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# The Demand Signal

*Rear Adm. Phillip H. Cullom says the Navy is serious about a 'Great Green Fleet'*

Written by: **Eric Tegler** on January 14, 2011

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**Rear Adm. Philip H. Cullum, director of the Energy and Environmental Readiness Division, explains the effectiveness of alternative fuel on the Riverine Command Boat (Experimental) (RCB-X) at Naval Station Norfolk. The RCB-X was powered by an alternative fuel blend of 50 percent algae-based and 50 percent NATO F-76 fuels to support the Secretary of the Navy's efforts to reduce total energy consumption on naval ships. U.S. Navy photo by Mass Communication Specialist 2nd Class Gregory N. Juday**

In an era when energy security is a matter of national security, the U.S. military will be the ultimate "early adopter" of alternative fuels. The reasons are many, but the simple fact that the military accounts for nearly 80 percent of the government's energy consumption, according to the Department of Energy, is reason enough. While the military's aggregate demand for energy won't likely change anytime soon, the mix of energy sources it taps will.

That's why the U.S. Navy along with the other services is sending a "demand signal" to private industry. To ensure that signal is clear, the Navy has declared that by 2020, 50 percent of its total energy consumption is to come from alternate sources.

"Secretary [of the Navy Ray] Mabus has discussed this a lot," Rear Adm. Philip Hart Cullom relates, "Trying to get ourselves off of one source of energy is something that the nation must do. The military is the logical place to start leading the way towards that. We're roughly two percent of all the oil that is consumed in the United States. We ought to move ahead, and it isn't just the military that has to [change], we all have to do it, but the military can serve as an early adopter."

Cullom is the USN's director, Energy and Environmental Readiness Division (OPNAV N45) and director Task Force Energy. He returned to Washington, D.C. in 2008 as the director, Fleet Readiness, following a tour as a carrier strike group commander – a position, he says, that made him an ironically ideal candidate to deal with energy and environmental issues.

"I paid the fuel bill for virtually all of the operating fleet, so I was the logical guy to go to when it came to figuring out a path forward on energy. The [OPNAV N45] position did exist, but when I got here we had

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just gone through a pretty tremendous change in our energy cost. From 2007 to 2008 oil went from $33 a barrel to $147 a barrel. It looked like our fuel bill would go from $1.2 billion in one year up to almost $5.1 billion the next year. As a result, the chief of naval operations said we need to come up with a plan, and as the head of Fleet Readiness, I was the guy to spearhead that effort."

**The Riverine Command Boat (Experimental) (RCB-X) conducts test runs at Naval Station Norfolk. The RCB-X was powered by an alternative fuel blend of 50 percent algae-based and 50 percent NATO F-76 fuels to support efforts to reduce total energy consumption on naval ships. U.S. Navy photo by Mass Communication Specialist 2nd Class Clifford L. H. Davis**

"It made sense because, as a person who'd spent a lot of time out in the fleet, I can probably say I was a 30 year serial abuser of energy. If you're going to try to catch an 'energy thief', go hire an energy thief. I was probably the right guy to come to."

Cullom's enthusiasm for possible energy alternatives is tempered by recognition that energy alternatives must be operationally practical. That requirement, in turn, sends a clearer demand signal to the private sector.

"The second- and third-generation biofuels we're assessing look, smell and act like petroleum… In other words, they enable a 'Flex-Fuel-Fleet' with existing platforms. We don't want to have to re-engineer the engines or the platforms… Industry is engineering the fuel to meet the spec we need. Those who do it best are those that will likely compete for DLA [Defense Logistics Agency] contracts. With that flexibility, we can be on one fuel one day and use another fuel the next day."

Whatever products 'engineering the fuel' produces technically, they must be cost-effective alternatives. That will depend on scale, and as such, the Navy has made clear the amount of demand for alternate fuel it will require.

"We have said affirmatively that by 2020 we'll need eight million barrels of biofuel per year every year thereafter," Cullom says. "If we can get it sooner at a good price, we'll take it sooner."

**A U.S. Navy MH-60S Sea Hawk helicopter assigned to the Blackjacks of Air Test and Evaluation Squadron (HX) 21 tests a 50/50 Camelina seed-based biofuel blend at Naval Air Station Patuxent River, Md., Nov. 18, 2010. The test demonstrates another step toward the certification of fuels from non-petroleum sources for use in all Navy and Marine Corps aircraft. U.S. Navy photo**

"The private sector knows that they can take those signals to their investors and say, 'The Navy is serious about this.' That's half the reason why we need to publicize these things [Biofuel tests, Green Fleet] so that they can see that it's not just talk. There's associated action and we are moving inexorably towards those goals."

The Navy expects to ramp-up demand, planning for 8,000 barrels for 2012 and 80,000 for 2016 on its way to 2020. Selecting the right mix of biofuels is a process that will continually be re-evaluated as technologies and costs change, but as director Task Force Energy, Cullom is already immersed in fuels development on a daily basis.

"There's a tremendous amount of movement in this whole arena, and I've had many opportunities to talk with people from corporations and companies that are working these things. Some are larger, some are smaller. Exxon Mobil and BP are active and there are many others, from Sapphire to Solazyme to UOP. Universities are working on this as well, including MIT, the University of Missouri, Arizona State, San Diego State, Cal Tech… there's a plethora of groups with different projects ongoing. There are interesting movements in all arenas – algae, camelina, you name it."

Nuclear power is a familiar alternative, and Cullom indicates that the "Green Carrier Strike Group" demonstration planned for 2011 could be performed solely on nuclear power or in combination with biofuels. Whatever the energy derivatives, they will not affect combat readiness, he insists.

"We're not giving up anything in terms of combat capability. In fact, we're getting something. We're getting flexibility in fuel-sourcing and at some point the desire is to go to neat [unblended] biofuels with aromatics added in to help with lubrication. Part of our energy plan is also the 'barrel you never have to use' – in other words, conservation and efficiency. It's nothing different than what Gen. [James H. "Jimmy"] Doolittle did in World War II, stripping his bombers to put them on an aircraft carrier and launch a raid that reached targets no one expected. If we better conserve energy that may mean one more pass for a nugget pilot who has already boltered twice. Or, a ship might not have to refuel every four days but at a lower frequency. All these [efficiencies] lead to combat capability."

Declaring the military's demand for alternative fuels and in turn stimulating private investment in alternatives is effectively a strategic measure, Cullom argues. The benefits of this demand signal lie in the potential for increased energy security and as a technology catalyst.

"It behooves us all to know what's going on out there and to talk with industry. All the services are doing that. We're making some pretty clear signals for the Navy. A lot of these are embedded in the Great Green Fleet idea. The march that we're on to do all the test and certification protocols for all of our aviation and surface platforms sends those signals… We're letting the public know that [pursuing energy alternatives] helps us do our mission. We need different sources of fuel and we need it to go as far as it can."


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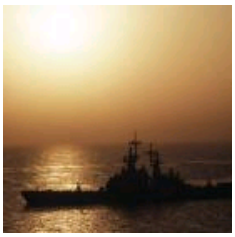


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