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

June 2001

“... with possible electricity shortages in California and in the Northeast and Northwest this summer, the Federal Government should set a good example of conservation by reducing its own energy use . . . ”

— President Bush

Memorandum for the Heads of Executive Departments and Agencies

Subject: Energy Conservation At Federal Facilities

A key component of my Administration's overall commitment to make the most economical use of public dollars and to protect the environment is to improve energy conservation at Federal facilities. Further, with possible electricity shortages in California and in the Northeast and Northwest this summer, the Federal Government should set a good example of conservation by reducing its own energy use, particularly in regions where electricity shortages may occur and during periods of peak electricity demand. Such conservation would save public money, protect the environment, and help to minimize shortages.

Therefore, I hereby direct the heads of executive departments and agencies to take appropriate actions to conserve energy use at their facilities to the maximum extent consistent with the effective discharge of public responsibilities. Agencies located in regions where electricity shortages are possible should conserve especially during periods of peak demand.

In addition, agencies should review their existing operating and administrative processes and conservation programs and identify and implement ways to reduce such use. Agencies should report to me, through the Secretary of Energy, within 30 days from the date of this memorandum, on the conservation actions taken. The agencies shall take these and other appropriate energy conservation actions using existing budget authority.



George W. Bush
May 3, 2001

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. . . and more!



Beth Shearer
FEMP Director

Secretary of Energy
Spencer Abraham

**Assistant Secretary,
Office of Energy Efficiency
and Renewable Energy**
David K. Garman

FEMP Deputy Director
Joan Glickman

FEMP Focus Editor
Annie Haskins



Director's Column

We're Out there, Working Towards Results

On May 3, President Bush directed the heads of executive departments and agencies to take appropriate actions to conserve energy use at Federal facilities. This month, agencies will report to the President, through Secretary of Energy Spencer Abraham, the conservation acts they have taken.

At the request of Secretary Abraham, FEMP is providing assistance to Federal agencies in implementing the President's directive. FEMP has started with a deployment of Assessment of Load and Energy Reduction Technique (ALERT) Teams, which you can read about on page 6.

Also in this issue, you will find a wealth of information on the actions that Federal, State, and local government agencies and businesses are taking in anticipation of this summer's potential power crisis. Much of this information targets California because they are already experiencing rolling blackouts. You can read about best practices at the Navy Region Southwest on page 13.

Agencies throughout the Nation are implementing effective projects to deal with our current problems. Headquarters, Air Force Space Command at Peterson Air Force Base, Colorado, is turning to wind power as an alternative form of energy. The Denver Federal Center in Colorado is not only looking to reduce electricity for the summer months, but staff are working on a facility-wide upgrade that will be satisfactory for tenants and good for the environment year-round.

It is good to know that many agencies have taken it upon themselves to reduce the burden on power grids, and it is encouraging that President Bush stepped forward to motivate facilities to do more to conserve energy. We in the Federal Government will continue to lead by example by reducing energy use and protecting the environment.

— Beth Shearer
Director of Federal Energy Management Programs

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Secretary Abraham Implements National Energy Policy

Announces Strategic Review of Energy Efficiency R&D

Secretary of Energy Spencer Abraham made a quick start of the Department's implementation of the President's National Energy Plan on May 23 by directing the Office of Energy Efficiency and Renewable Energy to undertake a strategic review of its energy efficiency research and development programs. This is the first recommendation of the National Energy Plan set for implementation since it was announced May 17.

"The President offered the American people a balanced and comprehensive plan to address our Nation's energy challenges," Secretary Abraham said. "With energy demand outpacing supply, it's also clear that the National Energy Plan is urgently needed. That's why we are moving swiftly at the Department of Energy to implement key recommendations contained in the plan.

"We are announcing a program review that highlights the balance in the President's policy. The Energy Department researches and develops energy-saving technologies for energy-efficient lighting, windows and more fuel-efficient cars and trucks," the Secretary said. "This review will identify ways to improve the lives of Americans through energy efficiency while streamlining our programs and saving taxpayer dollars. I welcome the public's input in this comprehensive review."

The President's energy policy recommended a review of current funding and historic performance of DOE's energy efficiency research and development programs. Secretary Abraham will propose appropriate funding of those research and development programs that are found to be performance-based and are modeled as public-private partnerships.

Public input will be sought at the outset of the review to be conducted by DOE's Office of Energy Efficiency and Renewable Energy. The review will evaluate past performance and identify ideas for future public-private partnerships. This review will complement a current National Academy of Sciences study, which is expected to be released this summer.

Secretary Abraham set July 10 as the deadline for the initial phase of the review, with the final phase to be completed by September 1.

View the National Energy Policy and related information online at www.eren.doe.gov/femp/resources/energy_policy.html.

"With energy demand outpacing supply, it's also clear that the National Energy Plan is urgently needed. That's why we are moving swiftly . . . to implement key recommendations contained in the plan."

— Secretary Abraham

Act Now to Save at Your Facility

An Energy Conservation Plan is the Key Element

A key component of the Bush Administration's overall commitment to make the most economic use of public dollars and protect the environment is to improve energy conservation at Federal facilities. Further, with electricity shortages in California, and likely in the Northeast and Northwest this summer, the Federal Government should set a good example of conservation by reducing its own energy use, particularly in regions where electricity shortages may occur and during periods of peak electricity demand. Such conservation would save public money, protect the environment, and help to minimize shortages. The Federal government is in a position to reduce loads and make a sizable contribution in the effort to avoid electrical emergencies.

On May 3, 2001, President Bush issued a directive to the heads of executive departments and agencies to take appropriate action to conserve energy use at their facilities to the maximum extent consistent with the effective discharge of public responsibilities. He asked agencies located in regions where electricity shortages are possible to conserve, especially during periods of peak demand.

The Department of Energy is dispatching special Assessment of Load and Energy Reduction (ALERT) Teams to 25 Federal facilities in California. These ALERT Teams will identify key short-term measures to reduce peak load at these Federal sites. DOE will hold a workshop in the next few weeks to pass on the "lessons learned" to all Federal agencies.

Many Federal facilities recognize the financial benefit of planning for electrical load reduction, and have excellent plans in place (see article on page 10). The Federal Government as a whole reduced its energy consumption in buildings by 20% and is on track to reach a 35% reduction by 2010. These gains in efficiency also represent a corresponding reduction in demand on the electrical system. This experience forms the basis of this Federal-wide plan for all Federal facilities and support for local electric reduction efforts. Each facility plan should be customized to



President Bush, with Deputy Defense Secretary Paul Wolfowitz (left) and Secretary Abraham (right), speak with cabinet officers on his National Energy Plan.

site-specific conditions. Emergency conservation plans are required (see Title 10, Code of Federal Regulations, Part 436, Subpart F, Paragraph 436.105).

Reporting of Conservation Acts to the President

Agencies should review existing operating and administrative processes and conservation programs and identify and implement additional ways to conserve. All agencies were required to report to the President, through the Secretary of Energy, by June 3 on the conservation acts taken. Agencies shall take these and other appropriate energy conservation action using existing budget authority. The required format for the report has been provided by the Department of Energy's Federal Energy Management Program at www.eren.doe.gov/femp/resources/dir_guidance.html.

General Guidelines

1. Establish/enhance communication with the local utility company. Understand its need for load reduction. Work with the local utility to develop the individual facility plan. For example, in the summer of 1999, Washington, D.C. Federal agencies participated in the Potomac Electric Power Company (PEPCO) Curtailable Load Program. They provided about 8 megawatts of peak load reduction on five occasions when requested by PEPCO, assisting PEPCO, and enhancing grid reliability.
2. Identify load reduction measures appropriate for the facility. Investigate separating loads into three categories:

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(continued from previous page)

- (1) life, health and safety driven; (2) mission critical; and, (3) non-critical. If not separately switchable, investigate modifying systems to allow terminating or reducing non-critical loads.
 3. Agencies should immediately update their “Plan of Action for Emergency Electricity Reductions.”
 4. Federal facilities in California are encouraged to participate in the state’s May 24 Emergency Load Reduction Test. The California Energy Commission is sponsoring the test, with Federal participation coordinated by DOE. The test will measure actual energy conservation measures taken by Federal, state, local and private sector facilities. The California Independent System Operator will monitor the load reductions.
 5. During Stage 2 or 3 alerts in California Federal facilities should rapidly reduce electricity loads, even if these acts would require some sacrifices in employee comfort or convenience. These acts should include: raising indoor temperatures to 78 degrees; shutting down non-essential space cooling up to 1 hour before the normal close of each workday; turning off non-essential lighting and building systems such as escalators; a portion of all elevators; chilled water (for fountains); and, reducing corridor lighting. DOE facility managers are required to take these steps.
 6. Establish a system to alert employees of expected high demand days including, but not limited to e-mail, voice mail, or public-address announcements. Communicate early to allow employees to take load reduction measures at home and to dress appropriately.
 7. Monitor total facility demand and demand for individual major loads (if separate metering is available). Monitor weather forecasts to predict high-demand days and become proactive in communicating with the local utility to assess reduce load needs.
 8. Initiate load reduction measures. Employees can reduce lighting and personal computer and appliance use. While energy efficiency should be encouraged on a daily basis, stressing the need for increased diligence to alleviate an emergency is necessary. Air conditioning operating changes and other system-wide measures should be included. Federal facilities with energy management and control systems are well suited for this task. Consider additional measures appropriate for site-specific circumstances.
 9. Encourage employees to reduce electrical loads at home. When no one is at home during the workday, unneeded appliances and lights should be turned off, and air conditioning thermostats should be set higher before departing for the day. Also, some utilities offer cost incentives to residential customers that allow the utility to remotely cycle off power to air conditioning and electric water heating systems. Periods without power are limited, so that comfort is not sacrificed. Encourage employees to participate in these programs, to assist the local utility, and to reduce their electricity bill.
 10. Enhance employee awareness of energy efficiency. Provide mandatory and voluntary training opportunities on smart energy practices so employees may practice energy efficiency during emergencies and year-round. In addition to training, run public service announcements about energy efficiency on televisions in cafeterias and other public areas; send periodic e-mail messages about turning off lights and computers and implementing other efficiency practices; and post signs or billboards near light switches or communal printers. Consider holding an annual energy fair before seasonal emergency periods that provides additional information to employees on managing energy use in the work place and at home.
- **Lighting Specific Guidance for Employees**
 1. Turn off fluorescent lights when leaving an area for more than 1 minute. (During non-emergencies, 5 minutes is recommended, to keep from excessively reducing lamp life.) Turn off incandescent lights when leaving areas for any period of time.
 2. Where there is sufficient daylighting, turn off lights. Adjust blinds, if available, to reduce glare.
 3. Use task lighting and turn off general lighting, where it is to the level to maintain sufficient lighting levels for safety and productivity.
 4. Turn off display and decorative lighting.
- Personal Computers and Appliances**
1. Turn off printers when not in use.

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(continued from page 5)

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

• Air Conditioning Measures

1. Pre-cool building(s) below normal temperature settings before the onset of peak-demand period. Alert employees of this practice, so that they will not operate space heaters. During peak demand periods, allow space temperatures to drift back up to normal settings (or as much as 5 degrees Fahrenheit above normal settings).
2. Permit casual attire that make higher temperatures more comfortable.
3. When systems allow, lower the chilled water temperature several degrees below normal before peak periods, and then allow temperatures to drift above the normal setting during peak periods.
4. Set the duty cycle for air handling units to “off.” Ensure adequate outside air flow rates to maintain indoor air quality.
5. Ensure that ventilation grilles and fan coil units are not blocked by books, flowers, debris, or other obstructions. This will improve air conditioning-system efficiency and comfort.

• Other

1. Operate emergency generators. Many agencies have negotiated financial incentives with the local utility for operating generators. Ensure that generators have ample fuel for emergency operation and are routinely tested. Turn off shore power to ships in dock and operate ship power systems. Make mobile utility system electrical generating equipment available to the local utility.
2. Shut off selected elevators and escalators. Ensure accessibility needs are met.

3. Schedule high electric energy use processes during off-peak periods.
4. Discourage copier use during peak demand periods. Turn off selected copiers. Ensure the power-saver switch on copiers is enabled.
5. Turn off unnecessary loads, such as fountain pumps.

• Long Term Solutions

1. Purchase interruptible power for select loads with high demand that are not affected in the event of the utility turning off power. The cost saving from the lower rate may far outweigh the inconvenience of power with limits specified in the utility contract.
2. Install sub-metering to identify high intensity loads to shed during an emergency.
3. Investigate thermal storage systems or alternative energy sources for air conditioning.
4. Install motion sensors. Separate lighting circuits to turn off unneeded lights. (Some agencies have installed switching to separate public areas from agency work spaces).
5. Install an energy management and control systems to shed and monitor loads from a central location. If non-critical loads are not separately switched, modify systems to allow terminating. Local utilities or energy service companies can assist with this effort.
6. Add measures on-site generation using micro-turbines, fuel cells, combined heat and power, renewable, or other technology.

For implementation questions or assistance, please contact your DOE regional officer listed below.

Sharon Gill
Chicago RO
312-886-8573
sharon.gill@hq.doe.gov

Randy Jones
Denver RO
303-275-4814
randy_jones@nrel.gov

Paul King
Boston RO
617-565-9712
paul.king@hq.doe.gov

Eugene Lesinski
Philadelphia RO
215-656-6976
eugene.lesinski@hq.doe.gov

Cheri Sayer
Seattle RO - Financing
206-553-7838
cheri.sayer@hq.doe.gov

Lisa Hollingsworth
Atlanta RO
404-562-0569
lisa.hollingsworth@ee.doe.gov

Quick Response ALERT Teams are Ready



FEMP offers Federal customers energy surveys with the SAVEnergy Audit Program to identify and implement energy efficiency, renewable energy, and water conservation measures. The SAVEnergy Team helps agency energy managers arrange for building audits, identify cost-effective technology retrofits, review funding alternatives, and develop monitoring strategies.

From the foundation of the SAVEnergy Audit Program, FEMP is launching Assessment of Load & Energy Reduction Techniques (ALERT) Teams to move quickly where Federal sites experience price volatility and dramatic increases in energy cost.

Recent developments in the electric utility industry accentuate three areas of concern at Federal facilities: (1) reducing peak electrical loads (to manage costs), (2) stressing the importance of on-site generation (reliability concerns), and (3) using public benefit funding to offset project costs. ALERT Teams are organized for rapid mobilization to address these concerns as follows:

- Assess conservation, energy efficiency, and distributed energy resource opportunities and identify feasible measures to implement.
- Identify available public benefit funds. Funding for efficiency and demand reduction is increasing dramatically, but these programs move fast. A confusing about application process is common. ALERT teams will identify and file applications for these funds for Federal projects.
- Develop with site staff an implementation plan.
- Start rapid implementation of low-cost/no-cost measures.

ALERT Teams can move very quickly and address urgent agency needs to manage price volatility and escalating energy cost. Using existing studies will accelerate load reduction activity and implement operation and maintenance strategies that result in reduced energy cost.

For more information, visit the FEMP Web site at www.eren.doe.gov/resources/dir_assessment.html, or contact Brad Gustafson of FEMP at 202-586-5865 or brad.gustafson@ee.doe.gov; or Cheri Sayer at FEMP's Seattle Regional Office at 206-553-7838 or cheri.sayer@hq.doe.gov.



Much like the SAVEnergy Audits, ALERT Teams will be dispatched to Federal sites to determine the best means of reducing a facility's energy consumption.

California Survival Strategies

Public Benefit Funding Programs Suitable for Federal Facilities

California's electricity crisis prompted the State's policymakers, regulators, and utilities to substantially increase energy efficiency and peak demand reduction programs. As a result, all energy users in California—including Federal customers—now face an array of energy efficiency, peak demand, and demand response programs.

Energy Efficiency Programs

Several existing energy efficiency programs are available to Federal customers in California. These programs are offered by the State's investor-owned utilities (IOUs) and by municipal and publically-owned utilities.

Energy efficiency programs administered by IOUs—Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, and Southern California Gas—are overseen by the California Public Utilities Commission (CPUC). In January, the CPUC approved energy efficiency programs valued at more than \$320 million for 2001.

A program of particular interest to Federal customers is the statewide standard performance contracting program, where financial incentives are included for both energy savings and peak demand reductions. The contract term is now 1 year, with simpler measurement and verification requirements.

The CPUC also expanded funding for the Express Efficiency program, which provides rebates for efficient equipment, and the Savings By Design program that provides incentives and technical assistance for new construction and major renovations. The CPUC also directed the utilities to set aside 8% (\$23 million) for "third-party initiatives" that will be awarded to energy service providers and/or customers based on proposals submitted to the utilities.

California's municipal and publically-owned utilities offer energy-efficiency programs that vary by utility. Check with the local utility for the available programs.

Peak Demand and Demand Response Programs

California implemented several programs encouraging customers to reduce peak electricity loads.

In February, the CEC awarded \$43.5 million in grants for 94 projects with an estimated peak load reduction of 284 megawatts. (See www.energy.ca.gov/efficiency/ab970.)

Federal customers are strongly urged to apply for CEC grants, such as Demand-Responsive HVAC and Lighting, Innovative Energy Efficiency and Renewables, and LED Traffic Signal Conversion. The CEC provides grant funding, typically around \$250 per kilowatt, for "innovative" energy efficiency as well as demand management technology/strategies.

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Learn more on
Public Benefit Funding at
[www.eia.doe.gov/cneaf/
electricity/chg_str/pbp.html](http://www.eia.doe.gov/cneaf/electricity/chg_str/pbp.html)

CALIFORNIA SURVIVAL STRATEGIES

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California's Independent System Operator (CalISO) developed three demand response programs. First, Federal customers reducing demand by at least one megawatt or those working through a load aggregator (e.g., utility, retail energy service provider) can participate directly as customers in the Demand Relief Program. The CalISO pays customers a monthly reservation payment of \$20,000 per megawatt-month for its right to curtail load on weekdays (between 11 a.m. and 7 p.m. from June through September), regardless if asked to curtail. Customers also are paid \$500 per megawatt for the actual demand that is curtailed. Curtailment is limited to 24 hours per month, and customers need special meters to participate.

By February, CalISO approved more than 1,155 megawatt of demand reduction offers and started contract negotiations for another 596 megawatt.

Another option is the CalISO's Participating Load Program (i.e., Ancillary Services) that allows customers to bid directly into CalISO-run markets for non-spinning reserve, replacement reserve, and supplemental energy. (In 2000, the program's stringent telemetry requirements posed a major technical barrier, but these requirements are being rethought for 2001.)

CalISO developed a Discretionary Load Curtailment Program operates year-round and for voluntary curtailment prior to emergency condition. Calls are placed to aggregators early in the morning or in the late afternoon the day prior to the emergency alert or warning.

Federal agencies can be load aggregators or can work through other aggregators like utilities. CalISO requests curtailments on the day-before or day-of and then pays participants between \$250 to \$500 per megawatt for demand reduction. An RFP for this program was issued on April 11 and offers to pay load aggregators \$350/megawatt hour for load curtailments in response to CalISO requests.

Several California utilities offered pilot "voluntary" demand response programs in 2000, like Pacific Gas & Electric's E-Bid program. In these programs, eligible large commercial/industrial customers were notified when day-ahead

forecast prices in the Power Exchange were above a certain trigger price. Customers could then offer "voluntary" demand curtailment through a Web-based system, that calculated the estimated financial incentives for reducing demand. Customers were not penalized for failing to reach these reductions, but were compensated for actual demand curtailment in a billing credit. The utilities propose to expand these programs in 2001 to create a Voluntary Demand Response Program for each utility.

Since the mid-1980s, California utilities offered a Non-Firm Rate Tariff with a 15% discount to large commercial and industrial customers willing to curtail load to a specific firm-service level, when needed. Program rules specify the frequency of interruptions, maximum hours per interruption, and total hours of interruption allowed per year. There are substantial penalties for non-compliance.

Historically, these customers were infrequently asked to curtail, but this changed dramatically in 2000 when these programs needed 1,200 to 1,400 megawatts of demand curtailed during system emergencies. This load reduction was critical to avoiding Stage III emergencies on several occasions. In 2001, the CPUC and utilities will revise the program to encourage continued customer participation.

FEMP continues to monitor and update Federal customers on these rapidly changing and complex situations in California. Federal customers are strongly encouraged to carefully evaluate and consider participating in all energy efficiency and peak-demand reduction programs as a way to improve operations and to help ease the severe electricity crisis that has gripped the state and region.

Details on programs and information about energy efficiency and demand-response opportunities available to Federal customers are on FEMP's restructuring site, www.femp-restructuring.org

Contact Brad Gustafson of FEMP at 202-586-5865 or brad.gustafson@ee.doe.gov for more information.

California Governor Unveils Energy Rebate Program for Energy-Efficient Consumers

California electric customers will receive a 20% rebate on their summer electric bill when they cut their electricity use to 80% of last summer's levels under an executive order unveiled by Governor Gray Davis.

The "20/20" program is designed to help the state avoid the likelihood of blackouts this summer. It is entirely voluntary and open to residential, commercial, and industrial customers. Residential and small commercial rebates require a 20% reduction of total consumption, while large commercial and industrial customer rebates will require a 20% reduction of peak load.

Federal customers are eligible for this rebate. Energy and facility managers

should contact their utility to enroll in this program. Because it is voluntary, there is no penalty if the reduction goals are not met.

Monthly energy cost could be reduced by as much as 40% by participating in the 20/20 program – 20% from demand reduction and a 20% reduction in the customer's summer bill. The benefit to the state from this program also could be significant – if only 10% of electric utility customers achieve the 20% reduction, it could result in a 3,500 gigawatt hour reduction in overall energy consumption and a 2,200 megawatt reduction in peak consumption. Tremendous saving comes from the avoided cost in power—between \$400 million and \$1.3 billion. Program savings also result from the significant decrease in energy prices from demand reduction.

Rebates will be issued at the end of the June-September period. The 20/20 program for Summer 2001 is a major component of Governor Davis' comprehensive energy efficiency and demand reduction program. Since January, Governor Davis has instituted various conservation measures to help Californians conserve energy, including:

- Directing more than \$800 million for programs to improve conservation and efficiency;
- Implementing aggressive conservation measures in state buildings, that have saved about 200 megawatts during energy emergencies;
- Developing a comprehensive outreach and education campaign to reach businesses, organizations, and millions of California consumers;
- Partnering with other Governmental entities, including school districts, to ensure that all 475 cities, 58 counties, and 8,300 schools in California reduce consumption;
- Adopting the strongest energy efficiency standards in the world for residential and non-residential buildings and appliances; and
- Incorporating energy-efficient, sustainable building designs in new state building projects.



Monthly energy cost could be reduced by as much as 40% by participating in the 20/20 program . . .

Visit the California Web site at www.governor.ca.gov. Click under the "Issues" header and go to the energy link for the latest news.

Denver Federal Center Overhauls for Total Efficiency

In Colorado, as in other parts of the country, Federal Energy users are vigorously trying to reduce electric peak demand. This is especially true for managers at the Denver Federal Center, a massive, 640-acre complex — more than 90 buildings with 4.2 million square feet.

But reducing electricity was not the only result the energy managers were looking for in a facility-wide upgrade, according to Scott Conner, Program Manager at the Denver Federal Center. “We’re home to many Federal agencies in the Denver area, such as the Bureau of Reclamation and the U.S. Geological Survey. We want to make sure these tenants are satisfied and working in a productive atmosphere,” Conner said.

Using the DOE Central Region Super energy savings performance contract (ESPC), the Denver Federal Center awarded a contract to Johnson Controls, Inc., for a comprehensive energy retrofit project. Because the Center has multiple buildings, Johnson Controls suggested a manageable, two-phase approach. Phase I consisted of retrofits to nine buildings, resulting in a total energy reduction of 34 billion Btu.

The energy-saving and building performance strategies include:

- Optimizing boiler plant operation;
- Installing new high-efficiency chillers for the existing central chiller plant;
- Using new high-efficiency pumps and variable frequency drives (VFDs) for the flat-plate heat exchanger;
- Controlling primary and secondary chilled water systems with VFDs;
- Retrofitting controls and upgrading air handling units, chiller plant, and other HVAC equipment;
- Retrofitting lighting and lighting controls; and
- Starting a renewable energy project—recommissioning an existing solar domestic hot water heating system.

Employees of Denver Federal Center’s Building 67, housing the Bureau of Reclamation, benefit from the facility-wide upgrade, which not only focused on electricity reduction, but also on a productive atmosphere in which to work.



In addition to energy savings, the Denver Federal Center saves water with an improved irrigation control system — sensors in the ground indicate when the landscaping needs water, rather than using preset time clocks. Water savings from the project are about 11 million gallons a year.

“While Colorado is lucky we haven’t seen any electric supply shortages, we’re certainly aware of the potential for power disruptions,” said Conner. “This comprehensive project ensures that Federal agencies—and taxpayers—benefit from wise energy management and increased efficiency. Our building tenants also have a brighter, more comfortable place to work.”

Conner notes that the project was recognized this year with a GSA Environmental Award for water conservation and reducing air pollution emissions.

The project’s first phase is 90% complete. It is expected to result in emission reductions of more than 6.6 million lbs. of carbon dioxide, 14,000 lbs. of nitrogen oxides, and 32,000 lbs. of sulfur dioxides. Phase II of the project begins soon.

For additional information, contact Scott Conner at 303-232-7174 or Andrew Morton at 303-932-3795 or andrew.m.morton@jci.com.

Driving Air Compressors with Gas Saves Fuel

Although electricity only accounts for about one-third of DoD energy consumption, it comprises two-thirds of the DoD's energy bill. Downsizing and consolidating facilities provides DoD an opportunity to upgrade remaining facilities with more efficient and cleaner equipment.

The Army Materiel Command plans to reduce its over-all environmental impact and energy consumption. It tasked the Army Construction Engineering Research Laboratory (CERL) to conduct a natural gas-engine-driven air compressor (NGEDAC) technology demonstration. The energy cost of operating a NGEDAC is usually less than operating an electric-motor driven unit. The higher initial capital cost is off-set by differences in gas and electric rates, partial-load operating efficiency, peak electric demand reduction, heat recovery capability, and by eliminating back-up generation.

DoD industrial facilities have a variety of process operations to manufacture munitions, weapon systems, tactical vehicles, aircraft, and naval vessels. Air compressor use in process operations is widespread in DoD.

An August feasibility assessment determined that Picatinny Arsenal in Northern New Jersey was a good site for a demonstration project, so CERL is installing one this summer.

The annual energy cost for the existing electric-driven air compressor system is \$58,000. With the \$160,000 natural gas system, CERL expects a \$21,000 drop in net operating costs and \$32,000 less in fuel cost.

The Picatinny site provides for a fairly straightforward technology application and demonstration with a very manageable system size. It affords DoD an excellent opportunity to test "gas/electric-hybrid system operations." In addition, the Arsenal gains experience with energy savings performance contracting to implement the recommended system optimization improvements. An internet site for NGEDAC technology transfer to public and private industrial sectors is planned.

For details, contact Richard Sloboda of Picatinny Arsenal at 973-724-7542 or Mike Linat, CERL, at 800-872-2375.

CDC's Roybal Campus Saves Six-Figures

For uninterrupted operation during potential disease outbreaks and related research, the Department of Health and Human Services' (HHS), Center for Disease Control and Prevention (CDC) Roybal Campus in Atlanta, GA, uses back-up fuel oil generators capable of powering the entire campus. Although utility power interruption is rare in Atlanta, the hourly ("real-time") pricing of electricity consumption is often a major cost issue. Electricity rates can soar from an average \$0.03 per kilowatt hour during normal operating conditions to nearly \$2.00 a kilowatt hour during high summer use. Thus, the CDC is using generators to reduce summer peak electrical loads.



Fuel oil generators used for peak load shedding at the CDC Roybal Campus in Atlanta, Georgia.

Georgia Power Company provides the CDC with advance notice of the next day's hourly rates. When the rates soar on hot summer afternoons, CDC Operations activate the emergency generators. During the long, sweltering summer of 1999, these generators cut the August electric bill by \$100,000 (approximately 50% of the average total bill). In FY 2000, CDC estimates that roughly \$200,000 was saved due to

peak-load shedding. Although the utility implemented some efficiency improvements in the past 2 years, CDC is anticipating FY 2001 savings of \$500,000. With the increased cost of fuel, Georgia Power predicts peak rates to average \$0.35 per kilowatt hour this summer, while CDC estimates on-site electricity generation cost at \$0.07 per kilowatt hour.

CDC's long term response to potential power shortages with onsite electricity generation represents innovative facility management, with a commitment to efficient energy management and the environment.

For more information, contact Ted Hyatt of CDC at 404-639-0329.

Navy's Southwest Region Aggressively Reduces Energy Use

With annual electric consumption at 800,000 megawatt hours, the U.S. Department of the Navy is San Diego Gas & Electric's (SDG&E) largest customer. Public Works Center San Diego's peak demand of 130 megawatts, represents 3% of SDG&E's peak load and 0.3% of all the peak load in California.

With its high energy use and associated energy and demand cost, conserving energy and reducing peak demand is not new to the Navy. The Navy Region Southwest (NRSW) Regional Energy Program Office was established in 1999. Prior to the California energy crisis in the summer of 2000, the NRSW acted to rein in energy consumption and reduce peak demand. Its major initiatives included:

- Re-establishing the Utility Demand Reduction Program;
- Installing energy-efficient fluorescent lighting and LED exit signs throughout the San Diego area;
- Expanding electric, water, and gas metering with more than 3,600 electric meters; 66% of which are demand-interval meters;
- Establishing an energy-efficient procurement policy;
- Placing 35 kilowatts of photovoltaic power and three 225-kilowatt wind turbines on line; and
- Recruiting a Resource Efficiency Manager.

Despite significant efforts resulting in efficiency gains, electricity costs rose in FY 2000 to \$70.7 million from \$49.5 million in FY 1999. NRSW responded with renewed zeal.

Today the Regional Energy Office broadcasts daily energy updates and load reduction alerts by e-mail and has set a permanent demand-reduction condition for August. Top-level messages prescribe load reduction measures. All air conditioning is banned, except for medical and critical equipment. Policy dictates turning off personal computers and office equipment at night. Eleven energy "specialists"



A 21.6 kilowatt photovoltaic system on Bldg 678, Naval Air Base Coronado, California.

were deployed to provide assistance. Weekly load profiles, issued for each base and the 10 largest consumers, were identified. Weekly electricity action meetings and Electricity Summits were convened.

NRSW maintains constant communication with the Department of Energy and the California Energy Commission. A communications tree is in place for

Commanding Officers and Navy and Marine Corps Action Officers in California.

Energy-intensive operations and training are now scheduled outside peak demand periods. Training schedules are compressed to fewer days to conserve energy. Additionally, there are restrictions on administrative and holiday lighting.

Being Proactive Keeps All Energy Aware

The Building Energy Monitor (BEM) network keeps personnel informed of developments, instructs personnel on needed actions, and provides positive reinforcement. The Regional Energy Office provides the expertise and the energy data specific to each building, through a Web-based demand-management system. The BEM provides the "knowledge" of the building's operations and requirements and identifies the building's deficiencies. The BEM generates many valuable ideas for reducing demand for the Energy Office.

NRSW also supports all-hands energy training, briefs key personnel, and recognizes top performers. In October the Naval Base San Diego commanding officer presented the Civilian Meritorious Service Medal to the bachelor housing site manager for his proactive installation of energy-efficient refrigerators, compact fluorescents, and clothes washers.

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NASA's Jet Propulsion Lab Shifts Load Off-Peak

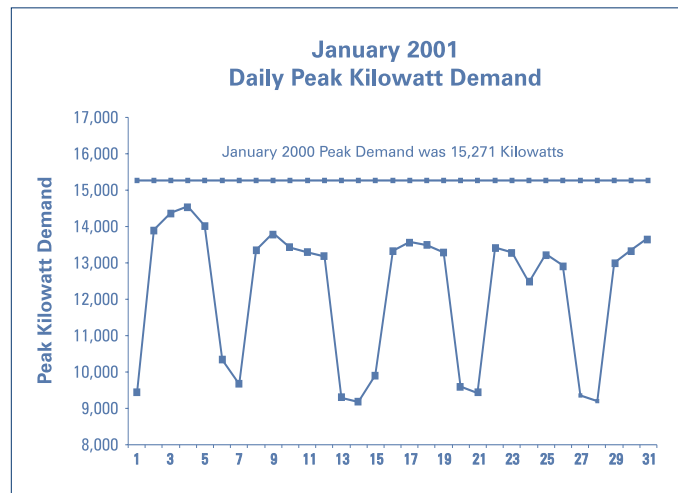
The National Aeronautic and Space Administration (NASA) Jet Propulsion Laboratory (JPL) in Pasadena is reducing its risk of “rolling blackouts” in California by reducing its load on the power grid.

JPL receives its electric power over a 66-kilovolt distribution line. Policy protecting 66 kilovolt and higher transmission lines from rolling blackouts was recently rescinded. JPL is included on the “essential facilities” list by Southern California Edison and is subject to rolling blackouts only as a last resort. However, a recent California Public Utilities Commission action suspending the voluntary power interruption program increases the likelihood of rolling blackouts.

Since October, JPL has significantly reduced connected load. JPL is refocusing its energy management efforts with a shift of electric load to off-peak hours. This change required a concerted effort by all JPL organizations and employees. January's demand reduction ranges between 5% to 12% over January 2000, as shown in the figure above.

Achieving this result required JPL to:

- Notify all JPL employees of the energy supply crisis and the need to conserve,
- Operate emergency diesel generators during winter peak hours,
- Shut down chillers in several buildings at 3:30 p.m. daily,
- Thoroughly review all standing and new requests for after-hours cooling and heating eliminating unnecessary energy use,
- Set building thermostats at 20°C (68°F) for heating and 25.6°C (78°F) for cooling in non-critical areas,



- Request janitorial and security personnel to turn off lights when work is completed, and
- Direct staff to turn off computers and non-technical workstations overnight.

Other options under consideration include:

- Alternative operating schedules,
- Increase emergency generator permits from 200 hours to 500 hours of operation,
- Re-programming funds for a fast-track project — installing motion sensors to control lighting in large open office areas,
- Notifying building occupants when lights are on after normal work hours,
- Delaying “early start” times for certain HVAC systems, and
- Enabling power management features on computers and disabling screen savers on ENERGY STAR® compliant monitors.

JPL also is considering:

- Instituting alternative work schedules during late July to early September to help reduce summer peak loads,
- Operating emergency diesel generators to the maximum limit allowed before October 1,
- A capacitor bank to improve power factor, and
- Increasing emphasis on employee energy conservation awareness.

For more information contact Richard Wickman of NASA at rwickman@hq.nasa.gov.

Wind Generates Huge Savings in the Middle of the Atlantic

The U.S. Air Force Space Command (AFSPC) operates a down-range missile and satellite tracking station on Britain's Ascension Island. The island is located 500 miles south of the Equator in the middle of the Atlantic, and electricity is from fuel oil-fired generators. To reduce the need for fuel oil, AFSPC is taking advantage of wind generation. The DoD Energy Conservation Investment Program (ECIP) installed four 225-kilowatt wind generators to supplement the station's power requirements. The project lowers fuel use by 287,000 gallons (39.8 billion Btu) which equates to \$350,000 annually. The project also reduces carbon dioxide and nitrous oxides by 2.8 million and 98,000 pounds, respectively, each year.

Wind generated power is fed onto the station's high-voltage electrical distribution system. The total project cost was \$3.1 million; the life-cycle cost analysis showed a savings-to-investment ratio (SIR) of 1.66 and a payback of 8.9 years. The actual construction took only 6 weeks. The contract was completed on time and within budget.

One unique feature of the installed wind machines allows electrical production at low wind levels. Instead of standing idle, the turbines slip into a mode that generates 40 kilowatts instead of the usual 225 kilowatts.

Because the project is so successful, AFSPC is submitting another ECIP project for an additional 1,500 kilowatts of wind generation. This project has an SIR of 2.52 and a payback of 7.17 years. The total cost is \$4.6 million with annual savings estimated at 65 billion Btu and \$485,000.

For more information on the Ascension Island wind project, contact Rich Bauman at 850-283-6206.

AFSPC Tracking Facility, Ascension Island

- 4,000 acres leased from the United Kingdom
- Average wind speed = 17 mph
- Annual fuel use before wind turbines = 1.3 million gallons
- Fuel use with four 225 kilowatt wind turbines = 1 million gallons
- Fuel savings = \$350,000 per year = 39.8 billion Btu



As concern about the global environment grows, international utilities are looking more seriously at wind systems to support remote need.

New York Governor George E. Pataki's administration is concerned about the potential for power shortages this summer. As a result, the state's power grid managers are taking steps to encourage businesses to run backup diesel generators at peak times during the summer.

The proposal has some people concerned because of its potentially harmful effect to the environment. "I can understand the criticism," said Richard M. Kessel, chairman of the Long Island Power Authority. "But there's a struggle to get every megawatt we can to make sure that Long Islanders don't experience what Californians are going through."

Another measure ensures natural gas power availability this summer. The New York Power Authority is installing 11 small natural gas-fired power plants in New York City and on Long Island. The installations should be completed this summer.

The Independent System Operators or agencies that run power grids for New England, New Jersey, Pennsylvania, Maryland and parts of Virginia, have similar plans encouraging the use of diesel generators.

To prepare for the rapidly-changing landscape in California energy markets, the Defense Energy Support Center (DESC) recently awarded two Basic Ordering Agreements (BOAs) for electricity supply. BOAs are acquisition instruments negotiated between the supplier and user of products or services. DESC's California BOAs for electricity may be just the ticket for a Federal agency trying to lock in price and stabilize the power budget—especially for a facility in San Diego Gas & Electric's service territory.

DESC awarded the BOAs to Sempra Energy Solutions and Coral Power. Both contractors can meet Federal customers' supply needs and have extensive knowledge of the California market. The contractors are major industry players and will compete for Department of Defense and Federal civilian agency requirements.

With pre-negotiated BOAs in place, DESC is able to meet Federal customer needs in a very short time. To make an award for a facility, DESC will retrieve usage and load data from the local utility, with the customer's approval. DESC then solicits the requirements in a Request for Price Submittal. In about 7 days, price offers are received and evaluated, then an award is made within 24 hours, but only after the price is coordinated with the customer. DESC awards contracts with terms longer than 1 year and up to 5 years, based on customer preferences.

DESC has a Market Research Office and utility industry consultants to assist DESC and its customers with timing and pricing issues.

If you would like to have your electricity requirements competed by DESC, call Jake Moser at 703-767-8328 or John Nelson at 703-767-8333.

New York Wants On-Site Power to Fight Blackouts

DESC Awards New Agreements in California

Grind Grain, Pump Water, Generate Electricity — Wind Does it All

Aside from powering the sails on boats, wind has been used throughout history as the energy for everyday tasks. The first windmills automated the tasks of grinding grain and pumping water, with the earliest-known system in Persia about 500-900 A.D.

Today, across the United States, wind power is attracting renewed interest with utilities, consumers, and policy makers. In a few states, customers choose wind power because of its low emission levels and good sustainability.

Here are some new wind power projects:

Pennsylvania — A consortia of companies and organizations announced a partnership to build a 15-megawatt wind energy project in Fayette County as a new source of power in the state's competitive electricity market. The Mill Run Wind Project will be built by Atlantic Renewable Energy Corporation and marketed to retail customers by Community Energy, Inc.

Texas — Enron Wind plans a 135-megawatt wind power facility in Pecos County. An Enron affiliate will purchase the output under a long-term agreement and resell the output in the Texas wholesale electricity market. The project will be the first major wind facility where wholesale customers can purchase a

portion of the power output, rather than having to contract for the entire amount.

Pacific Northwest — PacifiCorp Power Marketing, Inc. (PPM), and FPL Energy, LLC, formed a partnership to develop and market power from a 300-megawatt wind plant along the Washington-Oregon border. It will be the world's largest single wind energy development. FPL Energy will build, own, and operate the wind farm and PPM will purchase and market the output for 25 years. PPM will use hydropower to "shape" the wind energy into a firm energy product and market it.

Midwest — UtiliCorp United will purchase all output from a 110-megawatt wind farm being constructed near Montezuma, Kansas, by FPL Energy, LLC, with 80 megawatts for customers in Kansas and Missouri. UtiliCorp will market 30 megawatts to regional wholesale customers. The utility company started selling a wind product to its retail customers in 1999 from a two-turbine wind power project in northeastern Kansas that is owned by Western Resources.

For more information on wind energy, visit these Internet sites:

- *American Wind Energy Association - www.awea.org.*
- *Energy Efficiency and Renewable Energy Network - www.eren.doe.gov/state_energy.*

Wind's Essential Benefits

- Wind energy cost is dropping quickly. It's about 80% less than in the mid-1980s. Its cost is expected to decrease by another 35% to 40% in the next 5 years. Wind energy is now nearly competitive with traditional power technology.
- Wind energy is free of the environmental cost of mining, drilling, processing, or transporting a fuel.
- Wind energy produces no emissions. There is no harm to the environment or public health from emissions and waste.

Wind's Unlimited Potential

The top 10 states with wind energy potential, as measured by annual energy potential in the billions of kilowatt hours, are:

1. North Dakota
2. Texas
3. Kansas
4. South Dakota
5. Montana
6. Nebraska
7. Wyoming
8. Oklahoma
9. Minnesota
10. Iowa

Wind's Capability

- Current wind capacity = 2,550 megawatts = 5.5 billion kilowatt hours/year
- Potential annual production = 10,777 billion kilowatt hours/year
- Total capacity when current projects are completed = 4,500 megawatts

DER Rapidly Emerging as Viable Solution

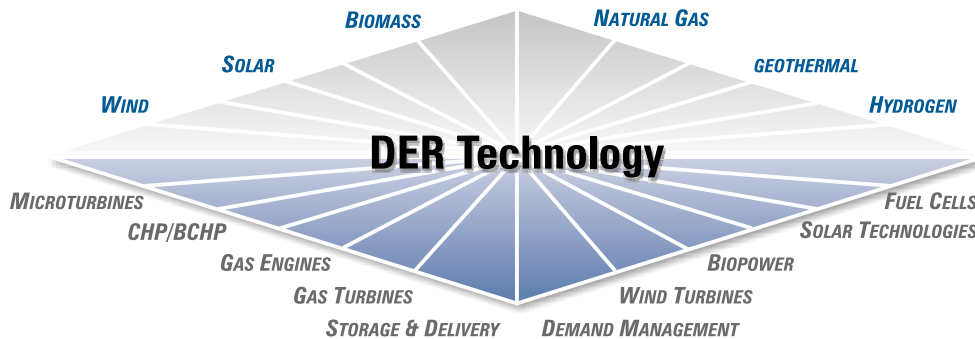
Working with its industry partners, DOE's Office of Power Technologies supports Distributed Energy Resources (DER) projects. A DER system is typically a small, modular, decentralized, grid-connected or off-grid technology located in or near the place where power is used. DER systems use renewable energy sources and/or natural gas and other fossil fuels. This year FEMP is funding \$600,000 toward several DER projects.

DER systems are coming to the forefront with the demand for more fuel-flexible, energy-efficient equipment, and for systems that reduce on-peak operating cost and increase reliability closer to the end use. Customers are beginning to favor small, modular power, and combined heat and power systems that serve as an economic hedge against peak energy prices, eliminate or reduce grid reliability problems, and will lower future emissions cost.

renewable distributed generation and granted a 50% tax credit for renewable distributed generation between 10 and 200 kilowatts.

DER benefits Federal customers with—

- **Improved Power Quality** - DER allows energy users to manage short-term outages of a few minutes or less. Technology includes uninterruptible power supply from photovoltaics, microturbines, or fuel cells.
- **Stand-by Power** - DER provides back-up power during longer outages. Technology includes batteries and photovoltaics, natural gas generator sets, microturbines, and small modular biomass systems.



DER technology includes:

- Microturbines,
- Advanced industrial turbines,
- Fuel cells,
- Cooling, heat and power systems,
- Geothermal systems,
- Hybrid systems (fuel cell-combustion turbine and renewable-fossil systems),
- Photovoltaic systems, and
- Wind energy systems.

Federal agencies can use DER to cut overall energy cost and to promote energy efficiency and environmental performance. California legislation funded \$50 million in rebates for

- **Peak Shaving** - DER supplies power at peak demand periods, avoiding excessive demand or time-of-use energy rates.
- **Combined Heat and Power** - DER can provide both baseload electric energy and heating for facility use or process applications. Technology includes fuel cells, microturbines, natural gas internal combustion engines, traditional gas turbines, and small modular biomass.

For more on DER, contact Lynne Gillette of DOE's Office of Power Technologies at 202-586-1495 or lynne.gillette@ee.doe.gov. For more information on the FEMP DER call for projects, contact Shawn Herrera of FEMP at 202-586-1511 or shawn.herrera@ee.doe.gov.

2001 Power-Related Conferences

JUNE

2001 APPA National Conference
Washington, DC
www.appanet.org
June 18-20

What Generation Developers Need to Know About Transmission
Washington, DC
www.euci.com/Conferences/wgdjun01.htm
June 20-22

Engineering and Planning for Aging Power T&D Infrastructures
Washington, DC
www.euci.com/Conferences/eapjun01.htm
June 20-22

JULY

Increasing Productivity through Energy Efficiency
Tarrytown, NY
www.aceee.org/conf/01ss/program.htm
July 24-27

AUGUST

Micro-Hydro Power
Carbondale, CO
www.solarenergy.org/michydro.html
August 13-18

Integrated Energy Efficiency 2001
Cleveland, OH
www.aeecenter.org/shows
August 29-30

SEPTEMBER

Eye for Energy USA 2001
New Orleans, LA
www.eyeforeenergy.com/usa2001/index.shtml
September 9-12

Energy Economy Conference and Exhibition
Houston, TX
www.energy-economy.com
September 10-12

OCTOBER

Pacific Northwest Strategies Conference
Portland, OR
www.ziffenergyconferences.com
October 2-3

Power Techniques for Power Purchasing: Profiting from Deregulation
Kansas City, MO
www.energyseminars.com
October 4-5

Federal Utility Partnership Working Group
Oklahoma City, OK
www.eren.doe.gov/femp/utility/fupwg.html
October 10-11

Combined Heat & Power Expo/Cogeneration Congress
Atlanta, GA
www.aeecenter.org/shows
October 24-26

World Energy Engineering Congress 2001
Atlanta, GA
www.aeecenter.org/shows
October 24-26

2001 Transmission and Distribution Conference and Exposition
Atlanta, GA
www.ieeet-d.org
October 28 - November 2

NOVEMBER

Business Energy Solutions 2001
Orlando, FL
www.aeecenter.org/shows
November 28-29

Energy & Electricity Reliability Online Resources

Online resources can provide useful information to save energy this summer.

Federal Sites

- Department of Energy's Federal Energy Management Programs
www.eren.doe.gov/femp
- Department of Energy's Office of Power Technologies
www.eren.doe.gov/power

Industry Sites

- Edison Electric Institute
www.eei.org
- National Association of Regulatory Utility Commissioners
www.naruc.org
- North American Electric Reliability Council (for electricity reliability assessments)
www.nerc.com/~filez/rasreports.html
- Energy Information Administration
www.eia.doe.gov/cneaf/electricity/page/restructure.html
- Electric Industry Restructuring
www.femp-restructuring.org
- Energy-efficient product information
www.energystar.gov
- FEMP's *Greening Federal Facilities* is an excellent guide for Federal facility managers and covers specific ways to reduce energy consumption and costs.
www.eren.doe.gov/femp/greenfed
- *Handbook for Promoting Behavior-Based Energy Efficiency in Military Housing* provides tips and strategies to reduce energy end-use.
www.eren.doe.gov/femp/yhtp/strategies.html



NAVY'S SOUTHWEST REGION AGGRESSIVELY REDUCES ENERGY CONSUMPTION
(continued from page 13)

Project Financing Saves \$\$\$ and Btu

With dwindling resources, utility energy service contracting (UESC) and energy savings performance contracting (ESPC) play a major role in funding energy efficiency projects and initiatives. NSRW awarded \$21 million in DSM projects in September. A \$2.1 million ESPC delivery order for high-intensity discharge lighting retrofits was awarded in March. Additional UESC and ESPC projects totaling \$30 million to \$40 million are under development for award later this year. These projects eliminate 50,000 incandescent light bulbs and replace 1,200 refrigerators.

Distributed Generation

NSRW plans three ESPC delivery orders:

- Two 75-kilowatt microturbines that will use waste heat to pre-heat the existing high-temperature hot water return system at Coronado Naval Air Base.
- A 30-kilowatt photovoltaic system.
- Expansion of the Naval Medical Center, San Diego cogeneration plant.

For more information, contact Lieutenant Commander Wade Wilhelm, U.S. Navy, at 619-556-7013 or wilhelmwb@pwcnsd.navy.mil.

INNOVATIVE TECHNOLOGY CORNER

*Brought to you in cooperation with the EERE
Inventions and Innovation Program.*

This new feature of *FEMP Focus* will highlight several new products developed by private companies in cooperation with DOE's Inventions and Innovation Program. EERE's Office of Industrial Technologies has a complete listing of these new technologies on its Web site @ www.oit.doe.gov/factsheets. Over time, FEMP will attempt to cover all new products developed through the Inventions and Innovation program that are relevant to Federal energy managers. In this feature, the first technology is emerging with first-round tests completed at Detroit Edison. The last two technologies are commercialized.

Deep-Discharge Zinc-Bromine Battery Module

Worried about the loss of critical loads during rolling blackouts? ZBB Energy Corporation's new deep discharge zinc-bromine battery module may provide your facility with both peak load shaving opportunities and highly reliable power delivery for mission-critical operations. ZBB's new F2500 is a transportable energy system that uses a zinc-bromine flow battery.

Zinc-bromine batteries have several advantages over traditional lead/acid batteries. Zinc-bromine batteries have increased energy density, providing more energy at less weight and reduced disposal concerns because only the battery stack must be replaced. Plus, zinc-bromine batteries allow for complete battery discharge, improving battery capacity, and extending cycle life. Modular construction allows for optimal sizing and portability of the system to suit widely varying applications.

The batteries also improve the cost effectiveness of solar, wind, and other renewable technology by allowing power produced during off-peak hours to be delivered reliably during peak consumption.

To find out more about ZBB's battery systems, see the DOE fact sheet online (which includes the Web address for Detroit Edison's press release) @ www.oit.doe.gov/factsheets/inventions/pdfs/zinc_brom.pdf or contact Rob Perry of ZBB Energy Corporation at 414-476-6680 or www.zbbenergy.com.

Dual Fuel Conversion System for Diesel Engines

Air quality restrictions got your diesel genset down? Consider converting it to dual fuel. Energy Conversions, Inc.'s (ECI) new dual fuel conversion system easily converts diesel engines into diesel-natural gas engines. The system reduces emissions by allowing engines to operate cleanly on domestically produced natural gas, while still maintaining the potential to operate on traditional diesel fuel. Ignition is reached through a pilot injection of about 5% diesel, the remaining 95% of fuel being burned is natural gas. The system maintains original engine power and significantly reduces emissions such as particulates and nitrogen oxides (NO_x).

Dual fuel capabilities also provide redundant reliability not available with a dedicated natural gas unit and provide opportunities for economic fuel switching. The ECI system also reduces maintenance cost by using cleaner fuel that leaves less carbon buildup.

To find out more about this system, check out www.oit.doe.gov/factsheets/inventions/pdfs/dual_fuel.pdf or contact Paul D. Jensen of Energy Conversions, Inc. at 253-922-6670 or www.energyconversions.com.

PowerGuard® Solar Roofing System

How can you increase energy reliability, reduce peak demand and energy consumption, and reduce harmful emissions associated with power generation in a life cycle cost effective way? PowerLight Corporation's new PowerGuard® solar roofing system may be the answer. PowerGuard®'s technology represents a novel approach to lowering the installed cost of photovoltaic power. The patented design joins two established products into a single roofing panel specifically for flat or nearly flat roofs.

PowerGuard® integrates PV modules with extruded polystyrene insulation to form an insulating roof tile. The panels use a tongue-and-groove design to interlock existing panels without penetrating existing roofing material. Each PowerGuard® area is bordered with a PowerCurb, which provides mechanical integrity ballast and wind resistance. Because PowerGuard® is 80% lighter than conventional aggregate-ballasted roofs, strengthening the building structure is virtually never required. The PowerGuard® system can typically create one megawatt of energy using 125,000 square feet of roof space. In areas like California, with high and rapidly increasing electric rates and significant incentives to reduce energy consumption, or in areas with time of day and peak demand charges, payback times can be quite reasonable.

To find out more about PowerGuard® solar roofing systems, take a look at EERE's Web based fact sheet @ www.oit.doe.gov/factsheets/inventions/pdfs/fs26750.pdf or contact Power Light Corporation directly at 510-540-0550 or www.powerlight.com.

LEAD by
EXAMPLE

SWITCH

THE TIME OF YOUR PEAK ENERGY USE



REDUCE MID-DAY DEMAND TO PREVENT POWER OUTAGES

LIGHTS

- Turn off lights when leaving a room.
- Turn on task lights; turn off general and overhead lights.
- Turn off display and decorative lights.

EQUIPMENT

- Turn off printers, copiers, personal computers, and monitors when idle.
- Activate and use the Energy Star® "power saver" and "sleep" features.
- Shut off coffee pots, radios, fans and other appliances in the office.

AIR CONDITIONING

- Set thermostats to pre-cool spaces at off-peak times.
- Loosen clothing and dress casually during the warmest hours.
- Make certain vent grills are not blocked by plants, books, or furnishings.



FEDERAL ENERGY MANAGEMENT PROGRAM
U.S. DEPARTMENT OF ENERGY
www.eren.doe.gov/energ
1-800-363-7112



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To obtain your color copy of this electricity awareness poster,
call 1-800-363-EREC or visit www.eren.doe.gov/femp/ordermaterials.html.

FEMP Contacts

For information on topics not listed here, call the FEMP Help Desk at 1-800-363-3732.

FEMP Office: 202-586-5772
FEMP Fax: 202-586-3000
FEMP on the Web: www.eren.doe.gov/femp

Beth Shearer
Director
202-586-5772

Joan Glickman
Deputy Director
202-586-9846
joan.glickman@ee.doe.gov

Schuyler Schell
Office Director - Planning and Outreach
202-586-9015
schuyler.schell@ee.doe.gov

Linda Mesaros
Office Director - Technical Assistance, Financing,
and Departmental and Utility Energy Team
202-586-8008
linda.mesaros@ee.doe.gov

Veronica Bellamy
Administrative Assistant
202-586-5772
veronica.bellamy@ee.doe.gov

Helen Krupovich
Weekly Reporting
202-586-9330
helen.krupovich@ee.doe.gov

Ladeane Moreland
Administrative Assistant
202-586-9846
ladeane.moreland@ee.doe.gov

Customer Service, Planning and Outreach

Nellie Greer
Awards Program/Technical Assistance
Communications
202-586-7875
nellie.tibbs-greer@ee.doe.gov

Annie Haskins
Outreach/FEMP Focus
202-586-4536
annie.haskins@ee.doe.gov

Rick Klimkos
Annual Report/Interagency Coordination
202-586-8287
rick.klimkos@ee.doe.gov

Ellyn Krevitz
Program Evaluation
202-586-4740
ellyn.krevitz@ee.doe.gov

Michael Mills
Program Evaluation
202-586-6653
michael.mills@ee.doe.gov

External Service Delivery

Ted Collins
Training Programs/New Technology
Demonstration Program
202-586-8017
theodore.collins@ee.doe.gov

Anne Crawley
Renewable Energy, Greening, and Software
202-586-1505
anne.crawley@ee.doe.gov

Danette Delmastro
Super ESPC Program
202-586-7632
danette.delmastro@ee.doe.gov

Beverly Dyer
ENERGY STAR®
202-586-7241
beverly.dyer@ee.doe.gov

Brad Gustafson
Utility Program
202-586-5865
brad.gustafson@ee.doe.gov

Shawn Herrera
Design Assistance
202-586-1511
shawn.herrera@ee.doe.gov

Ab Ream
Business and Marketing
202-586-7230
ab.ream@ee.doe.gov

Tatiana Strajnic
Super ESPC Program
202-586-9230
tatiana.strajnic@ee.doe.gov

Alison Thomas
Procurement
202-586-2099
alison.thomas@ee.doe.gov

Departmental Utility and Energy Team

Alan Gann
DOE Utility Management
202-586-3703
alan.gann@ee.doe.gov

Nellie Greer
Awards Program/Technical Assistance
Communications
202-586-7875
nellie.tibbs-greer@ee.doe.gov

Steve Huff
DOE Utility Management, FEMAC
202-586-3507
steven.huff@ee.doe.gov

Will Lintner
General Engineer
202-586-3120
william.lintner@ee.doe.gov

David McAndrew
SAVEnergy Audits
202-586-7722
david.mcandrew@ee.doe.gov

Vic Petrolati
Departmental Energy Management
202-586-4549
victor.petrolati@ee.doe.gov

Will Prue
General Engineer/Inspector
202-586-4537
wilfred.prue@ee.doe.gov

DOE Regional Office (RO) FEMP Team

Doug Culbreth
Atlanta RO
919-782-5238
carson.culbreth@hq.doe.gov

Beth Dwyer
Golden
303-275-4719
beth.dwyer@hq.doe.gov

Curtis Framel
Seattle RO
206-553-7841
curtis.framel@hq.doe.gov

Sharon Gill
Chicago RO
312-886-8573
sharon.gill@hq.doe.gov

Arun Jhaveri
Seattle RO - Technical Assistance
206-553-2152
arun.jhaveri@hq.doe.gov

Randy Jones
Denver RO
303-275-4814
randy_jones@nrel.gov

Paul King
Boston RO
617-565-9712
paul.king@hq.doe.gov

Bill Klebous
Philadelphia RO in NY
212-264-0691
william.klebous@hq.doe.gov

Eugene Lesinski
Philadelphia RO
215-656-6976
eugene.lesinski@hq.doe.gov

Cheri Sayer
Seattle RO - Financing
206-553-7838
cheri.sayer@hq.doe.gov

Lisa Hollingsworth
Atlanta RO
404-562-0569
lisa.hollingsworth@hq.doe.gov

Eileen Yoshinaka
Seattle RO in HI
808-541-2564
eileen.yoshinaka@hq.doe.gov

Principal DOE National Laboratory Liaisons

Bill Carroll
Lawrence Berkeley National Laboratory (LBNL)
510-486-4890

Mary Colvin
National Renewable Energy Laboratory (NREL)
303-384-7511

Patrick Hughes
Oak Ridge National Laboratory (ORNL)
865-574-9337

Paul Klimas
Sandia National Laboratory (SNL)
505-844-8159

Bill Sandusky
Pacific Northwest National Laboratory (PNNL)
509-375-3709

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Attn: FEMP Focus
Federal Energy Management Program
U.S. Department of Energy, EE-90
1000 Independence Avenue, SW
Washington, DC 20585-0121
or e-mail: annie.haskins@ee.doe.gov

To Change Subscription Information, Contact:

Judy Hockenbery
MA-221-Germantown
U.S. Department of Energy
Germantown, MD 20874-1290
301-903-3118, 301-903-9271 (Fax)
judy.hockenbery@hq.doe.gov



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