Federal Energy Management Program

Save with Renewable Energy

A technical bulletin for Federal renewable energy champions

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

U.S. Department of Energy
Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Moving Closer to the Goal for Renewable Energy

By Nancy Carlisle, AIA, National Renewable Energy Laboratory

The good news is that the federal government is nearly 500 gigawatt-hours (GWh) closer to its renewable energy use goal than it was three years ago (roughly the equivalent of the energy in a million barrels of oil). So, we're nearly halfway there, and more projects are planned.

To recap a little history, in 1999 Executive Order 13123 called for the Secretary of Energy to develop a goal for federal renewable energy use. In May 2000, the Secretary adopted a target approved by the Interagency Energy Task Force based on recommendations from the Renewable Working Group (RWG), which is led by DOE's Federal Energy Management Program (FEMP). The Secretary's goal directs federal agencies to obtain the equivalent of 2.5 percent of their electricity from renewable energy sources by 2005.

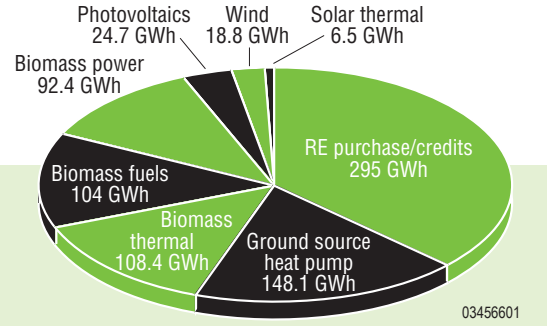
In June 2000, when guidance on the goal was issued, the government used about 173 GWh of renewable energy, or 13 percent of the goal. In 2002, the target was 1384 GWh, which is about 500 megawatts (MW) of wind energy, for example. In July 2003, federal usage reached an estimated 798 GWh, or 58 percent of the goal, with about 586 GWh to go by 2005. As this publication shows, agencies are clearly embracing the goal and well on their way to meeting it.

Solar, wind, biomass, and geothermal systems installed at federal facilities after 1990 all count toward this goal. As we approach the 2005 deadline, however, some agencies still aren't sure which technologies and improvements can be counted. So, the RWG will clarify the guidance on this.

Our progress can be attributed to several factors, but the greatest area of growth has been in renewable energy purchases and credits. Negligible in 2000, purchases and credits today account for about 50 percent of agencies' progress toward their goals. For example, Dyess Air Force Base in Texas recently purchased 80 million kilowatt-hours (kWh) of renewable energy as part of a two-year commitment to buy 100 percent renewable energy from six Texas wind farms. It was a strategic decision; that purchase alone represents 2.5 percent of the electricity requirements of the entire 19-base Air Force Combat Command.

Another major contributor, at 108.5 GWh per year, is a new landfill-gas project at NASA Goddard Space Center. And several new photovoltaic (PV) projects have been installed, such as the 750-kW system at Naval Base Coronado in San Diego, the 9-kW system on the White House grounds, and the 1.1-MW system on the Marine Corps base at Twentynine Palms, California (see page 2). In addition, projects nearly completed on military bases in Hawaii will increase federal use of solar thermal systems in 2003 (see also page 3). FEMP's work with the Bureau of Land Management to assess renewable resources on federal lands could result in projects having a big impact on the goal (see the publications listed on page 8).

The Senate Energy Bill contains a provision requiring federal agencies to purchase 7.5 percent of their electricity from renewable energy by 2011. If it passes, the RWG could again provide recommendations and guidance. Agencies are encouraged to review the RWG's meeting notes on FEMP's renewable energy Web pages (see *www.eere.energy.gov/femp/*) and to participate in meetings either in person or by phone. For more information, please call Jim Hoelscher, 301-731-1900.



Technology breakdown for federal renewable energy use (July 2003)

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Energy- and Cost-Saving Upgrades On Track at Twentynine Palms

By Carl Zeigler, Energy Program Manager, U.S. Marines Headquarters

MAGTFTC/PIX12754

A 7-MW cogeneration system is part of a comprehensive set of energy and facility upgrades at this Marine base in Twentynine Palms, California.

The final phase of a three-phase contract valued at $51 million is in place to complete comprehensive energy and facility system upgrades at the Marine Air/Ground Task Force Training Center (MAGTFTC) at Twentynine Palms, California. It is one of the largest single energy savings performance contracts (ESPCs) ever awarded by the Naval Facilities Engineering Command contracts office, which administers ESPCs for Navy and Marine Corps facilities.

ESPCs allow a federal agency to obtain funds for new energy-efficient systems from a private company, using a contract that has standard performance guarantees. The company is repaid out of the agency's savings in energy and operational costs. The total MAGTFTC ESPC program should save the base an estimated $6.9 million each year over the 20-year contract, for a total of $138 million saved.

Energy and water efficiency improvements under this ESPC include a 7-MW cogeneration system, a base-wide chilled water distribution system, an energy management control system (EMCS), a 1.1-MW photovoltaic (solar electric) array, and daylighting retrofitted in warehouses. Together, these improvements should reduce current electricity consumption by 76 percent, or 63,176 MWh per year.

The cogeneration plant will provide 68 percent (56,402 MWh per year) of the base's electricity needs. It will supply four main feeder lines to the central area of the base, providing an uninterrupted power supply for critical loads during utility power interruptions. The plant will also capture and use the waste heat from power production to improve fuel utilization. The plant's waste-heat stream will provide thermal energy for the absorption chillers in the chilled water distribution system.

The 1.1-MW PV system will be the largest in the federal sector—larger than the current title-holder, the 750-kW system at Naval Base Coronado. The PV array requires six to eight acres of land on base to supplement electric capacity during peak-load periods. The cogeneration plant and PV system together represent a sizable stand-alone source of reliable, efficient electricity and hot water.

The reliability of the base's air-conditioning systems has been a major headache. But the new distribution system and supporting chiller plants should eliminate this problem. Although they are not energy savers, at $30 million they will add a large amount of energy infrastructure. The system was designed to accommodate future growth and construction.

MAGTFTC should realize annual cost savings or avoided costs from the last two phases of the contract of about $500,000 to $1 million per year. Guaranteed annual cost savings in the contract cover only the payments to the contractor. It is important to note that operations, maintenance, and repair or replacement costs are factored into these payments to keep the new systems functioning at their maximum capabilities. For more information, please contact Carl Zeigler, 703-695-9781, ext. 3302 (e-mail: zeiglercf@hqmc.usmc.mil).

Biodiesel Can Reduce Emissions, Enhance Energy Security, and Help Fleets Meet EPAct Requirements

By Robi Robichaud, National Renewable Energy Laboratory

Warren Gretz, NREL/PIX11900

Robi Robichaud of NREL refills a diesel generator, provided by the U.S. Department of Agriculture as part of a demonstration project, with 100% biodiesel fuel made from soybeans.

Biodiesel—a renewable, domestically produced, environmentally friendly biofuel—is beginning to take hold in the market place. In contrast to petroleum diesel, biodiesel reduces particulate matter, carbon monoxide, and unburned hydrocarbons, and it contains no sulfur. The only emissions downside is a slight increase in nitrogen oxide.

Biodiesel provides multiple opportunities to reduce vehicle emissions and dependence on foreign petroleum, while helping federal fleets meet the goals for renewable energy use stated in Executive Orders 13123, 13124, and 13149, as well as those in the Energy Policy Act (EPAct). Liquid biofuels from domestically produced biological resources are one of the few alternatives to imported petroleum transportation fuels, and their further development and use are vital to our domestic energy security and economic vitality.

U.S. biodiesel currently comes from two primary sources: soybeans and used cooking oil. It is produced through a chemical process called *transesterification* and is often used in blends; for example, B20 indicates a blend of 20 percent biodiesel and 80 percent diesel fuel. In its pure form (B100), biodiesel is renewable, biodegradable, and nontoxic. It also has a high flash point, making it a safe fuel to use, handle, and store. The most common blend in use today is B20; B20 or lower blends can be used in almost all diesel engines. The power,

Renewable Energy Is Key to Energy Security

By Alicen Kandt, National Renewable Energy Laboratory

David Menicucci/PIX11060

This PV system provides solar electricity to a Marine Corps base at Twentynine Palms, California.

Our current dependence on foreign oil and a fragile energy infrastructure both pose a threat to national security. As we step up efforts to increase our energy security, policy makers and government officials at all levels are becoming more aware of the contribution that domestic renewable energy sources can make.

Adding "renewables" to our energy mix is one practical way to deal with an aging, overstressed infrastructure in the near term. Energy efficiency and renewable energy technologies offer cost-effective routes to a safer, more reliable, more resilient energy infrastructure.

Renewable energy technologies can enhance energy security in many ways. According to John Thornton, Energy Assurance R&D Coordinator at the National Renewable Energy Laboratory (NREL), renewable energy can be used in "prevention, through monitoring and detection; mitigation, with self-sustaining buildings and uninterruptible power systems; response, using emergency power systems; and recovery, using backup power." Thornton said that "the future of energy security lies in environmentally sustainable, secure energy sources that are readily available today."

Numerous federal agencies already believe it is important to supplement their current energy systems with renewable technologies. This is evident in the increasing use of biomass, geothermal, solar, and wind resources at federal sites.

And, according to some energy experts, distributed generation (DG) technologies are necessary if we are to increase our energy security. For example, Dave Menicucci, Defense Energy Support Program lead at Sandia National Laboratories, said, "DG uses small-scale power generation technologies, such as microturbines, fuel cells, thermal systems, CHP (combined heat and power), and PV (photovoltaics), located close to the load being served. DG can lower costs, improve reliability, reduce emissions, enhance security, and expand energy options by adding redundancy to an electric supply."

One good example is the Marine Corps Air/Ground Task Force Training Center (MAGTFTC) at Twentynine Palms, California (see also page 2). It is the largest Marine Corps base in the world; its peak electricity demand is 25 MW. The base's goal is to use 20 MW of renewable energy by 2007, and it is well on its way to achieving it. Currently, the base receives 7.6 MW from CHP and 1 MW from PV. Wind turbines and more PV systems are being installed to provide an additional 5 MW. And to reduce the overall load, solar hot water systems have been installed to serve 10,000 square feet of facility space.

Some military bases implement renewable energy systems to help combat their energy vulnerability. According to Menicucci, "Some bases are in remote locations, and a loss of power on a base not only results in lost money, but also a loss of mission-readiness, which is directly correlated with security." Many bases either have plans to install renewable energy systems or are developing them. The U.S. Army, for example, is conducting a study to determine suitable DG techniques for different bases. The Army is examining loads and secondary needs and making plans for future action. Ft. Lewis in Washington State expects the base to be completely independent of the utility grid in the next 15-20 years.

Every federal agency has the potential to enhance its energy security through the use of renewable energy systems. These systems can help agencies control their own power generation within a protected area, away from the larger, more vulnerable grid. And renewable energy systems are readily available today, so agencies can begin adding DG technologies according to their needs and funding, and continue to do so in the future.

For more information or assistance in developing a plan for implementing renewable energy, contact John Thornton, 303-384-6469 (e-mail: homelandsecuritycoordinator@nrel.gov) or Dave Menicucci, Defense Energy Support Program, 505-844-3077 (e-mail: dfmenic@sandia.gov).

Meanwhile, Space Command's satisfaction with the Ascension Island wind system has led them to look at some other installations. As a result, designs are being completed for a 4-MW wind system at Vandenberg AFB in California and a 2-MW system at F.E. Warren AFB in Wyoming.

The Air Force has also championed purchases of wind-generated electricity. Contracts are in place to purchase wind power at Edwards AFB, California; Dyess AFB, Texas (the largest wind energy purchase to date for a single installation); F.E. Warren AFB, Wyoming; Minot AFB, North Dakota; Grand Forks AFB, South Dakota; and Lackland AFB, Texas.

As reported in *FEMP Focus*, the Air Force is leading a major study of the potential of renewable energy at all DOD installations in the nation. The $6 million review, funded through the military construction budget, is examining the feasibility and economics of wind, solar, and geothermal energy projects or energy purchases for all the military services. Assisting in the wind energy portion are staff at the DOE National Renewable Energy Laboratory's National Wind Technology Center and Global Energy Concepts, Inc., Kirkland, Washington. The study should provide DOD with a road map for renewable energy projects as well as renewable energy purchases from commercial sources.

Much progress has been made, but much remains to be done to achieve federal goals for renewable energy and emission reductions. The Air Force is pointing the way and setting an excellent example for future renewable energy champions. For more information, please contact Craig Miller at Headquarters Air Space Command, 719-554-5376 (Craig.Miller@peterson.af.mil).

Solar and Public Education in the National Parks

By Steve Butterworth, Regional Energy Manager, National Park Service Pacific West Region

National Park Service/PIX06721

Entryway to the Cabrillo National Monument Visitor Center

"To promote and regulate the use of the ... national parks ... which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." National Park Service Organic Act (1916), 16 U.S.C. 1.

We call it *interpretation* rather than *education*. It means that every park employee gets an opportunity to share with others the wonders, the stories, and the inspiration of each national park, large or small. With an ever-growing number of parks, one part of the park story is how the National Park Service benefits from solar technologies.

The mission of the National Park Service, shown in the quotation, tells us to *promote*. (The author of this article is the chief promoter of solar technologies for 63 very different parks, from Montana to California and west to the far Pacific.)

Each fully developed park has a visitor center. As shown in the photo of the entryway to the Cabrillo National Monument Visitor Center, park visitors see solar panels as they enter. Inside, an exhibit or park staff member (or both) will help explain how the park benefits from a grid-tied solar system.

Parks that charge entrance fees usually distribute a small newspaper that highlights events and opportunities. When a new solar project comes on line, it will usually be given "coverage" via this type of publication for 3–6 months. This helps new park visitors understand the importance of the solar project.

If you have had a chance to camp in a national park, you might have gone to the evening campfire program. These "ranger talks" change nightly, and help campers learn about the park or plan the next day's activities. At Joshua Tree National Park, amphitheater facilities often have a solar array atop the main structure. The ranger usually explains the system and how it powers the pathway lighting and slide projection system. Even better, the solar system eliminates the need for a gas-powered generator and its associated noise during the show.

These are some examples of the educational methods we use to promote an understanding of solar systems to people who visit national parks. Today, the National Park Service, along with one of its partners, the Bonneville Power Administration (BPA), is working on a Web-based interaction with park solar systems. The individual performance of park solar systems can be found on a BPA-hosted site at *www.bpa.gov/Energy/N/tech/eemeteringdata/Federal/index.cfm*. Photos and graphs help explain the importance of the solar resource.

So, whether you are just getting to the park, enjoying your first night in a whole new environment, or Web-surfing from home, you will find that the National Park Service is promoting success through solar. For more information, contact Steve Butterworth, 206-220-4277, e-mail: Steve_Butterworth@nps.gov.

torque, and fuel economy of B20 are similar to those of diesel fuel. As an additive, biodiesel improves the lubricity of petroleum diesel fuel, even in concentrations as low as 1 percent.

In most parts of the country, diesel fuel is "winterized" to prevent plugging, gelling, or separation. Reports indicate few problems with blends of B2 to B20 in winterized diesel fuel, and additive packages for cold flow are effective with B20. At higher blend levels, fuel flow becomes a major issue in cold weather.

The Departments of Energy and Transportation have designated B100 as an alternative fuel. The Environmental Protection Agency has registered biodiesel as a fuel and a fuel additive. The General Services Administration (GSA) has approved the use of B20 in GSA fleet vehicles. See *Fleet Guidance on Biodiesel (B20) Use* on the GSA Web site (*www.gsa.gov*), or call 703-605-5630 for more information.

Biodiesel has been used in more than 100 major fleets and proven in more than 40 million successful on-road miles. Federal fleets governed by the requirements of EPAct can receive one alternative fuel vehicle (AFV) credit for using 450 gallons of B100. Covered fleets can meet up to 50% of EPAct's vehicle purchase requirement through the use of biodiesel, and agencies can use B20 to obtain the AFV credit on a prorated basis.

Biodiesel is available nationwide. Agencies can purchase B20 as easily as diesel through the Defense Energy Support Center and at similar prices—about $0.86/gal. For more information, contact Pam Serino, Defense Logistics Agency, 703-767-8363 (pamela.serino@dla.mil).

In addition, the National Biodiesel Board maintains a list of national suppliers of biodiesel (*www.biodiesel.org/buyingbiodiesel/producers_marketers/default.shtm*). And DOE's Alternative Fuels Data Center has an online database of maps and stations that provide alternative fuel (*www.afdc.doe.gov/refueling_mapsite.shtml*). At the pump, B20 costs 15 to 30 percent more per gallon than petroleum diesel, and B100 costs 50 to 100 percent more per gallon.

For more information, contact Robi Robichaud, NREL (Robi_Robichaud@nrel.gov).

Hawaii Enhances Energy Security with Renewables

By Patrina Eiffert, ImaginIt, Inc.

Imported oil supplies 89 percent of Hawaii's energy needs; no other state in the nation is so critically dependent on imported petroleum. Unlike mainland states, Hawaii can't readily turn to its neighbors for help during temporary or permanent power shortages. So, Hawaii is actively developing renewable energy resources through tax incentives, a renewable portfolio standard, net metering, mandates for state buildings, educational programs, and partnerships with the federal government.

Ronald Iwao/PIX08067

This Coast Guard housing at Kia'i Kai Hale near Honolulu, Hawaii, is one of several complexes featuring solar water heating.

Legislation and Tax Credits

New legislation supporting the state's energy-use goals includes a measure similar to federal Executive Order 13123; the new law requires state agencies to significantly reduce energy consumption in the coming decade. It calls for greater use of renewable energy, sustainable building design principles, and reduced water consumption when deemed cost effective. The law, which took effect on June 30, 2002, requires reductions in energy consumption of 20 percent in all non-laboratory facilities by 2007 and 30 percent by 2012. Twenty percent of the remaining energy needs of state facilities has to come from renewable resources.

Hawaii's net energy metering law, enacted in 2001, allows residential and commercial customers to connect eligible renewable energy systems (those that do not exceed 10 kW) to the grid without an additional electricity meter and to receive full retail credit for electricity exported to the utility.

Utility companies selling electricity for consumption in Hawaii are subject to a renewable portfolio standard (RPS) goal. Act 272 of 2001 (see *http://www.state.hi.us/dbedt/ert/rps.html*) sets targets of 7 percent of utilities' net electricity sales to come from renewable energy resources by December 31, 2003; 8 percent by December 31, 2005; and 9 percent by December 31, 2010. The RPS aims to reduce the environmental risk associated with fuel transport and storage, and stem the increase in the flow of money out of the state. The RPS goals are for net energy generation, so existing renewable systems qualify. There are no legislated penalties for noncompliance.

A state income tax credit for renewable energy can be claimed for renewable energy systems installed and in service after June 20, 2003, and before January 1, 2008. This applies to solar thermal, wind, and photovoltaic systems installed on residential or commercial property. Credits range from 20 percent of the cost for wind to 35 percent for solar, and they can be up to $250,000 for some commercial installations.

Federal Projects

The federal government is one of the largest energy consumers in Hawaii, and federal agencies in the state are working to reduce energy consumption and implement renewable energy systems. They often work with utilities such as Hawaiian Electric Company (HECO), Maui Electric Company (MECO), and Hawaii Electric Light Company (HELCO), which purchase renewable energy from independent producers with over 90 MW of installed capacity as of 2002.

There are also excellent examples of innovative partnerships between federal, state, and private-sector entities. For example, a Distributed

Western Area Power Administration/PIX08820

The visitors' parking area at the USS Arizona Memorial in Pearl Harbor, Hawaii, has 19 solar safety lights, installed in a joint project of the National Park Service and DOE FEMP.

Energy Resources Center is being developed at the Natural Energy Laboratory of Hawaii Authority (NELHA) in Kailua-Kona, Island of Hawaii. The Gateway project is expected to be completed in early 2004. When completed, the facility will include laboratories and offices as well as education, outreach, and retail space. Another example is a planned photovoltaic (PV) energy park on the Island of Oahu, developed by the Hawaii Natural Energy Institute, the Navy, and HECO. The initial phase of the project will include a 200-kW PV system that could be expanded to 2-3 MW, depending on the availability of funds. The initial phase of the project also includes modeling and conceptual designs of hydrogen production from solar-generated electricity and hydrogen storage technologies tied with a fuel cell system. Hawaii's congressional delegation was instrumental in securing federal funds for the project.

Congressman Neil Abercrombie said, "This project lays the foundation for the development and demonstration of renewable energy sources that are so important for our military and for Hawaii's future."

Solar water heaters also continue to proliferate across the state; an estimated total of 75,000 systems results in savings of about five barrels of oil per system per year. According to Ron Richmond, an analyst in customer efficiency programs at HECO, federal agencies are installing solar hot water systems in Hawaii at an unprecedented rate by leveraging utility incentives. Agencies have installed more than 2,600 systems and received at least $7 million in rebates for solar water heating projects. This is the result of contracts for multiple projects (primarily housing) with the Air Force, Army, Marines, NOAA National Weather Service, Coast Guard, and Navy.

Among the most notable solar water heating projects in 2002 were those at the Helemano Military Reservation and Waianae Recreation Center, which involved 650 homes and cottages. The Army presented a Renewable Energy Award to the 25th Infantry Division, Hawaii, for these projects.

A solar water heating system in Hawaii typically has a net cost of about $2,000 after electric utility rebates and applicable tax credits, for a payback of about 4 years for civilian housing and less than 10 years for military family housing. Military housing projects have longer payback periods because the federal government is not eligible to receive state tax credits.

Wind energy is taking hold in Hawaii, as well. Strong, steady trade winds prevail in certain areas throughout most of the year. Therefore, HECO, MECO, NREL, DOE, and the Hawaii Department of Business, Economic Development and Tourism are funding a project to develop high-resolution wind resource maps for the islands of Oahu, Maui, Molokai, and Lanai. Maps for the Big Island of Hawaii and for Kauai will be prepared later.

Because so many systems are in place or planned for Hawaii, it could soon become as well known for renewable energy as it is for its beautiful beaches. For more information, please see *http://www.eere.energy.gov/state_energy/states_currentefforts.cfm?state=HI* or contact Eileen Yoshinaka, DOE Pacific FEMP Liaison, 808-541-2564 (Eileen.Yoshinaka@hq.doe.gov).

Western's Renewable Power Program

Western Area Power Administration, in cooperation with the DOE Federal Energy Management Program (FEMP), has created a program designed to facilitate the purchase of renewable power by federal agencies. Western will buy renewable energy on behalf of federal agencies and deliver it either in the form of physical energy or as renewable energy certificates (RECs). For more information, see Western's Web site, *http://www.wapa.gov/powerm/pmtags.htm*. Agencies interested in participating in this program should contact either Chandra Shah, National Renewable Energy Laboratory, 303-384-7557 (chandra_shah@nrel.gov), or David McAndrew, DOE, 202-586-7722 (david.mcandrew@ee.doe.gov). And for more information about Western's Non-Hydro Renewable Resource Program, please contact Randy Manion at Western, 720-962-7423 (manion@wapa.gov) or see Western's Renewable Resources Web site (*www.es.wapa.gov/renew/*).

Warren Gretz, NREL/PIX08604

Federal installations in Colorado's Front Range purchase renewable power from Xcel Energy's Ponnequin Wind Farm in Weld County, Colorado. Projects like this can provide renewable power for Western.

New Pinnacles National Monument Complex Will Be a Model of Sustainability

By Otto Van Geet, P.E., National Renewable Energy Laboratory

California's Pinnacles National Monument is getting a new lease on life. Its deteriorating facilities for visitor services, ranger support, and maintenance are being relocated from an environmentally sensitive flood plain to a larger, more suitable site and revitalized with many sustainable, energy-efficient design features. The facility design has been completed, and construction is scheduled to begin in 2005.

Pinnacles National Monument is part of the U.S. National Park system. It is in the California coastal range, about 100 miles southeast of San Francisco. A Presidential Proclamation established the monument in 1908 to preserve its unique volcanic formations. Visitors enjoy hiking, rock climbing, and picnicking, primarily in spring and fall. In 2000, the monument hosted more than 200,000 visitors.

A rendering of the south and north façades of the planned new Pinnacles National Monument Visitor Center in California

James Crockett, National Park Service and Siegel and Strain Architects

In 1991, a Development Concept Plan recognized that the monument's facilities, constructed from 1945 to 1960, had become obsolete and inadequate, and they were rapidly deteriorating. The facilities were at the end of a narrow, confined canyon in a 20-year flood plain. From 1996 on, costs related to storm damage exceeded $405,000. New facilities will avoid flood damage and high reconstruction costs as well as serve as models of sustainability and renewable energy for federal parks, recreation areas, and monuments.

The Pinnacles project includes construction of a new visitor contact station, a maintenance facility that includes emergency response capabilities, an entrance station, parking area, and related utilities—all with energy efficiency in mind. The current lift station, comfort station, and well house will remain in place.

Because electricity from the grid is not available at the new complex, a PV-hybrid energy system will be installed. It has lower initial costs than extending power lines from the grid. All new buildings will incorporate energy-saving designs to provide daylighting, passive solar heating, a good thermal envelope, natural ventilation through low-emissivity windows, and overhangs for shade in summer. Trombe walls will provide heating, and high-efficiency lighting will feature occupancy and daylight sensors and controls. Office areas will feature energy-efficient, flat-screen computer monitors.

DOE2 was used in energy analysis of the proposed new Visitor Contact Station. The analysis predicted that the new station will use 70 percent less energy than the ASHRAE 90.1-99 base case building. This project also includes such sustainable design strategies as optimizing the siting of structures, minimizing building construction waste, and using native vegetation in landscaping and local construction materials. The building also uses recycled materials, such as cellulose insulation, and water conservation features, including waterless urinals. Buildings are designed for durability and adaptability to future reuse and recycling. For more information, please call Debbie Simmons, Facility Manager, 831-389-4485.

The Wind Beneath Their Wings: A Wind Energy Update on the U.S. Air Force

By Ed Cannon, VP Engineering, ImaginIt, Inc.

Pacific Industrial Electric/PIX06132

The Air Force's 1996 wind turbine installation on Ascension Island in the south Atlantic has been so successful that more turbines are being added to supply more renewable power there.

At 37% per year, wind energy technology is the fastest-growing energy source on the planet. The reasons? It's clean, dependable, and cheap enough to be competitive with fuel-derived electricity in many markets. In our country, nearly half of all 50 states have commercial wind operations, and a quarter have more than 30 MW of wind power.

Wind energy also owes much of its success to champions. In the federal sector, the clear leader in wind energy use is the U.S. Air Force in the Department of Defense (DOD).

It started in a big way in 1996, when the Air Force Space Command installed four NEG Micon 225-kW wind turbines on Ascension Island in the south Atlantic. That project, which has already nearly paid for itself, has been so successful that it is leading to many more. These include two new NEG Micon 900-kW turbines on Ascension itself, to effectively triple the amount of wind energy there. According to Craig Miller, Space Command Energy Manager, the 2.7-MW combined output of these turbines could easily constitute 40% of the base's total energy production—an unprecedented level.

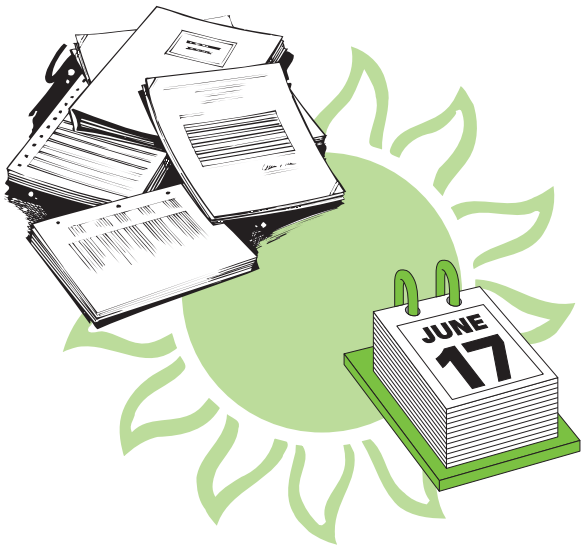
In order to take advantage of the added generating capacity of the new wind turbines, the Air Force completed a companion project using wind power to desalinate seawater for the base's fresh water supply. Two electric boilers are being added to the base desalination plant, replacing fuel boilers that consume 32–35 gallons of fuel oil per hour. Together, the six wind turbines will save the base 700,000 gallons of fuel each year.

Publications

Green Building: Project Planning and Cost Estimating, R.S. Means, 2002, ISBN no. 0876296592. This unique book provides cost data and explains what makes a building green; what green materials, products, and systems are available and how to specify them; what it takes to earn a LEED, Energy Star® or other recognized rating; what financial incentives exist for building green; what green products cost; and how to calculate energy savings and paybacks for your green investment.

Assessing the Potential for Renewable Energy on Public Lands, U.S. Department of Energy, Energy Efficiency and Renewable Energy, 2003, report no. DOE/GO-102003-1704. This new report—prepared by DOE NREL and the Bureau of Land Management—shows that areas in 11 western states have high potential for electric power production from one or more renewable energy sources, such as solar, wind, biomass, and geothermal. See *www.nrel.gov/docs/fy03osti/33530.pdf* or write to the BLM, Denver Federal Center, PO Box 25407, Denver, CO 80225-0047.

Deployment of Distributed Generation: Sources of Financial Assistance and Information, U.S. Department of Energy, Federal Energy Management Program, periodical. This publication briefly summarizes potential funding sources for distributed generation (DG) technologies and provides links to more detailed online information from utilities and other sources. For the June 2003 issue, see *www.eere.energy.gov/femp/techassist/pdf/der_navig_$6_03.pdf*.



Calendar

Business Energy Solutions Expo
December 11–12, 2003
New Orleans, Louisiana
Information: Patty Ardavin, 770-279-4390, patty@aeecenter.org, *www.aeecenter.org*

Designed specifically for the end user, this conference and expo will tackle today's most critical energy topics to help you effectively reduce energy costs, secure your energy supply, upgrade equipment, and improve your overall operations.

Global WINDPOWER 2004
March 28–31, 2004
Chicago, Illinois
Information: American Wind Energy Association, 202-383-2500, *www.awea.org*.

The Global WINDPOWER Conference and Exhibition brings together the world's leading wind energy companies and professionals involved in this dynamic market to share information and view the latest industry exhibits.

A Solar Harvest: Growing Opportunities
July 11–14, 2004
Portland, Oregon
Information: American Solar Energy Society (ASES), 303-443-3130, *www.ases.org*.

The Solar Harvest will focus on the many roles that renewable energy can play in achieving environmental integrity as well as on economic growth and energy reliability.

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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