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U.S. Coast Guard Forum

**SPECIAL SECTION
ARCTIC STRATEGY**

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Engineer**

**Rear Adm.
Ronald J.
Rábago**

**Assistant
Commandant for
Engineering &
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**Sustainability ★ Deployable Fitness ★ Coast Guard Foundation
Operation Fall Retrieve ★ Public Safety & Emergency Management Degrees**

FEATURES

COVER / Q&A



Operation Fall Retrieve

On the Great Lakes, the coming of winter is routine, but the preparation for extreme weather is not. This requires a herculean effort in the form of Operation Fall Retrieve, where nearly 1,300 aids to navigation must be either removed before they are damaged by ice or replaced with mostly unlighted ice buoys.
By Commander Kevin Dunn



Rear Admiral Ronald J. Rábago
Assistant Commandant for
Engineering & Logistics

SPECIAL SECTION: ARCTIC STRATEGY



Protecting the Last Frontier

Managing the safety and security of the evolving maritime environment in the Arctic and protecting U.S. interests and resources in this region is the responsibility of the 17th District. As the world's premier maritime service, the Coast Guard will continue to adapt to the changing operational environment created by a growth in Arctic shipping, natural resource development and tourism.

By Rear Admiral Thomas P. Ostebo



Charting a New Course

How can a degree in public safety or emergency management equip Coast Guardsmen with the education needed to complement their experience, advance in rank, or transition to a civilian career?



Building the Coast Guard of the Future

Undertaking an ambitious and creative energy management program, the Coast Guard of today is working to leave the service of tomorrow better positioned to meet energy and budget demands.

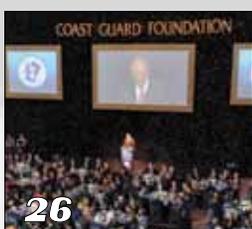
By Maura McCarthy



Fitness Afloat

A training plan, much like a navigation plan or flight brief, provides you with a road to fitness success. A plan you and your shipmates can stick to will help any unit maintain operation success.

By Lieutenant Commander Dan Leary



Coast Guard Foundation's 8th Annual Tribute to the Coast Guard in Our Nation's Capital

For the past seven years, the Coast Guard Foundation has made its mark in the Washington, D.C. area with its annual event, the Tribute to the Coast Guard in Our Nation's Capital. This year's 8th Annual Tribute to will be held on June 12, 2012 at the National Building Museum in Washington, D.C.

By Matthew Clark

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INDUSTRY INTERVIEW



Jeff Sherman
Director of Federal Energy Solutions
Schneider Electric

Building the Coast Guard of the Future

UNDERTAKING AN AMBITIOUS AND CREATIVE ENERGY MANAGEMENT PROGRAM, THE COAST GUARD OF TODAY IS WORKING TO LEAVE THE SERVICE OF TOMORROW BETTER POSITIONED TO MEET ENERGY AND BUDGET DEMANDS.

**By MAURA MCCARTHY
CGF EDITOR**

The Coast Guard continues to chart a course toward greater sustainability, a path exemplified in the service's Energy Strategy signed by the commandant in early 2010. "The strategic vision espoused by that document is to become the model federal agency for sustainable and reliable energy management. I think we're getting there; the Coast Guard is doing well," reflected Danny Gore, energy program manager for the service. The strategy identified three priorities for the service to pursue: energy efficiency and renewable energy, energy reliability, and energy accountability. In the past few years since Gore became energy manager, the Coast Guard has made significant strides tracking their energy consumption and where energy dollars are spent. "We realized that we needed to improve how we monitor our energy consumption; we're getting better and better. You can't improve until you can measure. Good measurement identifies best locations for effective conservation projects."



Danny Gore

In terms of energy usage, what the Coast Guard is measuring indicates great progress and promise. Recent reporting shows the service has reduced facility energy intensity (btus/building square feet) by 20.3 percent compared to a 2003 baseline. Overall, 7.1 percent of the service's electricity is attributed to renewable energy, whether that is energy the Coast Guard generates or the renewable

energy credits (RECs) they buy. "The current target is 5 percent. In the beginning we had to buy inexpensive RECs to meet the target, which help generate renewable energy in the open market. Now we're weaning off of that with our own renewable energy installations. Soon, we should meet the target completely on our own," Gore said. The Coast Guard also reports that all new buildings designed since 2006 are 30 percent more energy-efficient than applicable standards, and more recently, all new buildings are being certified LEED silver. The service is installing advanced electricity meters nationwide and has successfully reduced water consumption by 15.2 percent from the baseline year.

The reductions in shore energy consumption also help the service combat rising energy prices. Since 2003, CG energy expenditures are rising at an average rate of 10 percent per year and are roughly paralleling the price of oil. "In my opinion, that rate of increase is unsustainable and will soon impact CG operations," Gore predicted. "The reduction in shore energy usage helps our bottom line. However, next we will need to address our biggest fuel consumers—ships and aircraft. We'll need to think about how we buy and manage fuel, and if energy efficiency concepts can be applied to these assets."

True to its motto, the Coast Guard is always ready to rise to a challenge: thinking outside the contracting box, and even venturing outside of job descriptions to navigate its way toward greater sustainability. This mentality and can-do culture is demonstrated in three specific projects the service has undertaken: the installation of photovoltaic solar panels in Petaluma, Calif.; the renewable energy center in Baltimore, Md.; and the photovoltaic solar panel project on Puerto Rico.

THINKING OUTSIDE THE BOX

The largest renewable energy project in the Coast Guard, the Coast Guard Yard Energy Center, is fueled by landfill gas (LFG) that not only generates electricity and steam for the yard's operations but also prevents LFG (methane) from entering



ENERGY INNOVATION

As the Coast Guard and other federal agencies work to make their buildings more efficient, companies like Lutron Electronics are helping them achieve energy savings. Founded in 1961 with the invention of the solid state rotary dimmer, Lutron has been working to conserve energy ever since and currently boasts over 250 patents with 15,000 products. The new Coast Guard headquarters building is slated to have Lutron's Quantum system: a total building control system. "It's a processor-based system, so they will have the ability to impact every light in the building, to control the lights, and to manage the energy being consumed. They will also have the ability to report that out in what we call a green glance, so they will be able to see in real time the energy being used and the facilities staff will be able to impact that instantaneously if they so choose," explained Andy Wakefield, the company's director of government business development.

Since somewhere between 38-39 percent of a typical building's energy is used by the lighting system—accounting for the largest consumer of energy in most buildings—the opportunity for savings is significant. "By applying lighting control strategies, you can reduce that by up to 60 percent for an overall savings of 25 percent of the building's energy, which is a significant energy saving opportunity. Most people don't realize that you don't have to have lights on at 100 percent. Looking at potential savings, it's roughly one to one, so for every percentage that you dim the lights, you save roughly the same percent on your energy," Wakefield said. What's more, adjustments to lighting are to an extent imperceptible since our eyes do not adjust even when lights are dimmed up to 20 percent.

Echoing this emphasis on energy management, Joe Walsh, vice president of Federal Business Development at Lime Energy, explained, "While the technologies are all exciting, what these agencies have hanging over them is near-term deliverables. It is all about energy efficiency; it is all about the demand side. The most sophisticated and productive renewable energy system in the world is still wasteful if it is connected to a building that has not addressed 'low hanging fruit' first. The cheapest energy is still the energy not used." Lime provides full-service, turnkey, energy efficiency implementation and renewable energy designs and has provided multi-measure energy efficiency design and implementation services at nine Coast Guard facilities on the West Coast, Hawaii and in the Northeast through an energy services company. Projects include delivering water savings through water conservation measures and improved efficiency through motor upgrades, as well as developing, designing and upgrading lighting systems for facilities including administrative offices, residences, hangars and warehouses.

As federal mandates on renewable energy increase in the coming years, industry is prepared to help position government agencies meet those targets. At Lime, "We know that government agencies have energy saving and carbon emissions reductions goals to meet for the OMB now. And, of course, there are significant budget reductions to consider. The most savvy agencies will recognize the synergy there and use

sustainability improvements as a way to get budget savings through energy reductions while striving to meet efficiency goals and improving the environment," Walsh emphasized.

In 2009, SilRay, a commercial and utility-scale power plant developer, installed the PV system in Petaluma. Structured as a PPA, the Coast Guard did not bear any upfront costs and only pays for the electricity produced by the PV system. "It was a great experience working with Coast Guard to build their first solar power purchase agreement in their history. There were over 40 major solar companies throughout nation who participated in the RFP bidding process along with us. We feel extremely honored to work for Coast Guard. They have been very supportive throughout the entire process of building the system. They are wonderful people to work with. As of today, the solar power plant we built has exceeded our performance expectation," said April Zhong, SilRay's president and CEO.

It seems that the Coast Guard is willing to consider all reasonable options when it comes to alternative energy sources, including for example tidal power. Although not widely used because of specific environmental conditions required, in some parts of the country, such as Alaska and Maine, tidal power poses promise. Ocean Renewable Power Company has operation offices in Eastport, Maine, and Anchorage, Alaska, where they develop tidal energy technologies and tidal energy projects. The company is awaiting their pilot license from the Federal Regulatory Commission for its Cobscook Bay Tidal Energy project, which will be the first grid-connected tidal energy project in Maine and possibly the nation. The installation of one device, is planned and may increase in years to come. In 2011 the company won a contract with the Coast Guard for a demonstration project in Eastport; during the testing phase the company provided power to the service's station in Eastport. "Our testing area was too far away to connect with a transmission cable, so we used a concept of a virtual transmission cable where we charged batteries with energy generated from the tides and had those batteries transported to where Coast Guard station Eastport keeps their search and rescue vessel, which needs to be ready to go 24 hours a day, 365 days a year. We supplemented the shore side power to that vessel; it was a great example showing how energy generated from tidal currents could be used in a practical fashion," explained John Ferland, vice president of project development. "It was a great partnering opportunity between the Coast Guard and our company and helped to move some technology forward to our next phase of development," he continued.

Opportunities for increased energy efficiency and creative thinking are endless for the service. "I think the Coast Guard in their capacity with DoD and DHS is very well positioned to play a leadership role in implementing renewables into their daily operations—whether it's small scale wind, wood pellets or this highly visible successful project with tidal energy. It seems like the Coast Guard is not only leading by example, but also facilitating the speed with which renewables enter the marketplace outside the Coast Guard," Ferland noted.

the atmosphere. Financed through an energy savings performance contract (ESPC), the project captures methane gas produced in Baltimore's Quarantine Road Landfill. The center began producing electricity in 2009 and in fiscal year 2010 produced 9,700,000 kWh of renewable energy. Under an ESPC, a federal facility enters into agreement with an energy services company where the company designs an energy efficiency project and installs necessary equipment—at no increased cost to the federal agency. The agency, in this case the Coast

Guard, pays the company out of the calculated savings as a result of the efficiency improvements. According to Gore, the Coast Guard has awarded eight ESPCs and two UESCs (similar, but awarded to the local utility) since FY 2007, many of which are no-money-down contracts. "We have been accomplishing about \$44 million per year in these types of contracts. Roughly half of the savings pays for capital improvements and half pays off the amortized financing—the interest. So that's roughly \$22 million a year in capital improvements

that we're paying for out of energy savings. A lot of the work that we do needs to be done anyway. If the heating and cooling systems are getting old and we need to change them out, we're going to do so with more energy-efficient unit and we're using the savings to pay for it," explained Gore.

At the Training Center in Petaluma, Calif., the Coast Guard used an alternatively financed power purchase agreement (PPA) to install an 875kW photovoltaic array (PV); comprising 5,232 panels, this is the service's first PPA and largest ground-mounted PV project. It is expected to prevent more than 2 million pounds of greenhouse gas emissions annually. Legally, the Coast Guard only has the authority to enter into an agreement with a utility for one year; in the case of Petaluma, the Coast Guard issued the contract for one year with 24 option years. "We were able to make that work," explained Gore.

Perhaps the most innovative contract the Coast Guard has negotiated was executed in Puerto Rico for roof renovation and PV panel installation at Coast Guard housing facilities on the island. The project combined an ESPC and energy service agreement (ESA) to fund the largest solar project DHS history. "What we were able to do was use the ESPC and its 25-year authority and embed a PPA into it. We also did a traditional ESPC as well, but the portion for renewable energy was the equivalent of a PPA embedded into an ESPC. We call it an ESA as opposed to a PPA in order to keep the ideas separate," explained Gore. "This was the first time such a contract was executed in the government and it may become a model for us and other agencies to use in the future. In Puerto Rico we will be generating almost 3 megawatts of renewable power. When we place that on top of the 4.8 percent of electricity we are already getting from self-generating renewables sources, it is going to put us nearer to 7.5 percent Coast Guard-wide. When the statutory mandate goes up to 7.5 percent in 2013, we'll be close to the target," he added.

MANAGING ENERGY CONSUMPTION

Gore finds the use of alternatively financed energy projects to be extremely promising. "Those are really win-win scenarios for the Coast Guard. They do not increase the size of our energy budget, when paid off they will decrease the energy budget of tomorrow, they help us reduce our energy intensity and meet our statutory goals, and simultaneously facilitate much needed capital improvements at our shore campuses."

Treating energy as both a commodity and a resource will be important for the Coast Guard moving forward, and they have already made significant advances managing energy this way. In a given year, 20 to 25 percent of the money the Coast Guard spends executing day-to-day operations is spent on energy. "We know we spend a lot of money on energy, and if we can figure out how to conserve by using less or by learning how to manage it better so we don't have to spend as much, then we're freeing up funds to do other things. Anything you can pull off the energy side is money with which you can do more ops," Gore emphasized. Moving forward, the Coast Guard is well positioned to meet increasing federal



The service recently installed solar panels at Air Station Borinquen. [Photo courtesy of U.S. Coast Guard]

regulations. "We received a memo from the White House directing all federal agencies to execute \$2 billion in efficiency projects in the next 24 months, and we have submitted our plan to DHS indicating how the Coast Guard plans to do its share," Captain John Hickey, commanding officer of the Shore Maintenance Command said.

A BRIGHT FUTURE

Gore concluded that "the Coast Guard is rife with opportunities to save energy and we're still just scratching the surface. There's a lot we can do to reduce consumption and offset the continuous rise in energy prices." With the rising price of oil posing challenges for all sectors of the government, the Coast Guard is actively considering alternatives. "We have been studying the possibility of implementing biomass heating solutions for our facilities in Alaska due to the alarming escalation rates that we have seen in the cost of heating oil. Our financial analysis indicates that we could create tremendous savings by using biomass, which is a renewable form of energy, for heating rather than using oil," explained Hickey. Opportunities for energy savings abound, but the service cannot do it alone. "No matter how great the financial analysis looks, we simply don't have the appropriated funds to execute the projects. Therefore, we need industry to finance the projects for us, and then we pay off the loans with the savings generated. We have invested over \$200M in our facilities with this strategy already, and there is more opportunity available," Hickey said.

The service's success is perhaps in part due to willingness of individual servicemembers to step outside their job description and seize an opportunity. For example, the Energy Center at the Coast Guard Yard was initiated by the civilian facility manager, Richard Eschenbach, who identified the yard as the perfect opportunity. As Gore said, "He kept at it until he convinced his bosses and me to make that project happen." ★

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