FEMP FOCUS

U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy Spring 2010

FEMP's ARRA-Funded Technical Assistance Initiative Sends Energy Efficiency Experts Nationwide

Teams of national laboratory and contractor service providers have traveled to more than 50 Federal sites since September 2009 to provide energy efficiency-related technical assistance. The site visits are all part of FEMP's American Recovery and Reinvestment Act (ARRA)-funded technical assistance activity, which helps energy managers across the Federal government identify, design, implement, and evaluate new construction and facility improvement projects. During one of these site visits, a team of experts from Pacific Northwest National Laboratory spent two days in Columbus, Ohio evaluating the energy efficiency of the General Services Administration's Bricker Federal Building. Representatives of Idaho National Laboratory recently returned from Letterkenny Army Depot where they explored the feasibility of installing a methane gas well to power the site's energy-intensive boilers.

Nearly all of FEMP's 119 ARRA-funded projects will include a site visit. FEMP is using the number of completed site visits as one of the measures to track progress. With 101 sites visited as of March 31, 2010, FEMP is on track to complete the technical assistance projects by the September 2010 deadline.

The purpose of the site visits varies according to project type. While not all projects fit perfectly into one category, most projects involve retro-commissioning, renewables, assessments, training, or some combination of these four activities. Site visits for training projects typically occur later in the technical assistance process. After the service providers have prepared materials, they travel to a Federal site to present an educational workshop. An energy audit training project at Los Alamos National Laboratory demonstrated this approach. EMR, a contractor supporting FEMP technical assistance, developed curriculum for a workshop held in March 2010 that taught participants about energy and water efficiency in laboratories.

For other projects, the national laboratory or contractor team will visit a Federal site to perform a facility assessment. For example, in December 2009, representatives from Lawrence Berkeley National Laboratory traveled to Quantico, Virginia to recommend energy conservation measures for three U.S. Marine Corps data centers. The project resulted in recommendations such as occupancy sensors for lighting, better airflow management, and energy efficient thermostat settings.

For more information, please contact Shawn Herrera, FEMP, at 202-586-1511, or shawn.herrera@ee.doe.gov.

IN THIS ISSUE, You Will Find . . .

Project Type	Site Visits	
	Complete* (as of March 31, 2010)	Total Projects
Assessments	17	21
Training	8	11
Renewables	38	39
Retro-commissioning	6	8
Other & Combination	32	40

**Includes 13 Projects that do not require a site visit.*

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Cover Magnifying Glass Photo:

Ice tanks housed at the thermal energy storage plant, 95th Air Base Wing Consolidated Support Facility, Edwards Air Force Base, California (article on page 12).

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.

FEMP ESPC Reforms Protect Agencies

An audit conducted by the Department of Energy (DOE) Office of Inspector General (IG) on DOE's management of energy savings performance contract (ESPC) projects, along with media coverage of disputes in one Federal ESPC project, have prompted questions among some Federal staff about whether ESPCs can reliably deliver high-value facility improvements and guaranteed cost savings to agency facilities—or are ESPCs just too risky?

In fact, the provisions of the DOE Super ESPCs allocate the major risks to the energy services company (ESCO) by requiring savings guarantees assured by measurement and verification (M&V), and by requiring the ESCO to take ultimate responsibility for equipment performance. While the IG audit found that "weaknesses in the Department's contract management strategy for ESPCs, combined with a lack of guidance for evaluating contract proposals and subsequent performance" contributed to deficiencies in assuring guaranteed savings in two projects awarded in 2000 and 2001, practices have been and continue to be implemented to remedy those deficiencies and ensure that guarantees are met in existing and future projects.

Since 2000 and through 2009, FEMP has continuously improved its services to agencies by documenting best practices, continuing to update guidance and training, and through the award of new updated contracts. Agencies that depend on FEMP's guidance and assistance can be assured that they will achieve sound, technically excellent projects, and will be able to enforce the contract and realize the guaranteed savings.

FEMP Project Facilitators and Federal Financing Specialists

ESPCs offer benefits; but to ensure that contracts are not compromised, agencies must understand the nature of these agreements, the specific provisions of their own task orders, and how to carry out their contractual obligations effectively. FEMP realizes that many agencies will need ongoing support to ensure the long-term success of their ESPCs.

FEMP's "first best practice" is now a prerequisite for using Super ESPCs: agencies must engage the services of a FEMP project facilitator (PF) if they choose to use the DOE contract. Project facilitators are expert, unbiased consultants who guide the agency through the process of negotiating and awarding the ESPC task order and during first year of the performance period—through M&V activities and review of the ESCO's M&V report. Project facilitators, who see many ESPC projects, understand the risks and rewards of ESPCs and are able to balance the relationship between the ESCO and the customer's acquisition team.

Super ESPC experience tells us that the disputes in projects receiving recent media attention likely would not have occurred if a FEMP PF had been engaged while the project was being developed and the task order was being negotiated. The PF provides ongoing contract management support, which helps to avoid breakdowns in communication and improve mutual understanding on contract requirements. FEMP also serves agency ESPC customers by providing services from Federal Financing Specialists (FFSs), who are the agency's first contacts in the ESPC process, remain involved throughout the project development, and can be called on at any time for consultation and assistance.

Deficits in Savings Assurance–Root Causes

The deficits in ESPC savings assurance identified by the DOE IG audit took several forms. One site continued paying for energy savings under an ESPC even after four buildings containing ESPC improvements had

Continued on page 3

FEMP ESPC REFORMS PROTECT AGENCIES
(Continued from page 2)

been demolished; another failed to verify that contractually guaranteed cost savings had been achieved. Savings were also compromised because equipment installed under the ESPC was not properly operated and maintained by the agency.

The root cause of these problems can be diagnosed, in simplified terms, as personnel turnover. The most persistent obstacle to diligent ESPC task order administration is that the tenure of agency staff responsible for oversight is in most cases exceeded by the contract term, which can be up to 25 years. Combined with the unfamiliarity of most staff with this contracting vehicle and the heavy loads carried by many agency contracting officers, disrupted institutional memory can result in deficiencies in ESPC oversight.

FEMP Life-of-Contract Services

To directly address this problem, FEMP is now providing "life-of-contract" (LOC) services to sites that have active ESPC projects and have requested such services. These services ensure that agency staff understand their roles and responsibilities for ESPC administration and have the support needed to competently carry them out, hold up their end of the ESPC bargain, and enforce the contract.

DOE has discussed the protocols for LOC site support with the multi-agency ESPC steering committee, to encourage universal adoption of these protocols at all agencies and to offer FEMP's support. LOC services began in 2009 with site visits to all DOE sites with active ESPC task orders. These visits focused on a review of the ECMS and contract performance with the site personnel responsible for the contract administration, including the contracting officer, contracting officer's technical representative, and any other key staff.

Every year, FEMP will continue its engagement by conducting at least two calls with each DOE site to keep track of changes in personnel overseeing the ESPC and to ensure readiness to administer the contract. The first call will be conducted at least 30 days before the ESCO's annual M&V activities are to occur. During this call, FEMP and site personnel will discuss preparation for annual M&V activities and ensure that the site is aware of the contractual obligations. The second call, to be conducted after M&V activities and review of the annual M&V report are scheduled to be finished, will confirm that reviews were completed and received by the contracting officer, adequate levels of performance were measured, and that any problems have been resolved. In addition, FEMP will conduct site visits every three years to meet with contracting officer and technical representatives to review the projects.

Those responsible for ESPC administration also are required to attend FEMP's Comprehensive ESPC Workshops and annual ESPC refresher classes to ensure that new staff is trained and that all are aware of current best practices and guidance.

A Stronger Contract

All agencies can rest assured that the ESPCs contain robust provisions to protect the government's interests. Best practices implemented soon after the award of the first DOE Super ESPCs were incorporated into the contracts by modifications in 2004 and were further strengthened in the 2008 contracts—particularly those addressing M&V:

- The ESPC contract requires the ESCO to follow templates supplied in the contract in preparing the M&V plan, post-installation M&V report, and annual M&V reports. These templates were designed to ensure that M&V plans call for meaningful guarantees through adequate verification measures and that performance reports provide the information needed to confirm that guarantees are met.
- Government witnessing of M&V activities is required to strengthen confidence and assurance that reported savings are delivered.
- Commissioning requirements and deliverables are strengthened and formalized.
- The "Risk, Responsibility, and Performance Matrix" is a required part of the task order. This matrix documents agreements on the allocation of risks and responsibilities between the ESCO and agency. Use of the matrix ensures that agencies understand the implications of these agreements and are able to negotiate a task order that address their preferences and capabilities.
- Provisions regarding operations, maintenance, repair, and replacement emphasize details of agency and ESCO responsibilities and information sharing to ensure that both parties are able to carry out their obligations.
- ESCOs are required to seek competitive bids from financiers for ESPC financing to ensure that interest costs are controlled.

The FEMP services, guidance, and training that are in place today, along with provisions in the ESPCs themselves, can protect the government's interests in ESPC task orders. To ensure that contract enforcement is not compromised, agencies also need to understand their ESPC obligations, roles, and responsibilities and uphold their end of the ESPC bargain.

The comprehensive information on the ESPC program, along with FEMP's ESPC guidance, contract tools, and resources are posted on FEMP's Web site at http://www.femp.energy.gov/financing/espcs_resources.html.

For FFS contact information, visit www.femp.energy.gov/financing/espcs_financingspecialists.html.

For more information, please contact Ab Ream, FEMP, at ab.ream@ee.doe.gov.

U.S. Postal Service Implements Green Teams to Save Energy and Resources

Sometimes the most significant energy savings efforts come from the grassroots level. At the U.S. Postal Service, savings are often initiated at the employee level through cross-functional Green Teams. In 2009, the Postal Service formed Green Teams at its Washington, DC headquarters building and nine Area Offices across the country to develop low-cost, no-cost ways to help the Postal Service reduce energy use, lower vehicle petroleum fuel use, improve water efficiency, reduce the purchase of supplies, and achieve zero waste. Using Lean Six Sigma methods, the teams identified a number of opportunities to lower the Postal Service's carbon footprint, resulting in an estimated $5 million in cost savings.

In the Eastern Area Office, efforts have reduced petroleum fuel use 21 percent compared to last year. The Southeast Area Green Team has reduced energy use at its office by 7 percent compared to last year.

Eastern Area office Green Team Leader Jack Cleary took a novel approach to brainstorming ideas. He and co-worker Frank Fantigrassi visited each department, explained the team's goals, and canvassed employees for suggestions.

"People were excited at the prospect of helping," said Cleary. "Many said they wished we had started doing it a while ago." It didn't take long for their efforts to pay off. Two suggestions were implemented immediately. One suggestion was that the facility should turn off the lights at the garage dock during the day. Another employee recommended adjusting the automatic faucets in restrooms, since some of them activated when someone simply walked in the room. "These were two simple adjustments we made quickly, and we're already seeing savings from them," said Cleary.

When the Southeast Area Green Team started looking for ways to achieve zero waste, they had only to look at recycling containers to see an opportunity to capture what was being thrown away as trash. Even though the facility was already cost-neutral with paper and cardboard disposal fees, plastic bottles weren't part of the recycling plan. After the Memphis Area Office added recycling containers for plastic, staff noticed a huge shift in its zero-waste efforts. "We saw an immediate decrease in our trash bag count," said Phil Murphy, maintenance engineering analyst and Green Team Leader. "The new containers were so popular that we needed to add them to more places throughout our building." Now plastic recycling at the Memphis Area Office is cost-neutral.

Tasked with reducing water use, the Southeast Area Green Team began looking at ways to cut back at the Memphis facility. While checking the sprinkler system, they discovered one of the pipes was leaking and were able to repair the break. They also reduced the amount of time they kept their sprinkler system running from 30 minutes to 20 minutes per use. The reduction in unnecessary irrigation and the pipe fix lowered water use at the Southeast Area Office by 30 percent compared to last year.

Fundamental to the programs' success was getting early buy-in from key facility and organizational stakeholders and working to develop ownership among Green Team leaders and members. Green Teams receive support from all areas of the Postal Service—operations, maintenance, facilities, finance, supply management, safety, environmental, human resources, communications, and union representatives. It is also important to note that these Green Teams were implemented without additional hiring and with minimal start-up costs.

Conducting an employee online green survey helps gather information about green behavior among employees and sets a baseline of current knowledge and attitudes. An added benefit is that the survey gives employees an opportunity to volunteer as green team leaders in their facility.

Once underway, Green Team managers track the progress of these energy saving projects and share results with the organization. At Postal Service headquarters, Green Team posters at all building entrances show monthly progress toward reaching targets for the five Green Team goals.

Another well-received result of the Green Teams is that the Postal Service's efforts to save energy at work have spread beyond its own doors, as employees have taken their new-found interest in a sustainable environment to their homes, evolving into green champions in their communities.

For more information, please contact Dave Partenheimer, Postal Service, at david.a.partenheimer@usps.gov or 202-268-5016.

Headquarters Progress Report	AUGUST
Energy	Target: 4.2% below last year. **Current: 19.9% below SPLY** ☺
Vehicle Fuel	Target: 2.4% below last year. **Current: 3.2% above SPLY**
Water	Target: 3.6% below last year. **Current: 8.95% above SPLY**
Zero Waste	Target: 75% diverted from landfills to recycling. **Current: 39.6%**
Supplies	Target: 10% below last year. **Current: 45.28% below SPLY** ☺

VA's Green Routine Raises Environmental Awareness

In October 2009, the U.S. Department of Veterans Affairs (VA) launched its Green Routine, an initiative that aims to increase employee awareness about their environmental impact at home and at work, and gives them resources to incorporate "green actions" into their daily lives. The campaign includes a new VA Green Routine Web site (www.va.gov/greenroutine), a video featuring the VA Chief of Staff, and a guidebook designed to help VA employees implement sustainable actions.

The VA Green Routine Web site provides tips and tools to educate employees about reducing their environmental footprint. Also, it includes links to other VA and government-wide "green" resources. In the video, the VA Chief of Staff challenges all employees to do their part. The video cites examples from fellow VA employees and highlights success stories from VA facilities across the country. The Greening Action Guide and Toolkit recommends actions such as selecting a "green champion" in each office to help promote environmentally friendly steps including: printing double-sided, holding electronic meetings without paper hand-outs, turning off cubicle lights when not in use, unplugging cell phone chargers, recycling printer cartridges, and other items.

Since the October 2009 launch of the Green Routine coincided with Energy Awareness Month, the VA Central Office (VACO) in Washington, D.C. celebrated both campaigns by hosting educational events every Tuesday in October. Each Tuesday had a separate theme focused on an individual aspect of energy efficiency and sustainability (i.e. residential, government buildings, employee behavior). The event brought in other Federal Government programs to share information and materials including:

- General Services Administration
- DOE's Federal Energy Management Program
- Home Performance with ENERGY STAR (A DOE /EPA program)

On October 27th, 2009, members of VA's Green Management Team, which coordinated the Green Routine, dressed in energy-themed costumes (including a wind turbine, a E85 fueling station, a compact fluorescent light bulb, and Mother Earth) to promote Greening VACO. The Green Team distributed pens made out of recycled material and temperature magnets with the Green Routine logo and Web site address, as well as checklists for energy efficiency.

Through the Green Routine, VA focuses on reducing its energy costs and adopting sustainable practices to support its primary mission – to provide the highest quality care and services for our Veterans and their families.

For more information on the VA Green Routine, visit www.va.gov/greenroutine or contact Kristan Higgins at greenroutine@va.gov.

VA Green Management Team, Washington, D.C.

E4 Energy Audits Benefit U.S. Department of Agriculture

A Federal Energy Management FEMP E4 energy audit conducted at a single U.S. Department of Agriculture Agricultural Research Service (ARS) facility in 2007 led to implementation of 27 energy conservation measures (ECMs) at seven facilities within three years and the award of an energy savings performance contract (ESPC) delivery order for five additional ECMs at two facilities. Through these accomplishments, ARS will accrue substantial energy and cost savings, move forward in its resource conservation and sustainability goals, and obtain new equipment critical to support its pacesetting agricultural research mission.

In 2007, ARS received a FEMP E4 energy audit for its Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas. The FEMP report enumerated 18 energy conservation opportunities that would result in an estimated 28 percent reduction in natural gas consumption and 57 percent reduction in electricity consumption with a $500,000 investment.

Since appropriated funds were not available at that time, ARS explored private financing options. ARS has a nationwide plan to use utility energy service contracts (UESC) wherever they are available and use ESPCs at other viable locations.

Because the project was relatively small, it was thought not to be attractive to an energy services company (ESCO) under the Super ESPC, so a UESC was explored. The Texas Public Utility Commission however, did not allow electrical utilities to perform UESCs, and the small natural gas provider did not have the resources. With the advice of FEMP's Scott Wolf, a Federal Financing Specialist, ARS bundled its Texas sites into a single ESPC in order to make a project large enough to attract financing. This was ARS' first attempt to bundle several locations together in a single ESPC.

Ronda Ford, Bob Drechsler, Ken Coulter, and Sandy Morgan, the procurement team from ARS headquarters and the Southern Plains Area office, selected an ESCO, AMERESCO, who then surveyed the laboratory/office buildings, animal facilities, greenhouses, and agricultural buildings at the Texas sites. The ESCO's initial proposal identified 89 ECMs.

Under the leadership of Southern Plains Area Director, Dan Upchurch, and with the advice of Mike Holda, the DOE Project Facilitator, the procurement team, along with Phil Smith, Cindy Cose, and Barbara Crane, of the Southern Plains Area Office, determined that some ECMs were not economically viable. It made business sense for the locations to accomplish 27 ECMs—including lighting improvements, recommissioning, and advanced metering—with their own FY 2009 appropriated funds. A total of 18 ECMS proceeded to the Detailed Energy Survey phase, and five ECMs at two locations eventually made it into the December 2009 ESPC Delivery Order.

The original FEMP E4 energy audit identified energy improvements for Weslaco, and it had a far larger effect. It led to energy audits at all Texas ARS locations, encouraged seven locations to complete energy projects that would have otherwise been deferred by competing priorities, and resulted in an ESPC that included large equipment replacements that were needed badly at two major research facilities.

For more information, please contact Sandy Morgan, Facilities Energy Manager, USDA/ARS, at sandy.morgan@ars.usda.gov or 301-504-4895.

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Experts Offer Marines Energy Efficiency and Renewable Energy Advice

As an early adopter of cutting-edge technologies, the United States military is pioneering energy efficiency and renewable energy technologies in the field. Recently, the Commandant of the United States Marine Corps sent a team to visit military sites in Afghanistan to make recommendations on improving the supply and use of energy and water. If implemented, the findings will reduce demand for resources at military camps, translating to fewer trucks in convoys. This could save money and—more importantly—lives.

In a first-of-its-kind opportunity, Dr. John Barnett of the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL) joined a military-lead team working in a war zone, to help solve operational problems with energy efficiency and renewables. The Federal Energy Management Program supported and funded Dr. Barnett's work on the project. He was part of a team that included one other civilian and four active-duty Marines.

"It was a great privilege to be on the team. I had never been in a war zone, and the Marines really looked out for me," Dr. Barnett recalled. "As the trip progressed, I saw how DOE lab expertise could contribute to enhancing expeditionary self-sufficiency and help solve other tactical energy challenges," he said, adding that increased use of on-site resources can bolster Marines' freedom of action.

The team began by gathering at Central Command Headquarters in Tampa, Florida at the end of August 2009, returning to the U.S. September 21, 2009, after completing their mission. While in Afghanistan, the team of energy experts made observations at expeditionary camps in Helmand Province to support recommendations for more efficient energy use and to identify local resources to provide power and water, enabling decreased dependence on risky and expensive ground and air transport.

Currently, convoys transport fuel, water, and other supplies to forward operating bases in southern Afghanistan. Reducing the fuel and water demand at the bases would contribute to a decrease in the number of convoy vehicles, as well as reduced fuel and force protection requirements for the convoys themselves.

The team identified a number of near-term energy efficiency improvements for forward operating bases—including improved building insulation and generator load management—which could collectively save half of the diesel fuel used to generate electricity. Such efficiency measures alone may translate to eliminating as many as two vehicles from every 10 in a typical supply convoy. Further, the team believes the Marines can eliminate the use of bottled water in the field by drilling wells on-site. As Dr. Barnett comments, "All the sites we visited had the capacity for wells, and there are water purification systems available that would allow Marines to put the water straight into their drinking systems."

Beyond immediate savings, the team has longer-term ideas that include regulating climate control settings, using solar-thermal water heating, deploying solar panels, burning refuse to generate electricity, using solar ovens for food preparation, and looking at the feasibility of installing wind turbines in mountainous outposts in Afghanistan. The proposed actions would make the Marines more self-sufficient at the tactical edge, reducing risks to life and property by lowering the supply logistics requirements. The Marines are mindful that when their mission in Afghanistan is completed, some clean energy technology and associated know-how could remain behind as a valuable legacy for local populations.

The Commandant has established an experimental forward operating base in Quantico, Virginia, where candidate solutions recommended by the energy assessment team can be evaluated, with the goal of rapid fielding in theater. Dr. Barnett affirms, "The Commandant is a very strong supporter of energy efficiency and renewable energy technologies and their integrated application, and he aims to gain the operational benefits they offer."

For more information, please contact Dr. John Barnett, NREL, at John.Barnett@nrel.gov or 303-384-7469.

Dr. John Barnett, NREL, traveled to various locations in Afghanistan with the U.S. Marine Corps to provide advice on energy efficiency and renewable energy opportunities in theater at expeditionary camps like Camp Dwyer, above. Photo courtesy NREL.

ORNL Completes Retrofits Expected to Establish First DOE Net-Zero-Energy Building

Oak Ridge National Laboratory (ORNL) has completed retrofits that are expected to establish an office building in the laboratory's Buildings Technology and Research Integration Center (BTRIC) as the Department of Energy's (DOE) first net-zero-energy building (NZEB). Net-zero-energy buildings are highly-efficient structures that use renewable technology to produce as much energy as they consume from the grid over the course of a year.

Data on the retrofitted Building 3156, a two-story, 6990-square-foot office building occupied by about 25 energy researchers and support staff, have been submitted to DOE's Zero Energy Buildings Database. Analysis by the administrators of the database and close monitoring by ORNL staff are expected to confirm Building 3156's zero-energy status in FY 2010.

This demonstration project, part of ORNL's initiative to become a fully sustainable campus by 2018, was carried out by a multidisciplinary team of ORNL operations and support personnel and researchers to show that an existing commercial building can become an NZEB. Energy-efficiency retrofits on Building 3156 (noted in Table 1) reduced its energy demand from 100 to 60 megawatt-hours per year (MWh/year) such that the building's annual demand is provided by an ORNL-owned, grid-integrated, photovoltaic (PV) array, one of three ORNL solar installations. The average cost for electricity at ORNL for 2009 was approximately $0.07 per kilowatt-hour.

Table 1: Efficiency Measures to Reduce Building 3156 Demand from 100 to 60 MWhr/year

Energy-Efficiency Measure (MWhr/year)	Demand Reduction (Estimated)
Energy management control system to shed HVAC load during unoccupied hours	25
Reduced miscellaneous energy loads (primarily computers and peripherals)	7
New efficient heat pumps	4
Occupancy sensors to reduce HVAC use	4
Total	**40**

Conventional Efficiency Measures

Relatively conventional technologies account for about 80 percent of the reductions needed to achieve the net-zero energy goal:

- Replacing older packaged terminal air-conditioners with high-efficiency heat pumps saves about 4 MWh/year.
- Installation of occupancy, humidity, and temperature sensors to reduce lighting and heating, ventilation, and air-conditioning (HVAC) usage saves about 4 MWh/year.
- A new digital energy management and control system (EMCS) allows setback or shutdown of HVAC equipment when offices are unoccupied to save about 25 MWh/year.

The BTRIC building energy efficiency experts, along with ORNL facilities and operations staff, are taking full advantage of the new EMCS for analyzing energy use in 3156. Researchers implemented a method for clustering circuits to categorize and discriminate energy consumption and monitoring this information through the EMCS, which has been upgraded to take readings from the electrical panel. Team members can log on to the system from their desktop computers to see measurements of energy use broken down by individual heat pump, lighting, plug, and other circuits. These data are essential for calibrating the eQuest (Quick Energy Simulation Tool) model to baseline data and for verifying the savings predictions for the individual energy efficiency measures.

Measures to Reduce IT Energy Use

New power controls for computer and other office equipment in Building 3156—expected to save about 7 MWhr/year—are a key element of ORNL's sustainable campus initiative and are being evaluated for campus-wide implementation:

- ORNL's Information Technology Services Division implemented a power management software application that monitors, measures, and manages the energy use of computers and associated equipment in Building 3156. The application automatically places all networked computers and other networked devices into standby mode after working hours (determined and set for each employee). A single keystroke wakes up the computer.
- Smart power strips installed in each office extend the IT organization's energy savings reach to miscellaneous energy loads. This strategy assumes that if the computer in an

Continued on page 9

ORNL COMPLETES RETROFITS EXPECTED TO ESTABLISH FIRST DOE NET-ZERO-ENERGY BUILDING
(Continued from page 8)

office is not running, the office is probably unoccupied and other loads can be shed as well. The computer is plugged into the master outlet, and peripherals such as battery chargers and label printers are plugged into the other outlets. The computer and its peripherals are powered down when the computer is inactive. Exceptions are granted in cases where these actions would interfere with computing tasks.

- Printers, photocopiers, and fax machines are networked and centralized instead of having these resources in each office.

Cost-Effectiveness

All of the conventional energy efficiency retrofits installed in Building 3156 would be expected to show acceptable cost-effectiveness as part of a standard retrofit project having normal labor costs. Their total cost, to reduce energy consumption by 40 MWhr/year, was approximately $120,000, including more than $56,000 for the effort of the ORNL zero-energy team. True cost-effectiveness is also boosted by the fact that the packaged HVAC units in the building were at the end of their effective service lives. They had to be replaced regardless of project plans, and the high-efficiency equipment cost only about 5 percent more than less efficient options.

Exact costs for the IT measures are difficult to determine, because they were implemented in neighboring BTRIC buildings as well as in 3156 as part of ORNL's campus-wide sustainability initiative.

As a demonstration project, however, the Building 3156 retrofit was not expected to be conventionally cost-effective because of the high cost of energy from the PV installation, which was itself a demonstration project that cost $450,000.

An Educational Experience

Applying a systems approach to assessing the energy use in Building 3156, identifying cost-effective opportunities for energy-use reduction, and implementing energy efficiency technologies have provided an intense educational experience for the ORNL team. In addition to efforts to document the success of the Building 3156 retrofits, the team is continuing to pursue a goal to establish a near-zero-energy BTRIC campus through retrofitting an additional office building and two research buildings in the complex.

For more information on the BTRIC NZEB project, contact Julia Kelley, Oak Ridge National Laboratory, 865-574-1013, kelleyjs@ornl.gov. For more information on ORNL's Sustainable Campus Initiative, visit http://sustainability-ornl.org.

U.S. PACOM Energy Efficiency and Renewable Energy Analysis and Support

With funding support from the Department of Energy's (DOE) Federal Energy Management Program (FEMP), U.S. Pacific Command (PACOM) is working with all four military services and the U.S. Coast Guard to aggressively address significant energy challenges at military installations within its area of responsibility. These energy challenges are diverse, sizable and costly. To help PACOM meet these significant energy challenges, a team of six DOE national laboratories has been organized through FEMP. The laboratories are contributing needed capabilities based upon each laboratory core competencies. PACOM requested FEMP assistance with the following tasks:

- Comprehensive building energy efficiency assessments
- Renewable Energy Optimization modeling
- Data center energy efficiency assessments
- New construction EERE optimization modeling
- Industrial energy efficiency assessments
- Energy Security and Micro Gird analysis
- Net zero facility planning
- Energy manager training on building commissioning, efficiency assessments, and data center efficiency

These projects will help the Department of Defense meet its energy mandates and goals. Moreover, PACOM will serve as an example of integrated, systems-wide thinking on energy across various military installations. Instead of implementing separate individual projects, a systems approach maximizes energy savings by providing a framework for integrating the individual components into a logical whole.

In addition, with the military being the largest single user of electricity in Hawaii, U.S. PACOM is working in partnership with the state to help accomplish the DOE-Hawaii Clean Energy Initiative goal of 70 percent clean energy by 2030.

For more information, please contact David McAndrew, FEMP, at David.McAndrew@ee.doe.gov or 202-586-7722.

GSA's Blanket Purchase Agreement Helps Agencies Achieve Energy Goals

The General Services Administration has set up a Comprehensive Professional Energy Services (CPES) Blanket Purchase Agreements (BPA) to help Federal agencies meet their greenhouse gas, energy efficiency, and water efficiency goals using a streamlined, efficient acquisition process, with qualified BPA holders providing innovative, cost effective, and compliant solutions. The BPA is the Federal Government's first Federal Strategic Sourcing Initiative to support energy services, as required by the American Recovery and Reinvestment Act of 2009 (ARRA). Agencies can use the BPA for both ARRA and non-ARRA orders. Services available through the CPES BPAs include:

- Reviewing current energy-reduction measures including, but not limited to, those used in water efficiency, lighting, heating, and cooling of Federal buildings or other operations;
- Developing a process to ensure that any energy conservation measures employed in a major building renovation uses the most energy-efficient designs, systems, and equipment;
- Recommending and implementing renewable energy solutions, where feasible;
- Achieving, at a minimum, a Leadership in Energy and Environmental Design (LEED™) Silver rating certification for government facilities;
- Ensuring that all new buildings and major renovations are designed to reduce fuel consumption as required by the Energy Independence and Security Act of 2007;
- Ensuring energy analysis is part of any commissioning action; and
- Planning, monitoring, and reporting results with ENERGY STAR® or other government-approved tools.

For more information, including a complete list of the BPA holders, ordering information, and regional coverage, please visit http://www.gsa.gov/energyservicesbpa, or contact Angela Lehman, GSA, at angela.lehman@gsa.gov or 703-605-9541.

ESPC and UESC Training Reminders

ESPC Comprehensive Workshop

June 8-10, 2010 (DOE-specific)
Washington, D.C.

July 13-15, 2010
Albany, NY

ESPC Refresher Course

June 3, 2010
Washington, D.C.

July 20, 2010 (DOE-specific)
Washington, D.C.

For Federal sites with active ESPC projects. Reviews ESPC-specific legislation and guidance; risk, responsibility, and performance matrix; and measurement, verification, and performance period file maintenance.

Introduction to UESC Webinar

June 24, 2010

An overview of contracting options and services available from local utility companies to engineer, finance, and install cost-effective projects.

Alternative Finance Options Webinar

June 29, 2010

Use alternative financing tools to plan and implement energy and water saving measures and renewable energy systems.

Introduction to ESPC Webinar

June 30, 2010

Learn about the DOE ESPC program.

ESPC Pricing and Financing Webinar

July 7, 2010

Learn how ESPCs can finance the reduction of facility energy use and costs.

ESPC Contracting and Negotiations Webinar

July 28, 2010

Learn more about ESPCs from a contracting point of view.

Courses are limited to Federal employees and contractors located at Federal sites. To register, please visit www.fempcentral.com/workshops/registration.ws. For more information and a full listing of training and events, please visit www.femp.energy.gov/news/events.html.

FEMP FIRST THURSDAY SEMINARS

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First Thursday Seminars are a series of six 90-minute training sessions offered to Federal energy and environmental professionals at no cost on the first Thursday of each month from February through July 2010. The training is delivered via satellite broadcast or streaming video over the Internet. A list of upcoming dates and topics is provided below:

June 3, 2010
Advanced Metering Requirements and Best Practices
Greg Palko, Oak Ridge National Laboratory
Outlines fast-approaching Federal metering requirements, technologies, and best practices to help agencies implement, measure, and monitor their progress.

July 1, 2010
Operations, Maintenance, and Commissioning
Ray Pugh, Pacific Northwest National Laboratory
An overview of O&M best practices with a focus on corrective, preventive, and predictive infrastructure requirements and commissioning for existing buildings.

Avaliable on demand at http://www.femp.energy.gov/services/training_greenhousegas.html
Federal Greenhouse Gas Accounting and Reporting
Matt Gray, FEMP
Updates on new greenhouse gas regulatory requirements and FEMP-developed Guidance, as well as strategies, models, and technological tools to measure greenhouse gas emissions.

For more information on First Thursday Seminars, attendance registration and other FEMP training opportunities, please visit:

http://www1.eere.energy.gov/femp/services/training.html.

Celebrate Earth Day and Commit to a Low-Carbon, Clean Energy Future

The Federal Energy Management Program's (FEMP) theme for this Earth Day was "TAKE ACTION: Commit to a Low-Carbon Clean Energy Future."

Each year the Federal Government consumes more energy than any other single organization in the nation. In FY 2008 alone, the Federal Government spent $28 billion to operate facilities and fuel fleets. The government has a responsibility to use this energy wisely; by reducing fossil fuel use, purchasing the most energy-efficient equipment, choosing domestically-produced alternative fuels, and generating energy from renewable sources. By taking concerted action and making smart energy decisions, we will reduce greenhouse gases, save billions in energy costs, and create new jobs for America.

On Earth Day, FEMP encouraged Federal employees to make the connection between their daily actions as individuals and the health of our planet on a global level, and to make the commitment to achieve a low-carbon, clean energy future. Each of us can take small actions that collectively add up to big results. Together, we have the power to make our Federal Government more effective and more efficient, while reducing the threat of climate change, sustaining the clean energy economy, and encouraging innovation in new technology that will make our nation stronger.

FEMP's Earth Day poster and accompanying handout materials are available in limited quantities. To find more Earth Day information, please visit: http://www1.eere.energy.gov/femp/services/earthday.html. To create your own printed materials, high-resolution graphics are supplied on *A Power Kit: Awareness Resources* on CD ROM. Please call the EERE Information Center at 1-877-337-3463 to place an order. To learn more about the You Have the Power campaign, please visit the FEMP Web site at www.femp.energy.gov/services/yhtp/.

Edwards Civil Engineers Celebrate Energy Reduction

Energy and environmental engineers celebrated the 40th anniversary of Earth Day April 22 by reflecting on past energy reduction successes and planning new ones for the future.

"I feel passionate about the mission for the base," said Col. Jerry L. Gandy, 95th Airbase Wing commander, "and part of that mission is not only doing it effectively, but being able to do it efficiently."

Edwards Air Force Base (AFB) showcases a facility cooled by large ice machines, roofs designed to reflect the desert heat, and a high-tech room that controls the temperature in hundreds of buildings throughout the installation. Engineers here conserve energy with help from the Supervisory, Control, and Data Acquisition (SCADA) room. Computers in the SCADA room give them control of 25 percent of base buildings. In 2009, Edwards reduced energy consumption four percent saving more than $620,000.

"We pay a huge demand charge in the summer," said Jim Judkins, director of the 95th Civil Engineer and Transportation Directorate. "Between the hours of noon time and six in the evening during the summer our rates jump tremendously. If we can drive our demand down during those hours, we avoid a lot of expenditures. We use the SCADA system to do that. We might cycle buildings on and off to the point where people in the building never know what's going on, and we'll be able to save thousands of dollars every day."

"This is the place where America's aviation was grown, perfected and then sent out for our men and women to be able to use in our nation's defense," said Colonel Gandy.

That same sort of leading edge technology, the colonel said, can be found across the base in places like the thermal energy storage plant that helps cool the 95th Air Base Wing Consolidated Support Facility. Rather than refrigerating air during the day when Edwards has peak demand charges, the thermal energy storage plant makes ice at night, when it

A thermal energy storage plant houses six large ice tanks that help cool the 95th Air Base Wing Consolidated Support Facility shown here.

Continued on Back Cover


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Registration for the Labs21 2010 Annual Conference is opening early this year! Beginning April 29, you can register to attend this exciting event by visiting **www.i2sl.org/labs21/conference/registration.html**.
Be sure to register by July 25 to receive a $100 pre-conference registration discount.

The Labs21 program is co-sponsored by the U.S. Environmental Protection Agency and U.S. Department of Energy. I²SL has been selected as the official co-sponsor for the Labs21 2010 Annual Conference and Workshops.

August 15-18, 2010
Dallas Convention Center ★ Dallas, TX

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For information on topics not listed here, call the FEMP Help Desk at 1-877-337-3463

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EDWARDS CIVIL ENGINEERS CELEBRATE ENERGY REDUCTION THIS EARTH DAY
(Continued from page 12)

costs pennies per kilowatt hour to make it, and then blows air across the ice to cool the building. It saves the base an estimated $16,000 a year. Edwards engineers plan to add smaller versions to the rooftops of several buildings.

A simple agreement with the local utility provider also makes a big difference. "We essentially put in a bid for how much energy we think we're going to use in conjunction with Southern California Edison, and if we beat that, we get a rebate on our energy bill," said Colonel Gandy. "We earned thousands of dollars in rebates last year with our demand bidding program."

Renewable energy is also on the horizon for Edwards. Engineers have identified 10 facilities for solar rooftop development. They're also in negotiations to allow a private company to lease more than 3,000 acres of land to develop a solar farm.

Saving water is another important goal. Gravel and native bushes that require very little watering have replaced grassy areas in Edwards neighborhoods.

"We've reduced our water [use] in 2009 almost 25 percent," said Enrique Torres, base energy manager. "In our military family housing [areas] we've also partnered with Southern Cal Edison to have the incandescent light bulbs in all 700 houses replaced with new compact fluorescent lights." Changing the bulbs could save Edwards an estimated $50,000 dollars a year.

"It's getting people to walk the talk in everything they do," Colonel Gandy said, like "shutting off the lights when they leave a room, and setting up protocols where the monitors go into a dormant mode after a certain amount of time. Those sorts of things all save small chunks in the micro but in the macro, they save real dollars, real energy for our nation."

For more information, please contact Jennifer Elmore at jennifer.elmore.ctr@tyndall.af.mil or 850-283-6476.

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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.

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