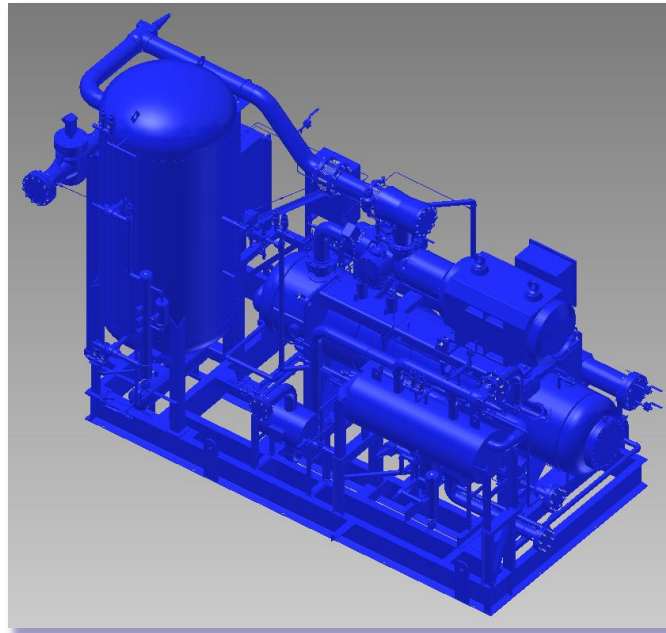


Industrial Ammonia Heat Pump in Cheese Processing

Sam Gladis

Business Director – Industrial Heat Pumps



Vilter™


EMERSON™
Climate Technologies

Cheese Processing Facility OVERVIEW

Production of "PIZZA TOPPING"

- 12 million pounds per day



AMMONIA Refrigeration System

- Refrigeration Compressor Load = 14,176 tons
- Condensing Capacity = 13,319 tons (shortage of 857 tons)
- Summer: Head pressure increases from 145 psig to 170 psig

ENVIRONMENTAL Concerns

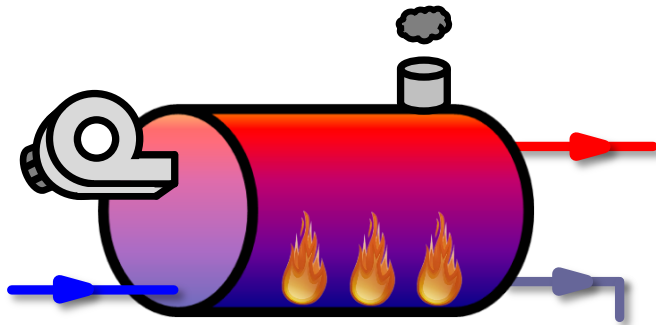
- Cap & Trade Costs
- Water Costs & Availability
- Waste Water



Cheese Processing Facility OPPORTUNITIES for Improvement

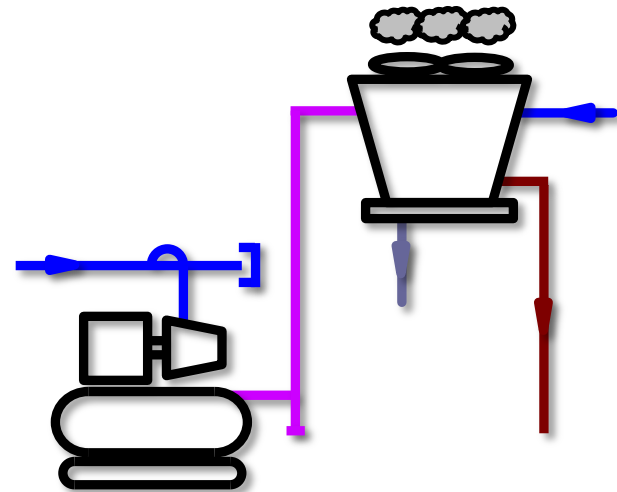
Steam Boiler System

- Increase Hot Water Capacity
- Increase Heating Efficiency
- Decrease Boiler Fan Power
- Decrease Water Consumption
- Decrease Waste Water
- Decrease CO₂ Emissions



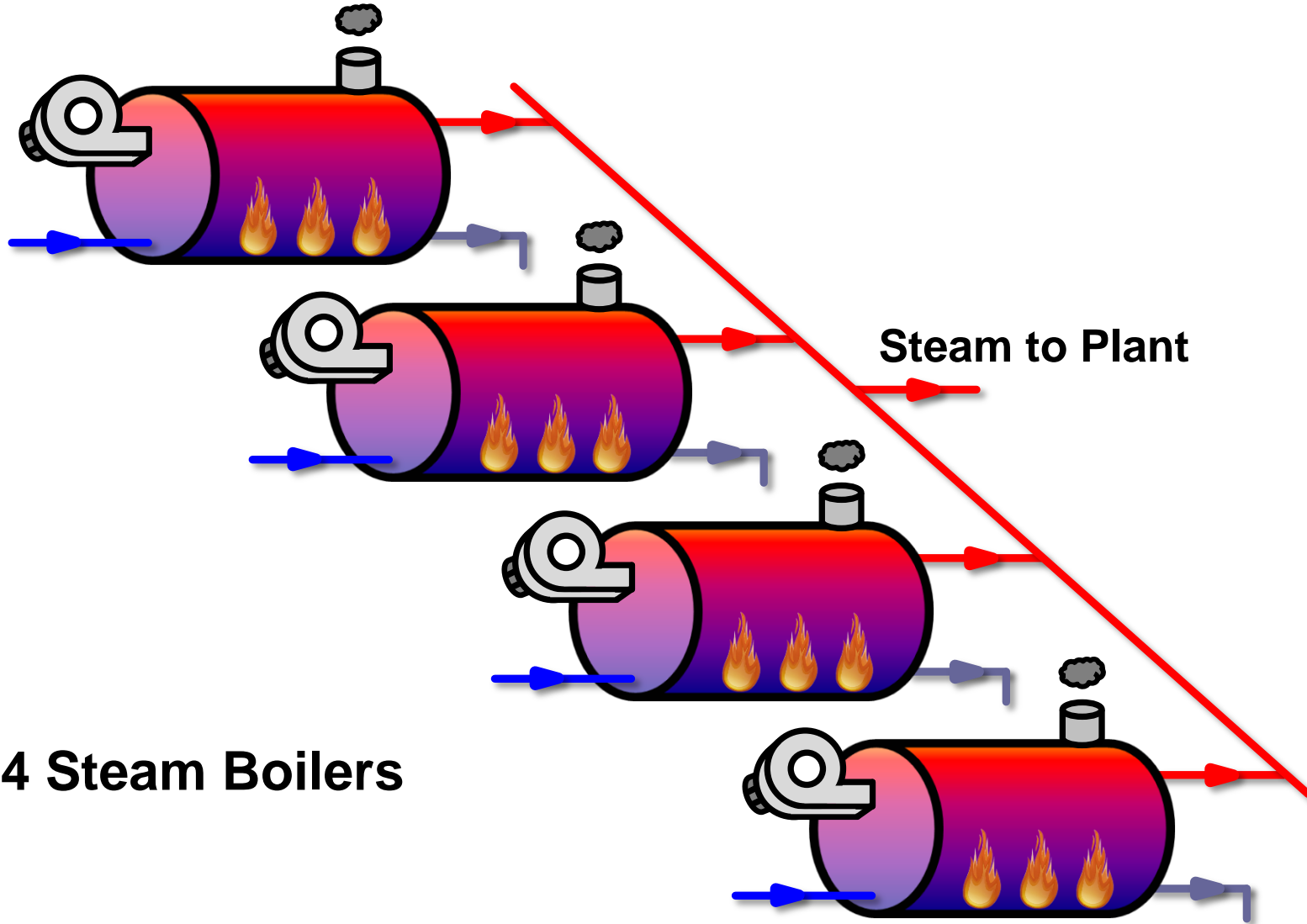
Refrigeration System

- Increase Condensing Capacity
- Increase Efficiency
- Decrease Water Consumption
- Decrease Waste Water



Cheese Processing Facility

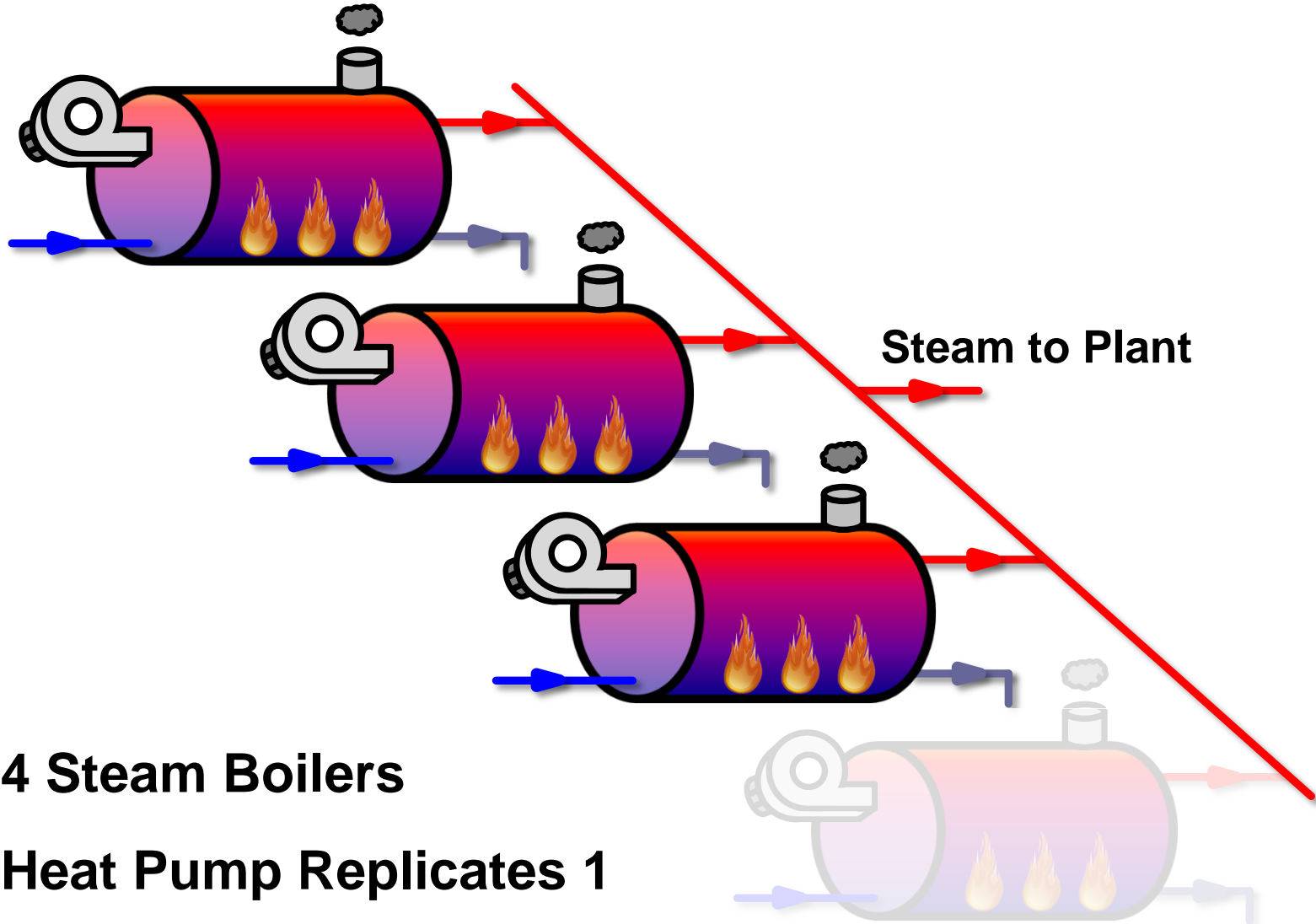
Steam BOILERS



4 Steam Boilers

Cheese Processing Facility

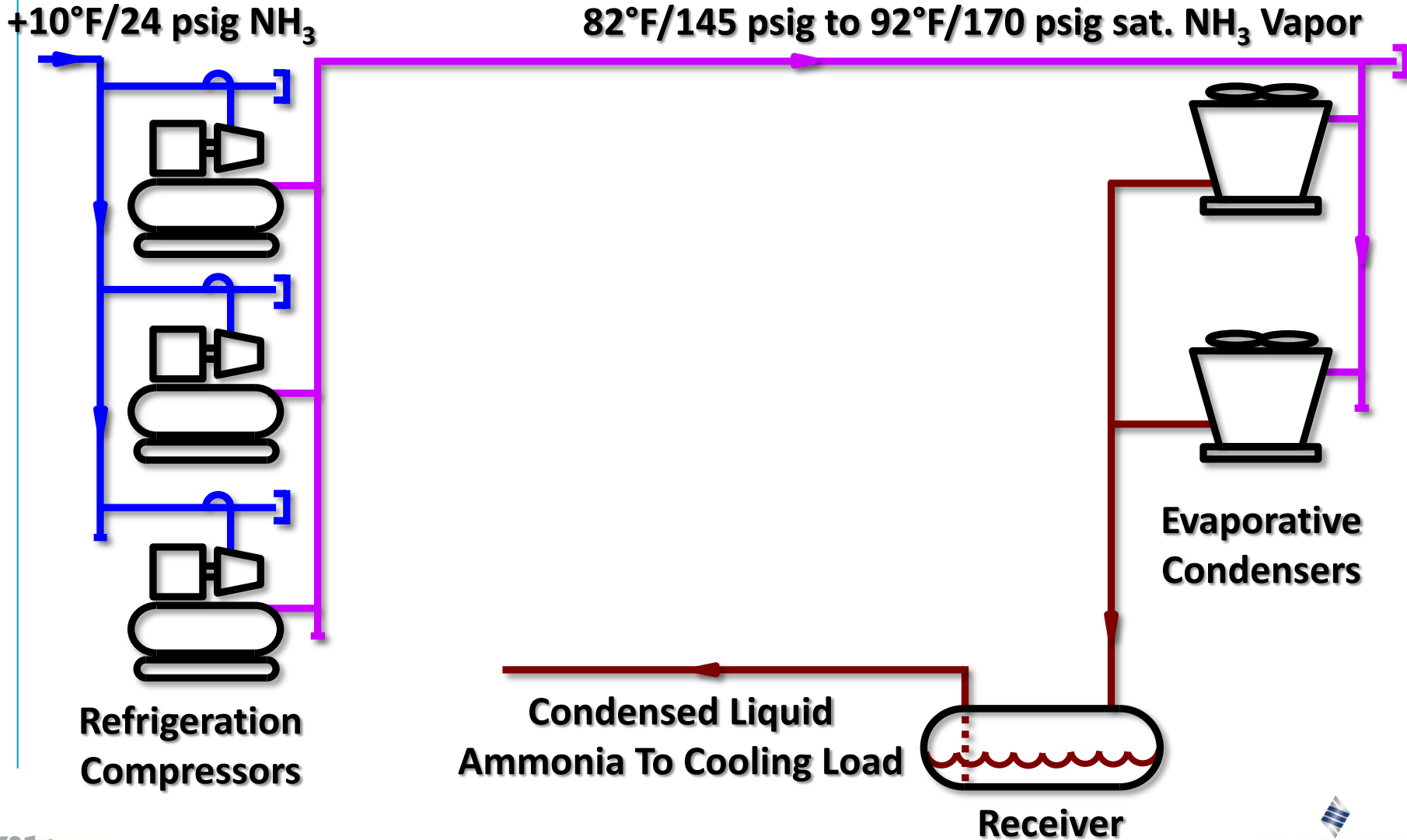
Steam BOILERS



4 Steam Boilers

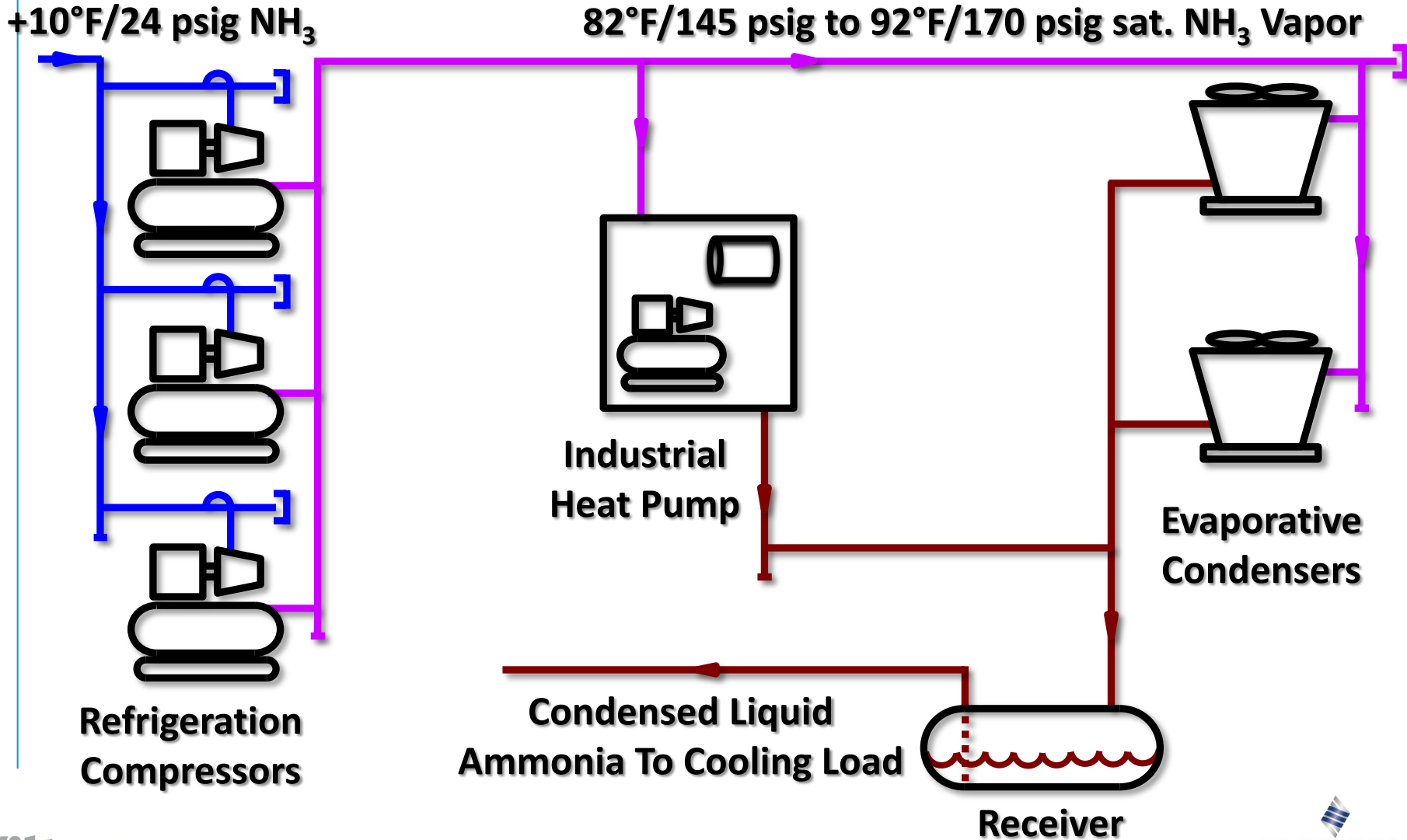
Heat Pump Replicates 1

Cheese Processing Facility Industrial HEAT PUMP



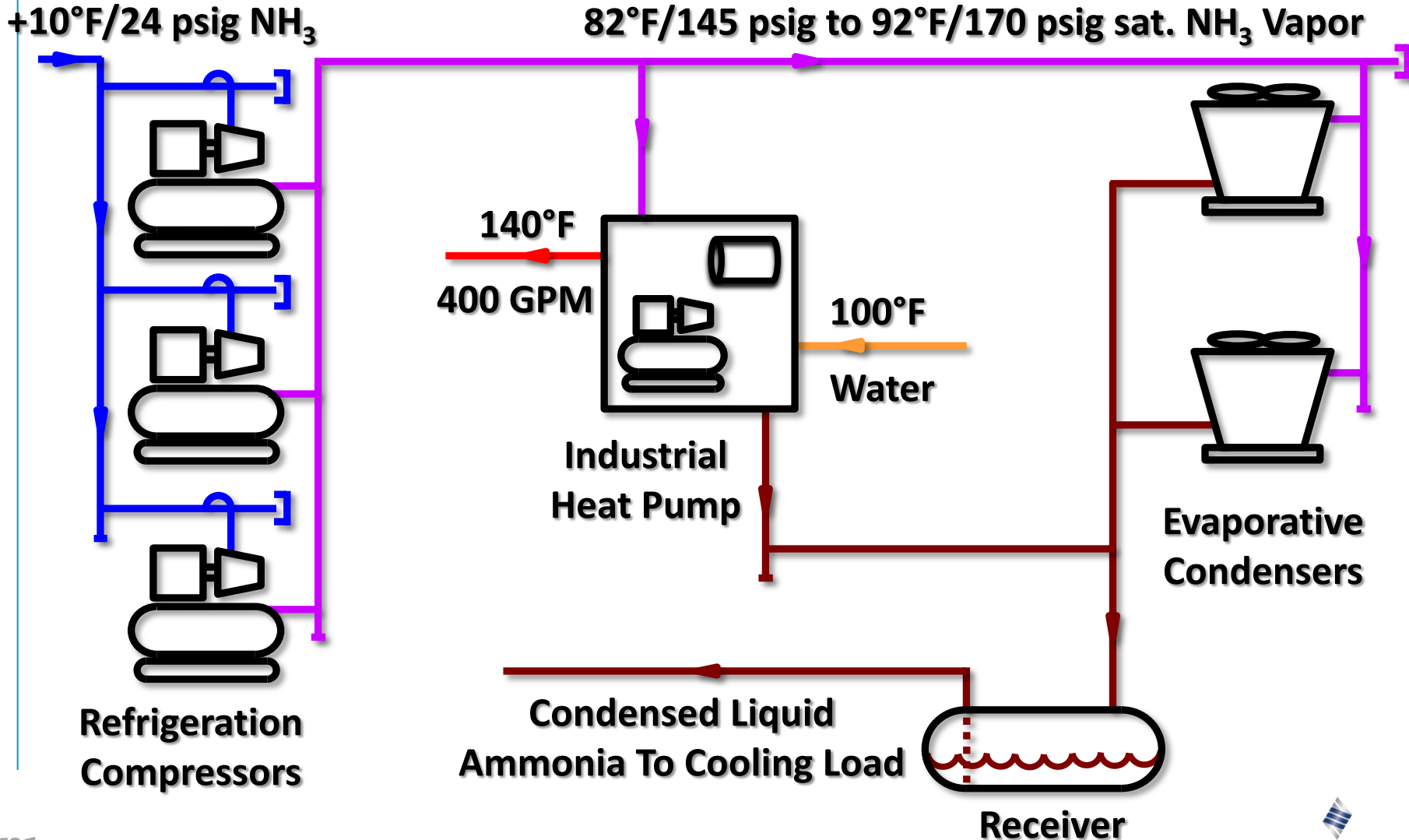
Cheese Processing Facility

Industrial HEAT PUMP



Cheese Processing Facility

Industrial HEAT PUMP



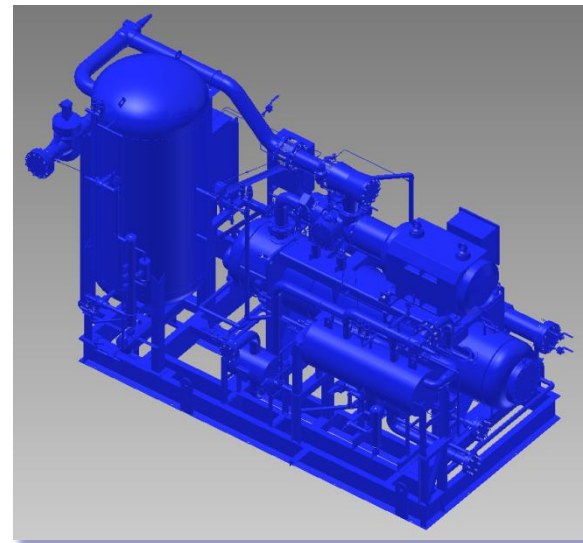
Cheese Processing Facility Industrial Heat Pump RESULTS

Benefits

- **581,000 Therms Fossil Fuel Saved**
- **1.27 MWH Electric Savings**
- **Shut Down 4th Boiler**
- **Increase Heating Efficiency COP from 0.75 to 5.08**
- **100 HP Boiler Fan Power Saved**
- **Decrease Water Consumption by 13 million gallons**
- **Decrease Waste Water by 6.6 million gallons**
- **3,400 metric tons of CO₂**

Savings

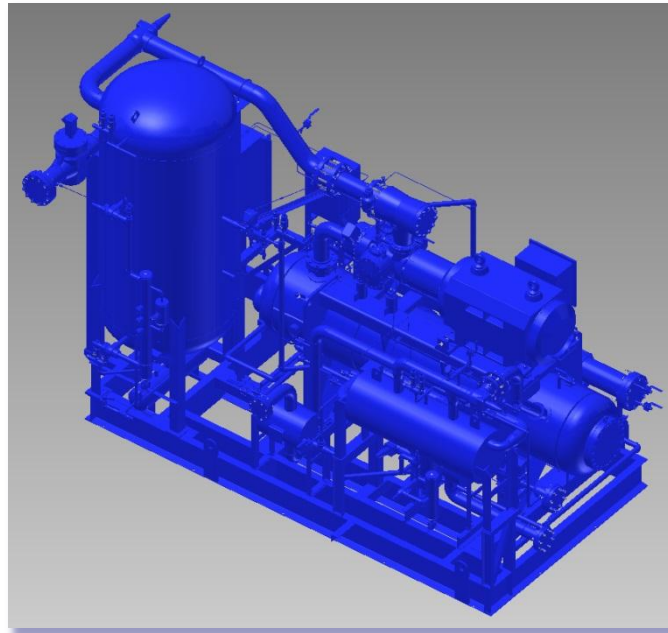
- **\$435,600 Utility Cost Savings**
- **\$707,700 Utility Incentive**
- **\$51,000 Cap & Trade Savings**
- **2.45 year simple payback**



Industrial Ammonia Heat Pump in Cheese Processing

THANK YOU!

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