH. The plant and office cover an area of approximately 70,000 square feet. The office area is cooled and heated using six Heating, Ventilation and Air Conditioning (HVAC) units. The plant area is heated using one air make-up system. The total energy budget for the facility is approximately \$305,252 per year for both electric and natural gas combined.

Assessment Approach

An assessment team from the WVU-IAC spent one day at the facility, examining its operations and collecting data. The team was led by one of the IAC Directors and included three graduate students.

Energy Conservation Awareness

The management and employees of Burton Metal Finishing, Inc. are “energy conservation” oriented, and follow many good practices to save energy. For example, the company returns all the condensate from the steam lines to the boiler. Another example is turning off the lights when not in use. The assessment team was able to identify other areas of energy conservation opportunities. All the recommendations identified by the team were discussed at the end of the day, and the company’s personnel were encouraged to call the IAC Center at any time for further discussion and/or clarification. The company has implemented seven of the 12 recommendations made by the assessment team. It is also interested in implementing some of the other

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BENEFITS

- The implemented recommendations will result in annual savings of \$19,277.
- The implemented recommendation will reduce total energy usage and cost by 6.5%.
- Paybacks range from .03 to 2.5 years.
- Twelve recommendations were made and seven were implemented, resulting in reduction of energy usage and cost.

APPLICATION

Burton Metal Finishing, Inc. uses electricity mainly for electroplating of the metal products, compressing air, lighting, and for heating and air conditioning. Natural gas is mainly used in the oven, air make-up system, and the boilers. Since the oven was well insulated and maintained, the assessment team concentrated its effort on reducing the energy usage for the boilers. The analysis performed at Burton Metal Finishing, Inc. and the results obtained may be used as examples to be followed in assessments at similar facilities



Compressed Air System

Air compressors are a significant user of energy. They produce compressed air which is mainly used in the process. The following measures can be taken to ensure reduction in energy usage: repair compressed air leaks, use synthetic lubricant in compressors, and replace compressed air use for agitation with a blower system.

Motors

Implement a motor management system based on the DOE MotorMaster software. This software assists in the analysis of energy and cost decisions of various situations such as rewind a failed motor or replace it with an energy efficient motor. A motor management system can help reduce energy costs through the efficient operation of a preventative and predictive maintenance program.

Lighting

Upgrade the light fixtures to more efficient fixtures with electronic ballasts and reflectors. Light levels in many areas were more than adequate. These suggestions will reduce lighting energy usage.

Boilers

Insulate boiler surfaces and steam pipes to reduce heat loss and natural gas usage. The heat available in the hot exhaust gases can be used to heat the facility in the winter season. Also, the air-fuel ratio for the boiler can be adjusted to reduce the amount of excess air passing through the boiler while ensuring high combustion efficiency.

Chillers

Refrigeration oil additive can be used in the chillers to increase the mechanical efficiency and therefore help reduce chiller unit energy consumption.

Results

Table 1 lists the annual energy savings that would be realized at Burton Metal Finishing, Inc. due to the implemented recommendations. The annual electrical energy usage will be reduced by 1,411 MMBtu. The electric demand and the demand cost will also be reduced. Also the natural gas energy usage will be reduced. The annual cost saving will be about \$19,277 per year which is equivalent to 6.5% of the current energy costs and will reduce carbon dioxide emissions by 459,728 lbs per year. The payback period ranges from less than one month to thirty months. The average payback period is 1 year.

Table 1. Recommendations Implemented at Burton Metal Finishing, Inc.

Recommended Action	Annual Energy Savings (MMBtu)	Annual Cost Savings (\$)	Implementation Cost (\$)	Payback (years)
Air Compressor System				
Repair Air Leaks	18	295	180	0.7
Use Synthetic Lubricant in Compressors	24	577	17	0.03
Replace Compressed Air Use for Agitation Using a Blower System	226	5,386	1,840	0.35
Motors				
Implement Motor Management System	28	459	54	0.12
Lighting				
Replace T12 with T8 & Electronic Ballast and Reduce Lighting Usage in Designated Areas	245	5,897	14,339	2.43
Boilers				
Insulation of Hot Pipes and Surfaces	843	6,011	1,797	0.29
Chillers				
Reduce Chiller Unit Energy Consumption by Using Refrigeration Oil Additive	27	652	367	0.56
Totals	1,411 MMBtu/yr	\$19,277	\$18,594	-

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