U.S. Coast Guard and Florida Power & Light Successfully Implement a Multi-Site UESC Project

As the largest component of the Department of Homeland Security (DHS), more than 42,000 active-duty members of the U.S. Coast Guard safeguard the nation's maritime interests. Consequently, Coast Guard facilities represent about 60 percent of the DHS shore energy use portfolio. Under the National Energy Conservation Policy Act (NECPA) and Executive Order 13423, the Coast Guard has reduced its facility energy intensity year-on-year, achieving a fiscal year (FY) 2012 reduction of 28.6 percent from a FY 2003 baseline.

The Coast Guard partnered with Florida Power & Light (FPL), to accomplish a 12-site utility energy services contract (UESC) throughout southern Florida. The project originally encompassed two separate Coast Guard sites in the Miami area—Air Station Miami and Base Miami Beach. However, this partnership fostered a strong commitment to achieve the most comprehensive and pragmatic project scope. As a result, the $6 million project expanded and delivered energy conservation measures (ECMs) to ten additional sites, covering a total of 42 buildings and spanning almost 400 miles.

Selecting the Right Sites with the Right Utility

The Coast Guard began considering a UESC by evaluating all sites for potential ECMs with consideration to benefits produced by the contract vehicle. Ultimately, the Coast Guard chose its Miami facilities based on energy audit recommendations, excessive energy consumption, and location within a singular utility territory. After advertising a notice of opportunity, the Coast Guard selected FPL and quickly established an effective relationship. Through this partnership, the two organizations created an understanding of expectations at each site. FPL was flexible during the development process to assure accuracy and successful project implementation

The development process was designed to be a seven-step process:

1. No Cost / No Obligation Preliminary Assessment (PA)
   - Existing Conditions
   - Rate Analysis
   - Preliminary List of ECM
   - No Cost Information Included
2. Technical Review/Resolution
3. Pricing Workshop
   - ECM Economic Evaluations
   - Identifies Final Scope

Base Miami Beach. *Photo from United States Coast Guard.*

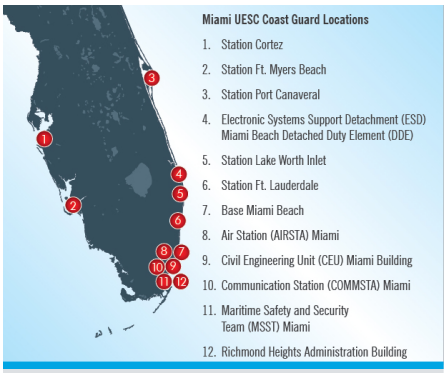
4. Investment Grade Audit (IGA)
   - Subcontractor Competition
5. Technical Review/Resolution
6. Compete Financing
7. Execute Delivery Order

Although the development schedule was intermittent at times, the flexibility of the UESC vehicle accommodated necessary schedule changes. The USCG and FPL calculated that the 12 sites had 33 electric meters and 16 water meters totaling a 4.1 megawatt (MW) peak demand for an estimated $1.5 million in annual electric costs. FPL was able to complete development within a year.

The Multi-Site UESC

While the Coast Guard intended to design a multi-site endeavor, it expanded the project cautiously to ensure completion. Prior experiences with energy savings performance contracts (ESPC) and UESCs helped tailor plans for the Miami UESC facilities. Previously, the Coast Guard implemented multi-site ESPC projects in New York, Puerto Rico, and the U.S. west coast. Leveraging lessons learned, these projects provided insight into specific issues that proved valuable best practices for the Miami UESC project. Plans were designed to be as comprehensive as possible in order to designate resources appropriately for execution and achieve the deepest energy savings. Support from each site's local command furthered project goals. Moreover, energy savings were improved by absorbing backlogged ECMs into the project.

The Coast Guard performed comprehensive energy consumption analysis that revealed Base Miami Beach and Air Station Miami were two of the top twenty-five energy consumers within the agency. The preliminary assessment estimated cumulative 15-to-25 percent reductions in both electricity and water consumption at the two initial sites with a ten-year simple payback. Based on this information, the Coast Guard focused on these locations for sizeable energy savings potential. Leveraging opportunities identified by the local resource efficiency manager, best practices from former multi-site Coast Guard ESPCs, and FPL's expansive territory, the Coast Guard incorporated additional sites served by the utility that would generate payback opportunities of less than five years. The Coast Guard also reviewed backlog maintenance and repair projects at these sites and worked to accomplish all tasks under one contract mechanism.



Map of the 12-site UESC project between USCG and FPL. *Photo from United States Coast Guard.*

By adding and completing all of the short-term payback items at the smaller stations, the expedited return would help fulfill some of the backlog energy savings projects with longer paybacks. By combining all sites and various ECMs, along with financing some of the projects directly, the Coast Guard achieved a singular, yet comprehensive financed project. This process allowed smaller sites that could not otherwise justify a stand-alone energy savings project to participate and allowed the project to almost quadruple in size.

Project Results

The 12-site project resulted in 21 separate, comprehensive energy and water ECMs, encompassing nine technical categories. These categories include heating, ventilation, and air-conditioning (HVAC); lighting improvements; building envelope modification; rate adjustments; boiler plant improvements; demand response; energy awareness; variable frequency drive pumping; and water and sewer conservation. ECMs produced a 19.1 percent reduction in electricity consumption for all sites, a substantial 64.2 percent reduction in water consumption, and natural gas was reduced by 21.1 percent. The 21 ECMs annual reduction totaled:

- 475 kW electricity demand
- 3,100,000 kWh (19.1%) in electricity consumption
- 260 gallons of diesel
- 775 therms (21.1%) of natural gas
- 12,750 kilo-gallons (64.2%) of water
- 2,000 kilo-gallons of sewer waste

The installed ECMs included:

- **HVAC***:* Replacement of numerous aged and failing DX and PTAC units, retrocommissioning and repair of HVAC systems at several stations.
- **Building envelope**: Installation of roof coatings, roof replacements with added insulation, and window replacements.
- **Demand response**: Installation of demand-side air-conditioning management. When units reach peak-load concerns, management systems turn off air-conditioning after business hours.
- **Energy awareness**: Installation of a solar-powered, light-emitting diode sign to the entrance to the Air Station Miami site used to educate employees and residents about methods to reduce their energy consumption.
- **Water and sewer conservation**: FPL's energy audit helped the Coast Guard reduce its water consumption by 64.2 percent by identifying a leak that emitted more than one million gallons of water annually.

Additionally, the Coast Guard qualified for incentives in roof installation, window replacements, lighting, and roof reflective coating.

Challenges and Lessons Learned

The goal of this multi-site UESC was to develop the most comprehensive project possible that resulted not only in overall energy savings for the Coast Guard, but also alleviated many of the existing operations and maintenance burdens at each of the 12 sites. In order to be successful, the Coast Guard and FPL had to develop a strong relationship that promoted a flexible and adaptive working ethos to conduct this large-scale project and avoid risks.

Addressing and accounting for the unique requirements of each site proved to be a challenge. The Coast Guard and FPL calculated that the 12 sites produced $1.5 million annual electrical costs based on 33 electric meters and 16 water meters that totaled a 4.1 megawatt peak demand. For the Investment Grade Audit development, FPL had to interact with multiple site point of contacts, assess different energy and water rates that varied based on each site's location, and avoid the possibility of overlapping data. Consequently, FPL had to meticulously analyze the data to optimize all energy conservation measures, which increased complexity.

Accomplishing and managing what would normally be multiple separate construction contracts under one contract was a huge benefit of the UESC. The Coast Guard was able to accomplish more than a dozen existing backlog maintenance and repair projects at these 12 stations. This action reduced procurement resources that otherwise would be burdened by stand-alone acquisitions. The Coast Guard also had the benefit of having FPL as a single point of contact to accomplish and provide quality assurance and consistent results for all of these maintenance projects. Expediting implementation through concurrent construction efforts minimized overall Coast Guard resource requirements and accomplished the work more quickly and efficiently. However, the expedited schedule did require the Coast Guard to acquire additional temporary construction inspectors to work with FPL and the site point of contacts to maintain proper oversight as work progressed at multiple sites concurrently.

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