"Make energy a consideration in all we do"

ENERGY express

A product of the Air Force Civil Engineer Center October 2015

Air Force celebrates 25th Energy Action Month

By Jess Echerri
AFCEC Public Affairs

The Air Force Civil Engineer Center is joining the Air Force and the rest of the federal government in a month-long observance of energy awareness October 2015.

Energy Action Month, hosted by the Department of Energy, is part of an Air Force initiative to decrease consumption of all Air Force energy and its associated cost, which reached $9 billion last year, while supporting mission accomplishment. This year's theme, "Mission Assurance through Energy Assurance," indicates the important role energy has in accomplishing the Air Force mission.

"I am always thankful that the Air Force sets aside a month out of the year to talk and focus on energy matters and awareness," said David Bek, director of AFCEC's Energy Directorate. "Every Air Force mission is reliant on energy to complete it."

Energy managers at each base are encouraged to participate in Energy Action Month by organizing commanders' calls and educating Airmen about individual efforts to save energy.

"Each base has an opportunity to take the campaign information and focus it to communicate to their Airmen how we can best accomplish our mission while conserving energy, and perhaps producing it," Bek said. "The awareness that comes about from this campaign will go a long way towards efficiently supporting Air Force missions and meeting Air Force energy goals… all year long. So, please listen, observe, participate and contribute."

One way Airmen are given a voice in energy efficiency is through Airmen Powered by Innovation, or API, a program that allows Airmen to submit their own ideas for Air Force process improvements. To submit ideas for better energy-saving practices, visit the API website on the Air Force Portal.

"I encourage our Airmen to submit their ideas through API because it is an easy process and could potentially save the U.S. Air Force millions of dollars," said Master Sgt. Dan Linville, airfield damage repair superintendent at AFCEC. "The Airman will also benefit as well. I always iterate to them, 'It does not matter how small the issue is. Whether it is motion activated light control systems in our offices and workspaces, or photovoltaics. When we're talking about an air force of over 300,000 personnel, the savings could be astronomical."

For more information on Energy Action Month, visit the Secretary of the Air Force's Installations, Environment and Energy Office website.

In this issue:

- Take action for Energy Action Month
- SAF/IE gives her support for energy conservation
- Rooftop solar array warning
- and more!

TAKE ACTION

Appliance reduction
Remove or unplug appliances you don't regularly use.

Computer log off
If everyone logged off at the end of the day, the AF could save more than $10 million a year.

Temperature control
Eliminate the use of space heaters and fans by dressing for the temperature.

Inform facility manager
Report incorrectly set thermostats, blocked or dirty air vents, leaky faucets and other energy inefficiencies.

Outdoor conservation
Report broken sprinklers and street lights left on during the day.

No waste
Turn electronics off when not in use.

Interested to know what you can do to maintain energy awareness?

See the checklists on page 3 for easy energy-saving tips

Click here to see Air Force Director of Civil Engineers Maj. Gen. Timothy Green's thoughts on Air Force energy and Energy Action Month.

Facility Energy

FOR BUILDINGS

- Lower thermostat settings
- Match heating, ventilating and air conditioning schedules to occupancy schedules
- Lower setback temperatures
- Optimize morning warmup and night setback controls
- Reduce/eliminate major sources of infiltration
- Install a desiccant dehumidification system
- Minimize use of outside air for process ventilation
- Educate employees on building systems and energy efficiency measures
- Check/adjust acombustion efficiency of gas-fired equipment
- Minimize the use of gas-fired refrigeration equipment
- Check for ways to reduce solar gain to reduce the cooling load on buildings
- Install revolving doors
- Install energy-efficient lighting and occupancy sensors
- Install light-emitting diode exit signs

IN CENTRAL HEATING PLANTS

- Conduct better efficiency tests
- Optimize combustion efficiency
- Perform boiler maintenance and set a maintenance schedule
- Check boiler water chemistry
- Minimize boiler blowdown

WITH THERMAL DISTRIBUTION

- Inspect/replace steam coils
- Inspect/repair condensate return equipment
- Locate/repair steam leaks
- Repair or add insulation
- Isolate non-essential distribution piping
- Reduce distribution pressure

Office Energy

FOR BUILDINGS

- Replace incandescent lights with compact fluorescent lights or light-emitting diodes for desk lamps and overhead lighting
- Switch off all unnecessary lights
- Use natural lighting
- Use task lighting instead of lighting an entire room
- Use ENERGY STAR® products
- Close or adjust windows to block direct sunlight to reduce cooling needs in warm months
- Open blinds on south-facing windows during the day to naturally heat spaces in winter
- Unplug equipment that drains energy when not in use likes cell phones, fans and coffeemakers
- Replace desktop computers with notebook computers and docking stations
- Replace cathode ray tube monitors with LED or liquid-crystal display monitors
- Turn off monitors when not in use for an extended time
- Turn off photocopier at night or purchase a new copier with a low standby feature
- Coordinate with vending machine vendor to turn off advertising lights
- Install low-flow toilets, urinals, faucets and shower heads
- Save paper by always using the second side of printer paper, either by printing double-sided or using the blank side as scratch paper later
- Carpool, bike or use mass transit when commuting to work
- Save gas by driving the speed limit, accelerating and decelerating slower, removing excess weight inside the car, reducing unncessary idling and miles traveled, and making sure the tires are inflated
- Reduce business travel by increasing phone, video and web conferencing capabilities

Myth BUSTERS ▶ FSRM Energy

Facility Sustainment Restoration Modernization rumors debunked

MYTH: There is no money for FSRM centrally-funded energy projects.
REALITY: Leadership supports and wants to fund a portfolio of energy conservation projects each year based on the financial and energy savings projects offered. While there is no longer a set-aside amount of FSRM funds specifically for energy projects, favorable funding consideration will be given to those projects that show a good life cycle cost savings as determined by the building life cycle cost, or BLCC, calculated savings to investment ratio, or SIR.

MYTH: Energy, including water conservation projects, must be completed and scored using the same criteria as all other centrally-funded FSRM projects.
REALITY: Energy conservation projects are selected for funding based primarily on their SIR score, not how they compare on mission risk factors with probability or consequence of failure. Energy projects might have mission considerations, such as a new and more efficient chiller system on a mission critical building, but they do not need to be scored using the probability or consequence of failure scored matrix. Since water conservation projects often do not receive a high SIR, major commands can help bases in arid or water-constrained areas get favorable consideration for important water projects by providing a MAJCOM priority and informing the Air Force Civil Engineer Center's Planning and Integration Directorate of the project's importance.

MYTH: At the wing level, energy conservation projects must be "racked-and-stacked" along with all other wing priorities for centralized FSRM funding.
REALITY: Energy conservation projects do not need to be prioritized at the wing level to compete for centralized FSRM funding. Projects with a SIR value greater than 1.0, and that have at least 35 percent of the life cycle financial savings directly from reduced energy consumption, need only be included in the base comprehensive asset management plan, or BCAMP, in order to be considered.

MYTH: Energy conservation projects can be programmed and added to the integrated project list after the IPL is published if it appears end-of-year funding might be available.
REALITY: Projects cannot be programmed and added to the IPL after it is published just because it appears EOY money will be available. There is an emergent project process for unforeseeable or mission critical projects and arising the IPL is published. Only those projects meeting the emergent-project criteria can be considered for after-the-fact addition to the list.

Miranda Ballentine

21st Century Approaches

for Air Force Energy Challenges

Assistant Secretary of the Air Force for Installations, Environment and Energy

As I conclude my first year as the Assistant Secretary for Installations, Environment and Energy, I have been amazed at the dedication and innovative spirit of all of you: our Air Force energy team. Each day, each and every one of you identifies new and innovative ways to improve our energy security, modernize our infrastructure, and field cleaner, cheaper, and more resilient sources of power.

First, I want to take this opportunity to thank you for all the work you do in support of our Air Force and the mission. But the work is not done, so let's move out and further our track record of success. As we start a new year, I challenge each of you to do more in fiscal 2016 -- build upon your accomplishments, look for new opportunities and reevaluate the ways we consume and manage energy to ensure we are doing it as efficiently as possible.

Given the strategic trends in the Air Force's 30-year strategy, the Air Force must evolve, and the technologies we use in our operations must evolve too. To meet our mission needs, we cannot rely only on old 20th-Century technologies and processes. Instead, we must activate the Secretary of the Air Force's concept of strategic agility by breaking down existing paradigms and leveraging next-generation technology. Our objective is to achieve Mission Assurance through Energy Assurance, our theme for Energy Action Month.

The Importance of Energy

As we begin Energy Action Month and recognize those who make a difference, it is important to remind ourselves why we must all care about energy. Energy powers everything we do, from loading cargo and flying fighter sorties, to providing humanitarian aid and launching satellites, every mission requires energy.

As Air Force Chief of Staff Gen. Welsh noted in his recent video release on energy, "without energy, there is no airpower." And in this cyber-dominated world, it is even more critical that we ensure uninterrupted access to fuel for our aircraft and electricity for our bases by investing in resilient infrastructure, reducing our need for energy, and assuring we can use multiple alternatives.

But energy also comes with risks, including geopolitical, mission, financial and environmental risks. From a geopolitical perspective, the availability, or lack thereof, of energy and water resources can exacerbate tensions and create conflicts. From a mission perspective, we must ensure we can maintain the continuous supply of energy to accomplish our mission.

Financially, future energy costs represent an unknown risk factor, especially in this austere budget environment. Last year, we spent nearly $9 billion to fuel our aircraft and power our installations, which equates to nearly 9 percent of the Air Force's

continued on pg. 6

continued from pg. 5

total budget. Over the long term, we can safely anticipate that today's traditional energy sources are only going to get more expensive and we can't afford to have energy eat up an even larger share of future budgets. Reducing the amount of energy we need improves our energy security, and also helps ensure there are funds available for other Air Force priorities. And last, the environmental risk associated with energy consumption results in increased air pollution and greenhouse gas emissions that impact the communities where we live and work. As the largest energy consumer in the federal government, we have a responsibility to minimize our impact.

Three Tenets

To address those risks and provide a strategic energy advantage, the Air Force is focused on improving our resiliency, optimizing our usage and assuring we have a continuous supply to meet our mission. Those three tenets form the core of what we are doing, and lay the foundation for all our energy initiatives.

This approach isn't unique to the Air Force. Across the government and throughout private industry, teams are focused on all three tenants to ensure they can continue to do their jobs. "How" we do this is considerably more important and is what sets the Air Force apart from other organizations. It will be the Airmen who integrate those inventions and their own ingenuity by leveraging their knowledge of their piece of the mission and developing innovative solutions to our energy challenges. Energy technologies are advancing rapidly — advanced batteries are able to store more energy and solar cells have almost doubled their efficiency in the last few years — and new inventions along with innovative application of existing technologies are constantly becoming available. We need to continue to push the envelope in using the technology and tools we have at our disposal.

The Air Force has always led from the front with innovative ideas, and the proof is shown by the recognition we received from the Department of Energy for our outstanding achievements in our energy and water programs. This year, the Air Force built on the eight Federal Energy Management Program awards we received last year and earned 10 awards, more than any other federal agency. Among the award winners was Tim Pugh, who has supported Air Force Space Command, or AFSPC, for the past 22 years and is a principal reason AFSPC has surpassed federally-mandated energy conservation goals. Now, the entire Air Force needs to leverage lessons like these to exceed those goals.

A Clear Focus

Strategic goals are important for any program, as they provide direction and offer our public and private sector partners insight on our objectives. Both the President and Congress have issued goals for Department of Defense and the federal government to increase renewable energy generation, and reduce energy and water use, which will also reduce our greenhouse gas emissions. As we strive to meet these important goals with extremely limited resources, I am focused on three areas to improve our energy security and modernize our facilities.

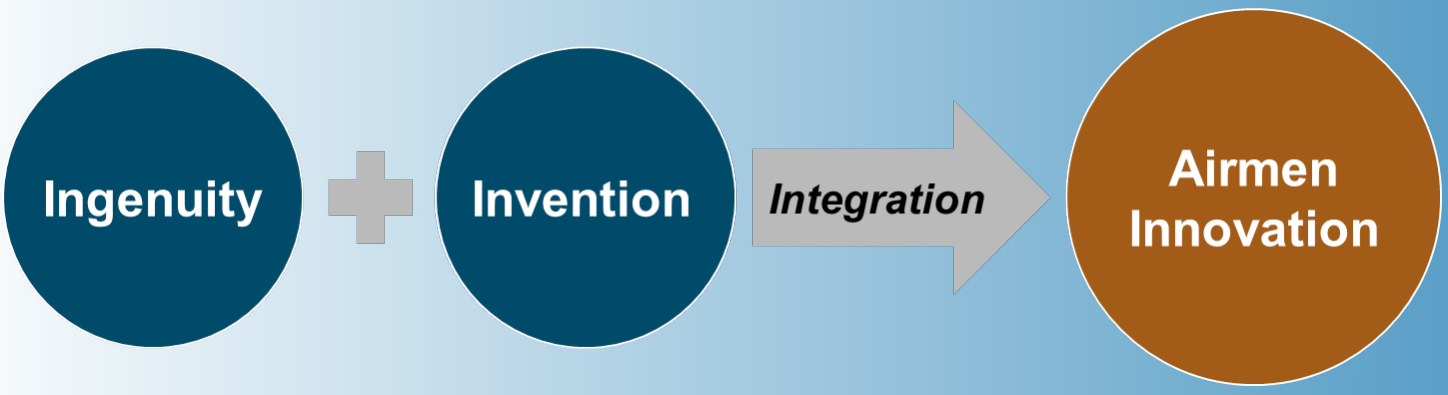
Energy resiliency is, first and foremost, my highest focus area for facility energy. The Air Force operates from our bases, and it is essential for those installations with critical missions to have access to uninterrupted power in the event of a man-made or natural disaster.

Over the last few years, we have seen installations lose power for significant periods of time as a result of ice storms, hurricanes and fallen trees. And while we were able to avoid any critical mission impacts due to those power losses, there are several situations where moving the mission is not possible and even a microsecond interruption in power is dangerous. We must enhance the energy resilience of Air Force installations through the adoption of innovative technologies and business models, and the first step is establishing a path forward.

As we advance our thinking and the technology becomes available, we will be looking for cyber-secure, smart microgrids that integrate clean energy and that can provide Air Force installations with access to electricity in the face of disruption from the commercial electric grid.

I am also focused on increasing the use of third-party financing tools to develop potential energy security projects and increase our investment in new capital equipment and energy efficiency. By partnering with the tprivate sector, U.S. Army Corps of Engineers and Defense Logistics Agency, we are increasing our program throughput for performance contracts to improve our installations. We awarded nearly $130 million in performance contracts and are projecting at least another

continued on pg. 7



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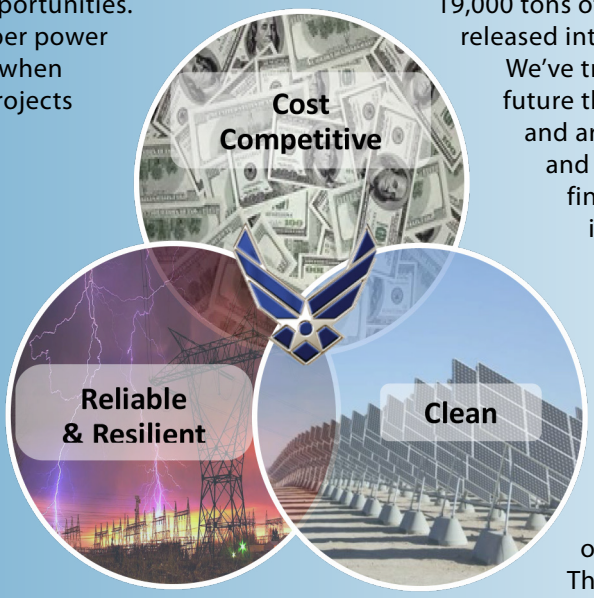
$600 million by 2017. The $90 million contract we awarded at Tinker Air Force Base, Oklahoma, our largest performance contract to date, has generated a 37-percent reduction in energy consumption and saves the base more than $6 million a year. We need to continue to identify and maintain a robust pipeline of potential energy saving projects to take advantage of funding opportunities as they arise.

My final area of focus is broadening our assessments of renewable energy opportunities. Traditionally, we have received cheaper power as the primary in-kind consideration when private industry developed energy projects on our underutilized lands.

As we move forward, we need to explore those in-kind considerations that will further bolster our energy security and supply continuity to the base. For example, at Nellis Air Force Base, Nevada, we are developing a 19-megawatt solar array, and we elected to have NV Energy install an additional substation and transmission line to feed the installation if the grid goes down. This energy security enhancement comes at no increased cost to the Air Force, while the initial solar project at Nellis in 2007 provided the Air Force with lower rates for the electricity we use.



When I evaluate new technologies, I focus on three characteristics — reliability & resiliency, cleanliness compared to other technologies, and cost-competitiveness — and the more characteristics a project can touch, the more favorable it is. And if a technology can hit all three, that's the sweet spot and something I can strongly support.

Celebrating our Successes

While it is in our nature to progress and strive to achieve more, it is always good to look back at the success we had over the past year. In addition to the 10 FEMP awards, there have been numerous accomplishments I can point to as examples of the work you are doing to improve our energy security.

Last February, the 16.4-megawatt solar array at Davis-Monthan Air Force Base, Arizona, started producing power, and it now provides about 35 percent of the base's electricity, while saving the base about $500,000 per year in energy bills.

Just a few months ago, the 10-megawatt solar array at Luke Air Force Base, Arizona, became operational thanks to outstanding work by the 56th Civil Engineer Squadron over the last several years and it is producing enough electricity to power 2,500 residences and preventing about 19,000 tons of carbon emissions from being released into the atmosphere.

We've tripled our project pipeline for future third-party energy savings contracts and are actively engaging the depots and data centers to see how those financing tools can be used to improve their energy productivity. And at Los Angeles Air Force Base, California, we're demonstrating how plug-in electric vehicles and vehicle-to-grid technology can be successfully incorporated at an installation without impacting the mission.

These are but a few examples of what's being accomplished. The next step is to ensure the great ideas, processes and technologies we identify and develop are shared to ensure everyone across the Air Force can take advantage of what is out there.

Mission Assurance through Energy Assurance

As we move forward, we must maintain our ability to adapt and respond faster to the changing environment. And if we cannot adapt, we must be committed to identifying why and changing the situation.

This month, I'm asking each member of the Air Force energy community to reach out and help educate their fellow Airmen on the importance of energy to the Air Force mission. By ensuring resiliency and adaptability of our energy sources, developing flexible approaches to funding and increasing our inclusivity through strategic partnerships, we can develop innovative solutions and provide mission assurance through energy assurance.

AFCEC roofing expert warns: Rooftop solar arrays need robust planning

Because of the potential for fire, thin-film photovoltaic panels are prohibited by Unified Facilities Criteria 3-110-03. The Air Force Civil Engineer Center has developed installation guidelines for the design, installation, operation and maintenance of solar PV systems on rooftops. (U.S. Air Force photo)

By Susan Lawson
AFCEC Public Affairs

When people think of rooftop solar arrays, they tend to focus on the potential energy savings without considering potential roof damage and safety concerns.

This is the concern of Clayton Deel, roofing engineer subject matter expert at the Air Force Civil Engineer Center. He has developed a list of guidelines and considerations for the design, installation, operation, and maintenance of solar photovoltaic, or PV, systems on rooftops.

"Mr. Deel's proposed guidance will give direction to the installations from a roof installation, maintenance and electrical safety perspective," said Clifford Fetter, chief. "An improperly installed rooftop PV array started a fire and this new technical criteria will help prevent that from occurring in the future."

Because of the potential for fire, thin film-PV panels are prohibited by Unified Facilities Criteria 3-110-03, Fetter said. Properly installed PV systems should incorporate all applicable design criteria, standards and other available guidance. In addition, various design factors should be considered such as economic and site evaluation; architectural compatibility; structural adequacy; firefighter and maintenance worker access; worker safety; and electrical.

There are three basic types of rooftop solar PV systems: shade structure, roof mounted and building integrated. Installing and operating these systems on Air Force-owned facilities requires careful consideration and coordination throughout the design, installation, and operation and maintenance phases. Implementing this guidance should reduce overall life cycle costs and increase safety, Deel said.

"I want to make sure those involved are aware of the possible impact to the roof's service life as well as potential safety concerns to facility maintenance personnel working near solar panels," Deel said.

For more information on solar PV system guidance, contact the AFCEC reach back center at afcec.rbc@us.af.mil or 850-283-6995.

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Please send your comments, story ideas and photos to afcec.pa@us.af.mil.

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