

Case study

March 2012



Hilton Anatole Hotel

Chiller upgrades, configuration earn \$1.3M+ in utility incentives

Dallas, TX

One of the premier hotels in the Southwest United States, the Hilton Anatole Hotel boasts 1,620 guest rooms and offers some of the finest, most advanced meeting and exhibition facilities in the U.S., including the 128,000 sq ft Trinity Conference Center, which is well-suited for large trade shows and expositions. The hotel also features multiple restaurants/bars and kitchens, a laundry, five large ballrooms, fifty-eight meeting rooms, and a full-service health and fitness center.

Challenge

The two chiller plants at the Hilton Anatole Hotel, both over twenty-five years old, had become inefficient and unreliable. Operating costs, in terms of energy use and chiller maintenance, were escalating. The hotel sought to implement upgrades to reduce costs, capitalize on local utility company incentives and improve temperature, humidity and indoor air quality for the comfort of its guests.

Solution

Phase I: Chiller upgrades, control system installation

The hotel team developed plans to upgrade its chiller plants and install a new property-wide energy management system, and selected Trane as their project partner. Using a lifecycle cost approach, Trane developed solutions to maximize energy conservation and reduce maintenance expenses. Upgrades included two new high-efficiency Trane CenTraVac™ centrifugal chillers to replace one of two chillers in each of the hotel's chiller plants. The two new chillers were equipped with adjustable frequency drives.

A Trane Tracer Summit™ building automation control system, with a dedicated PC workstation, was installed to monitor and control central plant operations. This includes chillers, boilers, water heaters, pumps and cooling towers, as well as air handler operation and VAV boxes in common areas, such as lobbies, meeting rooms, ballrooms, and exhibit halls. The



All upgrades at the Hilton Anatole Hotel were completed without disrupting guests or events.

Trane Integrated Comfort System (ICS) uses sophisticated system optimization strategies to minimize HVAC energy use, while meeting heating or cooling requirements.

The Tracer Summit system controls more than 2,300 different points in the hotel and can also interface with other hotel control systems and unit controllers to integrate HVAC, lighting, fire alarm systems, variable speed drives, generators, and power monitoring equipment. The system also controls lighting at large ballrooms/exhibit halls; and monitors walk-in cooler and freezer temperatures with automatic alarms (to prevent food spoilage in the event of refrigeration system failure) and critical sump pump alarm notification.

Phase II: Chiller configurations

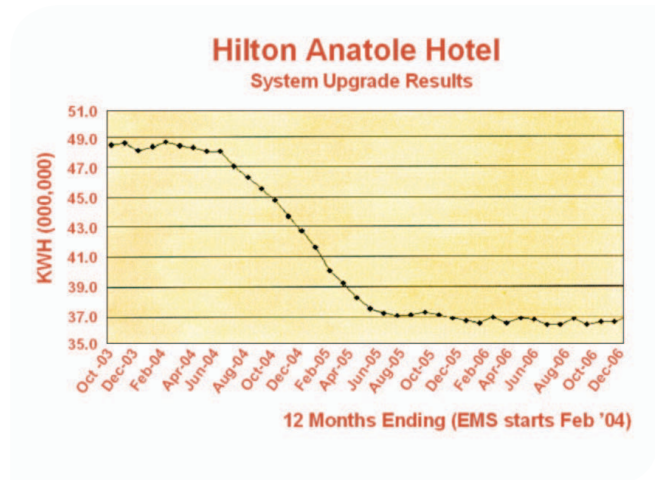
Teaming with the hotel's engineering services company, Trane evaluated chiller configuration options to achieve the lowest operating cost. In the Tower, the chiller configuration was converted from a parallel flow to a series flow application, in conjunction with replacement of the original 900-ton chiller with a new 980-ton centrifugal chiller, installed in the upstream position. The series flow arrangement allows the upstream chiller to use less kW input per ton output, and can increase efficiency 8 to 10 percent compared with a parallel flow configuration. A heat recovery auxiliary condenser was added to the downstream chiller to pre-heat city water distributed to the hotel's domestic hot water system, supplying guestrooms, laundry, kitchens, and restrooms. This modification greatly reduces the natural gas consumption of the domestic hot water boilers.

The new, high-efficiency chiller included the option of a free cooling vapor cycle utilizing refrigeration migration. This allows the chiller to operate as a heat exchanger and produce chilled water in the fall, winter, and spring (when it can operate with cold condenser water) without using the compressor motor. The pumping system was modified from a constant flow system to a variable primary flow system to reduce chilled water pumping energy while correcting low-delta T (temperature) syndrome.

The Atrium's 948-ton centrifugal chiller was replaced with a 1,000-ton chiller, and variable primary flow and free cooling were employed. The Atrium plant's operating sequence begins with free cooling when outdoor conditions allow, followed by the chiller equipped with variable frequency drive operating during lower loads, and only the newest, most-efficient chiller used during higher building loads.



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The initial system upgrade at the Hilton Anatole Hotel resulted in a 25 percent reduction in energy use.

Results

Chiller upgrades, control system installation and the implementation of innovative HVAC technologies puts the Hilton Anatole Hotel at the forefront in providing sustainable, environmentally-friendly hospitality services for its guests, while reducing overall cost of ownership. Metering and verification show an annual savings of over 14 million kWh (representing over 20 million pounds/year carbon dioxide emissions avoided), a peak electrical reduction of 1,764 kW, and a utility incentive of \$1,136,740. The project earned a U.S. Regional Corporate Energy Management Award from the Association of Energy Engineers. Significant operating cost savings is also expected from the Phase II system upgrade, which received a utility incentive of \$168,835, based on annual kWh savings and peak electrical savings.

"We decided to use Trane because we knew they would do a great job," said Rick Dringoli, project manager for capital improvements at the Hilton Anatole Hotel. "A project of this size has a lot of risk for problems and complications. Trane performed very well. They're very professional and did what they said they would do".