

Reduction of Water Consumption for Plant in Drought Region

Potential energy savings and water conservation opportunities, representing a cost savings of almost \$665,000, were identified by the **Industrial Assessment Center of San Francisco State University (IAC/SFSU)** at the Crystal Creamery facility in Modesto (CA). The facility decided to implement most of the proposed measures, realizing an overall saving of \$354,350.

Company Background

Crystal Creamery is part of the Foster Dairy Farms food manufacturing complex, employing close to 400 people, and producing over a half million pounds of dairy products per year. Products include milk powder, butter, frozen cream, milk and dairy mixes, sour cream, cottage cheese, and ice cream. The facility operates 52 weeks per year.

Summary

The IAC/SFSU team performed a comprehensive energy and water use assessment at this facility in October 2014. The team consisted of 6 engineering students led by Dr. Ahmad Ganji, professor of SFSU School of Engineering, and Director of IAC/SFSU. After an introductory meeting with the Management, the team toured the facility, performed detailed inspection of systems and



In the midst of a wide scale drought in California, Crystal Dairy was able to significantly reduce their Modesto plant's water consumption, leading to an 11% decrease in water costs at the plant. *Photo from Crystal Dairy*

processes, and identified a number of potential energy and water conservation opportunities. Collected data was utilized to quantify the potential savings.

Efficient Plant Practices

The team observed that the facility is aware of the importance of energy conservation and had already implemented several energy efficiency measures, including boiler economizers, high efficiency lighting, condensate return, application of variable frequency drives, and solar power generation.

Results

The Auditing Team identified 16 cost saving opportunities for a total annual potential saving estimated at approximately \$665,000. Plant Management decided to implement 9 opportunities for a total annual estimated saving of \$354,350, representing over 5% of the facility's energy costs, which includes reduction of annual electric energy usage by approximately 1.1 million kWh as well as 13,235 MMBtus of annual Natural Gas usage. The opportunities also included the reduction of annual water/wastewater usage by 26 million gallons, representing approximately 11% of facility's consumption. The

total cost of the implemented measures is estimated to be approximately 337,600 dollars, resulting in a simple payback period of about 1 year.

Client's Implemented Recommendations

- Repair Steam Leaks and Steam Traps: \$24,800/yr Savings
- Repair Air Leaks \$390/yr
- Heat Recovery from Boiler's Blowdown \$23,300/yr
- Improve Boiler's Insulation \$3,200/yr
- Sequence Air Compressors' Operation \$17,700/yr
- Sequence Ammonia Compressors' Operation \$58,100 /yr
- Replace Low Energy Efficiency Lighting LEDs \$14,300/yr
- O₂ Trim Control and Combustion Air VFD Control on Boilers \$14,700/yr
- Recycle Fresh Water from Various Areas \$166,400/yr