

energized

Message to Energy Managers

There are several examples of ways to conserve energy featured in this issue of *energized*.

ONR and PACDIV are exploring ways to tap into the natural energy of ocean waves to generate electricity for DON coastal activities.

EPA has two energy savings programs: the ENERGYSTAR® label is now available on telephones and water coolers, providing significant energy savings; and EPA's Environmentally Preferable Purchasing program encourages purchasing of environmentally preferable products and services. This is important since all Federal procurement officials are required by Executive Order to assess and give preference to products and services that are environmentally preferable.

In face of Executive Order 13123 requiring a reduction of 35% in Federal energy consumption, USMC tasked engineers at Pacific Northwest National Laboratory (PNNL) to develop technology to solve ongoing load programs and improve operations and maintenance practices. Read about their successful new software system on page 3.

Power In The Waves

One day in the not-too-distant future, DON coastal activities could tap the limitless power of ocean waves to light their facilities. When that day comes, they may have the Office of Naval Research (ONR) and PACDIV to thank for the budget and resource-conserving energy breakthrough.

Utilizing its Small Business Innovative Research (SBIR) program, ONR has contracted Ocean Power Technologies, (OPT) Inc. of New Jersey to develop and deploy a system that convert the energy of ocean waves surrounding Hawaii into electricity. A candidate site for the project is an area approximately 3,500 feet off Marine Corps Base Hawaii (MCBH). Under PACDIV's guidance, ONR acts as program manager, NFESC provides project management and technical oversight, and OPT is the project contractor.

The project will feature two-to-six buoy-like structures, 40 to 65 feet in length, anchored approximately four to 13 feet below the ocean surface. Inside each, a hydraulic cylinder moves up and down as the buoy bobs with the rise and fall of the waves. This motion pumps hydraulic fluid to a hydraulic motor, which turns a generator below, producing electricity. Electricity flows to shore via a shielded underwater cable.

The potential economic and environmental benefits of a larger scale project are obvious. This smaller demonstration project off MCBH, however, is principally intended to develop and validate

the technology base required to design and reliably operate wave energy converters in the ocean and connect them to an electrical grid.

OPT began producing this technology, called PowerBuoy™, in 1997. Other Power-

Buoy systems will be deployed off the coast of New Jersey by the end of this year and off the coast of Australia by early next year.

OPT first developed the technology with a SBIR contract from ONR to develop a wave power system to generate small amounts of electricity

for recharging batteries onboard remote underwater vehicles at sea, instead of having to bring them back to shore to do it. The successful results of these initial low-power wave energy converters led the Navy and members of Congress to realize the potential benefits of expanding the scale of the buoys to produce power suitable for connecting into an electric power grid.

PACDIV sees Hawaii as an ideal initial proving ground for the technology. The ocean around Hawaii has some of the highest recorded wave power around the world. And this project hopes to take advantage of it.

"Besides Hawaii having some of the best wave action required for power generation, the climate here is ideal for working year round, collecting the data we need (over the next two-to-five years)," explained PACDIV BOS 16 electrical engineer. "Also, the location where we



continued on page 2

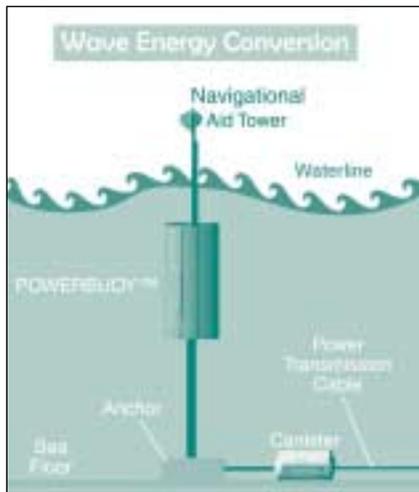
DON Energy Awareness Website: Access the tools on the Navy Energy website for ideas, planning tips, and tools. Set your browser to <<http://energy.navy.mil>> and scroll down the left-hand column to the Awareness pick.

Wave Power, from page 1

want to place the buoys in the waters off the Marine Corps base is close to shore, which will help in transmission load requirements of the underwater cable.”

In addition to the potential electric supply, data collection will also focus on ocean survivability. Earlier attempts at wave power energy generation fared poorly because of the formidable ocean forces. The new system is designed to survive natural marine tumult.

A U-joint at the base will help protect the buoy in large ocean swells associated with high winds and surf of hurricanes and tropical storms. Instead of the buoy withstanding all the pressures itself, the



U-joint will allow the buoy to lie down in the water and relieve some strain if ocean forces become too great. The design's strength was proven during Hurricane Bonnie off the coast of New Jersey.

System safety is also important. Computer controllers constantly monitor system performance, relaying real-time information back to shore. If a fault or a connectivity break of any kind is detected, the system can be instantly shut down. A Global Positioning Satellite (GPS) device is attached, so if the buoy ever did separate from its moorings, an electronic signal will alert personnel to take corrective action.

Before the system can be deployed, the on-site project manager is coordinating the environmental impact studies with PACDIV's Environmental Planning Division (PLN 23), and with the Naval Facilities Engineering Service Center (NFESC). Those studies will take place this year. Buoy deployment is planned for early 2003.

(Thanks to PACDIV Public Affairs Officer)

New Energy-Savers Unveiled

EPA wants all Federal facilities energy managers to know of the availability of a new range of office environment energy savers. Telephones and water coolers are now available with the ENERGYSTAR® label.

That may be bigger news than you realize; the potential energy savings are enormous. If all cordless phones, answering machines, and combination units sold in the US in the next ten years bore ENERGYSTAR labels, Americans would save approximately \$4 billion on their electricity bills and remove 66 billion pounds of greenhouse gas emissions from our air. This is the equivalent to the emissions of more than one million cars.



Water coolers consume 4 billion kWh/year (cost: \$300 million), and are responsible for annual pollution roughly equivalent to the emissions of more than 700,000 cars. Like telephones, most of the energy they use is consumed while they're not in use.

At a recent consumer electronics show, EPA announced performance standards partnerships with Panasonic, RadioShack Corporation, TT Systems LLC (PhoneMate), Uniden America Corporation, and VTech Communications, Inc.

Information about specific ENERGYSTAR labeled phones is available on the ENERGYSTAR web site at: <http://yosemite1.epa.gov/estar/consumers.nsf/content/cordlessphones.htm>

EPA has also announced that ADDICO Products, Inc. is the first partner with EPA to bring ENERGYSTAR labeled water coolers to the market. Their water coolers use significantly less energy when they are in standby mode than standard models. EPA expects that the annual energy savings from such an ENERGYSTAR labeled water cooler could be as much as \$47 per unit. For more information on these units, see: <http://yosemite1.epa.gov/estar/consumers.nsf/content/watercooler.htm>

NAVSTA Everett News Note

Near the closing bell of Fiscal year 2001, Engineering Field Division Southwest in cooperation with the Naval Station Everett (WA) Public Works Department, awarded the Everett Energy Efficiency Retrofit Project '02. Thanks to a \$229,379 Snohomish County Public Utility District incentive, the total cost to the Navy is \$599,033. Retrofits to heating, ventilation, air conditioning systems and lighting will be made in two phases at two main locations, the NAVSTA Everett Waterfront and Smokey Point complexes. The project will save 2,110,957 kWh of electricity and 26,832 therms of gas per year. The \$828,412 project will pay for itself in a little more than four years.

Choose EPP!

EPA's Environmentally Preferable Purchasing (EPP) is a Federal-wide program that encourages purchasing of environmentally preferable products and services (Website: <http://www.epa.gov/opptintr/epp/>).

All Federal procurement officials are required by Executive Order 13101 and Federal Acquisition Regulation (FAR) to assess and give preference to those products and services that are environmentally preferable. Environmentally preferable, according to Executive Order 13101 means, "...products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose..."

This is important because the United States consumes approximately 25% of the world's resources with only 5% of the world's population. And the Federal government is the single largest consumer of goods and services in the U.S., and probably, in the world—spending more than \$200 billion annually on goods and services. The Federal government also spends an additional \$240 billion a year, indirectly, through grant disbursements. EPP works to leverage that influence to minimize environmental burdens. EPP helps your activity through improved ability to meet existing environmental goals, improved personnel safety and health, reduced liabilities and reduced health and disposal costs.

USMC Uses Latest Tech to Manage Energy

By Richard Meador, Program Manager at Pacific Northwest National Laboratory

“Doing more with less” is a mantra heard by executives all across the country. It applies just as well to the Department of the Navy.

When military bases closed, many of the personnel were shipped to existing bases, which had to construct new buildings or overpopulate existing facilities. The result was growing demand on central energy plants just as legislation and executive orders required a reduction of 35% in Federal energy consumption.

The answer for the Marine Corps was to ask engineers at Pacific Northwest National Laboratory (PNNL) to develop technology to solve chronic load problems and implement better operations and maintenance practices. PNNL is operated by Battelle, of Columbus, Ohio, for the U.S. Department of Energy.

PNNL engineers designed the Decision Support for Operations and Maintenance, or DSOM[®], a software system that integrates operations, equipment diagnostics and maintenance programs. DSOM[®] was originally installed at the Marine Corps' Air Ground Combat Center in Twentynine Palms, California, in 1994. In 2001, the technology was selected by *R&D Magazine* as one of the year's 100 most technologically significant new products.

At Twentynine Palms, the system avoided capital construction costs of \$1 million that would have been required to meet new energy demands, and paid back the original investment in less than four years. What's more, the plant has had no critical equipment failures since the system was installed, thereby providing an extremely high level of reliability. The Marine Corps realized the benefit of looking ahead to how an investment today can mean fewer problems and greater savings down the road.

MCRD Parris Island in Beaufort, SC is becoming the most energy efficient base in the U.S. Marine Corps. It became the home of yet another, larger and more complex DSOM[®] system. The

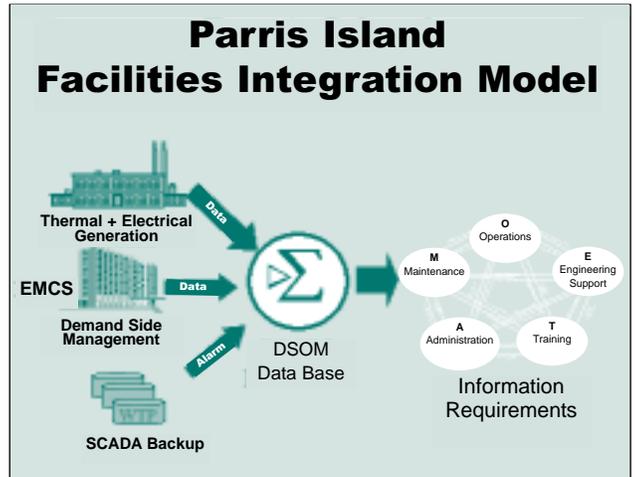
initial project at Parris Island involved installing DSOM[®] II in the Central Energy Plant (CEP) in 2000 to aid in efficient generation of electricity to maintain peak demand below a penalty demand limit. (Its success helped pave the way to FEMP Energy Conservation honors this past Autumn.)

Over the last few years, several DSOM[®] related projects have been undertaken at Parris Island to further reduce supply and demand energy consumption, and to provide better control over co-generation and building systems. PNNL's work at Parris Island expanded to minimize electrical demand and environmental impact, and to allow for a more effective distribution of limited manpower by:

- Upgrading the CEP to the DSOM[®] II system;
- Upgrading the Wastewater Treatment Plant (WTP) Supervisory Control And Data Acquisition (SCADA) system with a DSOM[®] II-related technology;
- Installing the DSOM[®] II system in the remote Weapons Area Steam Plant (WAP); and
- Installing a site-wide Energy Management and Control System (EMCS) for major energy intensive buildings and barracks at Parris Island with control activated by the DSOM[®] system at the CEP.

All of these components are tied to the same information management system to allow a central management system to preside over the entire Parris Island energy landscape. Information is available for operations, maintenance, engineering, training and administrative users. Having the WTP and WAP systems fully monitored by CEP staff allowed manpower reductions with little to no impact on safety, reliability and efficiency of services.

The DSOM[®] II system provides electric demand information to the EMCS system in a load shedding scheme that actually lowered the peak demand limit by one megawatt. At a predetermined level of demand, after engaging the EMCS initial load shedding scheme, the DSOM[®] II system indicates to the CEP operators they must generate electricity up to maximum genera-



tion capacity in guided stages. At that point, if it's necessary, the EMCS load shedding software kicks in and can shut down some equipment to prevent exceeding the peak demand limit. The first buildings under this EMCS load shedding scheme went on line in June 2001 and, even with only control over a limited load, the program resulted in preliminary savings figures of about \$180,000 of electricity and lowered peak demand for the summer months from 9.2 to 8.2 MW. More savings are expected as additional buildings come on line.

A similar EMCS upgrade program is in progress at Marine Corp Air Station Beaufort, SC. By the time peak demand periods approach spring of 2002, both Parris Island and the Beaufort Air Station will have a significant number of buildings on line, resulting in the capability to orchestrate a major energy use reduction. Parris Island and Beaufort Air Station Energy Management staff have taken a proactive role in these energy reduction activities, working closely with PNNL and contractor staff to successfully implement these energy reduction technologies.

For more information on DSOM[®] go to <<http://www.pnl.gov/dsom/>>.

Thanks to Richard Meador, PNNL Program Manager and Staci Maloof, PNNL Media Relations

Check It Out



All You Need is ... Meetings

Well, maybe not, but here are a few upcoming meetings of possible use to DON energy managers and senior energy personnel:

2002 Energy, 02-05 June, Palm Springs, CA. Workshop and expo for Federal, state, local and private sector energy managers. Workshop organized by Pentagon Energy Office and sponsored by U.S. Department of Energy & FEMP, co-sponsored by Department of Defense and GSA. Info and registration: 800-395-8574 or www.energy2002.ee.doe.gov

Skills Update 2002 for Certified Energy Managers, 4-5 June, Anaheim, CA. A follow-up to AEE comprehensive 5-day training primarily but not limited to professionals who already have the CEM credential. Organizer: Association of Energy Engineers; \$1050; Info: Valerie Oviatt 770-925-9633.

2002 West Coast Energy Management Congress Conference & Expo, 6-7 June, Anaheim CA. Insight into market direction, applying latest technologies to reduce energy costs, and energy management and facilities strategies to improve operations. Organized by: Association of Energy Engineers; \$795; Info: 770-279-4388.

Bioenergy for the Environment 2002, 22-26 September, Boise, ID. A forum to develop ideas and extend knowledge about uses of bioenergy to reduce dependency on fossil fuels and supplement regional energy resources. Organized by Bioenergy; Info: 208-885-7906.

energized

Watts News?

We want to hear from you.

Tell us about the energy initiatives you're working on, the problems you encounter, and the solutions you discover.

Submit article ideas, comments, or questions to:

Dean Ryan Consultants & Designers, Inc.
1733 King Street, Third Floor

Alexandria, VA 22314

Phone: (703)548-8115

Fax: 703.548-6855

e-mail: johnc@deanryan.com

Be sure to include your name and commercial phone number.

energized is a publication sponsored by the Energy and Utilities Management Division, Naval Facilities Engineering Command. The views and opinions expressed in this publication are not necessarily those of the Department of the Navy.

Printed by the Naval Facilities Engineering Service Center



Department of the Navy
Commanding Officer
NFESC
Code: ESC 22
1100 23rd Avenue
Port Hueneme, CA 93043-4370