Case Study

U.S. Marine Corps Air Ground Combat Center

Johnson Controls

U.S Marine base works securely, reliably, efficiently and comfortably

The challenge: Create a reliable, secure power source to ensure continuous operations at a military base that is vulnerable to power outages

The U.S. Marine Corps Air Ground Combat Center (MCAGCC) at Twentynine Palms, California helps ensure military operating force readiness. A military base must run without interruption. However, the MCAGCC sits at the end of the electrical distribution line and has experienced frequent power outages. Keeping military and civilian personnel and their families comfortable has also been challenging because of the base's location in the Mojave Desert where temperatures range from 120 degrees by day to 20 degrees by night. The base needed significant climate control, lighting and security system improvements, but funding those improvements presented another challenge, given budget restraints.

> "We have more than 10,000 Marines housed here in the desert with summer temperatures reaching more than 120 degrees. We needed a self-sufficient, reliable energy source to provide an environment that helps us fulfill our mission. The new cogeneration plant is an innovative way to meet both goals at a low cost, and save energy at the same time."
>
> **– Wayne Hofeldt**
> Base Energy Manager,
> Marine Corps Air Ground Combat Center,
> Twentynine Palms, California

The solution: An energy and facility upgrade plan to meet the base's continuous energy needs and deliver sufficient energy savings to fund facility-wide improvements

Johnson Controls worked with the MCAGCC civilian facilities management team, federal agencies and

Case Study

Johnson Controls

other resources to develop and implement a multi-year project to address energy efficiency, reliability and security, and to ensure comfortable living and working conditions. The company also coordinated the funding for the project, which included:

- A 7.2-megawatt dual-fueled cogeneration plant that produces electricity and heat, helps reduce energy costs and consumption, and increases power reliability and self-sufficiency.
- Replacing diesel-driven chillers with more efficient and reliable chillers.
- An on-site 1.2-megawatt photovoltaic solar array providing a renewable energy source.
- Lighting controls and increased use of daylighting.
- HVAC system upgrades.
- The Johnson Controls Metasys® building management system to monitor and control key electrical and mechanical systems for maximum efficiency, comfort and security.

Through an energy savings performance contract, Johnson Controls guarantees sufficient savings over 20 years to finance the improvements.

Results and benefits

The cogeneration plant provides enough power to meet all critical needs for up to six days, so that if an outage occurs on the utility company's distribution line, the base operates without interruption. The dual-fueled cogeneration plant also makes it possible to switch seamlessly between diesel and natural gas should there be an interruption of either fuel supply, thereby ensuring a reliable, continuous source of electricity independent of the grid.

The cogeneration plant saves approximately $5.8 million a year, providing payback for construction costs within just four years, after which the savings keep coming and can be used to fund future improvements. The photovoltaic solar array is expected to save $1.1 million a year while providing clean, renewable energy, and helping to reduce the base's carbon emissions and environmental impact. In all, the base will save $6.9 million a year over 20 years for a total of $138 million in savings. Upgrades and improvements to HVAC and lighting systems throughout the base have made living and working conditions much more comfortable for military and civilian personnel and their families. Maintenance calls responding to heating or cooling complaints have fallen from 400 a month to an average of two a week.

In short, MCAGCC is a military base that works, fulfilling its mission reliably and securely while saving money and energy.

MCAGCC has received numerous prestigious awards for improving energy efficiency and reliability, including the Commander-in-Chief Installation Excellence Award.