AMERICAN PACKAGING CORPORATION

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STORY CITY

COMPANY BACKGROUND

American Packaging Corporation in Story City, Iowa is a leader in flexographic printing and lamination, making packages for many well-known consumer products. The company's two other divisions are located in Rochester, New York and Columbus, Wisconsin. The Story City division began operation in 1989. It now employs approximately 150 people at its 230,000-square-foot facility. The company makes packages for a variety of industries including food, household, and personal care. The packages are customized for each product to effectively meet the customers' needs.

PROJECT BACKGROUND

The heating, ventilation and air conditioning (HVAC) system, the compressed air system, and the three regenerative thermal oxidizers (RTOs) each comprise a significant portion of American Packaging's energy bills. Therefore, optimizing these three systems would have a substantial effect on the company's overall energy usage and costs, as well as its environmental footprint.

INCENTIVES TO CHANGE

American Packaging is committed to both high quality production and environmental sustainability. Improving the HVAC, compressed air and RTO systems would help the company meet its goals in both these areas by increasing reliability and productivity and by decreasing the plant's impact on the environment. Furthermore, reducing the energy usage of these systems could considerably reduce American Packaging's energy bills. Realizing that it could positively affect its profits, its production, and the environment, American Packaging had the incentive to invest in pollution prevention efforts.

RESULTS

Destratification Fans: American Packaging has approximately 30-foot high ceilings throughout most of the facility. These high ceilings can cause air to become stratified into layers of different temperatures at different heights, with warmer air concentrated at the ceiling and cooler air concentrated at the floor. This wastes energy and money during winter, when heat that could be used to warm occupied areas is instead left useless at the ceiling. Destratification fans could reduce the wasted energy by pushing warm air from the ceiling down to the floor where it is needed, saving energy and money.

Repair Compressed Air Leaks: Compressed air leaks at American Packaging were accounting for a large portion of the facility's overall compressed air usage. Compressed air is an expensive utility to produce, so repairing the leaks could provide an almost immediate payback for the company.

On-Going Leak Detection Plan: Compressed air leaks form rapidly and the cost of the leaks adds up quickly. Because of this, preventative maintenance on the compressed air system is needed to minimize leaks at all times. A spreadsheet was developed that uses ultrasonic leak detector readings to estimate the amount of air flowing through a given leak. Leaks that are located with the detector can be prioritized for repair.

Compressor Waste Heat Recovery: It generally takes approximately 8 HP of electricity to produce 1 HP of compressed air. The rest of the energy is wasted as excess heat. However, most of this heat is recoverable, so as much as 80 percent of the energy put into an air compressor could become usable heat. The heat can be used for space heat in the winter, reducing the heating load of the facility, and ducted outside in the summer, reducing the cooling load.

Duct Outside Air into Compressor Room: Compressors run more efficiently with cooler intake air. The ambient air inside the compressor room reaches temperatures of up to 90°F. Ducting cooler outside air into the compressor room can save money by making the compressor run more efficiently.

RTO Ceramic Media Upgrade: American Packaging uses three RTOs to prevent solvent vapors from being released into the atmosphere. Solvent-laden air is heated with natural gas to approximately 1500°F to oxidize the solvent vapor into carbon dioxide and water vapor. A ceramic media then recovers much of this heat to preheat the incoming solvent-laden air before the clean airstream is exhausted. Improving the ceramic media would increase the amount of heat that is transferred to the incoming airstream, reducing the need for natural gas heating.

RTO Secondary Heat Recovery: Although most of the heat is recovered by the ceramic media, the air is still exhausted from the RTOs at approximately 200°F. Secondary heat recovery could use heat from the exhaust to preheat air for the plant's press dryers, which would further reduce the demand for natural gas.

CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN STANDARD TONS

Total for all sectors					
CO_2	SO_2	CH_4	N_2O	CFC	PM-10
775.83	1.77	341.33	0.85	5.29	0.07

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
DESTRATIFICATION FANS	$22,000	36,750 THERMS	RECOMMENDED
REPAIR COMPRESSED AIR LEAKS	$13,000	160,900 KWH	RECOMMENDED
ON-GOING LEAK DETECTION PLAN	$4,330	53,600 KWH	RECOMMENDED
COMPRESSOR WASTE HEAT RECOVERY	$13,825	21,600 THERMS	MORE RESEARCH NEEDED
DUCT OUTSIDE AIR INTO COMPRESSOR ROOM	$3,165	39,170 KWH	MORE RESEARCH NEEDED
RTO CERAMIC MEDIA UPGRADE	$41,150	68,600 THERMS	MORE RESEARCH NEEDED
RTO SECONDARY HEAT RECOVERY	$142,800	238,000 THERMS	RECOMMENDED