

United States Air Force

Presentation

Before the House Committee on Armed
Services, Subcommittee on Readiness



***What is the Price of Energy
Security: from Battlefields to
Bases***

Witness Statement of
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Assistant Secretary of the Air Force
(Installations, Environment, and
Logistics)

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BIOGRAPHY



UNITED STATES AIR FORCE

TERRY A. YONKERS

Terry A. Yonkers is the Assistant Secretary of the Air Force for Installations, Environment and Logistics, Washington, D.C. Mr Yonkers is responsible for providing oversight for all matters pertaining to the formulation, review, and execution of plans, policies, programs, and budgets for installations, energy, environment, safety and occupational health as well as weapon systems logistics support.

Mr. Yonkers was born and raised in Hemet, Calif. He has more than 35 years experience developing and managing environmental, safety and occupational health programs. This includes 22 years in government and more than 16 years in private industry. Mr. Yonkers has worked extensively within the Department of Defense's planning, programming, budgeting and resource allocation as well as congressional budgeting processes. As the acting Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health, he developed strategic policies, guided and oversaw Air Force's ESOH programs worldwide and a \$1.5 billion annual appropriation.



As Senior Vice President, Business Development, ARCADIS, Inc., Mr. Yonkers advised government clients on innovative and cost-saving environmental and energy security solutions as well as represented business interests in national forums seeking process improvements to environmental security, energy security, climate change, environmental cleanup/compliance and property redevelopment.

EDUCATION

1972 Bachelor of Science degree in biology, University of California, Riverside

1973 Advanced degree in education, University of California, Riverside

1993 Master's degree in national security studies, Industrial College of the Armed Forces, National Defense University, Fort Lesley J. McNair, Washington, D.C.

1999 Program for Executives, Carnegie Mellon University

2000 Seminars in International Relations and National Security, Massachusetts Institute of Technology, Cambridge

2001 Master of Public Administration degree, George Mason University, Washington, D.C.

CAREER CHRONOLOGY

1. 1976 - 1980, biologist, Southern California Edison Company, Corporate Headquarters, Rosemead, Calif.
2. 1980 - 1984, environmental coordinator, Air Force Flight Test Center, Edwards Air Force Base, Calif.
3. 1984 - 1985, regulatory liaison and environmental engineer, Air Force Regional Civil Engineering Office, Dallas, Texas
4. 1986 - 1990, Deputy Director Environmental Programs, Air Force Systems Command, Andrews AFB, Md.
5. 1990 - 1996, Deputy Director and Chief of Environmental Programs, Air Force Base Conversion Agency, Arlington, Va.
6. 1996 - 2000, special assistant to the Assistant Secretary, Manpower, Reserve Affairs, Installations and Environment, the Pentagon, Washington, D.C.
7. 2000 - 2002, acting Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health, the Pentagon, Washington, D.C.
8. 2002 - 2010, Senior Vice President, Business Development, ARCADIS, Inc., Highlands Ranch, Colo.
9. 2010 - present, Assistant Secretary of the Air Force for Installations, Environment and Logistics, Washington, D.C.

AWARDS AND HONORS

- 2002 Air Force Outstanding Civilian Service Award
- 2002 Letter of Recognition from the Secretary of Air Force

(Current as of March 2010)

Energy is a common thread that runs through every mission in the Department of Defense and each of us brings different capabilities to this challenge, but our overarching mission is the same: *protect the security of our nation*. Each day, the Air Force flies to points around the globe, including over 900 mobility missions a day to provide the Nation with *Global Vigilance*, *Global Reach*, and *Global Power*, missions that require significant amounts of energy. To meet our energy needs, the Air Force is leveraging sound business practices and making prudent investments in energy conservation and alternative sources of energy to enable our warfighters and improve our energy security. These investments are crucial to ensure we have the energy where and when we need it to conduct the military missions that protect our core national interests.

The Air Force is requesting more than \$530 million in Fiscal Year (FY) 2013 for aviation, infrastructure, and research, development, test and evaluation (RDT&E) energy initiatives to reduce demand, improve efficiency, diversify supply, and enhance mission effectiveness.

Energy Strategy

Energy is the cornerstones of the Air Force's ability to maintain global vigilance, reach, and power at home and abroad. Energy security is having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs. To enhance energy security, we have developed a three-part strategy to:

- 1) Reduce energy demand through conservation and efficiency,
- 2) Assure and expand supply through alternative and resilient energy sources, and
- 3) Foster an Air Force culture to recognize the necessity and criticality of energy.

We have set a number of aggressive targets across our entire portfolio—targets that, if met, will help us avoid more than \$1 billion a year (based on today’s energy prices) and improve energy security for our critical assets.

Energy Consumption and Expenditures

The Air Force is the largest single consumer of energy in the federal government spending more than \$9.7 billion on fuel and electricity for approximately 2.5 billion gallons of aviation fuel and more than 64 trillion British Thermal Units (BTUs) of installation energy in FY11. To put our energy costs into context, \$9.7 billion is the equivalent of the procurement costs for approximately 79 F-35 Joint Strike Fighters

Despite our reductions in consumption, fuel costs have increased 225% over the past decade and we are expecting them to continue to rise in the future. Between FY10 and FY11, our energy costs increased by \$1.5 billion, an increase that occurred even as fuel use went down by more than 50 million gallons and facility energy consumption was reduced by 2 trillion BTUs. Moreover, as energy costs increase and take up more and more of our budget, it is essential that we continue to reduce the amount we consume. Every dollar we don’t spend on fuel frees up funds for reinvestment into capabilities for the warfighter.

Expenditures for aviation fuel drive our energy costs and are primarily responsible for that \$1.5 billion increase, going from \$6.8 billion to \$8.3 billion in one year. We expect that to exceed \$9 billion next year based on current prices and expected consumption rates. In contrast, there was little fluctuation in both our installation and ground vehicle energy expenditures from FY10 to FY11. We spent \$1.1 billion on facility energy and \$323 million for ground vehicle fuels in FY11.

With the austere fiscal environment before us, energy can also pose a financial risk to the Air Force's ability to plan, develop, and acquire the technologies and equipment necessary to maintain air superiority. Energy is consuming a larger share of the Air Force budget, going from 3% in FY03 to more than 8% in FY2011, and it is becoming more difficult to forecast and plan for volatile prices.

ENERGY SECURITY TO THE AIR FORCE

Price Volatility and Budget Impact

While long-term energy cost increases are a significant concern, short-term fluctuations in energy prices can critically impact the budget in the year of execution. For example, in June 2011, the price for a gallon of JP-8 jumped 30% from \$3.03 to \$3.93 a gallon, and today the price is at \$3.82. When we began developing the FY11 budget submission in 2009, we were estimating a cost of \$2.37 a gallon. That translated into a bill of more than \$3.5 billion in FY11 – funds for which we did not budget and which became a year of execution bill.

In contrast to our aviation fuel costs, our installation expenditures have been relatively constant at approximately \$1.1 billion per year since FY06. This consistency is achieved through improvements in efficiency and decreased overall facility energy consumption to overcome per unit energy costs that have nearly doubled since 2003. Without the consumption decrease, our facility energy bill would have been \$257 million larger last year. Installation utility costs are different from fuel costs in that the Services procure fuel through the Defense Logistics Agency Energy (DLA Energy). Through the process established by DLA Energy, aviation fuel costs \$3.82 per gallon today, regardless of where it is consumed.

However, electricity rates vary nationwide. These rates are often negotiated directly with utilities on a longer-term basis; as such, they are more stable than fuel prices. While this stability facilitates planning, it can impact development of renewable energy and energy conservation projects. The Air Force builds its business case analysis for an installation energy project on the utility rates at that particular installation, and a project that may generate a high return on investment in one part of the country, may not be cost effective in another. Additionally, beyond cost, there are also other, more intangible factors to consider such as energy security and the need to maintain missions and assets critical to our nation's national security.

Risk to Supply Lines

Beyond price volatility, there are risks from depending solely upon traditional energy supplies, as access and costs are impacted by natural disasters, accidents, terrorism, and political instability. In addition to petroleum-based fuels, our installations are heavily dependent on the commercial grid. These dependencies add risk to our core mission support functions and can jeopardize effectiveness. To address these, we are mitigating risks by identifying alternate sources of energy, building in redundancies, and identifying where and for how long we need to ensure we have the ability to operate. These challenges require an energy security posture – as described in FY12 National Defense Authorization Act – that is *robust*, *resilient*, and *ready*.

- A *Robust* posture means that the Air Force has sufficient supply when and where we need it regardless of external challenges.
- A *Resilient* posture means we have options – whether in terms of location or types of fuel or electricity.
- A *Ready* posture means we are prepared to respond at a moment's notice if energy supplies are compromised or our mission requires large amounts of additional fuel and electricity.

In short, energy security enables our warfighters, expands operational effectiveness, and enhances national security.

BUSINESS RULES

Our first priority is doing what is right to make sure we can achieve our mission. To achieve that, we are implementing no- or low-cost initiatives, such as policy changes, wherever possible, partnering with other federal agencies and private industry to share best practices, and investing in those materiel solutions that provide the best returns from both financial and energy security perspectives.

Appropriated dollars vs. Private Funding

The Air Force recognizes the value of the limited financial resources available for investments. To ensure we are making the best use of taxpayer dollars, our corporate structure requires strong evaluations based on sound business case analyses, with a particular focus on return on investment and payback periods. Every action taken by the Air Force to improve its energy security and efficiency is well researched and executed to provide the greatest impact in support of the Air Force mission.

The Air Force is also looking at private investment wherever possible, particularly with regards to developing renewable energy sources and reducing our facility energy consumption. By utilizing this approach, we can improve our energy security and take advantage of underutilized land with little or no additional costs to the taxpayer. Beyond our installations, we are looking to expand the concept of third party investment into other areas of our operations.

Total Ownership Cost

The Air Force considers total ownership costs when developing contingency plans or acquiring equipment, as opposed to a “stovepipe” view of just energy savings. For example, we are requesting \$29 million in FY13 to begin upgrading the high-pressure components of the KC-135 tanker’s engines, an effort that will improve each engine’s efficiency, reliability, and maintainability. This initiative requires a total investment of \$278 million through FY28, and is expected to yield a reduction of 1.5% in fuel consumption—approximately 56 million gallons through FY46. In addition to the fuel savings, the Air Force also expects to avoid an additional \$1.3 billion due to decreased maintenance requirements. While this is not expected to occur until FY 2025, when the first maintenance overhauls would be avoided, they are significant and provide strong evidence for supporting the total ownership perspective.

AVIATION

The Air Force’s aviation fleet is composed of more than 4,600 aircraft that consume nearly 2.5 billion gallons of jet fuel every year. Our fleet represents the largest category of energy consumption in the military, accounting for approximately 59% of the total DoD aviation fuel consumption. Aviation fuel costs represent a significant financial requirement for the Air Force. To help mitigate the impact of those costs, we have set a target to reduce aviation fuel consumption 10% by 2015 based on our 2006 consumption. While this 10% reduction target—which equates to 254 million gallons—is aggressive, if we can achieve it, there will be a big impact. Since 2006, the Air Force has reduced its aviation fuel consumption by 4%, which translated into a cost avoidance of \$165 million in 2011. In 2015, if the price of fuel were at \$4, the Air Force would avoid more than a billion dollars of energy costs.

Efficiencies

Efficiency is not just about aircraft improvements, but also changing how we fly. To address this, the Air Force is looking at policy changes across our mobility, combat, and training aircraft, in addition to investments in equipment. The Mobility Air Forces account for 64% of aviation fuel consumption within the Air Force, and as their mission lends itself to capturing lessons from industry, these aircraft have been our primary focus for energy savings.

For example, Air Mobility Command (AMC) updated their policies to eliminate any extra fuel carried, while still maintaining safety standards. Category 1 fuel requirements existed for decades as an added amount of reserve fuel equal to 10% of the time over water (outside of ground-based navigation systems) to account for inaccurate navigation systems. With technological advances and current on-board navigation systems requirements, this additional fuel is unnecessary, and by eliminating the requirement (and associated excess weight) we estimate an annual savings of 5 million gallons in fuel, or more than \$19 million a year based on today's fuel prices. While each one of these policy changes is small, together they add up to 19.5 million gallons of fuel, or \$75 million, in FY11, with an expected savings of \$325 million over the Future Years Defense Program (FYDP). With these efficiencies put into practice, the cost for AMC to move 1 ton of cargo 1 mile by air is down by 21% and the Air Force was able to move 27% more cargo on just 3% more fuel last year.

Alternative Aviation Fuels

While we endeavor to reduce demand in our aviation fleet, we are also focused on increasing and diversifying the supply side of the equation to improve energy security. The Air Force views energy security as a strategic imperative and alternative fuels are key to addressing that imperative. To demonstrate our commitment to this effort, we set a very ambitious target to be

prepared by 2016 to meet half of our domestic jet fuel needs via an alternative fuel blend by ensuring our aircraft can fly on commercially available fuels. These blends must be drop-in fuels that are cost competitive with traditional petroleum-based jet fuels and meet our environmental and technical specifications.

To get there, we are certifying our aircraft to fly on three different alternative fuel blends, all of which are half-traditional petroleum-based JP-8 fuel and half-alternative fuel. The first blend the Air Force tested was synthetic fuel developed using the Fischer – Tropsch process. The Air Force has completed the testing and certification process for 100% of its fleet on a 50/50 blend of Fisher-Tropsch and JP-8. By applying lessons learned and experience from the extensive Fisher-Tropsch certification program, the Air Force conducted certification of the second alternative fuel effort, hydro-treated renewable jet (HRJ), using a “pathfinder” approach. Only the most challenging systems, such as the C-17 and F-15, were tested and the rest of the fleet will be “certified by similarity.” The Air Force expects to complete certification of the entire fleet by the end of 2012. The Air Force is beginning to evaluate a third alternative fuel process called alcohol-to-jet (ATJ), which is produced using cellulosic materials. Depending on funding availability, the Air Force anticipates completing certification efforts by 2014 using the “certification by similarity” approach used for HRJ.

By preparing for a variety of alternatives, we are ensuring we will be ready for whatever private industry is able to bring to market, as well as having the flexibility to use those fuels in different areas of the world, depending on the availability of fuel stocks and refining capability. Since we started our certification initiative in 2006, we have purchased 1.1 million gallons of alternative fuels. Through our certification process, we are ensuring we will be ready to purchase a variety of different fuels by 2016 but we are just a purchaser, not a producer, of

alternative aviation fuels. The Air Force's core competency is understanding the fuel/engine interface, not producing fuel. We will need industry to produce those fuels in a manner that meets our criteria.

Promising market opportunities and testing of these fuels in the field are positive steps, however we recognize that to achieve our ambitious target, we need to be involved directly with the private sector to share lessons learned, establish standards, and support the development of these fuels as a consumer. While the Air Force consumes a large amount of fuel, we are relatively small compared to the commercial sector. Overall, the Air Force makes up just 11% of the aviation fuel market in the United States, about the same as American Airlines. This means that while we do have some market power, we are not large enough to drive the market.

To help move the market and provide the ability to exchange data and best practices, we are partnering with commercial industry through the Commercial Aviation Alternative Fuels Initiative (CAAFI). CAAFI includes other government entities like the Federal Aviation Administration, along with airlines, airports, aircraft and engine manufacturers, energy producers, researchers, and international participants. Together, we developed a repeatable process to certify fuels in a way that helps both commercial aviation and the military. Through CAAFI's efforts, ASTM International, which develops industry technical standards, approved the 50% HRJ blend for use in commercial aircraft in July 2011. As several of our aircraft are commercial derivatives, we can apply the aircraft certifications directly to our fleet.

Role of RDT&E

Innovation is part of our DNA and the Air Force is on the lookout for ways to improve warfighter effectiveness. Led by Dr. Maybury, the Air Force Chief Scientist, a team from across the Air Force collaborated with other services and federal agencies to identify a framework for

thinking about new energy technologies that are being developing in the near, mid, and long terms. The report looks at all aspects of the Air Force mission—air, space and cyberspace—and evaluates many technologies, including aircraft engines, airframe design, energy storage, and best practices in planning and logistics. Energy Horizons identifies three priority categories for technology:

- Technology Leader – The Air Force is inventing novel technologies that are at the core of our mission. Aircraft engines and airframes fall into this category.
- Fast Follower – The Air Force is not at the forefront of research but looks to rapidly adopt, adapt, or accelerate technologies originating from external leading organizations.
- Technology Watcher – The Air Force stays aware of developments and is ready to adopt technology as it matures.

While some are unique, many of the challenges we face are similar to those of the Army and Navy, federal agencies, and private industry and we are actively partnering with them to leverage each entities unique expertise, resources, and experience. For the Air Force, we are focusing our RDT&E efforts primarily to meet our aviation, space, and cyberspace missions, as opposed to areas where there is significant overlap with our Sister Services or private industry. For example, in FY13 we are investing more than \$300 million in energy RDT&E, which includes \$214 million for the Adaptive Engine Technology Development (AETD) initiative. This initiative will build upon the Adaptive Versatile Engine Technology (ADVENT) effort to reduce energy consumption and improve efficiency and reliability of future and legacy aircraft, and current estimates are that it will be as much as 25% more fuel efficient than current technology.

INSTALLATIONS

Renewable Energy

The Air Force is looking to improve its energy security and diversify its energy supply through increased use of renewable energy. In FY11, more than 6% of the electrical energy used

by the Air Force was produced from renewable sources. Moving forward, our goal is to develop more than 1,000 megawatts (MW) of renewable power, including more than 600MW from solar. By making the most of private sector knowledge, technology, and financing, we plan to improve our energy security by capitalizing on underutilized land on our installations to develop those projects. Currently, the Air Force has 131 operational renewable energy projects and another 50 under construction across a wide variety of renewable energy sources, including 8.7MW from wind energy, 26.2MW from solar, and 2.4MW from waste-to-energy projects. In FY11, the Air Force had 46 projects funded through the MILCON appropriation with at least one renewable energy component, such as solar photovoltaic systems or cool roof attributes.

The Air Force is pursuing renewable energy on a cost effective basis through a three-tier priority order. The first priority is to develop renewable energy generation either on Air Force property or on adjacent federal property. There are three avenues to accomplish this. First, a renewable energy Power Purchase Agreements (PPA) may be developed with third parties under a utility purchase contract. This allows third party developers to obtain financing and build renewable generation with cost recovery through a long-term utility purchase agreement. Second, the Air Force can sign an agreement with a utility or other third party to provide renewable energy at a pre-negotiated rate. Third, a direct Air Force investment could be made to construct the renewable power generator.

Direct Air Force funding of renewable projects is very rarely cost-effective when compared to commercial utility rates, due to the inability of federal agencies, including the Air Force, to gain the benefit of renewable energy certificate (REC) sale value, tax rebates, and state or federal incentives. If the Air Force attempted to meet the renewable energy goal through

direct investment, the cost would be over \$7 billion based on our history with recent renewable energy projects and the current cost of power.

To address this, the Air Force is using existing authorities, such as Enhanced Use Leases (EUL) and PPA, to attract private industry to develop renewable energy projects on underutilized land on Air Force installations. The Air Force is anticipating third-party investments could reach more than \$1 billion over the next 5 years to construct on-base renewable projects, while we plan to invest only \$5 to \$8 million for renewable projects over the same period. The Air Force has set a goal to identify \$5 billion worth of EULs and over half of this value will be energy EULs.

The second priority is to purchase renewable energy from a distant producer and have it delivered to us via the normal power grid. The third priority is to purchase RECs along with the renewable power from an off-base generator.

Energy Conservation

Overall, our focus is to reduce our energy footprint across all operations and we have made significant progress. We have reduced our overall facility energy consumption by nearly 20%, and reduced energy intensity by more than 16% since FY03. However, installation energy expenditures have increased 32% over that same period due to increased prices for electricity. Looking long term, the Air Force is on track to meet its installation energy goals by reducing energy intensity by 37.5% by 2020 and increasing renewable energy use to 25% by 2025.

Included in our FY13 budget request is \$215 million for energy conservation projects on our installations, a continuation of the nearly \$800 million we have invested in such projects over the last four years. As a result of those energy conservation efforts, we have cumulatively avoided \$1.1 billion in facility energy costs since 2003, which is money that could be redirected to better

support our warfighters. Investments we are making in FY12 to improve our facility energy efficiency and reduce our energy requirement are expected to start generating savings in FY14, and the majority are expected to payback before or just shortly after the FYDP.

The Energy Conservation Investment Program (ECIP) is a critical element of the Air Force's strategy to improve the energy performance of its permanent installations. In FY11, we completed 17 ECIP projects at a cost of approximately \$30 million. The Air Force estimates these projects will save more than 253 billion BTUs annually and nearly \$54 million over the life of the projects. For FY12, we have submitted an additional six projects projected to save 213 billion BTUs to the Office of the Secretary of Defense (OSD), which manages ECIP.

The Air Force is also leveraging third-party financing to fund energy conservation projects through Energy Savings Performance Contracts (ESPC) and Utility Energy Service Contracts (UESC). The Air Force is targeting over \$260 million in ESPCs and UESCs over the next two years. While the Air Force did not award any third-party financed projects in FY11, we anticipate awarding six such projects in FY12 that would save approximately 1.1 trillion BTUs, and are evaluating three projects for FY13. Based on current estimates, we anticipate reducing our energy consumption by 1.1% when these contracts reach full term.

The Air Force is also looking to reduce demand by building in smarter ways that maximize energy efficiency and use environmentally-friendly materials. We are also identifying and demolishing 20% of our old, unnecessary, and high-energy use facilities by 2020.

GROUND VEHICLES

In FY11, the Air Force spent \$323 million on fuel for ground vehicles and equipment, or 96 million gallons, which equates to approximately 3% of the overall Air Force energy costs. This

is an increase of \$13 million from FY10, even though consumption declined by 20 million gallons. The Air Force is committed to reducing the amount of petroleum products it utilizes for its ground vehicle fleet, and has targets to reduce fossil fuel consumption 2% annually through 2020 while increasing alternative fuel usage 10% compounded annually by 2015. The Air Force has made significant progress towards both targets, seeing a reduction in vehicle petroleum consumption by 8% and an increase in alternative fuel use by 70% since 2005 (in its CONUS based vehicle fleet applicable to executive orders and federal mandates). The Air Force's plan to meet its targets include: implementing an acquisition strategy to procure the right-sized, least cost vehicle option; maximizing the use of alternative fuels; and increasing the use of hybrid electric vehicles and explore the use of plug-in electric vehicles.

Right sizing

One effort that the Air Force is undertaking right now is right-sizing our motor vehicle fleet, which entails eliminating vacant authorizations, deleting underutilized authorizations, and using more fuel-efficient vehicles. To date, the Air Force has identified over 5,000 vacant or underutilized vehicle authorizations. The Air Force has also been working on a midsize and large vehicle burn down plan to reduce the number of high gas-consuming vehicles. Over 2,250 vehicles have been identified for down-sizing to smaller, more fuel efficient vehicles, and over 725 of those have already been down-sized.

Alternative Fueled Vehicles

In FY11, the Air Force consumed 1.7 million gallons of alternative fuel (E85 ethanol and biodiesel) and has 28 E85 stations and 63 B20 stations on Air Force installations. We now have over 10,000 E85 capable vehicles in the light duty fleet, compared to only 9,000 in FY10. The Air Force has also incorporated nearly 1,000 hybrid electric vehicles into its vehicle fleet.

The Air Force is not just limiting its efforts to incorporating alternative fueled ground vehicles into our fleet through acquisition, but is also working to ensure such vehicles as compatible with its mission. With the support of other private and public stakeholders, the Air Force is currently working to develop an all plug-in electric vehicle fleet at Los Angeles Air Force Base (AFB) in California. When the initiative is completed later this year, Los Angeles AFB will be the first federal facility to replace 100% of its general-purpose vehicle fleet with plug-in electric vehicles. By working with OSD and our Sister Services, we have identified 15 other potential locations where such vehicles will support the mission and improve our energy security. We will use the lessons learned at Los Angeles AFB to continue to refine the business case and operational analyses to determine where best to employ electric vehicles.

CONCLUSION

From aviation operations to installation infrastructure within the homeland and abroad, energy enables the dynamic and unique defense capabilities the Air Force requires to fly, fight and win...in air, space and cyberspace. Effective and efficient energy management is not only necessary, it is critical to assuring energy availability today and energy sustainability into the future to ensure the Air Force can execute these missions. We are making business-driven investments to reduce our energy demand and assure our supply to meet our mission needs. The Air Force is taking a coordinated, progressive, and comprehensive stance towards energy management through the integration of its three-part energy strategy to reduce demand, assure supply, and foster an energy aware culture. This approach will lead to enhanced energy security and reduced energy costs, and enables our warfighters, expands operational effectiveness, and enhances national security.