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Strategic Approach to Energy Efficiency Helps Secure Reliable Energy Supply, Saves Millions

A long-term strategic approach to energy efficiency developed by **Johnson Controls** is helping the Twentynine Palms military base secure a reliable energy supply, while saving nearly \$7 million per year.

Under a comprehensive facility systems project, Johnson Controls upgraded five chiller plants on the base and installed a \$16 million, 7 MW dual-fueled cogeneration system. The next phase of the project will include a 1.1 MW photovoltaic plant, one of the highest-capacity non-utility solar power plants in the world.



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Twentynine Palms, 45 miles north of Palm Springs, CA, is the site of the Marine Air Ground Task Force Training Command (MAGTFTC), which operates the U.S. Marine Air Ground Combat Center, promoting readiness of operating forces. The Command also provides facilities, services, and support to meet the needs of Marines, sailors, and their families. The base covers 632 square miles and is home to 11,000 Marines and 814 officers. Its total population, including dependents of service personnel, exceeds 25,000.

Meeting the Energy Challenges

Located at the end of the utility distribution line, the base experienced frequent power disruptions, and the Twentynine Palms facilities management division wanted to increase power reliability and make the base more self-sufficient. The base was also challenged by federal orders to reduce energy consumption and use renewable energy sources.

To meet these challenges, Twentynine Palms began working with Johnson Controls in 1998 on a facility system project that included five chiller plant

upgrades, completed in 2000. As part of that project, Johnson Controls audited base buildings, developed a comprehensive plan, coordinated funding, and guaranteed results.

Since then, the base facilities management division has partnered with Johnson Controls through energy saving performance contracts (ESPC) administered by the U.S. Army Corps of Engineers and the Naval Facilities Engineering Service Center. ESPCs allow federal government agencies to make energy-efficiency improvements and pay for them out of contractually guaranteed energy cost savings.

“Strategic energy planning is a key component of our master plan,” says Commander Rob Tye, head of the facilities management division at Twentynine Palms. “Johnson Controls is helping us treat energy as a resource rather than as an expense.”

The cogeneration plant, which went online in February 2003, saves about \$5.8 million per year by reducing electricity purchases from the utility grid by almost two-thirds. The system’s natural-gas-fueled combustion turbine can switch seamlessly to diesel fuel in case the gas supply should fail.

Turbine exhaust is captured by a heat-recovery generator that delivers 30 to 35 MBtu/hr of hot water. That water

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feeds the base's absorption chillers for air conditioning in summer, when temperature in the base's Mojave Desert climate can reach 120° F. In winter, when the base experiences temperatures into the low 30s, the hot water augments boilers for heating.

The project included a 7,200-square-foot turbine hall, a 3-mile high-pressure natural gas fuel line, and connections to the electrical substation feeding critical base electricity loads. The work also included new fiber-optic communication cabling to connect the cogeneration plant with monitoring and control equipment at the substation.

Making a Brighter Future

The next phase of the project is a \$51 million ESPC that includes the 1.1 MW photovoltaic system, an 8-acre installation that takes advantage of the base's 360 days of annual sunlight. The work also includes:

- Three central chilled-water plants and distribution systems providing 3,000 tons of initial cooling capacity and ultimately 5,700 tons,

- A Metasys® building automation system for base-wide energy management,
- Skylighting and daylighting in 12 warehouses, and,
- A \$1.6 million annual service contract.

The total ESPC is expected to save the base \$6.9 million per year for 20 years—a total savings of \$138 million.

“What makes this project especially interesting is the large, quantifiable energy savings the installed hardware will generate for us,” says Wayne Hofeldt, energy manager for MAGTFTC.

“In addition to the energy savings, we are capturing the budget dollars saved by the energy measures and reinvesting them into infrastructure improvements. For example, the energy savings are

paying for three new chiller plants to service a chilled-water distribution loop that will replace many aging air-cooled units. Because many buildings will be served by the same modern, efficient system, we will also save on maintenance every year for the foreseeable future.”

Johnson Controls is a Fortune 150 company based in Milwaukee, WI, with full-service offices in San Diego and most major cities around the world. The company offers a wide range of facility-related products and services and has more than 770 active performance contracting projects in North America.

*For more information, call Chuck Strand at 858-614-8500 or visit www.johnsoncontrols.com. **

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