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Comprehensive Energy Program at Patrick Air Force Base Set to Exceed Energy Goals

The 45th Space Wing at Patrick Air Force Base (PAFB) is pursuing its energy goals through a partnership with Florida Power & Light (FPL). At the request of PAFB, FPL developed a base-wide comprehensive energy program that charts a course for improving the base's energy efficiency in five phased projects and demonstrates that PAFB can exceed their federal goals for reducing energy use by 2015.

The base, stretching along four miles of Florida's east coast south of Kennedy Space Center, is home to the 45th Space Wing and more than 35 major mission partners and tenants. PAFB is responsible for launching unmanned rockets down the eastern range, and has completed more than 3350 launches. With 1900 personnel in about 200 buildings and structures, Patrick's annual energy bill is about $6 million and peak demand is 19 MW.

FPL, the third-largest investor-owned utility in the United States, produces more electricity from renewable wind and solar sources than any other U.S. utility. Widely recognized as first in the nation in energy conservation, FPL has also garnered more than 25 awards for its leadership in environmental stewardship.

FPL and PAFB joined in their partnership for energy and demand savings in 2000, building on their past success. In 1995 the partners executed a basic ordering agreement — one of the first utility energy services contracts (UESCs) between a utility and federal customer — and through 2000 had invested nearly $10 million in energy improvements such as lighting, generators, and energy management control systems (EMCS).

The cornerstone of the partnership was the development and implementation of the base-wide comprehensive energy program — a program to implement a series of energy, demand, and water savings projects over the entire base. Taking a holistic view rather than a building-by-building or system-by-system approach, the program is based on two key elements:

- a strategic plan to logically and systematically approach a base-wide audit of the numerous and varied buildings and energy systems, and
- executing UESCs for projects that show a positive year-10 net present value.

Completed in 2001, the audit identified potential savings of $1,448,900 per year (71,839 MMBtu and 65,273 therms) and demonstrated the potential to meet PAFB's energy goals. The audit divided the base into five groupings of buildings based on size, location and technology.

Energy-conservation measures (ECMs) considered were a base-wide EMCS, central chiller plants, decommissioning of the steam plant, lighting, ground-source heat pumps, thermal energy storage, renewables, water-saving technologies, building envelope improvements, FPL's load control program, and solar pool heating.

Completion of the five phases of the program, one for each group of buildings, is planned for overlapping two-year periods from 2006 through 2012. About six months is allowed for development of each phase, six months for approval and execution of the contract, and 12 months for full design and construction.

The five steps of the development process used by FPL and PAFB for each phase are the following.

- Step 1 — Survey and analysis of the targeted facilities
- Step 2 — Feasibility study of selected ECMs
- Step 3 — Development of firm-fixed-price proposal
- Step 4 — Implementation of ECMs
- Step 5 — Monitoring and evaluation of ECMs, including post-installation measurement and verification (M&V)

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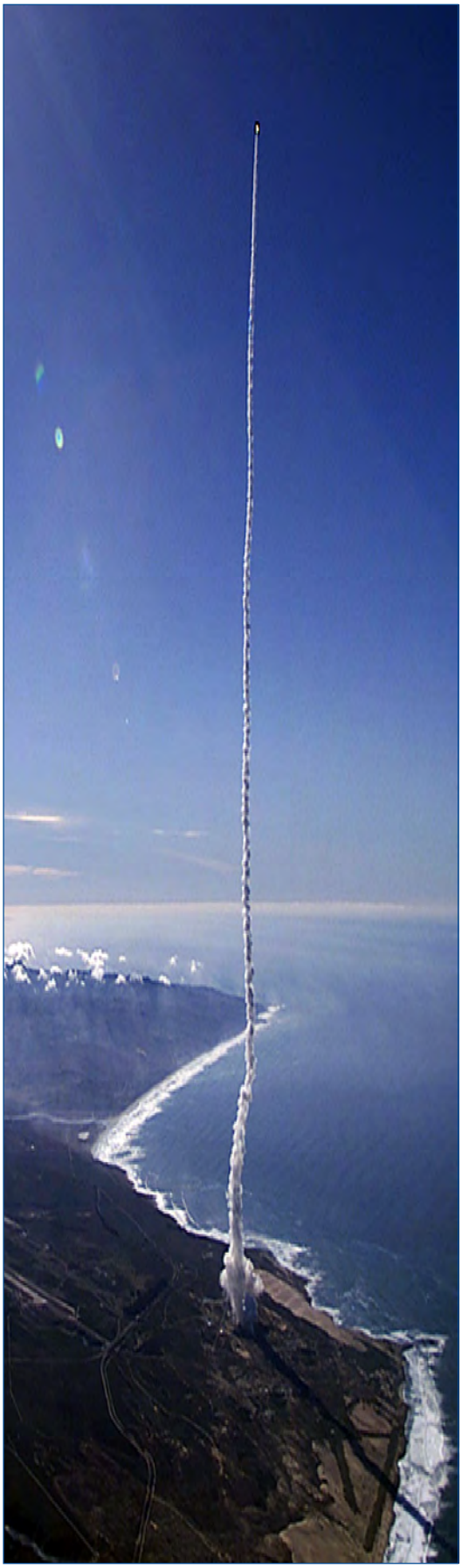

The work of each step is reviewed and approved by an FPL–PAFB team before advancing to the next step.

The $3,780,000 agreement for the Phase-One project was executed in September 2006. Overseen by the 45th Civil Engineer Squadron, the upgrades include connecting chillers from groups of buildings into two chiller loops and reducing the number of chillers from ten to four, expansion and upgrading of the EMCS, and decommissioning of the central steam plant. The work will result in significant operations and maintenance savings, as well as avoided capital expenditures of $500,000 for repairing the steam plant building. The upgrades and modifications should save PAFB about two million kWh and $259,509 per year. Construction on Phase One is scheduled to be completed by the end of 2007.

The program's managers expect to benefit in phases two through five from lessons learned in Phase One. First, to be successful, development of the project must be a team effort — a partnership. A formal energy team comprising representatives of contracting, civil engineering, finance, environmental, legal, and the HVAC shop should be brought together to ensure that the correct people are available, informed, and ready to review and approve the choice of ECMs, designs, maintenance plans, and other aspects of the project. Such a team can also help provide the coordination necessary to ensure that when personnel changes occur progress is not undone or momentum lost.

Developing a firm schedule establishes expectations and goals, ensures that deadlines are met, and keeps the project moving. If tasks lag behind the schedule, not only are potential savings lost, but personnel changes midstream are more likely to require backtracking and re-educating those who have review and approval responsibilities.

Phase Two is well underway, a notice to proceed having been issued in April 2007. A formal energy team has been identified and feasibility studies are underway for a central chiller plant, further expansion of the EMCS, lighting, and thermal energy storage.

Ongoing partnerships similar to the one between PAFB and FP&L are a typical outgrowth of utility energy services contracts between utilities and federal sites.

A Strong Energy Portfolio for a Strong America

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