

Leading by example, saving energy and taxpayer dollars in federal facilities

## Utility Energy Service Contracting Boosts Mission Support for NASA

Energy savings are taking off at Kennedy Space Center

### Overview

The National Aeronautics and Space Administration (NASA) recently announced the completion of a \$3.1 million utility energy services contract (UESC) between John F. Kennedy Space Center (KSC) in east central

Florida and Florida Power and Light (FPL). With the resulting reduction in electricity use KSC is expected to save \$440,000 annually in energy costs, enough to power more than 670 homes in Florida.

Energy savings obtained through NASA's partnership with FPL are flying

high—more than \$5.5 million to date from \$10 million invested in projects.

### Background

This multifaceted project called for energy conservation measures (ECMs) at several key KSC facilities, including replacing lighting, installing and improving lighting controls, replacing compressed air systems, improving the chilled water system, and adding HVAC controls in space shuttle service areas.

FPL provided feasibility studies, design, construction, commissioning, and financing. The project was contracted based on the UESC method, which was authorized by the Energy Policy Act of 1992. This legislation encourages federal agencies to contract with their utility companies for energy-related services. This is NASA's seventh such contract with FPL in the past five years, with two more UESCs in development. Through this partnership and other efforts, KSC has reduced its annual energy consumption by more than 20 percent (relative to a 1985 baseline).

"Along with the reduction in energy use, NASA will get upgraded facility infrastructure, which will reduce maintenance costs associated with older equipment,"

said Manuel Cabrera, lead power systems engineer, NASA Ground Systems. "The Space Center's new, state-of-the-art equipment will also mean improved safety for workers and reduced risk to the mission from old, outdated equipment."

### Project Summary

The Kennedy Space Center, with more than 700 facilities on site, is the primary NASA center for the launch of manned space vehicles, probes, and satellites. KSC also maintains and prepares the Space Shuttle Orbiter Vehicles, supplies cryogenic propellants, and maintains payloads for its missions. This historic national landmark, the nation's premier launch site for manned space flight, was in need of significant infrastructure improvement to replace aging, outdated systems and equipment.

The numerous ECMs weren't the only challenge. Working around ongoing operations in KSC's sensitive facilities added some complications. Access to many facilities was restricted, and workers had to be escorted and supervised at all times. Also, KSC's business and mission-critical operations could not be interrupted. Despite the continual vulnerability to work stoppage due to shuttle processing and launch requirements, the upgrades and efficiency measures were accomplished on schedule.

### Facilities and Improvements

**Solid Rocket Booster Assembly and Refurbishment Facility.** Inert solid rocket booster hardware is refurbished and assembled in this facility. To provide better operations at the central chiller plant while also reducing energy usage, the condenser water pumps used for cooling the complex's water distribution system were replaced and downsized. The chiller plant's two aging 200-horsepower compressed air systems were also replaced. Finally, lighting systems throughout the facility were upgraded.



The Kennedy Space Center has reduced its annual energy consumption by more than 20 percent.



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**Launch Control Center.** The Launch Control Center contains two primary control rooms and one backup control room equipped with the Launch Processing System, an automated computer-operated system that monitors and controls shuttle assembly, checkout, and launch operations. In this facility, FPL replaced T-12 fluorescent lights, incandescent lighting, and magnetic ballasts with more efficient lighting.

**Vehicle Assembly Building.** The Vehicle Assembly Building supports the processing of rockets, shuttles, and payloads. In this facility, one of the largest buildings (by volume) in the United States, the shuttle is lifted and mated with its external fuel tank and the two solid rocket motors and then placed on the mobile launch pad, or "crawler." Built in the early 1960s to support the Apollo Space Program, much of the interior infrastructure is original, including the lighting. FPL replaced nearly 60 percent of the outdated and poorly positioned lighting to improve lighting quality and better support shuttle requirements. Also installed was a sophisticated control system capable of providing multiple lighting scenarios based on the locations and kinds of activities occurring in the facility. These ECMs alone reduced KSC's peak energy demand by more than 600 kW.

**Orbiter Processing Facilities.** The Orbiter Processing Facilities are the "garages" for the shuttles when they are not in flight. The shuttles are overhauled, modified, repaired, and flight-prepared in these structures. Access to these facilities is tightly controlled, and HVAC requirements are extremely critical. FPL provided HVAC modifications for the Space Center's three Orbiter Processing Facilities to improve the water-side efficiency of the HVAC systems. The Launch Complex 39 Area's chilled water loop was also connected to two nearby facilities, a machine shop and communication repeater, to increase cooling efficiency and avoid expensive equipment repair and replacement that would have otherwise been required.

In all, the KSC project took 12 months to complete and was third-party financed with a term of 10 years. The project reduced the Space Center's energy use by approximately 28 billion Btu per year, helping KSC meet its energy goals. The project should result in annual savings of more than 8,100,000 kWh and reduce peak demand by more than 770 kW, resulting in a total cost avoidance of nearly \$440,000 annually.

As part of its business energy conservation incentive program, FPL presented KSC with a \$46,680 rebate check for qualifying lighting replacements.

## Benefits of Utility Contracting

Utility contracting allows government agencies to install efficient, state-of-the-art energy equipment, water conservation measures, and other upgrades through financing arrangements that allow payment over time from the resulting energy cost savings. These contracts can help agencies meet their energy mandates without having to pay for energy improvements up front. The Federal Energy Management Program (FEMP) can help federal agencies and their utility companies work together to save energy and dollars at federal facilities.

FEMP supports agencies and their utilities by promoting partnerships, supplying project financing information, and assisting with technical and financial reviews and project facilitation. UESCs have evolved over the past 10 years. There is a growing group of innovative energy managers and utility professionals who are steadily developing best practices through their experiences, making UESCs easier to implement and even more successful.

## For More Information

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## A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.



The "crawler" carries a space shuttle to the launch pad.



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