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HOUSE ARMED SERVICES
SUBCOMMITTEE ON
READINESS

STATEMENT OF

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ON

ENERGY MANAGEMENT AND INITIATIVES ON MILITARY INSTALLATIONS

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Chairman Ortiz, Representative Forbes, members of the subcommittee, thank you for the opportunity to present an overview of the Department of the Navy's Energy Program, specifically as it relates to Installation Energy initiatives.

INTRODUCTION

The Department of the Navy (DoN) is committed to implementing a balanced energy program that exceeds the goals established by the Energy Independence and Security Act of 2007, Energy Policy Act of 2005, National Defense Authorization Act of 2007 and 2010, Executive Orders 13423 and 13514. We place a strong emphasis on environmental stewardship, reducing overall energy consumption, increasing energy reliability, and reducing our dependence on fossil fuels. The Department is a recognized leader and innovator in the energy industry by the federal government and private sector as well. Over the past nine years, DoN has received 28% of all of the Presidential awards and 30% of all of the Federal energy awards. Additionally, DoN has received the Alliance to Save Energy "Star of Energy Efficiency" Award and two Platts "Global Energy Awards" for Leadership and Green Initiatives.

Organization and Commitment

Increased Energy Efficiency is a Department of Defense (DoD) High Priority Performance Goal. Moreover, the Secretary of the Navy (SECNAV) is whole-heartedly committed to the energy effort and it is one of his top three initiatives for the Department. The Secretary established a Deputy Assistant Secretary of the Navy for Energy (DASN-Energy) to consolidate the Department's operational and installation energy missions. The consolidation of both operational and installation energy portfolios under one director is unique to the Department of the Navy.

The DASN-Energy will be a career member of the Senior Executive Service who will report directly to the ASN (I&E) and will be able to coordinate across the Department to develop overarching policy, provide guidance, oversee the continued development of new ideas and align existing programs. In turn, each of the Services has established an energy management office to implement the Secretary's guidance. Within the Chief of Naval Operations (CNO) organization, a Navy Energy Coordination Office (NECO) was established to develop and institutionalize the Navy's Energy Strategy. Within the Commandant of the Marine Corps (CMC) organization, an Expeditionary Energy Office was established to drive energy efforts and initiatives within the expeditionary forces on the ground in theater.

From the Secretary down to the deck plate Sailor and the Marine in the field, the Department is committed to meeting our aggressive energy goals. We all view energy as an invaluable resource that provides us with a strategic and operational advantage.

Energy Goals

The key statutory and regulatory goals relevant to installation energy consumption require the following:

- Reduce energy intensity (BTUs per square foot) by 3 percent per year, or 30 percent overall, by 2015 from the 2003 baseline [Energy Independence and Security of 2007, or EISA] [this includes an 18 percent reduction by the end of FY2011 in accordance with DOD's High Priority Performance Goals in the President's Budget];

- Increase use of renewable energy to 7.5 percent in 2013 and beyond (Energy Policy Act of 2005, or EPACK); and produce or procure 25 percent of all electric energy from renewable sources by the end of 2025 [National Defense Authorization Act of 2007] [this includes the DOD's High Priority Performance Goal of 14.3 percent by 2011]; and
- Reduce consumption of petroleum (gasoline and diesel) by non-tactical vehicles by 30 percent by 2020 [Executive Order 13514, October 2009].

However, in October of 2009, Secretary Mabus established far more aggressive goals for the Department. For installations, he directed that 50% of our shore energy will come from alternative sources and that by 2015 the Department will reduce fleet vehicle petroleum usage by greater than 50%.

Based on these ambitious energy goals, we are developing our strategic roadmap and a set of energy directives that will provide guidance and direction to the Navy and Marine Corps. We are also developing baseline metrics, milestones, tools and methodologies to measure and evaluate progress towards meeting the Secretary's goals. Additionally, we are documenting our past and current energy use for tactical platforms and shore installations. We are making investments, allocating resources, developing possible legislation, institutionalizing policy changes, creating public-private partnerships, and pursuing technology development required to meet these goals.

ENERGY STRATEGY

With respect to installations, the Department has pursued a two-part strategy that is designed to (1) reduce the demand for traditional energy while (2) increasing the supply of renewable energy sources. Financing for these investments has come from appropriated funds, such as our Energy

Conservation Investment Program (ECIP), Operations and Maintenance, Military Construction, and most recently, the American Recovery and Reinvestment Act. We have been successful in utilizing third-party financing through Energy Savings Performance Contracts (ESPC) and Utilities Energy Service Contracts (UESC). We are also pursuing other mechanisms, such as Enhanced Use Leases (EUL) and Power Purchase Agreements (PPA).

Energy Efficiency

Efforts to curb demand—through conservation measures and improved energy efficiency—are by far the most cost-effective way to improve an installation’s energy profile. A large portion of our energy efficiency investments go to retrofit existing buildings. Typical projects install high efficiency HVAC systems, energy management control systems, high performance roofs and improved lighting. For new construction, the Department is incorporating more energy efficient designs, material and equipment, using LEED Silver standards, and building to 30% better than American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) standard 90.1-2004 for energy efficiency requirements. From FY2005 to FY2009, we reduced the energy intensity of our facilities by 13 percent through conservation and energy efficiency investments.

Renewable Energy

Renewable energy is a key component of our comprehensive energy program. The Department of Navy is a leader in developing innovative approaches for the construction of renewable generation within the fence line of our installations. We are making significant progress towards the renewable and alternative energy goals mandated by the Secretary. Currently, nearly 19% of

our energy produced or consumed on our installations today comes from alternative sources such as wind, solar, and geothermal power.

The Department is committed to using renewable energy where cost effective and fostering the development of renewable energy technology when it supports and is compatible with our mission. We partner with industry to facilitate power purchase agreements, public private ventures and Energy Savings Performance Contracts that build renewable energy systems on our installations; we make use of proven technology developed by industry, universities, and the Department of Energy; and we encourage renewable technology development in ocean environments.

The Department analyzed options for constructing renewable generation capability on installations, purchasing renewable power from commercial sources, and purchasing renewable energy credits from private entities. We made the decision a number of years ago to concentrate our efforts on generating renewable energy on base. We took this position for several important reasons. First, in a time of man-made or natural disaster, electric power received from national power grids may not be as reliable as we require. By locating large-scale renewable energy generation systems on installations we increase energy security and decrease demand on our nation's electric grid. Of course, some renewable technologies, such as wind and solar will be subject to periods of limited or non-availability, but we have implemented redundant capabilities for mission critical functions and assets while awaiting for large scale energy storage to become more viable. We continue to pursue geothermal and bio-mass opportunities where applicable, while funding RDT&E efforts on the large scale applicability of wave and ocean thermal energy.

A second important reason for choosing to locate renewable energy systems on installations is because every kilowatt-hour (kwh) of electricity produced simultaneously reduces the amount of fossil fuel burned and the associated emissions released. Third, renewable energy is of great interest to our Sailors, Marines, and their families and our civilian workforce. They often take pride in the renewable energy systems installed on installations and feel part of the solution. We have seen that energy awareness increases and overall energy consumption has decreased at work and in military housing.

Geothermal Energy

The earliest and, by far, the most successful of our renewable energy plants is the 270 MW geothermal power plant at the Naval Air Weapons Station China Lake, California. Awarded in 1979, 180 MW is produced from Navy lands and 90 MW is produced from Bureau of Land Management lands. The electricity generated is the equivalent amount of energy to power 180,000 homes annually. To facilitate construction of this world-class plant, the government provided land and the geothermal steam resource and the contractor provided investment funds. The contractor owns, operates and maintains the plant. The project is unique, being the only geothermal power plant of its type on Department of Defense (DoD) lands. Its distinctiveness is more startling when you consider that 166 wells, 200,000 linear feet of piping and four power plants are operating on one of the Navy's busiest weapons and test ranges that is also surrounded by Native American cultural sites.

The Navy does not take ownership of the electric power generated from this “facilitated” project. The electricity produced, to date over 45 million mega-watt-hours, is owned by the contractor and sold to the grid. As authorized by 10 USC 2867, the Navy receives a share of the contractor’s revenue as compensation for the land and geothermal resource. The amount of compensation is typically based upon an increasing percentage over time, a smaller percentage in the early years when the contractor’s risk and investment are higher, and a larger percentage to the Navy when the contractor’s investment is recovered and the plant, resource and operations are more stable. The majority of the revenue received is used to fund the Department of Navy’s shore energy program and to meet mandated goals. Annual revenue is leveraged to validate and transfer technology into broad DoN use, to install advanced meters, energy efficient lighting, heating, air conditioning, motors and other energy systems, provide program quality control and standardization, educate and involve all personnel in our efforts to reduce consumption, recognize and share success, and develop and utilize new renewable resources.

We are pursuing other geothermal resources in our role as the DoD Lead Service for Geothermal Energy. We are exploring geothermal resources at Naval Air Station Fallon, NV, Naval Air Field El Centro, CA, Marine Corps Air Ground Combat Center Twenty-nine Palms, CA, Marine Corps Air Station Yuma, AZ, and we are assisting the Department of Army to delineate their geothermal resource at the Hawthorne Army Depot in Hawthorne, Nevada.

One of the challenges affecting our ability to attract industry participation in geothermal partnerships is the inherent risk involved in committing to a long term contract with the government when the scope and extent of the resource is unknown. To reduce this risk the Navy

has adopted the “farm out business model” used extensively by the oil industry. The Navy performs the preliminary investigations up to and including drilling test wells to quantify the resource. With proven test results and a hot well which can be instrumented, industry is more willing to partner in what is still a financially risky enterprise.

Ocean Thermal Energy Conversion (OTEC)

The Department of the Navy has been a world leader in setting the standard for innovative energy reduction initiatives. We have partnered with industry to support deployment of innovative technologies such as wave and ocean thermal energy conversion (OTEC). We are monitoring the operation of the 3rd generation of wave power buoys at Kaneohe Bay Marine Corps Base. This program will evaluate the economic and technical feasibility of converting wave energy into reliable electrical power for Naval applications. In the spring of 2004, the first buoy was deployed and produced 20 Kilowatts of carbon-free electricity. The second and third generation buoys have increased efficiency and have become smaller. The Wave Energy Project objectives are: 1) maximize the efficiency of the wave energy conversion process; 2) demonstrate system reliability; and 3) minimize deployment, operation and maintenance requirements. In meeting these key objectives, the Navy will gain the capability to deploy a unique renewable energy system, taking advantage of the Navy’s linkage to the sea, and applying renewable energy where traditional systems are not cost effective or technically feasible.

With ARRA funds, we are advancing technology to convert the ocean’s thermal gradients to electricity and potable water. We partnered with industry to further develop the design and concept of a 5-10 MW OTEC power plant that we plan to test near Naval Station Pearl Harbor,

HI in the coming years. Using ONR funding, various ocean bathymetry studies are ongoing off the coast of Hawaii to support the OTEC project

We are evaluating the technical and economic feasibility of integrating hydrogen and synthetic liquid hydrocarbon fuel production with ocean thermal energy conversion (OTEC) technology on floating platforms. A hydrogen/synthetic-fuel production facility on a floating OTEC platform could serve as a floating fuel depot in tropical oceans for the US Navy or as a production facility for commercially viable liquid hydrogen and/or synthetic-fuels.

Fuel Cell Development

While fuel cells are not yet cost effective, DoN is gaining experience with the technology and facilitates industry's fuel cell development by providing sites to validate fuel cell performance. In FY2005 the Navy demonstrated 12 proton exchange membrane fuel cells in cogeneration applications at selected DoN sites. The fuel cells offset a total of 30 kW of electric demand and are projected to generate 200,000 kWh and 670 MBTU in thermal recovery. We are currently demonstrating molten carbonate fuel cells at 4 locations. The current test involves two to four 250kw units at each location and is projected to be completed by FY 2011. An added advantage of fuel cell technology is that it only emits water vapor.

Non-Tactical Vehicle Fleet

The current mandated goal for fleet commercial vehicles is a 30% reduction in non-tactical vehicle petroleum use by 2020. SECNAV set the goal that by 2015, DoN will reduce our vehicle fleet petroleum use by greater than 50%. With investments in hybrid, flex fuel, and electric vehicles, we can retire many of our petroleum-intensive vehicles currently in use – a clear

example of how we can protect our Nation while we protect our environment. We have already replaced 30% of our non-tactical fleet vehicles with their alternative fueled counterparts.

At Marine Corp Base Camp Pendleton, California, we are involved in long range pilot demonstration of hydrogen fuel cell infrastructure and vehicles. The project includes installation of a hydrogen fueling system that will be used to test and evaluate fuel cell vehicles. The fuel cell vehicles get the equivalent of 26 miles per gallon and the only exhaust is pure water.

At the Naval Facilities Engineering Service Center (NFESC) in Port Hueneme, California, the Navy is conducting a biodiesel production facility demonstration/validation effort executed under a Cooperative Research and Development Agreement (CRADA). The effort is a collaboration between industry and the Navy. Biodiesel is an alternative fuel, produced from domestic, renewable resources such as spent restaurant vegetable oil. Biodiesel contains no petroleum and can be blended at any level with petroleum diesel to create a biodiesel blend. DoD currently approves the use of B20, which is a blend of 20% biodiesel and 80% petroleum diesel for non-tactical vehicles. NFESC has completed the testing on the 400 gallon batch processing pilot and is in the process of preparing to test a 1-3 million gallon per year full production unit. The economic model of biodiesel production facilities dictates small-distributed production facilities that the Navy would implement via public private ventures. The Navy installation would not pay for any of the capital investment or operational costs and would agree to buy a negotiated amount of biodiesel at a negotiated price for a set number of years. Other applications also under investigation include biodiesel as a tactical vehicle fuel and small containerized production facilities for remote applications.

Compatible Energy Development

Vital to the readiness of our Fleet is unencumbered access to critical water and air space adjacent to our facilities and ranges. An example is the outer continental shelf (OCS) where the vast majority of our training evolutions occur. The Department realizes that energy exploration and off-shore wind development play a crucial role in our nation's security and are not necessarily mutually exclusive endeavors. Therefore, we are engaging with the other services, the Secretary of Defense's office, and the Department of Interior to advance the administration's energy strategy. We are poised to coordinate with commercial entities, where feasible, in their exploration and development adjacent to installations and our operating areas along the OCS that are compatible with military operations. However, we must ensure that obstructions to freedom of maneuver or restrictions to tactical action in critical range space do not measurably degrade the ability of naval forces to achieve the highest value from training and testing.

RESOURCES

DoN makes very effective use of funding authorized by Congress. Each year, the Department is committed to allocating all 100% of ECIP funding to renewable energy projects. Additionally, DoN has obligated over \$500 million of American Recovery and Reinvestment Act (ARRA) funds on more than 100 energy projects and \$75M on research and development energy initiatives. The ARRA projects will increase solar photovoltaic capacity within DoN to over 24 MW.

Third Party Financing

Energy Savings Performance Contracts (ESPC) are a critical tool for building, operating and maintaining renewable energy systems on DoN installations and have been the primary method for financing capital investments. These contracts take advantage of private sector expertise and financing to meet energy goals with minimal up front government investment. Contractors often maintain the installed technology so that equipment efficiency is maintained and long term savings are realized. The savings generated are dramatic and more than pay for the project's life-cycle cost. Without ESPC, these same funds would instead be spent paying utility bills generated by consumption of inefficient systems that do nothing to reduce dependence on fossil fuels .

Using ESPCs, DoN constructed two of the largest federal photovoltaic projects in the U.S. The two systems are a 1.1 MW photovoltaic power generating plant at the Marine Corps Air Ground Combat Center Twenty-Nine Palms, CA, and a 1 MW photovoltaic parking structure at Naval Base Coronado, North Island, CA. Together, these systems generate energy equivalent to electrical demand of more than 1,200 homes, avoid the equivalent of burning 6,000 barrels of crude oil and reduce an estimated 567 metric tons of greenhouse gases annually.

DoN has constructed almost 6MW of wind farms by taking advantage of the unique capabilities of the ESPC program. At Naval Station Guantanamo Bay, Cuba, a 3.8 MW wind farm, the world's largest wind/diesel hybrid system, generates 7500 megawatt hours of electricity annually (25% of the Station's power requirements). On San Clemente Island, CA, nearly 15% of the island's electrical demand is generated by wind turbine technology. The quiet and smog-free

675-kilowatt wind farm takes advantage of the island's 13 mile-per-hour average winds. Finally, at Marine Corps Logistics Base Barstow, CA, the Marines have installed their first 1.5 MW wind turbine, which provides 15% of the installation's power and avoids the equivalent of burning 2,700 barrels of fuel oil annually.

INTER-AGENCY COOPERATION

The Department of the Navy is committed to expanding inter-agency partnerships in order to develop the United States' renewable energy economy. On January 21, 2010, Secretary Mabus and the Secretary of the U.S. Department of Agriculture (USDA) signed a Memorandum of Understanding (MOU) between the two Agencies. This agreement provides a platform through which DoN and USDA can work together to achieve a significant increase in the use of renewable energy sources. Specifically, we will explore and develop advanced biofuels, which will be a major component in the solution to accomplish our aggressive goals. We will also reach out to other Federal, State, and local organizations and encourage technical assistance and sharing of resources.

Another example of inter-agency partnerships is our recent agreement with the Department of Energy (DOE) to work together on a number of energy initiatives. Both agencies will establish a number of working groups to explore opportunities for joint development and implementation. The Department of Energy is already testing biofuels that have potential for supporting our efforts towards meeting Secretary Mabus' goals.

CRITICAL INFRASTRUCTURE PROTECTION

Energy security, energy efficiency, and environmental stewardship are critical to our mission and combat capabilities. We have historically looked at each of these concepts separately and have often competed one against each other for resources. We now look at them as complementary.

We have begun a major effort to address the risk to our installations from potential disruptions to the commercial electric grid. The Department is participating in interagency discussions on the magnitude of the threat to the grid and how best to mitigate it. We are also looking at how to ensure that we have the energy needed to maintain critical operations in the face of a disruption to the grid. The development of renewable and alternative energy sources on installations will be one element of this effort. When combined with smart grid or micro-grid technologies, investments that reduce demand and produce renewable energy will enable installations to sustain mission-critical activities during grid disruptions

CONCLUSION

I take pride in the Department of Navy's energy program and our achievements. Our energy management program, with large scale solar, wind, and geothermal projects, has a proven track record of saving energy and making the Nation more secure. We know we cannot meet the threats of tomorrow by simply maintaining today's readiness and capabilities. Through the partnerships we are forging with industry and other agencies to rapidly develop renewable energy sources to reduce our petroleum usage, the Department of the Navy's energy program will continue to lead the way and I am confident that the Navy and the Marine Corps will excel at meeting the energy challenges of the 21st century.