"Make energy a consideration in all we do"

ENERGY express

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Air Force funds solar array to increase energy savings

By Jess Echerri
AFCEC Public Affairs

The Office of the Secretary of Defense granted $6.2 million to the National Guard Bureau for the 154th Wing of the Hawaii Air National Guard, or HIANG, to develop solar arrays that are projected to maximize use of renewable energy sources at Joint Base Pearl Harbor-Hickam.

The Air Force Civil Engineer Center recommended the project be funded through the Energy Conservation Investment Program, which provides funding for energy projects that result in lower utility costs.

"The purpose of this project is to reduce the energy cost for the Hawaii Air National Guard," said Capt. Nhut Dao, chief of engineering for the 154th Civil Engineering Squadron. "On average, the HIANG pays $8 million per year in energy costs."

Energy conservation and minimal

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Hawaii Air National Guard officials break ground at the site of a future HIANG solar array farm on Joint Base Pearl Harbor-Hickam. The solar array farm will be one piece of the HIANG's renewable energy strategy to decrease its electricity expense and increase its energy security. (U.S.Air National Guard photo /Senior Airman Orlando Corpuz/Released)

In this issue:

- Vandenberg utility privatization saves resources
- AFCEC director details his vision for AF Energy
- Minneapolis ANGB rocks Energy Action Month
- ... and more!

Utility Privatization

to save Vandenberg 1.1 billion gallons of water

By Jess Echerri
AFCEC Public Affairs

The Air Force recently signed a $299 million, 50-year contract with American Water Operations and Maintenance, Inc., a private utility company out of Voorhees, New Jersey, to privatize the water distribution and wastewater collection systems at Vandenberg Air Force Base, California.

To bring Vandenberg's water systems to industry standards, American Water plans to invest approximately $11 million in the first three years of the contract.

"Maintaining utility systems is no longer a core competency of the Air Force," said Rick Weston, head of the Air Force Civil Engineer Center Utilities Privatization program management office. "Private industry does it day in and day out, so they can normally do it cheaper than we can."

American Water plans to use a new technology that will save approximately 1.1 billion gallons of water during the contract lifespan by re-introducing potable water into the utility system during fire-hydrant flushing instead of dumping the water into storm drains.

"Vandenberg used to be Camp Cooke, which goes back to World War II," said Lt. Col. Ryan Novotny, 30th Civil Engineer Squadron commander. "We have water lines that go to parts of the base that might not have as much use as they once did."

The water will sit stagnant in remote lines where there is no demand, Novotny said. Over time the stagnant water is at risk for growing contaminates and must be flushed out through fire hydrants to maintain water cleanliness. The American Water technology will draw the stagnant water from the lines, provide chemical treatment and recycle the water back into the system.

The Air Force has used utility privatization to upgrade base utility systems for more than 17 years. To date, 167 systems have been privatized, creating a cost avoidance of $511 million. Sixty Air Force utility systems, including electric, natural gas, water and wastewater, are currently in various stages of the privatization solicitation process.

With reductions in funding for installation support in recent years, utilities privatization is helping to fill the gap through more effective and efficient operations and maintenance programs.

Team Vandenberg launches the 19th U.S. Air Force Defense Meteorological Satellite Program payload on an Atlas V rocket from Space Launch Complex-3 at Vandenberg Air Force Base, California. The Air Force recently signed a 50-year contract with American Water Operations and Maintenance, Inc. to privatize the base's water systems. (U.S. Air Force photo/Joe Davila)

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environmental impacts were top considerations in the design and construction of facilities for the F-22A bed-down at JBPHH. The Air National Guard followed U.S. Green Building Council Leadership in Energy and Environmental Design, or LEED, program criteria to ensure all new buildings were designed and constructed to be energy-efficient and meet LEED certification requirements.

"We wanted to go with renewables from the very beginning," said Jesus Figueroa, HIANG project manager. "We rolled in that effort as part of our LEED process, so every building was being designed to be certified silver for LEED, at a minimum."

The HIANG F-22 squadron operations building and aircraft maintenance unit hangar saw a dramatic efficiency increase following LEED guidelines, Figueroa said. Low-flow plumbing fixtures reduced water use by 47 percent annually and, with these buildings alone, the HIANG will have estimated annual energy savings of 72 percent. Using photovoltaic solar cells to generate electricity, these buildings are also the first to achieve a net-zero operating capability, meaning the energy they generate locally is equal to or more than the energy they need to operate.

"Incorporation of the photovoltaic solar cells is to target net-zero for a campus of buildings, which is the first of its kind in the Air Force," Figueroa said.

Officials for the Hawaii Air National Guard look on as Hawaiian "Kahu" or priest Roy Brooks performs a traditional Hawaiian blessing on the cornerstone pillar of a future solar array facility being built at Joint Base Pearl Harbor-Hickam. (U.S. Air National Guard photo/Senior Airman Orlando Corpuz/Released)

Figueroa hopes all of the base's facilities will be operating at a net-zero capability in the future. To achieve this goal, the HIANG is teaming with the Air Force Research Lab, based out of Wright-Patterson Air Force Base, Ohio, to identify different renewable energy technologies.

"It started out as a return on investment idea," Figueroa said. "Now, it's not only about money, it's about national security. If hackers shut down the grid, we have no power. If we have no power, things get very problematic."

The traditional scheme of energy usage involves using locally-generated power as a secondary or back-up source. The JBPHH team is attempting to turn that scheme upside down by using power generated on the installation for all energy consumption and only using power from the city's grid as needed.

"We want to demonstrate to the world and to the Department of Defense that we can be self-sustaining with renewables," Figueroa said. "Our enemies can shut down the grid, but they can't shut down the sun."

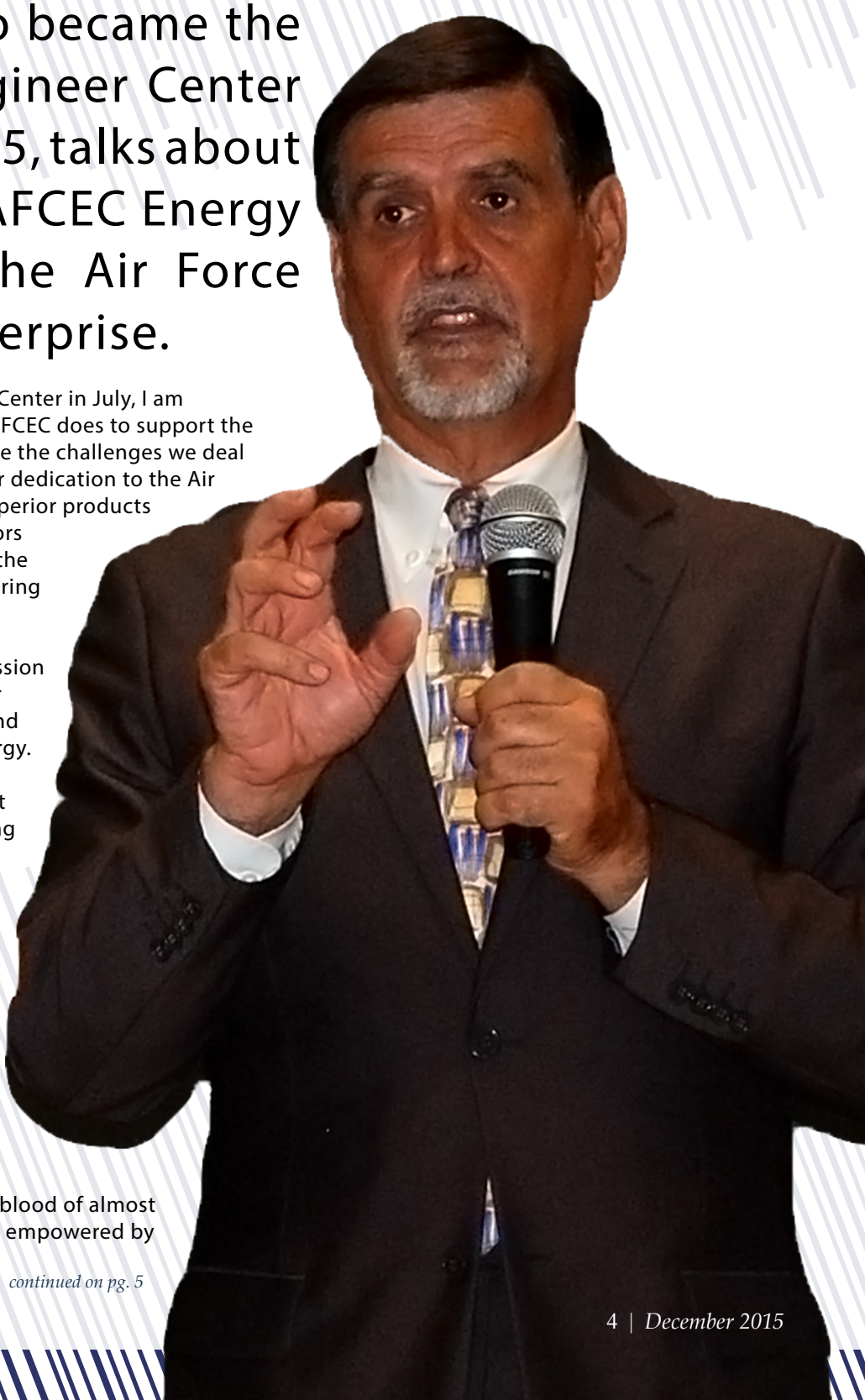
Live webinar with Air Force Civil Engineering leadership

Assistant Secretary of the Air Force for Installations, Environment, and Energy Miranda Ballentine will hold a live webinar Dec. 15 at 2 p.m. EST to speak to energy managers and installation leaders about her installation energy strategy. She, along with Deputy Assistant Secretary Mark Correll and Director of Civil Engineers Maj. Gen. Tim Green, will take questions from attendees. Click here to register, or copy and paste the link below. You will be emailed the link to view the event within a day of registering.

https://cs1.eis.af.mil/sites/ceportal/Lists/CE%20Webinar%20%20Energy%20Strategic%20Direction/NewFormaspx?Source=/sites/ceportal/Lists/CE%20Webinar%20%20Energy%20Strategic%20Direction/NewForm.aspx

The way forward

Randy Brown, who became the Air Force Civil Engineer Center director in July 2015, talks about his vision for the AFCEC Energy Directorate and the Air Force facility energy enterprise.



Since arriving at Air Force Civil Engineer Center in July, I am impressed daily by the outstanding work AFCEC does to support the warfighter and Air Force leadership. Despite the challenges we deal with, the professionals at AFCEC show their dedication to the Air Force and nation's mission by providing superior products and programs to the Airmen, Soldiers, Sailors and Marines protecting us. For all of great the work AFCEC and the Air Force civil engineering community does daily, I say -- thank you!

Part of the Air Force DNA is leveraging innovative technologies to execute our mission and be the best Air Force in the world. Our challenge: delivering affordable, reliable and resilient capability—more specifically, energy. Last year almost $1 billion went towards paying Air Force facilities' electric bills. That bill continues to increase every year, putting additional strain on an already constrained budget and causing other critical base level capabilities to go unfunded.

We see change almost daily in all aspects of our lives, and we adapt. Many of those changes are also working in our military environment. As the DOD and AF become more dependent on networks and communications to do our job, we recognize that critical dependencies and potential vulnerabilities are introduced. In most cases we are tightly connected with our industry utility partners to provide the life blood of almost any mission— energy. Mission assurance is empowered by energy assurance.

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Air Force leadership has given AFCEC and you a challenge: continue to find ways to reduce our energy costs and make our energy more resilient so we can "fight through" any contingency that we face, even those that may deny typical energy sources for extended periods of time. We must implement layered redundancies for our mission critical infrastructure to achieve energy resiliency

We need to continue to create a culture of energy conservation, but that is not sufficient. We also have to bring to bear technology and better buying power to couple the technical innovation of the commercial marketplace to our mission needs. Renewables are one area that we are already employing but we need to scale that up well beyond what we do today. If we can generate power on our installations, consume it when and where we need; store it or provide it to the grid when we don't, it reduces our energy costs, provides a more reliable source of power and provides us more resiliency for our missions. A large part of our facility energy future lies with renewables, micro grids, more efficient equipment, energy efficient construction and a culture that looks to reduce demand at every opportunity.

> **"Mission assurance is empowered by energy assurance."**

One way to reduce demand is to scrutinize our construction and Facilities Sustainment, Restoration, and Maintenance specifications to ensure we are addressing energy reduction from the earliest design phases through completing the build. This is another area where private industry is leading the way and we can take advantage of their learning and apply it what we do.

A few days ago I learned of a large university that has increased its campus square footage by 9 million since 1976. Over this time span they are 42 percent more energy efficient when they began. In 2015 alone they are 87 percent more energy efficient than they were in 1976. Both of these are "Best in World" achievements. This same university achieves a 10 to15 percent energy reduction for each building re-commissioning and a 25 percent energy avoidance on all new construction. These are benchmarks we can seek to achieve.

Efficiency, resiliency, technology, reliability, culture, and construction help us get to energy assurance. We value that because energy assurance empowers mission assurance. And that helps us remain the best Air Force in the world.

Spangdahlem hopes to set the stage for further ESPCs overseas and at home

By Jess Echerri
AFCEC Public Affairs

The Army Corps of Engineers in Huntsville, Alabama, released a notice of opportunity for an energy savings performance contract to significantly reduce energy use and water consumption at Spangdahlem Air Base, Germany.

The goals of this ESPC are to convert the main fuel source from fuel oil to natural gas and maximize reliance on renewable energy sources where applicable. Both objectives will provide cleaner sources of energy to the base.

"Many of our buildings were built in 1953 with no modifications since then," said Daniel Thiel, the portfolio

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An F-16 Fighting Falcon taxis past the control tower on the flightline at Spangdahlem Air Base April 27. The U.S. Army Corps of Engineers released a notice of opportunity for energy service companies to visit the base for a new energy savings performance contract. (U.S. Air Force photo/Senior Airman Benjamin Wilson/Released)

133rd Airlift Wing exhibits most Energy Action Month engagement

By Ruth Ann Scoles
Headquarters Air National Guard

MINOT, N.D. – The Minnesota Air National Guard Base's 133rd Airlift Wing led the Air National Guard in engaging in Energy Action Month October 2015.

Base civil engineers involved Airmen in Energy Action Month activities with email engagement, marquee advertisement, leadership involvement activities and recognition of energy achievements.

The 133th Civil Engineer Squadron team considers energy year round, so for Energy Action Month, the goal was to promote what was already happening and to consider how to do even more.

Base civil engineers used the base marquee to send messages like "Saving Energy is Mission Essential!" or "Sustainable Practice is a Force Multiplier!"

The Energy Action Month newsletter, which was sent out electronically and also distributed in print throughout the base, explained Air Force energy concerns to the base Airmen.

"Since 2003, our energy-use intensity or energy use per square foot has decreased by over 32 percent. In fiscal year 2014 alone, the Wing saved over $125,000 in natural gas and electric utility bills compared to what we would have paid had we not reduced our energy usage from 2003," the newsletter read.

It also listed energy-saving tips and explained specific actions the 133rd civil engineering team has taken to reduce energy consumption through energy-efficient lighting and heating, ventilation and air conditioning upgrades, installation of solar window film, establishing optimal temperature set points and schedules, retro-commissioning and preventative maintenance.

The energy program status was briefed to key stakeholders and base Airmen at every opportunity in October, said Capt. Fernando Nacionales, energy manager and base civil engineer. The facility board, the environmetal safety occupational hazard board, building managers and all Guardsmen at a commander's call and base-wide town hall were updated on the energy program.

The briefings "hit home" by showing individual building energy intensity data and answering natural questions like "How does my building compare to the others?" and "How has my building performed recently compared to last year?" Nacionales said.

For base building managers, Nacionales took it a step further and led an online Pacific Northwest National Laboratory building energy walkthrough training, wheret they discussed lighting, HVAC and other energy conservation opportunities.

The 133rd Air Wing building managers have been competing against each other for more than a year in reducing their buildings' energy consumption and those building managers who elicited exceptional building reductions were awarded at the town hall.

The base will continue to search for opportunities to realize Secretary of the Air Force for Installations, Environment and Energy Miranda Ballentine's goal for Energy Action Month, which is to "inspire the total force to be more efficient," Nacionales said.

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optimization energy manager for the 52nd Civil Engineer Squadron at Spangdahlem. "The ESCOs seemed excited about this opportunity. They asked a lot of questions during the visit and we look forward to seeing what they come up with."

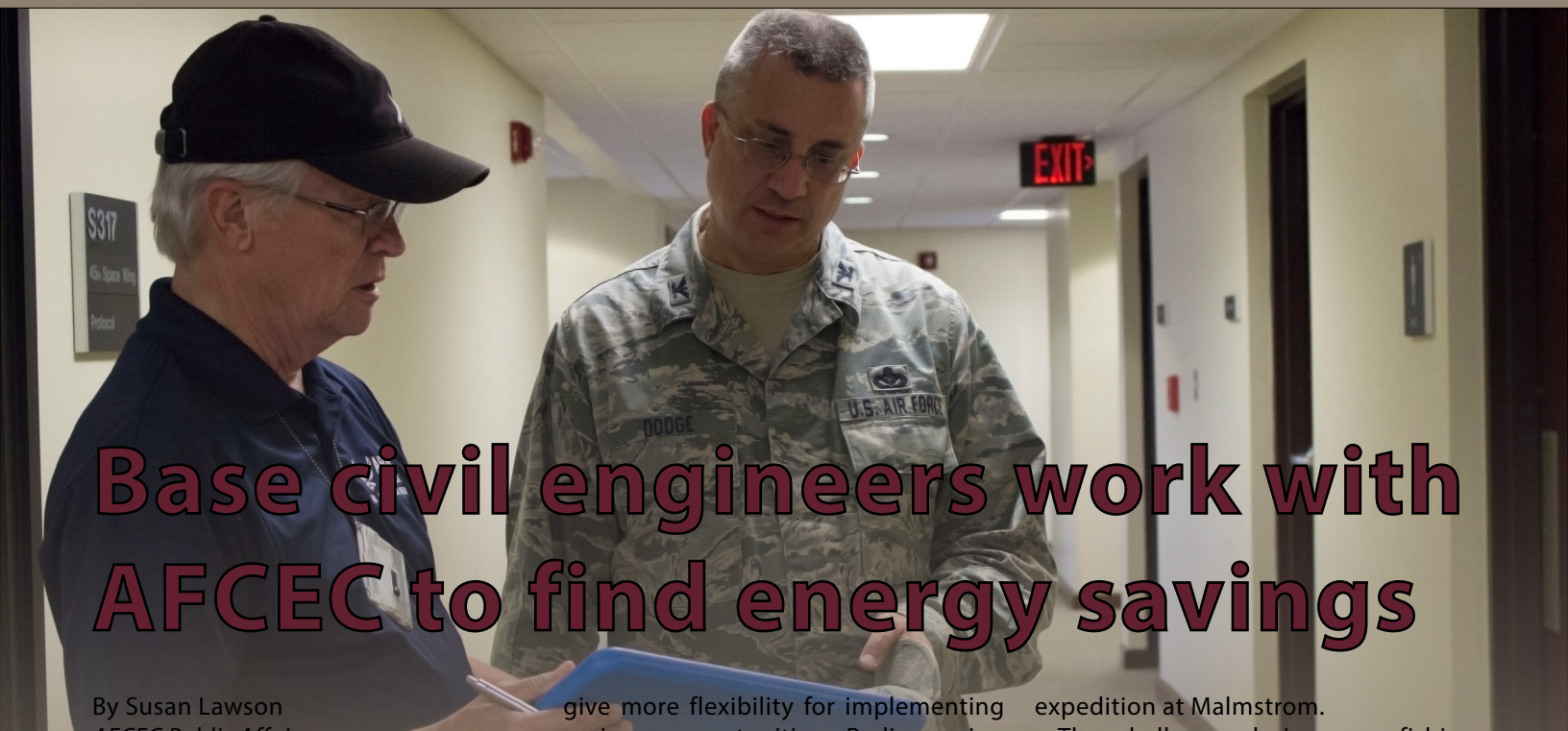
The notice focused on four energy conservation measures in four facilities, but it left the entire scope of the project up to each energy service company, or ESCO, to decide.

"We took the ESCOs to see four sample buildings at the installation," said Morgan Hurst, Air Force Civil Engineer Center program manager. "Each facility had a unique purpose with unique energy requirements, and the opportunities for energy updates look extremely viable."

An ESPC is a contract where the ESCO arranges financing, designs, implements, operates and maintains infrastructure improvements that increase the efficiency of energy consuming systems. The Air Force pays the ESCO back over the term of the contract, typically between 10 to 25 years, with cost savings accrued through more energy-efficient equipment and decreased utility consumption. In this way, ESPCs are a valuable and realistic tool the Air Force uses to meet energy-saving goals.

"An ESPC is the only way to get these kinds of energy savings," Thiel said. "We hope this can be used as a model for other overseas bases, or all bases, to use when they begin planning for ESPCs."

The U.S. Army Corps of Engineers partnered with the Department of Energy on this opportunity using DOE's indefinite delivery, indefinite quantity contract vehicle. This IDIQ ensures each ESPC has the core requirements, while allowing the contract officer to add requirements unique to each installation.



Base civil engineers work with AFCEC to find energy savings

By Susan Lawson
AFCEC Public Affairs

The Air Force Civil Engineer Center's Asset Visibility Team worked with base civil engineers at Malmstrom Air Force Base, Montana, and Patrick AFB and Cape Canaveral Air Force Station, Florida, recently to identify energy-saving opportunities and provide substantial savings for the Air Force.

One tool used by the AVT to identify energy conservation measures is the "spearfishing" methodology. The AVT coined the term "spearfishing" to describe an expedition that involves taking a deeper dive into rediscovering and harvesting previously-realized energy and water saving opportunities.

The spearfishing initiative is part of the AVT concept of operations which was put into place in 2014. Energy-saving opportunities that are identified can be funded either through AFCEC's "Just Do It," or JDI, funding list or the integrated priority list, or IPL. The JDI funding initiative opened the door for the AVT to fund "micro" energy projects that are of work order scope, rather than project scope, while the IPL focuses on larger, long-term savings projects.

"Spearfishing has become effective because of the way the civil engineering enterprise has changed the business rules and added tools to give more flexibility for implementing savings opportunities. Rediscovering previously identified opportunities can now provide a real benefit, where previously there were obstacles to their implementation," said Michael Clawson, AFCEC Asset Visibility Division chief.

Base civil engineers and the AVT have collectively identified and validated $15 million in investments that could yield the Air Force over $51 million in potential operational energy savings across the 20 bases visited by the AVT. Since 2013, the $1.2 million of JDI funding invested at 20 bases will yield approximately $20 million in discounted operational and energy savings over its life cycle, Clawson said.

Members of the AVT have extensive Air Force base level experience as well as working knowledge of the Automated Civil Engineering System, or ACES, and Interim Work Information Management System, or IWIMS, software programs. They work closely with base energy managers, engineers and maintenance personnel to discover and validate opportunities.

"I work diligently with the base personnel to find those opportunities and dive deep into any avenue possible to find those projects that are eligible for JDI funding for long term projects for the base," said Dr. Ivonne "Ivy" Bates, electrical engineer and AVT member, who led the recent spearfishing expedition at Malmstrom.

The challenge during spearfishing is to sift through existing documents such as sustainable infrastructure assessments and energy audit reports to evaluate opportunities and validate currency and viability, Bates said. The spearfishing team collects data from the assessments and reports to evaluate energy data and perform comparative analyses of report findings.

The team also looks for new energy products and opportunities for using renewable energy and innovative technologies. While spearfishing, the team looks at buildings on the demolition list to see if there are high payback opportunities associated with consolidation of base facilities. They look at light-emitting diode, or LED, technologies for both interior and exterior applications such as street and parking lot lighting as well as other energy-saving devices that would produce energy or operational savings for the base.

Col. Timothy Dodge, director of the Air Force Civil Engineer Center Operations Directorate, and Edwin "Ed" Bartlett, Jr., electrical engineer and AFCEC asset visibility team member, discuss opportunities for energy savings during a recent visit to Patrick Air Force Base, Florida. (U.S. Air Force Photo/Susan Lawson/Released)

AFCEC BEARs down on energy consumption

By Nathan Smith
AFCEC Public Affairs

Expeditionary bases are power intensive and, with power produced by diesel generators, require large amounts of fuel. This results in an additional logistics burden where lives are put at risk while supporting fuel convoys.

Reducing energy demand is a key priority of the Air Force Energy Plan's strategy, and the Air Force Civil Engineer Center's Readiness Directorate at Tyndall Air Force Base, Florida, is doing its part by improving the Basic Expeditionary Airfield Resources, or BEAR, program.

The BEAR program provides expeditionary base facilities and equipment for beddown of up to 3,300 Airmen in austere locations. AFCEC and the Air Force Research Lab out of Wright-Patterson Air Force Base, Ohio, have been evaluting ways to reduce energy usage through energy-efficient shelter systems.

AFCEC expeditionary modernization engineers Rodney Fisher and Richard Peck have assisted with the testing of the BEAR system in a variety of austere environments ranging from the dry Kuwaiti desert near Ali Al Salem Air Base to the damp jungles outside Andersen Air Force Base, Guam.

Through a combination of careful coordination with active-duty counterparts and the good fortune of avoiding severe storms, testing has proven successful with an anticipated reduction in expeditionary base energy consumption of about 4,000 gallons of fuel per day per unit, Fisher said.

"One of the main challenges is being able to monitor your systems," he added. "We had excellent support from civil engineer troops at the bases, so we could reach out to our support over there, and they would do daily checks for us."

One example of the refined system's success came during an exercise with the Air Force's Rapid Engineer Deployable Heavy Operational Repair Squadron Engineers, or RED HORSE. The new system cooled shelters in a 122-degree environment, allowing Airmen there on an unrelated exercise to convalesce in a much more bearable 75 degrees while reducing fuel consumption by about 55 percent.

Fisher and his team are still analyzing results from cold weather testing conducted earlier this year at Ellsworth Air Force Base, South Dakota, and a second round of desert testing at Holloman Air Force Base, New Mexico.

"We are really proud of the work Rod Fisher and Rich Peck have put in over the past several years to accomplish this innovative testing," said AFCEC Readiness Directorate Deputy Director Lt. Col. John Tryon. "The energy savings in the field provide direct warfighter support, because less fuel required equals fewer convoys, which means less time our service members need to be in harm's way."

Air Force expeditionary units are expected to begin fielding the new BEAR systems in 2019.

Shelters, such as this one on display at Tyndall Air Force Base, Florida, are used to house Airmen in contingency locations. Features designed to reduce energy use, such as a vestibule, hard door and shade fly, can reduce energy consumption as much as 63 percent. (U.S. Air Force photo/ Jennifer McCabe/Released)

Energy Express is a publication of the Air Force Civil Engineer Center, Detachment 1, Tyndall AFB, Florida.

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

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