Aspire Bakeries

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Organization Background

Aspire Bakeries comprises 14 locations across the United States and Canada. It produces 900 million pounds of baked goods per year and is dedicated to creating the highest quality, best tasting baked goods on the market. The Chaska facility, the site of the internship project, manufactures 164 variations of frozen Otis Spunkmeyer cookie dough and around 50 million pounds of cookie dough per year. It measures 108,500 square feet and employs 114 people.

"Working at Aspire Bakeries through MnTAP this summer was an amazing experience! This project was a perfect introduction to working in a manufacturing environment as well as on sustainability efforts. My project management and communication skills have improved exponentially this summer and I feel like I have grown a ton through my work." ~ JH

Project Background

At the Chaska facility, 6.6 million gallons of water and 7.3 million kilowatt-hours (kWh) are currently used each year. The ammonia refrigeration system consumes considerable water and electricity, and the compressors are the number one consumer of energy at the facility. This project focused on the ammonia refrigeration system with compressor energy use and condenser water use receiving added attention. The sanitation process and compressed air system were also evaluated for potential resource saving opportunities.

Incentives to Change

One of the company's main goals is to reduce scope 1 and 2 emissions by 46% by 2030 compared to a 2019 baseline. In Chaska, there are many opportunities to cut costs and resource use, especially since the facility has been using more water due to enlarging and more varied production.

The passion Jackson showed in identifying opportunities, collecting data and translating it into actionable improvements was outstanding. I look forward to working with MnTAP in the future to continue to educate the next generation of leaders."

~Peter Boevers,
Operational Excellence Manager

SOLUTIONS

Use Low Flow Nozzle Tips for Sanitation

The hoses for sanitation come with a standard flow rate tip and a low flow rate tip. Currently, the facility uses the standard flow rate tip. However, if they switched to the low flow rate tip, they would use around 25% less water. This could reduce as much as 780,000 gallons per year. Since the facility already owns these tips, the implementation cost would be $0 for $7,400 in yearly savings.

Replace Line 3 Vortex Panel Cooler with Air-to-Air Heat Exchanger

The facility currently uses two compressed air vortex panel coolers. Vortex panel coolers work by first separating input compressed air into a hot and cold stream with a vortex. Then, the cold stream is used to cool the panel, and the hot air is discharged. Switching the larger Line 3 panel to an air-to-air heat exchanger would save 17,700 kWh and $1,600 annually. The cooling capacity provided by an air-to-air heat exchanger would be excessive for the other panel, so installing a solenoid valve controlled by panel temperature to limit the amount of compressed air used is recommended. The savings and associated costs of solenoid valve and temperature control are unknown but would also reduce panel cooling energy use.

Solutions

Increase Cycles of Concentration to 3.8 and Update Condenser Water Treatment

Increasing the cycles of concentration from 1.6 to 3.8 and updating the current water treatment plan is recommended. Increasing the cycles of concentration raises the alkalinity of the water to protect against further corrosion and scaling that are preventing the condensers from running at peak efficiency. For the two 18 to 20-year-old condensers, heat transfer efficiency is reduced significantly due to corrosion and scaling. Since the new one-year-old condenser is already showing scaling and corrosion, this condenser will likely degrade quickly with the current water treatment regimen. Updating the water treatment plan will extend the lifespan of the old condensers and protect the new condenser from corrosion and scaling. The total cost and savings for the new water treatment is not currently known, but the increase in cycles of concentration would save 1,400,000 gallons and $13,400 per year.

Enable Floating Head Pressure Control for Ammonia Compressors

This action varies the ammonia temperature depending on the outside wet bulb temperature. This saves energy by reducing the compressor discharge pressure. In the winter, the lower wet bulb temperature allows the compressors to run at a lower discharge pressure and save energy compared to the higher set points for summer wet bulb temperatures. The control ensures that the temperature difference between the ammonia and outside air stays constant throughout the year, which ensures that effective ammonia condensation occurs. The facility already has this control in place, but it is currently disabled. Enabling the floating head pressure control could save 400,000 kWh per year and $36,200 in associated electricity costs. Additional testing is needed to ensure that this reduction could be achieved with the current condensers, but any reduction in discharge pressure would save energy.

Recommendation	Annual Reduction	Annual Savings	Status
Use Low Flow Nozzle Tips for Sanitation	780,000 gal water	$7,400	Recommended
Replace Line 3 Vortex Panel Cooler with Air-to-Air Heat Exchanger	17,700 kWh	$1,600	Recommended
Increase Cycles of Concentration to 3.8 and Update Condenser Water Treatment	1,400,000 gal water	$13,400	Recommended
Enable Floating Head Pressure Control for Ammonia Compressors	400,000 kWh	$36,200	Recommended

MnTAP Advisor: Laura Sevcik, Engineer