

Pepsi Bottler and Boise State IAC Pop the Top on Energy Savings

A team of students and faculty from the Industrial Assessment Center (IAC) at Boise State University performed an industrial energy assessment for a Pepsi bottling facility in February 2012. The assessment was sponsored by the Department of Energy. Center Director Dr. John Gardner led the assessment.

The IAC team observed that the client had previously implemented several energy efficiency measures, including lighting upgrades, and recycling and cleaning programs. The assessment focus was directed toward HVAC, process heat, compressed air systems, pumps, and behavioral aspects of energy usage. In the assessment report, the Boise State IAC team made nine recommendations with simple payback periods two years or less to further decrease energy usage and costs. In addition, multiple energy efficiency measures with longer payback periods were provided to the client for further review.

Based on the recommendations from the IAC team, the client could potentially save more than \$37,000 per year in energy costs. Decreased natural gas usage accounts for 73% of these cost savings while the remaining 27% are a result of reduced electrical use. Together, the savings total nearly 13% of the facility's overall energy costs in 2011.



The Pepsi bottling plant in Nampa, Idaho produces and distributes carbonated soft drinks, bottled water, juices, and teas. *Photo courtesy of Pepsi.*

Facility Background

The facility visited by the IAC team in Nampa, ID, was built in 2004 by a local bottler to expand the company's Pepsi product manufacturing, sales, and distribution in Southwestern Idaho. In 2011, production grew to an estimated 10 million gallons of finished product at this location. PepsiCo acquired the plant in early 2013.

The Idaho Department of Environmental Quality recognized the Pepsi bottling facility in Nampa as a 2012 Pollution Prevention Champion, highlighting management's dedication to reducing natural resource and energy consumption in their industrial facility.

Recommendations

Observations and data collected throughout the facility by the IAC team were used to develop the following recommendations. The savings,

and payback details for each can be found in the "Implemented Recommendations" table.

Insulating cleaning-in-place (CIP) lines and holding tanks was recommended to reduce process heat loss. The bottling equipment in the facility requires a significant amount of high temperature CIP water to adhere to corporate and industry requirements. By insulating these lines the initial CIP

Assessment At A Glance

- Identified nine opportunities to reduce energy usage and costs
- Recommendations to be implemented save over \$37,000 in energy costs
- 73% of cost savings in reduced natural gas usage; 27% in electrical energy cost savings
- Cost savings of 13% over 2011 energy spending

water temperature could be reduced while still maintaining the required water temperature at the point of use, reducing the load and fuel consumption of the boiler.

Two recommendations in the report focused on HVAC improvements that could be made. First, the team suggested installing destratification fans to better circulate air in the warehouse, reducing the temperature differential between the ground level and ceiling. The second was to set back the thermostat during non-working hours to reduce energy use when areas of the building were not occupied.

Three recommendations were made for the compressed air system. Eliminating air leaks in the system would reduce the compressor work by keeping air in the system rather than allowing it to vent

to atmosphere in the plant. Installing a smaller compressor to operate a water treatment pump during non-production hours. This would allow the facility’s primary compressor to be turned off on evenings and weekends to save electricity. Lastly, it was recommended that they isolate separate production lines to avoid charging unused lines.

To reduce excess energy use by lights in the facility, adjusting light levels to those recommended by the Illuminating Engineering Society as well as educating employees to turn off production lighting when not in use were both recommended. Additionally, the IAC team recommended using lower wattage LED lamps in a walk-in cooler to reduce energy use and warm-up time compared with current compact

florescent lamps (CFL).

The final recommendation was to install a variable-frequency drive (VFD) on a well pump motor. The VFD would allow the pump drive to be adjusted to match the call for water into a storage tank. With this adjustment, the pump would be more efficient since it would not be consistently operating at full power.

Implementation

The facility’s management was very active in investigating the benefits of implementing the IAC team recommendations. The “Implemented Recommendations” table below summarizes the nine energy-saving measures that have either been implemented already or are planned for the near future.

Implemented Recommendations

Assessment Recommendations	Annual Resource Savings	Total Annual Savings	Capital Costs	Other Costs	Simple Payback
Insulate CIP Supply Lines and Holding Tanks	831 MMBtu	\$ 6,068	\$ 2,300	\$ 10,000	2 years
Install Destratification Fans	2,687 MMBtu	\$ 19,506	\$ 31,200	\$ 4,000	1.8 years
Reduce Space Conditioning During Non-Working Hours	233 MMBtu	\$ 1,703	\$ 0	\$ 0	0 years
Use / Purchase Optimum Sized Compressor	81,586 kWh	\$ 2,535	\$ 650	\$ 1,244	0.7 years
Eliminate Air Leaks in Compressed Air Lines	53,539 kWh	\$ 1,664	\$ 1,149	\$ 467	1 year
Make a Practice of Turning Off Lights When Not Needed	33,271 kWh	\$ 1,034	\$ 50	\$ 150	0.2 years
Utilize Higher Efficiency Lamps	3,092 kWh	\$ 96	\$ 150	\$ 10	1.7 years
Install Variable Frequency Drive on Well Pump Motor	111,790 kWh	\$ 3,474	\$ 4,800	\$ 840	1.6 years
Isolate Air Compressor Lines	37,248 kWh	\$ 1,158	\$ 1,600	\$ 682	2 years
TOTAL	320,526 kWh 3,752 MMBtu	\$ 37,238	\$ 41,899	\$ 17,393	1.6 years