



## AIDAN MCDERMOTT

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# JBS USA, LLC



MARSHALLTOWN

### COMPANY PROFILE:

JBS USA is one of the world's largest food companies. The United States headquarters are in Greeley, Colorado. JBS USA produces more than 200 million servings of pork, beef, and poultry every year. JBS employs more than 260,000 people globally, with the Marshalltown, Iowa, plant employing approximately 2,500 people and processing 21,000 head of pork per day.

### PROJECT BACKGROUND

The purpose of the intern project was to research and integrate methods and practices to reduce electrical usage at the Marshalltown plant. Working with staff and vendors, the intern applied best practices to ensure that mechanical aspects of the plant were running as efficiently as possible. Key areas of interest included some of the larger equipment, such as blowers and compressors, and electric motors for the conveyors. Recommendations were made that were cost-effective and easy to implement.

### INCENTIVES TO CHANGE

Energy conservation is an important part of sustainability because of the role that greenhouse gases and emissions play in the production of electricity. In 2019, JBS USA committed to a net-zero carbon emission climate pledge by 2040, becoming the first company in its field to make such a commitment. As part of this, the Marshalltown plant set a goal to reduce electrical usage by 30 percent. These goals were motivated by the company's strong environmental values and commitment to a more environmentally friendly future.



### RESULTS

**Parking Lot Lights:** The parking lot lights in the western parking lot were found to have a broken photo eye. This resulted in the lights being turned on all the time even though the lights were only necessary for a nine-hour period each day. A contractor was brought in to install a timer to control the external lighting and the recommendation to operate the lights only as needed has since been implemented.

**Distribution Center Insulation** Once product is packaged on the production floor, it is sent to the distribution center where it remains until it is shipped. Inside the distribution center, a system of fans and chillers are used to ensure that the building's interior stays below 32 degrees Fahrenheit to preserve the integrity of the product. Gaps were found throughout the building in some of the insulation, which resulted in the cooling system running more than necessary. The intern recommended repairing or replacing missing insulation throughout the plant.

**Conveyor Belts:** The Marshalltown plant uses hundreds of conveyors, both hydraulic and electric, for the rapid movement of products throughout the plant. The conveyors are left on all the time, because there are two production shifts that utilize the conveyors to carry product. A third sanitation shift runs the conveyors to ensure cleanliness. Turning off the electric conveyors during breaks, would reduce the amount of energy consumed by the conveyors. This project has been implemented.

**Wastewater Air Conditioning:** The wastewater building of the Marshalltown plant houses both the wastewater offices and the electrical room that houses the power source for the majority of the equipment in the wastewater building. During construction of the wastewater building, installation of the air conditioning units for the offices and the mechanical room were switched. This resulted in unexpected equipment failures due to overheating. It also meant that the

energy conservation system that was in place was not being utilized to its fullest potential. A contractor was brought in to switch the units back to their intended uses. This recommendation has been implemented.



**ASP Blowers:** In the Activated Sludge Processing (ASP) building, an aeration basin is utilized to reduce the levels of pollutants in the wastewater, which are formed from meat particulates that are sent down the drain. This generates high levels of sludge which requires pre-treatment, before being sent to an aeration basin. In the aeration basin, four blowers blow compressed air onto the sludge, where the oxygen helps to promote aerobic digestion to break down the sludge. Increasing the amount of polymer added to the water would reduce sludge levels and could allow one of the blowers to be turned off.

**Dehair Steam Leaks:** One of the largest steam users in the plant is the dehair area of the harvest floor. During an assessment of this process, numerous steam leaks were found, resulting in the overuse of steam. These leaks cause an increase in natural gas and water usage and also put a higher load on the system. The leak repairs were completed by an in-house maintenance team, resulting in a reduction of water and natural gas consumption.

**Compressed Air and Steam Audit:** Throughout the plant, piping systems that carry compressed air and steam have leaks that are causing the systems to work harder than necessary. Boiler and compressed air systems are both very energy intensive systems so any leaks cause the systems to be less efficient. It was recommended that a complete leak detection audit be conducted to identify and quantify all of the steam and compressed air leaks. It is recommended that a contractor be hired that could also repair the identified leaks to reduce natural gas, water, and energy usage by these systems.

## ENVIRONMENTAL AND ECONOMIC SAVINGS TABLE

PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
PARKING LOT LIGHTS	\$2,800	35,000 kWh	IMPLEMENTED
DISTRIBUTION CENTER INSULATION	\$93,750	1,171,700 kWh	RECOMMENDED
CONVEYOR BELTS	\$5,485	68,550 kWh	RECOMMENDED
WASTEWATER AIR CONDITIONING	\$15,500	18,670 kWh	IMPLEMENTED
ASP BLOWERS	\$47,000	587,150 kWh	RECOMMENDED
DEHAIR STEAM LEAKS	\$62,053	31,185 therms 3,127,921 gallons	IMPLEMENTED
COMPRESSED AIR AND STEAM AUDIT	Further Analysis Needed	Further Analysis Needed	IN PROGRESS