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Executive Order 13123: Opportunities and Challenges for Solar and Renewable Energy

By Nancy Carlisle, Federal Energy Management Program Team, National Renewable Energy Laboratory

A new Executive Order titled "Greening the Government Through Efficient Energy Management" clearly states that renewable energy technologies will play an important role in helping the government achieve national goals for a healthier environment through the use of clean energy systems.

Executive Order 13123, issued on June 3, 1999, reenergizes the Federal government's commitment to installing more solar and renewable energy systems in its facilities and establishes target numbers and dates for solar installations. The order states:

Each agency shall strive to expand the use of renewable energy within its facilities and in its activities by implementing renewable energy projects and by purchasing electricity from renewable energy sources. In support of the Million Solar Roofs initiative, the Federal Government shall strive to install 2,000 solar energy systems at Federal facilities by the end of 2000, and 20,000 solar energy systems at Federal facilities by 2010. (Sec. 204)

This Executive Order tasks the Secretary of Energy, in collaboration with other agency heads, with setting goals for energy generated at Federal facilities by renewable energy technologies. It also reemphasizes the Administration's position on the long-term

benefits of renewable energy. The challenge now for the government's Renewable Energy Working Group (RWG) and other supporters of renewables is to ensure that these technologies are strongly recommended as tools to assist agencies in carrying out the primary quantitative directives of the Executive Order. These directives include the following:

- Each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30% by 2010 compared to such emissions levels in 1990. (Sec. 201)
- Each agency shall reduce energy consumption per gross square foot of its facilities, excluding facilities covered in section 203 of this order, by 30% by 2005 and 35% by 2010 relative to 1985. (Sec. 202)

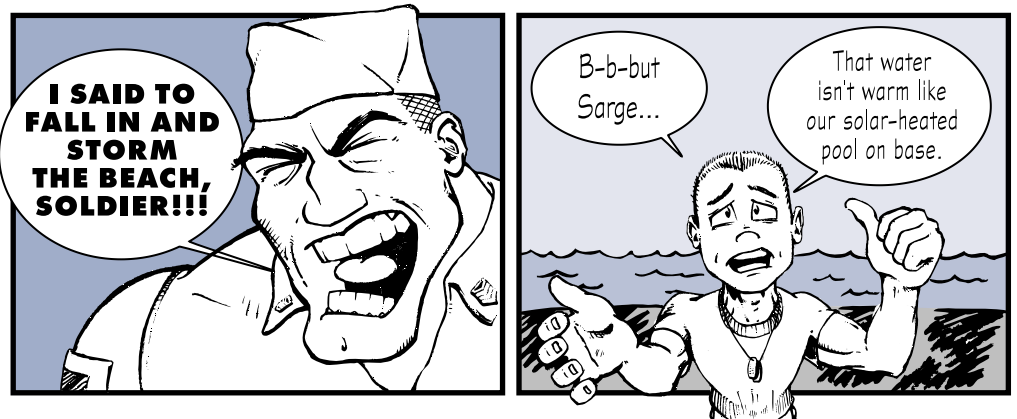
The Executive Order identifies the use of renewable energy technologies as a priority and key strategy for achieving the government's primary goals. It directs agencies to incorporate renewables into their projects in the following ways:

- Where appropriate, agencies shall consider the life cycle costs of combinations of projects, particularly to encourage bundling of energy efficiency projects with renewable energy projects. (Sec. 401)

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U.S. Department of Energy
Federal Energy Management Program



Solar-heated swimming pools save energy and money, but they might have one slight disadvantage.

Fort Hood Turns On Solar-Powered Lights

By Jim Wollam, Solar Outdoor Lighting, Inc.

The largest installation of solar outdoor lighting in the world is now up and running in an area that demands the highest level of security and reliability: Headquarters, III Corps, and Fort Hood, the largest Army base in the United States.

Located in Killeen, Texas, Fort Hood needed lighting for parking lots along a six-mile stretch of main roadway adjacent to troop barracks, training buildings, and other key areas. So a project team was formed that included staff from the Department of Public Works, the Fort Hood Energy Management Team, and the Corps of Engineers. They concluded early on that lighting for this internationally important defense facility presented several unique challenges.

First, they needed reliable units that would provide the kind of lighting that meets the security and safety needs of the facility. Second, they needed to find ways to reduce energy consumption and costs, a goal that was reiterated in President Clinton's most recent Executive Order on energy use in government facilities.

"A great deal of money is involved in putting in conventional electric light systems,



Jim Wollam, Solar Outdoor Lighting, Inc./PIX07841

Solar-powered lights are featured in parking areas at Fort Hood, Texas.

so we tested solar lights," said Colonel Richard Craig, Director of Public Works.

With funding provided by the Department of Defense Federal Energy Management Program, the first 20 solar-powered lights were installed in 1997. Solar Outdoor Lighting, Inc. (SOL), located in Stuart, Florida, was selected to supply the lights in part because of its experience in providing solar lighting to Federal agencies, because its products are UL-listed, and because the company is on a General Services Administration (GSA) Federal Supply Schedule.

The initial installation was successful, and SOL received the go-ahead to deliver more than 150 additional units. The units now provide more than 30 kilowatts of solar power to light up a six-mile stretch of main road running through Fort Hood. To meet the installation schedule set by the facility, the project was completed in just 90 days in late 1998.

The model selected was the SOL PM 150. This unit includes two 77-watt PV arrays, two 80 amp-hour batteries, and one 36-watt fluorescent bulb in a standard cobrahead fixture. The light output of the unit, which meets IES (Illuminating Engineering Society of North America) standards, was increased by the addition of an anodized aluminum reflector in the cobrahead.

One noteworthy feature of the SOL 150 is the aluminum pan covering the bottom of the solar panels. This pan protects the units from the damage that can be caused by the severe windstorms that are a common weather hazard in central Texas.

The units were installed on standard galvanized steel poles with fixture-mounting heights of 20 feet. Each unit is independent and self-contained, which eliminates the need for costly trenching, repaving, conduit, transformers, and electrical hook-ups. Using solar radiation data developed at the National Renewable Energy Laboratory, the systems are sized to operate from dusk to dawn every day, and they include batteries that allow the lighting to work effectively for up to five days without solar input.

This new solar lighting installation is meeting Fort Hood's need to address concerns about security and more efficient energy use. An analysis of the installation suggests that the project will result in significant energy cost savings over its lifetime, which is estimated to be more than 20 years. In addition, the installation will reduce emissions of carbon dioxide (a greenhouse gas) by thousands of metric tons, as well as emissions of sulfur dioxide and nitrous oxides, over the life of the project.

Solar-powered lighting is used at government facilities throughout the United States and abroad. These include facilities of the National Park Service, NASA, the Coast Guard, the Navy, the Air Force, and the Marine Corps as well as the Army.

For more information, contact Robert Kennedy, Fort Hood, 254-287-8774, (kennedyr@hood-emh3.army.mil) or Jim Wollam, SOL, 800-959-1329 (jwollam@solarlighting.com). ■



Jim Wollam, Solar Outdoor Lighting, Inc./PIX07840

The solar lighting installation at Fort Hood is the largest of its kind in the world.

Department of the Interior Leads the Way in Renewable Energy Installations

By David Guthrie, Energy Coordinator, U.S. Fish and Wildlife Service; John Moresko, Energy Coordinator, U.S. Department of the Interior; and Kent Bullard, Maintenance Supervisor, Channel Islands National Park, California

How can you reduce the use of fossil fuels, emissions of greenhouse gases, and energy maintenance costs all at once? And how, at the same time, can you solve logistical problems and free up resources for other priorities? One sure way is to tap into renewable energy resources. The Department of the Interior, a leader among government agencies in the use of renewable energy, is doing just that.

Historically, in the remote areas where Interior stations personnel and equipment, electric power has been supplied by diesel generators or a distant electric grid. The ship-to-shore fuel transfers needed to supply fuel to island generators have posed both logistical and environmental challenges. And electric power lines are expensive and aesthetically intrusive. Fortunately, a growing interest in sustainability has opened the door to new renewable energy installations in many remote, environmentally fragile areas.

Interior owns and operates more than 34,000 buildings and many other facilities. They serve 380 million visitors annually and provide schooling for 53,000 Native American children. Interior has also implemented many successful renewable energy projects, including several designated as "energy showcases" by the Department of Energy.

Interior's U.S. Fish and Wildlife Service has installed seven ground-source (geothermal)

heat pump systems as well as several off-shore photovoltaic (PV) systems like the one at Farallon National Wildlife Refuge (NWR) in California. One of three USFWS energy showcases is the National Conservation Training Center in West Virginia, a large, rural campus of 16 farm-like buildings. This Presidential Design Award contender, with its many passive solar features, is Interior's best example of "green" building construction.

The national parks, especially in the western United States, provide some spectacular backdrops for PV energy systems. Most of the 30 major PV systems in National Park Service facilities range in output from 5 to 20 kW. The largest system is a 145-kW PV array at Dangling Rope Marina (another energy showcase) in Utah's Glen Canyon National Recreation Area.

But the best example of Interior's use of a variety of renewable energy and energy efficiency technologies is found on the five Channel Islands off the coast of southern California. The 59 energy systems either installed or planned there include 29.5 kW of PV, 21.5 kW of wind power, and several energy efficiency technologies. They are replacing about 36,000 gallons per year of diesel fuel, a 94% reduction.

At the Bureau of Reclamation's Leadville Mine Drainage Tunnel Water Treatment Facility near Leadville, Colorado, a new

(Continued on p. 6)



John Lovgren/PIX07920

The Block Island Post Office PV system

Block Island Post Office Goes Solar

By John Lovgren, U.S. Postal Service District Environmental Coordinator

At the Block Island Post Office in New Shoreham, Rhode Island, a 6-kW photovoltaic (PV) energy system, designed to provide nearly half the facility's electricity, is coming on line in the summer of 1999.

This new PV system includes a 54-kWh battery backup that will provide up to three days of power in the event of a major power failure. The batteries will also be used to provide power during periods of high demand (peak shaving). The grid-connected PV system will also have a net metering capability; any excess power it generates can be sold back to the Block Island Power Company (BI Power).

This project was a cooperative effort involving people both within and outside the U.S. Postal Service (USPS). It required commitment, persistence, and teamwork.

For example, the Block Island Post Office is in a leased facility and is situated in the center of the community's historic district. These factors made it somewhat difficult to get approval to install a major new energy system. But the supporting factors far outweighed the difficulties:

- The island has one of the highest utility rates in the country, about 28–33 cents per kilowatt-hour (including demand charges), so utility customers are understandably seeking ways to reduce their use of conventional power.
- Block Island is prone to experiencing sporadic power failures that tend to wreak havoc on the facility's computer and automation equipment. The PV

(Continued on p. 6)



Kent Bullard, National Park Service/PIX05426

A hybrid wind/PV energy system powers the ranger station on San Miguel Island in Channel Islands National Park, off the coast of California.

New Photovoltaic Systems Installed at Five BLM Field Stations

By Trent Duncan, Utah State Office, Bureau of Land Management

Bureau of Land Management (BLM) employees assigned to five remote field stations are now enjoying the benefits of clean, quiet electric power, thanks to the new photovoltaic (PV) energy systems recently installed at their facilities.

The PV systems were installed at stations in Arizona, California, Utah, Idaho, and Alaska; they were the featured items in a standardized design process developed by a partnership between the BLM and the Photovoltaic Systems Assistance Center at Sandia National Laboratories. Sandia's Hal Post and Mike Thomas provided BLM staff with invaluable assistance in assessing facilities, standardizing the design process, developing specifications, reviewing contractor submittals, and preparing operation manuals.



Dave Lochtefeld/PIX07959

The power center, inverter and battery installation at Chimney Peak are typical of those at all five facilities.

The design process included site assessments at each facility. These assessments also involved meeting with the facility's staff to identify heating and cooling loads and potential conservation measures. Typical conservation measures included using compact fluorescent lamps, daylighting, and propane-powered refrigeration, heating, and cooking.

The Sandia-BLM partnership developed a standardized (i.e., virtually off-the-shelf) PV system design for use at field stations. The

standardized hardware included Solarex MSX 64-watt modules, a Pulse Power Center, Trace SWXX48 inverters, and valve-regulated lead-acid batteries. The system size needed can be determined on the basis of site loads and past experience with similar facilities (see the table on p. 5).

All five systems were obtained under a single procurement request. The standardized system specifications can be found in the publication *Renew the Government*; call Hal Post at Sandia, 505-844-2154, for more information, or see the publication online at <http://www.sandia.gov/pv/lib/PVBOOK.PDF>.

The system provider, selected on the basis of the lowest cost (about \$11 per watt), was Solar Depot, Inc., of San Rafael, California. Each system was delivered as a ready-to-install kit that included all the hardware,

conductors, combiner boxes, conduit, ground rods, and other items needed for a complete PV system. A detailed installation, operation, and maintenance manual was also included.

These installations involved electricians, carpenters, maintenance technicians, and others from the local BLM field offices. They received on-site assistance and training from Trent Duncan of the Utah State Office. This hands-on installation method is proving to be very effective in obtaining local acceptance of the PV systems and ensuring their satisfactory performance. Maintenance technicians in particular seemed to be more accepting of the PV systems after seeing the results of their own installation efforts.



Trent Duncan, Bureau of Land Management/PIX07958

Kent and Aaron of BLM in front of array mounted on storage garage at Chicken Field Station, Alaska.



Trent Duncan, Bureau of Land Management/PIX07960

Array installation at Mt. Trumbull; the power center, inverters, batteries, and generator are located in the nearby building.



Bob Stucker/PX07961

Equipment Summary Table Used in Purchasing Standardized PV Systems

	Parriette	Chicken	Mt. Trumbull	Mud Flat	Chimney Peak
Modules:	16	20	40	32	40
Quantity/Capacity	1024 Wp	1280 Wp	2560 Wp	2048 Wp	2560 Wp
Batteries:	8/Concorde	8/Concorde	8/Absolyte IIP	12/Concorde	8/Absolyte IIP
Quantity/Model	PVX-12210	PVX-12210	3-90A-23	PVX-12210	3-90A-23
Number/Capacity	25 kWh	38 kWh	64 kWh	38 kWh	64 kWh
Inverter Size (Continuous Power Rating)	4.0 kW	4.0 kW	11 kW (Dual Inverter)	5.5 kW	11 kW (Dual Inverter)
Output Voltage	120 VAC	120 VAC	120/240 VAC	120 VAC	120/240 VAC
Array mount/tilt	Roof/20°	Roof/64°	Top of pole	Top of pole	Roof/20°
Daily Load:	3-4 kWh/d	3-4 kWh/d	8-10 kWh/d	7-8 kWh/d	8-10 kWh/d

Batteries and controls are located inside this steel building at Mud Flat Station in Idaho.

Most of the facilities at the field stations in which the systems were installed are rather spartan. The comfort and convenience provided by a power source that operates 24 hours a day are greatly appreciated by personnel stationed there. Because of heavy winter snows, however, each facility is usually occupied only during spring, summer, and fall. A brief description follows of each BLM facility in which the new PV systems were installed.

Parriette Field Station, Utah: Surrounded by miles and miles of harsh, arid desert, Parriette Wetlands is a green, marshy home for shorebirds, Canada geese, and ducks of all kinds. This field station, located 40 miles south of Roosevelt, Utah, provides support for administration, maintenance, and observation activities; it includes a bunkhouse and storage garage. A propane generator provides backup power. Evaporative cooling is used during summer months.

Chicken Field Station, Alaska: Located on the Taylor Highway, about 80 miles northeast of Tok, this facility includes two bunkhouses, a kitchen, a garage, and storage buildings. BLM manages several campgrounds, wild and scenic river corridors, and all-terrain-vehicle trails, as well as numerous mining operations in the area. Since BLM has provided the only highway emergency telephone between Dawson and Tok, tourists

seem to greatly appreciate the agency's presence in the area.

Mt. Trumbull Field Station, Arizona: Located in a large stand of ponderosa pine about 70 miles south of St. George, Utah, this facility includes two houses, a garage, and an outdoor dining pavilion. BLM manages several wilderness areas, timber harvesting, and numerous grazing permits there. The agency also has a fire-suppression presence in the area that extends north from the Grand Canyon to the Utah state line. A propane generator is used as a backup energy source at this station.

Mud Flat Field Station, Idaho: This small field station, located about 80 miles south of Boise, Idaho, consists of two bunkhouses, a storage building, and a deep well pump.

Chimney Peak Fire Station, California: BLM works closely with other Federal and local agencies in fire suppression, and Chimney Peak is one of many remote areas where

wildland firefighters are stationed. The facility is located about 110 miles northeast of Bakersfield, California; it includes two houses, two storage buildings, a deep well pump, and radio and telephone systems. A propane generator is used as a backup energy source.

There are many more similar opportunities to develop photovoltaics at remote locations within the BLM. The standardized design process developed under the partnership with Sandia National Laboratories will benefit these future installations, ensuring that each system operates successfully and meets the needs of the facility.

For more information, please contact Trent Duncan, 801-539-4090 (e-mail: tduncan@ut.blm.gov).



Trent Duncan, Bureau of Land Management/PX07962

A PV array is installed on the roof of a garage at Parriette Field Station in Utah.

New Executive Order

(Continued from p. 1)

- Agencies shall apply [sustainable building design] principles to the siting, design, and construction of new facilities. (Sec. 403 (d))
- Agencies shall use off-grid generation systems, including solar hot water, solar electric, solar outdoor lighting, small wind turbines, fuel cells, and other off-grid alternatives, where such systems are life cycle cost-effective (Sec. 403 (h))
- Each agency shall evaluate its current use of electricity from renewable energy sources and ... adopt policies and pursue projects to increase the use of such electricity. Agencies may use savings from energy efficiency projects to pay additional incremental costs of electricity from renewable energy sources. (Sec. 404 (c) (1))

Note that section 604 revokes E.O. 12902, issued March 9, 1994, among others. The 10-year payback requirement was removed from the definition of life cycle cost-effectiveness for renewable projects.

Department of the Interior

(Continued from p. 3)

solar collector (solar wall) preheats approximately 10,000 cfm of outdoor air for the ventilation system. It also removes a substantial (and costly) load from the building's conventional heating system, saving energy and money.

Interior's Bureau of Land Management (BLM) estimates that it has completed about 215 PV projects and identified 514 more that need funding. Completed projects include PV applications for communications (88), monitoring (56), power (34), water pumping (26), electric fences (8), and other uses (3). There are many more opportunities in BLM

The agency energy scorecard required by the order is the key tool for measuring and reporting an agency's progress to the President. The agency scorecard is also the central mechanism that will make the order one of an agency's priorities. The scorecard will measure not only how an agency is progressing but also how it is taking advantage of certain key tools for saving energy and reducing greenhouse gases. The order specifically identifies renewable energy technologies and electricity from renewable sources as key tools.

The RWG met on July 12, 1999 and identified some next steps that will assist DOE in implementing the renewables portion of the order. These are as follows:

- Develop goals for the amount of electricity generated at Federal facilities from renewable technologies.
- Develop guidance for agencies to use in counting renewable energy use as one way they are meeting greenhouse-gas and energy-reduction goals.

campgrounds to use renewable energy for ventilation, lighting, and host facility power.

A PV retrofit was also planned for the Chuuk Finance Center, in Interior's Office of Insular Affairs, in Micronesia. And an innovative air conditioning/dehumidification system has been installed at the Commonwealth of Puerto Rico's Cabo Rojo NWR. It is a 35-kW absorption chiller powered by a 144-m² solar array consisting of 50 high-performance, flat-plate solar collectors.

There is also a large, flat-plate solar collector at the U.S. Geological Survey's National Wildlife Health Research Center in Madison, Wisconsin. It saves about 2.9 billion Btu of non-renewable energy annually.

Faced with critical funding limitations, Interior's energy managers and field station

Block Island Post Office

(Continued from p. 3)

equipment and battery backup will protect the facility against the adverse effects of such power failures.

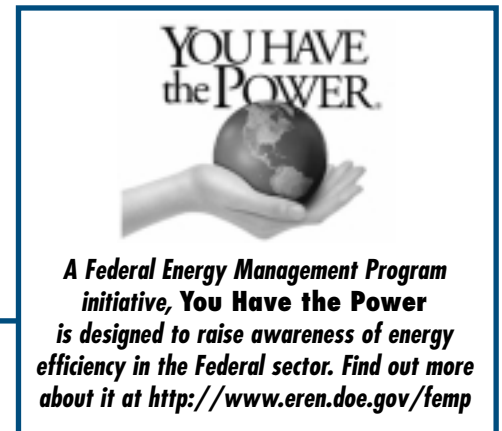
- BI Power had been using a combination of newer diesel and older equipment dating back to World War II, which resulted in a Clean Air Act violation. To remedy this, Block Island received \$400,000 from

the Department of Energy (DOE) to seek opportunities for renewable energy. Approximately 30% of the project was funded through this grant program.

- Finally, there was a strong commitment from both the Block Island Postmaster, Fred Leeder, and the facility's landlord, Ned Phillips, to make this project happen. Fred Leeder had already reduced energy bills there by nearly 30% by using conservation measures and installing high-

- Define key concepts, provisions, and procedures that impact the implementation of the order.
- Develop recommendations on how to address renewables in the energy scorecard.
- Identify and characterize key issues and mechanisms and ensure they are included in actions addressing electric utility restructuring, sustainable building design, transportation, and modification of acquisition regulations.

For more information, contact Nancy Carlisle, NREL, 303-384-7509; e-mail: Nancy_Carlisle@nrel.gov. ■



personnel are using innovative funding approaches and relying on partnerships and technical assistance from the Department of Energy's National Renewable Energy Laboratory, Sandia National Laboratories, and others. They have overcome most of the technology-related problems they encountered in the start-up years. And they are demonstrating renewable energy projects that are cost-effective and provide an economical source of clean electric power at remote field stations. For more information, please contact John Moresko, U.S. Department of the Interior, 202-208-5704 (e-mail: John_Moresko.DOI@fws.gov). ■

Events

Energy '99: A conference and exhibition for those who plan, coordinate, or carry out energy efficiency, renewable energy, or water conservation projects. Interactive sessions will be conducted by experts in energy technologies, programs and policies, building design, financing, and maintenance. More than 150 suppliers will have displays. Sponsors include DOE FEMP, the Dept. of Defense, the GSA, the State of Florida, and many others.

Location: Omni Rosen Convention Center, Orlando, FL

Dates: August 23-25, 1999

Contact: Jo Ann Stirling, 407-638-1014

<http://www.energy99.ee.doe.gov>

Fourth Biomass Conference of the Americas: This conference will address today's most important issues and challenges. These include the deregulation of the electric power industry, green power, and reducing greenhouse gases, as well as recent advances, achievements, and opportunities for partnerships in the development of biomass and bioenergy technologies. Organized by the California Energy Commission, DOE, Natural Resources Canada,

and the National Renewable Energy Laboratory.

Location: Oakland Marriott City Center, Oakland, CA

Dates: August 29-September 2, 1999

Contact: Dee Scheaffer, 303-275-2980

<http://www.nrel.gov/bioam>

Utility Photovoltaic Experience Conference & Exhibition (UPEX '99), Opening Doors in the Solar Marketplace:

This conference will examine the issues involved in building the solar photovoltaic power market, and provide information about new photovoltaic projects and products. It is for electricity providers, solar manufacturers, builders, designers, government personnel, and anyone else interested in learning about photovoltaic electricity.

Location: Tucson, AZ

Dates: October 4-6, 1999

Contact: Tina Schneider, 202-857-0898, or

upvg@ttcorp.com

<http://www.ttcorp.com/upvg/upex99.htm>

North American Electric Vehicle & Infrastructure Conference and Exposition:

This conference is designed to demonstrate the industry's

impressive technological progress and commercial promise.

Location: Atlanta, GA

Dates: November 17-20, 1999

Contact: Pam Turner, 650-365-2667

<http://www.evaa.org>

Web Sites

Federal Energy Management Program (FEMP)

<http://www.eren.doe.gov/femp>

National Renewable Energy Laboratory

<http://www.nrel.gov>

Sandia National Laboratories

http://www.sandia.gov/Renewable_Energy/renewable

U.S. Department of Energy (DOE)

<http://www.doe.gov>

U.S. DOE Energy Efficiency and Renewable Energy Network (EREN)

<http://www.eren.doe.gov>

President's Million Solar Roofs Initiative

<http://www.millionsolarroofs.com>

New GSA Energy Project in Boston includes Solar Roof

By Roman Piaskoski, General Services Administration

Summertime recipe: Take one roof with deferred maintenance, add the high cost of district steam, combine with deregulated electricity and gas markets, stir in solar power, mix well and serve up one tall, cool energy project!

GSA New England has issued a notice to proceed with a comprehensive project plan for the Williams Building in downtown Boston. This 160,000-square-foot building, whose leading tenant is the U.S. Coast Guard, sits on Rowe's Wharf at 408 Atlantic Avenue, close to the city's financial district.

The project involves upgrading a regularly scheduled roof replacement by installing a 40-kW building-integrated photovoltaic roof. It also involves switching from district steam in the building to on-site gas boilers and adding two 75-kW Teco-gen co-generation units, a new high-efficiency chiller, efficient lighting, and motor upgrades, including variable-frequency drives.

The first step in this project involved scouting the local government building

inventory, reviewing five-year repair and alteration plans, and talking with property managers to identify sites and assign priorities.

Step two was to find GSA project champions. In this case, they were the author's immediate supervisor, James Devir, Branch Chief of Facilities Management, and Karen Palladino, Director of Property Management.

In step three, assistance was requested from the regional FEMP liaison, Paul King, in the form of a SavEnergy audit. Local utilities reviewed the audit and made additional recommendations. Taking all their recommendations, the project team added a solar roof, ran a life-cycle-cost analysis, and, using the results, requested funding from GSA's national Energy Center of Expertise in Kansas City. The cost analysis showed a nine-year payback for the project and predicted annual utility cost savings of \$90,000.

When the team had obtained nearly \$2 million in funding, they applied to the Renewable Energy portion of DOE's Federal Energy Management Program (FEMP) for an additional \$150,000, plus design review and assistance. With \$2.12 million in total funding, it was time to choose a contracting vehicle: either an ESPC, Super ESPC, area-wide

contract, or Region 1 third-party electricity supply contract.

GSA New England had made a contract award in July 1998 to Enron Energy Services (EES, a subsidiary of Enron Corp.) to supply electricity. The five-year contract, modeled on GSA's area-wide contracts, allows any Federal agency in the six New England states to receive power at a price fixed by a percentage discount. It also allows value-added services (VAS) that range from audits and billing services to complete energy projects. The Williams Building will be the pilot VAS project. And an EES audit resulted in one more new energy technology: co-generation.

EES received the Notice to Proceed in June 1999; roof construction was scheduled to begin in late July. The solar roof should be operational this September. The new boilers, co-gen equipment, and chiller will be installed by September 2000. This project, which involved recognizing a need and obtaining support from both local and national decision makers, has already benefited greatly from FEMP's support. For more information, contact Roman Piaskoski, GSA New England Region, 617-565-4693 (roman.piaskoski@gsa.gov). ■

Save with Solar


Save with Solar: A Quarterly Technical Bulletin for Federal Solar Energy Champions

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FEMP
FEDERAL ENERGY MANAGEMENT PROGRAM



Karen Atkinson/PIX07756

Ken May, President of Industrial Solar Technology (IST) of Golden, Colorado, is shown with the solar water-heating system at the Federal Correctional Institution (FCI) near Phoenix, Arizona. Installed in 1998 under a unique partnership consisting of the Department of Energy's National Renewable Energy Laboratory, the Federal Bureau of Prisons, and IST, the system preheats 50,000 gallons of water daily for use by more than 1,500 inmates and staff. Solar collectors track the sun to heat a circulating stream of propylene glycol antifreeze and water. Heat from the collectors is transferred by copper coils to tanks that store hot water for use in laundry, kitchen, and shower areas. Data indicate that the system saves about \$6,000 in electricity costs per month; 90% of these savings go to IST under an Energy-Savings Performance Contract to amortize the capital cost of the system and pay for maintenance.