2009 SUPPLIER PROFILE

Taco®

Taco employs the latest technologies for LEED cerification of its facility addition

A cogeneration plant and LoadMatch® single pipe system combine for big energy savings

Taco, Inc. has been manufacturing in the same building, a converted trolley car barn in Cranston, RI, since 1954. For decades the plant operated in the summer months without the benefits of air conditioning. Over the years the lack of conditioned make-up air created negative pressure inside the brick building and caused a myriad of problems affecting air quality, productivity and especially paint operations.

To cope with the heat and humidity during the summer large fans would be positioned at either end of open bays in an attempt to keep things cool, but the brick walls held the heat like "an old brick oven," Clearly the company needed a system to draw in conditioned outside air to help cool the place down. Compounding the problem was the decision to expand the plant in 2006 by adding on 60,000 sq. feet of new warehouse and distribution space.

The need to remedy the lack of air conditioning in summer combined with the decision to move ahead with new construction prompted Taco to totally revamp the building's HVAC system and construct its new distribution center addition to LEED New Construction (NC) standards. This would not only modernize the plant but would also demonstrate Taco's commitment to the environment along with employing its own line of equipment and systems uniquely tailored toward sustainable building practices. Specifically, it would allow Taco to showcase its single pipe LoadMatch® system in its own facility.

A new and modern conditioned make-up air system for the 175,000 sq. ft. facility (existing building and new addition) would be an expensive proposition. Working with Carrier Corporation, however, Taco came up with a design to use a cogeneration plant to reduce electricity use by a third, utilizing waste heat from electricity generation to produce both chilled water and hot water for the HVAC system. In capturing waste heat from electricity the cogeneration plant produces both chilled water and hot water for BAC-supplied rooftop air handlers.

The cogeneration plant was designed to generate approximately one-third of Taco's electrical requirements through six 60-kW gas-fired Capstone microturbines, utilizing waste heat from electricity generation. Chilled water production would be via hot water waste heat to the 180-ton absorption unit. A high efficiency Carrier 500-ton electrical centrifugal chiller with VFD makes up the rest of the central chilled water plant.

During winter, heat from the microturbines is used to heat the building. Four high efficiency gas-fired Thermal Solution boilers serve the existing office area loop and serve each of the new rooftop air handlers to temper outdoor air makeup air.

To move water through the building, use of the company's own LoadMatch single pipe system was a natural and logical fit for both heat and cooling needs – not only to showcase the LoadMatch system within its own facility but also to enhance energy savings and reduce installation costs – twin benefits of the LoadMatch system that replaces control valves and most balancing valves and greatly reduces the amount of pipe needed.

The LoadMatch-type system installed at Taco replaces normally used LoadMatch 00 circulators with higher gpm Taco KV pumps working with the rooftop air handlers. The KV pumps provide decoupled secondary piping off the primary, single pipe loop.

This combination of old technology (co-generation) and new technology (the LoadMatch single pipe system and the Hydronic Systems Solution (HSS) software that designed the system) provided substantial energy savings compared to typical energy code-compliant systems. The new HVAC system to serve both the original building and the new distribution center addition played a major role in the company's objective to qualify the facility for LEED Green Building certification. The system provides heating and cooling at approximately 50 percent less energy than would be required for a typical DX cooling and conventional boiler hot water heating.

The LEED scorecard for the project, mapped out by the project architectural firm AECOM, called for achieving 29 points to qualify for LEED certification. The project employed a number of sustainable design and construction practices to satisfy all of the LEED category requirements, to include:

- Remediation of soil contamination on the property that Taco acquired for its distribution center along with storage racks for bicycles
- Construction materials were specified in order to achieve a minimum of 20 percent overall recycled content. During construction, waste materials were sorted for recycling/salvaging of 95 percent of the total waste generated at the construction site.
- Low VOC construction products and materials were also specified to provide improved indoor air quality. Window materials were selected to provide natural daylight and were incorporated as clerestory windows
- High efficiency lighting in the storage area is controlled by motion sensors, saving energy and reducing operating costs – rack aisle lighting comes on only in the presence of a forklift truck.

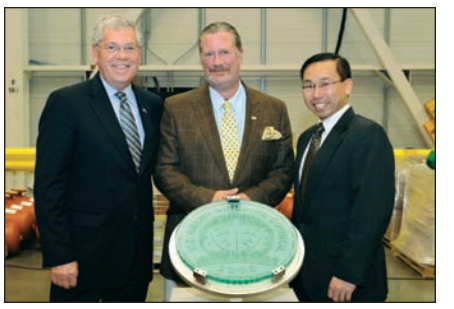
Completed in June of 2007, Taco's new HVAC system provides comfortable heating and cooling by employing cogeneration and LoadMatch solutions. The negative air pressure that bedeviled the plant's interior during the summer is gone for good, replaced by a 78° F space ambient temperature (72° F during winter).

In addition to a one-year $200K electrical rebate based on anticipated energy savings, Taco purchased renewable Green Power certificates for 70 percent of the warehouse addition's electrical requirements for two years.

The company received LEED NC notification for the warehouse-distribution facility in January of 2009, and held a certification ceremony on April 22nd, Earth Day 2009. ■

Information for this article was supplied by Taco, Inc., AECOM and RDK Engineers.

Taco worked with Carrier Corporation to design a cogeneration plant that cuts electricity use by a third and uses waste heat from electricity generation to produce chilled and hot water for the HVAC system in this 175,000 sq. ft. facility.



Taco received LEED NC notification for its warehouse-distribution facility in January 2009, and held a certification ceremony on April 22, Earth Day 2009. Taco President and CEO John Hazen White, Jr. is flanked at the LEED presentation ceremony by RI Governor Don Carcieri and Cranston Mayor Alan Fung.

Project Partners:

Architect: *AECOM, Boston, MA*
Construction Manager: *A.O. Ahlborg & Sons, Cranston, RI*
HVAC System Support: *Carrier Corporation, Needham, MA*
LEED Commissioning Services: *RDK Engineers, Andover, MA*