CASE STUDY

VILTER HEAT PUMPS

Pork producer facility

Conestoga Meats cuts carbon emissions using Vilter heat pumps.

Conestoga Meats – balancing return on investment with sustainability

A fully farmer-owned business, Conestoga Meats has long prioritized sustainability in its business culture, demonstrated by its dedication to wastefree production and investments in sustainable processing initiatives. In 2013, as part of a major infrastructure upgrade project at its Breslau facility, Conestoga Meats decided that a heat pump would be an important element of the refrigeration plant expansion.

Conestoga Meats' objective was to identify a solution that would address its need for expanded capacity, but also provide benefits from a reliability, efficiency, sustainability and return on investment standpoint. To develop the initiative, Conestoga Meats turned to its trusted partners, Short Cooling Solutions (contractor) and Vilter (heat pump manufacturer), for expert refrigeration support.

From a design perspective, one of the key challenges faced was that the plant demand for hot water was expected to vary with seasonal weather conditions and production shifts. To account for these fluctuating conditions, the heat pump was sized to meet the system base load, where final temperature lifts and additional load requirements would be managed by the existing boiler system. System-level analysis and optimization techniques were used to determine an effective strategy for balancing the water preheat temperature produced by the heat pump with the inlet water temperature required by the existing boiler system. In the end, it was determined that the optimal solution was to utilize the heat pump to preheat water from 55°F to 100°F and top-up the water temperature to 140°F using an on-demand boiler system.

Vilter heat pump an excellent fit for pork processing application

The ammonia heat pump installed in Breslau provides simultaneous process cooling and hot water heating for Conestoga Meats' pork processing operation. Process cooling loads are used to chill fresh pork, while hot water loads are used for clean-in-place (CIP) and washup processes. The system operates on a continuous basis 360+ days per year.

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Delivered performance – SCS refrigeration and Vilter solution

The ammonia heat pump system at Conestoga Meats delivers hot water preheat at 100°F using source heat from the refrigeration plant. By providing useful refrigeration work in addition to heat production, the system yields a combined COP of 6.19. The heat pump solution runs in parallel with the refrigeration plant and has been sized to meet the base loads for both the refrigeration and hot water loads. This approach has resulted in high system utilization which helps to optimize payback. Original projections were based on a simple payback of 3.5 years, but Conestoga Meats has reported this occurred in less than 3 years due to elevated production rates, increased natural gas costs and lower than projected maintenance expenditures.

> **“Since installed, this system has run for over 50,000 hours with no unplanned maintenance or lost production time.”**
>
> Rob Schneider, Plant Chief Operator, Conestoga Meats

+3374 MWh

Annual energy savings.

ROI

< 3 years.

3000 $MTCO_2e$

Annual carbon reduction.

> **“In hindsight, the only thing we might have done differently on the project was to install a larger heat pump as Conestoga has experienced healthy growth in their business over the last few years.”**
>
> Jason Short, President, SCS Refrigeration

System details

- Installed in summer 2014
- Ammonia refrigerant (<50 lbs charge) with 0 ODP and 0 GWP
- Provides glycol cooling and water heating services for building processes
- Vilter single screw compression technology
- Heating capacity: 1450MBH @ COP 3.15
- Cooling capacity: 1150MBH @ COP 3.04
- Combined COP: 6.19
- Annual carbon reduction: 3,000 metric tons of CO2 per year
- Annual energy savings: 3,374 MWh
- Annual water savings: 3,107K gallons
- Designed for 20+ years' service without costly maintenance

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