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Statement by

Mr. Tom Morehouse

**Acting Assistant Secretary of Defense for
Operational Energy Plans and Programs**

Submitted to the

**Subcommittee on Defense
Senate Appropriations Committee
United States Senate**

May 21, 2014

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Introduction

Chairman Durbin, Vice Chairman Cochran, and distinguished members of the Subcommittee, thank you for the opportunity to discuss my office in the Department of Defense, Operational Energy Plans and Programs (OEPP). Today, the Department faces continued operational energy challenges as our defense posture adjusts to meet the rapidly-changing global security environment. The dynamic global energy landscape adds to our strategic challenges and opportunities. I will provide some perspective on those issues, along with an update of our progress and some information on the President's Fiscal Year (FY) 2015 Budget Request as it relates to operational energy.

Mission of OEPP

Established in 2010, my office's primary purpose is to strengthen the energy security of U.S. military operations. Specifically, the office's mission is to help the Military Services and Combatant Commands improve military capabilities, cut costs, and lower operational and strategic risk through better energy planning, management, and innovation. By statute, operational energy is defined as the energy required for training, moving, and sustaining military forces and weapons platforms for military operations. In June 2011, the Department released "Energy for the Warfighter: The Department of Defense Operational Energy Strategy," which set the overall direction for energy use in the Department: to assure reliable supplies of energy for 21st century military operations. It outlines three ways to meet that goal: reducing the demand for energy; expanding and securing the supply of energy; and building energy security into the future force.

These goals are especially important as we build a military force that is prepared and postured for a complex, global security environment, "capable of simultaneously defending the homeland; conducting sustained, distributed counterterrorist operations; and in multiple regions, deterring aggression and assuring allies through forward presence and engagement," as the Secretary of Defense called for in the 2014 Quadrennial Defense Review (QDR). The QDR also directly connects energy to capability, noting that, "Energy improvements enhance range, endurance, and agility, particularly in the future security environment where logistics may be constrained." To these ends, OEPP has achieved considerable progress by supporting current operations and energy innovation, building operational energy considerations into the future force, and promoting institutional change within the Department.

Changing Energy Landscape

DoD's efforts to transform our own energy use are occurring as the global energy landscape rapidly changes. Here at home, the significant surge of domestic oil and gas production is fundamentally altering the balance of the energy markets we have known for the past 40 years. The U.S. is expected to become the world's largest producer of natural gas; around the country, massive terminals built to import natural gas are now rapidly being converted to export it.¹ Oil imports have been reduced by about 2.5 million barrels a day in just the last 5 years² while U.S. production is expected to increase by a further 3 million barrels per day by the end of the decade.³ The U.S. now exports around 3 million barrels per day of refined product, an increase of more than 2 million barrels per day since 2005.⁴

This rebalance is significantly altering the flow of the global energy trade. Energy shipments from West Africa that used to cross the Atlantic are now headed to Europe or through the Indian Ocean en route to Asia. Permits to export natural gas are now being approved and by the end of the decade we can expect U.S. natural gas to be available for markets in Europe and Asia. It is not just the supply patterns that are changing. Energy demand in the developed world has leveled off. The majority of the growth in the world's energy consumption over the next decade will come from the developing world with China, India, and other non-Organization for Economic Co-operation and Development countries increasing their energy consumption by 50% in the next twenty years.⁵

As regions which have previously exported to the US redirect their energy products to new customers, our economic, political, and military relationships with those countries will evolve as well. As the Department considers base access, security cooperation and partnerships, we must be cognizant of these changing underlying economic forces.

We also see how the appearance of new energy resources is influencing the Department's strategic direction. Last year, Secretary of Defense Chuck Hagel unveiled DoD's first-ever Arctic

¹ <http://www.eia.gov/todayinenergy/detail.cfm?id=13251>

² <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=wcrimus2&f=w>

³ http://www.eia.gov/forecasts/aeo/er/early_production.cfm, EIA Annual Energy Outlook, Early Release Overview, "U.S. production of crude oil (including lease condensate) in the AEO2014 Reference case increases from 6.5 MM bbl/d in 2012 to 9.6 MM bbl/d in 2019."

⁴ <http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MTPEXUS2&f=M>, EIA data on U.S. exports of finished petroleum products indicates monthly U.S. exports of finished petroleum products in November 2013 was 3 million bbls/d compared to 811,000 bbls/d in November 2005.

⁵ <http://www.eia.gov/forecasts/ieo/world.cfm> - According to EIA, non OECD countries consumption will rise from 307 quadrillion BTUs in 2013 to 460 by 2030.

Strategy and addressed the driving force behind it—global climate change. According to the U.S. Navy’s Task Force Climate Change, “average Arctic temperatures have increased at almost twice the global average rate” in the past 100 years, and “in 2012, Arctic sea ice reached its smallest extent in recorded history, 1.3 million square miles.” The changes in that region have opened up new areas to energy development and shipping. As the Arctic region becomes more accessible to other nations, expanded capabilities and capacity may be required to increase U.S. engagement in this region.

Changes in the climate, driven by global energy use, will affect military operations elsewhere as well. Specifically, as the 2014 QDR found, climate change can act as threat multiplier, as heat waves, drought, floods, and severe storms may significantly add to the associated challenges of instability, hunger, poverty, and even conflict. At the installation level, climate risks may disrupt training, testing, and direct support to ongoing operations. In fact, the National Intelligence Council estimates over 30 US military installations face elevated risks from rising sea levels. In the cases of severe weather events, demands on the Department for humanitarian assistance or disaster response — both within the United States and abroad — may increase as the climate changes.

However, even with all these changes, some constants remain. First, it is important to point out that most of the Department’s operations occur outside the U.S, and we will continue to buy energy overseas to simplify our supply chains, limit costs, and increase flexibility for the warfighter. Second, a large proportion of global energy will continue to flow through a relatively small number of chokepoints. Today, nearly a fifth of all oil and nearly 25% of globally traded liquefied natural gas transit the Strait of Hormuz. Current and planned pipelines across the Arabian Peninsula and around the Strait would provide only limited relief in the event of a blockage and would do little to cushion any global price spike. The Strait of Hormuz will continue to pose an outsize risk to global prices for the foreseeable future — and to prices at the pump here at home.

Indeed, the Middle East will remain a major source of oil for nations across the globe, particularly our allies in Asia. Even so, the 2014 QDR states that “competition for resources, including energy and water, will worsen tensions in the coming years and could escalate regional confrontations into broader conflicts – particularly in fragile states” in the Middle East. As long as petroleum powers our transportation sector, we will experience the economic consequences of price volatility from events in any oil-producing region. At the United Nations General Assembly this past September, the President made clear that the U.S. will continue to ensure the free flow of energy from the Middle East to the world, even as the U.S. steadily reduces our dependence on imported oil. It is important to remember

that even as the U.S. is able to meet more of our energy needs ourselves, the price for oil and petroleum products will still be set by a global market.

The Defense Energy Challenge – Today and Tomorrow

As a critical enabler for military operations, the Department consumes significant amounts of energy executing missions around the globe. While only accounting for approximately 1.3 percent of U.S. oil and petroleum consumption in FY13, the Department is the single largest energy user in the nation. In FY13, the Department consumed almost 90 million barrels of liquid fuel at a cost of \$14.8 billion, with more than 60 percent of that outside of the U.S. In FY14, the Department estimates it will consume nearly 105 million barrels of liquid fuels at a cost of \$16 billion. In FY15, the Department estimates it will consume 96 million barrels of liquid fuel at a cost of approximately \$15 billion.

The Department's demand for operational energy varies according to the missions assigned to the Department, as well as the equipment used in to execute those missions. Including training, exercises, and the full range of military operations, the Department uses operational energy to maintain readiness and deploy, employ and sustain forces around the globe. Year over year, operations tempo reflects unexpected demands (i.e., post-9/11 operations, humanitarian relief missions) as well as changes in the magnitude of other ongoing operations like Afghanistan.

In Afghanistan, the Department used more than 9 million barrels of liquid fuels to support Operation Enduring Freedom in FY13. In addition to the fuel provided to vehicles and aircraft, the demand for electricity on the battlefield has steadily increased over years of sustained combat operations. Combat outposts and forward operating bases are the hubs for our troops – to project power from, fight from, and live in. However, they consume tremendous amounts of energy and have, therefore, been a steady focus of recent efficiency efforts.

The reliance on diesel generators to supply battlefield and contingency base electrical power produces an unintended consequence – a growing energy sustainment burden that must be sourced, in many cases, from great distances. Unfortunately, that logistics effort consumes fuel as well. The two main fuel distribution routes into Afghanistan present daunting challenges that range from the political effort needed to sustain them, to long distance transport on unimproved roads with multiple choke points and poor weather conditions which can slow movement to a trickle, and the threat of attack from insurgents or thieves. Each of these challenges adds time, manpower, and cost to the supply process. Once the fuel reaches larger distribution points inside Afghanistan, it still needs to be deployed to a nationwide network of bases and outposts. Given the terrain and the threat, aerial distribution of

supplies, including fuel, is often used to sustain coalition efforts across Afghanistan. Delivering all of this fuel takes a toll on aircraft, vehicles, and personnel. Looking further back in the supply chain, DoD has depended on political support from countries that allow our energy supplies to flow into Afghanistan through northern or southern transportation routes, which can be disrupted at any time.

The growing requirement for troop-borne capability has launched another sustainment burden – portable batteries – which represents a serious logistical challenge for the warfighter as our troops are increasingly overburdened platforms themselves. They carry gear which sends and receives data from remotely powered aircraft and far-away command posts, and integrates the information into intelligence collection, surveillance, and targeting like never before. Soldiers and Marines have scopes, sights, and radios that give them unsurpassed awareness and accuracy. But, this capability requires a steady supply of power, and for dismounted operations that means batteries, and lots of them. Consider an Army estimate that an average troop on a three-day patrol may carry up to 23 batteries weighing nearly 14 pounds. While these batteries support important capabilities, the trend of increasing weight is unsustainable from both resupply and soldier loading perspectives. Battery resupply requirements can greatly diminish a patrol's combat radius, and soldier-carried weight already impedes mobility on the battlefield and presents a significant risk of musculoskeletal injuries.

These fuel and battery requirements also place a significant logistics burden on planners, troops, equipment, and supply lines. Reducing the demand for energy on the battlefield has a direct effect on reducing the energy logistics burden and freeing up manpower and equipment resources previously engaged in logistics tasks to operational commanders for use in generating combat power.

As we draw down forces from ongoing operations in Afghanistan and adapt to a changing security environment, the Department's use of energy will continue to be of great importance. Generally speaking, our future operating environment will include a range of threats – from homemade improvised explosive devices (IEDs) and suicide bombers to GPS-guided mines and missiles, computer viruses, and electronic warfare – that may not only characterize actual combat, but also situations short of war. At the same time, the lessons of the last 12 years have not been lost on our potential adversaries, who are increasingly developing or acquiring capabilities that threaten our ability to project and sustain this power. These asymmetric and “anti-access/area-denial” capabilities will likely target those U.S. capabilities that may be more susceptible to disruption, such as logistics, energy, and command and control.

More specifically, the President and the Secretary have emphasized that we shift our strategic focus to the Asia Pacific, a region whose security and prosperity is indispensable to our own. Promoting our interests in the area – and much of that will focus on non-military tools – means long distances, far from our own shores. For example, intra-theater lift in Afghanistan requires a fraction of the fuel that will be required for intra-theater lift in the Pacific. A cargo plane flying from Bagram to Kandahar burns around 3,000 gallons of fuel, but that same aircraft will burn around 11,500 gallons of fuel flying from Guam to Seoul and over 16,000 gallons flying from Guam to Singapore. In this environment, demands for fuel, electricity, and energy logistics – aerial refuelers and oilers, for instance – can become a limiting factor for military operations. Not only will we need extended range and endurance to operate – whether for today’s relief missions in the Philippines or for other military missions – but we also will need to be interoperable with our allies and partners from an energy and logistics perspective to effectively carry out coalition operations. In fact, energy can be a positive tool for cooperating with emerging partners to help support U.S. presence and operations with U.S. forces.

Reducing Demand

Increasing combat effectiveness in current operations through reductions in fuel demand has been a significant DoD focus since OEPP’s establishment in 2010. To quote the former International Security Assistance Force / U.S. Forces-Afghanistan Commander General John Allen, “Operational energy equates exactly to operational capability.”⁶ We aspire to achieve the most “mission per gallon” by reducing the demand for energy and decreasing the logistics effort necessary to support the warfighters. The Department has made progress, particularly at the tactical edge where fuel logistics cost the most and resupply risks are the greatest. However, DoD’s fuel demand still accounts for a large percentage of the overall logistics burden and many opportunities remain to build a more efficient future force. In general, this is a huge incentive for improving our materiel capabilities and is reflected in the \$1.7B in FY15 and \$8.3B across the Future Years Defense Program that the Services have budgeted for operational energy initiatives and efficiency improvements. That equates to almost 92% of the OE-related budget invested in reducing the demand for energy.

⁶ ISAF/USFOR-A memo, “Supporting the Mission with Operational Energy,” 11 Dec 2011

Let me sketch out some key activities to highlight the OEPP's efforts in partnership with the Combatant Commanders.

US Central Command (USCENTCOM)

The Operational Energy Division (OED) within the Joint Program Integration Office at US Forces-Afghanistan (USFOR-A) was established in 2011 with a mandate to improve operational capabilities and warfighter effectiveness by reducing our forces' reliance on liquid fuels. Staffed with technical experts, the OED continues to develop and implement materiel and non-materiel energy solutions to reduce dependence on petroleum fuels and increase operational effectiveness. OED coordinates directly with OEPP, and we maintain a close relationship to address operational energy issues and initiatives in theater. In 2012, OEPP and OED combined efforts with the Army's Program Manager-Mobile Electric Power (PM-MEP) to answer an Operational Needs Statement with \$110M worth of advanced, energy efficient power generation and distribution equipment. OED and OEPP also collaborated to fund and support an operational demonstration of an advanced tactical microgrid to gather data for future microgrid technology development.

This past year, OED also provided significant support to Operation DYNAMO. Improvements in energy efficiency produce the greatest leverage at the extreme tactical edge, since the risks and costs to provision fuel there are so great and potentially so disruptive to the operational mission. In a tactical environment, electrical demand has usually been met by multiple diesel-powered generators, sized for peak loads but often operating far from peak capacity and efficiency. The consequence of poor generator loading is significant fuel waste, increased maintenance effort, and decreased reliability. In an attempt to address those issues, PM-MEP, in coordination with USFOR-A OED, recently completed Operation DYNAMO I and II, which assessed the electrical supply and demand footprint at 67 forward operating locations. Mission-specific advisory teams developed more efficient power generation and distribution plans, replaced older equipment with more than 500 fuel efficient Advanced Medium Mobile Power System generators and 430 Improved Environmental Control Units, updated distribution systems to improve reliability and safety, and trained local soldiers to operate and maintain the equipment properly. This effort spotlights the value of OE advisors teamed with expert technicians and military standard equipment and their ability to become a significant combat force multiplier for operational commanders. Building on the success of its predecessors, Operation DYNAMO III is

underway now to oversee the right sizing of power assets during the drawdown in Afghanistan to ensure that as we reduce our forces we continue to apply the lessons we have learned.

US Pacific Command (USPACOM)

OEPP has embraced emergent energy challenges in the Pacific and partnered with USPACOM and other key stakeholders to understand and address them.

The vast expanse of the oceans and seas that comprise USPACOM's Area of Responsibility put a premium on the ability of maritime forces to foster relations with partner nations, protect commercial and military shipping, and execute offensive operations on and from the sea. The Navy is exploring many technologies, such as Hybrid Electric Drive, stern flaps and improvements to marine-growth reducing hull and propeller coatings, to reduce fuel consumption. The Naval Postgraduate School-developed Replenishment at Sea Planner is great example of an inexpensive, in-house software solution to reduce our logistics burden. It is intended to optimize logistical transit plans and the fuel necessary for both warships and military sealift logistics vessels to prepare for and execute underway replenishment. This software tool is already in use in Fifth and Seventh Fleets and is expected to save millions of dollars in fuel costs each year.

OEPP remains engaged in the Department's ongoing efforts to improve liquid fuel delivery ashore in areas where little to no distribution infrastructure exists. In April 2013, my predecessor attended the Joint Logistics Over-The-Shore demonstration in Korea. This recurring, combined US / Republic of Korea event exercises our ability to deliver fuel, supplies and equipment from ships at sea to encampments ashore where sufficient maritime port facilities do not exist. We have impressive over-the-shore fuel distribution capabilities, and yet they may be stressed in some scenarios. I am pleased that the Navy has programmed \$34 million between FY13-17 to fund a replacement for an aging Offshore Petroleum Discharge System ship the *USS Petersburg*, while the Army develops the next generation of Inland Petroleum Distribution System. Each Service needs to continue to ensure that this capability can meet current and future operational requirements.

As the DoD operational energy strategy has evolved, OEPP and the Combatant Commanders have expanded our efforts beyond improving only US force capabilities. Teaming with partner nations to improve fuel efficiency and reduce energy demand across our combined forces benefits global cooperation and our combined security in the region. To that end, my office is currently exploring options within the Asia-Pacific region to identify and assess low-cost, high-payoff operational energy-

related security cooperation opportunities that could contribute to broader U.S. and Asia-Pacific partner policy objectives. The results are intended to inform future guidance to inform USPACOM planning guidance, and to build partnership capacity activities for USPACOM, the Joint Staff, the Office of the Secretary of Defense (OSD), and interagency partners. Additionally, ongoing contingency basing energy technology demonstrations and experimentation events during joint and combined exercises, such as CRIMSON VIPER in Thailand and BALIKATAN in the Philippines, are improving our own capabilities and those of key partner nations through focused military-to-military engagements.

US Africa Command (AFRICOM)

In the US Africa Command area of responsibility, OEPP is mentoring a growing and effective headquarters staff effort to incorporate operational energy across their operations and theater security cooperation activities. The staff recently assigned its first dedicated operational energy advisor and, in addition, continues to benefit from a Department of Energy (DOE) employee serving as a liaison to advise the commander on energy issues. Additionally, my office supported the establishment of the governance structure for the command's Interagency Energy Security and Environment Working Group which considers operational energy equities in operations and exercises.

As the US increases its focus on the African continent, the Department is similarly stepping up its efforts to support the Combatant Commander across a range of operational energy issues. The austere operating environment is compounded by the lack of infrastructure which introduces a challenging sustainment picture. The Army's Rapid Equipping Force recently conducted an energy assessment of remote and urban locations supporting US forces across the Trans-Sahara region to help them increase electrical power generation, improve electrical safety, and increase drinking water production and safety. The Naval Facilities Engineering Command, in coordination with the National Renewable Energy Laboratory, completed an energy assessment at Camp Lemonnier, Djibouti. Camp Lemonnier, though an enduring site and under the responsibility of the Office of the Deputy Under Secretary of Defense for Installations and Environment (ODUSD(I&E)), contains some equipment more typical of contingency locations, so OEPP collaborated with the ODUSD(I&E) on energy issues at the Camp by identifying peak electrical load requirements and analyzing the energy demand impact of several new environmental control system configurations. In addition, my office recently partnered with the U.S. Agency for International Development to exchange information, establish a working forum, and

begin leveraging DoD lessons learned in Afghanistan to assist the Power Africa initiative in its mission to improve power distribution to rural villages and towns.

In general, as part of my office's focus on contingency basing, we recently helped identify measures in CENTCOM, SOUTHCOM, and AFRICOM to reduce fuel demand in contingency plans and to determine the potential operational value of that fuel demand reduction. Employing improved power generation equipment and shelter construction standards, and future fuel efficiency improvements to aerial resupply vehicles, will help operational commanders optimize in-theater fuel resupply plans as part of larger contingency planning efforts.

Operational Energy Capability Improvement Fund (OECIF)

My office is also supporting longer term innovation and change via the Operational Energy Capability Improvement Fund (OECIF). The OECIF began in FY12 with the goal of funding innovation that will improve the operational energy performance of our forces while creating institutional change within the Department. It promotes partnering and joint programs and encourages Service teaming. The programs started in FY12 have concentrated on reducing the energy load of our expeditionary outposts. For example, there is a joint Army/Air Force program developing ways to improve the energy efficiency of soft shelters (i.e. tents), which has demonstrated improved tents and camp architectures in Kuwait, resulting in a 50% reduction in power consumption. Another program demonstrated a 54% reduction of the energy needed to cool hard shelters (i.e. containerized living units) used in Djibouti, Africa. In FY12, OECIF also started a program to demonstrate and evaluate load reduction technologies for expeditionary outposts in tropical environments – something particularly suited to our shift to the Pacific environment. By combining upgraded environmental control units (ECUs) with light emitting diode (LED) lighting and hybrid automatic/manual controls, energy savings as high as 80% over earlier technologies have been demonstrated. The OECIF is also supporting the development of technology for more efficient ECUs, which heat and cool our deployed shelters and consume a great deal of energy, including through a partnership between the Navy and the Department of Energy's Advanced Research Projects Agency for Energy (ARPA-E).

The OECIF programs begun during FY13 emphasized establishing entities aimed at involving a wide variety of organizations in solving our operational energy problems. OEPP encouraged the use of innovative business methods, such as consortia, to involve small businesses and non-traditional defense contractors. For example, one of these programs, led by the Army, is focused on energy for our

dismounted warfighters. Our soldiers and Marines benefit from the world's most technologically advanced weaponry; however, this equipment can require that a warfighter carry around 14 pounds of batteries on lengthy patrols. The Army-led OECIF program is meant to comprehensively address this problem through developing better system engineering techniques and technologies to improve both the energy demand and supply in order to reduce the weight burden. Other programs begun in FY13 are developing standards for tactical microgrids to promote their interoperability and adoption, developing planning methods and control technologies for designing and running more efficient expeditionary outposts, and engineering surface coatings to reduce aircraft drag.

Most recently, for FY14, OECIF is pursuing new programs to develop the analytic methods and tools necessary to support the thorough analysis and consideration of operational energy issues throughout DoD's various planning and management processes. The basic idea is to give decision makers within the Department better ways to factor operational energy into their decisions. This focus was based on our experience in the last few years and on observations made during our budget certification process, where we found challenges to the ability of the Department to consider energy in its decisions. We are using the OECIF to help solve it, which is consistent with its goal of creating institutional change.

Increase/Assure Supply

Another element of our strategy is diversifying and securing military energy supplies to improve the ability of our forces to get the energy they require to perform their missions.

Alternative Energy and Fuels

The Department's operational energy investments are focused on meeting warfighter needs, including by diversifying the Department's supply options. One focus is on energy that can be generated or procured locally near deployments to lessen the burden on supply lines. The Services are evaluating, and, where appropriate, deploying tactical solar technologies to generate electricity on contingency bases or to recharge batteries to increase patrol range and mission duration. OEPP is assisting in these efforts by coordinating information sharing amongst the Services and between the Services and DOE, which has broad technical expertise in civilian solar technologies. Additionally, the Department is funding research in deployable waste-to-energy systems that could reduce the volume of waste requiring disposal and produce energy for contingency bases. Other technologies in which the Department is investing include hydrogen-powered and solar-powered unmanned aerial vehicles, which

have the potential to achieve much longer mission durations than those powered by traditional petroleum-based products.

Another component of the Department's operational energy strategy is alternative fuels. As the nation's largest consumer of energy, the Department recognizes that our military will need alternatives to petroleum to diversify sources of supply. Over the long term, the Department will need fuels derived from various feedstocks that are cost-competitive, widely available around the world, and compatible with existing equipment and storage infrastructure, as our existing fleet of ships, planes, and combat vehicles will be with us for decades to come. So the Department is investing around 2% of its operational energy funding over the next five years on alternative fuels. The Services are focusing the majority of their alternative fuels efforts on certifying aircraft, ships, tactical vehicles, and support equipment to use these emerging fuels, as they have been doing since 2006. These initiatives improve the flexibility of military operations by ensuring that our equipment can operate on a wide range of fuels when they are cost-competitive and commercially available.

To create clear guidelines on the Department's alternative fuels investments both now and in the future, on July 5, 2012, the *Department of Defense Alternative Fuels Policy for Operational Platforms* was released, pursuant to Section 314 of the National Defense Authorization Act of 2012. The policy establishes coordinated, Department-wide rules to guide and streamline its investments in the development and use of alternative fuels. The policy states that the Department's primary alternative fuels goal is to ensure operational military readiness, improve battlespace effectiveness, and further the flexibility of military operations through the ability to use multiple, reliable fuel sources. All Department investments in this area are reviewed during the Department's annual operational energy budget certification process.

To date, the Department has only purchased test quantities of biofuels for testing and certification purposes. These test fuels are often more expensive than commercially-available petroleum fuels because they tend to be produced at small, not-yet-commercial-scale facilities using novel conversion technologies. However, the policy formalized what was already the practice for all the Military Services: the Department will not make bulk purchases of alternative drop-in replacement fuels unless they are cost competitive with traditional petroleum products. With this policy in place, the Department will continue to steward its alternative fuels investments towards the ultimate goal of enhancing the long-term readiness and capability of our joint force.

Because the Department does have long-lived platforms designed to use liquid fuels, there is a long-term defense interest in fuels diversification. The Department also supports a larger national goal to promote the development of low-carbon, renewable fuels. The Defense Production Act (DPA) advanced drop-in biofuels production project, led by the OSD Manufacturing and Industrial Base Policy Office, is a Department of Defense partnership with the private sector and the Departments of Energy and Agriculture, which have the lead roles for the Federal government for biofuel feedstocks and production. This project works to accelerate the production of cost-competitive advanced alternative fuels for both the military and commercial transportation sectors. The FY12 DPA funding for Phase 1 was awarded to four companies in May/June 2013 and is being used for competitive commercial-scale integrated biorefinery design efforts. Awards totaled \$20.5 million, which was matched by \$23.5 million in private sector funds. The technical evaluations for Phase 2 proposals are complete, and in July 2014, awards of \$70 million will be made to up to four companies for the construction of drop-in biofuel production facilities.

Securing Our Energy Supplies

There is rising concern about risks to the U.S. electric grid that powers most DoD bases, ranging from cyber-attacks to hurricanes. The risks and vulnerabilities of the U.S. electric grid and overseas electricity supplies supporting DoD facilities are not well characterized. Today, military operations can include warfighters conducting missions remotely from domestic facilities; the disruption of electric power in one location could adversely affect the outcome of a battle thousands of miles away. And, in the event of a major domestic outage, as with Hurricane Sandy, the lack of adequate power could create tension between Defense support for civilians and the Department's own needs.

We recognize the need for better information and coordination on risks to the grid and are exploring the Department's role in building resiliency into the system. To that end, OEPP and the lead offices within OSD responsible for electric grid issues (i.e., ODUSD(I&E) and the Office of the Assistant Secretary of Defense for Homeland Defense and America's Security Affairs), in partnership with the Department of Homeland Security's Office of Infrastructure Protection, led an interagency, scenario-based workshop to gain a better understanding of how the Department would respond to a prolonged and widespread power outage in the National Capital Region that affected military bases and missions in the area. We continue to engage in discussions with utility service providers, Federal agencies and other DoD entities to address this challenge.

In addition to electrical power concerns we are also looking at the security of our liquid fuel supply. OEPP is currently examining logistical challenges generated by the vast distances and extensive operating areas present in the Asia-Pacific theater. My office is working with the Defense Logistics Agency and the Joint Staff in studying nodes and transportation links to support modifications to the Global Petroleum Distribution System.

Building Energy Security into the Future Force

The Department continues to make strides in improving energy security for the future force. We have invested a significant amount into the development and deployment of operational energy initiatives to increase the combat effectiveness of our warfighters. Programs of note include the:

- Adaptive Engine Technology Development (AETD) program – AETD is focused on developing a “sixth-generation” fighter engine with better fuel-burn rates. At the core of the program is a move to a design with three streams of air, allowing more flexibility for the engine to operate efficiently under varying conditions. AETD’s goal is to provide 25 percent greater fuel efficiency which will increase range and endurance of fighter aircraft and decrease the requirement for tanker aircraft to support AETD-equipped aircraft. The Department recently announced a follow on program, the Advanced Engine Technology Program, to carry the engine through technology maturity risk reduction.
- Improved Turbine Engine Program (ITEP) program – This program provides an improved engine for the Apache and Blackhawk helicopter fleets to replace the current T-700 engine. ITEP will improve operational effectiveness by giving commanders an improved aviation fleet with longer loiter time, increased altitude limits, increased payload and lower fuel and maintenance costs. The Army expects a 25 percent fuel reduction from current engine consumption levels.
- Hybrid Electric Drive (HED) program – The Navy will begin installing HEDs in Arleigh Burke-class (DDG 51) destroyers in 2016. HED is an electric motor attached to the main reduction gear of DDG-51-class ships to provide low speed propulsion, resulting in improved fuel economy and longer time on station. Installation of an HED on a single ship has the potential to save over 5,000 barrels of fuel per year, which equates to approximately a seven percent reduction from current usage or 11 additional underway days each year, and provides our commanders at sea improved operational flexibility.

- Medium Tactical Vehicle Replacement (MTVR) – This effort includes developing and demonstrating a fuel efficiency improvement of 15 percent over the existing MTVR while maintaining affordability, mobility and survivability. Additionally, within this program, the Marine Corps funded the procurement of prototypes of the On-Board Vehicle Power sources to reduce fuel requirements at idle, which is the majority of the vehicle drive cycle.

We have worked with the Joint Staff and the Services to implement the Energy Key Performance Parameter (eKPP) or energy Key Support Attribute (eKSA) across all acquisition categories. This includes Acquisition Category I programs such as the Armored Multipurpose Vehicle, Joint Light Tactical Vehicle, DDG-51 Flight III and the Air Missile Defense Radar, along with smaller acquisition programs such as the Medium Tactical Vehicle Replacement, Prime Power Mobile Production System, and the Force Provider – Expeditionary Program. The eKPP and supporting analyses are included in the Chairman of the Joint Chief of Staff (CJCS) Instruction and the Joint Capabilities Integration and Development System (JCIDS) Manual. It is a requirement for all program seeking Joint Requirements Oversight Council (JROC) approval unless a waiver is approved.

In regards to shaping the requirement and acquisition systems, the Department is working to conduct operational energy analysis earlier; that will provide a greater opportunity to consider the tradeoffs and options that would result in a more energy-secure force, more effective or efficient equipment, or a more capable force. The Joint Staff, the Service Energy Offices, and my office have worked together to make operational energy an integral part of war games and exercises. We are developing a tool to provide the war gamers timely feedback about attacks on our logistics and energy supplies. We are also working together to ensure operational energy supportability analysis is conducted during the Services' concept development, which provides a realistic energy distribution and allows simulated enemy forces to interdict our energy supplies, to more closely approximate real world conditions.

Moving forward, we must continue to fund analysis to identify which capabilities and missions to target for operational energy improvements. We have found that engaging earlier, well before Milestone A, will give us the greatest opportunity to provide greater capabilities through operational energy improvements.

Institutionalizing Operational Energy by Sharing Information

OEPP has taken a number of tangible steps to institutionalize operational energy improvements and avoid duplication across the Services and the military establishment through the sharing of knowledge. Our Budget team regularly participates at a senior executive level in Service budget reviews, Service POM reviews, Defense Acquisition Boards, Overarching Integrated Product Teams, and Initial Integrated Product Teams. OEPP also participates in Analysis of Alternatives Senior Advisory Groups to consider energy issues early in the acquisition process. Through our annual Budget Certification process, which certifies the adequacy of the budget to the Secretary of Defense for implementing the Operational Energy Strategy, we gain visibility into Service program objectives through a detailed review of all operational energy objectives. This ensures minimal duplicative efforts. We also interact regularly with the Services, including their energy offices, the Joint Staff, and the COCOMs. We have driven the consideration of operational energy into established DoD Decision Support Processes, including JCIDS and the Defense Acquisition Planning, Programming, Budgeting, and Execution process. Our office works with USD(Policy) to ensure operational energy is included during the Planning phase and in the Defense Planning Guidance, and the Quadrennial Defense Review.

Through our DOE/DoD Memorandum of Understanding, we seek to leverage the complementary goals of DoD and DOE energy programs where it exists, and where it helps the DoD mission. We are collecting Operational Energy Lessons Learned to capture the valuable learning from forces deployed in-theater. Through the Defense Operational Energy Board (DOEB), co-chaired by the ASD(OEPP) and the Joint Staff Director of Logistics, and the Deputy DOEB, we communicate with the Services and receive Service input into our highest operational energy priorities.

Our Requirements and Analysis team participates in milestone reviews for Acquisition Category (ACAT) I programs. Just this simple action has gone a long way to increasing OEPP recognition and creating a structure for ensuring the introduction of operational energy considerations into all the major DoD weapon systems programs.

OECIF also helps institutionalize operational energy and we run it to share results across the Services. We fund innovative energy programs within the Services. We cement institutional buy-in by generally insisting that all proposals be vetted by a Service Energy Office. We also ensure the dissemination of innovation across military stovepipes by encouraging the programs to have multi-Service participation. Program reviews are also an opportunity to share research results.

Institutionalizing Operational Energy in Policy

In the long term, the Department must build operational energy considerations into the regular rhythm of how the Department operates. To begin with, the Secretary of Defense signed the Operational Energy Strategy Implementation Plan in March 2012 and identified seven targets:

1. Measure operational energy consumption;
2. Improve energy performance and efficiency in current operations and training;
3. Promote operational energy innovation;
4. Improve operational energy security at fixed installations;
5. Promote the development of alternative fuels;
6. Incorporate energy security considerations into requirements and acquisition; and,
7. Adapt policy, doctrine, professional military education, and Combatant Command activities to include operational energy.

The Department is making great progress implementing the strategy; further details are available in our Operational Energy Annual Report to Congress and budget certification reports, which are available on the OEPP website (<http://energy.defense.gov/>).

In April 2014, the Acting Deputy Secretary of Defense Christine Fox issued DoD Directive 4180.01, “DoD Energy Policy.” As the Department’s first overarching defense energy policy in over 20 years, this new directive provides a common energy framework to guide the full range of defense energy activities, including operational energy, facility energy, and energy-related elements of mission assurance. The directive also codifies responsibilities for implementing the energy policy across OSD, the Joint Staff, Combatant Commands, Military Departments and Defense Agencies. The directive establishes that “It is DoD policy to enhance military capability, improve energy security, and mitigate costs in its use and management of energy.” In support of these overarching goals, the policy directs the DoD to adapt core business processes – including requirements, acquisition, planning, programming, budgeting, mission assurance, operations, and training – to improve the Department’s use and management of energy.

The Department also issued other policies over the past year to support the operational energy mission. In January 2013, the Under Secretary of Defense for Acquisition Technology and Logistics released Department of Defense Directive 3000.10, “Contingency Basing Outside the United States.” In addition to outlining Department policy related to interoperability, construction standards, and other

areas, the Directive specified the role of operational energy and identified a smaller logistics footprint as enabling more effective and capable contingency bases.

In addition to the strategy, guidance, and policy set forth by my office and OSD, the Military Services have followed with their own initiatives. In the past year, the Army and the Air Force have updated their own energy strategies while the Marine Corps issued guidance for improving the incorporation of energy into their acquisition programs. Similarly, the Navy has moved out, leading the Department with efficiency upgrades to their legacy aircraft and propulsion innovations in their ships. In addition, working with OSD/Policy and the AT&L International Cooperation office, we have tracked international developments in this area, and encouraged consideration of operational energy in multi-national security cooperation.

Conclusion

In November 2013, Secretary Hagel stated, “DoD invests in energy efficiency, new technologies, and renewable energy sources at our installations and all of our operations because it makes us a stronger fighting force and helps us carry out our security mission.”

Our vision to better manage the Department’s use of energy will continue to improve military capability across all missions. As we adapt to threats and geopolitics shaped by energy, now is the time to drive long-term innovation and energy improvements into our core business processes, force structure, and planning to ensure we have the military we need to succeed in the future.

Going forward, the Department is committed to addressing how energy shapes our capabilities and operations, as well as how it affect the missions the Department may be called upon to conduct. This past year, the Department has made great strides in reforming core business processes and decision-making, supporting current operations, and applying energy considerations to the development of the future force. All that said, institutional change within the Department is difficult, time consuming and not for the faint of heart; we appreciate this Committee’s continued support of OEPP.

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STATEMENT OF

THE HONORABLE DENNIS V. MCGINN
ASSISTANT SECRETARY OF NAVY
(ENERGY, INSTALLATIONS, AND ENVIRONMENT)

BEFORE THE

SUBCOMMITTEE ON DEFENSE

of the

SENATE APPROPRIATIONS COMMITTEE

21 MAY 2014

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THE SUBCOMMITTEE

Statement of the HON. Dennis V. McGinn ~ SAC-D Hearing on Operational Energy

Chairman Durbin, Vice Chairman Cochran, members of the subcommittee; thank you for the opportunity to discuss the Department of the Navy's (DON) operational energy program and review the progress of the Advanced Drop-In Biofuels program.

I also appreciate the subcommittee's continued support of the men and women in uniform and our civilian workforce and their families. These men and women serve their nation around the world with skill and dedication, no matter the hardships they face.

The Navy has a long, proud history of energy innovation; and it is no different today. Throughout his tenure, Secretary of the Navy Ray Mabus has made power and energy a top priority. In 2009, he announced 5 energy goals for the Department of the Navy to improve our energy security, increase our strategic independence, and improve our warfighting capabilities. The Department of the Navy is committed to generating one-half of its energy needs from non-fossil fuel sources by 2020. Over these past 5 years, we have made real progress toward those goals through greater energy efficiency and alternative fuel initiatives.

The wars in Iraq and Afghanistan have proven that energy is, and will continue to be, a national security issue. Each \$1 increase in the price of a barrel of oil results in a \$30 million bill for the Navy and the Marine Corps. These are the same dollars that provide for the operational readiness of our forces and we cannot afford to divert scarce resources in post—Budget Control Act fiscal environment.

Statement of the HON. Dennis V. McGinn ~ SAC-D Hearing on Operational Energy

As you are well aware, President Obama directed the Department of the Navy to work with the Departments of Energy and Agriculture to promote a national biofuel industry. This year, under authority in Title III of the Defense Production Act (DPA), these three agencies plan to complete a DoD DPA award to up to four companies to produce up to 160 million gallons of drop-in biofuels each year at a weighted average price of less than \$3.50 per gallon. This price will be competitive with what we are paying today for conventional fuels – this is aligned with DoD policy that operational quantities of biofuels must be cost competitive.

The Farm-to-Fleet Program pairs DON and U.S. Department of Agriculture (USDA) to begin integration of JP-5 and F-76 biofuels blend purchases as part of the Defense Logistics Agency (DLA) Energy's regular bulk fuel acquisitions process. USDA Commodity Credit Corporation (CCC) funds are also available to support the effort. This will mark the start of the "new normal", where drop-in biofuels will be fully integrated with our regular operations and logistics.

The program will begin with the 2014 Inland/East/Gulf Coast bulk fuels solicitation that will begin deliveries in mid-2015. This will be followed by the 2014 Rocky Mountain / West Coast program which will also begin deliveries in 2015. The Navy's requirement will stipulate that biofuels or other advanced alternative fuels comprise from 10% up to 50% of the total JP-5 and F-76 volume to be acquired. We anticipate the total volume of alternative fuels acquired through these contracts would be approximately 80 million gallons at the 10% alternative fuel blend.

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The use of CCC funds will be available to defray premiums to conventional fuels (if any) for biofuels whose feedstocks meet the Farm Bill definition of “renewable biomass” and are grown in the United States, its territories, and protectorates.

In addition to our partnership with other Federal Agencies, we have also been working with our allies and strategic partners. We have signed Statements of Cooperation with both the Australian and Italian Navies to share biofuel specifications, research outcomes, and certification documentation. These actions will ensure the interoperability of all fuel types used among our allied partners.

We continue to develop energy efficiency through research and development of more efficient propulsion systems. The USS Makin Island (LHD 8), during its maiden deployment in 2012, saved more than four million gallons of fuel resulting in an estimated cost savings in excess of \$15 million. The Marine Corps’ development of expeditionary power solutions, through the Experimental Forward Operating Base or ExFOB, has allowed them to lighten their load and be more agile warriors.

Finally, during the past month and a half, I have attended energy training events at Marine Corps Bases Camp Lejeune and Camp Pendleton, and Naval Stations Norfolk and San Diego. And our Sailors and Marines get it. They understand that these programs are about diversifying fuel supplies, stabilizing fuel costs, and reducing our overall energy

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Operational Energy

needs. They get that reducing our energy consumption translates into greater combat capability. And, they are ready to respond, whenever our nation calls upon them.

I thank you for the opportunity to testify before you today and I look forward to your questions.

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Statement by

Dr. Daniel Y. Chiu

**Deputy Assistant Secretary of Defense for
Strategy and Force Development**

on

The National Security Implications of Climate Change

Submitted to the

**Subcommittee on Defense
Senate Appropriations Committee
United States Senate**

May 21, 2014

NOT FOR PUBLICATION UNTIL RELEASED BY THE SUBCOMMITTEE

Introduction

The Department of Defense (DoD)'s primary responsibility is to protect our nation's security interests around the world. This includes building security globally through assurance of allies, engagement with partners, and deterrence of adversaries; prevailing in conflicts should they arise; and supporting civil authorities and others around the world in times of emergency. To ensure DoD is adequately prepared to accomplish our missions, we need to consider all aspects of the global security environment and plan appropriately for potential contingencies and the possibility of unexpected developments in both the near- and longer-terms.

As such, the Department tracks, analyzes, and considers a range of current and future trends and changes, including political-military, economics, demographics, technology, and the environment. All of these issue areas have the potential to significantly impact U.S. national security interests in both positive and negative ways. DoD must take into account these trends to ensure we are able to create and pursue opportunities when they serve our national interests and that we are ready for a wide range of challenges now and into the future.

This is why climate change is included in the 2014 Quadrennial Defense Review. In particular, we noted that: "The impacts of climate change may increase the frequency, scale, and complexity of future missions, including defense support to civil authorities, while at the same time undermining the capacity of our domestic installations to support training activities." The effects of climate change – such as sea-level rise, shifting climate zones, and more severe weather events – will have an impact on our bases and installations at home and overseas; on the operating environment for our troops, ships, and aircraft; and on the global security environment itself as climate change affects other countries around the world.

While all projections contain a degree of uncertainty, the Department considers risk across a wide spectrum of possibilities to ensure DoD is appropriately prepared for the range of possible contingencies. In considering the effects of climate change, scientific data and studies are used to further refine projections and planning. The Department also continues to update and assess this work to ensure that changes are taken into consideration so that plans and capabilities can be adapted, when needed.

Near Term: Infrastructure, Training, and Testing

The National Climate Assessment, released by the White House earlier this month, noted that the world's climate is already rapidly changing. Certain types of weather events are already occurring more frequently and intensely, including heat waves, heavy downpours, hurricanes, floods, and droughts. Glaciers and Arctic sea ice are melting at a relatively rapid rate, sea levels are rising, and oceans are becoming warmer and more acidic. Moreover, scientists predict that some of these changes will increase in frequency, duration, and intensity over the next 100 years.

Some of these current effects of climate change are being seen on the military bases, installations, and other infrastructure that DoD manages. Our infrastructure serves as the staging platform for the Department's national defense and humanitarian missions, and the natural landscape supports military combat readiness by providing realistic combat conditions and vital resources to personnel. For example, an installation may need a forest or desert landscape for maneuvers, coastal waters for amphibious assault training, or wetlands to prevent flooding and erosion. The effects of climate change will have serious implications for the Department's ability to maintain both its infrastructure and the landscape around it, and to ensure military readiness in the future.

Our coastal installations are already experiencing increased flooding and damage from sea-level rise and increased storm surge; longer-term impacts could include increased inundation and erosion. Rising temperature and extreme weather will increase building heating and cooling demand, raising installation energy requirements and operating costs. Those conditions will also increase maintenance requirements for runways and roads, as well as cause disruption to and competition for reliable energy and fresh water supplies. Thawing permafrost and melting sea ice are damaging our infrastructure in Alaska and the Arctic region. Changed disease vector distribution, particularly exposure to diseases in regions in which they are not routinely encountered, will increase the complexity and cost of on-going disease management efforts, and may have acute and long-term impacts on personnel health and safety.

The Department also needs to be able to train our forces to meet the evolving nature of the operational environment by training in the field environment to achieve and sustain proficiency in mission requirements. The Department conducts testing in the field environment in anticipation of the military's use of weapons, equipment, munitions, systems, or their components. As such, access to the land, air, and sea space that replicate the operational environment for training and testing is critical to the readiness of the Force.

The impacts of climate change may decrease the capacity of DoD properties to support current testing and training rotation types or levels. Some training and testing lands may lose their carrying capacity altogether. Rising temperatures could lead to an increased number of "black flag" (suspended outdoor training) or fire hazard days. Increased dust generation during training activities may interfere with sensitive equipment, resulting in greater repairs, or may require more extensive dust control measures to meet environmental compliance requirements. These conditions could also lead to increased health and safety risks to the Department's personnel.

Climate change also impacts may affect the supplies, equipment, vehicles, and weapons systems the Department buys, where and from whom we buy them, how they are transported and distributed, and how and where they are stockpiled and stored. Changes to the operating environment may require changes to operational parameters for current and planned weapons and equipment, resulting in increased associated maintenance requirements or requirements for new equipment.

Environmental changes may introduce supply-chain vulnerabilities, reducing the availability of or access to the materials, resources, and industrial infrastructure needed to manufacture the Department's weapon systems and supplies. They may also cause the interruption of shipment, delivery, or storage and stockpile of materials or manufactured equipment and supplies. Many major corporations have recognized the potential effects of climate change on their operations and are aggressively pursuing manufacturing/supply resiliency efforts. As appropriate, the Department will seek refinements to existing processes and develop new climate-specific plans and guidance.

Because of these current and ongoing concerns, the Department initiated in 2013 a review of existing directives, policies, manuals, and associated guidance documents and criteria to identify which ones should incorporate considerations of a changing climate. The initial screen reviewed 58 documents and identified 28 policies, programs and procedures for update; five have already been updated, all dealing with installations. During 2014, the Department will work within the existing review and update cycle to establish a plan for incorporating appropriate consideration of climate change into the relevant documents.

Many infrastructure managers are already adapting to changing climate factors. Reported rebuilding efforts after extreme storms include upgrading to more wind-resistant structures, burying utility lines underground, changing storage locations for chemicals used in low-lying

wastewater treatment plants, protecting water supply wells, and removing vulnerable trees. In preparation for the possibility of more wildfires, installations reported preparing better firebreaks and making timber stand improvements to reduce fire fuel loads.

The Department has updated our master planning criteria for installations to require the consideration of climatic conditions, as well as mandating the consideration of changing climate conditions when designing buildings, including potential increased heating or cooling requirements. We also issued a Floodplain Management Policy in February 2014 that establishes requirements to minimize risks when military assets must be located within flood plains.

The Department is exploring the expansion of applications of risk management schemes already in use, primarily within the Defense Critical Infrastructure Program. Decisions on where and how to locate future infrastructure will become increasingly reliant on robust risk management processes that account for dynamic factors associated with the effects of climate change. While the initial modifications to risk management methodologies are focused on critical infrastructure, it is anticipated that the Department will utilize them across all decision-making in the future.

The Department has initiated several research and survey efforts to more fully identify and characterize vulnerabilities, impacts, and risks posed by climate change. The Department is implementing a phased installation-level vulnerability assessment approach to: develop methodologies for conducting consistent screening-level vulnerability assessments of military installations world-wide (starting with coastal and tidal installations); leverage recent scientific advancements regarding coastal assessment; and provide a platform to build upon prior to conducting more comprehensive and detailed assessments, whether coastal installations or otherwise.

A screening level survey assessment tool was piloted in the Fall of 2013 and was deployed in 2014 to assess current installation-specific vulnerability to the impacts of climate-related events. Data from these screening-level assessments will be used to identify areas and installations where more detailed vulnerability assessments may be needed. The Department is using a whole-of government approach to develop recommendations on regional sea-level rise for use in more detailed coastal vulnerability and impact assessments of military installations worldwide, to ensure consistency in conducting these assessments.

As climate science advances, the Department will regularly reevaluate climate change risks and opportunities in order to develop policies and plans to manage its effects on the Department's operating environment, missions, and facilities. Research organizations within the Department, including the Strategic Environmental Research and Development Program (SERDP), are planning and completing studies to characterize climate change impacts in specific regions of the world and develop and pilot vulnerability assessment and adaptation methodologies and strategies.

Research to develop coastal assessment methods is scheduled for completion during 2014. Work in other regions is still underway, including research designed to understand how increased temperature trends and changes in the fire regime in the interior of Alaska will impact the dynamics of thawing permafrost and the subsequent effects on hydrology, access to training lands, and infrastructure; and how changes in storm patterns and sea levels will impact the Department's Pacific Island installations, including their water supplies.

The Department is actively conducting research that will support further integration of climate change into our considerations. This includes projects that: assess potential changes in the intensity, duration, and frequency of extreme precipitation events, including changes in the timing and intensity of snowmelt and subsequent run-off events; include development of

adaptive decision frameworks; and address understanding the characteristics of species that are either conservation reliant or adaptable to potential changes in climate and human activities.

Longer-Term: Plans and Operations

The longer-term impacts of climate change may alter, limit, or constrain the environments in which our military will be operating. For example, sea level rise may impact the execution of amphibious landings; changing temperatures and lengthened seasons could impact timing windows for operations; and increased frequency of extreme weather could impact assumptions about flight conditions that could affect intelligence, surveillance, and reconnaissance capabilities.

The impacts of climate change may aggravate existing or trigger new risks to U.S. interests. Maintaining stability within and among other nations is an important means of avoiding full-scale military conflicts. The impacts of climate change may cause instability in other countries by impairing access to food and water, damaging infrastructure, spreading disease, uprooting and displacing large numbers of people, compelling mass migration, increasing competition for natural resources, interrupting commercial activity, or restricting electricity availability.

As Secretary of Defense Chuck Hagel said at the 2013 Halifax International Security Forum, “Climate change does not directly cause conflict, but it can significantly add to the challenges of global instability, hunger, poverty, and conflict. Food and water shortages, pandemic disease, disputes over refugees and resources, more severe natural disasters – all place additional burdens on economies, societies, and institutions around the world.”

These developments could undermine already-fragile governments that are unable to

respond effectively or challenge currently-stable governments, as well as increasing competition and tension between countries vying for limited resources. These gaps in governance can create an avenue for extremist ideologies and the conditions that foster terrorism.

As a Department, we are working to better understand how the impacts of climate change will affect plans and operations in the U.S. and abroad. The Department's unique capability to provide logistical, material, and security assistance on a massive scale or in rapid fashion may be called upon with increasing frequency. We are looking to identify early warning indicators for those areas critical to DoD's mission set, as well as conduct systematic regional and localized impact assessments to identify trends and where our resources should be focused.

The Department will be monitoring these developments and deciding which situations will require intervention based on U.S. security interests – either preemptively through security cooperation and capacity building, or through stability operations if conditions escalate. We are exploring ways for the combatant commands to include in their missions non-combat support to address serious climate change-related U.S. national security vulnerabilities and to include climate considerations in their theater campaign plans.

We are currently working to integrate the impacts of climate change into our longer-term planning scenarios, which articulate a range of future challenges that U.S. military forces must be prepared to confront. These scenarios support deliberations by DoD senior leadership on strategy and planning, programming, budgeting, and execution (PPBE) matters, including force sizing, shaping, and capability development.

We also plan to more fully integrate the impacts of climate change into our humanitarian assistance/disaster relief and other exercise plans, and are working to enhance the capacity of

partner militaries and civil response readiness groups to plan for, and respond to, natural disasters. As noted in the 2014 QDR, “Climate change also creates both a need and an opportunity for nations to work together, which the Department will seize through a range of initiatives.”

We also hope to more systematically harness resources beyond the traditional combatant command structure. This included the National Guard, and its State Partnership Program, service engineering units such as the U.S. Army Corps of Engineers and Naval Facilities Command, and OSD-led programs such as the Defense Environmental International Cooperation Program and the Strategic Environmental Research and Development Program.

To the extent that we are engaged in the construction of military and civilian infrastructure for partner nations, we are working to include consideration of climate change impacts on all our projects, ranging from site selection to resiliency planning.

Here in the U.S., state and local governments responding to the effects of extreme weather may seek increased defense support to civil authorities. The heightened demand, particularly on the National Guard and Reserve Component, could impact their availability for other contingencies or operations. We are in the process of exploring these implications and finding the right balance to ensure that our domestic needs can be met.

The Arctic

The effects of climate change are particularly acute in the Arctic region. Profound changes are already occurring that are having and will continue to have significant and long-lasting consequences. Over the coming decades, the Arctic will remain a remote, isolated, and complex environment; but over time, diminishing sea ice will make the Arctic Ocean

increasingly accessible and used by Arctic as well as non-Arctic nations. At the same time, land access—which depends on frozen ground in much of the Arctic—will diminish as permafrost thaws.

Although some recent media reporting overstates the nature of current human activity and potential for military conflict in the near term, the U.S. government, including DoD, must account for and closely monitor the long-term dynamics in the Arctic. Regardless of the rate and scale of change, we must be ready to contribute to national efforts in pursuit of strategic objectives in the region.

In response to these changing dynamics, the Department released a DoD Arctic Strategy in November 2013. The DoD Strategy supports the overarching national approach to the Arctic, embodied in the National Strategy for the Arctic region (released in May 2013): advancing U.S. security interests, pursuing responsible Arctic region stewardship, and strengthening international cooperation.

In accordance with the National strategy, the DoD Strategy seeks to preserve an Arctic region that is free of conflict, in which nations act responsibly and cooperatively, and where economic and energy resources are developed in a sustainable manner. In order to do so, we will ensure security, support safety, promote defense cooperation, and prepare for a wide range of challenges and contingencies.

The DoD Strategy recognizes that the U.S. government response to changes in the Arctic requires a whole-of-government approach. In terms of preserving security, the U.S. Coast Guard in particular faces distinct near-term challenges. DoD continues to seek opportunities to coordinate our responses with the Coast Guard to leverage existing resources and avoid duplication of effort. We also continue to prepare ourselves to provide defense support for civil

authorities when directed.

Our Arctic strategy will enable us to take a balanced approach to improving human and environmental security. Our challenge is to balance the risk of having inadequate capabilities or insufficient capacity appropriate for this changing region with the opportunity cost of making premature and/or unnecessary investments. We assess that the Arctic is a relatively low threat environment, and that existing DoD infrastructure and capabilities in the region are adequate to meet current U.S. defense needs in the near and mid-term future.

Capabilities and requirements will need to be re-evaluated as conditions and regional activity change, and any gaps will need to be addressed. Given the low potential for armed conflict in the region, a buildup beyond what is required for existing DoD missions could send the wrong signal about our intentions for the region. We will continue to train and operate routinely in the region as we monitor the changing environment, revisit threat assessments, and take appropriate action as conditions change.

Given the nature of the Arctic, our approach to the region requires more than just interagency cooperation, it requires international cooperation. As we highlight in the 2014 QDR, relationships with allies and partners are important enablers for meeting our security and defense commitments. Our strategic approach to the Arctic reflects the relatively low level of military threat in a region bounded by nations that have not only publically committed to working within a common framework of international law and diplomatic engagement, but have also demonstrated the ability and commitment to do so.

We engage in frequent consultations with our Arctic partners, including through the Arctic Council, Northern Chiefs of Defense conference, the Arctic Security Forces Roundtable, and in Service-to-Service dialogues and exercises. Russia, one of five coastal Arctic states, has

historically played a collaborative role in these forums. Although our near-term cooperation with Russia has been impacted by Russia's ongoing intervention in Ukraine, we continue to work with other Arctic partners and remain committed to the long-term objectives, approaches, and capabilities outlined in the Arctic Strategy.

Interagency Collaboration on Climate Change

Partnerships are needed to fully ensure the Department's mission is sustainable given the effects of climate change. The Department cannot effectively assess its vulnerabilities and implement adaptive responses at its installations if neighbors and stakeholders are not part of the process. The Department's decisions and those of neighboring communities are intrinsically interconnected. Aspects of our mission, such as Force deployment, may be affected by assets outside our control, such as transportation infrastructure.

Understanding the complexities and uncertainties of climate change require a whole-of-government approach as well. Therefore, the Department already participates in nationwide efforts such as the U.S. Global Change Research Program, including the National Climate Assessment. It also partners with individual agencies such as the National Oceanic and Atmospheric Administration on, for example, the development and operational implementation of a national Earth System Prediction Capability.

The Department is also represented on interagency climate change councils and working groups and will continue to participate in federal climate partnerships and other interagency processes. The Department, through the Air Force Weather Agency, contributes earth-space environmental data, receiving nearly 500,000 weather observations and satellite-derived wind profiles each day and sharing these data with the National Climatic Data Center and the Navy's

Fleet Numerical Meteorological and Oceanographic Center.

Climate change is an inherently global problem, and will require us to work closely with our allies, partners, and other countries across the world. As such, the State Department is leading our efforts to engage with the international community on these issues in multilateral forums and in bilateral relations. DoD is collaborating with and supporting the State Department in many of these initiatives, and we are continuing to develop new mechanisms and avenues for cooperation.

Conclusion

The effects of the changing climate affect the full range of Department activities, including plans, operations, training, infrastructure, acquisition, and longer-term investments. The direction, degree, and rates of the physical changes will differ by region, as will the effects to the Department's mission and operations. By taking a proactive, flexible approach to assessment, analysis, and adaptation, the Department can keep pace with the impacts of changing climate patterns, minimize effects on the Department, and continue to protect our national security interests.

SENATE APPROPRIATIONS COMMITTEE - DEFENSE

STATEMENT OF

BRIGADIER GENERAL KENNETH D. LEWIS, JR.

J-5 DEPUTY DIRECTOR FOR PARTNERSHIP

STRATEGY AND TRANS-REGIONAL POLICY

JOINT STAFF

BEFORE THE SENATE APPROPRIATIONS COMMITTEE - DEFENSE

ARCTIC STRATEGY

MAY 21, 2014

SENATE APPROPRIATIONS COMMITTEE - DEFENSE

Mr. Chairman, Vice Chairman Cochran, distinguished members of the Defense Appropriations Subcommittee, thank you for the opportunity to appear before you this morning.

The Arctic region is changing. This year, the Navy concluded in its *Arctic Roadmap* that ice conditions in the Arctic Ocean are changing at a more rapid pace than first anticipated in the first *Arctic Roadmap* in 2009. The emergence of new challenges and opportunities in the Arctic is demanding greater attention from governments and stakeholders.

While significant uncertainty remains about the rate and extent of changes in the region and the pace at which human activity will increase, human activity in the Arctic is increasing and will likely continue to increase. With increased activity comes the potential for increased security challenges, but also new opportunities. In planning the Armed Forces' future role in the Arctic, we see the opening of the region as an opportunity to work collaboratively with allies and partners to keep the Arctic as a secure and stable region where U.S. national interests are safeguarded, the U.S. homeland is protected, and nations work cooperatively to address challenges.

The Armed Forces existing infrastructure and capabilities are sufficient to perform required missions in the Arctic in the near to mid-term. This point

must be emphasized because some recent reporting has overemphasized the changes in the security landscape.

For example, some media reporting highlights exponential growth in the use of Arctic shipping lanes for global commerce. The present reality, however, is that an extremely small percentage, between one to two percent (1-2%), of total global shipping activity occurs in the Arctic, and much of that activity is local fishing and destination shipping, meaning shipping from one area of the Arctic to another area of the Arctic. The small numbers of transits through the region are not necessarily preferred by the shipping industry due to added expense for icebreaking and other services and increased risk from less predictable weather. As uncertain as the rate of activity may be, decades from now more activity is likely to lead to greater security and safety challenges. These uncertainties result in a difficult situation where we must balance the risk of having inadequate capabilities or insufficient capacity with the opportunity cost of making premature and/or unnecessary investments.

Various sources indicate there are there are significant undiscovered mineral and hydrocarbon resources in the region, and media reporting would indicate that a “Wild-West, gold rush” mentality exists with Arctic and non-Artic nations racing to stake claims to these resources. Additionally, it is widely reported that regional boundary and territorial disputes, the resolution of which

inevitably impact jurisdiction over potentially valuable resources, may be a source of tension and conflict in the region.

The view that competition for resources and boundary disputes will lead to regional conflict overlooks the fact that the Arctic is a region bounded by nation states that have not only publicly committed to approaching Arctic issues within a common framework of international law, but have demonstrated the ability and commitment to doing so over the last fifty years. This low level of threat in the region is reflected in DoD's strategy.

Our strategic approach to the Arctic seeks to link goals with resources and activities in a manner that is consistent with the low threat environment and uncertainties regarding the rate of increase in human activity while taking practical fiscal realities into consideration.

Activities to accomplish our goals run the range from national interests of global application to issues unique to the Arctic region.

For example, we seek to preserve freedom of the seas in the Arctic as a necessary component and strategically consistent with our global interest in preserving all of the rights, freedoms, and uses of the sea and airspace recognized under international law. Promoting navigational and overflight freedoms, whether in an increasingly accessible Arctic or other maritime

spaces, such as the South China Sea, is vital to preserving global mobility of our Armed Forces and communicates - to liked-minded partners and allies as well as states seeking to restrict freedom of the seas - that the United States is committed to upholding international norms and the rule of law. We continue to support accession to the Law of the Sea Convention because it codifies the rights, freedoms, and uses of the sea and airspace DoD, State, Coast Guard, and other Federal departments and agencies seek to preserve.

Our Armed Forces are manned, trained, and equipped to be the “away team,” operating forward deployed for extended periods of time in some of the most austere environments in the world. Alaska’s vastness and harsh conditions throughout the entire Arctic region, present us with a unique opportunity to enhance human and environmental security and safety as both a “home team” and an “away team” by supporting and collaborating with both domestic civil authorities and allies and international partners to support search and rescue or humanitarian assistance and disaster relief. Establishing a foundation of cooperation – internal and external to the U.S. Government – is vital to success for both an emergent humanitarian crisis and long term stability in the Arctic.

While the most significant changes to the Arctic itself may be years away, we are currently well-postured with existing infrastructure and capabilities as well as a strategy to support our long-term planning efforts. Though we are presently well-postured, we are not idly waiting for the all the multi-year ice to

recede. We are currently focused on improving sea ice and weather forecasting, enhancing domain awareness, and evolving communications and satellite capabilities. Progress in these areas is vital as these are necessary key enablers should increased presence and operations be required in the future.

In sum, we are optimistic in our assessment that increased human activity and accessibility in the Arctic will provide opportunities to work collaboratively to promote a balanced approach to improving human and environmental security in the region. In such a security environment, we have currently assessed that existing defense infrastructure and capabilities in the region are adequate to meet near- to mid-term U.S. defense needs. As with any issue or activities, capabilities will need to be reevaluated as conditions and regional activity changes, and any gaps will need to be addressed and we will periodically reassess missions and supporting infrastructure needs in the Arctic.