

Steaming Toward Energy Culture Change

WELCOME TO THE spring 2011 issue of *Currents*. As you browse these pages and take note of the many new and innovative projects the Navy is undertaking in the energy and environmental arena, I ask you to ponder the larger picture of why the Navy invests dollars and manpower in these areas. While few would dispute that “greener” technologies and processes, more efficient use of our natural resources, and reduced carbon emissions are laudable goals in and of themselves, fiscal realities dictate that the Navy must also keep foremost an ultimate goal of maintaining or increasing our combat capability afloat and ashore. If we can also do this by “greening” our footprint, we create a win-win for national security and environmental security. This is most certainly true today as the Navy pursues innovative technological and behavioral energy initiatives that promote energy conservation and efficiency along with sustainable alternatives to petroleum, all of which result in a decrease in greenhouse gas emissions. This is not a first for the Navy, however. Over the past few decades, there have been other cases where Navy was able to find win-wins for the service as well as the Nation.

improving our waste management and recycling efforts ashore and afloat.

These environmental efforts have helped make it possible for the Navy to continue carrying out our mission. If we ignore environmental laws and trends, our ability to operate ships and bases in the strategic locations our mission requires could be severely restricted by regulatory agencies and also impacted by a loss of trust by the American public. In this way, effective environmental stewardship is needed to maintain our combat capability.

Like much of the nation, the Navy underwent an “environmental culture change” as the new awareness of the 1970s took hold. While our understanding of how we affect the environment continues to evolve as new scientific findings



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Looking back to the 1970s, a grassroots environmental movement and series of tragic, sensational incidents (e.g., Love Canal, Cuyahoga River fire) raised awareness of the effects that manmade contaminants can have upon human health and the environment. Regulatory agencies such as the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration were created, and new environmental legislation was enacted to protect the land, water, air, and the organisms (including humans) that depend on that environment to survive and thrive. As a result, the Navy, along with the other military services and private organizations, began developing policies to comply with those laws. We have since begun a host of initiatives to minimize our impacts, including cleaning up past chemical disposal sites and munitions, preserving threatened and endangered species on and around our bases, reducing air pollution and carbon emissions, minimizing our effects on marine life while training, and

and technological innovations come to light, we made changes 40 to 50 years ago that have long-term effect on our approach to environmental stewardship today. Sailors and their leadership on ships in 2011 understand that their daily environmental stewardship decisions and behaviors can impact both combat capability and the natural environment.

Changes in the Navy’s approach to energy have been slower to take hold. While the Organization of Petroleum Exporting Countries (OPEC) oil embargo of 1973 pushed the Navy to pursue shipboard fuel efficiency measures at the time, those initiatives did not lead to consistent, long-term changes in Navy energy use. Not until 2004, when a sudden global increase in energy demand (largely from newly developed and industrialized nations) caused oil prices to skyrocket within four years, did the Navy fully recognize the spectrum of strategic vulnerabilities that petroleum dependence can create. Once that energy shock occurred, we began working on a solution set to



deal with the issue of increasing global demand for energy and the ability of the oil industry to respond.

Among the Navy's immediate energy priorities are reducing energy consumption through efficiencies, driven by technological advancements and behavioral change, and adopting new alternative sources of energy for tactical and shore applications.

Greater energy efficiency directly translates into combat capability in a wide range of scenarios. On the ground in Afghanistan, greater fuel efficiency means that our tactical equipment on the front lines can run longer and/or farther on a gallon of fuel and that fewer convoys will be needed to resupply fuel. That also means fewer convoys will be

aircraft (the "Green Hornet," as featured in the winter 2011 issue of *Currents*), an MH-60S helicopter, a riverine command boat, and a gas turbine engine used to generate electricity aboard destroyers and cruisers have shown that advanced biofuels can be indistinguishable in performance to both the operator and the weapon system. Together with other alternative energy sources (such as wind, solar, geothermal, and ocean thermal energy conversion where feasible), these technologies are an initial step toward the Secretary of the Navy's vision of a 'Great Green Fleet,' creating an off-ramp from petroleum and helping to insulate our operating forces and critical infrastructure from dependence on a volatile and ultimately finite fuel supply.

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exposed to potential attacks by improvised explosive devices (IED). On the open ocean, shipboard energy efficiency means more time on-station performing mission functions and less time spent refueling at sea. On the shore side, energy efficiency helps insulate critical infrastructure from the fragility of the commercial power grid. Examples of efficiency initiatives include reducing the fuel consumption of portable generators and environmental control (HVAC) units; the shipboard Incentivized Energy Conservation Program (i-ENCON), which results in increased steaming hours at no additional cost by managing fuel consumption and transit speeds; and advanced electric metering for shore facilities, which tells base commanders which buildings have the highest energy use and the greatest potential for improved efficiency.

At its most basic level, combat capability requires weapon systems that are fueled and ready to respond. The Navy recognizes that ships (apart from nuclear-powered carriers) and aircraft will likely require energy-dense liquid fuel to operate for the foreseeable future. Because more than half of the fuel the Navy uses is petroleum, we will continue to face supply issues, increased cost, and competition over this finite resource. To reduce this vulnerability, we are testing and validating alternative fuels that can serve as drop-in replacements for petroleum-based fuels. These alternative fuels require no engine modifications and can be mixed in the same tank as petroleum. Tests to date using 50/50 blends of biofuel and petroleum on an F/A-18

As promising as these innovations may be for optimizing energy use in support of the Navy's mission, technology is not a solution by itself. Only through a combination of technology and changes in personal behavior will the full potential for increasing combat capability through energy be achieved. Sailors must reinvent their concept of energy and adopt an energy-frugal mindset, considering fuel as valuable to their ship, plane or tactical vehicle as ammunition is to a weapon system. This is not a new concept. As Admiral Ernest King said in WWII, "Oil is Ammunition." Once a Navy-wide energy culture change occurs, profound change can take place on a much broader scale. Many of these energy initiatives, when fully implemented, will also minimize greenhouse gas emissions and other forms of air pollution, as well as reduce the potential for environmental catastrophes such as oil spills.

We must look far beyond annual and five-year budget cycles and learn how to sustain our combat capability for decades, if not a half century. Taken as a whole, that long view can ultimately allow the Navy's energy and environmental programs—while driven by our need for combat capability—help our nation and our world become more sustainable. As residents of Planet A (otherwise known as Earth), with no Planet B anytime soon, we should view that as a highly worthwhile goal. 📌

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