



Assessment Date: July 12-13, 2011

Benefits:

- Equipment operating parameters were adjusted to save electricity and natural gas.
- Recommendations already implemented saved almost \$100,000 annually
- Four out of seven recommendations to reduce energy usage were implemented within three months. The remaining three were implemented within one year.

Applications:

The IAC assessment team identified opportunities to decrease energy usage, increase capacity, and enhance corporate competitiveness. The assessment team focused primarily on the manufacturing process as well as the support systems.

"The results of your help at Saratoga have been very fruitful – leading to over \$1 million per year savings at Ball plants."

Doug Barndt
Manager Demand Side Energy
– Sustainability
North American Metal Beverage Packaging

**Aluminum Can Manufacturer:
Ball Corporation of New York**

Summary

Ball Corporation's Saratoga, N.Y., plant, a manufacturer of aluminum cans, found that several process adjustments can be made to save energy without affecting productivity thanks to a study conducted by the Department of Energy's Industrial Assessment Center located at the University of Massachusetts. As a result, the plant was able to fine tune their equipment and realize significant cost and energy savings. For example, the assessment team noticed that washer and deco oven hot air exhaust was higher than needed. By reducing it without affecting operation, the company saved approximately \$28,694 per year.

All recommendations made by the IAC audit team have been or will be implemented; so far annual savings total nearly \$100,000. The total annual savings of all implementations is estimated at \$217,000.

Company Background

Ball Corporation is a leading manufacturer of metal packaging. Its Saratoga, N.Y., plant manufactures aluminum beverage cans. The facility employs 215 people. Total floor space for all buildings is about 300,000 ft², of which about 150,000 ft² is for manufacturing and the remaining 150,000 ft² is used as a warehouse. The facility operates 24/7, with one major shutdown in December. Annual energy expenses include approximately \$3.5 million for electricity, and nearly \$1.2 million for natural gas.

Assessment Approach

A team of students and faculty from the Industrial Assessment Center (IAC) at the University of Massachusetts Amherst performed an industrial assessment at the plant in the summer of 2011. The assessment was led by center director Dr. Beka Kosanovic, along with students Ghanshyam Gaudani and Justin Marmaras, all members of the Department of Mechanical and Industrial Engineering. Seven energy savings measures were proposed.

Variable Speed Drives

The UMass team identified opportunities for variable speed drives: on exhaust fans and recirculating fans of the washer, deco and IC ovens, scrap blower and on the hydraulic oil pump. The drives application reduced hot exhaust from the oven along with electricity saving from the low speed operation. Together, these measures will result in annual cost savings of more than \$135,000, and energy savings of 483,987 kWh and 15,305 MMBtu of natural gas. A combined implementation cost of \$90,600 is estimated, for a simple payback of approximately 8 months.

Fresh Air Intake Dampers Repair

The exhaust from the ovens is sent to a Regenerative Thermal Oxidizer (RTO) for VOC destruction. The fresh air dampers placed at many locations were leaking, which introduced larger than needed fresh air in the stream. Repair of the dampers saved energy required to pass the fresh air through the RTO and discharge it to the atmosphere at a higher temperature. This measure resulted in annual cost savings of more than \$50,000, and energy savings of 239,116 kWh and 5,273 MMBtu of natural gas. The implementation cost of \$8,000 is

estimated, for a simple payback of approximately 2 months.

Use of Alternative Energy Source

The lubricant oil used for the process is heated with electric heaters. Using natural gas for heating could save annually nearly \$17,000. An implementation cost of \$30,000 is estimated, for a simple payback of approximately 1.8 years.

Equipment Heat Recovery

The plant has the good practice of recovering heat from two of its three air compressors. The opportunity exists to recover heat from the third compressor by adjusting the temperature differential of the compressor’s cooling loop to match the existing

temperature differential from the other two compressors and utilize this recovered heat. This measure would result in annual cost savings of nearly \$10,000 and energy savings of 1,610 MMBtu of natural gas. An implementation cost of \$20,000 is estimated, for a simple payback of approximately 2 years.

Emissions Reduction

In addition to cost saving realized from the energy efficiency measures, Ball Corporation reduced its carbon dioxide emissions by approximately 2,002 tons, NOx emissions by about 3,734 lbs and SO2 emissions by 4,280 lbs. Carbon dioxide is a leading contributor to global warming, and NOx are major contributors to smog formation and acid deposition.

Results

Table 1 shows the annual cost savings at the Ball Corporation facility from implementing the energy conservation opportunities identified by the IAC team during the assessment. Based on these results, the facility can reduce its energy consumption by over 1,024,376 kWh and 20,979 MMBtu in natural gas. These reductions will consequently reduce annual utility costs by a total of more than \$215,000.

Implemented opportunities are described in the following table:

Implemented Recommendations

Assessment Recommendations	Annual Resource Savings	Approx. Total Annual Savings	Capital Costs	Simple Payback
Reduce Exhaust from Washer Ovens	Gas: 9,835 MMBtu Elect.: 99,282 kWh	\$70,000	\$12,000	3 months
Repair Fresh Air Intake Dampers of Oven Exhaust Ducts	Gas: 5,273 MMBtu Elect.: 239,116 kWh	\$53,000	\$8,000	2 months
Reduce Exhaust from Deco & IC Ovens	Gas: 5,470 MMBtu Elect.: 126,637 kWh	\$45,000	\$11,200	3 months
Replace Electric Oil Heater with Natural Gas System	Gas: -1,209 MMBtu Elect.: 301,273 kWh	\$17,000	\$30,000	1.8 years
Implement Manual Operation of Deco Scrap Blower	Elec.: 150,932 kWh	\$12,000	\$55,750	4.5 years
Recover Heat from High Pressure 600 hp Air Compressor	Gas: 1,610 MMBtu	\$10,000	\$20,000	2.0 years
Install Variable Frequency Drive on Hydraulic Oil Pump on Deco Scrap Baler	Elec.: 107,136 kWh	\$8,000	\$11,650	1.4 years
Total	Elec.: 1,024,376 kWh Gas: 20,979 MMBtu	\$215,000	\$148,600	

