FEMP FOCUS

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Meeting the Goal Page 2

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Advanced ESPC/Financing

San Antonio, Texas

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...and more!

Energy Savings Performance Contracting Re-Authorized Through FY 2006

Federal agencies can once again use Energy Savings Performance Contracts (ESPCs) to finance new federal energy-saving projects. The House-Senate Conference Committee for the FY 2005 Defense Authorization bill (H. 4200) completed work on the conference report, and over the weekend of October 9-10 was approved separately by the House and Senate. On October 28, 2004, the *National Defense Authorization Act for Fiscal Year 2005* was signed into law by the President. H.R. 4200 extends from 2003 to September 30, 2006, authority for all federal agencies to use ESPC contracts to finance federal energy management and water projects. Section 1090, Energy Savings Performance Contracts under Title X - General Provisions, amends Sections 801-804 of the *National Energy Conservation Policy Act*. The amendments are summarized below.

Defines the term "energy savings" to mean -

A reduction in the cost of energy, water, or wastewater treatment, from a base cost established through a methodology set forth in the contract, used in an existing federally owned building or buildings or other federally owned facilities as a result of –

(A) the lease or purchase of operating equipment, improvements, altered operation and maintenance, or technical services;

(B) the increased efficient use of existing energy sources by cogeneration or heat recovery, excluding any cogeneration process for other than a federally owned building or buildings or other federally owned facilities; or

(C) the increased efficient use of existing water sources in either interior or exterior applications.

Defines "energy savings contract" and "energy savings performance contract" to mean –

A contract that provides for the performance of services for the design, acquisition, installation, testing, and where appropriate, operation, maintenance, and repair, of an identified energy or water conservation measure or series of measures at one or more locations. Such contracts shall, with respect to an agency facility that is a public building, be in compliance with the prospectus requirement and procedures of section 3307 of title 40, United States Code.

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Meeting the Goal

The FY 2005 milestone year for the energy reduction goal of 30 percent for standard buildings is quickly approaching. Currently, the government's energy intensity is just under 25 percent of what it was in 1985. This means the government will need to save an additional 5 percent in Btu per square foot between now and FY 2005.

During the coming year, agencies should focus on high-impact, low-cost, quick-turnaround strategies to meet the goal. One such strategy is the purchase of renewable energy. The agencies that are currently making significant renewable energy purchases are the Air Force, Environmental Protection Agency, General Services Administration, and the Department of Energy. Renewable Energy Credits (RECs) can be a quick, low-cost way to meet the goal, and provide every site with access to the least expensive renewable generation nationwide. Purchasing RECs is now fairly easy for customers, as companies now have much experience in these types of transactions. FEMP can help evaluate agencies' options and strategies for purchasing RECs.

The Air Force, National Aeronautics and Space Administration, General Services Administration, and the Environmental Protection Agency have all exceeded the renewable energy goals for their own agencies and are effectively pulling the rest of the government along to meet the goal government-wide (to read more about renewable power purchase activity, see Summer 2004 *FEMP Focus)*. Total government renewable energy use has now reached 1,212 gigawatt-hours, with a goal of 1,334 gigawatthours by 2005. Several new projects are close to implementation including two Air Force projects—a pending large biomass project and a renewable energy project at Hill Air Force Base (Spring 2004 *FEMP Focus*).

Focusing on Operations and Maintenance (O&M) is another way to achieve the FY 2005 energy efficiency goal. Tremendous amounts of savings are attainable through improved O&M practices. Savings of 10 to 30 percent are typical and well documented. These practices should be part of facility standard operating procedures, not short-term, temporary efforts. O&M impact strategies for 2005 can include in-house recommissioning efforts and outreach programs. Awareness programs are valuable because they can provide a boost in conservation and can target end users and operators. Visit FEMP's *You Have the Power* Web site (http://www.eere.energy.gov/femp/yhtp/strategies.html) for awareness ideas and to download a copy of guidance for creating a successful campaign. The February 2004 handout from the new series from FEMP called *O&M First* features five of the most likely opportunities for improved O&M. Other resources include the FEMP O&M Web site, at http://www.eere.energy.gov/femp/operations_ maintenance. Links on the site include a continuous commissioning guidebook for federal energy managers and the FEMP O&M Best Practices Guide. The Portland Energy Conservation, Inc. (PECI) site (www.peci.org) features many resources on recommissioning and general O&M. FEMP's Resource Efficiency Manager (REM) approach is another effective way of instilling O&M best practices.

With the signing of the National Defense Authorization Act for Fiscal Year 2005, authority for federal agencies to use ESPC contracts to finance federal energy management projects has been extended from 2003 to September 30, 2006. Take this opportunity to move ahead on stalled projects to get them approved and underway.

In the meantime, you will find energy saving ideas and tools in this issue of the *FEMP Focus* that your agency can implement quickly. The FEMP staff is interested in helping everyone with implementation and strategy to meet the 2005 and 2010 goals and beyond. Agencies should feel free to call with any questions or concerns.

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

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Re-Commissioning the Senator Sam Nunn Atlanta Federal Center

The General Services Administration and DOE in Atlanta have long demonstrated partnership and entrepreneurial drive in meeting the energy reduction requirements of Executive Order 13123. Accomplishments include award-winning new-technology demonstration projects and energy savings performance contract projects. Challenging the team's efforts, however, was the high energy usage in GSA's 1.6-million-square-foot Senator Sam Nunn Atlanta Federal Center. By expanding a partnership with EPA, the primary tenant, the three-agency team leveraged resources and skills to establish a comprehensive program and a re-commissioning effort based on the Energy Star® Building program was initiated. Already, more than 11.8 billion Btu have been saved—enough to power 228 homes for a year, and the building will qualify for Energy Star® Certification after 12 months of savings. The team is now commissioning additional buildings using the Atlanta Federal Center model.

In March 2003, GSA tasked the team to conduct equipment diagnostics in order to address the numerous issues identified in a previously-conducted energy assessment. As early as summer 2003 some measures were implemented, including delamping the cafeteria, repairing inoperable equipment, and switching equipment set on unoccupied (manual) override. Also, the basement main entry, where doors were frequently opened by air pressure, was re-engineered.

Retro-commissioning of the facility's automation began in October 2003. Originally, the team pursued a strategy of returning of the building to original control mode. However, little documentation was available for the original design control scheme, so facility changes were implemented according "good judgment and good practice" as determined by the retro-commissioning team.

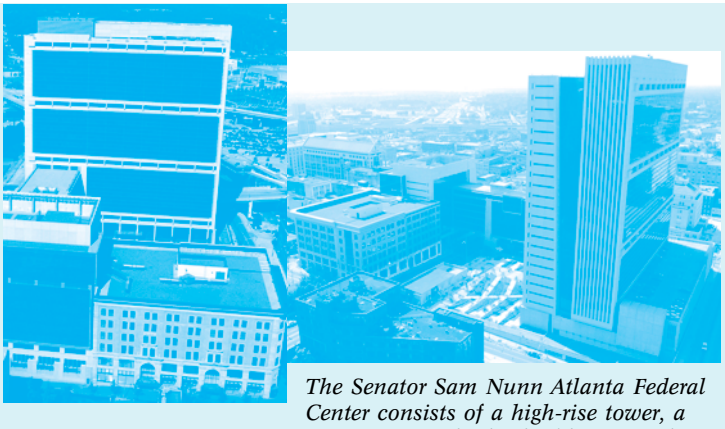
The program is ongoing, but major changes made to-date include:

1. Lighting schedule reduced from 19 hours per day to 12 hours. Lights set to go off after evening cleaning (A 5 minute warning blink for lights-out was planned).
2. No HVAC during evening cleaning (80°F limit).
3. Activated the small (400-ton) chiller for low-load conditions so the five large 1,300-ton units don't run in an inefficient, excessively-throttled mode.
4. The waterside economizer was placed back into service. The unit had never been activated due to original engineering problems.
5. Removed air handling unit (AHU) "unoccupied mode" overrides. Numerous AHUs running constantly on manual were returned to remote control for building automation control.
6. Numerous sensors that were not functioning or never connected were repaired.
7. Repaired two numerical controllers with bad battery backups (losing programs during power blinks).
8. Tuned secondary chilled water loop to reduce excessive pump horsepower during low load periods.
9. Reduced secondary loop pump pressure during setback periods (and during closed valves).
10. Deactivated excessive cooling water pumping and cooling towers during low cooling load periods.
11. Instituted a night setback with temporary 2-hour delay and fans shut down with night setback. Later and upon satisfactory results, eliminated the 2-hour night setback delay.
12. Set exhaust and outside air make-up to off during night setback.
13. Shut down fire emergency smoke exhaust fans that were running continuously.
14. Repaired a leaking chilled water valve resulting in night overcooling.
15. Operator training was instituted to minimize turning equipment to unoccupied mode override during problem periods. Equipment turned to unoccupied mode override are now quickly returned to remote upon resolution of problem.

As a result of these efforts energy consumption was reduced between 9 percent and 25 percent each month (depending on the season) resulting savings averaging $19,000 per month. Tenant comfort complaints were also reduced by 35 percent.

Assuming the facility sustains its current energy profile even with no additional improvements, Energy Star® certification is projected to be reached in January 2005, (upon achieving a 12 month history). Also, the facility expects to save in excess of $200,000 per year in utility costs.

For more information, please contact John Adams, Atlanta Regional Office, at 404-562-0563, JohncAdams@ee.doe.gov.



The Senator Sam Nunn Atlanta Federal Center consists of a high-rise tower, a street crossing bridge building, a mid-rise tower, the 1924 Building (the historic Rich's Department store), and a 10-story parking garage.

New Lighting Solutions for High-Bay Spaces: High-output T5 Lamps and Luminaires at Camp Pendleton

As energy conservation in industrial spaces becomes an increasing concern, lighting retrofit projects are being encouraged as a way to save energy and improve the quality of the work environment. Currently, a popular application for high bay industrial spaces is to replace existing high intensity discharge (HID) fixtures with high output T5 (T5HO) fluorescent fixtures. The T5HO is a 5/8 inch tubular fluorescent lamp, available from 24 watts to 80 watts. As a retrofit solution, the T5HO lamp offers several advantages including easier control, dimming ability, good color rendition, and high energy efficiency—all resulting in a very cost effective solution.

Researchers at Lawrence Berkeley National Laboratory recently investigated a retrofit project being carried out for 16 maintenance hangars and warehouses at the Marine Corps Base Camp Pendleton (Carlsbad, CA) by Tetra Tech EM, Inc. under an utility energy services contract of San Diego Gas and Electric. As part of this project, more than 1,000 HID fixtures (using 400-watt high pressure sodium and 1,000-watt mercury vapor lamps) were replaced with T5HO fixtures (with a total fixture wattage of 234 watts). The LBNL study documented the energy and visual quality benefits resulting from this retrofit, including annual energy savings, light quantity, light distribution, and color content. The total energy saved is estimated to be 57 percent, a cost savings of more than $230,000. The project has also provided significant improvements in the visual quality of the facilities, as evidenced by higher horizontal and vertical light levels, more uniform light distribution patterns, and better spectral content. Additionally, feedback from employees indicates a high appreciation for the project.

Suggestions for Other Federal Agencies

Retrofitting with T5HO fixtures is applicable in any high-bay space, such as maintenance workshops, warehouses, and large retail buildings. The system wattage reduction as a result of replacing existing fixtures with the lower-wattage T5HOs offers significant energy savings. Further reductions are possible through the use of lighting controls such multi-level switchers, photosensors, motion sensors, and occupancy sensors.

For more information on T5HO lighting retrofits, please contact: Mehlika Inanici, Lawrence Berkeley National Laboratory, 510-486-4531, Minanici@lbl.gov.

Renewable Energy Certificates Offer Quick, Low-Cost Way to Meet Goals

A Renewable Energy Certificate (REC), also known as a Tradable Renewable Certificate (TRC) or "green tag," represents the environmental, social, and other positive attributes of power generated by renewable resources. One REC is created with each megawatt-hour of renewable electricity generation. The RECs represent the "renewable" attribute of the electricity generation, including, for example, the reduced emissions from renewable electricity generation compared with those from conventional generation. These attributes may be sold (and, of course, purchased) separately from the underlying commodity electricity. When the REC is sold separately from the electricity, the actual power generated is no longer considered "green" and is treated like any other commodity electricity. RECs can also be re-combined with other generic electricity to create a renewable energy product.

Because RECs can be separated from the underlying electricity, they can be purchased from any location, regardless of the location of the original generation, enabling federal agencies to choose renewable power even if their local utility or power marketer does not offer a green power product. Although theoretically there are no geographic constraints on buying RECs, accounting systems to record and track the exchange of certificates are not yet available everywhere. In addition, the location of environmental benefits and/or local economic development may be important to some purchasers. A variety of REC products are available from local and national sources.

> The EPA's Green Power Purchase Program has received numerous awards, including a Presidential Award for Leadership in Energy Management. Visit www.epa.gov/oaintrnt/greenpower.htm to learn how the EPA is meeting their energy reduction goals through purchasing RECs.

Customers do not need to switch from their current electricity supplier to purchase RECs, and they can buy RECs based on a fixed amount of energy (or carbon footprint) rather than on their daily or monthly load profile. Because certificates are independent of the customer's energy use, load profile, and the delivery of energy to the customer's facility, they provide greater flexibility than purchasing energy and attributes bundled together as renewable power. One drawback to RECs is that they

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Clean Up With Water Savings

A pre-rinse valve? What's that? If you know, it's probably because you are familiar with commercial kitchens—especially the dishwashing part. Pre-rinse valves are the spray nozzles used to clean leftover food and grease off plates, pots, and pans before putting them in the dishwasher. So why have they become a hot topic now? For the past year or so, both the energy-efficiency and water-conservation communities have been abuzz about these devices because of the tremendous savings low-flow models offer. In fact, FEMP is so impressed with the savings potential and rate of return on investment that it has issued a product recommendation. It is available at www.eere.energy.gov/femp/technologies/eep_low-flow_valves.cfm.

Many pre-rinse spray valves work by brute force, using as much as 7 gallons of hot water per minute (gpm) and generally accounting for more water and sewer costs than the commercial dish machines (warewashers). A low-flow pre-rinse valve uses higher water velocity and more effective spray patterns to remove the food waste just as quickly, while using only 1.6 gpm. Depending on the model being replaced, a new low-flow valve could save anywhere from 30 to 70 percent of the rinse water. One manufacturer has had a low-flow model on the market for a number of years, but it wasn't until the Food Services Technology Center (FSTC) in San Ramon, CA, began testing the devices that the savings potential offered was recognized. Foodservice Equipment Reports calls installing low-flow valves a slam-dunk when it comes to water conservation, not to mention energy savings for water heating.

The concept behind the low-flow valve is so simple that it is surprising only one manufacturer used it. Think about power washing a wood deck or washing your car with a garden hose. Without a nozzle several gallons of water flow out of the hose at low velocity every minute. When you use the hose this way to rinse a car off, it takes a long time and a lot of water. But if you put your thumb over the end of the hose, or even better, attach a nozzle set to a wide spray pattern, rinsing the car off is faster and easier and uses less water. Low-flow pre-rinse valves work on this same principle.

In commercial kitchens pre-rinse valves impact three utility costs: water, gas or electricity (to heat the water) and sewer. By reducing the water flow, all three of these costs are reduced. FEMP estimates that replacing a 3.0-gpm pre-rinse spray valve (the average older model) with a 1.6-gpm low-flow model can save more than $600 per year on these utility costs with a pay-back of less than 2 months, and this is a conservative estimate. Because this potential is so significant, federal facilities managers should consider changing all the pre-rinse spray valves in their kitchens immediately.

What's most surprising about low-flow pre-rinse spray valves is their low cost and ease of installation. Two manufacturers currently offer products and a third will introduce one shortly. They retail for about $75 and should last 5 years under normal conditions. The hose threads, handles and valves are standardized so the new valve can simply be attached to the existing pre-rinse assembly. Regardless of what brand you're currently using, a replacement low-flow valve is available.

Of course, performance is a concern. No kitchen manager wants to install a product to reduce utility costs if it ends up increasing labor costs or process time. To make sure low-flow pre-rinse valves really are an improvement, researchers at the FSTC developed a well thought-out procedure to test the dish cleaning performance of pre-rinse valves. In the test, which uses dried-on tomato sauce to simulate one of dishwashing's most troublesome problems, the low-flow products all performed as well as or better than standard flow spray valves.

There are a number of programs already in place for pre-rinse spray valve replacement. The California Urban Water Conservation Council Rinse & Save Initiative has been the most successful. It has distributed more than 18,000 low-flow valves free of charge to restaurants and other hospitality businesses throughout the state. By calling 916-552-5885, managers of federal facilities in California can receive a valve.

Wisconsin's Focus on Energy offers a similar program. It replaced more than 1,000 sprayers in restaurants, local government institutions, and multi-family food service operations. For the first 100 installations, the staff tested old valves against the new ones to gather performance data for flow, temperature and usage to estimate savings. Their findings indicate that each sprayer replacement is saving an average of 500 therms of natural gas per year. For information on this program call 800-762-7077.

In Texas, the San Antonio Water System asks, "Is your restaurant rinsing money down the drain?" They launched a 1 year retrofit program in March 2004 with a goal of installing 3,000 valves as part of their Certified WaterSaver program. Austin has a similar replacement program.

FEMP recommends valves with a flow rate of 2.0 gpm or less at 60 pounds per square inch of water pressure and a cleaning performance of 26 seconds per plate or less (based on ASTM F2323-03). FSTC maintains a list of products that meet the FEMP recommendation on their web site at: http://www.fishnick.com/saveenergy/femp. Their site also includes a calculator (www.fishnick.com/tools/watercost/) so that you can estimate the savings at your facilities. Regardless of whether you get a free valve from one of the programs mentioned above or buy one with agency funds, changing the valves will save thousands of dollars over the next 5 years.

For more information, please contact Donald Mauritz or Mary Jo Ibánez, Lawrence Berkeley National Laboratory at 202-646-7955 (DLMauritz@lbl.gov or MJIbanez@lbl.gov), or Alison Thomas, FEMP, Alison.Thomas@ee.doe.gov.

U.S. Postal Service Uses Energy Information Systems to Reduce Energy Costs

The U.S. Postal Service recently installed energy information systems (EIS) at 30 facilities in California, taking advantage of financial incentives offered through the California Energy Commission's Peak Load Reduction Program. By enabling facility managers to view and analyze facility interval load data, these systems can be used to identify a wide variety of opportunities for significant energy cost savings. Historically, however, many facility personnel have not been sufficiently trained in techniques for interpreting and applying EIS data. As a result, the value that these systems can provide has frequently gone unrealized.

To help Postal Service personnel utilize their EIS, Lawrence Berkeley National Laboratory (LBNL) has issued a guidebook, *Using Energy Information Systems: A Guidebook for the U.S. Postal Service*. The guidebook is intended as a resource for facility managers interested in identifying energy cost savings opportunities, with an emphasis on energy saving O&M improvements. It also will serve as the basis for training sessions offered to Postal Service personnel by LBNL.

The guidebook outlines a set of specific strategies for using EIS data to reduce energy consumption and costs, including:

- **Benchmarking Energy Use Levels**. Benchmarking can be an important first step in assessing the potential for energy efficiency gains. With the data available through their EIS, energy managers can create a variety of energy metrics to compare their facility's performance to similar Postal Service facilities or to compare performance between shifts at their facility. In this way, resources can be targeted at less efficient facilities and shifts.
- **Reducing Peak Demand**. EIS can be employed in a number of ways to assist in reducing peak demand and associated demand charges. By regularly examining daily load profiles, facility managers can identify and eliminate demand spikes, such as those associated with simultaneous motor start-ups. Load duration curves, another instrument in the EIS toolbox, are particularly helpful for assessing the potential benefits from peak shaving efforts. Finally, by monitoring facility loads in near real-time or using demand alarms, facility managers will know when to take action to avoid exceeding targeted peak demand levels.
- **Eliminating Inefficient Equipment Operation**. Wasteful equipment scheduling can often be detected easily with EIS data. By reviewing daily load profiles and comparing to benchmark levels, facility managers can identify instances when unused equipment is left running or is turned on prematurely.
- **Improving Building Energy Equipment Performance**. Malfunctioning or degraded equipment often has an associated "energy fingerprint." For example, a broken economizer damper may be signaled by an increase in the frequency of compressor cycling. Such fingerprints can often be detected by regularly reviewing EIS data and comparing to established benchmarks.
- **Facilitating Demand Response**. Electric utilities in many regions offer demand response programs that pay incentives to customers who are willing to reduce demand for a limited number of hours per year. Federal facilities are also occasionally requested by senior management or state agencies to reduce electricity use voluntarily during periods when electricity supplies are tight. Facility managers can use EIS to assess the demand response potential at their facility and monitor their performance during emergency events. EIS with event notification and/or load control capabilities can be used to streamline and automate demand response and ensure that load reductions are rapid and reliable.

With these tools—and a little creativity—facility managers can begin to tap the rich source of information offered by EIS to yield significant energy cost reductions.

For more information, please contact Bill Golove, Lawrence Berkeley National Laboratory, 510-486-5229 or hgolove@lbl.gov.

RENEWABLE ENERGY CERTIFICATES OFFER QUICK, LOW-COST WAY TO MEET GOALS
(continued from page 4)

do not currently offer the same financial hedge value that some other green power products provide (although GSA is working to create such a REC product).

Price premiums for certificates may be lower than those for renewable electricity products, for several reasons: (1) RECs have no geographic constraints and therefore can provide access to the least expensive renewable resources; (2) the supplier does not have to deliver the power to the REC purchaser with the associated transmission and distribution costs; and (3) the supplier is not responsible for meeting the purchaser's electricity needs on a real-time basis.

The Defense Energy Support Center, General Services Administration, and Western Area Power Administration all have experience with REC purchases and can work with your agency to complete a purchase that meets the renewable purchase requirements of EO 13123 within a couple of months. In general, agencies have found that RECs provides a quick, low cost way to meet the FY 2005 renewable goal.

For more information on RECs, please contact David McAndrew, 202-586-7722, david.mcandrew@ee.doe.gov.

DOE-HQ Kicks Off Buy Bio Initiative

U. S. Department of Energy (DOE) Headquarters kicked off its Buy Bio initiative this fiscal year at a nationwide teleconference in April and a technology transfer session in July.

"Buy Bio" is the purchase of commercial or industrial products that use biological products or renewable domestic agricultural or forestry materials. To more directly align with DOE's mission of energy security, the focus is on biobased products that displace petroleum.

At the nationwide teleconference, Doug Kaempf, Program Manager of the Office of the Biomass Program, explained why purchasing biobased products is of special interest to the Department: "The U.S. Department of Energy's mission is energy security. With our Buy Bio initiative, the Department enhances the nation's energy security by substituting domestically-produced biobased products for fossil fuel based products derived from imported oil and natural gas. It also enhances the economics of biorefineries when we have demand for biobased products that can be co-produced with biobased fuel."

According to Dana Arnold, Chief of Staff of the Office of the Federal Environmental Executive, the legal driver for all federal agencies to purchase biobased products is the Farm Security and Rural Investment Act Section 9002, which specifies:

- Federal agencies will purchase certain designated products with biobased content.
- The U.S. Department of Agriculture will designate which products.
- The program will be similar to that for recycled products, allowing justified exceptions of the CAP (cost, availability, performance) with reporting required 1 year after a product has been designated.

Biobased Product Categories

Adhesives	Inks
Cleaners and Solvents	Landscaping Materials
Construction Materials/ Composites	Lubricants and Functional Fluids
Fibers, Papers, Packaging	Paints and Coatings
Fuel Additives	Plastics
	Sorbents

- Should there be a conflict between a recycled content and a biobased content product, the recycled product takes precedence.

DOE is encouraging its sites to be early adopters. Richard Langston, Procurement Policy Analyst from the Office of Procurement and Assistance Management, is urging procurement staff to evaluate potential contracts where they might help their site become early adopters.

Several DOE sites have already transitioned to biobased products. Others are piloting them. The National Bioenergy Center (NBC) Laboratories are pursuing transitioning to biobased products. It is the biomass research at the NBC Labs that results in biobased products. Some examples of sites already using biobased products are:

- Brookhaven National Laboratory has transitioned to biobased hydraulic fluid in their garbage trucks, motor pool hydraulic lift system, and three large lawn mowers. An example of the benefits Brookhaven has experienced is clean up of hydraulic fluid spills, which rarely but occasionally occur from the garbage trucks and used to cost between $2,500 to $3,500 per spill. With the biobased hydraulic fluid, the cost of such spills has been reduced to less than $1,000 per spill.
- Pacific Northwest National Laboratory transitioned to a biobased general purpose cleaner and found the product helps protect workers and the environment; saves time by reducing chemical inventory and the number of cleaning products from an average of 33 to 7 per custodial station;

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DOE-HQ KICKS OFF BUY BIO INITIATIVE
(continued from page 7)

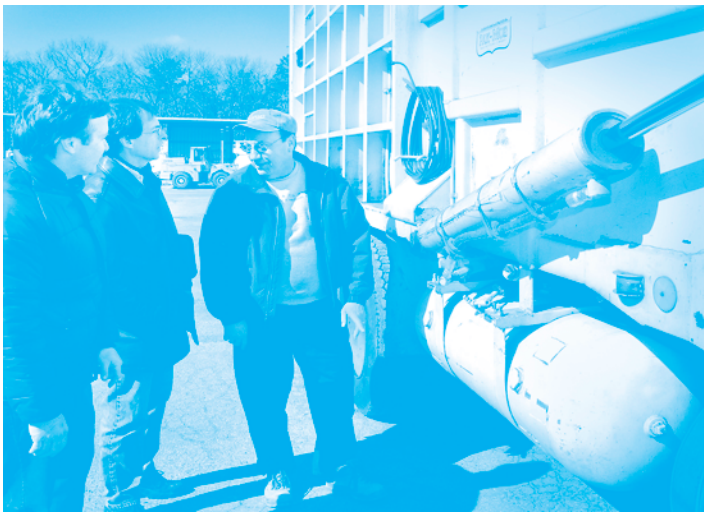
reduces waste handling, shipping, disposal, and purchasing costs-saving approximately $1,500 per container of product per year times the number of containers purchased each year. In FY 2004, PNNL surveyed all potential products they might transition to a biobased counterpart and are presently exploring transitioning to a biobased detergent for two of their parts washers and biobased floor finish remover.

- Princeton Plasma Physics Laboratory specified biobased hydraulic fluid in their new elevators.

In general, the U.S. Department of Agriculture expects biobased products to "have a more benign effect on the environment, will be biodegradeable, and will have lower disposal costs and cleanup costs than the fossil energy based products they will replace" (http://www.biobased.oce.usda.gov/public/faq.cfm).

The kickoff teleconference in April was one of the regular quarterly teleconferences hosted by Don Lentzen of Environment, Safety and Health on Environmentally Preferable Purchasing and part of the Department's effort to encourage procurement especially of preferred products: biobased, energy/water efficient, recycled, and vehicle/fuel alternative.

To be notified of future teleconferences or for help in transitioning to a biobased or other environmentally preferable product, contact Sandra Cannon at Sandra.cannon@pnl.gov or 509-529-1535. Vendors wishing to share biobased product information with DOE should contact Linda Mesaros at Linmesaros@aol.com or 843-768-3396).



Brookhaven National Laboratory uses bio-based hydraulic fluid in their garbage trucks.

DOE Preferred Procurement Team Members

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Energy/Water Efficient Products:
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http://www.eere.energy.gov/femp/technologies/eeproducts.cfm

Energy Star:
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Alternative Fuels and Vehicles:
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Alternative Fuels: http://www.eere.energy.gov/cleancities/afdc/
Vehicles: http://www.eere.energy.gov/vehiclesandfuels/epact/federal/

Prepare for Natural Gas Price Hikes

Federal facilities are already facing high energy costs for buildings and vehicles. Here are a few recommendations that may alleviate the budget crunch when natural gas (and other fuel) prices soar.

- Become more aggressive in natural gas conservation and efficiency.
- Evaluate modifications to the work week that allow for lower energy use without affecting productivity (for example, 4-day work weeks).
- Lower overall building temperatures and substitute with temporary personal electric space heating where needed.
- Evaluate air flow losses of heat and adjust where possible without affecting worker health.
- In cafeterias, install low-flow pre-rinse valves to save water and energy.
- Where possible, shut off heated space that is unoccupied or otherwise not needed for mission critical activities.
- Implement heating season dress code changes to allow use of warmer functional clothing in the workplace.
- Emphasize improving the efficiency of natural gas-fueled equipment. Boiler efficiency can improve with routine cleaning, tube replacements, burner tests, etc.
- Adjust water heating to lower temperatures during off-peak hours. Water heaters can be checked for burner and overall efficiency.
- Refresh your skills and techniques with training offered by manufacturers and natural gas utilities.
- Seek the latest low-cost technology to improve the product from natural gas-fueled equipment—that is, for steam or hot water heating.
- Contact the local natural gas distribution utility and start a dialogue and working relationship toward more efficient use of natural gas.
- Let us know how we may assist. FEMP regional offices (www.eere.energy.gov/femp/about/regionalfemp.cfm) can help your facilities implement demand-side efficiencies where possible. Check our Web site for added information—www.eere.energy.gov/femp/

These are a few ideas, plans, and goals FEMP believes will help federal agencies with rising natural gas prices. In further brainstorming with your colleagues, expand and refine the above ideas and perhaps develop others. Hopefully, the benefits will show up on agency natural gas bills this winter.

High Gas Prices Change the Calculation

While natural gas prices have receded from their 2001 price peak, they are still more than 40 percent higher than the average price to federal customers just 4 years ago. What's more, natural gas prices are likely to remain higher for some time to come. The market has changed dramatically.

To reflect this new market environment, FEMP is revising the *Product Energy Efficiency Recommendations*. The gas prices in the cost-effectiveness examples will be increased from $0.40 per therm to $0.60 per therm. If you're buying new products, you'll be pleasantly surprised by the additional savings available from the recommended products. For example, buying the best-available commercial water boiler will now save more than $62,000 over the life of the product compared to a standard model.

High fuel prices make the purchase of new energy-efficient technologies even more cost-effective, and the increased savings available also provide a stronger incentive for early replacement of inefficient products. If you've been putting off replacing an older natural gas system, now may be a good time to make the move to a new high-efficiency unit.

FEMP is adjusting to the new market—you can, too. Visit the Buying Energy Efficient Products Web site at http://www.eere.energy.gov/femp/technologies/eeproducts.cfm. ***Don't wait to save—buy an energy-efficient product today.***

Fuel Costs Reduction Checklist

In your buildings. . .

- ❑ Check/adjust combustion efficiency of natural gas-fired equipment
- ❑ Lower thermostat settings
- ❑ Lower setback temperatures
- ❑ Optimize morning warmup and night setback controls
- ❑ Reduce/eliminate major sources of infiltration
- ❑ Minimize use of outside air for process ventilation
- ❑ Modify work activities
- ❑ Minimize the use of natural gas-fired refrigeration equipment

In central heating plants. . .

- ❑ Conduct boiler efficiency tests
- ❑ Optimize combustion efficiency
- ❑ Perform boiler maintenance
- ❑ Minimize boiler blowdown
- ❑ Optimize steam plant heat balance
- ❑ Minimize deaerator steam venting
- ❑ Optimize boiler loading

With thermal distribution. . .

- ❑ Inspect/replace steam traps
- ❑ Inspect/repair condensate return equipment
- ❑ Locate/repair steam leaks
- ❑ Repair insulation
- ❑ Isolate non-essential distribution piping
- ❑ Reduce distribution pressure

An Operations & Maintenance Focus Lowers Cost, Increases Efficiency

There are numerous measures that may improve fuel-use efficiency and reduce energy consumption—and the accompanying cost—at federal facilities:

In Buildings

Check and adjust combustion efficiency of natural gas-fired equipment. Inspect furnaces, space heaters, and water heaters. Tune and adjust natural gas burners to achieve proper excess air settings and uniform, efficient combustion. Performing this maintenance can often save from 2 to 12 percent of annual fuel use. Contact the local natural gas utility company for assistance if necessary.

Lower thermostat settings, particularly in large heated spaces during the coldest winter days. A common rule-of-thumb is that for each degree the thermostat setting can be lowered, a 3 percent reduction in fuel consumption can be achieved. Implement dress code changes to allow the use of warmer functional clothing.

Lower setback temperatures in buildings during unoccupied periods. For a typical building, a 10 percent reduction in annual fuel consumption can be achieved if the thermostat setting is lowered 10 degrees an average of 8 hours each day. Isolate unoccupied building areas to further reduce space temperatures and provide only minimum freeze protection.

Optimize morning warmup and night setback controls. Programmable temperature controls, particularly energy management and control systems (EMCS) at large installations, are oftentimes not adjusted to coincide with building occupancy schedules as they change. Heating is needlessly activated when the buildings are not in use. Fuel savings can be achieved by updating warmup and setback control schedules to coincide with current occupancy periods in affected buildings for each heating zone and weekday.

Reduce and eliminate major sources of infiltration. Leakage of outside air into heated spaces during the coldest winter days can be the largest single contributor to the heating load in some buildings. Keep large overhead doors tightly closed in warehouses, hangars, and industrial buildings. Check and repair overhead door seals which are often deficient and can allow significant leakage. Shut off exhaust fans when not needed.

Minimize use of outside air for process ventilation. Many large installations use 100 percent outside air to ventilate hazardous areas, meaning that none of the heated air is recirculated. The heating requirement associated with these kinds of systems can be substantial. It is estimated that the fuel cost that will be incurred this year to heat one facility at one DOE site with this type of ventilation system will be about $250,000, if gas prices increase as anticipated. Verify with facility managers the cost implications of outside air ventilation in view of the higher fuel prices expected this winter, and that all available opportunities have been taken to minimize the impact.

Modify work activities to reduce heating requirements without affecting productivity. During the coldest part of the heating season, implement a 4-day work schedule for buildings that are least energy efficient. Large industrial shops having minimal insulation and high infiltration would be good candidates for this initiative. Where possible, temporarily relocate work activities from larger, less energy-efficient buildings to smaller, more efficient ones.

Minimize the use of natural gas-fired refrigeration equipment. Several federal installations operate gas-fired refrigeration equipment (including absorption refrigeration and steam turbine-driven centrifugal machines) to provide space cooling in one or more buildings. Natural gas-fired refrigeration equipment is typically more expensive to operate during the heating season than electric-driven equipment. The use of natural gas-fired refrigeration should be minimized during the winter if mechanical refrigeration is required and electric-driven equipment is available.

In Central Heating Plants

Conduct boiler efficiency tests. Boiler efficiency tests are often the only reliable way of revealing deficiencies in a heating plant and identifying problem areas that can impact fuel consumption. Boiler efficiency tests should be conducted for the largest site boilers if such testing has not been completed within the last several years.

Optimize combustion efficiency. It is important that the correct air-to-fuel ratio be maintained in boilers and that sufficient excess air is used to assure complete combustion. Maintaining too much excess air is a common occurrence and unnecessarily wastes fuel. With well designed natural gas-fired boilers, an excess air level of 10 percent is usually attainable. Excess air levels should be continuously monitored by utility personnel and corrected if necessary. An often stated rule-of-thumb is that fuel costs can be reduced by 1 percent, if the amount of excess air is reduced by 15 percent.

Perform boiler maintenance. Stack temperature more than 150

degrees Fahrenheit above steam temperature often indicates the presence of excessive water-side scaling, which can reduce heat transfer and increase fuel consumption by as much as 10 percent. If stack temperatures are excessive, heat transfer surfaces should be cleaned to remove scaling.

Minimize boiler blowdown. Reliable steam plant operation requires that a portion of the boiler water be discharged to drain in order to maintain acceptable solids concentrations. Blowdown rates are often excessive and waste fuel. Plant personnel should continuously monitor boiler blowdown to minimize energy losses.

Optimize steam plant heat balance. Many large steam plants use a combination of electric motors and steam turbines to drive auxiliary plant equipment. Continuous venting of large amounts of steam at a steam plant usually indicates that these drives are not optimally balanced, which can be costly when fuel prices are high and electric rates are low. Plant personnel should immediately correct these imbalances when they occur.

Minimize deaerator steam venting. Excessive steam losses in a steam plant can often be attributed to deaeration, a corrosion control process that removes air and gases from boiler feedwater. Plant personnel should keep deaerator venting to the minimum acceptable level.

Optimize boiler loading to coordinate the operation of multiple boilers and ensure that all load conditions are met in the most efficient manner. Selected boilers should be shut down during the low load periods so that the remaining boilers can operate at higher, more efficient firing rates.

With Thermal Distribution

Inspect/replace steam traps. Steam traps are mechanical devices that remove condensate from steam piping and equipment. Hundreds of steam traps may be in service in a typical system, and it is not uncommon to find 15 to 20 percent not functioning properly. Collectively, trap losses can be significant. A single failed trap, which might cost $400 to replace, will increase fuel costs by about $2,000 this year if gas prices increase as expected. In systems with a scheduled maintenance program, leaking traps should account for no more than 5 percent of the total trap population.

Inspect/repair condensate return equipment. Inoperative condensate return equipment, like steam traps, often go unnoticed because collected condensate can be wasted to drain, while the steam system continues to function. Condensate contains useful thermal energy that can be recovered to offset fuel costs. If condensate is returned to a steam plant, fuel costs will typically be reduced by about 10 percent.

Locate/repair steam leaks. Steam leaks can also be significant. A continuous steam leak with a visible plume only a few feet in length will likely cost about $8,000 in additional gas purchases this year if no corrective action is taken. Steam leaks can also pose a significant safety hazard.

Repair insulation. Up to one-quarter of total heating system fuel costs can be attributed to the thermal losses from distribution piping, valves, and equipment. Deteriorated or missing insulation from a 10-foot section of a 6-inch steam line, for example, will increase gas costs by about $1,000 this year if left unrepaired. An uninsulated 6-inch steam valve will cost about $300 in additional natural gas purchases. Thermographic instruments and infrared pyrometers can be helpful in surveying steam lines and identifying areas needing repair.

Isolate non-essential distribution piping. Changing missions have reduced the steam requirements at many sites. Steam distribution systems may no longer be optimally configured to serve facility loads. Opportunities may exist to discontinue operation of major sections of a distribution system originally designed to supply much larger loads, allowing existing loads to be served by other more efficient means. The avoided distribution losses can be substantial. Fuel purchases attributable to thermal losses from a typical 6-inch steam line 1,000-feet in length, for example, will cost about $12,000 this year at the anticipated higher natural gas price.

Reduce distribution pressure. Load reductions that have resulted from changing missions and energy conservation measures may also afford the opportunity to lower steam pressures in existing distribution systems to achieve a corresponding reduction in thermal losses. For example, lowering the average distribution pressure in 1,000 feet of 6-inch steam line from 120 to 80 psig would reduce distribution losses by about 10 percent, saving about $1,200 in natural gas purchases this year.

For more information on O&M, please visit http://www.eere.energy.gov/femp/operations_maintenance/.

Electricity Reduction Measures at Federal Facilities

Background

In the past, extreme temperatures have stretched the capabilities of electrical generating and transmission systems in parts of the country. This resulted in: (1) rolling blackouts; (2) voltage reductions; (3) requests from utilities for voluntary reductions; (4) interruptible power curtailments; and (5) requests from utilities for companies to operate emergency generators.

However, federal facilities can plan for electrical load reductions by using the experience gained by other facilities. Individual facility plans should be customized to site specific conditions. The requirement for emergency conservation plans is contained in Title 10, Code of Federal Regulations, Part 436, Subpart F, Paragraph 436.105.

General

1. Establish/enhance communications with the local utility company. Understand their needs for load reductions. Work with the local utility to develop the individual facility plan. An example is the Potomac Electric Power Company's (PEPCO) Curtailable Load Program.
2. Identify load reduction measures appropriate for the facility. Investigate separating loads into: (1) life, health and safety driven; (2) mission critical; and (3) non-critical. If not separately switchable, investigate modifying systems to allow terminating or reducing non-critical loads.
3. Establish a system to alert employees of expected high demand days including, but not limited to e-mail, voice mail, or public address announcement to all employees. Communicate early to allow employees to take load reduction measures at home and to dress appropriately.
4. Monitor total facility demand and demands for individual major loads (if separate metering is available). Monitor weather forecasts to predict high demand days and be proactive in communicating with the local utility to assess need to reduce load.
5. Initiate load reduction measures. Employees can take steps to reduce lighting, personal computers and appliances electricity use. While energy efficiency should be encouraged on a daily basis, stress the need for increased diligence to alleviate the emergency. Air conditioning operating changes and other system-wide measures should be accomplished by facilities management. Federal facilities that have energy management and control systems are well suited for this task. Facilities should also consider additional measures appropriate for site specific circumstances.
6. Encourage employees to reduce electrical loads in their homes, to reduce demand on the utility system. If no one is at home during the workday, unneeded appliances and lights should be turned off, and air conditioning thermostats should be set higher before departing for the day. Also, some utilities offer cost incentives to residential customers who allow the utility to remotely cycle off power to air conditioning and electric water heating systems. Periods without power are limited, so that comfort is not sacrificed. Encourage employees to participate in these programs, to assist the local utility, while reducing their electricity bill.
7. Enhance employee awareness of energy efficiency through training and less formal methods. Provide mandatory and voluntary training opportunities on smart energy practices so that employees can practice energy efficiency during emergency periods and year-round. In addition to training, run public service announcements about energy efficiency on televisions in cafeterias and other public use areas; send periodic e-mail messages about turning off lights and computers and implementing other efficiency practices; post signs or billboards near light switches or communal printers; and consider holding annual energy fairs prior to seasonal emergency periods to provide additional information for employees about how to manage energy use in the work place and in their homes.

Lighting Measures

1. Turn off fluorescent lights when leaving an area for more than 1 minute. (During non-emergencies, 5 minutes is recommended, to keep from excessively reducing lamp life). Turn off incandescent lights when leaving areas for any period of time.
2. In areas with sufficient daylighting, turn off lights. Adjust blinds, if available, to reduce glare.
3. Use task lighting and turn off general lighting, where it is feasible to maintain sufficient lighting levels for safety and productivity.
4. Turn off display and decorative lighting.

Personal Computers and Appliance Measures

1. Turn off printers when not in use.
2. Turn off monitors when not in use.
3. Ensure ENERGY STAR® power down features are activated.
4. If computers do not have ENERGY STAR features available, turn them off when leaving the office for more than 30 minutes.
5. Ensure personal appliances, such as coffee pots and radios are turned off.

Air Conditioning Measures

1. Precool building(s) below normal temperature settings prior to onset of peak demand period. Make sure to tell employees about this practice, so that they will not operate space heaters. During peak demand period, allow space temperatures to drift back up to normal settings (or as much as 5 degrees Fahrenheit above normal settings).
2. Allow casual attire, to make higher temperatures more acceptable.
3. Where systems allow, lower chilled water temperatures several degrees below normal settings prior to peak periods, and allow to drift above normal settings during peak periods.
4. Duty cycle air handling units off. Ensure adequate outside air flow rates to maintain indoor air quality.
5. Ensure that ventilation grilles and fan coil units are not blocked by books, flowers, debris, or other obstructions. This will improve air conditioning system efficiency and improve comfort.

Other

1. Operate emergency generators (many agencies have negotiated financial incentives from their local utility for operating generators). Ensure that generators have ample fuel for emergency operation and have been tested routinely. Turn off shore power to ships in dock and operate ship power systems. Make mobile utility system electrical generating equipment available to the local utility.
2. Shut off selected elevators and escalators. Ensure accessibility needs are met.
3. Where feasible, schedule high electrical energy use processes during off peak periods.
4. Encourage employees to not use copiers during peak demand period. Turn off selected copiers. Ensure power saver switch on copiers is enabled.
5. Turn off unnecessary loads such as fountain pumps.

Long Term Solutions

1. Consider purchasing interruptible power for selected loads with high electrical demand, and which will not suffer adverse consequences in the event of the utility turning off power. The cost savings from the lower rate may far outweigh the inconvenience of power being turned off within the interruption limitations agreed to in the utility contract.
2. Consider installing sub-metering to identify high intensity loads to be shed during emergencies.
3. Investigate thermal storage systems or alternative energy sources for air conditioning.
4. Install motion sensors and separate lighting circuits to allow turning off unneeded lights. (Some agencies have installed switching to separate public areas from agency work spaces).
5. Install an Energy Management and Control System to allow shedding and monitoring loads from one central location. If non-critical loads are not separately switchable, modify systems to allow terminating. Local utilities or energy services companies (ESCOs) can assist with this effort.
6. Consider adding on-site generation using micro-turbines, fuel cells, combined heat and power, renewable, or other appropriate technology.

ENERGY SAVINGS PERFORMANCE CONTRACTING RE-AUTHORIZED THROUGH FY 2006
(continued from page 1)

Defines energy or water conservation measure to mean –

(A) an energy conservation measure, as defined in section 551 of the *National Energy Conservation Policy Act*; or

(B) a water conservation measure that improves the efficiency of water use, is life-cycle cost-effective, and involves water conservation, water recycling or reuse, more efficient treatment of waste water or stormwater, improvements in operation or maintenance efficiencies, retrofit activities, or other related activities, not at a federal hydroelectric facility.

Furthermore, the bill directs the Secretary of Energy to complete a review of the ESPC program within 180 days of enactment of the Act to:

- Identify statutory, regulatory, and administrative obstacles preventing Federal agencies from fully utilizing the program.
- Use the review to identify all areas for increasing program flexibility and effectiveness, including audit and measurement verification requirements, accounting for energy use in determining savings, contracting requirements, in including identification of additional qualified contractors, and energy efficiency services covered.
- Report findings to Congress.
- Implement identified administrative and regulatory changes to increase program flexibility and effectiveness to the extent that such changes are consistent with statutory authority.

For more information on Energy Saving Performance Contracts, contact Tatiana Strajnic at 202-586-9230 or tatiana.strajnic@ee.doe.gov.

Solar World Congress 2005 to be Held in Orlando, Florida

The American Solar Energy Society welcomes the International Solar Energy Society (ISES) Solar World Congress back to the United States in Orlando, Florida, August 6-12, 2005. Join leading researchers, scientists, engineers, architects, designers and other renewable energy professionals from around the world at this comprehensive program.

Now is the time to start making plans for this important event. It has been 14 years since the ISES Solar World Congress was held in the U.S. Highlights of the program will include:

- A celebration of the 50th anniversary of ISES, honoring the pioneers, organizations and milestones in the society's history, with special sessions and presentations on solar science in the past 50 years. Also included will be a retrospective on worldwide Solar Energy History of the 20th Century.
- Special solar tracks looking at the technologies, issues and applications of solar energy in the coming years.
- A special track on solving the world's water problems by using solar energy for pumping, desalination, purification, irrigation and more—bringing safe, accessible water to people around the world.
- An indoor and outdoor international exhibition displaying the latest products, technologies and services in solar, wind, biomass, sustainable technologies and water applications.
- Pre- and Post-Congress trips to the Florida Solar Energy Center, the University of Florida's Solar Energy and Energy Conversion Laboratory, Kennedy Space Center, solar companies and local attractions.
- A variety of educational workshops and short courses on solar technologies.
- Expected to be the largest gathering of renewable energy professionals in the world.

The "Sunshine State" of Florida is the home to a thriving solar industry, two nationally renowned solar energy research centers and hundreds of thousands of residents who use solar water heating, pool heating and photovoltaic technologies in their homes and businesses.

For full details on the 2005 Solar World Congress, visit www.swc2005.org.

Alternative Financing Q&As

You've asked. . .

Q. *A local contractor that is not an ESCO has performed several projects at my facility. Can that company be used as a sub-contractor to an ESCO on an ESPC project?*

A. Yes. The Super ESPC energy service companies (ESCOs) are open to suggestions regarding contractors who have experience at your facility. Much of the equipment installation under an ESPC will be sub-contracted from the ESCO to local companies, so if there is a local contractor with experience in the appropriate technology(ies), necessary security clearances, and knowledge of your facility, they could be a great benefit to the ESCO and your project.

Q. *Is it possible for calculation of baseline energy use to change from initial proposal to the final proposal? How?*

A. Yes. In fact, this almost always happens. It is important to remember that the baseline energy use is the energy use of the equipment proposed for replacement (or the energy use of a building if a computer simulation model is used) rather than the utility bill for the entire facility. The baseline energy use calculated in the Initial Proposal will be based on utility rates, equipment nameplate data, estimated efficiencies, and engineering calculations. Energy and cost savings estimates are made the same way. During the detailed energy survey, the baseline energy use will be verified through metering and more detailed engineering calculations for use in the Final Proposal. This verified baseline may be different from the Initial Proposal estimates if equipment efficiencies or operating hours are found to differ from assumptions or agency-provided information, and if energy conservation measures have been dropped from or added to the ESPC project.

Q. *Can different Measurement & Verification methods be used for different ECMs for the same project?*

A. Yes. While savings are guaranteed at the project level, performance is assessed for each ECM included in the project. It is very important to develop a Measurement & Verification (M&V) Plan that addresses each proposed ECM individually. Simple, well-known technologies with low performance and savings risk (such as lighting) will require fewer measurements for shorter durations than systems with multiple variable parameters or variable use (such as variable frequency drives or cogeneration). The FEMP M&V Guidelines defines various M&V methods by ECM and is a procedural guide that you can use to help select the appropriate M&V methods for the ECMs included in your project. The M&V Guidelines and other M&V resources are available at the FEMP Web site at www.eere. energy.gov/femp/financing/superespcs_mvresources.cfm.

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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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The Online Green Purchasing Course is Now Available

The online green purchasing training course is available on the Office of Personnel Management's Gov Online Learning Center http://www.golearn.gov web site (www.golearn.gov). You can find it in the Free Catalogue section, under Legislatively Mandated & Agency Required Topics.

"What is 'Green' Purchasing, Anyway?" is a fun and instructional course for contracting personnel, purchase card holders, facilities managers, and fleet managers. The course provides an introduction to the federal "green" purchasing program. The federal government has requirements to purchase products with environmental and energy attributes. Also known as "green" purchasing, this program requires the purchasing of recycled content products, energy-efficient products and renewable energy technologies, alternative fuel vehicles and alternative fuels, biobased products, environmentally preferable products and services, and non-ozone depleting substances. The course is organized into modules explaining why the government is buying "green," the legal basics, requirements for purchasing, the different types of "green" products, where to purchase them, roles and responsibilities, and required reporting. It also provides examples, resources, and lots of reference web sites. Course duration ranges from 1 ½ hours for purchase card holders to approximately 2 ½ hours for contracting officers and contracting officer representatives. Completion of the course satisfies the Executive Order 13101 requirement that agencies provide training to contracting and program personnel.

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