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JBS SWIFT PORK

OTTUMWA



COMPANY PROFILE

JBS S.A. is the world’s largest protein producer with nearly 400 operating locations in fifteen countries. A subsidiary, JBS USA, a leading global food company, is headquartered in Greeley, Colorado. As the nation’s second-largest producer of fresh pork, JBS USA delivers high-quality food products to customers in more than 125 countries on six continents. The company operates six pork production facilities, including JBS Swift Pork in Ottumwa, Iowa. The Ottumwa plant employs more than 2,400 team members and is a major contributor to the international pork market with production numbers averaging 21,000 hogs per day.

PROJECT BACKGROUND

JBS Ottumwa identified carbon dioxide (CO₂) capture and utilization as a key, potential strategy in achieving a closed loop system. The aim of this project was to evaluate carbon dioxide offset potential based on the facility’s current CO₂ and biogas generation and usage. To accomplish this, the intern conducted a feasibility study, comparing carbon capture strategies and technologies at an industrial facility similar to JBS’ size and sector. The intern also analyzed internal operational processes, identifying opportunities for CO₂ usage reduction.

INCENTIVES TO CHANGE

In March 2021, JBS became the first global meat and poultry company to commit to achieve net zero greenhouse gas emissions by 2040. Included in this commitment, JBS pledged to use 100 percent renewable electricity by 2040 and to cut emissions by 30 percent by 2030. This environmental commitment was made in addition to existing efforts to reduce water usage and increase renewable energy sources from previous years. JBS pledged \$1 billion (USD) for emission reduction projects and another \$100 million for the research and development of emission mitigation technologies.



RESULTS

Carbon Capture System: Carbon dioxide is currently emitted to the atmosphere at JBS Ottumwa as a by-product from its stationary combustion operations and onsite industrial wastewater treatment plant. A demand for CO₂ inside the plant is needed for process operations and maintaining dry ice quality. The implementation of a carbon capture system could both significantly reduce greenhouse gas emissions and contribute to JBS Ottumwa becoming self-sufficient in carbon dioxide supply. The capture system could also provide consistency and stability to JBS’ CO₂ costs – a significant benefit given increasing market prices for CO₂ and decreased availability of liquid carbon dioxide, caused by carbon sequestration market growth.

The project recommendations include the installation of a post-combustion capture system that utilizes an amine-based solvent with chemical specificity to CO₂ to filter the carbon from the rest of the flue gas. Operating such a system could allow JBS to collect and scrub the exhaust gas from the boiler stacks. In addition to the avoided purchasing costs for production, excess captured CO₂ could potentially be sold as a commodity, offsetting system costs. Further stack testing is needed to ascertain specifications for a request for proposal.

Dry Ice Production: Dry ice is purchased from a third-party vendor to refrigerate products through delivery to the customer. To maintain control over the quality and quantity of the dry ice needed, the intern recommended the installation of dry ice pelletizers, along with additional recovery systems. Since existing CO₂ storage tanks meet the required inlet specifications for the pelletizers, dry ice production can occur onsite with or without a facility carbon capture system in place. Quotes for two pelletizers with additional recovery systems estimated that the proposed equipment could reduce dry ice waste by 11.6 percent, resulting in decreased costs. In addition,

onsite dry ice production could significantly reduce dry ice loss from sublimation and address over and under ordering concerns. The equipment proposal is now being reviewed by JBS management.

Dry Ice Handling SOPs: In an effort to move JBS Ottumwa forward to meet industry standards for dry ice waste due to sublimation, the intern recommended implementing standard operating procedures (SOPs) at a number of identified production areas. Recommended SOPs prioritize usage, first by utilizing partially filled totes and totes with the oldest dry ice, and also replacing lids when totes are not in use or during production breaks. These recommendations were passed along to JBS management, and changes are being implemented.

Hinged Dry Ice Lids: Dry ice sublimation losses occur when lids are left off of totes by employees who may find the large, bulky lids difficult to maneuver throughout the production day.



Adding hinged lids to the dry ice totes will allow employees to easily close the totes when not in use. Lids could be constructed in-house from plastic in a high contrasting color for optimal visibility on the plant floor. To implement this recommendation, plant staff need to design and construct the hinged lids and then fit the totes.

Reduce Stunner Levels: JBS Pork utilizes CO₂ stunning equipment as a humane method to render hogs unconscious before slaughter. The stunning equipment is currently set to use more CO₂ than necessary based on equipment design specifications. Incrementally scaling back the CO₂ concentrations in the stunners, until the average usage per animal reaches that of other JBS pork plants, could save 8 percent of the carbon dioxide used while still exceeding safety factors based on equipment specifications. Management has been informed of the savings potential and is moving forward with verification with the Quality Assurance department.



PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
CARBON CAPTURE SYSTEM	\$279,994	23,400.00 MTCO ₂	RECOMMENDED
DRY ICE PRODUCTION	\$246,664	2,914.81 MTCO ₂	RECOMMENDED
DRY ICE HANDLING SOPS	\$17,088	201.63 MTCO ₂	IN PROGRESS
HINGED DRY ICE LIDS	\$7,549	67.21 MTCO ₂	RECOMMENDED
REDUCE STUNNER LEVELS	\$22,465	243.78 MTCO ₂	RECOMMENDED

