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## The Air Force's Quiet Energy Revolution

By Deborah Lee James Secretary of the Air Force

Modern catch phrases like 'energy security' and 'energy independence' have had a renewed urgency in recent years as Americans felt the pinch of high oil prices and considered the benefits and risks of the domestic boom in natural gas and oil production.

But here at the Air Force, energy's role in national security has always been top of mind, since without energy, we cannot fly planes, transport troops or run bases. In that way, there's been a quiet revolution at Air Force installations around the world.

The reason for this focus on energy is simple. In the event of natural or man-made catastrophe, we want to guarantee our planes can fly and our installations can operate in the face of disruptions in energy supplies. Now, more than ever, energy is a critical means to maintain our strategic advantage.

Put another way, energy is central to readiness. The Air Force has developed four priorities in a Strategic Energy Plan: improve our resiliency; reduce our demand; make sure we have an assured supply; and foster an Reprinted with permission from DefenseOne.com

energy-aware culture. This approach improves our ability to manage energy needs in a way that keeps our troops ready. By executing this strategy, we realize a secondary benefit of saving money, which we can redirect into training, equipment and other priorities.

As we look to improve resiliency, diversity of fuel source gives us the *continued on pg. 2* 

Photo: A DC-135 Stratotanker from Fairchild AFB refuels a B-1B Lancer during a training exercise over South Dakota on Sept. 23, 2014. (U.S. Air Force photo/Senior Airman Mary O'Dell/Released)

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New "solar wall" heats historic N.J. hangar
L.A. AFB unveils electric vehicle fleet



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flexibility to bounce back if energy supplies are disrupted. With this in mind, we are improving resiliency at our bases through a variety of means, to include windmills at Joint Base Cape Cod in Massachusetts, reducing dependence on the commercial electrical grid.

Now, more than ever, energy is a critical means to maintain our strategic advantage.

Reducing energy demand on our bases means that every kilowatt of power we avoid using is one we do not need to replace in the case of supply disruption. We are reducing energy demand using new technology and new methods. We are developing technology through research, development, testing and evaluation, as with the Adaptive Engine Technology Development initiative.

In essence, we are working with government and business partners to build a new kind of jet engine that could use as much as 25 percent less fuel and provide 10 percent more thrust than today's systems. This means our aircraft will fly farther on less fuel. You can imagine the net savings to the Air Force – the government's largest user of fuel – if we can make this project work.

We know that when our major commands review and update their mission planning to make energy a consideration, they are able to increase effectiveness. Air Mobility Command, which flies our aerial refueling tankers and cargo planes, did this and increased by more than 9 percent the distance it can transport a ton of cargo on a gallon of fuel.

We also reduce demand by training more efficiently. At Altus Air Force Base in Oklahoma, the 97th Air Mobility Wing trimmed the fat from its air drop and air refueling training programs, using only the closest tracks and most efficient flight routes, to save \$30 million per year. That, from just two initiatives.

All of these efforts to improve resiliency and reduce demand also ensure a supply of energy when we need it, where we need it.

These innovations, improvements and plans happen because we are now fostering an energy-aware culture. We know from decades of experience that Airmen are the best source of new methods for continuing the energy revolution. Many of our best ideas came from the rank and file, including the restoration of a historic World War II-era hangar at Wright-Patterson Air Force Base, Ohio, now a paragon of energy-saving design and world-class energy saving measures. Another is a holistic energy plan instituted at RAF Mildenhall, England. Airmen deserve the lion's share of the credit, and that's worth highlighting that **October is Energy Action Month.** 

A final thought. The Air Force is not taking this approach because it's politically attractive or expedient. We're doing it for the same reason we do everything – to better complete our mission.



### Report finds U.S. military leads in clean energy use

By Troy Wilde Utah News Connection

A new report concludes the military in Utah, and across the U.S., is leading the nation in the use of clean energy and energy efficiency.

The study, titled *How Clean Energy Works for the Military*, was published by the nonprofit and nonpartisan organization Environmental Entrepreneurs. Bob Keefe, executive director at Environmental Entrepreneurs, says the military is quickly moving away from fossil fuels.

"Almost every branch of the military right now is moving away from dirty fuels like oil and gas, and moving toward cleaner fuels," he says. "The Navy and Air Force want to get at least 50 percent of the fuel that powers our airplanes and our ships from biofuels over the next few years."

Keefe says this is "big news" because the U.S. military is the biggest consumer of fuels and electricity on Earth. The report cites the use of electric vehicles like the Chevrolet Volt at Tooele Army Depot as an example of the military's clean energy practices in Utah.

Keefe adds that military personnel are also learning job skills that are becoming increasingly valuable as the clean energy economy continues to grow.

"The folks that are coming home from war and from deployments overseas already know how this stuff works," he says. "So they can move right into the private sector whether it's at a solar company, a biofuels company, or an energy efficiency company."

Beyond the military, Keefe's organization publishes a clean energy quarterly jobs report, which shows Utah has added over 1,200 jobs in the clean energy sector this year.

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Two hangars at Joint Base McGuire-Dix-Lakehurst, New Jersey, are saving as much as \$100,000 per year in utility costs following the installation of solar walls in 2013. The red solar walls were specially designed to blend with the existing walls, a requirement because of the historic nature of the facilities. (Courtesy photo)

## Historic hangars merge past with present

By Jennifer Schneider AFCEC Public Affairs

The past has met the present at the lighter than-air historic district at Joint Base McGuire-Dix-Lakehurst, New Jersey.

Two historic hangars at JB MDL were fitted with solar walls last year, and the effort is saving the installation as much as \$100,000 per year in utility costs. In addition to cost savings, the systems are expected to reduce greenhouse gas emissions by more than 470 metric tons per year -- the equivalent of taking about 100 passenger vehicles off the road.

The hangars, located adjacent to the site of the 1937 Hindenburg disaster, were originally built to house the patrol airships, or blimps, that accompanied supply ship convoys in support of the war effort in Europe during World War II. The blimps played a crucial role in anti-submarine warfare conducted by the allies against German U-boats. Since the mid-1970s, the hangers have been used by the Navy as industrial shops for the production of launching and arresting gear components for aircraft carriers.

To help meet the installation's energy reduction goals and reduce natural gas heating costs, energy experts with the 87th Civil Engineer Squadron researched energy-saving options for the hangars, and ultimately chose to install solar walls.

"These facilities were large natural gas users in the winter," said Chun Eng, energy manager at JB MDL. "They also both have a southern exposed wall, with no windows or offices behind the walls which made it easier for installation."

The walls work by using the sun to heat the building's ventilation air, thereby reducing dependence on other energy sources for heating purposes, Eng said.

The systems, which will pay for themselves in less than eight years, are relatively maintenance-free and projected to last 30 years or more, Eng said.

While the benefits can be substantial, fitting historic buildings with solar walls can be challenging, as the additions cannot detract from the historic character of the facility, said John Joyce, natural and cultural resources manager at JB MDL.

"The biggest challenge is visual," Joyce said. "If you can't get the panels *continued on pg. 5* 

# Air Force tests first allelectric vehicle fleet in DOD

By Secretary of the Air Force Public Affairs

Air Force officials unveiled the Department of Defense's first non-tactical vehicle fleet composed entirely of plugin electric vehicles, Nov. 14, at Los Angeles Air Force Base, California.

The rollout of the 42-vehicle fleet marks a milestone in the DOD's demonstration of emerging technology and the vehicles will serve as a resource to the electrical grid when they're not being driven.

"Everything we do to fly, fight and win requires energy, whether it's aviation fuel for our aircraft or power to run the bases that support them," said Secretary of the Air Force Deborah Lee James. "This vehicle-to-grid pilot is a great example of how Airmen are driving the Air Force forward and finding new and innovative ways to make every dollar count."

The PEV fleet includes both electric

and hybrid vehicles ranging from sedans to trucks and a 12-passenger van. The vehicles have the capability to direct power both to and from the electrical grid when they're not being driven, known as vehicle-to-grid technology. Unique charging stations have been installed on Los Angeles AFB to support the vehicles' V2G capability.

The V2G technology enables the vehicles to provide more than 700 kilowatts of power to the grid, sufficient power for more than 140 American homes. The vehicles also enhance the power grid's reliability and security by balancing demand against supply without having to use reserves or standby generators.

California energy providers and regulators worked closely with the Air Force on safety and performance testing as well as technical and regulatory aspects of launching the fleet.

"We absolutely couldn't have done this without our federal, state and private partners," said Miranda Ballentine, the assistant secretary of the Air Force for installations, environment and energy. "The shared investment and commitment by our partners illustrates that innovations such as this have value not only to the Air Force and Department of Defense, but to the nation as a whole."

The Air Force plans to expand the V2G demonstration to Joint Base Andrews, Maryland, and Joint Base Mc-Guire-Dix-Lakehurst, New Jersey. The service will also continue to look for additional capabilities, such as utilizing used batteries as a form of on-base energy storage.

"The forward thinking of the Air Force promises to be an important signal to the market to move this technology into the mainstream," said William Kempton, the director of the University of Delaware's Center for Carbon-free Power Integration. "By requesting V2Gcapable trucks and cars from several *continued on pg. 5*  The Air Force Civil Engineer Center Energy Newsletter



A fleet of plug-in electric vehicles sits ready to roll at Los Angeles Air Force Base, California. (U.S. Air Force photo/Tech.Sgt. Sarah Corrice/Released) CARS cont.

vehicle manufacturers, placed in bases in several states, the Air Force has helped to stimulate demand from both automotive suppliers and the electric industry in these states. We can hope that the Air Force program announced today, together with the recent successful early demonstrations - by the University of Delaware with Honda, BMW, NRG Energy, PJM and others

### HANGARS cont.

to blend, they kind of stick out like a sore thumb. Who goes by a roof full of solar panels and doesn't notice that it's a roof full of solar panels?"

To overcome this issue, the installation's cultural resource and energy team worked closely with the New Jersey Historic Preservation Office to design panels that blend almost perfectly with the existing exterior hangar walls.

The project proves that protecting the past doesn't have to infringe on the

- will move us from demonstration to early commercial-scale products."

In addition to the PEV fleet in L.A., the Air Force is also investigating the benefits of other alternative fuel vehicles. More than 9,000 ethanol flex fuel vehicles are in the service's inventory worldwide, along with 50 biodiesel fuel stations on its installations.

"Pursuing this program was an easy

future, Joyce said.

"We had what amounted to two potentially competing goals - historic preservation and energy conservation," Joyce said. "Like a lot of other things you do in life, it's a balancing act. A project like this one proves it can be done to satisfy both requirements. It does take effort, but in the long run, this project will save money and yet it doesn't really infringe on the historic character of the building. It was a win-win in this case." decision for us," James said. "Energy is key to accomplishing the mission, and as the largest energy consumer in the federal government, we are always looking for opportunities to improve our resiliency, reduce our demand and assure our energy supply. From a mission, environmental and fiscal perspective, this program simply makes good sense."

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