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Daniel T. Magro  
NAVFAC EXWC ESPC Program Lead



CASE STUDY

# MARINE CORPS RECRUIT DEPOT PARRIS ISLAND

The United States Marine Corps Recruit Depot Parris Island selected Ameresco in 2015 to deploy combined heat and power (CHP) and solar photovoltaic (PV) generation assets and to integrate them with a battery energy storage system (BESS) and a microgrid control system (MCS) capable of fast load shedding. Together with the improvements outlined below, this comprehensive project will further the Marine Corps Installation Command mission to ensure a reliable, secure energy supply and reduce lifecycle operating costs of Marine Corps facilities while managing future commodity price volatility.

TECHNOLOGY TYPE

- BOILER PLANT IMPROVEMENTS
- ENERGY MANAGEMENT CONTROL SYSTEM/HVAC CONTROLS
- RENEWABLE ENERGY SYSTEMS
- LIGHTING UPGRADES AND CONTROLS
- CHILLER IMPROVEMENTS
- HVAC
- WATER SYSTEM UPGRADES
- HOT WATER/STEAM DISTRIBUTION SYSTEMS

FACILITY SIZE

**8,095**

ACRES  
(OVER 3.9 MILLION SQUARE FEET)

ESPC ENERGY PROJECT SIZE

**\$91.1**

MILLION

PV CAPACITY

**6.7**

MW

ESPC ANNUAL ENERGY SAVINGS:

**\$6,000,000**

## SERVICES PROVIDED



Ameresco replaced the existing end-of-life steam plant with a new, fully automated, natural-gas fueled CHP plant capable of producing 3.5 MW of electricity and all of the steam required for the entire installation. This measure consisted of the decommissioning of an aging, inefficient central steam plant and installing a 3.5 MW gas turbine, a Heat Recovery Steam Generator, 3.5 MW total in backup diesel generators, and two 30,000 lb/hr dual fuel backup boilers.

Ameresco will deploy integrated renewable energy solutions, including solar PV, domestic hot water system upgrades, a battery energy storage system (BESS), and a microgrid control system (MCS) capable of fast load shedding. The solar PV measure consists of a 1.6 MW PV carport system and a 5.1 MW ground mount system.



The 4.0MW/8.1MWh Lithium-Ion BESS reduces energy costs for Parris Island and enhances the reliability and security of on-site power generation assets. The BESS captures a substantial amount of excess PV energy generation and stores this electricity for later use to reduce power and energy purchases from the utility. As designed, the 4.0MW/8.1MWh system will store over 1,120,000 kWh of annual excess PV generation, reducing the curtailment requirement of the PV from 23% of its total annual generation to 11%.

## SERVICES PROVIDED (cont.)



The MCS will monitor and coordinate dispatch of CHP, PV, BESS, and Emergency Generators as required in response to site electrical and thermal loads. A fast load shedding (FLS) capability is included in the controls package to provide an uninterrupted transition from utility power to islanding mode. For the duration of islanding operations, the MCS will ensure the support of mission-critical systems from these on-site generating assets.

Ameresco is also addressing energy and water efficiency at Parris Island, installing over 29,000 LEDs as part of lighting system upgrades that result in higher efficiency lighting and reduced maintenance costs.

Energy monitoring and control system (EMCS) upgrades improve energy efficiency, lower utility cost, improve system performance, enhance the quality of occupied facility indoor environments, optimize operations and maintenance of building systems, and preserve the operating lifespan of mechanical and electrical equipment.

Ameresco's chiller improvements provide a comprehensive solution to upgrade existing chiller equipment and replace failed infrastructure. The measure will reduce both energy consumption and maintenance requirements while providing an improved work environment for buildings with problematic HVAC systems. Additional HVAC improvements enhance laundry system energy efficiency and preserve site cooling system longevity and efficiency.



Water system upgrades will reduce MCRD site water usage by 25% and provide necessary infrastructure upgrades, including a liquid pool cover and optimized pool filtration. A comprehensive hot water and steam distribution system repair will likewise enhance efficiency and reducing maintenance costs.

Ameresco will assume the Operations and Maintenance (O&M) and Repair and Replacement (R&R) responsibilities for the installed ECMs, with the exception of the operations of the CHP plant.

# CUSTOMER BENEFITS



*"This ESPC project is probably the most comprehensive ESPC ever entered into by the Navy, involving 121 buildings (3.1 million square feet total) and 20 energy conservation measures (ECMs), This will result in MCRD Parris Island reducing their energy consumption by 384,962 million BTUs (79%) and water consumption by 74.6 million gallons (27%) annually. I think the team at Parris Island, with this ESPC, may have just redefined a 'deep energy retrofit!'" -Daniel T. Magro, NAVFAC EXWC ESPC Program Lead*

This state-of-the-art infrastructure will provide Parris Island the capability to maintain reliable operations in the event of loss of utility services. This comprehensive project also features solar photovoltaic (PV) arrays that will add another 6.7 MW of on-site generation capacity. The PV systems will displace the purchase of electricity from the serving utility, and the carport PV system provides shading at the primary parking area for visiting family members. Together with demand reduction ECMs, these improvements will result in:

- **75%** reduction in utility energy demand
- **25%** total water reduction
- **10 MW** onsite electrical generation
- Combined annual carbon reduction of **37,165** metric tons of CO<sub>2</sub>



## CUSTOMER BENEFITS (cont.)



The CHP plant also eliminates the site's current use of fuel oil #6 and its reliance on expensive temporary boilers. This system also provides 30 days of fuel oil storage for curtailment and security, improves site maintenance and safety regimes, and provides optimal siting for on-site utility access, the capacity for black start and backup power production, and multiple backup options for steam production. Overall, the project will revitalize Parris Island's existing infrastructure and enhance the reliability and functionality of site buildings and facilities

### ABOUT THE MARINE CORPS RECRUITING DEPOT

*MCRD Parris Island is an 8,095-acre military installation located on the southern coast of South Carolina that provides training for approximately 17,000 new USMC recruits each year. The Marine Corps Recruit Depot has been on Parris Island continuously for one hundred years and the Navy presence dates back to the 1860s. The facilities on Parris Island include an historic district centered on the Commanding General's House and the Navy dry dock dating from the 1890s. All male recruits east of the Mississippi River and all female recruits nation-wide are trained for 13 weeks at this facility.*

*Learn more at [www.mcrdpi.marines.mil/](http://www.mcrdpi.marines.mil/).*

## ABOUT AMERESCO

Ameresco, Inc. (NYSE:AMRC) is one of the leading energy efficiency and renewable energy services providers. Our energy experts deliver long-term customer value, environmental stewardship, and sustainability through energy efficiency services, alternative energy, supply management, and innovative facility renewal all with practical financial solutions. Ameresco and its predecessors have constructed billions in projects throughout North America.

**For more information about Ameresco and our full-range of energy efficiency and renewable energy solutions, please visit [ameresco.com](http://ameresco.com).**