

FEMP

FEDERAL ENERGY MANAGEMENT PROGRAM

FOCUS

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New Goal for Federal Renewable Energy Use

What is the Government's overall goal for the use of renewable energy in Federal facilities? To answer that question, and to fulfill one of the mandates of Executive Order 13123, FEMP staff and representatives of Federal agencies in the FEMP Renewable Energy Working Group have assisted the Secretary of Energy in establishing a renewable energy goal for the Federal sector. As a result, the Secretary has recommended that the Federal Government strive to have the equivalent of 2.5 percent of its facilities' electricity consumption come from new renewable energy sources by 2005.

New renewable energy includes any acquired by the Federal Government after 1990. Using 1999 Federal energy consumption data as the basis for calculations, the 2005 goal translates to 1,351 gigawatt-hours (GWh) of electricity annually, or 4.6 trillion Btu, that will come from new renewable sources. A preliminary analysis conducted last year found that 173 GWh, which is a very small fraction of total consumption, of new renewable energy was either already in use or available under contract in the Federal sector.

The goal is measured against facilities' electricity use, because that is where the greatest opportunity for renewable energy exists. However, agencies are allowed to substitute renewable energy generated or used in several different kinds of situations, as well. These are some examples:

- On- and off-grid power technologies;
- Thermal technologies;
- Renewable transportation fuels (for example, ethanol or hydrogen derived from renewable energy);
- Passive solar energy captured by equipment and building design;
- Renewable energy mechanical power;

Renewable energy is becoming an important part of a Federal agency's portfolio of energy options. As more successful projects are put in place, they build experience and provide energy and operations cost savings, as well as pollution reduction. Renewable energy is a clean energy supply option that can also help agencies reduce peak loads (especially photovoltaic technology) and provide emergency power.



FEMP
*is Your Partner in
Making Projects
Happen*

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The Director's Column

In May 2000, former Secretary of Energy Bill Richardson established a Federal renewable energy goal as directed by section 503(b) of Executive Order 13123. The Secretary, through an interagency working group process, set a target for FY 2005 of 2.5 percent of total facility electricity use as the goal for Federal Government energy used from renewable sources (excluding large hydro). Renewable energy eligible to contribute to this goal must have been acquired by agencies after 1990 either by implementing renewable energy projects or by purchasing electricity generated from renewable energy sources.

Take a moment to recap your agency's strategy for achieving the Federal Government's renewable energy goal. What is *your* Federal agency doing to meaningfully contribute to this goal? Federal agencies will find this renewable energy issue of the *FEMP Focus* beneficial in evaluating their renewable energy progress. Learn more about the Government's renewable energy goal, where the greatest opportunity for renewable energy exists, and agency reporting requirements. This issue features several inspiring renewable energy projects that exemplify how agencies are getting recognized for their efforts. Some of these projects include new solar energy systems on the rooftops of Federal buildings in downtown Chicago and Suitland, MD, and the Naval Undersea Warfare Center's Atlantic Undersea Test and Evaluation Center's (AUTECE) Green Island Program.

Please keep up-to-date on Renewable Working Group activities and utilize FEMP training courses on renewable energy. FEMP has also prepared a guidebook, *Purchasing Renewable Energy: A Guidebook for Federal Agencies*, to assist Federal agencies considering purchases of renewable energy. Definitions of renewable energy and green power are discussed and the potential benefits and costs of Federal renewable energy purchases are identified to both regulate and restructure markets. The guidebook can be found on the FEMP Web site at www.eren.doe.gov/femp/resources/purchase_renew_energy.html.

Tell FEMP What You Need!

Throughout February and March, FEMP will conduct a program-wide customer survey by telephone. If you would like to participate in this important survey, please contact TecMRKT Works, our evaluation team, at 608-835-8855.

Federal Agencies Unveil Solar Energy Systems

Solar systems are really catching on in Federal agencies, as more building managers across the nation choose to use more clean, renewable energy.

The U.S. Environmental Protection Agency (EPA), the General Services Administration (GSA), and the U.S. Department of Energy (DOE) recently unveiled a new solar energy system on the rooftop of GSA's Metcalfe Federal Building in downtown Chicago. GSA also has installed a solar system in the Suitland Federal Center in Maryland, with assistance from DOE.

"EPA, in partnership with GSA, DOE, and private industry, is responding to the Million Solar Roofs Initiative, which encourages clean, energy-efficient technologies," said former EPA Assistant Administrator Romulo L. Diaz, Jr. Mr. Diaz was instrumental in getting EPA funding for the Chicago project. The project, which was in the works for more than three years, also reflects a 1999 Executive Order calling for Federal agencies to seek out environmentally preferable products as well as the city's campaign to make Chicago a center for green technology.

"The Metcalfe solar energy project will reduce carbon dioxide emissions equal to the emissions produced from driving an average passenger car 25,117 miles, or once around the world," said EPA Regional Administrator Francis X. Lyons. "We hope to set an example that will start a new trend in the use of renewable energy in downtown Chicago."



The Metcalfe solar energy project will reduce carbon dioxide emissions equal to the emissions produced from driving an average passenger car 25,117 miles, or once around the world.

Eighty-four photovoltaic (PV) panels are on the roof of the building. The PV panels convert sunlight into DC electricity. A power inverter then changes the DC into AC electricity and loads it directly into the building's power grid.

"Last year about this time, we were celebrating the fact that the Metcalfe Federal Building was among only 25 percent of buildings nationwide eligible to receive the ENERGY STAR® label," said Norbert Kieszkowski, Deputy Assistant Regional Administrator of GSA's Public Buildings Service. "Today our challenge is to develop new ways to make solar energy cost-effective on a large scale to power entire buildings and to educate people about the exciting possibilities of solar energy."

Also benefitting from the Million Solar Roofs Initiative is GSA's Washington National Records Center at the Suitland Federal Center. Expected to provide a

minimum of 60 percent of the building's normal electrical requirements, the solar system provides 100 kilowatts of power and will save approximately \$60,000 per year in electrical costs. The system includes 2,800 thin-film PV modules.

This project showcases how quickly and easily amorphous silicon technology can meet the energy needs of many different types of commercial and industrial facilities. Amorphous silicon technology is an advanced photovoltaic material that performs better under high ambient temperatures and costs less to manufacture than conventional PV technologies.

Peter Dreyfuss, former national coordinator of the Million Solar Roofs Initiative, applauded the addition of the Suitland and Metcalfe Federal Buildings to the Million Solar Roofs Initiative system count. "We are now ahead of our goal of 2,000 solar energy systems on Federal buildings this year, and are on track to meet the installation goal of 20,000 by 2010," he said. "Federal agencies have invested more than \$10 million into solar energy systems over the past three years, offsetting more than 16 billion Btu of energy generated by burning fossil fuels each year," said Dreyfuss.

For more information about the Metcalfe Federal Building, please contact Karen Thompson, EPA, 312-353-8547; Bruce Hall, GSA, 312-353-2605; or Sharon Gill, DOE, 312-886-8573. To learn more about the Suitland Federal Center, contact Gary Caruso, GSA, 202-260-4227.

Energy Costs Plummet in Award-Winning DOE Building

The energy bills for the Thermal Test Facility (TTF) at DOE's National Renewable Energy Laboratory (NREL) in Golden, CO, are more than 60 percent lower than those of similar, conventionally-designed buildings. The TTF was designed using an energy-efficient, "whole-building" approach, and it has been receiving national recognition for its low-energy design and performance almost since the day it was completed in 1996.

The building houses the research laboratories of NREL's Center for Buildings and Thermal Systems. There, the research staff works on increasing the use of energy efficiency and renewable energy technologies in the buildings sector. They develop new, cost-effective, environmentally-friendly building equipment and energy systems, such as advanced solar collectors and thermal storage. The 10,000-square-foot TTF also houses offices and support areas.

The chief reasons for the TTF's success at saving energy include a commitment to energy efficiency early in the design process, the use of good simulation tools to engineer the building envelope, and the building's extremely good use of daylighting. "The TTF shows that lighting, heating, and cooling costs can be reduced significantly when the design team makes the minimization of energy use a high-priority goal," said NREL Senior Engineer Paul Torcellini.

The energy-efficient, integrated building design was a collaborative effort of engineers and designers in NREL's Center for



The Thermal Test Facility is an energy-efficient, state-of-the-art laboratory in which NREL researchers and their Federal and private-sector partners can investigate and develop advanced building components and systems.

Buildings and Thermal Systems and the Site Operations Center. The TTF's south-facing "stepped" design includes clerestory windows for the open mid-bay and high-bay labs. East- and west-facing windows were minimized to prevent overheating as a result of solar gains.

Window overhangs on the south side reduce unwanted solar gains in the summer but permit solar gains for passive solar heating in winter. Daylight/occupancy sensors control all the electric lighting. Daylighting alone reduced the lighting load of the building by an impressive 75 percent in comparison to that of comparable buildings. In fact, daylighting meets nearly all of the TTF's lighting needs except those in minimal-use areas in the core of the building, such as restrooms and electrical closets. Daylighting, window overhangs, and lighting controls combine to cut the building's cooling load by more than 40 percent in comparison to that of a conventional building.

The heating, ventilating, and cooling (HVAC) system was designed to meet the building's loads after the building envelope design was completed. Cooling costs were reduced further by a direct/indirect evaporative cooling system, which is less expensive to operate than a conventional chilled-water or direct-expansion system. Other HVAC features include short duct runs to minimize static pressure and permit the use of smaller fans; thermostatically controlled ceiling fans to reduce stratification and distribute both conditioned and ventilation air; air-to-air heat exchangers; fan-powered, variable-air-volume units with hot water coils that run independently of the main air-handling unit; and an energy-management system to operate all the mechanical and lighting elements.

The flexible TTF design can be adapted for several different uses in many other locations. The design incorporated conventional construction techniques and materials, so the TTF cost no more to build than a similar conventional building. The energy simulation tools used to optimize the design also are easy to obtain. See www.eren.doe.gov/femp/techassist/softwaretools/softwaretools.html for more information on energy simulation tools.

The TTF, and the careful design process associated with it, serve as good models for other low-energy buildings and design teams in the Federal sector.

For more information, please contact Otto VanGeet, NREL, 303-384-7369.

Clean PV System is the “Natural” Choice for Emergency Power

Federal facility managers are finding that photovoltaic (PV) technology is one of the smartest choices for charging a building's uninterrupted power supply (UPS) system, which provides electricity for critical needs when there's a power outage or other power disturbance. There are at least four reasons why PV is such a good choice.

First, a solar electric PV system doesn't emit the greenhouse gases that conventional emergency power generators do, so it's easy on the environment. Second, the PV power generated when there is no power outage and the UPS storage batteries are charged can offset the building's electrical loads; often, excess power can be sold back to the local utility. Third, if you already have the batteries, the inverter, and other balance-of-system equipment needed for a standard UPS system that is PV-ready, the only new purchase you'll need to make is the PV array. And fourth, the PV system can provide UPS power for a longer time than UPS battery storage can provide on its own if the power failure occurs when the sun is shining.

Two new PV/UPS systems are already being used at facilities in Colorado and Utah. At the National Renewable Energy Laboratory's Site Entrance Building (SEB) in Golden, CO, the UPS system is composed of a PV array connected through a charge controller to a battery bank. The SEB houses site security personnel, so maintaining power for communication and other security equipment during a power outage is essential.

Although the grid-tied, 660 watt PV/UPS system can provide power for about nine hours in emergency operating mode, the system also is connected to a 6.5 kilowatt natural gas generator in case of an extended power outage. Under normal operating conditions, when there is no outage, the building uses power produced by the PV/UPS system to reduce peak power demand, and thus energy costs. This system has been estimated to save \$300-\$400 per year in peak demand costs alone.

At Zion National Park in Utah, a new 7,600-square-foot visitor center and 1,100-square-foot comfort station have been outfitted with a PV/UPS system. Because of power reliability concerns, uninterrupted emergency power is a requirement there. The UPS system needed only the addition of a PV array and a few modifications to create a system that is more environmentally benign than a conventional generator that runs on fossil fuels.

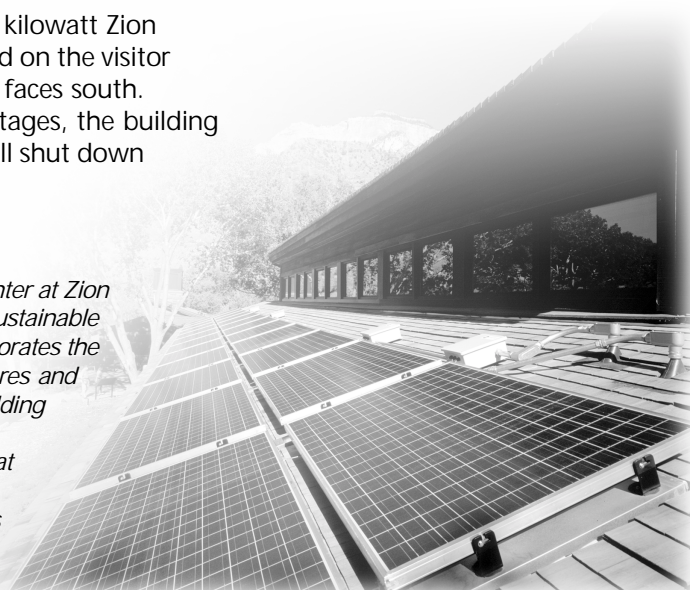
The grid-tied, 7.2 kilowatt Zion system is mounted on the visitor center's roof and faces south. During power outages, the building control system will shut down

nonessential electrical loads. While the sun is shining, the PV/UPS system will maintain power indefinitely for normal building operations. When the sun is not out, the system will still continue operating for a limited amount of time.

Other energy-efficient features in Zion's visitor center include daylighting, passive down-draft cooling towers for natural ventilation cooling, a Trombe wall for solar heating, thermal mass flooring, and window glazings and overhangs optimized for energy efficiency as well as solar heating and cooling. See www.nrel.gov/buildings/highperformance/projects/zion/zion.htm for a case study of the whole building features at the Zion Visitor Center.

Facility managers who want to use clean solar energy in their UPS systems are welcome to find out more about the ones described here. For more information, please contact Otto VanGeet, NREL, 303-384-7369.

The new Visitor Center at Zion National Park is a sustainable building that incorporates the area's natural features and energy-efficient building concepts into an attractive design that saves energy and operating expenses while protecting the environment.



Ground Source Heat Pumps in Residential Applications Proved Successful at IHS

The Department of Health and Human Services Indian Health Service (IHS) installed ground source heat pumps to provide heating and cooling in 111 residential housing units in Rosebud and Pine Ridge, SD. These staff quarters consist of one-bedroom fourplex units, two- and three-bedroom duplex units, and three-bedroom residences.

Ground source heat pumps operate by using the heat in the ground to act as a heat source in the winter and a heat sink in the summer. The units installed in the IHS staff quarters also provide approximately 30 to 40 percent of the energy needed to heat the residential hot water.

When the residences were originally designed, IHS determined that a ground source heat pump system would significantly reduce the overall life-cycle and annual operating costs of the homes' heating and cooling systems. The original design (based on extreme heating and cooling conditions) indicated that an estimated 37 percent annual energy cost savings over a conventional highly efficient heat pump system would be realized. After installation of the equipment, IHS engineers carefully reviewed the energy consumption in the homes, and determined that the pumps are actually saving closer to 46 percent, which

equates to \$600 per year for a three-bedroom home. The systems are expected to pay for themselves in roughly 5 to 6 years.

Not only have the energy savings surpassed IHS expectations, but customer satisfaction has been extremely high. The home owners have been very pleased with the low operating costs of the ground source heat pumps, their quiet and easy operation, the simple and easy maintenance, and, in particular, the positive environmental impact of using renewable energy technology.

For more information contact John Rodgers at IHS Seattle Engineering Services at 206-615-2461.

NEW GOAL FOR FEDERAL RENEWABLE ENERGY USE

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- Renewable energy from projects on Federal facilities facilitated by the host agency (for example, a geothermal project on Federal land in which the host agency assisted with siting); and
- Renewable energy used by clients of a Federal agency, if the agency provided financial or project development support (for example, solar energy on public housing).

Agencies are required to submit information about renewable energy purchases in their annual

reports. FEMP is responsible for developing engineering estimation techniques for converting project information into estimates of Federal renewable energy use. Since the goal is based on 2.5 percent of the Government's total electricity consumption, the targeted level of renewable energy use will be recalculated each year to account for changes in the amount of the Government's electricity consumption.

FEMP is also currently developing a voluntary on-line reporting system for all other relevant projects; it

will request the minimum amount of information needed to estimate renewable energy output. This system will be used to track agencies' progress in meeting the renewable energy goal.

For more information on this guidance, on participating in the Renewable Energy Working Group, or on attending a FEMP training course on renewable energy, please contact Nancy Carlisle, NREL, 303-384-7509, and see the FEMP Web site www.eren.doe.gov/femp/aboutfemp/renewableguide.html.

New Federal Energy Management Advisory Committee Holds Premiere Meeting

The new Federal Energy Management Advisory Committee (FEMAC) met for the first time October 23-24, 2000, in Washington, DC. President Clinton established FEMAC in his Executive Order 13123, "Greening the Government through Efficient Energy Management," in June 1999.

The Committee will advise the Assistant Secretary for Energy Efficiency and Renewable Energy (EERE) at the Department of Energy on a host of Federal energy management topics, such as increasing use of energy savings performance contracting and utility energy service contracting; purchasing ENERGY STAR® and other energy-efficient products; increasing sustainable building design; and deploying efficient, renewable, and clean energy technologies at Federal facilities.

Dan Reicher, former Assistant Secretary of Energy Efficiency and Renewable Energy, addressed the group and indicated how important their input was to help ensure the future success of the program.

The Committee discussed short- and long-term goals and set four areas for further Committee development—Budget, Project Financing (ESPC and UESC), Sustainable Design, and New Technologies. Working groups, set up by FEMAC, will include members from outside the Committee in the private sector, from the FEMP and EERE staffs, from industry insiders, and others who can provide insight and expertise in developing and researching ideas, suggestions, and can provide recommendations to the Committee.

The Committee decided, after briefings by FEMP managers and extensive discussion on objectives, goals, and short- and longer-term topics, to examine the fiscal year 2001 and 2002 FEMP budgets. A working group, chaired by member Richard Earl, will report its recommendations in early 2001. The second FEMAC meeting was held January 25, and 26, 2001 in Washington, DC.

FEMAC member Jared Blum told the Alliance to Save Energy, "The meeting was highly successful and I was excited at how receptive FEMP management is to outside suggestions on program direction."

Former Secretary of Energy Bill Richardson selected the members for their expertise in a wide range of areas named in the E.O. FEMAC members are:

- Stuart Berjansky, Government Accounts Manager, Philips Lighting, Columbia, MD.
- Jared Blum, President, Polyisocyanurate Insulation Manufacturers Association, Washington, DC.
- Kenneth Calvin, Interim Director, Mississippi State Energy Division, Jackson, MI.
- Robert E. Collins, Jr., Principal Engineer and State/Federal Governmental Accounts Manager, Tampa Electric and Peoples Gas companies, Tampa, FL.
- Richard W. Earl, Vice President, PB Facilities (a Parsons-Brinkerhoff Company), Herndon, VA, former

DOE Director of Infrastructure Support Services.

- Shelley N. Fidler, Principal with the law firm of VanNess and Feldman, Washington, DC, formerly a DOE Senior Advisor and Principal Deputy, White House Climate Change Task Force.
- Erbin Keith, Senior Vice President, Sempra Energy Solutions, LLC, San Diego, CA.
- Vivian Loftness, Professor of Architecture and Head, School of Architecture, Carnegie Mellon University, Pittsburgh, PA.
- Mary M. Palomino, Energy Conservation Manager, Salt River Project, Phoenix, AZ.
- Cynthia Vallina, Management Analyst, Executive Office of the President, Office of Management & Budget, Washington, DC.

The FEMAC Chair is Beth Shearer, Director of FEMP.

For more information, please contact Steven Huff, Designated Federal Officer for the FEMAC, at 202-586-3507 or by E-mail to steven.huff@ee.doe.gov.



Members of the Federal Energy Management Advisory Committee.

DOE's Boston Regional Office Partners with EPA to Promote ENERGY STAR® Buildings

DOE Boston Regional Office personnel recently collaborated with New England General Services Administration (GSA) building managers in promoting the Environmental Protection Agency's (EPA) ENERGY STAR® Program for high-performance buildings in New England.

Early last spring, staff from the New England EPA, working together with colleagues at the Cadmus Group, Inc., of Waltham, MA, made an inquiry to GSA engineers and managers responsible for energy use in hundreds of Federal buildings in the New England area. They were looking for potential candidates for the ENERGY STAR® Buildings Program label for highly-efficient buildings in time for an announcement on Earth Day 2000.

DOE Boston Regional Office personnel identified 30 candidate buildings in the Northeast that had a reasonable chance of meeting the strict performance requirements of the ENERGY STAR® Building Label. Eight of these office buildings, managed by GSA, were prequalified, based on low energy consumption combined with low vacancy rates. Two buildings were then nominated—the Thomas P. O'Neil, Jr., Federal Building in Boston, and the U.S. Courthouse and Federal Building in Springfield, MA. They already earned a benchmarking score of 75 or higher and could thus apply for the ENERGY STAR® Building Label.

Benchmarking building energy consumption on a 0 to 100 scale is the basic criteria. Buildings that are

among the top 25 percent nationwide in terms of energy performance (earning a benchmarking score of 75 or greater) and maintain an indoor environment that conforms to industry standards can qualify to receive the ENERGY STAR® label.

After the two GSA buildings were nominated, the EPA required an independent assessment by a licensed professional engineer. The Boston Regional Office offered to arrange this on short notice. Staff provided engineering support for site visits to both buildings, together with a GSA staff engineer, and reviewed a number of indoor environment criteria. Both buildings passed, and the GSA engineer is now familiar enough with the procedure to assess other GSA buildings in the New England region.

The close coordination and willing partnership allowed GSA to submit all the required documentation by the April deadline. The knowledge and contacts of the Boston Regional Office accelerated the early identification of candidate buildings, and provided trained and professional technicians to work with GSA staff. The FEMP staff was able to corroborate the buildings' physical characteristics and energy consumption, based on extensive work being done to collect and analyze data consumption, and earlier partnering with GSA on a number of projects.

Building managers can take advantage of the ENERGY STAR® Building Label in several different

ways. One of the most frequent questions a building manager has is: "How am I doing?" The benchmarking tool can help compare an individual building's performance with that of other similar-use buildings in the region and throughout the United States. The benchmarking tool also allows managers to identify opportunities for energy efficiency improvements that can save money on monthly utility bills and add value to the property.

A Statement of Energy Performance is designed to readily communicate energy performance information as part of the building's permanent documentation. EPA anticipates that the Statement of Energy Performance will provide valuable input into business transactions involving buying, selling, appraising, leasing, and insuring the building, as well as contracting for energy, operations, and maintenance services.

The Thomas P. O'Neil building in downtown Boston and the Springfield Federal Building, in the western part of the state, are two of only six buildings in Massachusetts to carry the ENERGY STAR® Building label. These two Federal buildings were identified as such because of a strong working partnership between the New England GSA and EPA and the DOE Boston Regional Office.

For more information contact Paul King of the Boston Regional Office at 617-565-9712.

EPA

DOE

Waste Isolation Pilot Plant Finds Savings in Lighting Retrofit

The Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) near Carlsbad, NM, recently replaced 20 high pressure sodium lamps in bay areas with a new technology—inductively coupled electrodeless lamps—or ICE technology, which combines extremely long-lamp life of up to 100,000 hours with high performance. The retrofits have lowered energy and maintenance costs while improving lighting quality. The project is realizing a 3.1 year simple payback.

The WIPP is owned by DOE and operated by the Waste Isolation Division of Westinghouse Electric Company. The WIPP consists of process, support, and administration buildings for the site's mission of low-level, radioactive waste disposal. The site uses about 18 million kilowatt hours of electricity per year, at an average rate of \$0.045 per kilowatt hour or about \$755,000 per year.

The buildings comprise approximately 268,800 gross square feet of conditioned space. Approximately half of the total area is used as office space. The other half is used for waste handling, specialty labs, maintenance activities, and storage or mechanical rooms.

In an effort to meet its goals for energy and cost reduction, the WIPP site will retrofit a majority of its lighting, including the high bay areas. The high bay areas currently use high pressure sodium fixtures which are typically switched on (at the lighting panel) on Monday morning and switched off on Friday afternoon. They



DOE's Waste Isolation Pilot Plant is located 26 miles east of Carlsbad, NM.

remain "on" due to their long restrike intervals, and require lamp or ballast maintenance every 1 to 2 months in order to meet the readiness and task demands in these areas. Lighting maintenance in these areas is difficult to schedule and perform due to mission constraints and safety requirements.

As a trial installation, the WIPP site replaced 20 high pressure sodium fixtures in one of their high bays with OSRAM SYLVANIA's ICETRON™ technology and installed light switches near the exits. Each 400-watt high pressure sodium fixture (475-watts including ballasts) was replaced with a two-lamp, 300-watt, ICE fixture (314-watts including ballasts). The ICE lamp utilizes an electronic ballast with an expected average life of 100,000 hours and offers instant-on fluorescent light quality and instant restrike. The project has alleviated the poor light quality associated with high pressure sodium and deferred the group relamping interval to 15+ years. This eliminates the cost and risk to personnel in relamping on a more frequent basis and

provides the facility with an improved light source for the waste handling tasks. The improved controls/switching allows the site to turn these lights off when not in use and realize additional energy savings.

The two-lamp fixture was made specifically for the ICE technology by 1st Source Lighting of Auburn, CA. OSRAM SYLVANIA and 1st Source Lighting worked closely to produce a fixture that would optimize the lamp and ballast's operating characteristics. In this approved fixture, the lamp and ballast are fully warranted by OSRAM SYLVANIA for 5 years or 20,000 hours including replacement labor.

Lawrence Berkeley National Laboratory provided additional design feedback/assistance and pre- and post-metering for this installation. The cognizant engineer for the project and site energy manager provided the baseline economics and projected savings. At \$0.045 per kWh and a

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**WASTE ISOLATION PILOT PLANT
FINDS SAVINGS IN LIGHTING
RETROFIT**

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(burdened) hourly maintenance rate of \$35 per man hour, the site will realize a 3.1 year simple payback, including energy and maintenance savings. Based on the reduced operating hours, the new ICE fixtures should last longer than the facility is expected to remain operational. In an area that is so difficult to maintain at a facility that is so remote, the maintenance savings were a justified and important element in the economic analysis.

Instant on/off, better color rendering, improved light quality, energy savings, longer life, and reduced maintenance costs made this project an easy choice. The site has plans to replace more than 150 additional high pressure sodium fixtures as part of their long-term facility improvement plan.

High ceiling spaces, warehouses, cleanrooms, and aircraft hangars are examples of areas that can benefit from this type of lighting improvement. Zero-maintenance over a 10 to 30 year period adds to the value of this technology in a variety of locations. Additional information regarding the ICE lamp and ballast can be found at www.sylvania.com/prodinfo/business/fluorescent/icetron.htm.

For additional information please contact the WIPP energy project manager, James Hedin, at 505-234-8411.

Information on the fixtures and photos of the WIPP installation can be found at www.1stSourceLight.com.

Additional information about the WIPP site and its mission can be found at www.wipp.carlsbad.nm.us/.

Cogeneration Plant Generates Success for USDA Research Site

Even cows and pigs appreciate saving energy, at least at the National Animal Disease Center (NADC) in Ames, IA. NADC is a major U.S. Department of Agriculture (USDA) Agriculture Research Service Center for research on livestock and poultry diseases. The center, which opened in 1961, has 80 buildings totaling 450,000 square feet with 270 employees.

The site had a badly outdated infrastructure and its energy needs have greatly increased over the years. An Energy Savings Performance Contract (ESPC) with Johnson Controls, developed in cooperation with the Department of Energy's Chicago Regional Office, guarantees to pay for facility improvements over the 17 years of the contract at no cost to taxpayers.

"USDA's Modernization Plan calls for the demolition of several major buildings over the next decade. The one challenge was to implement projects with short payback or implement projects at facilities that would still be in existence following modernization. The plan also requires the power plant to remain operating during construction of the new \$378 million center modernization," says Dennis Jones, NADC facility director.

"So, continuing an ongoing collaborative effort with our staff, Johnson Controls audited the buildings and developed a plan to save energy and money while increasing the reliability of the present utility system. JCI also coordinated the funding and guaranteed the results," he said.

NADC and Johnson Controls looked both at short payback items (such as lighting and heat recovery systems) in the existing buildings and long payback items (such as chiller systems and a utility rate review) for the entire facility.

Perhaps most noteworthy is the inclusion of a cogeneration power unit. This natural gas-driven combustion turbine generates 1.2 megawatts of electricity, then uses the heat from the combustion process to generate steam through a boiler system. NADC is able to produce electricity for half of the current utility rate, and the steam is essentially a free byproduct used to run autoclaves and for wastewater sterilization, and provides heat in the winter. The installation of the cogeneration system and an emergency generator allows NADC to purchase electricity and gas on interruptible rates reducing the overall cost of utilities.

"All of this is accompanied by improvements in operation and maintenance designed to keep the NADC running smoothly and meeting its goals for years to come," Jones says.

For information, contact Dennis Jones at djones@nadc.ars.usda.gov or Jerry Cook at jerry.p.cook@jci.com.

Energy Savings at Fort Knox Result of Infrared Heating

U.S. Army's Fort Knox, KY, has chosen infrared heat as one method to meet energy reduction goals and create savings year after year. During FY 1999, the Directorate of Base Operations Support at Fort Knox achieved an energy savings of approximately 50 billion Btu (48.6 million cubic feet of natural gas) and \$194,000. This was achieved by installing 92 percent plus efficient infrared heating systems while improving the environment of occupants.

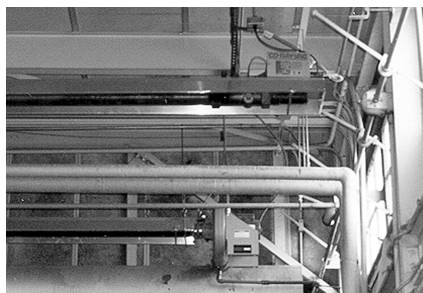
Infrared heat is located above the workspace and exhaust via plastic pipes. Benefits of utilizing high quality infrared heating equipment is the elimination of boiler inspections, smoke stacks, steam traps, and pipe insulation. This concept, with site-adapted designs and sizing, is transferable to most any large high bay building. The payback and reward is even greater in areas where high heat loss is encountered, such as buildings with large overhead doors or poor insulation. Radiant heating uses less fuel than other systems because it heats a building and the people inside in the same manner as the sun heats the earth. The sun does not heat the earth's atmosphere directly; rather its infrared rays strike the earth from 93 million miles away, heating the earth's surface. The surface then acts as a heat reservoir and releases heat into the atmosphere by convection to raise the ambient temperature.

Fort Knox has passed their experience on to nearby Fort Campbell, KY. Fort Campbell has now started to install this radiant heating system in their hangar buildings.

Fort Knox chose Co-Ray-Vac® infrared heaters because of the manufacturers experience, quality of materials, the burners which are in series for greater comfort, and combustion gases which are condensed to provide flue temperatures below 200 degrees.

Now with more than 100 buildings heated with radiant heating, Fort Knox is using this type of heat to help reach base energy goals. Because of the principles of infrared heating, the thermostat can be set 5 to 10 degrees F lower with radiant heating. This saves fuel, yet people stay warm and comfortable. This means that radiant ambient temperatures are lower than warm air systems ambient temperatures. Also, air is heated indirectly, so less fuel is needed to maintain warmth at floor level.

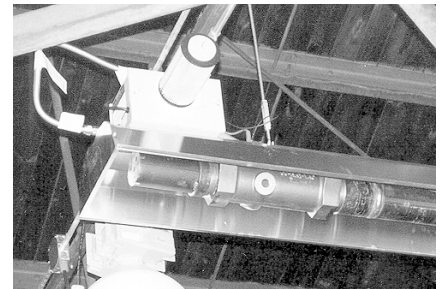
Fort Knox has incorporated a thermostat that uses an adjustable photoelectric eye to lower the thermostat setting to 55 degrees whenever the lights are turned down, or at night. This thermostat has removed the headaches of having to reset timers or clocks



Infrared heating efficiently heats buildings and people the same as the sun heats the earth.

after every power failure or time change, and teaching occupants how to program thermostats. The estimated savings per year is about \$194,000 and more than 50 billion Btu. Most of these savings are a result of work accomplished with Department of Defense Energy Conservation Improvement Program Funds and demand side management funding that was available at the time. All new construction at Fort Knox will include infrared heating where applicable.

For more information, contact Gary Meredith of Fort Knox at 502-624-8358 or e-mail mereditg@ftknox-emh3.army.mil.



Notice the use of cast iron combustion chambers and schedule 40 black iron radiant pipe. Even after the system has been turned off, the mass of these components continues to provide radiant energy to the occupants in the same manner as an old cast iron stove.

FEMP Technology Guide Now Available

Trying to quickly locate information on energy efficiency technologies? Then look to the new, on-line FEMP Technology Guide at www.eren.doe.gov/femp/prodtech.html.

This Web-based document provides easily-accessible top-level information on energy efficiency and renewable energy technologies.

The FEMP Technology Guide contains profiles of 40 technologies. Each technology is presented individually in a two- to three-page profile with the following information:

- Brief description that presents basic information on the technology;
- Listing of appropriate applications;
- Discussion of the technology's performance and costs;
- Summary of the technology's commercial availability; and
- Listing of related Web sites (links included), where additional, more detailed information can be obtained.

Examples of technologies included are:

- Front loading clothes washers;
- Boiler combustion monitoring and oxygen trim systems;
- Spectrally selective glazing;
- Reflective roof coatings;

- High efficiency chillers, desiccant cooling and dehumidification;
- Dual-source heat pumps;
- Ground source heat pumps;
- Lighting and lighting controls such as daylight dimming;
- Photovoltaics;
- Wind turbines; and
- Heat pump water heaters.

In short, there's something for everyone in the FEMP Technology Guide.

The Technology Guide was developed by the Washington State University Energy Program under subcontract to the Pacific Northwest National Laboratory. Paul King, Department of Energy Boston Regional Office, provided the FEMP oversight.

We hope you have a chance to visit the FEMP Technology Guide soon. While you are there, please give us your feedback through the automatic feedback forms provided.

For more information regarding the Technology Guide, contact David Hunt, Pacific Northwest National Laboratory, Washington, DC, office at 202-646-7867, or Paul King of the Boston Regional office at 617-565-9712.

Utilities Management

GSA and SBA Promote Business Opportunities in Gas Industry

The General Services Administration's (GSA) National Center for Utilities Management (NCUM) and the U.S. Small Business Administration (SBA) have teamed up on a procurement strategy to deliver a 10-year \$1 billion multiple award Federal contract to small disadvantaged firms in the natural gas utilities business. More than 6,000 businesses are members of the SBA's 8(a) Business Development Program and will be chosen through the competitive selection process to distribute natural gas to the Federal Government. This program is designed to assist small disadvantaged businesses with financial, technical, and contracting opportunities.

NCUM is committed to providing Federal agencies with energy resources in the most cost effective manner and developing innovative solutions in the utilities industry. NCUM is one of three services within the Energy Center of Expertise that provide specialty services for GSA.

For more information on this program or other GSA services, contact Cathy Findley at 816-823-2694 or www.gsa.gov/pbs/centers/energy.

Navy Develops Green Island Program to Improve Base Life

Almost due east of Key West, FL, tucked away on the eastern shore of Andros Island, the largest island in the Bahamas, is the Naval Undersea Warfare Center's Atlantic Undersea Test and Evaluation Center (AUTEC). This small, one-square-mile U.S. Navy base has adopted numerous programs and improvements to save energy and sustainably live on Andros Island.

ELECTRIC VEHICLES

More than half of the base's 145 ground transportation vehicles are battery-powered golf carts. In addition, AUTEC personnel privately own and operate about as many battery carts as the Navy Base. AUTEC started out with 20 electric carts in the 1980s, and has added to its Electric Vehicles (EV) fleet several times. Last year, AUTEC placed an order for 11 Neighborhood Electric Vehicles (NEVs) for delivery in 2000. NEVs are more sophisticated than electric golf carts and are increasingly being used in gated communities with reduced speed limit restrictions.

Bill Lescalleet, Supervisor of Transportation of the Naval



More than half of the AUTEC's 145 ground transportation vehicles are battery-powered golf carts such as these.

Undersea Warfare Center's ground transportation fleet at AUTEC says, "Convenience is the primary reason we have such a large EV fleet here." What makes EVs so convenient? Carts only need to be registered; no insurance is required. If none are available to buy on base, EVs can be bought through the Base Exchange to avoid paying shipping costs and taxes. It's also duty-free; and carts are much cooler than gasoline vehicles, which heat up as sunlight streams in through windows and windshields.

"Most departments don't carry heavy loads," Lescalleet explains. "If you have good batteries in them, you can generally run the carts 3 to 5 days before they need to be recharged." Recharging is no problem, because people can hook up to their home's 110 outlet.

Cost is another selling factor. The last round of Club Cars cost about \$5,500 for the two-seaters; four-seaters were another \$1,000. Carts are easier and less expensive to maintain. They take up less space and require less technical knowledge for maintenance and repair. Carts have no oil or filters



The second solar water heating system installed at AUTEC.

to change. Annual maintenance costs average around \$500 per unit, versus about \$2,000 for each gasoline vehicle. Batteries and computer modules are the major repair items. Computers cost around \$300, about the same price as a battery pack containing six batteries. But it's rare to have to replace all six batteries at once.

Ron Miller, Energy Program Manager, was instrumental in inaugurating a policy that requires all new fossil fuel vehicle requisitions to be accompanied by a "non-electric" justification. What is the future for EVs at AUTEC? Long-term: total elimination of gasoline vehicles.

Electric vehicles are clean, but generally the electric utility plant that supplies the electricity produces pollution. AUTEC produces its own electricity, and recently installed a new efficient power plant that has cut fuel consumption by 16 percent.

WASTE OIL RECOVERY

The base generates approximately 800 gallons of waste lube oil per month. To minimize the adverse environmental effects from this waste, AUTEC implemented a waste oil recovery program, at a cost of \$1,000, that uses a centrifuge to remove the contaminants and recycle the oil as fuel in the power plant. This results in a reduction of hazardous waste and recovers the energy content of the oil, saving \$7,200 per year.

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NAVY DEVELOPS GREEN ISLAND PROGRAM TO IMPROVE BASE LIFE

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SOLAR WATER HEATING

Remote Site 2, located about 15 miles from the base, is the site of a new solar water heating system. A new barracks is under construction to house up to 10 unmarried personnel, and is being equipped with energy-efficient lighting and appliances. Three solar collectors are mounted atop a utility building behind the barracks. Small photovoltaic (PV) panels alongside the collectors supply power to a pump that pumps unheated water from three 119-gallon tanks within the utility building up through the roof-mounted solar collectors.

The Site 2 solar water heating system is the second solar water heating system to be installed at AUTEK. Mobile homes housing base personnel have integral collectors ground mounted next to the houses that were installed in the early 1990s. Another solar water heating system is planned for concrete block houses on base. The base also uses the power of the sun for PV street lamps.

MAINTENANCE AND AWARENESS

Personnel are assigned to designated floors and buildings and conduct a monthly inspection of AUTEK's buildings, looking for wasteful practices and needed repairs, such as air leaks and air conditioner problems, which are reported. Certain inspections are conducted on a daily basis, depending on need.

Water waste is another problem being tackled. AUTEK's water distribution system, aging prematurely in a high salt environment, has been losing an estimated 40,000 gallons per day. The highly absorptive coral ground structure of the island makes leaks difficult to detect or locate. Replacement of this system is underway, at a total cost of \$500,000, and is expected to save approximately \$115,000 per year when completed.

AUTEK strives to install a good sense of stewardship in personnel. AUTEK has its own multi-channel television system with one channel dedicated to facility news. There is an hourly energy and water conservation roll-over message that is changed weekly. In addition, energy reminders are included in each monthly issue of the base-wide general interest newspaper.

When AUTEK won the Secretary of the Navy Energy Award in November 1998 for its prior year's accomplishments in saving energy, the decision was made to spend the entire \$30,000 award on quality of life improvements. "Thirty thousand dollars wouldn't go very far for a large base like Camp Pendleton," explained Navy Commander S. G. Hyman, "but on a small base like AUTEK, \$30,000 goes a long way."

AUTEK Recreation Association (ARA) solicited suggestions from the basewide population and the



Due to the amount of sun that beats onto the AUTEK base, one of the primary concerns for the base was shading, which is provided by this gazebo.

results from this survey were used as the basis for allocating the \$30,000 award money.

The sun beats down relentlessly on the AUTEK base. It was only natural that the biggest demand was for shading. "Building tiki huts with thatched palm leaf roofs is a dying art on Andros Island," said the Commander. "Someone recommended a young man who had learned the art from the old master builders." The energy conservation program contacted this gentleman and hired him to build a large gazebo-style hut, as well as smaller, tiki huts for two beaches on base.

Award funds were also used to purchase 13 picnic tables that were placed under the huts. ARA chose picnic tables made of recycled plastic, which will not rot. "The only things that may need to be replaced on the recycled tables are the nuts and bolts," says Brenda Borton, ARA Recreation Specialist. "Plus, they're 600

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DOE, EPA Propose Clean Energy Incentives

The Department of Energy and the Environmental Protection Agency are working to provide greater incentives for companies to use clean energy technologies in their efforts to meet clean air regulations. Former DOE Assistant Secretary for Energy Efficiency and Renewable Energy Dan Reicher stated that the two agencies are looking at ways to give companies credit under the rules for investments in energy efficiency or clean energy technologies.

Speaking at the first meeting of the Federal Energy Management Advisory Committee, in October 2000, Reicher said currently the only way for industries to comply with clean air rules is to add more filters to their plants and smokestacks, which may hinder the plants' energy efficiency. "Federal and state environmental regulations have not been structured to foster investment in clean energy," Reicher said, adding that DOE and EPA aim to change that. EPA and DOE officials met in St. Louis late last year with state energy officials and utility regulators to discuss the concept.

The agencies are considering accepting energy-efficient practices in place of pollution reduction. For example, if a company pays for the weatherization of 10,000 homes instead of reducing pollution at its factory, the company could possibly get credit under the Clean Air Act. Right now, noted Reicher, "You can't collect a single sulfur credit if you invest in a wind farm."

For more information, contact Steve Huff of FEEMP at 202-586-3507 or steven.huff@ee.doe.gov.

NIH Engineer's Challenge to Traditional Ventilation Standards Save Energy

Farhad Memarzadeh, Ph.D., Chief of the Technical Resource Group and Senior Mechanical Engineer with the U.S. Department of Health and Human Services, National Institutes of Health (NIH), in Bethesda, MD, has performed extensive empirical and analytical research on the traditional ventilation standards for health and animal care facilities. His research findings have resulted in significant revisions to national and international design standards for such facilities that have improved patient care and research environments, increased the efficiency of heating, ventilating, and air-conditioning systems, and decreased energy consumption.

While reviewing the ventilation standards for health and animal care facilities, Dr. Memarzadeh questioned the high and somewhat arbitrary figure of 10 to 15 air changes per hour (ACH) for animal care facilities. He decided to conduct his own research, under the auspices of the NIH Office of Research Services (ORS), Division of Engineering Services (DES), to determine if these standards were optimal. His research showed that the actual ACH required when using static animal cages should only be 5 ACH to a maximum of 10 ACH. The reduction of air flow, on the average of 5 ACH, dramatically reduces energy consumption in laboratories that operate 24 hours per day at 100 percent fresh outdoor air requirements.

The *Guide for the Care and Use of Laboratory Animals*, published by the National Research Council, was revised to reflect Dr. Memarzadeh's findings. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) also has incorporated the findings in the *ASHRAE 1999 HVAC Applications Handbook* and the soon to be released *ASHRAE 2001 Fundamentals Handbook*. Other studies performed by Dr. Memarzadeh and the NIH/ORS/DES are being integrated into the *Guideline for Construction and Equipment of Hospital and Medical Facilities* that is currently under revision. This document is published by the American Institute of Architects and adopted by the Joint Commission on Accreditation of Healthcare Organizations.

Today, Dr. Memarzadeh continues his ground breaking research in bio-environmental engineering focusing on better indoor air quality and energy efficiency. His findings affect not only Federal facilities, but private industry as well, and are examples of the outstanding leadership and contributions of the Federal Government to not only energy conservation, but to higher quality indoor air standards and ultimately human comfort and safety.

To review several of Dr. Memarzadeh's publications visit the NIH Web site at <http://des.od.nih.gov/farhad/index.htm>. Dr. Memarzadeh may be reached at 301-496-8102.

NAVY DEVELOPS GREEN ISLAND PROGRAM TO IMPROVE BASE LIFE
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pounds a piece. They're definitely not going to blow away in a hurricane."

Some of the funds were used to build a shady playground for base families. Additionally, a new recumbent bicycle and step mill were purchased for the exercise room as were new wind screens for the tennis courts. Energy Award money was also used to buy two kayaks and six rental bikes. "The kayaks and bikes go out a lot," explained Borton. "The AUTEK personnel like to use them and take their guests out."

What is AUTEK up to now? AUTEK was a double winner in 2000 based on 1999 achievements: recipient of a 2000 FEMP Energy Efficiency/Energy Management Award to an Organization, and the winner of the 2000 Secretary of the Navy Energy Award in the Small Activity Category, again receiving a monetary award of \$30,000. "We achieved an even higher level of energy savings last year, than in 1997," says Ron Miller, Energy Program Manager. Stay tuned for additional quality of life improvements.

For more information, contact Ron Miller at 401-832-7010 or e-mail millerrf@npt.nuwc.navy.mil.

FEMP Announces New Energy Management Section of Utility Markets Restructuring Web Site

Federal agencies around the country, particularly in California and the West, are facing significantly higher electric rates due to high prices in the wholesale spot and forward markets, electric system reliability problems, and much higher gas costs this winter. Federal customers can manage their energy costs by reducing consumption, particularly during peak periods, through investments in high efficiency equipment, control systems to manage loads, and operational actions and strategies, which will support efforts underway in Western states to address the electricity crisis. To support these efforts, FEMP has expanded its utility markets Restructuring Web site and developed state-by-state summary information on energy efficiency and peak demand management programs offered by investor-owned utilities, administrators of public purpose programs, and state agencies, which can be found from the FEMP home page or directly at: www.femp-restructuring.org/. This site can help you locate much needed funding and/or technical assistance for energy efficiency and demand management projects as direct links are provided to utilities and state agencies that administer programs and offer services.

The information on state public purpose-funded energy efficiency programs is provided state by state in the following format.

- What are the public purpose-funded EE programs available in my state?
- What utility energy efficiency programs are available for me?
- What utility load management options are available for me?
- Are there EE programs sponsored by state government?
- Other sources where I could look for more information

Users can easily access information on programs that may be of particular interest to Federal customers in a specific state by clicking on the U.S. map or summary table. The summary table provided on the Web site highlights new programs and opportunities in each state as well as recent regulatory decisions or legislation that could significantly impact energy efficiency and demand management opportunities for Federal customers. FEMP plans to periodically update the energy management Web site so Federal agencies can keep abreast of new opportunities to leverage funds, obtain financial incentives and services, and participate in innovative energy management programs.

For more information, contact Brad Gustafson, FEMP Utility Program Manager, at 202-586-2204 or e-mail brad.gustafson@ee.doe.gov.

States Respond to High Electricity Prices and Reliability Concerns by Increasing Support for Energy Efficiency and Demand Response Programs

The prospect of significantly higher electricity and gas prices has Federal energy managers in many parts of the country straining to manage their energy costs within current utility budgets. Energy efficiency and demand response programs administered by utilities, state agencies, or Independent System Operators (ISO) provide significant opportunities for Federal customers to reduce consumption, particularly during peak periods, through investments in high efficiency equipment and control systems and operational strategies that can manage their loads. This article highlights recent activities in New York, California, and the Pacific Northwest (see *FEMP Focus*, September 2000 for initial article on public purpose energy efficiency programs).

- In January 2001, the New York Public Service Commission issued a decision that continued a public benefits fund for five more years and doubled funding levels to approximately \$140-150 million per year in order to provide customers with additional opportunities to respond to rising energy costs. The New York State Energy Research and Development Authority administers the energy efficiency programs.
- The California ISO has developed several demand response programs for 2001 in order to minimize or eliminate the need for involuntary rotating blackouts. Federal customers are eligible to participate directly as customers in the Demand Relief Program if they have at least one megawatt of demand reductions or work through a Load Aggregator (e.g., utility, retail energy service provider). The ISO will pay customers a monthly reservation payment of \$20,000 per megawatt each month to be available on weekdays between 11 a.m. and 7 p.m. from June 1 through September 30 to curtail load at the ISO request whether or not they are asked to curtail. Customers will also be paid \$500 per megawatt hour for the actual demand that they curtail. Curtailments are limited to 24 hours per month and customers must have an hourly interval meter. As an example of Federal leadership in this area, the General Services Administration has submitted a proposal to the California ISO for approximately 1.3 megawatts of savings through innovative demand limiting strategies at four GSA buildings. The ISO is also developing a Discretionary Load Curtailment program that will operate year-round and is designed to attract voluntary curtailments prior to emergency conditions from Load Aggregators. Federal agencies can be Load Aggregators or they can work through other entities such as utilities. The ISO would request curtailments on the day-ahead or day-of and pay participants between \$250 to \$500 per megawatt hour for demand reductions.
- Other ISOs, including the New England ISO and PJM ISO (Mid-Atlantic region), have also developed pilot demand response programs for Summer 2001 for Load Serving Entities, which include utilities and retail energy service providers. Federal customers should contact their local utilities and/or competitive suppliers in New England and the Mid-Atlantic region to find out about these programs, if they have discretionary loads that can be curtailed during system emergencies.
- The California Public Utilities Commission (CPUC) recently approved 2001 budgets and program designs for approximately \$275 million of energy efficiency programs administered by the three investor-owned utilities and programs. Programs that may be of particular interest to Federal customers include the statewide Standard Performance Contract program where financial incentives were included for both energy savings and peak demand reductions and contract terms were shortened with simpler measurement and verification requirements. Funding was expanded for the Express Efficiency program, which provides rebates for efficient equipment. The CPUC also directed the utilities to set aside 8 percent of their budgets or \$23 million for "third party initiatives" proposed by customers in response to solicitations issued by utilities; this may provide opportunities for Federal customers to propose innovative projects.
- In the Pacific Northwest, skyrocketing power costs in the wholesale electricity market and a tight supply/demand balance have led Bonneville Power Administration (BPA) to develop a pilot program called Demand Exchange that provides benefits to customers if they curtail load during system emergencies or volatile market conditions. BPA alerts customers to

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Get Recognized!

Designate Your Facility a Federal Energy Saver Showcase

To promote wise energy and water use throughout the Federal Government, agencies are showcasing cost-effective energy efficiency, water-conserving, and renewable energy technologies in their facilities. Since 1995, FEMP has recognized more than 70 facilities across the country as Federal Energy Saver Showcases. Each showcase site prominently displays a plaque notifying visitors that the Government building they are entering uses energy and water, as well as taxpayer dollars, wisely.

Showcasing facilities has many benefits, including:

- Increasing awareness of energy-efficient and renewable energy technologies applicable to all Federal facilities;
- Improving the quality of projects through design assistance to selected showcase facilities; and
- Recognizing agencies for their efforts.

FEMP is also prepared to help Federal agencies with their designated Federal Energy Saver Showcases. A limited amount of funding will be available for design assistance to maximize agency savings. Designs should be sent early — at the conceptual stage whenever possible — so that FEMP can make as significant a contribution as possible.

When selecting top projects, please consider the following criteria:

- The project achieves the goals of Executive Order 13123;
- Buildings receive a high level of non-Federal visitors;
- Features of a project are replicable; and
- Visitors can learn from site displays and implement similar projects.

In addition, many outstanding projects will likely be identified by the following:

- Creative financing methods or leveraging of funds;
- Use of a variety of technologies;
- Use of innovative technologies;
- Designation as an ENERGY STAR® Building; and
- Leadership in Energy and Environmental Design Certification.

Once again, FEMP urges agencies to identify and designate their very best projects, or potential projects, so that others may benefit by example. The showcase designation form on pages 19 and 20 must be completed and returned to Trina Brown, FEMP Showcase Coordinator, at the fax number or mailing address included at the end of the form.

For additional information concerning 2001 Federal Energy Saver Showcases, contact Trina Brown of NREL-FEMP at 303-384-7518, trina_brown@nrel.gov.

STATES INCREASE SUPPORT FOR ENERGY EFFICIENCY AND DEMAND RESPONSE PROGRAMS

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- hour ahead, one and two-day ahead price signals, customers indicate their willingness to participate through an Internet-based Web site, and then BPA aggregates load reductions from individual customers and offers them in the wholesale market.
- Energy efficiency programs and budgets are also increasing in the Pacific Northwest. BPA has announced that they will acquire approximately 150 average megawatts of conservation during the 2002-2006 period in order to augment their expected power supply needs. The Oregon Public Service Commission recently approved the formation of a non-profit corporation with a Board of Directors that will ultimately administer approximately \$30 million per year of public purpose energy efficiency programs.

FEMP monitors and summarizes these innovative programs; state-by-state information on energy efficiency and demand response opportunities available to Federal customers can be found on the FEMP restructuring web site (www.femp-restructuring.org).

For more information, contact Chuck Goldman, 510 486-4637, or e-mail cagoldman@lbl.gov.

Federal Energy Saver Showcase
Designation Form | 2001

-- Submit By 3/1/01 --

www.eren.doe.gov/femp/successstories.html

Step 1: Tell us about yourself and the facility you're nominating.

Agency Name: _____

Applicant's Name: _____

Applicant's Title: _____

Mailing Address: _____

City, State, Zip: _____

Phone: _____ Fax: _____

E-mail: _____

Building Name: _____

Square Footage: _____

Location/Address: _____

Contact at Facility: _____

Phone: _____ Fax: _____

E-mail: _____

Secondary Contact: _____
(If Facility Contact same as Applicant)

Phone: _____ Fax: _____

E-mail: _____

How many Federal Energy Saver Showcase Facilities has your agency designated?

This is the first Less than 5 More than 5

Did this project receive funding from FEMP's 1998 or 1999 Renewable Energy Hardware Grants? If so, what year? _____

Step 2: Tell us about the energy-efficiency project implemented.

Provide a Brief Project Description/Overview: _____

List the Types of Technologies used: _____

Step 3: Estimate project energy savings.

What are the savings from implementing this project? _____ kWh/year

What was your annual facility energy consumption prior to implementing this project? _____ kWh/year

Percent Savings = (A) ÷ (B) x 100 = _____ %

Please tell us which FEMP courses (if any) you've participated in:

Step 4: Provide us with additional information about this project and facility.	
<p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Was this project funded through an ESPC or Utility Contract?</p> <p>Did this project involve any sustainable design concepts or strategies?</p>	<p>Please describe: _____</p>
<p><input type="checkbox"/> Is this a renewable energy project?</p> <p><input type="checkbox"/> Do you purchase electricity from any renewable energy sources?</p> <p><input type="checkbox"/> Does this project involve water conservation?</p>	<p>If yes, what type(s) of renewables? <input type="checkbox"/> Solar <input type="checkbox"/> Geothermal <input type="checkbox"/> Wind <input type="checkbox"/> Biomass <input type="checkbox"/> Passive Solar Design Other: _____</p> <p>If yes, what percentage of your facility energy comes from energy sources? _____</p> <p>If yes, what type(s) of water conservation? <input type="checkbox"/> O&M <input type="checkbox"/> Low-flow fixtures <input type="checkbox"/> Equipment Replacement Other: _____</p> <p>How much water is saved? _____ kgal/year How much does your water cost on site? _____ \$/kgal</p>
<p><input type="checkbox"/> Does your project reduce greenhouse gas emissions?</p> <p><input type="checkbox"/> Is this facility an industrial or laboratory facility?</p> <p><input type="checkbox"/> Was this project identified as the result of an energy or water audit or renewable energy screening completed for the site?</p> <p><input type="checkbox"/> Does this facility receive a large number of nonfederal visitors each year?</p> <p><input type="checkbox"/> Do you plan to replicate this project within your agency?</p> <p><input type="checkbox"/> Does this project meet the requirements of the Million Solar Roofs (MSR) initiative? (see http://www.eren.doe.gov/millionroofs/)</p> <p><input type="checkbox"/> Has this facility been labeled as an Energy Star Building? (see http://www.epa.gov/buildings/esbhome/)</p> <p><input type="checkbox"/> Does this facility have a LEED Rating? (see http://www.usgbc.org/programs/leed.htm)</p>	<p>If so, how much reduction is achieved? Carbon: _____ tons/year* (*see http://www.eren.doe.gov/femp/aboutfemp/countguide.html)</p> <p>If yes, who provided the audit/screening? <input type="checkbox"/> FEMP <input type="checkbox"/> Other: _____</p> <p>If yes, approximately how many? _____</p> <p>If so, briefly describe your replication plan: _____ _____ _____</p> <p>If so, what is the rating? <input type="checkbox"/> Bronze <input type="checkbox"/> Silver <input type="checkbox"/> Gold <input type="checkbox"/> Platinum</p>
Step 5: Provide any supplementary information.	
<p><i>Please forward any other materials applicable to your project (designation letter, design plans, project summary, press release, photos, etc.) with this application form.</i></p>	
Step 6: Return the completed application by 3/1/01 via fax or mail.	
<p>Fax: Trina Brown NREL FEMP (303) 384-7411</p>	<p>Mail: NREL, Attn: Trina Brown 1617 Cole Blvd., MS 2723 Golden, CO 80401</p>

Huntsville Center Awards Millions in ESPC Contracts

Where can you go to get infrastructure improvements and new, energy-efficient equipment when funding is scarce? One place besides the DOE Super Energy Savings Performance Contract program (ESPC), is the U.S. Army Engineering and Support Center, Huntsville, AL. Since September, Huntsville Center has awarded \$51.4 million in contractor-funded projects under its ESPC Program. ESPC contractors fund and provide energy-efficient infrastructure improvements and maintain them in exchange for a portion of the energy savings realized.

The Huntsville ESPC Team currently serves 48 customers, including all the Military Services, the Defense Logistics Agency, and the Department of Veterans Affairs. Twenty-one Huntsville Center staff comprise the ESPC Team. Recently, the ESPC Team earned the Project Delivery Team Merit Award, a third place award for fiscal year 2000, at the Corps of Engineer's Project Delivery Team Conference in November. "For every dollar that the ESPC team receives from customers, we generate an average of \$40 in ESPC contractor-funded investment. That is a phenomenal return on investment," explains Sally Parsons, ESPC program manager.

The facilities benefitting from the latest contractor-funded projects are West Point, NY, Fort McPherson and Fort Gillem, GA, Fort Richardson, AK, Fort Bragg, NC, Fort Polk, LA, and Marine Corps Base, HI.

A \$788,000 phase 1 task order was awarded to NORESKO for the U.S. Military Academy at West Point. Under the final project, NORESKO will replace boilers, remove fuel oil tanks, and install a natural gas pipeline.

Huntsville Center made two modifications totaling almost \$860,000 to add projects to existing ESPC task orders for Fort McPherson and Fort Gillem. The first \$262,000 modification was awarded to Systems Corporation and involves the installation of paralleling switchgear for stand-by generation in the U.S. Army Reserve Command Headquarters building located at Fort McPherson. The second \$597,000 modification was awarded to ERI Services and includes the installation of direct digital controls in 31 buildings at Fort McPherson and four buildings at Fort Gillem.

A \$25 million task order was awarded to Honeywell for Fort Richardson. The Corps' Alaska District provided project management, cost estimating, and technical support. The project requires decentralization of the central plant and installation of stand-alone gas-fired boilers and domestic hot water heating equipment in 73 buildings. Honeywell will also install building management and controls systems in 72 buildings.

Huntsville Center awarded six additional projects totaling \$20 million to a task order with Honeywell for Fort Bragg. A \$1.4 million project was added involving lighting, heating, controls, and compressor improvements in the Materiel Maintenance Division. The next modification combines three projects totaling \$5.4 million. The first project calls for lighting, controls, and cooling system improvements and electrical peak shaving in the Security Operations Training Facility. The second project calls for efficiency improvements to lighting systems, heating, ventilation, and air conditioning systems, and control systems in the 82nd Division and the Main Post areas. The third project

gives Fort Bragg a method for determining which areas are consuming the majority of its energy. This phase 1 metering project involves installing meters for selected users and central plants. Additionally, this project will establish the backbone architecture for an Energy Information System (EIS). The EIS allows authorized users to monitor and control energy usage. This metering project allows Fort Bragg to manage energy costs and make modifications that will help achieve additional savings in the future. The most recent additions are two projects totaling \$13 million. The first project adds phase 2 metering. The second project involves improvements to heating, cooling, and control systems in two areas.

A \$4 million task order was awarded to Johnson Controls for Fort Polk. This project involves lighting retrofits, motor replacements, variable air volume conversion, utility monitoring control system installation, cooling system upgrades, building envelope improvements, and water conservation measures.

Huntsville Center awarded its fifth task order for Marine Corps Base Hawaii to NORESKO. Honolulu District will provide quality assurance, safety, and inspection support. The \$731,000 project involves replacement and retrofit of more than 8,600 lighting fixtures in 160 buildings in Kaneohe Bay. In addition, lighting control systems, daylight, and traffic signal LEDs will be implemented to maximize energy savings.

For further information, contact Sally Parsons, ESPC Program Manager, at 256-895-8233 or Sally.B.Parsons@HND01.usace.army.mil.

Changes to Congressional Notification for ESPC Projects

Congressional Notification for ESPC Projects has been Changed from \$750,000 to \$10 Million

Department of the Interior and Related Agencies Appropriations Act 2001 amends the *National Energy Conservation Policy Act* to change one of the conditions under which Federal agencies may enter into Energy Savings Performance Contracts. The law contains language raising the threshold for required Congressional notification by Federal agencies entering into an ESPC from \$750,000 to \$10 Million. This change eliminates an unintended, but longstanding barrier to their more widespread use.

The previous legislative language included in the ESPC Procedure and Methods (10 CFR 436) did require Congressional notification as follows:

10 CFR 436.34(a)(3) states that 30 days before the award of any multi-year ESPC that contains a clause setting forth a cancellation ceiling in excess of \$750,000, the head of the awarding Federal agency gives written notification of the proposed contract and the proposed cancellation ceiling for the contract to the appropriate congressional authorizing and appropriating committees.

Congress must receive notification of the project and be given a minimum of 30 days to respond. If Congress does not respond within the 30-day period, the agency may proceed with awarding the contract. Again, please note that it is strictly a notification matter.

Preparing a Congressional notification can take many months depending on the internal agency Congressional communication policy. Receiving upper management approval on the notification can be a time-consuming process of explaining the project, reiterating the authorities behind the ability to do the project, and explaining the Congressional notification process.

After approval has been received and the notification has been sent, the 30-day waiting period begins. All in all, in FEMP's experience, this entire process could take anywhere from 1 week to more than 6 months to complete. That is why FEMP urges agencies involved in implementing an ESPC to begin the congressional notification process as early as possible.

For more information please go to www.eren.doe.gov/femp/financing/espc_intro.html or submit your questions via e-mail to Tatiana Strajnic at tatiana.strajnic@ee.doe.gov.

Q&A

When should I initiate the Congressional notification for projects with a cancellation ceiling over \$10 million?

The Congressional notification should be processed as soon as possible. After the energy service company completes its detailed energy survey and submits a revised proposal, you will be able to determine a maximum delivery order price to initiate the letter. Prior to receiving the ESCO'S revised proposal, and to help expedite the notification process, you may want to coordinate with personnel in the Congressional notice concurrence chain established for your agency and explain the ESPC process and the statutory requirement for the notification. By acting quickly you can avoid delays in the delivery order process which can result from the agency Congressional correspondence process.

I am trying to decide between using a Super ESPC or a utility service contract. What do I do?

When weighing the pros and cons of Super ESPCs review the information on FEMP's Web site under Alternative Financing –www.eren.doe.gov/femp/financealt.html. Second, ask for a briefing from your DOE Regional Office FEMP representative. Third, attend the ESPC workshop and/or utility workshop. Both Super ESPCs and utility service contracts have particular strengths and weaknesses. It is important when using any method that the energy management professional understand the project objectives and financing alternatives.

What questions do you need answered? FEMP wants to provide the most useful information possible, but we need your help to achieve this! Please submit your questions via e-mail to Tatiana Strajnic, at: tatiana.strajnic@ee.doe.gov.

Low-Energy, Sustainable Building Design Course

As a Federal project manager, architect, or engineer designing new facilities, are you getting the assistance and resources you need to comply with Executive Order 13123, *Greening the Government Through Energy Efficient Management*? Do you need more information to be part of Government-wide efforts to incorporate a 'whole-building' approach to design that can save energy and operating costs, provide healthier indoor environments, and protect natural resources? FEMP can help. FEMP continues to offer training on *Low-Energy, Sustainable Building Design for Federal Managers*, and now provides two different training formats to meet your needs.

Classroom Workshop:

Once again, FEMP will offer the traditional workshop – two days of instruction from four of the country's experts in sustainable building design and building energy use. In 2001, workshops are scheduled in Washington, DC, April 26-27, and June 21 and 22 in Atlanta, GA.

Internet Course:

Can't travel to these locations this year? FEMP is pleased to announce the first Web-based version of *Low-Energy, Sustainable Building Design for Federal Managers*. The course was developed to capture some of the experience of the classroom course by providing a slide show for each of the 12 "tutorials" and a forum for interaction with the instructors and other participants. Participants may begin the course whenever they choose after registering and receiving the Web address and may take up to 3

months to complete the 12 tutorials. Instructors will be available to answer questions through E-mail. After completing a final examination and evaluation form, participants will receive a certificate of course completion.

Course Contents:

Low-Energy, Sustainable Building Design for Federal Managers provides information about sustainable, energy-efficient design strategies, contracting for A/E services, and achieving compliance with Executive Order 13123 and other "Greening the Government" mandates. Buildings designed with an integrated approach use significantly less conventional energy, make more effective use of renewable energy (such as PV and solar hot water), incorporate recycled and recyclable building materials, and minimize construction waste. All Federal building types are good candidates for low-energy, sustainable design – office buildings, visitors' centers, courthouses, barracks, warehouses, border stations, and prisons.

The Web course is organized into 12 tutorials and includes slide presentations and links to related Web sites such as the Whole Building Design Guide and the U.S. Green Building Council's LEED™ Rating System. The tutorials focus on the integration of architectural features and high-performance equipment using specific energy-efficient strategies. Participants learn techniques for designing sustainable, climate-responsive, "green" buildings that combine daylighting, natural ventilation, passive solar heating, energy-efficient lighting/systems/materials, and HVAC control strategies. The

course also helps participants gain a more thorough understanding of water conservation, low-VOC building materials, indoor environmental quality, site issues, cost-effective design and consulting services, Super Energy Savings Performance Contracts, and green power procurement.

Course Instructors:

William Bobenhausen, FAIA - Senior Associate with *Steven Winter Associates, Inc.*, an A/E consulting firm specializing in cutting-edge building technology.

Joseph Bourg - President of *Millennium Energy LLC*.

Catherine Coombs, CIH, CSP - Director of Environmental Hazards Research for *Steven Winter Associates, Inc.*

Donald Prowler, FAIA - Principal and President of Donald Prowler & Associates, an architecture and consulting firm specializing in ecologically sound and energy-efficient design.

Course Fee:

\$75 includes the comprehensive resource book, *Low-Energy, Sustainable Building Design for Federal Managers*, which covers all the material in the tutorials and much more to help you comply with Executive Orders and set an example for sustainable building design.

How to Sign Up:

Contact the Sustainable Buildings Industry Council (SBIC), 202-628-7400, or register online at www.sbicouncil.org.

Plan Now for March Teleworkshop

FEMP's free revised "Energy Management Telecourse" will take place March 6, 13, and 20. Each 4-hour broadcast will be comprised of two 2-hour modules, consecutively as follows: Life-Cycle Costing (Basic) and Buying Energy-Efficient Products; O&M Maintenance Management and Water Resource Management; and Energy Savings Performance Contracting and Utility Project Financing. Additionally, there will be training on associated Web instructional material. Register now at <http://energyworkshops.org/femp>, or call 865-777-9869. If you need help finding a downlink location or if you wish to sponsor a downlink site, please send an email to hbs@icx.net or call Heather Schoonmaker at 865-777-9869.

Energy 2001 Sign up Now!

June 3-6, 2001
Kansas City, MO

Early bird registration ends March 31, 2001.
Visit our Web site at www.energy2001.ee.doe.gov.



Correction to Distributed Energy Resources Project and Workshop article in November/December *FEMP Focus*

1. Proposals are due March 16, 2001, instead of March 7. For more information on FEMP's call for FY2001 DER projects, visit www.eren.doe.gov/femp/newsevents/callforDER.html.



FEMP Training Reminders

Revised Energy Management Telecourse

www.energyworkshops.org/femp/
865-777-9869

Part 1: EO 13123 Updates; Life-Cycle Costing - Basic; Buying Energy Efficient Products

March 6

Part 2: Operations and Maintenance Management; Water Resource Management

March 13

Part 3: Energy Savings Performance Contracting; Utility Project Financing

March 20

GLOBALCON 2001 (FEMP Symposia)

March 29-30
Atlantic City, NJ
703-243-8343
www.aeecenter.org

Water Resource Management

April 10-11
Albuquerque, NM
509-372-4368

Electric Utility Restructuring and Utility Project Financing Workshop

April 10-11
Washington, DC
703-243-8343

Solar Energy Forum (FEMP Symposia)

April 23-25
Washington, DC
703-243-8343

Designing Low Energy Sustainable Buildings

April 26-27
Washington, DC
202-628-8343

New Building Life-Cycle Cost Software Now Available



Executive Order 13123, *Greening the Government through Efficient Energy Management*, mentions life-cycle costing 26 times. The Order directs Federal energy managers to base all investment decisions for energy and water conservation, renewable energy projects, or sustainable building design, on lowest life-cycle cost as it is defined in 10 CFR 436A and OMB Circular A-94. A great aid for performing life-cycle cost (LCC) analyses are the Building Life-Cycle Cost programs, BLCC4 and BLCC5, developed and supported by the National Institute of Standards and Technology under FEMP sponsorship. The BLCC4 program has been used extensively for almost 25 years by Government and private-sector analysts. Recently a new, Windows-like version of BLCC has been released. BLCC5 maintains the basic approach to computer-supported LCC analysis that was developed for BLCC4 and follows the LCC standard of the American Society for Testing and Materials. But its graphical user interface and new LCC engine make it a much more modern and flexible program than the DOS-based BLCC4.

BLCC5 is user- and Web-friendly. It uses the conventions that energy managers are familiar with from other Windows-based programs for inputting cost data and for navigating the screens. All help is on-line, either in screen-specific "tips" or under the HELP menu. Because BLCC5 is programmed in Java, it can be used with any operating system. You can download it free of charge from the FEMP Web site at www.eren.doe.gov/femp. Click on Technical Assistance and Analytical Software Tools.

Version BLCC5.0 contains two modules for performing energy- and water-related LCC analyses for Federal buildings, one for agency-funded projects and one for projects financed through ESPCs or utility contracts. The remaining modules that are now in BLCC4 will be reprogrammed into BLCC5 over the next few years. NIST will continue to support BLCC4 until all its modules are transferred to BLCC5. BLCC5, like BLCC4, will be updated every year on April 1 with the current discount rates and energy price projections.

The screen shot in figure 1 on page 26 shows the tree structure of the inputs required by BLCC5.0. The hierarchical list serves as a guide and checklist for entering the cost items and other project information in the adjacent frames.

In figure 2, an excerpt from the Comparative Analysis Report shows the present-value LCC for a base case and an alternative. In addition to lowest LCC, the program calculates Net Savings, the Savings-to-Investment Ratio, Internal Rate of Return, and Payback Period for each alternative compared with the base case. It also gives you a summary of energy savings and emission reductions. Emission factors can be customized by project location or fuel end use. For financed projects, the report also compares year by year non-discounted contract payments with savings from the alternative. Five additional reports thoroughly document the analysis for you.

For more information or to register for BLCC workshops, please go to the FEMP Web site at www.eren.doe.gov. For further information on the LCC methodology or the BLCC programs, please contact Linde Fuller at sieglinde.fuller@nist.gov or Amy Boyles at amy.boyles@nist.gov.

Figure 1. Typical input screen in BLCC5

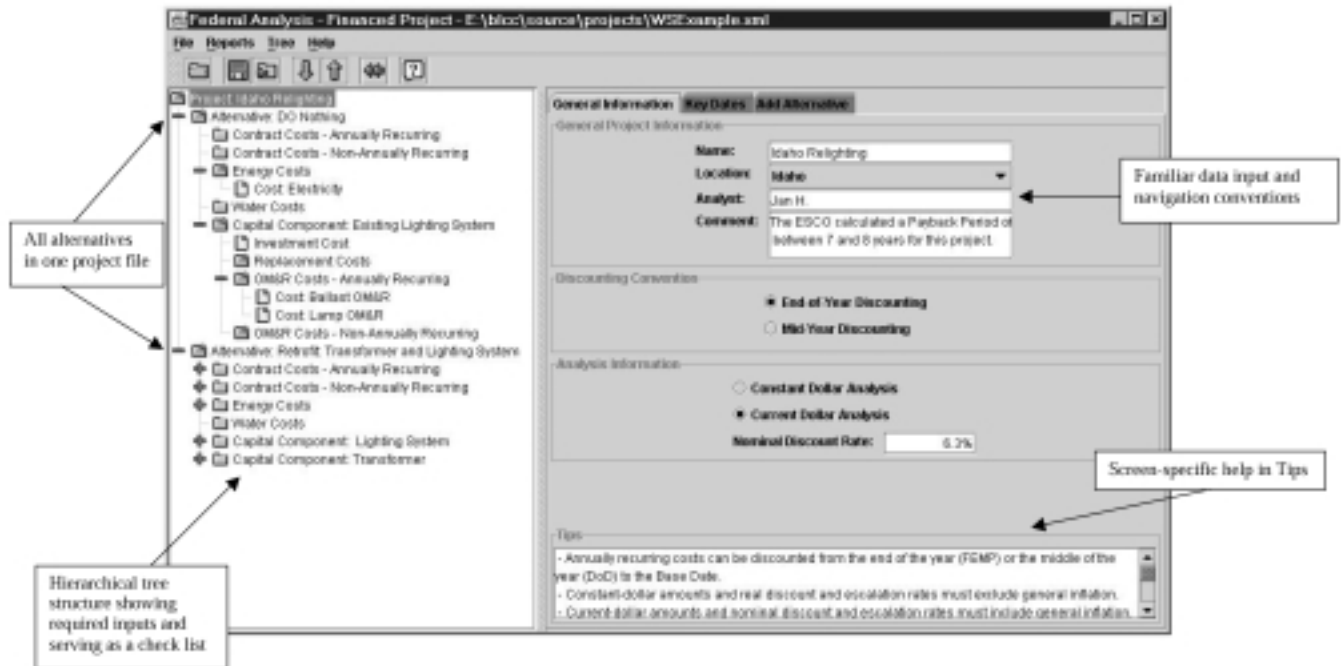


Figure 2. Excerpt from Comparative Analysis Report

Comparative Analysis Report

File

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative	
Initial Investment Costs Paid By Agency:				
Capital Requirements as of Base Date	\$0	\$0	\$0	
Future Costs:				
Recurring and Non-Recurring Contract Costs	\$0	\$463,879	-\$463,879	
Energy Consumption Costs	\$822,018	\$372,060	\$449,957	
Energy Demand Charges	\$191,804	\$170,049	\$21,755	
Energy Utility Rebates	\$0	\$0	\$0	
Water Costs	\$0	\$0	\$0	
Recurring and Non-Recurring O&M&R Costs	\$861,220	\$688,976	\$172,244	
Capital Replacements	\$0	\$0	\$0	
Residual Value at End of Study Period	\$0	\$0	\$0	
	-----	-----	-----	
Subtotal (for Future Cost Items)	\$1,875,041	\$1,694,964	\$180,077	
	-----	-----	-----	
Total PV Life-Cycle Cost	\$1,875,041	\$1,694,964	\$180,077	
Net Savings from Alternative Compared with Base Case				
PV of Operational Savings		\$643,956		
- PV of Differential Costs	\$463,879			

Net Savings		\$180,077		
NOTE: Meaningful SIR, AIRR and Payback can not be computed for Financed Projects.				
Comparison of Contract Payments and Savings from Alternative (undiscounted)				
	Savings in	Savings in	Savings in	Savings in
Year Beginning	Contract Costs	Energy Costs	Total Operational Costs	Total Costs
Nov 2000	-\$16,940	\$6,604	\$16,912	-\$26
Nov 2001	-\$37,400	\$26,707	\$37,335	-\$65
Nov 2002	-\$44,000	\$33,850	\$44,807	\$807

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LBNL:	Lawrence Berkeley National Laboratory
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ORNL:	Oak Ridge National Laboratory
PNNL:	Pacific Northwest National Laboratory
SNL:	Sandia National Laboratories

The *FEMP Focus* is published bimonthly by the Federal Energy Management Program of the U.S. Department of Energy/Office of Energy Efficiency and Renewable Energy.

If you are making projects happen at your Federal facility, FEMP would like to hear from you. Please submit project descriptions to Annie Haskins at the address listed below. You will be contacted for additional information if your project is selected to be featured in a future edition of the *FEMP Focus*.


Address mail to:
Attn: FEMP Focus
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U.S. Department of Energy, EE-90
1000 Independence Avenue, SW
Washington, DC 20585-0121
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annie.haskins@hq.doe.gov



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 Printed on recycled paper with soy ink.

**U.S. DEPARTMENT OF ENERGY
FEDERAL ENERGY MANAGEMENT PROGRAM, EE-90
WASHINGTON, DC 20585-0121**

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