JBS SWIFT PORK

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COMPANY PROFILE

JBS USA is a leading global provider of diversified, high-quality food products. The company processes, prepares, packages and delivers fresh and value-added premium meat, poultry and retail-ready food products for customers in approximately 100 countries on six continents. JBS USA's exclusive global production and distribution platform covering five continents allows the company to service nearly every consumer market in the world, providing more than 270 million 4 ounce servings of protein to families every day. The company operates five pork processing facilities primarily located in the Midwest, one of which is JBS Swift Pork, a fresh pork and bacon processing facility in Ottumwa, Iowa. The plant in Ottumwa is one of the company's largest facilities and is witnessing continuous growth.

PROJECT BACKGROUND

The aim of this project is to reduce energy use of the compressed air system at the JBS Ottumwa plant. A comprehensive analysis of the compressed air system revealed inefficiencies in the system and presented opportunities to significantly reduce energy usage. Six projects with low initial investment and high return were recommended, presenting the plant with an opportunity to reduce the operational costs associated with compressed air generation and end-use applications. Current and future demand for compressed air at the facility were also assessed, and a preventative maintenance plan that includes air leak detection was studied.

INCENTIVES TO CHANGE

JBS has a 2020 sustainability goal of reducing electrical energy use by 12 percent and reducing greenhouse gases and emissions by 20 percent. Compressed air is a costly utility at the JBS Ottumwa plant, accounting for 9 percent of direct electrical costs. Compressed air also accounts for significant indirect costs contained within the water and HVAC systems at the plant. Additionally, there are many systems at the plant that are dependent on a consistent supply of compressed air, without which the plant suffers expensive downtime. Implementing projects that improve the efficiency of operating systems, such as compressed air, offers JBS valuable opportunities for cost reduction and meeting its environmental goals.

RESULTS

Rerouting Inlet Air Ducts: The compressors in the plant are currently configured to draw air from either inside the plant or inside the compressor room. Both hot and cool conditioned air drawn from inside the plant is very expensive to produce, depending on seasonal variations. During a week-long survey using temperature and humidity sensors, the air inside the compressor room was found to be at least 5°F hotter and significantly more humid than ambient air in other plant areas, which requires increased costs to cool and dry the compressed air. Drawing ambient air for compression was shown to be the most efficient option and would use significantly less energy. Quotes for this project have been provided and are awaiting approval and allocation of funds.

Adding Air Storage Capacity: The industrial standard for compressed air storage is 3-5 gallons per cfm, with two-thirds of that amount ideally in dry storage. At the Ottumwa plant, current available storage is approximately 2.86 gallons per cfm, the bulk of which is in wet storage. Having a higher storage capacity will ensure a smoother operation of the compressors, 5 percent power savings, and a measurable reduction in down time caused by an insufficient supply of compressed air. Adding dry storage would also mitigate the bottleneck restriction of the air flow rate by the dryer and filters during peak demand. Compressed air storage closer to the point of air use would also allow the operation of the equipment at a lower pressure, generating additional savings. Quotes for implementing additional dry storage have been provided and are awaiting management review and approval.

Using Effecient Air Nozzles for Drying: The current air wands used to dry the plant surfaces after sanitation clean-up are inefficient and create a peak air demand that is followed by expensive downtime. Installing a flat-end air nozzle with a flow control valve on these wands could reduce the air demand for clean-up by 75 percent, dropping from 367 cfm/wand to 93 cfm/wand. Samples of the recommended nozzles are available for onsite testing, after which a final management decision can be made.

Uninstalling Unnecessary Equipment: A chilled water-to-air shell & tube heat exchanger acts as a preliminary refrigerant cooler upstream of the vertical air receiver. After analyzing inlet air temperatures to the vertical air receiver, the cooling provided by this heat exchanger was found to be unnecessary. Uninstalling this heat exchanger could reduce annual water usage and associated cost savings.

Lowering the Supply Pressure: Implementing recommendations to improve dry storage and other system efficiencies will allow JBS to reduce the overall supply pressure of their compressed air system. Excessive pressurization leads to higher electrical costs, and magnifies the artificial demand presented by air leaks. Reducing the supply pressure by a recommended 10 PSI leads to a 5 percent reduction in compressor power and cost savings.

Air Leak Detection and Repair: Air leaks are relatively easy to repair and present fast returns in savings with low initial investment. Using an ultrasonic leak detector, the intern detected and documented 130 cfm of pressure lost in air leaks. Purchase of an ultrasonic leak detector was also recommended, to support the inclusion of air leak detection in a quarterly preventative maintenance (PM) plan. Repair of the documented air leaks is underway, and an ongoing PM plan is in development.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
Rerouting Inlet Air Ducts	$37,889	473,626 kWh	Recommended
Adding Air Storage Capacity	$177,801	421,638 kWh	Recommended
Using Effecient Air Nozzles for Drying	$70,642	651,191 kWh	Recommended
Uninstalling Unnecessary Equipment	$29,124	2,329,920 gallons	Implemented
Lowering the Supply Pressure	$33,731	421,643 kWh	In Progress
Air Leak Detection and Repair	$33,777	422,213 kWh	In Progress