

# TYSON FOODS, INC.



**STEVEN ZIMMERMAN**  
MECHANICAL ENGINEERING  
IOWA STATE UNIVERSITY

### COMPANY PROFILE

Tyson Foods, Inc. is one of the world's largest producers of meat and poultry goods. The company employs 115,000 people in more than 400 facilities worldwide. At the Council Bluffs plant, Tyson Fresh Meats employs 875 people. Tyson Fresh Meats turns raw beef and pork into packaged products that are ready for consumers. The Council Bluffs facility manufactures numerous products, including ground pork, beef steaks, and beef roasts.

### PROJECT BACKGROUND

Over the next 10 years, Tyson Foods, Inc. plans to reduce energy usage by 10-20 percent at all of its plants. In order to achieve the corporate goals at the Tyson Fresh Meats-Council Bluffs facility, an audit was completed to establish a baseline. The compressed air system was evaluated, including an analysis of end-use efficiency, air storage capacity, and leak detection. An audit of the water pump system was also conducted to identify inefficiencies.

### INCENTIVES TO CHANGE

Tyson Foods, Inc. has committed to reducing its environmental impact by reducing energy usage and water consumption. An optimized compressed air and water pump system would allow Tyson Fresh Meats-Council Bluffs to reduce its carbon footprint and save on operating costs. Furthermore, small tweaks to infrastructure and maintenance provide the opportunity for sustainable change.



### RESULTS

**Air Leaks:** Air leaks decrease the amount of air available to machinery and put unnecessary load on air compressors. To ensure Tyson Fresh Meats-Council Bluffs operates at optimal efficiency, an ultrasonic leak detector was used to conduct a leak detection survey of the facility. The results of the survey concluded that leaks throughout the plant contribute to approximately 680 cubic feet of air lost per minute.

Repairing air leaks is an easy way to save on electrical energy usage and will result in significant cost savings for the company. By fixing the leaks, roughly 42 percent of the electrical energy used by the compressors could be saved. Additionally, improvements to maintenance programs will lessen the potential for leaks in the future.

**Sealer Machines:** Sealing machines have valves that allow air to flow through the machine when not in use. Tyson Fresh Meats-Council Bluffs shuts down operations at night to conduct a sanitation process. Many of the pneumatic sealing machines are left on idle overnight, which means that although they are not running, air is still being supplied.

By turning off the air supply to the sealing machines at night, airflow loss can be eliminated, saving 17 percent of the total electricity used by the compressors. This represents more than \$10,000 in annual energy cost savings.

**Air Nozzles:** During the factory's sanitation process, air is used to dry equipment after cleaning. The nozzles currently in use require high volumes of air, placing undue strain on the air compressors. Utilizing high-efficiency nozzles with airflow control features could save the company an estimated \$11,858 per year in utility costs. This update would represent approximately 18 percent less electric energy required by the compressors annually.

**Daytime High-Pressure Pump:** The plant's current system utilizes two pumps to transport high-pressured hot water throughout the plant. The full capacity of the pumps is not required for daytime production, but is vital to the nighttime sanitation process due to the large amount of water required. The addition of two smaller pumps for use during daytime production would eliminate the need to use the higher-powered system, yielding an annual savings of more than \$11,000 per year.



### CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN METRIC TONS

From Implemented and In Progress recommendations

TOTAL FOR ALL SECTORS									
CO <sub>2</sub>	SO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CFC	NO <sub>x</sub>	VOC	PM <sub>10</sub>	MTCO <sub>2e</sub>	
111.82	0.60	4.20	0.06	1.37	0.29	0.01	0.01	117.41	

### CONVENTIONAL AIR POLLUTANTS AND GREENHOUSE GASES DIVERTED IN METRIC TONS

From Recommendations in Recommended Status

TOTAL FOR ALL SECTORS									
CO <sub>2</sub>	SO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CFC	NO <sub>x</sub>	VOC	PM <sub>10</sub>	MTCO <sub>2e</sub>	
495.12	2.68	18.60	0.25	6.08	1.27	0.04	0.07	519.86	



PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
AIR LEAKS	\$26,719	607,250 KWH	RECOMMENDED
SEALER MACHINES	\$10,886	247,407 KWH	RECOMMENDED
AIR NOZZLES	\$11,858	269,502 KWH	RECOMMENDED
DAYTIME HIGH-PRESSURE PUMP	\$11,171	253,886 KWH	IN PROGRESS

