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TYSON FOODS INC. HILLSHIRE BRANDS

COMPANY PROFILE

Originating in Arkansas in 1931, Tyson Foods Inc. is the largest protein-centered food company in the United States. Tyson Foods employs more than 139,000 team members worldwide in more than 100 processing plants. Within Tyson's portfolio is the Tyson Foods Inc. Hillshire Brands, a turkey processing plant located in Storm Lake, Iowa. The facility's 700 team members process 36,000 turkeys daily into bulk cuts of white and dark meats, and pre-blended sausage mixtures. The plant operates two eight-hour shifts and one sanitation shift five days per week.

PROJECT BACKGROUND

Compressed air is essential for the pneumatic machinery and sanitation processes at the Storm Lake plant. Compressed air is generated on-site by three air compressors and flows through pipes throughout the plant. The focus of this project was to perform an audit of the energy efficiency of the compressed air system and to suggest opportunities for optimization.

INCENTIVES TO CHANGE

In June of 2021, Tyson Foods announced its goal to achieve net-zero greenhouse gas (GHG) emissions by 2050, with an intermediate goal of reducing GHG emissions by 30 percent by 2030. With compressed air being almost 3 percent of the Storm Lake facility's direct energy bill, many systems are dependent on its supply. Optimizing the efficiency of compressed air has the potential to offer a significant gain towards Tyson Foods Inc. Hillshire Brands' environmental goal while providing opportunities for cost savings.



RESULTS

Air Leak Repairs: Air leaks in the plant arise when connections become loose or materials decay. In compressed air systems, air leaks are often cited as one of the most overlooked and costly aspects of plant operations. An ultrasonic leak detector was used to identify and document leaks throughout the plant. When comparing compressed air consumption with pneumatic equipment demand, leaks were found to be an appreciable demand within the system. An investment of labor and materials in detecting and repairing leaks is projected to yield immediate benefits and cost savings. Repairing leaks with a non-ferrous material in place of the standard galvanized steel could extend the part's lifespan and reduce future air leaks. Repairs of the documented leaks are being tracked on a spreadsheet and through a work order system.

Air Leak Preventative Maintenance: Leaks can surface at any time and can be very costly when undetected. Even a plant that is well maintained can have leaks that consume anywhere





from 10 to 20 percent of the compressed air created, inflating the electricity bill. Contracting a company to perform an annual air leak survey could combat leaks and prevent their potential buildup. In between surveys, it is recommended that quarterly inspections of individual machines suspected of generating leaks be conducted by maintenance staff to help maintain efficiency. The intern developed instructions for performing these inspections and quantifying the energy loss. An operating procedure describing the closure of air valves after every shift and during breaks was also provided, which may result in additional savings.

Air Compressor Resequencing: Enhancing the efficiency of Tyson’s three air compressors presents considerable savings with the shortest time investment. Currently, a variable speed compressor generates most of the air with a fixed speed compressor that loads to trim when needed. Reversing the role of each compressor so that the variable speed drive motor is trimming could increase the operating

efficiency of each compressor. Resequencing will significantly reduce inefficient unloaded motor energy consumption and allow the variable speed motor to operate in its ideal range. Implementing all recommendations will enable a reduction in line pressure by an estimated six pounds per square inch. Restricting excessive pressurization presents savings of 3 percent of the operating costs in motor electricity consumption. Indirect savings of reduced energy usage may also be realized by extending the lifespans of machinery while decreasing labor costs.

Engineered Air Nozzles: Two air wands are utilized by the sanitation shift to displace water beneath mezzanines located in processing areas. The air wands used for this purpose consume 8.4 cubic feet of air per minute. The intern identified an engineered air nozzle that could improve airflow by discharging it in a conical pattern, which creates a larger volume than the current open end. An increased air volume discharge will allow team members to work more efficiently while experiencing an additional benefit of reduced noise levels.



PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
AIR LEAK REPAIRS	\$11,336	158,468 kWh	IN PROGRESS
AIR LEAK PREVENTATIVE MAINTENANCE	\$2,700	38,369 kWh	RECOMMENDED
AIR COMPRESSOR RESEQUENCING	\$8,089	133,376 kWh	RECOMMENDED
ENGINEERED AIR NOZZLES	\$14	167 kWh	RECOMMENDED

