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ENERGY express

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Nellis breaks ground on new solar array, DOD's largest

By Kevin Elliott
AFCEC Public Affairs

Nellis Air Force Base, Nevada, hosted a groundbreaking ceremony March 24, for the newest Air Force solar array, a photovoltaic farm named Nellis II. The system, upon completion, will provide 19 megawatts of direct current capacity to the base, making Nellis II the largest PV system in the Department of Defense.

The project, a collaboration between Nellis, Air Combat Command and the Air Force Civil Engineer Center, will be the second industrial-scale array at the base. The first, 14-megawatt Nellis I, energized in 2007 and was, at the time, the largest PV system in the United States.

"This is a great day for Nellis Air Force Base," said 99th Air Base Wing Commander Col. Richard Boutwell, who spoke at the event. "When this solar array is online, combined with our first solar array, Nellis will be host to the largest solar photonics system in the Department of Defense."

Nellis II will be constructed by SunPower Corporation, and owned and operated by NV Energy, the Nevada state utility. Under the 31-year lease agreement, NV Energy will sell energy produced by the array to the base at existing tariff rates. Nellis will purchase all the power it needs from the array, and any additional energy

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Photo: Nellis Air Force Base, Nevada, hosted a groundbreaking ceremony March 24, for the newest Air Force solar array, named Nellis II. This is the second industrial-scale array at the base; once complete, the combined arrays will be the largest photovoltaic system in the Department of Defense. (U.S. Air Force photo/ Released)

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AMRS:
Measuring Success

The Air Force Civil Engineer Center is preparing to launch the Advanced Meter Reading Solution, an integrated utilities metering system that has the potential to provide Air Force bases unprecedented opportunities for energy savings. We spoke with program manager Paul Carnley about the project.

What is AMRS and when did the program begin?

In the past, most Air Force bases had just one meter located at the perimeter fence to capture that installation's energy use. Air Force officials learned that they needed information about base energy consumption at the building level, so they started a metering program by adding meters to larger buildings in 2008. To improve the ability to monitor energy use Air Force-wide, the service began an initiative in 2010 to develop a software solution that would connect and manage meters at each base under a centralized platform. In November 2013, AFCEC received interim authority to operate this integrated platform called Advanced Meter Reading Solution. AMRS was implemented as a test at Altus Air Force Base, Oklahoma, and Beale Air Force Base, California. Preparations are now underway to field the system at other bases across the Air Force, focusing initially on the bases with the highest energy consumption.

What is the value of metering every building on an Air Force installation?

Building-level energy consumption data is extremely valuable. With this data, you can compare kilowatt hours per square foot between buildings that are similar in use, occupancy and construction. Base energy managers can benchmark and baseline the true energy usage of individual buildings which is a great improvement over square-foot based averages used in the past.

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Comparisons can then be made by type to see which ones have a higher kilowatt hour per square foot usage. If the actual usage is higher than the type average, they can take a closer look at that building and see what is driving high energy consumption to determine the reason for the difference in energy intensity and take appropriate action.

Integrating this data improves the ability of the Air Force to understand energy use across the service. Data integration is a powerful tool for evaluating energy reduction opportunities, finding and analyzing anomalies, and reducing the overall Air Force facilities energy consumption. More money saved here means more money to fly, fight and win.

How can base energy managers use AMRS data to reduce energy consumption?

A major use of the AMRS platform is to monitor and control energy demand limits. The base energy manager can keep a close eye on individual buildings and develop methods to balance the usage to limit high energy spikes. With AMRS data, you can see when your usage is likely to be out of tolerance, analyze the data and implement demand reduction strategies. These strategies include running the backup generator for a few hours, cycling the heating, ventilation and air conditioning system, or using renewable energy sources such as solar electric. Having data at the building level makes this possible.

What is the plan for launching AMRS across the Air Force?

The office of the Secretary of Defense requires each service to capture at least 60 percent of the agency total facility energy use on a centralized data collection system. For the Air Force, AMRS is that system. Its roll-out will start with the highest-consuming bases in the continental United States and continue down the prioritized list until we reach the 60 percent goal. After that, business case analyses will determine if it makes good business sense for the Air Force to continue adding more systems. There are substantial challenges with implementing AMRS at our bases outside the continental U.S., but we will field it at our high-consuming overseas bases first. Utility providers are unique to every country, so AMRS will have to be tailored to fit these situations.

Graphic: Several screenshots of the Wonderware software that powers the Advanced Meter Reading Solution. Base engineers and energy managers will use the software to monitor energy use on bases building-by-building and make adjustments to maximize energy savings, especially for high-cost items such as peak energy demand.

What are some of the challenges you expect to face as you launch AMRS?

AMRS requires an operating base civil engineer virtual local area network, or CE-VLAN, to provide the cybersecurity that's needed for such a powerful system. We have a 2018 target for all bases to install CE-VLANs and bring all of their CE IT systems on the CE-VLAN so they are part of the Air Force secure network.

CE-VLAN is a base area network platform for industrial control systems. It is important that base CE squadrons support the effort to bring the AMRS and energy management control systems into the CE-VLAN. A major challenge is that the CE-VLAN cybersecurity rules don't allow remote access to connected systems from outside the Air Force Network because of potential security problems. Energy management and control systems vendors that remotely diagnose problems on the EMCS through internet access will now require regulated and controlled access.

CE-VLAN is capable of communicating only with other systems on the base where it is installed. To provide AF-wide data integration with AMRS, the CE-VLANs require modification for secure interconnections and management. This enterprise-level version of CE-VLAN interconnection is called ICSNet, and is currently in the planning and programming stage.

Do you have any advice for base utility managers concerning AMRS?

We really appreciate your patience and interest in the program. Keep in mind there is a lot of coordination between the AFCEC Energy Directorate, the AMRS program management office, our counterparts at the Civil Engineer Maintenance, Inspection and Repair Industrial Control Systems Team and base-level civil engineers to install the systems. Together we can realize efficient and effective ICS across the Air Force and conserve precious resources which support the warfighter.

E|e *Profile* **Mark Hunt**

A Legacy of Doing

After serving the Air Force for almost 38 years and in multiple capacities, Mark Hunt will retire in May 2015. In his current position as Air Combat Command Facility Energy Branch chief, his award-winning team has made significant strides toward energy reduction and generation goals. As he transitions to his next chapter, we spoke with Hunt about his career, his ideas about the future of Air Force Energy and what keeps him up at night.

You were there at the start of the Air Combat Command energy branch. How did that come about?

We were fortunate in ACC to have senior leadership foresight to create an energy branch. That didn't exist before. The team consisted of people from both the infrastructure and operations sides of the house. We put them together with a focus on energy goals and meeting those expectations. This became the largest major command energy branch in the Air Force, and that allowed us to be as successful as we have been.

What are some of your team's accomplishments of which you are most proud?

The ACC energy team is an exceptional and dynamic group of experts who are solely focused on supporting our bases and advocating for their needs. Together we annually garnered about a quarter of the total Air Force energy conservation focus fund capital investment. We stemmed the increasing tide of base utility costs. We provided the two largest renewable energy photovoltaic arrays in the Department of Defense, with a third on the way. We also established a building retro-commissioning program that reaped immediate, tangible savings. And one achievement of which I am particularly proud is that our branch received the Federal Energy Management Program Team Award twice!

How have you seen the Air Force energy program change during your tenure?

When we had direct funding of energy projects, ACC was very successful at identifying and programming projects and getting them funded. We routinely

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LEGACY cont.

executed a $25 million program. Partly because of sequestration, the focus fund program changed to one requiring all energy projects to compete for placement on the Integrated Priority List with every other operation and maintenance project in the Air Force. As a result, our energy program budget was reduced last year to around $5 million per year.

To put it in perspective, ACC needs roughly $30 million dollars of capital investment annually to meet Air Force energy goals. At current funding levels, we have a chronic gap in meeting the goal. That's a real challenge.

In your opinion, what are some of the major challenges the energy program will face going forward?

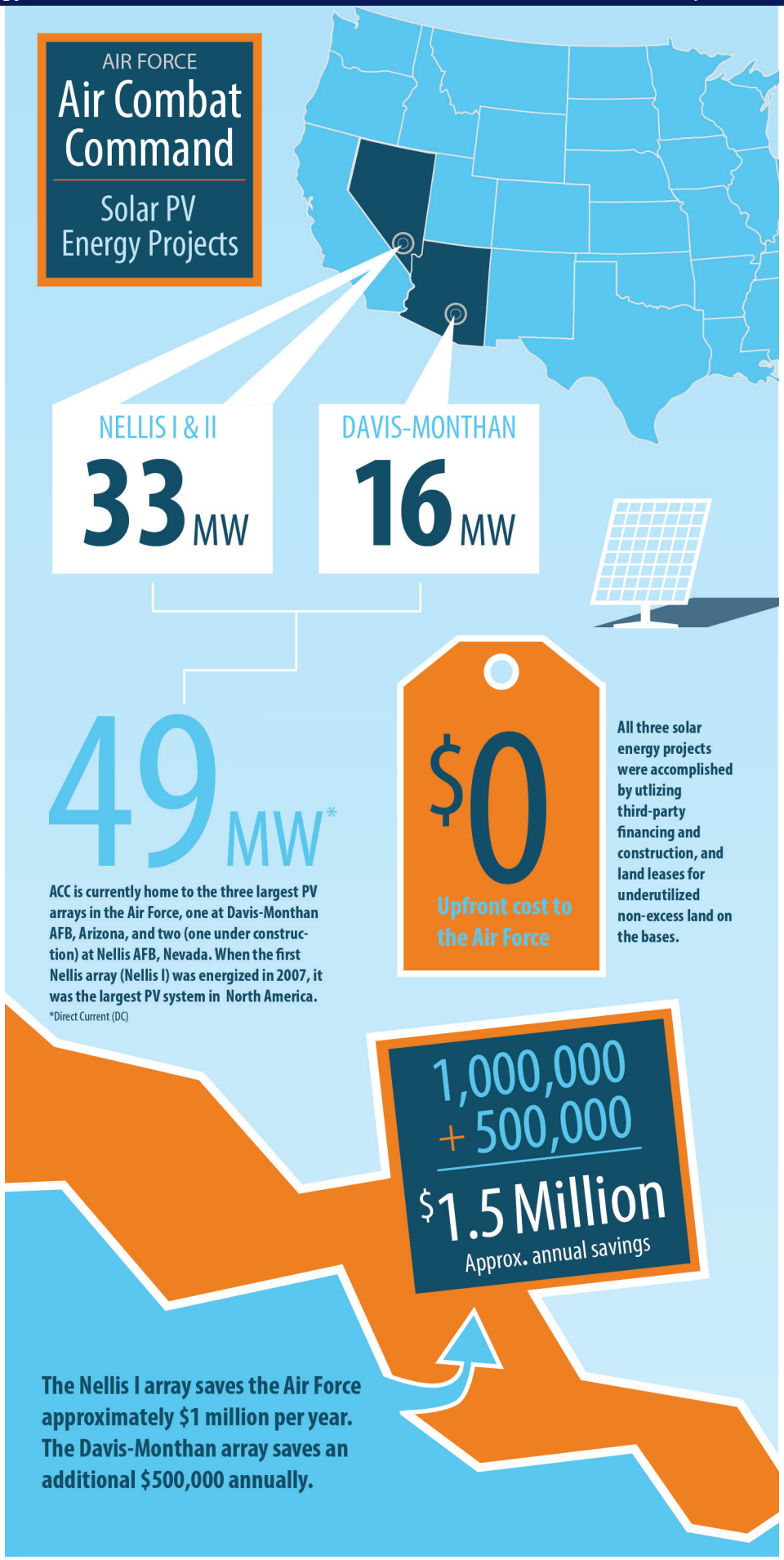
Of course, sequestration has had a major impact on the monetary side. Centralization has been another challenge. The major commands have had a lot of friendly competition with one another to identify new ways of getting things done smarter, faster and cheaper. MAJCOMs acted as crucibles of experience, where we learned things that could be adopted or modified for the larger Air Force.

That said, I can appreciate centralized control and standardization of processes and products across the Air Force as a whole. I get that. It's just a matter of what capabilities and expertise we may lose along the way.

Anything else you would like to add?

The level of professionalism in Air Force energy is fantastic! We are all dealing with the fiscal and personal challenges of what we are expected to accomplish. And we are working really hard at it. I am just amazed at the energy folks from the bases, MAJCOMs, the Air Force Civil Engineer Center and headquarters Air Force. They are dedicated, but burdened beyond their control. That, at times, weighs on really good people who strive for excellence.

My optimism is in our people. This is a people business, and I think that is where the solutions are. One of my favorite Eddie Rickenbacker quotes says it best: "Aviation is proof that given the will, we have the capacity to achieve the impossible."



MacDill makes strides in energy conservation

By Senior Airman Shandresha Mitchell
6th Air Mobility Wing public affairs

Investment in metering systems and high-efficiency lighting is producing positive results at MacDill Air Force Base, Florida.

Starting in 2010, the energy team began metering buildings on the base to discover energy inefficiencies and as a means of measuring the effectiveness of subsequent energy savings initiatives.

"Meters were the first step because we had to know what was being used and where," said David Walker, MacDill AFB energy manager. "The metering system is the core of it all; it allows us to identify a problem, the solution to the problem and then measure the return on that investment."

Meters allow a precision that was not possible to that point, Walker said.

"Before it was just estimation—a calculation on paper—now it's real world data."

Once meters were installed, a lighting upgrade program began. So far, approximately 25 percent of base lighting has been converted to light emitting diode technology; the fixtures generate an average 62 percent wattage reduction.

"Lighting is approximately 22 percent of the total base electric load," said Col. Peter Santa Ana, commander of the 6th Mission Support Group. "We anticipate a 13-percent reduction in MacDill's energy intensity through lighting conversions without any impact on operations or changes in facility use. We have already realized a 3-percent reduction in our energy intensity."

Operation and maintenance costs have also been reduced.

"The responsibility of having to purchase or replace lamps is now taken away from the Airmen," Walker said. "These products have a 10-year warranty."

At the end of the day, reductions in energy use translate to dollar savings for MacDill and the Air Force, said Walker. Those funds can then be applied to other mission needs.

"The purpose of these initiatives is to save resources in the form of dollars. Everyone is being squeezed within their budgets; if we can save on a consumable like the utility bill, the budget doesn't have to be cut elsewhere."

Members of the MacDill Air Force Base energy team prepare to install light-emitting diode lighting outside a building on MacDill Air Force Base, Florida, March 25, 2015. Since the installation of the LED lighting, the base has seen, on average, a 62 percent wattage reduction compared to the lights previously used. (U.S. Air Force photo/Senior Airman Shandresha Mitchell/Released)

NELLIS cont.
produced by the system will then go to the outside grid, for use by NV Energy's other customers.

"Nellis II is a great opportunity for us to partner with the Air Force base and at the same time benefit our other customers," said Stacey Kusters, vice president of Renewable Energy and Origination at NV Energy. "Because the array is situated on the installation, Nellis gains an energy security component. And, because any extra electricity generated by the system will flow to the grid, the surrounding community benefits as well. So, what's good for Nellis is good for all our customers."

The project benefits Nellis in other ways. As part of the land lease, NV Energy agreed to install an additional substation and transmission line to feed the installation. These in-kind considerations will further bolster energy security for and supply continuity to the base.

"The Air Force has to look at the total picture of where our energy needs will be decades down the road," said Dan Gerdes, director of the AFCEC Rates and Renewables Division. "We have to make smart choices now to support that evolution. So, sometimes ancillary benefits are, for us, more valuable than a lower rate. We have to set ourselves up for follow-on projects, so we are always looking for where we can find second-order, non-monetary benefits."

Construction on Nellis II is expected to be complete by the end of 2015. To learn more about the Air Force renewable energy program, visit this link: http://www.afcec.af.mil/energy/renewableenergy/index.asp

AFCEC releases new EMCS playbook

The Air Force Civil Engineer Center Operations Directorate recently went live with a new playbook for Air Force energy, management and control systems.

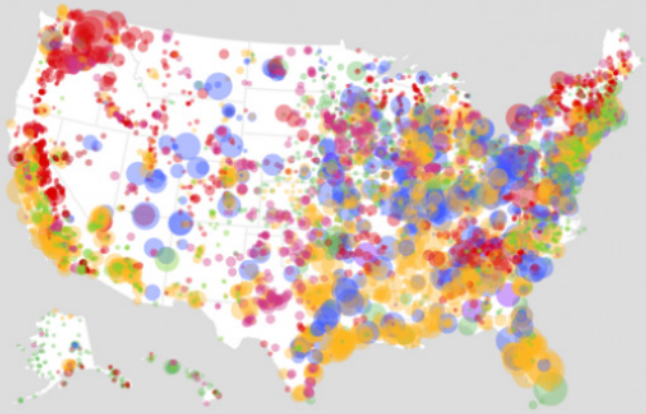
EMCSs control energy consuming devices such as fans, pumps, heating and cooling equipment, dampers and thermostats through a central computing system. The goal is to keep building occupants comfortable while managing energy consumption, demand and costs.

The new playbook outlines strategies for optimizing energy savings such as set point/setback temperatures scheduling, among others.

The playbook is available for download. Just click the button below.

Click to download the playbook

Know Your Power Plants



Test your knowledge!

Think you know about U.S. electricity generation? Find out by taking this quiz from the Department of Energy. The quiz shows a series of maps that each show existing U.S. power plants for a specific fuel source, scaled by the plant's production capacity. See if you can guess the energy source by how it it is distributed across the country! Click the button below to take the quiz.

Click here to start the quiz >>

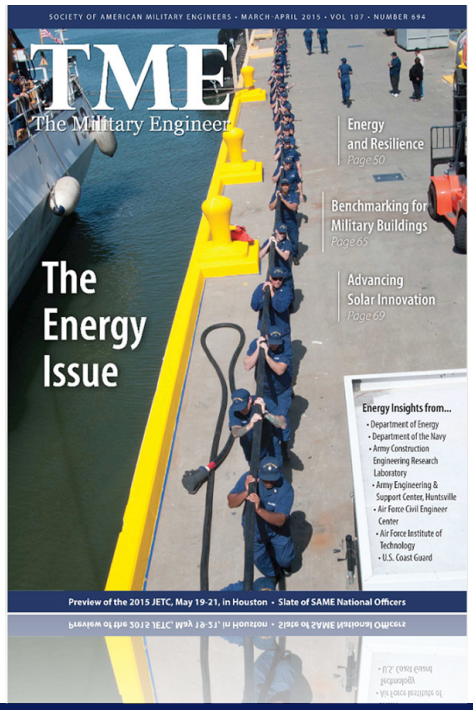
AFCEC featured in TME magazine "Energy Issue"

AFCEC Energy Directorate Chief David Bek and AFCEC Installations Directorate Chief Robert Moriarty co-authored a feature article in the recent energy issue of The Military Engineer magazine. The article, *Security, Resiliency and Opportunity*, highlights the role of site-built renewable energy generation in providing energy independence and supply continuity to Air Force installations.

The piece showcases renewable energy success stories from Air Force installations across the United States, including a landfill gas project at Joint Base Elmendorf-Richardson, Alaska; a wind farm at F.E. Warren Air Force Base, Wyoming; and the Department of Defense's first utility-scale renewable project, the Nellis I solar array at Nellis Air Force Base, Nevada.

To read the full article, click the button below.

Click here to read the full article >>



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