

May-June 2005

Atlantic City Energy Provider Hits Cost-Savings Jackpot

Integrated power and energy management system draws a full house of operational efficiencies and energy cost savings.

By Al Hamdan

Located in the Renaissance Pointe area of Atlantic City's Marina District, Borgata Hotel Casino and Spa is the first new casino/hotel/shopping destination built in Atlantic City in more than a decade. The Las Vegas-style venue brings a new concept to the boardwalk, representing the future of casino development trends in New Jersey.

Borgata features more than 2,000 guest rooms, 135,000 square feet of gaming, 11 restaurants, a 35,000-square-foot spa, lounges, bars, shopping and entertainment facilities, and 70,000 square feet of conference space.



Employee and guest comfort is key to the success of this new facility. That comfort starts with the fundamentals: hot and cold water. To provide these essential services, Borgata signed a 20-year contract with Marina Energy LLC, a wholly owned subsidiary of South Jersey Industries. Under the agreement, Marina Energy provides the campus with a full range of heating and cooling services, as well as electricity and natural gas.

To serve Borgata, Marina Energy uses its brand new Marina Thermal Facility (MTF), a 26,000-square-foot plant that provides the hot and cold water needed to heat and cool the Borgata Hotel Casino and Spa. The \$54 million plant is capable of providing nearly 15,000 gallons of chilled water and 2,600 gallons of heated water per minute, delivering enough heated and chilled water to meet all Borgata's heating, cooling, and domestic hot water needs.

Eight thousand feet of underground pipes connect the MTF with Borgata. The distribution piping system consists of hot and chilled water supply and return. It terminates in the hotel at metered energy transfer heat exchangers that separate MTF systems from Borgata's chilled water and low-temperature, hot water distribution systems. Three independent feeds from an adjacent 69-kV substation are stepped down to 12.47 kV to supply normal power for the plant. For redundancy, diesel generators at the MTF can provide backup power in the event of substation failure, as well as peak shaving capabilities.

The Challenge

To maximize the MTF's energy efficiency, Marina Energy wanted a state-of-the-art facility featuring the highest class of controls and engineering. In this case, with the many different requirements of the MTF's primary customer, the best system couldn't come from just one vendor. It required the involvement of several different companies with products and project teams that could work well together.

While Marina Energy wanted to create the most advanced plant, the customer was focused on cost and delivery time. Vendor selection was based on total cost of ownership and risk management, not just up-front proposal cost.

The project site presented its own unique set of challenges. The future home of the MTF broke ground next to a major roadway construction project, creating some coordination issues for the construction team. While the plant footprint was compact, the project had to be designed with future expansion in mind. Not one square inch could be wasted on excess or inefficient equipment.

For plant controls, Marina Energy wanted a system that could interface with third-party systems with easy customization and expansion—but without the need to develop new human-machine interfaces.

The Strategy

Rockwell Automation, with a strong background in similar installations, was asked to create a control system that could interface with other computer control systems and collect disparate data into one solution.

Rockwell Automation's project team recommended a system with a central point of control, which would loop back to a central control room, even though control would also be distributed throughout the plant.

For the control system, Rockwell Automation leveraged its industry-leading Integrated Architecture featuring an Allen-Bradley ProcessLogix distributed control system, Allen-Bradley ControlLogix processors, 1756 I/O modules, SLC 500 controllers, variable-frequency AC drives that control a total connected horsepower of 4550, and motor control centers. The Integrated Architecture approach allows Marina Energy to integrate their entire MTF plant, replacing isolated cells of activity with a single coordinated system that provides robust, continuous, and sequential control, and improves the flow of information—from the simplest sensor on the plant floor to users' desktops. This tight integration enables MTF plant personnel to concentrate on optimizing their processes, rather than troubleshooting systems integration.

Rockwell Automation installed the Allen-Bradley Powermonitor 3000 to generate a spectrum of power line information, including real-time power quality data, harmonics analysis, oscillography, and active energy.

In order to integrate multiple data sources and provide user-friendly information, Rockwell Automation added Rockwell Software RSEnergyMetrix to the system. This energy management software collects and trends data from more than 300 points throughout the MTF plant, delivering critical energy information to users' desktops. The Web-based capabilities of RSEnergyMetrix allow plant operators to easily share available information with individuals throughout the facility, helping optimize energy consumption, improve productivity, and lower energy costs.

In order to ensure the smoothest possible integration during startup, Rockwell Automation drew upon resources from its Global Manufacturing Solutions group to first test the system in the factory and then at the installation site.

The Payoff

The Borgata casino complex opened July 2, 2003—just in time for the Independence Day holiday weekend. It was one of the hottest weekends on record in Atlantic City, and the casino's cooling systems were put to the test almost immediately. As expected, they successfully supplied all the chilled and heated water needed to keep guests cool and comfortable.

Behind the scenes, the seamless facility control system delivers data on demand to shift operators. At any time of day, operators can report on plant operations simply by using information from the system developed by Rockwell Automation. Plant operators use real-time information to make cost-saving changes to operations and respond quickly to surges in demand from Borgata. According to Frank DiCola, president of DCO Energy, the developer for Marina Energy, "The system operates exactly as we thought it would."

Going forward, the staged combined heat and power thermal plant has the capacity to supply a total of 25,000 tons of chilled water, 300 MMBtu of hot water and 8 MW of emergency generated power to multiple hotels and casinos throughout Atlantic City's Renaissance Pointe area.

Topics: [Reliability](#), [Energy Efficiency](#)

