

Remarks by the Honorable Ray Mabus
Secretary of the Navy
Naval Energy Forum
Washington, DC
Wednesday, 17 October 2012

Good morning. I'm glad to be with you all, and glad to see the crowd that we've got here today.

As the admiral said, three years ago, almost to the day, I came and spoke to this forum and laid out some energy goals that, frankly, I'm not sure many people in the audience thought we would see realized. But I'm here today to talk to you about where we are on this path, and the progress that we've made. We're not there yet, but we are far further along than I think anybody thought, three years ago at this time, we would be.

Three years ago, when I came, I was entering my fifth month in office. But I was already very aware of the impact that energy had on the Navy and Marine Corps on our warfighting capability and on our national security. The fragility and volatility of the global energy market and the resulting economic and security ramifications to the United States of overreliance on foreign sources of fossil fuels are vulnerabilities that we absolutely have to confront. And those vulnerabilities only get bigger over time; when you got policy pronouncements by hardliners, or national or transnational instability or threats, or you close some vital chokepoints on our sea lanes. And when these things either actually disrupt the flow of oil or even threaten to disrupt the flow of oil, the same thing almost always occurs. The price of energy goes up, sometimes dramatically, with significant and dangerous impacts to our economy and to our security. And the U.S. military is the largest consumer of fossil fuels in the world. And for the Navy, every time the price of oil goes up a dollar a barrel – a dollar – it costs us \$30 million in additional fuel costs.

In fiscal year '12 alone, the Navy had to pay an additional half a billion dollars – \$500 million – because when the budget was done the increase in the price of oil simply wasn't big enough. The forecast underestimated how fast and how far oil would go up. And when you're presented with a half a billion dollar bill, there are not many places to go to get that money, because there's not any extra money for defense or anything else today. And there are only two places, really, to get money like this.

One is from operations. Which means we steam less, we fly less, we train less. And the other, if the bill gets too big, is we buy fewer platforms, fewer ships, fewer aircraft. And we spend, as a nation, almost \$84 billion a year protecting maritime oil transit routes and infrastructure around the world.

Now, those choices about constricting operations or buying fewer platforms, or paying for fuel, are simply choices that I don't think we ought to make. I don't think we ought to have to make those choices; I think there's another way to do this. But the only way we're going to do it is if we think and act pretty big. I said it three years ago, and I believe it more today: **Bold**

steps are part of our nature as Americans, and it's part of what makes us a great nation. No one has ever gotten anything big done by being timid.

So three years ago, 2009, I proposed some pretty ambitious goals. The most important and the most far-reaching, which I am absolutely confident we're going to meet, is that by no later than 2020 at least half of Navy energy both afloat and ashore will come from alternative sources.

In 2012, here today, I'm happy with our progress and I'm happy to report on it. Maybe the biggest change that's happened in both the Navy and the Marine Corps is the change of the culture – a culture, now, that embraces getting different sorts of energy; doing the same mission using less energy. And this cultural change is due in no small part to the leadership of the Navy and the Marine Corps, starting with our CNO Jonathan Greenert and our Commandant of the Marine Corps Jim Amos. Both have been enthusiastic public and private supporters of these efforts to change the way we think about energy and the way we use and produce energy. They do it, as career military officers and the leaders of these two services, because they know that these efforts will improve our warfighting capability.

And our Sailors and Marines, from the Blue Angels to surface warfare officers to Marines fighting in Afghanistan, they've also embraced renewable energy, energy efficiency and alternative fuels because they know firsthand that these measures make them safer, make them more effective, make them a more flexible warfighter. And I'm confident that this change is permanent and that the Navy and Marine Corps team will be leaders in energy innovation not just for the next three years but for the next three decades.

We're taking steps now to ensure that our commitment to energy innovation stays a part of the permanent fabric of the Navy and Marine Corps. For example, I'm happy to announce that for fiscal year '14, the officer selection boards will give special consideration for promotion of those men and women who've made energy resource management a priority and who have excelled at it.

So with that cultural change and with that framework in place we've initiated, we've advanced and we've achieved a great many of the objectives that we've set. And even though we are a seagoing service, I first want to talk about our shore installations.

One of the goals was to produce at least half of all shore-based energy requirements from alternative sources. The ability to sustain our military missions despite what happens to the commercial grid isn't possible unless we have either on-site or near-site independent generation and the ability to control where power goes.

The President, in this year's State of the Union, in January, announced that the Navy would purchase enough renewable energy capability to power a quarter of a million homes. This became our 1 Gigawatt Initiative. And later, the Air Force and the Army have announced their own 1 Gigawatt initiatives. This 1 Gigawatt strategy is a key component of our department's effort to achieve these energy goals and what will ultimately become a truly secure energy posture ashore for the Navy and Marine Corps.

At this conference last year, I said we had some major solar projects on the drawing board. Well earlier, this year, the Navy executed three power purchaser agreements for solar energy and – at Twentynine Palms, at China Lake and at Barstow. These are the longest power purchase agreements in DOD history, and combined they'll produce more than 16 megawatts of power. Tomorrow, we'll cut the ribbon on a 1.1 megawatt photovoltaic array at Marine Corps Logistics Base Barstow. And the following day, we'll cut the ribbon on a 13.8 megawatt array at China Lake. All of these are incredible accomplishments to have happened this fast and this well. And on all of these projects, there are no upfront costs to the American taxpayer. These projects, in combination with other projects, will provide power cheaper than conventional power from day one and every subsequent day of their project life, saving the Department of the Navy more than \$20 million over their lifespan.

Now, since last year, we've also awarded the first tri-service solar multiple award contract. And it's the military, so you got to have an acronym – a MAC. I guess it would be a Big Mac for Hawaii. And it'll produce up to 56 megawatts of solar power at various military installations across Hawaii. Hawaii has the highest energy cost in the nation. It's because their grid is run on fossil fuels and they have to import every single drop of that fuel. And so it only makes sense to invest in alternative energy programs that rely on the strength of the Hawaiian sun, the environment in Hawaii, for solutions. Under these contracts, the military – all of our services - will purchase electric power at rates either equal to or less than conventional power.

In many of the areas that were developed onshore, we're looking at new technologies, at cutting-edge technologies, at technologies that will become available in the future. We've been actively engaged in a DOD-wide project to initiate large-scale integration to plug in electric vehicles on our installations.

One of the things that this project is going to develop and test and evaluate is vehicle-to-grid technologies, V2G, which will allow these vehicles to be used as an energy resource when they're parked and plugged in. Sort of movable batteries, that power can flow both ways – not just to them but from them.

The Navy has, in our history, always gotten power from wind and waves. We also have a large number of installations between the Navy and Marine Corps located on the coast, and on islands. So it's a logical next step for us to turn to those waves and energy in the ocean and water to address some of our energy concerns. Marine hydrokinetics, which include wave and tidal and river current, seawater cooling, ocean thermal energy, are all early stage technologies, but we are actively partnered with industry to develop them and others. Our wave test site at Marine Base Kaneohe Bay in Hawaii is proposed to be designated as a Department of Energy national wave test site, and we have successfully connected a wave buoy to the local grid – first time that's ever been done in the United States.

So we're making a lot of progress onshore. But we are a seagoing service. And making progress onshore, while important, is not enough, because almost three-quarters of our fuel is burned in an operational environment. To really achieve these goals and to make a big impact, we have to make changes where it counts. And we have to do it in two ways. One is through

different sources of energy and the other is through using less energy to do the same job, because using less means needing less. And in an operational environment, that's critical.

Three years ago, I talked about the USS Makin Island, the big deck amphib built in my home state of Mississippi, that on its maiden voyage – and I announced it at this conference – from Pascagoula around the tip of South America to San Diego where it's home ported, saved \$2 million in fuel costs. Well, Makin Island completed a seven-month deployment this year. We had budgeted \$33 million in fuel costs for that deployment. When Makin Island returned, she had only spent \$18 million. That's \$15 million that goes back into our operational and maintenance budget, which we use for training and other operations.

And I went and visited Makin Island about two weeks ago. And one of the people I talked to there was the main propulsion officer. And he was showing me the hybrid drive – the electric drive for speeds under 12 knots, the normal drive for speeds of over 12 knots. And he got very excited. And it wasn't just about the equipment; he said that the thing that excited him the most was that every single Sailor on Makin Island, every single Marine on Makin Island, had become so involved in this new culture of saving energy that they would come up and say, "I think we can do this better, I think we can do that better, I think we can save some electricity, I think we can save some fuel, I think we can save some power if we do it this way instead of that way." He said that was the big change that started with having those two power sources, those two drive trains – what was really going to count for those young Sailors and Marines buying into this and coming up with their own ideas. This is the future of shipboard energy innovation. And Makin Island, no surprise, this year won the highest energy award that I give every year.

We're currently in the process of contracting to backfit those hybrid drives on our destroyers. And the design will be incorporated in future ships from the keel up. We're also using technologies like hull coatings and voyage planning and computer course guidance, and just stuff like more efficient lighting. They don't sound very exciting and they don't make many headlines, but they all add up. One change, adding stern flaps to ships, saves as much as a million dollars per ship per year in fuel costs.

When I visited the Great Green Fleet demonstration this summer, I went with the CNO, who is a submariner. And it was pointed out to him that one of the ships had the stern flaps on. And it worried him because he said the wake is different and less turbulent, and he was concerned that his submarines and their wake-homing torpedoes might have a problem. That's a problem that I'm glad to have. Just putting stern flaps -- we have 287 ships in the battle force inventory right now -- million dollars a year per ship that we'll save in fuel costs.

Last year when I was here, I also talked about the Marines in Afghanistan, where I've now visited nine different times, about how they cut their headquarters fuel use in some of the toughest fighting in Afghanistan by 25 percent, how they cut some of their forward operating base's energy consumption by more than 90 percent.

The commandant of the Marine Corps is such a believer in new energy technology – and it's not just this commandant, it was the previous commandant, too. Commandant Jim Conway created the ExFOB, the experimental forward operating base, at Quantico. The ExFOB brought

together people – Marines and others – from across the Corps to try to accelerate commercial technologies from concept to combat that reduced the need for what the Marines call liquid logistics. This is the type of process that the military knows how to do pretty well. This process produced the solar panels that I talked about, which the Marines use to power their radios and their GPSs, as well as things like solar generators and LED lights and tent insulators.

Now – and I may have mentioned this last year, but – I don't know, when I think of Marines, the first thing I think of is probably not ardent environmentalists. But I'll tell you, they're the greatest warfighters you'll ever meet. And they have adopted these energy-saving measures and they've carried these solar blankets with them because it makes them better at their job. They don't have to carry 700 pounds of batteries that a Marine company would carry. They don't have to be resupplied with those batteries every couple of days. They're better warfighters, and we're losing fewer Marines guarding the convoys to go resupply.

This year, the Marines completed their fourth and fifth ExFOB, including one it held last month at Pendleton in California focusing on commercial solutions, off the shelf, that address a significant Marine Corps need, a need to reduce the impact of heating and cooling on the battlefield, or near the battlefield.

There was a study in 2010 that said that 57 percent of all our energy in-theater is used for climate control, particularly if you're fighting in a place like Afghanistan, where it's boiling hot in the summer and freezing cold in the winter. So just efficiencies in that have the potential to reduce fuel requirements a lot, enabling a more self-sufficient, more combat-effective force. Fourteen companies at this ExFOB demonstrated some cutting-edge technologies in thermal designed to efficiently heat and cool things like our Marines, bulk water, electronics, vehicles, tents, buildings.

Some other research projects are testing new state-of-the-art technologies which have incredibly clear and great benefits for the warfighter. As part of the Department's Small Business Innovation and Research Program, Marines at Quantico are testing the suspended-load backpack, which uses Marine energy as they're humping that backpack into electricity, enabling them to, in turn, carry lighter loads.

The Department of Defense just purchased solar diesel generators from two companies in Virginia, and these bring a couple of advantages to the warfighter. One is they'll spend less time building up and getting things like diesel fuel and filling up the generators, and so they'll require fewer resupply convoys; and second, when you turn off the generator, you can hear, and the enemy doesn't have a target, big noise, to know where you are. We just deployed a special operations task force in Afghanistan with these, and the Navy has been buying them for our SEALs.

Even though we've done all these things, from electric vehicles to wave to solar backpacks, the thing that's gotten by far the most attention is our development of a drop-in biofuel. This drop-in biofuel, when used in combination with traditional jet fuel for our planes or Marine diesel for our ships, is used to power the fleet at sea.

At this conference in 2009, I announced the goal that we would demonstrate the Great Green Fleet, a carrier strike group where, with the carrier being nuclear but the aircraft and ships

flying and sailing on a blend of traditional fuels and biofuels, by 2012. So we had three years to do it. A year later, in 2010, we flew an F/A-18 dubbed “The Green Hornet” on that 50-50 blend, and that aircraft went 1.7 times the speed of sound. And when I talked to the pilots afterwards and asked them if they noticed any differences in the plane, they didn’t notice any difference. And last year, the Blue Angels flew an entire airshow using that 50-50 blend.

And so this past summer, at RIMPAC, the biggest maritime exercise in the world, we demonstrated successfully the Great Green Fleet. There were a lot of firsts that day. Every single type of aircraft taking off from Nimitz that day took off flying on biofuels and aviation gas. Every ship in the convoy or in the strike group was sailing on a 50-50 blend. And the oiler was refueling at sea, the Princeton, seen here, with biofuels. We also did some air-to-air refueling on biofuels. The Australians sent a helicopter over, and they got refueled on biofuels.

Now, to show you I don’t just talk about this, the helicopter I flew out on was fueled with the same mixture of biofuels. And I think the big news out of this is that nothing happened. We bought this through the Defense Logistics Agency in the open market, bid it out, put it in our normal logistics chain, got it to our ships at sea and our aircraft, and we changed nothing. We didn’t change a single engine. We didn’t change any of our logistics.

The only difference that that preliminary data seems to show – and the Air Force is doing a big study on this – but the only difference seems to be that biofuels burn a little bit cleaner, and so they give you a little bit more power and they don’t gunk up your engines quite as much. The engines may last longer with the biofuels. That’s the only difference, so far, that we found.

And we’re not by ourselves in this. At the Great Green Fleet, we had a whole bunch of airlines, commercial airlines, out there watching. A lot of commercial airlines, including the world’s biggest carrier, United, have completed test flights on biofuel. You’ll be hearing a lot more about that at the industry panel this afternoon.

Maersk, the largest commercial sea shipping line in the world, ran one of its container vessels on 100 percent algae-based renewable diesel. I said later on today in this program, there’ll be people from United and from Maersk to talk about the case for biofuels, and you’ll get a message via video from Richard Branson, the Virgin Airlines CEO, on why he believes in the business case for biofuels and why he’s pursuing that for his airlines and why he thinks commercial airlines are going to have to move there for that.

There is absolutely clear and overwhelmingly compelling evidence that these efforts are vital to our national security. That’s why the Navy is using our market and our buying ability to accelerate domestic alternative fuels that are cost competitive.

Last year, last spring, spring of ’11, President Obama directed the departments of Energy, Agriculture and Navy to come up with a viable, domestic, advanced biofuel industry, geographically dispersed, that would be competitive in price with traditional fuels. The three departments committed up to \$510 million for this. In July of this year, the three departments announced that \$30 million in funding will be made available as a part of that commitment. The funding opportunity announcement is made possible through Title III of the Defense Production Act.

Now, the DPA, as most of you know, has been around since the early '50s, and what it says is if you – if there is an industry that defense needs, that we need for the defense of this country that is not available in sufficient quantity on a commercial scale in the United States, we can help spur it along. We've used it for things like steel and aluminum and titanium for things like semiconductors, radiation-hardened electronics, and even used it to help the Navy's nuclear program in the 1950s.

The primary objective of every one of the DPA projects is to improve domestic production capability to support our national defense requirement. This law specifically calls out energy as a place that we ought to be investing.

And these efforts are already showing some progress. One of the ways they're showing progress is the price is coming down very dramatically. Since we first made these purchases in 2009, the cost of biofuel has been cut in half. We've tested all our aircraft platforms on this 50-50 blend and we're about to complete testing all our service platforms.

What I've often said is we don't have a favorite source of alternative energy or biofuels, it has to only meet the following criteria: It works with the engines we have – we're not going to change our airplanes, we're not going to change our ships; it doesn't take land out of food production; and it doesn't increase the carbon footprint. If it works, we're interested in pursuing it.

We're going to, soon, we think, qualify Fischer-Tropsch fuels for our ships and airplanes. So in addition to the things we're now using with feedstocks like crop oils and agriculture waste oils and algae, we'll be able to use these Fischer-Tropsch process fuels based on feedstocks that comply with the law we have in place, things like biomass and natural gas and combinations of biomass and coal.

And the next new feedstock path that we're going to test is alcohol to jet fuel, which uses woody biomass, like the tops and limbs of trees that aren't used when they're cut, and agriculture residue like hay and corn stover. And no, I didn't know what corn stover was either. It's the things that are left after you get the corn. It's the stalks, it's the leaves. But that can be turned into fuel.

We're doing what we're doing, and we're leading in what we're doing because it increases national security and, I would argue, increases international stability. It reduces the impact of price spikes on military readiness and on our procurement, and it can save lives.

Our military has shown it knows how to innovate in areas crucial to our national defense that ultimately have gone on to have a lot broader impacts on our society as a whole. You don't have to look very far. GPS, the internet, flat-screen TVs, a lot of our medical and surgical procedures owe their existence to military innovation. It's part of our history and it's a part of our heritage.

And I mentioned this before and I'm going to keep mentioning it because it is in Navy's DNA. In the middle of the 19th century, we moved from sail to coal. At the early part of the 20th century, we moved from coal to oil, and in the 1950s, we pioneered the use of nuclear. And we're going to continue to do that. And some of these advancements that I've talked about today, we will continue that leadership role in changing how we use and produce energy.

And as I've said before, every single time that the Navy has done this in the past, there've been those who have said, you're making a terrible mistake. This is awful. This is crazy. You're trading one source of proven energy that's less costly for another one that's more costly – in the case of wind, it was free – and you're going to give that up to go to coal? Are you going to give up all those coaling stations we've established around the world to go to oil? What are you thinking? Nuclear will never be small enough or safe enough to put in something like a submarine.

And if price was the only concern, if that was the only thing we looked at, we'd still be using sails and we wouldn't be buying nuclear subs and carriers today because they're still more expensive than conventional, but they give us so much more capability.

Every time we've changed, every revolution that we've had changed the nature of the military and made the Navy and the Marine Corps stronger, more effective and better able to defend the United States, better able to keep the sea lanes open and the global commons zone safe.

The Navy had a birthday last week; the Marine Corps will have one next month. Two hundred thirty-seven years. Those great services, the Navy and the Marine Corps, have defended not only America's shores, but have worked with our partners to maintain the world's oceans as a free and open space, accessible and available to anybody participating in peaceful commerce.

Today, we not only have the opportunity, we have the obligation to lead in the creation of a new energies future which can assure our security and will help in international security, because that's what the Navy and the Marine Corps have always done – innovate, adapt, come out on the other side victorious. From the Navy, *semper fortis* – always courageous. From the Marine Corps, *semper fidelis* – always faithful. Thank you all.