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Presentation

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Installations, Environment, BRAC, and Energy

Witness Statement of
The Honorable Miranda A.A Ballentine,
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Installations, Environment, and Energy

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BIOGRAPHY

UNITED STATES AIR FORCE

MIRANDA A. A. BALLENTINE

Miranda A.A. Ballentine is the Assistant Secretary of the Air Force for Installations, Environment, and Energy, Headquarters U.S. Air Force, the Pentagon, Washington, D.C. Ms. Ballentine is responsible for the oversight, formulation, review and execution of plans, policies, programs and budgets for installations, energy, environment, safety and occupational health.

Prior to assuming her current position, Ms. Ballentine served as the Director of Sustainability for Global Renewable Energy and Sustainable Facilities at Walmart Stores, Inc. In this role, she developed and executed global strategies to reduce operating expenses in over 10,000 facilities in over 25 countries. Through acceleration of renewable energy, energy efficiency, and sustainability, Ms. Ballentine identified over $1 billion in potential annual expense reductions and 9 million metric ton of potential avoided greenhouse gas emissions.

Prior to joining Walmart, Ms. Ballentine was Vice President for Investor Analysis and Chief Operating Officer at David Gardiner & Associates, where she informed multi-million dollar investment decisions by analyzing companies' off-balance sheet risks and opportunities, including climate and energy programs, environmental management, labor relations, diversity, and corporate governance.

Ms. Ballentine previously served as the chair of the World Economic Forum's Global Growth Action Alliance's Renewable Energy Working Group, as well as a number of non-profit boards, including the Sustainability Consortium's External Relations Committee; the NetImpact Corporate Advisory Council; and the George Washington University's Institute for Sustainability Research, Education, and Policy Advisory Board.

In 2013, Ms. Ballentine was selected by the World Economic Forum for membership in its Forum of Young Global Leaders. Ms. Ballentine also serves as a guest lecturer at a number of national business schools, including Duke University, University of North Carolina, and George Washington University.

EDUCATION

1996 Bachelor of Science Degree in Psychology, Colorado State University, Magna cum Laude
2004 Master of Business Administration in Environmental Management and Policy and International Business, George Washington University

CAREER CHRONOLOGY

1. 2001 – 2004, Operations Director, Solar Electric Light Fund, Washington, D.C.
2. 2003 – 2008, Vice President of Investor Analysis and Chief Operation Officer, David Gardiner & Associates, LLC, Washington, DC.
3. 2008 – 2014, Director of Sustainability for Renewable Energy and Sustainable Buildings, Walmart, Washington, D.C.
4. 2014 – present, Assistant Secretary of the Air Force for Installations, Environment, and Energy

(Current as of October 2015)

Introduction

Ready and resilient installations are a critical component of Air Force operations. Unfortunately, twenty-four years of continuous combat, a fiscal environment constrained by the Budget Control Act (BCA), and a complex security environment have taken their toll on Air Force infrastructure and base operations support investments. Furthermore, the Air Force is currently maintaining installations that are too big, too old and too expensive for current and future needs. This forces us to spend scarce resources on excess infrastructure instead of operational and readiness priorities.

Air Force installations are foundational platforms comprised of both built and natural infrastructure. Our installations serve as the backbone for Air Force enduring core missions delivering air, space and cyberspace capabilities; sending a strategic message to both allies and adversaries signaling commitment to our friends and intent to our foes; foster partnership-building by stationing our Airmen side-by-side with our Coalition partners; and enable worldwide accessibility when our international partners need our assistance and, when necessary, to repel aggression. Taken together, these strategic imperatives require us to provide efficiently operated, sustainable installations to enable Air Force core missions.

The total Air Force Fiscal Year (FY) 2017 facilities budget request is down 4 percent from FY16 at $8.5B including Military Construction (MILCON), Facility Sustainment, Restoration and Modernization (FSRM), Housing, BRAC implementation and Environmental programs. As in FY 2016, the FY 2017 President's Budget (PB) request for the Air Force attempts to strike the delicate balance between a ready force today and a modern force for tomorrow while also continuing its recovery from the impacts of sequestration and adjusting to sustained budget reductions. The result is the Air Force facilities budget accepts near term risk in the entire infrastructure Maintenance and Repair portfolio of MILCON and Sustainment, Restoration and Modernization accounts in order to protect readiness and maintain credible capabilities in other core missions. In doing so, it acknowledges this choice will have long term effects on the overall health of infrastructure.

The Air Force's FY17 President's Budget includes $1.8 billion in Military Construction (MILCON) requirements, a 14 percent increase over the FY16 President's Budget. This allows the Air Force to replace degraded facilities that can no longer wait, while still meeting Combatant Commander (COCOM) needs and new weapon systems beddown requirements that must be accomplished now. This also allows us to provide an equitable distribution of $333 million to the Guard and Reserve components. This increase was funded by reductions in our Sustainment, and Restoration and Modernization

accounts for which we request $2.9 billion, about 10 percent less than last year. We recognize this reduction will expand a backlog of facility investment requirements that already totals nearly $20 billion. To assure continued focus on taking care of our Airmen and their families, the FY17 President's Budget also requests $274 million for Military Family Housing operations and maintenance, and $61.4 million for Military Family Housing Construction, $56.4 million for Base Realignment and Closure and $842 million for Environmental programs.

Military Construction

The FY17 MILCON program consists of three primary tiers. The first is support to the COCOMs; the second is providing facilities for the beddown of new weapons systems by their need dates; and the third is replacing our most critical existing mission degraded infrastructure on a worst-first basis.

COCOM Support

This year's President's Budget request includes $293 million for COCOM requirements; $35 million for Central Command (CENTCOM), $97 million for European Command (EUCOM), $29 million for Northern Command (NORTHCOM), and $293 million for Pacific Command (PACOM). The Air Force continues with phase three of the U.S. European Command Joint Intelligence Analysis Center consolidation at Royal Air Force (RAF) Croughton, United Kingdom, which also supports four other COCOMs. Additionally, the Asia-Pacific Theater remains a focus area for the Air Force where we will make a $109 million investment in FY17 to ensure our ability to project power into areas which may challenge our access and freedom to operate, and continue efforts to improve resiliency. Guam remains one of the most vital and accessible locations in the western Pacific. For the past ten years, Joint Region Marianas (JRM)-Andersen AFB, Guam has housed a continuous presence of our Nation's premier air assets, and will continue to serve as the strategic and operational center for military operations in support of a potential spectrum of crises in the Pacific. Additionally, FY17 investments in the Pacific Theater include Kadena Air Base, Japan; Royal Australian Air Force Base (RAAF) Darwin, Australia; and the Commonwealth of Northern Marianas Islands (CNMI).

To further support PACOM's strategy, the Air Force is committed to hardening critical structures, mitigating asset vulnerabilities, increasing redundancy, fielding improved airfield damage repair kits and upgrading degraded infrastructure as part of the Asia-Pacific Resiliency program. In 2017, the Air Force plans to construct a Satellite Communications Command, Control, Communications, Computers and Intelligence facility at JRM-Andersen AFB, Guam to sustain Guam's continued functionality. The Air Force also intends to recapitalize the munitions structures in support of the largest

munitions storage area in the Air Force. Furthermore, the FY17 budget invests in the aircraft parking apron expansion and aircraft maintenance support facility projects at RAAF Darwin supporting the Air Force's participation in bilateral training exercises. The FY17 PB investment also includes a land acquisition in CNMI, to support the Air Force's operational capability to execute weather diverts, accomplish training exercises and respond to natural disasters. Our total FY17 COCOM support makes up 16 percent of the Air Force's MILCON request.

New Mission Infrastructure

The FY17 President's Budget request includes $623 million of infrastructure investments to support the Air Force's modernization programs, including the beddown of the F-35A, KC-46A, Combat Rescue Helicopter (CRH) and the Presidential Aircraft Recapitalization. The Air Force's ability to fully operationalize these new aircraft depends not only on acquisition of the aircraft themselves, but also on the construction of the aircraft's accompanying hangars, maintenance facilities, training facilities, airfields and fuel infrastructure.

The FY17 PB includes $132.6 million for the beddown of the KC-46A at five locations. This consists of $11.6 million at Altus AFB, Oklahoma, the Formal Training Unit (FTU); $8.6 million at McConnell AFB, Kansas, the first Main Operating Base (MOB 1); $1.5 million at Pease International Tradeport Air National Guard Base (ANGB), New Hampshire, the second Main Operating Base (MOB 2); $17 million at Tinker AFB, Oklahoma, for KC-46A depot maintenance; and $93.9 million at Seymour Johnson AFB, NC, the preferred alternative for the third Main Operating Base (MOB 3).

This request also includes $340.8 million for the beddown of the F-35A at five locations consisting of $10.6 million at Nellis AFB, Nevada; $20 million at Luke AFB, Arizona; $10.1 million at Hill AFB, Utah; $315.6 million at Eielson AFB, Alaska; and $4.5 million at Burlington International Airport, Vermont. Additionally, the FY17 investment includes $7.3 million in support of the CRH beddown at Kirtland AFB, New Mexico. As the Air Force continues its efforts to modernize its fleet, we have moved forward to select installations to beddown our newest airframes. In January of this year, we announced the enterprise and criteria for the fourth KC-46A Main Operation Base (MOB 4).

In preparation for the Presidential Aircraft Recapitalization acquisition, the Air Force's 2017 budget request accounts for the planning and design requirements essential to this future beddown and a project to relocate the Joint Air Defense Operations Center Satellite Site at Joint Base Andrews, Maryland.

Existing Mission Infrastructure Recapitalization

This year's President Budget request also includes $723 million in MILCON recapitalization projects addressing existing mission infrastructure. Existing mission projects include requirements that revitalize the existing facility plant and projects that address new initiatives for capabilities already contained in the Air Force inventory. The Air Force's FY17 PB supports Nuclear Enterprise priorities and includes three MILCON projects, totaling $41 million. With this budget submission, the Air Force intends to provide a Missile Transfer Facility at F.E. Warren AFB, Wyoming, which recapitalizes the current facility and continues to ensure proper processing of missiles in support of the Missile and Alert Launch Facilities at three sites. The FY17 budget also includes a Consolidated Communications Facility recapitalization project at Barksdale AFB, Louisiana. Additionally, a new Missile Maintenance Dispatch Facility at Malmstrom AFB, Montana will be built in support of the UH-1 Helicopter and Tactical Response Force facilities beddown. Together, these projects will consolidate scattered installation functions and provide adequately sized and configured operating platforms for the UH-1 recapitalization. Additionally, the FY17 PB request includes three munitions storage projects to accommodate the realignment and relocation of primary Standard Air Munitions Package assets from McConnell Air Force Base, Kansas to Hill Air Force Base, Utah.

The Air Force's FY17 PB supports airfield recapitalization requirements to include a project to construct an updated, properly sized Air Traffic Control Tower at McConnell Air Force Base, Kansas and a new aircraft maintenance hangar in support of the Global Hawks at JRM-Andersen AFB, Guam. Additionally, the Air Force's FY17 PB supports force protection recapitalization requirements to include a project that constructs a compliant main gate complex at RAF Croughton, United Kingdom and new Combat Arms Training Maintenance facilities at Buckley Air Force Base, Colorado, Yokota Air Base, Japan, and Joint Base-Andrews, Maryland.

In total, our FY17 request represents a balanced approach ensuring critical infrastructure requirements to meet mission needs and operational timelines.

Facility Sustainment, Restoration and Modernization

In FY17, the Air Force requests $2.9 billion for Facilities Sustainment, Restoration and Modernization (FSRM), which is approximately 10 percent less than our FY16 PB request and funds sustainment to 77 percent of the OSD modeled requirement. The Restoration and Modernization account is reduced by 34 percent in FY17 as compared to FY16. The Air Force cut this account in order to increase the MILCON program and therefore reduce the greatest risk within the facility infrastructure

portfolio this year. Nonetheless, the Air Force's FY17 FSRM request attempts to keep "good facilities good" as the AF continues to focus limited resources on "mission critical, worst-first" facilities through application of asset management principles.

Housing

During periods of fiscal turmoil, we must never lose sight of our Airmen and their families. Airmen are the source of Air Force airpower. Regardless of the location, the mission, or the weapon system, our Airmen provide the innovation, knowledge, skill, and determination to fly, fight and win. There is no better way for us to demonstrate our commitment to service members and their families than by providing quality housing on our installations. The Air Force has privatized its military family housing (MFH) at each of its stateside installations, including Alaska and Hawaii. The Air Force has 32 projects at 63 bases, with an end-state of 53,240 homes and we are now focused on long-term oversight and accountability of the sustainment, operation and management of this portfolio.

Concurrently, the Air Force continues to manage approximately 18,000 government-owned family housing units at overseas installations. Our $274 million FY17 Family Housing Operations and Maintenance (O&M) sustainment funds request allows us to sustain adequate units and improve inadequate units, and our $61.4 million request for Family Housing Construction funds improves 204 tower units at Camp Foster, Okinawa and 12 units on Kadena Air Base. This request will ensure we support the housing requirements of our Airmen and their families as well as the Joint Service members the Air Force supports overseas.

Similarly, our focused investment strategy for dormitories enables the Air Force to achieve the DoD goal of 90 percent adequate dormitory rooms for permanent party unaccompanied Airmen, while continuing to support Airmen in formal training facilities. The FY17 PB MILCON request includes two training dormitories at Fairchild AFB, Washington and Joint Base San Antonio, Texas. With Congressional support, we will continue to ensure wise and strategic investment in these quality of life areas to provide modern housing and dormitory communities. More importantly, your continued support will take care of our most valued asset--our Airmen and their families.

Air Force Community Partnership Program

In support of the Air Force priority to "make every dollar count", the Air Force has put a concentrated effort to cultivate partnerships between our installations and the local communities. The Air Force Community Partnership program has been heralded by our Wing Commanders and community leaders as an ideal forum for exploring win-win partnerships. To date, there are 53 installations and

communities participating in the Air Force Community Partnership program. Since the program's inception in 2013, we have completed more than 140 partnership agreements that have generated over $23 million in Air Force benefits and $24 million in community benefits. Beyond the tangible savings, the program creates an invaluable forum for fostering relationships and promoting innovation. Installations and communities now have the framework and tools needed to finalize many of the over 1,000 potential initiatives identified to date, such as shared medical/EMT training, joint small arms ranges, and shared refuse management services.

Without losing focus on fostering a partnership mentality across the Air Force, we are now turning our attention to cultivate initiatives that show significant promise of large returns-on-investment (ROI) or have Air Force-wide application. In the future, the Air Force Community Partnership program will continue to strengthen its foundation by building upon concepts under development while reallocating resources towards initiatives with large returns on investment.

Of course, we need your help to pursue the initiative, which has, by far, the largest return-on-investment -- Base Realignment and Closure.

Base Realignment and Closure (BRAC)

The Air Force has more infrastructure capacity than our missions of today and tomorrow require. Our numbers of aircraft and personnel have drawn down significantly since the Cold War. Since the last round of BRAC in 2005, we have continued to drawdown our forces, but we have not paired these drawdowns with comparable reductions in our infrastructure. Since BRAC 2005, the Air Force has thousands fewer personnel and hundreds fewer aircraft in our planned force structure, yet we have not closed a single installation in the United States. Ultimately, we are paying to retain more installations than we require, and that money could be used to recapitalize and sustain our weapons systems, on readiness training, and on investing in Airmen quality of life programs.

Congress has expressed concerns that BRAC may cost too much, is often hard on communities, and may not adequately consider potential future growth of our forces.

Regarding cost, Air Force experience shows that BRAC provides significant savings. BRAC pays for itself. In each prior round of BRAC, including BRAC 2005, the Air Force achieved net savings during the implementation period. Couple that with the plain truth that the Air Force simply cannot afford to maintain our current infrastructure footprint, and our request for BRAC makes fundamental economic sense. The Air Force has a $20 billion facility investment backlog. We estimate (parametrically) that we

currently have about 30 percent excess infrastructure capacity when measured against our FY19 force structure. Sustaining and maintaining this extra infrastructure further strains our limited funds by forcing us to spread them even thinner to support infrastructure that we simply do not need. Without previous rounds of BRAC, the Air Force infrastructure bill would be about $3 billion higher each year than it is now. BRAC has been effective in reducing our infrastructure cost and we need another round to truly align our infrastructure to our force structure. We acknowledge there will be upfront costs, but those costs are the down payment to significant savings in the future.

Regarding BRAC's impact on communities, we understand that Air Force installations are key components of their communities. These communities house not only our missions but also our families; our kids go to the local schools; our Airmen attend the local sporting events; our families volunteer across the spectrum of activities – these communities are our neighbors. With that in mind, the Association of Defense Communities asked our neighbors what they thought about BRAC, and 92 percent of community leaders[1] believe BRAC is better for their community than the status quo of hollowed bases, reduced manning and minimal investment. As BRAC is, by nature, a consolidation effort, some installations will be the recipients of new missions and these communities will benefit from the economic boost that increased installation activity will provide. Other installations will close; however, it is only under BRAC that communities whose bases are closing will receive direct economic support through redevelopment guidance and financial assistance. Based on prior rounds of BRAC, communities in which bases closed had lower unemployment rates and higher per capita income growth than national averages[2]. Additionally, the Air Force is committed to partnering with DoD, Congress, and communities to consider alternative approaches to the prolonged BRAC analysis and selection process that puts an economic drag on all communities surrounding military installations. In sum, without a BRAC, the Air Force will continue to spread out our people and force structure, and as this occurs many communities will continue to suffer the economic detriment of hollowed out bases without the economic support that BRAC legislation provides. This lose-lose scenario can only be reversed through BRAC.

Finally, Congress has expressed concerns that a BRAC will enable reductions in infrastructure that do not account for potential future force structure growth. In asking for the authority to

[1] From the June 2015 Association of Defense Communities National Summit at which General Session audience members were asked: "What would be worse for defense communities?" and chose from "Status Quo" or "BRAC".
[2] From Government Accountability Office (GAO) studies GAO-05-138 and GAO-13-436

permanently reduce our infrastructure footprint, the Air Force has considered both its needs for today and its needs for the future. The Air Force has no intent to close infrastructure that may support any realistically achievable surge or contingency needs of the future. While we estimate 30 percent excess infrastructure capacity, the Air Force would build specific reduction targets on future needs, and seek to reduce only infrastructure that exceeds future scenarios. BRAC would be driven first by a military value assessment grounded in operational needs, and would not compromise future growth in force structure. In comparing infrastructure capacity with force structure requirements going back to the 1990s, the Air Force has never dipped below 20 percent excess infrastructure capacity[3] despite numerous force structure changes and five previous rounds of BRAC. Thus, we believe we have the opportunity to significantly reduce excess capacity while ensuring more than adequate infrastructure to support any envisioned force structure. Further, we are certain that BRAC provides the most effective means for our infrastructure to achieve the right balance of effectiveness, efficiency, and support to AF missions.

Climate Change

The 2010 and 2014 Quadrennial Defense Reviews (QDRs) recognized that climate change will shape DoD's operating environment, roles, and missions, and that we will need to adjust to the impacts of climate change to our facilities, infrastructure and military capabilities. As part of a larger DOD effort, the Air Force recently collected data from over 1,500 sites regarding impacts from past severe weather events. Surveyed sites not only included major installations, but also radar/communications sites, housing annexes, training ranges, missile sites, etc. Sixty percent of all sites reported some impact due to past flooding, extreme temperatures, drought, wildfire, and wind. The single most prevalent factor was drought which accounted for 42 percent of all reported impacts, followed by non-storm surge flooding and wind with 19 percent each. Further, roughly a third of the 78 sites within 2 kilometers of the coast reported having experienced storm surge flooding.

There are several pertinent examples of how climate change is affecting our plans for current and future infrastructure operations. The Air Force recently completed a study on the risks of coastal erosion to remote Alaskan radar sites. Our radar stations are at risk due to rapid, significant coastal erosion because the shore ice that used to protect the coast from waves has melted. We continue to

[3] From DoD reports to Congress on BRAC and capacity in April 1998 and March 2004 in accordance with section 2912 of the Defense Base Closure and Realignment Act of 1990

study the rate of erosion, mitigate impacts and incorporate considerations in future planning for these sites.

The DOD climate survey provided qualitative data that helped to frame a more holistic understanding of the impacts of climate on installations and operations. For the majority of reported severe weather events, bases reported emergency preparedness actions and procedures were successful in mitigating impacts on mission and personnel. That being said, mitigation becomes more difficult and cumulative impact to missions more crippling with increasing frequency and/or magnitude of severe weather events. The Air Force continues to integrate climate considerations into individual mission and installation planning efforts to produce informed and resiliency-focused decisions.

Energy

The Air Force is the largest single consumer of energy in the federal government. Air Force budgetary constraints have strained investments in right-sizing, modernizing, and maintaining power systems. As energy costs increase and budgets decrease, energy places greater pressure on the constrained Air Force budget. From a cost perspective, in FY15, the Air Force spent approximately $8.4 billion on fuel and electricity, with more than 86 percent going towards aviation fuel. That $8.4 billion represented approximately eight percent of the total Air Force budget; only 10 years ago, less than four percent of the budget went towards energy expenses. As we refocus our efforts, the Air Force will take a multi-faceted energy investment approach to enhance mission assurance.

Mission Assurance through Energy Assurance

The Air Force's ability to accomplish its mission—whether executing today's fight or training for future fights—is dependent on fuel and installation electricity. We must ensure reliable, resilient, cost-competitive power for our Airmen to fly, fight and win. To do so, the Air Force has revectored its installation energy program from a largely conservation oriented stance to one of energy resilience through strategic agility in installation energy programs and projects. The guiding tenet for this strategic agility is "Mission Assurance Through Energy Assurance." This new paradigm focuses on providing the Air Force with the ability to complete its mission in light of disruptions to electricity and fuel, as well as optimizing its energy productivity through improvements in technology and process.

Installation Energy

Over the last several years, the Air Force has seen installations lose power for significant periods of time as a result of ice storms, hurricanes, fallen trees, and other forms of denial of service. So far, the Air Force has been able to mitigate the most critical mission impacts due to those power losses by exercising alternatives such as moving missions in the case of weather events. There are several critical missions, however, that cannot be moved and where even a microsecond interruption in power puts Air Force mission capabilities at risk. Even though the Air Force has reduced its energy intensity by more than 23 percent since FY03, we still rely almost exclusively on expensive, non-networked diesel generators limited to very specific systems to provide the only depth of resiliency beyond that inherent in the electrical grid in our system. While that can be sufficient for short outages, today's grid is increasingly threatened by cyber incursions and physical attacks designed to disrupt power; increasing frequency and severity of natural disasters; and malfunctions from human error, aging equipment, and faulty infrastructure; all with the potential for long-term outages. To that end, we must enhance the energy resilience of Air Force installations through the adoption of innovative technologies and business models.

Going forward, the Air Force will transition to a more *comprehensive* approach to installation energy challenges, and it will holistically optimize cost and provide resilient, cleaner sources of energy by balancing the objectives of AF energy projects, including energy efficiency, renewable energy, energy resilience, and other energy projects. The core principles below will continue to characterize Air Force installation energy projects, but with an *increased focus on meeting multiple objectives* within single projects.

- Resilient: Every Air Force energy project should be designed through the lens of enhancing energy resilience; the strategic energy agility to maintain critical mission functions even during unexpected disruptions. Air Force missions require agile networks of platforms, communications equipment, satellites, and other technology and equipment. The Air Force will secure critical infrastructure and missions through a layered approach to energy resilience, taking advantage of rapidly evolving energy technologies to meet both home station and expeditionary needs. The Air Force will buttress commercial power with on-site electricity generation (preferably cleaner) paired with smart distribution networks and cyber-secure control systems, enabled to power critical infrastructure during grid disruptions.

- Cost-competitive: Air Force installations and commands should continue to "make every dollar count" when acquiring advanced, cleaner energy projects, while also examining trade-offs between lowest price and other priorities such as resilience. The Air Force will continue to pursue energy projects or transactions that will save money, leverage third-party investment, and prioritize resources to projects that also enhance energy resilience and reliability.
- Cleaner: Three global trends identified in *America's Air Force: A Call to the Future* (rapidly evolving technologies, decreasing availability of natural resources, and diverse operating environments) work in favor of energy modernization. Renewable and other distributed energy technologies are key components of energy agility and assurance, especially when projects are on site and capable of delivering continuous energy when the grid is disrupted.

Resilience

To help achieve Air Force energy resiliency goals, the Secretary and the Chief of Staff of the Air Force established the Air Force Office of Energy Assurance (AF-OEA) to serve as a central management office dedicated to the development, implementation, and oversight of privately-financed, large-scale renewable and alternative energy projects. This office leverages partnerships with the Army's Office of Energy Initiatives and Navy's Renewable Energy Program Office to develop projects that contribute to strategic energy agility by identifying and awarding third-party financed energy projects that provide 10MW or greater and cleaner (but preferably renewable) power that increases energy resiliency. These projects will provide significant energy alternatives to assure Air Force missions in the event of grid outages for short or long periods. The Air Force is establishing this office with existing personnel resources and will not include any new headquarters personnel; rather, it will co-locate AF-OEA with the Army's Office of Energy Initiatives to share support and processes, and move forward as a team. The AF-OEA will proactively team with the Navy's Renewable Energy Program Office to optimize opportunities that office identifies.

Finally, AF-OEA is charged to take a holistic, enterprise-level approach to its energy assurance programs brought to bear on the Air Force's mission assurance through an energy assurance approach. This includes clean, cost-competitive, reliable and resilient energy through the application of utilities privatization, power purchase agreements, direct investment (e.g., energy conservation investment program), and third-party financed (e.g., ESPCs, etc.) authorities Congress has granted the Air Force. All available tools will be used.

Cost Competitive

Although current and projected energy prices are relatively low, from a mission perspective, price volatility does not change mission vulnerability. With mission assurance as our focus, the Air Force still recognizes the need to reduce the cost of energy to allow our dollars to support readiness and recapitalization requirements. The Air Force directly invests in facility energy projects primarily using FSRM funding based on Air Force priorities. Based on an historical average, the Air Force anticipates approximately $223 million of its FSRM funding going towards projects with energy benefits such as increased resiliency and efficiency through modernized infrastructure.

While the Air Force has made considerable progress to avoid costs through reduced energy consumption, there is more to do. The Air Force is pursuing Energy Savings Performance Contracts (ESPC) and Utility Energy Service Contracts (UESC) to fund energy conservation projects. Since FY12, the Air Force has awarded approximately $128 million across eight ESPCs and UESCs. In FY16, the Air Force expects to award up to $359 million in such contracts. To take advantage of existing expertise, the Air Force has also partnered with the Defense Logistics Agency (DLA) and the U.S. Army Corps of Engineers (USACE) to expand its ability to identify and execute third-party performance contracts.

Clean Energy

The Air Force recognizes both clean energy, and its more desirable renewable subcomponent, are key elements to diversifying our energy portfolio to achieve strategic energy agility. By the end of FY15, the Air Force had 311 renewable energy projects on 104 sites, either installed, in operation, or under construction, across a wide variety of renewable energy sources, including wind, solar, geothermal, and waste-to-energy projects. Cumulatively, the Air Force has 104.3 megawatts of on-base renewable energy capacity. These projects, which are typically owned and operated by private industry, have increased energy production on Air Force installations by more than 26 percent from FY14 to FY15. About eight percent of the Air Force's total electrical energy consumption in FY15 came from a mixture of renewable on-base projects and purchased commercial renewable supply. Unfortunately, little of this energy can be directly consumed by our bases in the event of a grid outage. As we evaluate both direct investment and third party investment opportunities, the Air Force will exhibit preference for renewable solutions where cost effective, followed by clean but not renewable solutions, and ultimately by solutions that provide mission assurance through energy assurance without a clean element.

The Sweet Spot

Each of the principles above are spectrums, and the Air Force does not consider them "either-or" choices. The "sweet spot" projects will have elements of all three core principals, but not every project will demonstrate every characteristic. The Air Force will expect each project to demonstrate a clear connection to at least two principles. Projects that only achieve one principle will need strong mission justification. In short, energy projects should move toward the "sweet spot."

Operational Energy

Similar to the installation energy program, mission assurance is the basis for the Air Force's operational energy program. Through behavioral and technological advancements, the Air Force is optimizing its capabilities in order to maximize combat readiness and reduce the mission risks posed by our fuel supply challenges. With more than 5,000 aircraft in the Air Force fleet, and a demand for over two billion gallons of jet fuel every year, improving how the aircraft and crew use their fuel can generate significant increases in capabilities. To address the risks posed by that demand, the Air Force has a goal to improve its fleet aviation energy efficiency, defined as productivity per gallon, by 10 percent by 2020. Since developing the goal in FY11, the Air Force has improved its aviation energy efficiency by almost six percent through a combination of materiel solutions and changes to policies and processes.

The Air Force is requesting $682.6 million in operational energy related funding for FY17. Included in this is $567.1 million to increase future warfighter capabilities, $4.5 million to reduce the logistical risks to the mission from energy, and $111.0 million to improve current mission effectiveness.

Materiel Solutions

The Air Force faces a challenge when implementing materiel solutions, as many of them require high upfront investments with long-term paybacks. However, those paybacks often provide significant returns in both fuel savings and reduced maintenance requirements. The Air Force is in the midst of a propulsion upgrade program for the KC-135 at a rate of 100 to 120 engines per year for the next 12 years, at a cost of approximately $106 million per year. While this is primarily a service-life extension effort, it provides a 1.5 percent reduction in its fuel consumption rate per engine. Additionally, by improving reliability and durability, these upgrades will provide lifetime fuel and maintenance savings approaching $3 billion.

Science and Technology

Part of the Air Force's funding request for FY17 is for research, development, test and evaluation (RDT&E) opportunities with operational energy benefits. One of the main operational energy related projects is developing new adaptive engine technology, which provides revolutionary advances in turbine engine performance. By incorporating these advanced technologies, the Air Force will be demonstrating a transformational engine that can operate with the power and performance needed for a combat aircraft, while maintaining the higher fuel efficiency of large aircraft. Based on the results of Air Force lab experimentation, this engine will provide 25 percent greater fuel efficiency, 30 percent greater range, 10 percent greater thrust, and improved thermal management compared to current engines.

Modeling and Simulation

While the Air Force is enhancing its fleet through current and future materiel solutions, it is also looking to improve how it manages fuel usage for future conflicts. As part of the Joint Operational Energy Modeling and Simulation (JOEMS) project, the Air Force is leading a collaborative effort to examine how technology upgrades impact operations in various scenarios through identification of fuel usage requirements and logistical fuel supply challenges. By incorporating energy considerations in wargames and other modeling and simulation efforts, the Air Force can better understand the role fuel and logistics can play in future operations. The way it manages and consumes fuel can be a catalyst towards a successful mission, and the Air Force is driving forward to ensure it maintains an energy advantage against potential adversaries.

Process Changes

The Air Force is also actively fostering an energy-aware culture that empowers Airmen to take a smart approach to energy to better complete their mission. Simple changes in how a pilot flies and trains can affect aircraft fuel consumption. Through the Energy Analysis Task Force (EATF), the Air Force studied how instructor pilots and simulator instructors at Vance AFB in Oklahoma could incorporate fuel efficiency concepts into pilot training to ensure new pilots understand how to optimize fuel use. As part of a year-long trial, the EATF developed four training techniques to reduce fuel consumption in the T-1A Jayhawk, which were tested in T-1 simulators with a small group of students. The energy efficiency techniques explored for integration into the T-1 syllabus have the potential to save up to six percent in fuel requirements on navigation training sortie profiles. One of these techniques, called the Fuel

Efficient Descent, involves teaching student pilots to select the optimal point to begin their descent into an airfield. When the students select the correct point to begin their descent, they are able to reduce engine power to idle and descend using minimum fuel. So far, the new technique has proven the potential to reduce fuel usage by 35 percent during the descent phase of flight.

While this effort saves fuel today, it goes much further by instilling an energy aware culture in those new pilots, which proliferates into the Air Force's major weapons systems and will potentially provide exponential savings. This type of savings can be seen in the process changes executed at Altus AFB in Oklahoma, which instituted scheduling and airspace utilization initiatives in 2013 that are providing over $60 million in cost savings on an annual basis.

Alternative Aviation Fuel

The Air Force is also committed to diversifying the types of energy and securing the quantities necessary to perform its missions, both for near-term benefits and long-term energy resiliency. The ability to use alternative fuels in its aircraft provides the Air Force with enhanced capabilities by increasing the types of fuels available for use. The entire Air Force fleet has been certified to use two alternative aviation fuel blends; one of these is generated from traditional sources of energy and the other one is generated from bio-based materials.

Environmental Stewardship

While the Air Force strives to prevent or minimize environmental degradation from our training activities and operations, we recognize that sustaining the world's most capable Air, Space, and Cyber Force inevitably results in environmental impact. As a result, we view our responsibility to protect human health and the environment as an extraordinary duty. The Air Force is subject to the same environmental statutes and regulations as any other organization in the country and recognizes both its legal and inherent environmental responsibility. The Air Force FY17 PB request assures our programs comply with applicable regulatory requirements but, more significantly, in a manner that ensures the ready installations and resilient natural infrastructure necessary to support the Air Force mission now and in the future.

Environmental Program Funding Details

Within our environmental programs, the Air Force continues to prioritize resources to ensure our defense activities fully comply with legal obligations and our natural infrastructure remains resilient

to support our mission and our communities; restore sites impacted by Air Force operations; and continuously improve. The FY17 PB seeks a total of $842 million for environmental programs. This is $20 million less than last year due to sustained progress in cleaning up contaminated sites and efficiencies gained through centralized program management. By centrally managing our environmental programs we can continue to fund full compliance with all applicable laws, while applying every precious dollar to our highest priorities first. Further, our environmental programs are designed to provide environmental stewardship to ensure the continued availability of the natural infrastructure; the air, land and water necessary to provide ready installations and ensure military readiness.

Environmental Quality

The Air Force's FY17 PB request seeks $422.6 million in Environmental Quality funding for environmental compliance, environmental conservation, and pollution prevention. With this request, the Air Force ensures a resilient natural infrastructure and funds compliance with environmental laws in order to remain a good steward of the environment. We have instituted a standardized and centralized requirements development process that prioritizes our environmental quality program in a manner that minimizes risk to Airmen and surrounding communities, the mission and the natural infrastructure. This balanced approach ensures the Air Force has ready installations with the continued availability of the natural infrastructure it needs at its installations and ranges to train and operate today and into the future.

The environmental compliance program focuses on regulatory compliance for our air, water and land assets. Examples of compliance efforts include more detailed air quality assessments when analyzing environmental impacts from Air Force activities; protecting our groundwater by improving management of our underground and aboveground storage tanks; and properly disposing of wastes to avert contaminating our natural infrastructure.

Efforts in pollution prevention include recycling used oil, fluorescent lights and spent solvents, as well as sustaining our hazardous materials pharmacies to manage our hazardous materials so they don't turn into waste. We continue to make investments in minimizing waste and risk to Airmen through demonstrating and validating new technology such as the robotic laser de-painting process on aircraft.

The Air Force remains committed to a robust environmental conservation program. Prior appropriations allowed the Air Force to invest in conservation activities on our training ranges, providing

direct support to mission readiness. The conservation program in FY17 builds on past efforts to continue habitat and species management for 96 threatened and endangered species on 45 Air Force installations. This year's budget request also provides for continued cooperation and collaboration with other agencies, like the U.S. Fish and Wildlife Service, to provide effective natural resources management and safeguard military lands from wildfire hazards through coordinated planning and incident response, and the application of prescribed burn techniques. The FY17 budget will further the Air Force's implementation of tribal relations policy to ensure that the unique trust relationship the U.S. government shares with tribes continues, and to provide opportunities to communicate aspects of the Air Force's mission that may affect tribes.

As trustee for more than 9 million acres of land including forests, prairies, deserts, wetlands, and costal habitats, the Air Force is very aware of the important role natural resources plays in maintaining our mission capability. Sustained military readiness requires continued access to this natural infrastructure for the purposes of realistic training activities. The Air Force utilizes proactive ecosystem management principles and conservation partnerships with other federal and state agencies to minimize or eliminate impacts on the training mission. We are challenged by the fact that in many instances, our installations have become the last bastion of habitat for certain species due to the increased development outside the installation boundary. The FY17 PB request includes $53.4 million to implement the Air Force's conservation strategy, which will ensure that all aspects of natural resources management are successfully integrated into the Air Force's mission.

The Air Force remains committed to good environmental stewardship, ensuring compliance with legal requirements, mitigating mission impacts, reducing risk to our natural infrastructure, and honing our environmental management practices to ensure the sustainable management of the resources we need to fly, fight, and win now and into the future.

Environmental Restoration

The Air Force FY17 PB request seeks $419 million in Environmental Restoration funding for cleanup of current installations and those closed during previous BRAC rounds. Our focus has been on completing investigations and getting remedial actions in place, to reduce risk to human health and the environment in a prioritized manner. Ultimately, the Air Force seeks to make real property available for mission use at our active installations, and to facilitate community property transfers and reuse at our closed installations.

The Air Force has made progress over time in managing this complex program area, with more than 13,500 restoration sites at our active and closed installations (over 8,200 active and almost 5,300 BRAC). The Air Force BRAC restoration program is on-track to achieve, at least, a "response complete status" at 90 percent of its Installation Restoration Program (IRP) sites at closed installations by the end of FY18. Our active installation restoration sites are currently projected to achieve the same 90 percent response complete level by FY20.

A new topic of focus is Emerging Contaminants (EC). ECs pose significant risk management challenges to the Air Force environmental program. Regulatory requests for environmental sampling and implementation of EC response actions are on the rise. Characterizing the extent of Air Force environmental releases of an emerging contaminant, assessing the potential risk and impact to human health and the environment, and initiating response actions and implementing appropriate mitigation measures, drive unforeseen, chemical- and site-specific environmental liabilities and program costs.

The Air Force response to releases of ECs from its facilities is a deliberate, science-based and data-driven process that is focused on protection of human health and the environment, conducted in accordance with the Defense Environmental Restoration Program, and consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The Air Force continues to work with regulators, city and state officials and other stakeholders to develop the best solution to an emerging problem. For example, for confirmed perfluorinated compounds (PFC) releases, the Air Force is determining the extent of contamination and taking steps to mitigate any validated human exposures with interim actions until cleanup standards and effective remedial technologies are available. When groundwater sampling results indicate PFC levels exceed the EPA's provisional health advisory for drinking water, the Air Force reduces PFC levels with filtration technologies or provides an alternate drinking water source. When PFCs are detectable, but below the provisional health advisory level, the Air Force may conduct well monitoring to track PFC level changes and determine if further action is needed.

While we cannot compromise on the protection of the public, our Airmen and civilian workforce and their families, neither can we endlessly absorb the operational and financial risks of attempting to work with a myriad of unregulated contaminants without some level of certainty that the cost of controlling exposure will have a commensurate public health and operational benefit.

Conclusion

The Air Force made hard strategic choices during formulation of this budget request. The Air Force attempted to strike the delicate balance between a ready force for today with a modern force for tomorrow while also recovering from the impacts of sequestration and adjusting to budget reductions. Our FY17 PB request increases funding in MILCON to support COCOM and new weapon system requirements, reduces Restoration and Modernization (R&M) and continues to address the current mission backlog of deferred infrastructure recapitalization from the FY13 PB strategic pause. Sequestration will halt this recovery. We also must continue the dialogue on right-sizing our installations footprint for a smaller, more capable force that sets the proper course for enabling the Defense Strategy while addressing our most pressing national security issue - our fiscal environment.

In spite of fiscal challenges, we remain committed to our Service members and their families. Privatized housing at our stateside installations and continued investment in Government housing at overseas locations provide our families with modern homes that improve their quality of life now and into the future. We also maintain our responsibility to provide dormitory campuses that support the needs of our unaccompanied Service members.

Finally, we continue to carefully scrutinize every dollar we spend. Our commitment to continued efficiencies, a properly sized force structure, and right-sized installations will enable us to ensure maximum returns on the Nation’s investment in her Airmen, who provide our trademark, highly valued airpower capabilities for the Joint team.