

Contract Details

Contract Type:

Energy Savings Performance Contract; Design/Build, Permitting, Commissioning, Measurement and Verification, and Maintenance

Facility Size:

4 million square feet

Energy Project Size:

\$44 million (Design, Construction, Financing)

\$34 million (Maintenance)



Summary

The U.S. Army Corps of Engineers and the U.S. Navy selected Ameresco to design and install two comprehensive energy conservation projects under an Energy Savings Performance Contract at Portsmouth Naval Shipyard in Kittery, Maine.

Customer Benefits

Normally the shipyard operates in a cogeneration mode with Central Maine Power with the power plant and the public utility both feeding the shipyard's electrical distribution grid. However, the installation of the gas turbines and the backup diesel generators have made the shipyard self-sufficient if it is required as they are sized to be able to provide for the critical requirements of the facility should there be a loss of service from Central Maine Power. In fact, the facility has an agreement with Central Maine Power to break the tie with the utility if requested during times of very high demand on the main New England power grid.

Environmental Benefits

Phases one and two of the project installed two low emission Solar Turbine gas turbines which use the SoLoNox technology combined with Deltak heat recovery boilers. Emission level readings on the turbines are performed annually and are consistently below the levels required by the shipyard's emission permitted which is issued by the Maine Department of Environmental Protection and the U.S. Environmental Protection Agency. The two dual-fuel Nebraska boilers that augment the steam production of the heat recovery boilers are also tested annually and are maintained to achieve an average efficiency rating of 85 percent or better. Although it is dependent on fuel costs, all units normally operate on natural gas with #2 fuel oil used as a back up. Alone, phase three of the project is projected to save over 13 tons of carbon dioxide, nitrogen dioxide, and sulfur emissions.

Services Provided

For its first phase of the task order, Ameresco focused on the shipyard's power plant and its steam and hot water distribution systems, including operations and maintenance practices. Ameresco's responsibilities included an energy survey, engineering analysis, design, plan preparation, specifications, and bid documents. They also included coordinating the bid process, construction management, system commissioning, and training. Once installation was complete, Ameresco became responsible for energy savings measurement and verification and operation and maintenance of the installed equipment.

The existing power plant consisted of four boilers with a total output capacity of 510,000 pounds per hour of steam, steam turbine generators with a total of 11 megawatts of capacity, and four 1,000 horsepower air compressors. After a thorough energy survey and engineering analysis, Ameresco designed and installed a comprehensive power plant upgrade and improvements to the steam and hot water distribution systems. The power plant upgrade in phase one included a 5-megawatt gas turbine generator and 70,000 pounds per hour of heat recovery steam generators and associated afterburners that enable boiler shutdown during the summer. Improvements to the steam and hot water systems involved installing individual boilers, steam trap work, modifying hot water pump operation with variable-frequency drives and controls, and shutting down 2,575 feet of steam and condensate piping.



About Portsmouth Naval Shipyard

Portsmouth Naval Shipyard is a mission-critical U.S. Navy facility that undertakes maintenance and repair of U.S. Navy vessels and consists of over 300 buildings.

Learn more at

www.navsea.navy.mil/shipyards/portsmouth/default.aspx

About Ameresco

Ameresco, Inc. is one of the leading global energy services providers. We deliver long-term customer value, environmental stewardship, and sustainability through energy efficiency services, alternative energy solutions, supply management, and innovative facility renewal strategies. The company has over 650 employees in regional offices throughout North America. Ameresco, Inc. has constructed billions in energy projects throughout the world.

Learn more at

www.ameresco.com

Services Provided (cont.)

In the second phase, Ameresco was responsible for modernizing the existing central power/steam plant, raising overall efficiency, and streamlining plant operations. The primary energy cost savings opportunity stemmed from installing additional combustion-turbine-based cogeneration capacity, which provided the shipyard with the capacity to meet its year-round electricity and steam needs. The new system added further electrical generating capacity of approximately 5.2 megawatts and steam capacity of approximately 70,000 pounds per hour, and replaced the existing power plant steam turbines, complementing the gas turbine generator installed in the first phase of this task order. These additions also allowed the 60-year-old high-pressure steam boilers required for the old steam turbine generators to be abandoned. This system improvement will also greatly enhance utility system security and reliability while offering protection against energy market pricing volatility. Two 2-megawatt diesel generators were also installed to provide backup power and additional generating capacity for periods when commercial utility power is unreliable or unavailable.

The project also included the installation of two new 70,000-pounds-per-hour packaged dual-fuel boilers to augment steam production for shipyard heating in winter and consolidation of the shipyard's heating systems, resulting in a complete decommissioning of the existing 600-pounds-per-square-inch boiler plant system.

A completely new digital power plant control system was installed, replacing a patchwork of older controls and instrumentation. This work was done while maintaining all of the essential services provided by the power plant. Enhancements and repairs were made to the compressed air system and lighting systems as well. Ameresco provided all commissioning and start-up services in-house, and was able to implement this complex program with a minimum of disruption to normal utility services and shipyard operations. By working in close contact with the U.S. Navy's operating personnel, these systems were brought on line seamlessly.

The third phase of the of the task order was completed in fall 2010 and consisted of the replacement of over 6,500 feet of deteriorated condensate piping and rebuilding the facility's two main condensate pumping stations. These repairs will greatly increase the amount of condensate returned to the steam plant resulting in a large savings in make-up water and chemical water treatment costs. Because the condensate project required having large areas of utility trench and excavations open throughout the facility, Ameresco project management, working closely with shipyard personnel, provided detailed logistical planning and close project oversight to ensure that the shipyard's critical mission path was not impacted in anyway.

The third phase also included the installation of two energy efficient air compressors and an expansion of the power plant's digital control system. The smaller compressors will require far less horsepower than the existing larger machines and will be used at times when the compressed air requirements are lower such as nights and weekends. They will also be able to cover the access load requirements during production shifts. For example instead of running two 1,000 horsepower machines, partially loaded, the operating profile will be one 1,000 horsepower machine supported by a 250 or 500 horsepower machine to cover the load swings. The digital control system will watch the air system pressure and flow and automatically operate the compressors in the most economic operating mode while still covering the shipyard's production requirements. This air measure has been recognized by Efficiency Maine as having a potential of saving the shipyard over 1.6 kilowatt hours per year.

