Coast Guard Awards UESC at Academy; Largest Contract of Its Kind for DHS

The Coast Guard awarded an unprecedented Utility Energy Service Contract (UESC) at the Coast Guard Academy, located in New London, Connecticut. The $72.6 million contract will accomplish $39 million in capital improvements and is estimated to avoid more than $2 million in energy expenditures annually. The project is completely self-funded. Out-year energy cost savings will pay for all project costs. The UESC is largest executed by the Department of Homeland Security (DHS).

Modernization Meets Resilience

Environmental and logistic concerns associated with the Academy’s fuel-oil-fired boiler plant seeded the project. However, the project team expanded the scope to execute a holistic energy project that will reduce consumption, install renewable energy generation, and enhance energy resilience across the Academy.

The project will replace the aged, fuel oil-fueled central plant with a high-efficiency natural gas plant that is supplemented by a one megawatt combined heat and power (CHP) plant (see Figure 1, next page), expand the central chiller plant, and implement twenty other energy conservation measures (ECMs), including the following.

- Boiler System Improvements
- Chiller Plant Expansion and Optimization
• Distributed Generation (one megawatt of CHP)
• Expansion of Main Electrical Distribution to Smith Hall and Waesche Hall Transformers
• Kitchen Ventilation Controls
• Laboratory Hood Replacement and Exhaust Modifications
• Smith/Waesche/Dimick Heating System Conversion
• McAllister Hall HVAC Improvements
• Campus-wide Direct Digital Controls (DDC) System Improvements
• Plug Load Controls
• Retro-Commissioning
• Solar PV and Roof at Rolland Hall (284 kW)
• Solar PV at Waesche Hall (170 kW)
• Steam and Hot Water System Improvements

• Water Conservation
• Lighting Improvements

**Anticipated Outcomes**

These measures will reduce total energy consumption at the Academy by 24,488 MBTU per year, or a reduction of 16%, and reduce water consumption by 7%. Total energy costs will be reduced by 80%. The project also includes maintenance, repair, and replacement for major equipment including the boiler, the CHP, and the chiller plant to ensure energy savings are achieved.

The UESC aims to increase energy resilience by including increased on-site generation via the CHP plant, coupled with two rooftop solar arrays, that will provide 82% of required electricity. The UESC also includes a measure to improve the Academy distribution system, and upgrade transformers that will provide a framework for energy resilience beyond the project. These changes, in addition to the conversion from liquid fuel to natural gas, will harden...
the Academy’s energy infrastructure and supply. Sam Alvord, Chief, Coast Guard Office of Energy Management, COMDT (CG-46), highlights the benefits of CHP. “By extending a continuous supply of natural gas onto the Academy campus, we are reducing manpower historically required to order fuel trucks, and are diversifying the site’s energy inputs. The next phase of course will be to ensure load sequencing, so the Academy’s utility system can automatically prioritize and shift loads with the various sources of power generation.”

Core Mission Enhancement

The Academy prepares cadets for their roles as future Coast Guard officers through a complete higher education experience. Departments include engineering, humanities, management, mathematics, science, professional maritime studies, and strategic intelligence studies.

The UESC will replace 20 laboratory fume hoods housed in the Smith Hall chemistry lab. The new hoods will permit science cadets to work with compounds and chemicals restricted by previous conditions, double student capacity, enhance safety, and broaden curriculum. Coast Guard Academy professor, Dr. Glenn Frysinger, is enthusiastic about lab upgrades. “We are able to double the size of our organic chemistry laboratory—from 6 to 12 students—and on the hood/infrastructure front we will be on par with the top institutions in the area.” Moreover, engineering cadets will gain early exposure to a micro-turbine generator, similar to modern equipment found on the Coast Guard’s newest National Security Cutters.

Ancillary Benefits

Ancillary benefits include the execution of planned capital improvements, such as a replacement of the roof at Roland Hall two years ahead of plan and at a lower cost, tying three buildings into the central chiller plant, and removing existing, decentralized cooling and heating infrastructure. By including this work, the UESC not only increases energy savings, but will simplify procurement, address backlog, and dramatically reduce the operations and maintenance burden at the Academy.

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Top: U.S. Coast Guard Academy cadets demonstrate experimental techniques in Smith Hall April 2, 2015. The lab will receive new venting hoods that will benefit the science curriculum. U.S. Coast Guard photo by Petty Officer 2nd Class Cory J. Mendenhall. Center: Dimick Hall (left) and Smith Hall (right) will receive heating system conversions. Photo by U.S. Coast Guard Academy. Bottom: Current rooftop solar PV on McAllister Hall. The UESC will extend rooftop solar to Waeche Hall and Roland Hall. U.S. Coast Guard photo by Petty Officer 3rd Class Cory J. Mendenhall.