FEMP FOCUS

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ESPC Creates Long-Term Success at Portsmouth Naval Shipyard

The three-phase Portsmouth Naval Shipyard project is helping the Navy meet its energy, water, and carbon dioxide (CO2) reduction goals—all while making badly needed improvements to the shipyard's heating, cooling, electric and infrastructure. This helps the shipyard meet its mission and increase security while meeting national goals to reduce the Federal government's demand on limited energy resources and reduce pollution and green-house gas emissions.

In 1998, Portsmouth Naval Shipyard in Kittery, Maine was one of the first commands to take advantage of energy savings performance contracts (ESPC) when the financing tool was still new to agencies. Together with the Navy ESPC team and the Army Corps of Engineers, the shipyard's energy team selected Ameresco, Inc. (then HEC Energy and Design Services) as the energy service company (ESCO).

The Initial Projects

Ameresco developed ESPC Phase 1 in 1999, which provided $11 million in infrastructure improvements to the shipyard, including a 5.2 megawatt (MW) combined heat and power (cogeneration) plant and improvements to the steam and hot water heat distribution systems.

After ESPC Phase 1 was completed in December 2000, electric utility deregulation in Maine caused energy costs to fluctuate dramatically. These fluctuations highlighted the benefits of implementing additional energy efficiency measures at the shipyard as a means of reducing long-term energy pricing risk.

ESPC Phase 2 was awarded in 2002 to install additional cost-effective measures with a total investment of $33.2 million. The project included another major upgrade of the power plant, shutting down the 600 pounds per square inch gauge (psig) steam system and converting to smaller, more efficient steam sources generating at 200 psig. The project consisted of a 5.5 MW dual-fuel combustion turbine cogeneration system, two 70,000 pound per hour packaged boilers, two 2 MW diesel generators, complete shutdown of the central hot water system, a compressed air distribution system maintenance program, and shipyard-wide lighting upgrades.

Construction was completed in May 2004. Most of the energy savings are generated by the installation of the turbine-based cogeneration systems. The cogeneration systems and power plant upgrades allowed the steam turbines and the 600 psig steam system to be shut down, and reduced electric and steam generation costs dramatically. The shutdown of the central hot water system and implementation of a steam trap maintenance program reduced steam use and thermal losses, resulting in decreased fuel consumption and pumping fuel consumption and pumping electric consumption. The lighting upgrade and compressed air improvements further reduced electric consumption.

Ten Years of Verified Savings

Measurement and verification reports confirm that the total project resulted in an actual cost avoidance of more than $45 million since December 2000. The infrastructure improvements have saved 71,944 million British thermal units (MBtu) of energy and seven million

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U.S. DEPARTMENT OF
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Energy Efficiency &
Renewable Energy

Cover Magnifying Glass Photo: New Pump at a Hybrid Electric Charging Station

FEMP
Federal Energy Management Program

The Federal Energy Management Program (FEMP) facilitates the Federal Government's implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship.

Welcome Letter From Tim Unruh, FEMP Program Manager

FEMP Focus readers,

I'm excited to introduce myself as the Program Manager of the Federal Energy Management Program (FEMP). I've been impressed with the program and look forward to meeting many more of you as we work to facilitate the Federal Government's implementation of sound, cost effective energy management.

Some of my specific priorities for 2011 are strengthening FEMP's customer service structure, identifying new technologies to demonstrate in Federal agency facilities, training Federal employees, and updating energy efficient product specifications.

Before coming to FEMP, I served as Director of Operations for ConEdison Solutions where I led a team of engineers and project managers to implement energy savings projects within government and private installations. While in this role, I worked to educate energy users on alternative finance methods to achieve energy reduction goals. I was also heavily involved in the measurement and verification of energy savings resulting from these projects.

Earlier in my engineering career, I built a program to provide energy services to major industrial clients. I trained and coordinated industrial clients on methods to produce energy savings while operating in a short financial payback environment. I am licensed in multiple states across the U.S. and am a Certified Energy Manager (CEM) as well as a Leadership in Environmental and Energy Design Accredited Professional (LEED AP).

I hope you enjoy this issue of the FEMP Focus, which provides updates on this year's FEMP First Thursday training seminars, information on the DOE guide to procuring solar energy, agency updates from the Navy and Air Force, and technology spotlights on vehicle fleets and lighting.

Sincerely,

Timothy D. Unruh, PhD, PE
Program Manager
Federal Energy Management Program
Office of Energy Efficiency and Renewable Energy

ESPC CREATES LONG-TERM SUCCESS AT PORTSMOUTH NAVAL SHIPYARD
(Continued from Front Cover)

gallons of water every year, with the project's performance period extending through January 2018. ESPC Phase 2 resulted in net reductions in allowed air emissions including a net reduction of 158.3 tons/year of sulfur dioxide, 172 tons/year of nitrogen oxides and 29.2 tons/year in particulate matter.

The Trend Continues

Building on past successes, ESPC Phase 3 was awarded in December 2009 and completed in December 2010. "This is our third ESPC energy project, and it will significantly add to the annual cost avoidance of $5.6 million currently achieved from our first two ESPC projects," said Captain Rod Moore, Portsmouth Naval Shipyard Public Works Officer. "We are extremely excited about the energy savings of this project, as well as the critical investment it provides in some of our key utility systems."

ESPC Phase 3 installed two new variable speed compressors to the existing compressed air system that will serve as trim compressors to reduce energy use during lighter demand periods. Variable speed compressors use a special drive to control the unit's speed, saving more energy than its fixed speed equivalent. Additionally, the project repaired the condensate return system serving the highest flow areas close to the power plant.

The shipyard is beginning to see some of the anticipated annual reduction of 24,318 MBtu and 18 million gallons of water. This equates to a cost avoidance of more than $8.4 million over the 14-year performance period of the contract that will be used to repay Ameresco for their services. Ameresco is now in their performance period, guaranteeing the project's annual cost avoidance through January 2025.

In addition to the savings listed above, Phase 3 will reduce carbon dioxide emissions by 1,800 tons, volatile organic compounds by 114 pounds, nitrogen oxide by 1.5 tons, carbon monoxide by 500 pounds, and sulfur dioxide by 12 tons.

An Overall Success

All told, the Portsmouth Naval Shipyard ESPC projects have financed well over $79 million of improvements that are avoiding the use of almost 100 thousand million Btus per year. Major greenhouse gas reductions are also achieved as annually 42,000 tons CO2 reduction results from the projects. Fundamental to the ESPC process, all improvements are paid for from avoided costs. The savings, guaranteed by the contractor, are verified on an annual basis and are sufficient to pay for the $79 million investment.

For more information please contact Sharon Parshley, Portsmouth Naval Shipyard, at sharon.parshley@navy.mil or 207-438-4632.

Air Force to Quadruple its Solar Energy Production

For nearly three years, a 14.2-megawatt solar array spanning 140 acres at Nellis Air Force Base, Nev., has held the title of the largest renewable energy project in the Air Force. Hundreds of media outlets have published stories featuring the large display of solar panels, and President Obama visited the site last year. Now the Air Force is set to outdo itself with plans to build three new solar arrays by 2013 that are as big as or bigger than the current Nellis project.

Three bases in the Southwest could soon have the largest Air Force solar arrays. They are Davis-Monthan Air Force Base, Ariz., Luke Air Force Base, Ariz., and Nellis Air Force Base, Nev., which has plans to expand.

Davis-Monthan officials awarded SunEdison a solar photovoltaic utility contract in September 2010 with a 20-year ground lease. The base plans to purchase electricity from a 14.5-megawatt photovoltaic solar array to be constructed, designed, owned, operated, and maintained by SunEdison on 130 acres of under-utilized base property. Engineers expect the array to deliver 35 percent of the energy needed to operate base facilities.

Luke AFB officials have teamed up with Arizona Public Service Company to build a 15-megawatt solar array on 100 acres of under-utilized base property. The project could produce enough energy to satisfy 50 percent of the base's energy needs and save up to $10 million on utility bills over 25 years, according to Lieutenant Colonel John Thomas, Commander of the 56th Civil Engineer Squadron, which maintains and develops base facilities.

While Davis-Monthan AFB and Luke AFB could soon have the largest renewable energy plants in the Air Force, with 14.5 and 15 megawatts respectively, the distinction may be short lived. Air Combat Command and Nellis AFB leaders have plans to construct a 17-megawatt phase two project in 2012 to add to the 14-megawatt array built in 2007.

"The focused efforts of the skilled and professional Air Force renewable energy program team over the last several years are beginning to deliver a large increase in the number and capacity of renewable projects in the pipeline," said Mr. Ken Gray, Air Force Facility Energy Center Renewable Energy Branch Chief. "More ideas move into the planning stage every day."

For more information, please contact Jennifer Elmore, Air Force Civil Engineer Support Agency, at jennifer.elmore.ctr@tyndall.af.mil or 850-283-6476.

LBNL Releases New Laboratory Energy Profiling Tool

Lawrence Berkley National Laboratory (LBNL) has released a new software tool, the Laboratory Energy Efficiency Profiler (LEEP), with support from Laboratories for the 21st Century (Labs21®) sponsored by the Department of Energy (DOE), the Federal Energy Management Program (FEMP) and the Environmental Protection Agency (EPA). The tool helps users identify opportunities for energy efficiency and prioritize potential actions to reduce energy use in laboratory facilities based on relevance, savings potential and cost implications. It also provides information on achieving the next steps and serves as the foundation for a more detailed audit.

The motivation behind LEEP's creation was to offer a quick "action-oriented" evaluation of an existing laboratory's energy efficiency. Typical commercial building profiling and audit tools do not address issues or offer solutions appropriate to the unique features of laboratory buildings. Since labs use six to ten times more energy than standard office buildings, they provide many challenges, as well as opportunities, for operators and administrators of these facilities. This is especially true for managers of Federal Government laboratories required to meet the aggressive energy, water, and greenhouse gas reduction goals of Executive Order 13514 and EISA Section 432.

The LEEP tool does not require any specialized knowledge of energy audits or analysis. Site facility personnel can input data on key characteristics of the facility's basic configuration and ventilation, heating, cooling, and lighting systems, as well as plug and process loads. The tool is flexible, allowing site personnel to choose the scope of the assessment based on the characteristics they select. Based on the input provided, the LEEP tool supplies information on the relevance, impact and comparative cost of more than 60 actions to reduce energy use.

LBNL has successfully completed a pilot test of LEEP at four U.S. Department of Agriculture Agricultural Research Service laboratories. The pilot demonstrated that with just two to three hours of effort, LEEP provides actionable information to laboratory personnel and energy managers, affirming that users do not need to have any expert knowledge of energy audits.

LEEP is available for free at leep.lbl.gov. The LEEP tool will eventually work in conjunction with the Labs21 Energy Benchmarking Tool. Benchmarking is the first step in profiling energy use and is especially useful if you have a portfolio of facilities. It is recommended that you benchmark your facility before using LEEP. To get started, visit labs21benchmarking.lbl.gov.

For comments and questions about LEEP, please contact Geoffrey C. Bell, Energy Engineer, Lawrence Berkeley National Laboratory at gcbell@lbl.gov.

For comments and questions about the Benchmarking Tool, please contact Paul Mathew, Staff Scientist, Lawrence Berkeley National Laboratory at PAMathew@lbl.gov.

2011 First Thursdays Training Seminars

To deliver timely training on cost-effective energy management and investment practices, the U.S. Department of Energy's Federal Energy Management Program (FEMP) has begun a second series First Thursday Seminars in February 2011. The season will be offered online via streaming video and satellite downlink to Federal facilities through the Government Education and Training Network (GETN).

FEMP's 2011 series of 90-minute programs follows the success of six 2010 offerings. Of those participants who completed post-program evaluations, 98.7 percent indicated they would participate in future First Thursday Seminars and, on average, rated the program with a score of 4.03 out of 5.0. All programs are currently archived on FEMP's website for on-demand viewing.

The FEMP First Thursday Seminars are scheduled to air on the first Thursday of each month from 1:30 pm to 3:00 pm EST. Specific topics are:

April 7: Utility Energy Service Contracts and Public Benefit Funds

May 5: Renewable Energy

June 2: Federal Fleet Infrastructure & Electric Vehicles

July 7: Labs, Data Centers & High-Tech Facilities

August 4: Energy Efficient Product Procurement

A comprehensive Learner's Guide makes it easy to follow along and take notes during each program and a Facilitator's Guide can be used to direct group study and discussion. A live on-air Q&A segment at the end of the broadcast allows participants to e-mail or call-in their questions and receive tailored advice from program experts.

For more information about participating in the upcoming season of FEMP First Thursday Seminars, visit femp.energy.gov/training/first_thursday_seminars.cfm.

Project Funding Q&A: Training

I work for an ESCO. Can I attend FEMP project funding training?

FEMP training is available to help Federal agencies implement energy savings performance contracts (ESPCs) and other forms of project funding. Five previously recorded ESPC related training sessions are now available on the FEMP website at any time on demand. These sessions are now open to non-Federal personnel as well as all Federal employees. Certificates of completion are provided to everyone who completes the training sessions.

- **First Thursday Seminar on Energy Savings Performance Contracts:** Teaches Federal agencies how to work with energy service companies (ESCOs) to streamline contract funding for energy management projects while meeting energy efficiency, renewable energy, water conservation, and emissions reduction goals. Recorded March 3, 2011.
- **Introduction to Alternative Financing for Energy Efficiency and Renewable Energy:** Covers the use of alternative financing tools to plan and implement energy and water saving measures and renewable energy systems in Federal facilities. Recorded June 29, 2010.
- **Introduction to Energy Savings Performance Contracts:** Outlines how ESPCs can help Federal agencies implement renewable energy, energy efficiency, and water efficiency projects. Recorded June 30, 2010.
- **Financing and Pricing Evaluation for Energy Savings Performance Contracts:** Offers a brief overview of costs and pricing review of the ESPC final proposal and how ESPCs can finance the reduction of Federal facility energy use and costs. Recorded July 7, 2010.
- **Energy Savings Performance Contract Contracting and Negotiations:** Covers ESPCs from a contracting point of view, including the review of enabling legislation, the contractor selection process, negotiations, and price-reasonableness approaches. Recorded July 8, 2010.

I attended the Introduction to Project Funding webinar a few years ago, and now my site is starting an ESPC project. Should I complete the same webinar training again?

FEMP is engaged in continued program improvement and refreshes training content regularly. Webinar presentations are updated to reflect lessons learned and legislative and policy changes. With on-demand webinars available on the FEMP website, you can access the most recently updated content. Webinars are the first step to take before attending the more intensive on-the-ground workshop. In addition, your project team can contact your Federal Finance Specialist to inquire about onsite training when you start a project.

When will there be a workshop near me?

There are three workshops coming up in 2011:

ESPC Contracting Roundtable
April 12-13, 2011
Golden, CO

ESPC Comprehensive Workshop
June 7-9, 2011
Chicago, IL

ESPC Comprehensive Workshop
July 19-21, 2011
Seattle, WA

Plug-in Electric Vehicles Charging Stations Installed in DOE-Forrestal Building Parking Garage

In the coming months, mass-market plug-in electric cars will be arriving in showrooms around the country. The Department of Energy has played a major role in supporting the development of electric vehicles, batteries and the stations required to re-charge electric vehicle batteries.

To support low-carbon employee commuting, the Department of Energy is making electrical charging stations available to Federal employees at the Forrestal and Germantown offices. These charging stations were originally established for DOE's own fleet but will be available for employee use when not needed by DOE.

For additional information about the new service provided by Parking Management, or to request information regarding the procedures for charging vehicles at the DOE-Germantown facility, please contact the Parking Management staff at (202) 586-4271 or Mary Anderson, Director of the Office of Administrative Management and Support, at (202) 586-4375.

DOE Announces Federal Efforts to Save Energy with Solid-State Lighting in Washington, DC

The Department of Energy's (DOE) Solid State Lighting (SSL) Technology Demonstration GATEWAY program installs eligible high-performance SSL products at demonstration host sites, where their performance can be evaluated. This summer, DOE announced the first Washington, DC-based GATEWAY demonstration project using SSL in a Federal facility. The project is a demonstration of light emitting diode (LED) parking garage lighting in the U.S. Department of Labor (DOL) headquarters parking garage. The program showcases market-ready, high-performance LEDs in order to improve illumination and reduce energy consumption.

"The DOE-DOL demonstration shows us in very real terms how LED lighting can make a significant impact on not only our Federal energy consumption, but also our nation's energy use," stated Roland Risser, Building Technologies Program Manager at DOE. "Federal agencies must lead by example, and DOE will continue to guide government-industry collaborations to implement high-performance LED products in appropriate applications." The installed product at the DOE-DOL demonstration is a U.S.-made, award-winning product manufactured by Philips Wide-Lite.

The nineteen VizorLED parking garage lights with motion detectors installed at the DOL Frances Perkins Building show an estimated energy savings of more than 75 percent of the electricity used by the previous lighting system, greatly improved illumination quality, more uniform light and heightened color clarity. To learn more about the project results, see the project fact sheet at: www.buildings.energy.gov//publications/pdfs/ssl/doe-dol_demo.pdf.

DOE shares the results of completed projects – including analysis of data collected, projected energy savings, payback analysis, and user feedback – in detailed reports and briefs.

For more information on the GATEWAY Program and how to participate, visit www.ssl.energy.gov/gatewaydemos.html.

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For information on topics not listed here, call the EERE Information Center at 1-877-337-3463

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New DOE Publication Guides Solar Installation on Federal Sites

Solar energy is positioned to play a significant role in meeting the Federal Government's sustainability initiatives. This point was emphasized recently by a U.S. Department of Energy (DOE) announcement of plans to install solar technology on the White House. Federal agencies have many reasons to consider implementing solar energy on their sites, including legislation, executive orders, and agency targets, among others. Procuring solar energy and technology on Federal sites, however, can pose a unique set of challenges.

A new DOE publication and Web site—Procuring Solar Energy: A Guide for Federal Facility Decision Makers—provides guidance for Federal facility managers and their procurement teams on the process of successfully installing solar systems on their sites.

The publication presents an overview of the solar project process in a concise, easy-to understand step-by-step format. Detailed information and sample documents for specific tasks are referenced with Web links or included in the appendixes. In addition, the guide features:

- An overview of sustainability initiatives and solar incentives, as well as legislation and executive orders relevant to solar energy
- Recommendations on solar screening and project selection
- Detailed guidance on financing and contracting options for procuring solar energy
- Case studies and best practices from successful solar projects on Federal facilities.

The information in the guide is specifically targeted toward Federal and building site managers, contracting officers, energy and sustainability officers and regional procurement managers. The guide concentrates on distributed on-site solar generation rather than large, centralized solar energy generation.

Procuring Solar Energy: A Guide for Federal Facility Decision Makers is a collaborative publication of the DOE's Federal Energy Management Program, Solar Energy Technologies Program, and National Renewable Energy Laboratory.

Visit www.solar.energy.gov/federal_guide to download the guide or for more information, or contact Blaise Stoltenberg, NREL, at blaise.stoltenberg@nrel.gov.

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