

"Make Energy a Consideration in All We Do"

ENERGY express

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Advanced meters to help Air Force manage utilities

Jennifer Elmore
AFCESA/CEBH

When it comes to energy, the old axiom is true: "if you don't measure it, you can't improve it." That's why the Air Force is adding high-tech metering systems at 80 installations to measure electricity, gas, steam and water. A \$14.2 million contract was awarded last week to Benchmark Construction Inc. (the prime contractor), teamed with TolTest, Inc., to provide a standardized advanced meter reading system at 40 installations. The Air Force plans to award the remaining 40 next year. A combination of Wonderware and Itron software will be used as the foundation of the advanced meter reading system. The AMRS will manage utility data and provide critical information required by the Energy Independence and Security Act of 2007.

The award comes after several years of research and effort by engineers at the Air Force Civil Engineer Support Agency Tyndall Air Force Base, Fla., and the Air Force Civil Engineering Resource Division, Information Technology Branch, Pentagon, Washington, D.C., in partnership with the General Services Administration.

"This AMRS award is a major step in providing a powerful energy-saving capability to base energy managers," said Ken Walters, Conservation Branch chief at

AFCESA. "It also sets the stage for future integration with other systems."

Holloman AFB, N.M. and Beale AFB, Calif., will be the first to receive AMRS. Work will begin in September and is scheduled for completion in December. The AMRS will be standardized across all 80 installations, using one of two configurations – energy management control systems or wireless communication. Holloman and Beale will serve as test bases for deploying the AMRS: Beale collects meter data using an EMCS, while Holloman collects data using approved wireless communication.

The five-year contract includes design, installation of hardware and software, training, technical support, and system sustainment.

Walters says the AMRS may save the Air Force up to \$25 million a year in utility costs, and provide energy staffs the information needed to ensure buildings are operating as efficiently as possible. The AMRS is not only capable of measuring energy consumption, but also provides near real-time utility information, identifies anomalies, flags buildings that are performing out of normal range, and forecasts future consumption— all while eliminating the need to send someone out to read a meter.

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22 CES at McConnell AFB, Kan., installed this 4kW vertical axis wind generator earlier this year as an experiment. The test project is connected to the commercial grid along with the base's utilities shop to assist in powering lights. The generator can catch wind from all directions. (U.S. Air Force photo)



Advanced meters to help Air Force measure utilities continued...

Bases receiving advanced meter reading systems over the next two years. This is subject to change. The contractor will provide a detailed schedule with milestones and dates to AFCESA mid-October.

Year 1

Initial Configuration: Holloman AFB, NM
 Initial Configuration: Beale AFB, CA
 Altus AFB, OK
 Barksdale AFB, LA
 Buckley AFB, CO
 Cannon AFB, NM
 Cavalier AFS, ND
 Cheyenne Mountain, CO
 Columbus AFB, MS
 Creech AFB, NV
 Davis-Monthan AFB, AZ
 Dyess AFB, TX
 Ellsworth AFB, SD
 Edwards AFB, CA
 Fairchild AFB, WA
 FE Warren AFB, WY
 Goodfellow AFB, TX
 Grand Forks AFB, ND
 Hill AFB, UT
 Keesler AFB, MS
 Kirtland AFB, NM
 Little Rock AFB, AR
 Los Angeles AFB, CA
 Luke AFB, AZ
 Malmstrom AFB, MT
 McConnell AFB, KS
 Minot AFB, ND
 Mountain Home AFB, ID
 Nellis AFB, NV
 Offutt AFB, NE
 Peterson AFB, CO
 Schriever AFB, CO
 Scott AFB, IL
 Sheppard AFB, TX
 Travis AFB, CA
 Tinker AFB, OK
 USAF Academy, CO
 Vance AFB, OK
 Vandenberg AFB, CA
 Whiteman AFB, MO

Year 2

RAF Alconbury, England
 JB Andrews, MD
 Arnold AFB, TN
 Aviano AB, Italy
 Cape Canaveral AFB, FL
 JB Charleston, SC
 Clear AFS, AK
 Dover AFB, DL
 Eglin AFB, FL
 Eielson AFB, AK
 JB Elmendorf-Richardson, AK
 Hanscom AFB, MA
 Hurlburt AFB, FL
 Incirlik AB, Turkey
 Kadena AB, Japan
 Kunsan AB, South Korea
 Lackland AFB, TX
 Lajes AB, Portugal
 RAF Lakenheath, England
 JB Langley-Eustis, VA (2)
 Laughlin AFB, TX
 Macdill AFB, FL
 Maxwell AFB, AL
 JB McGuire-Dix-Lakehurst, NJ
 RAF Mildenhall, England
 Misawa AB, Japan
 Moody AFB, GA
 Osan AB, South Korea
 Patrick AFB, FL
 Ramstein AB, Germany
 Randolph AFB, TX
 Robins AFB, GA
 Seymour Johnson AFB, NC
 Shaw AFB, SC
 Spangdahlem AB, Germany
 Thule AB, Denmark
 Tyndall AFB, FL
 Wright Patterson AFB, OH
 Yokota AB, Japan

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The AMRS can be customized with base specific charts, graphs and gauges with real-time and historical meter data, and can provide reports, facility baselines and mock bills. The system can normalize for weather and collect stored data during a communication outage.

“For example, if a lightning strike causes a communication outage for an extended period of time, the AMRS has the ability to estimate the missing information, temporarily eliminating the data voids in your report,” said Mike Ringenberg, AFCESA’s meter program lead. “Once communication is restored, it can download stored data from the meter and overwrite the estimate if necessary. This feature significantly improves the quality of the data.”



The Air Force is set to begin testing a standardized advanced meter reading system which will manage utility data and provide critical information required by the Energy Independence and Security Act of 2007. The AMRS will save the Air Force at least \$25 million a year in utility costs, and provide energy staffs information needed to ensure buildings are operating as efficiently as possible. (U.S. Air Force photo)

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Wind Energy at Cape Cod to Save \$1 Million a Year

Amy Ausley
AFCEA/CEBH

The wind in Cape Cod, Mass., is about to be called into action once again to reduce energy costs and air pollution at the Massachusetts Military Reservation. The Cape Cod Air Force Station, located at the MMR, has some of the best wind resources on the property according to the Department of Energy and the Massachusetts Renewable Energy Research Lab. Air Force Space Command is preparing to install two 1.6 megawatt utility-scale wind turbines at the station's early warning radar site, called PAVE Phased Array Warning System; also known as PAVE PAWS.

Cape Cod AFS has some of the highest electricity costs in the Air Force at \$0.133 per kWh and uses about 13,000 MWh a year. The two turbines will offset over 50 percent of the station's annual electrical purchases. The economic benefit is expected to be \$1 million per year.

"The wind turbine project will help the Air Force meet its renewable energy goal of 25 percent by 2025," said Fox Theriault, AFSPC energy analyst and project manager. "The Air Force will get double credit for building a renewable energy project on the Air Force portion of the site and using the power in accordance with the Energy Policy Act of 2005."

In addition to saving money, the turbines will also help reduce pollution. Electricity for the area is usually produced by conventional fossil power plants which generate air pollution. Each wind turbine will reduce air emissions by over 1,000 metric tons of combined sulfur dioxide, nitrogen oxide, and carbon dioxide annually.

The project was funded from the FY12 Energy Conservation Investment Program and is expected to pay for itself within 12 years. That means the Air Force will receive free energy for the remainder

of the 20 to 25-year life span of the turbines.

The two new wind turbines join three others already in place at the MMR which are being used to power environmental remediation efforts.

The MMR is a military training facility located on the upper western portion of Cape Cod, Mass. It covers about 22,000 acres or approximately 30 square miles. The facility is used by various agencies including the Massachusetts Air and Army National Guard, the United States Air Force, and the United States Coast Guard.



Air Force Space Command is preparing to install two 1.6 megawatt utility-scale wind turbines at the Cape Cod Air Force Station, Mass., located at the Massachusetts Military Reservation. The new turbines will be similar to these two already in place at the MMR and will offset over 50 percent of the station's annual electrical purchases. (U.S. Air Force photo)

Electrical expert retires after 36 years of Air Force service

Amy Ausley
AFCESA/CEBH

Turn out the lights! After 36 years of federal service working in the electrical field, including the last eight as the Air Force's chief electrical engineer, Dr. Daryl Hammond officially retired on August 3, 2012.

Dr. Hammond enlisted in the Air Force right out of high school in 1971, and had the opportunity to learn the electrical skills that became the foundation for his engineering career.

"My shop chief at Spangdahlem made a comment that stuck with me," said Dr. Hammond. "We were working on a piece of equipment and I complained that it wasn't put together well and we should make some changes. The chief said, 'Well, Airman Hammond, that's a nice thought, but we can't make those changes because you're not an engineer.'"

So, he became one. After leaving the Air Force in 1977 as a Staff Sergeant, Dr. Hammond got his California state electrical contractor's license, began



Shown here is an example of the arc flash personal protection equipment worn today by Air Force electricians. The requirements for PPE were put into place after Dr. Daryl Hammond wrote the new guidelines for electrical safety in 2004. (U.S. Air Force photo/Eddie Green)



Dr. Daryl Hammond is retiring after 36 years as an Air Force electrician. As the Electrical Subject Matter Expert, Dr. Hammond was involved with developing service criteria for electrical safety, as well as working on energy security and emergency generator issues. (U.S. Air Force photo/Eddie Green)

his own business, and completed his bachelor's degree in electrical engineering. In 1982, he rejoined the Air Force as an officer and worked as an electrical engineer in both research and civil engineering and obtained a master's degree from the Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.

In 1992, Dr. Hammond changed uniforms, trading his blues for a civilian shirt and tie. While working at Tinker AFB, Okla., he completed his doctorate by attending Oklahoma State University part-time. During his 20 years of civil service, Dr. Hammond worked as an electrical engineer at base and major command levels and, for the last eight and a half years, at the Air Force Civil Engineer Support Agency, Tyndall AFB, Fla.

"AFCESA has a phenomenal Air Force-wide mission, giving engineers such as myself a once-in-a-lifetime opportunity to make a difference," he said.

Asked what part of his career he will remember the most, Dr. Hammond answered without hesitation, "Developing new guidelines for Air Force electrical workers, even though it was a hard sell to the career field. The new

guidance involved a change in the way electricians work on live circuits and change can be difficult."

"I was involved in the investigation of several electrical accidents that resulted in injury," he said. "Seeing an electrician so severely burned had a profound impact on me. One Airman so badly injured is one too many. I knew we had to work to prevent it."

Although they don't know it, Airmen and their families on bases everywhere have also benefited from Dr. Hammond's expertise, with his input on Air Force standards for street lighting, renewable energy, emergency generators, and energy security. And, he's worked to make sure the next generation of Air Force engineers and electricians are ready by influencing the curriculum and teaching classes at his alma mater, AFIT. He was an integral part of the largest AFIT satellite broadcast of an electrical safety class, with viewers from around the world.

He wrote numerous engineering technical letters, contributed to many Air Force instructions, and published over 20 technical and general articles during his career. In 2006, he won the Major General

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Augustus M. Minton Award for the most outstanding contribution to the Air Force Civil Engineer magazine for his article "Expanding the Envelope in Electrical Safety." He was also the Air Force Federal Engineer of the Year in 2005 and 2010.

Dr. Hammond credits much of his success at AFCESA to having the privilege of working with the electrical career field managers and with the outstanding electricians and technicians of the Civil

Engineer Maintenance, Inspection and Repair Team.

"As a base-level electrical engineer, I learned to value the technical expertise CEMIRT provides. And, I always tell new civil engineers and electricians to build a good relationship with the career field managers," said Dr. Hammond. "Their leadership skills are amazing, so utilize their expertise. Never be too proud to say 'I need help' or 'I don't get it.'"

After such a long and dedicated Air Force career, there are mixed emotions about retirement.

"It's a bittersweet feeling. There's no question I'll miss being able to advocate for the career field and working with the many fine people in the civil engineer community. On the other hand, I'm looking forward to retirement, pursuing some of my other interests and especially spending time with the grandchildren, hopefully being a positive influence in their lives."

Large solar array planned for Davis-Monthan AFB

Jennifer Elmore
AFCESA/CEBH

The Air Force plans to expand its renewable energy portfolio substantially with a 14.5-megawatt photovoltaic solar array at Davis-Monthan Air Force Base, Ariz. The base has entered into an agreement with SunEdison, LLC to design, finance, build, operate and maintain the array on 170 acres of underutilized base property. Construction will begin soon with completion planned for no later than December 2012.

The power purchase agreement will provide electricity to Davis-Monthan at a reduced rate for a period of 25 years saving the base from \$400,000 to \$500,000 a year in utility costs. The project will provide 35 percent of the energy needed to power Davis-Monthan. It will be slightly larger than the Nellis AFB, Nev., photovoltaic solar array built in 2007.

According to Ken Gray, the Energy Rates and Renewables Branch chief at the Air Force Civil Engineer Support Agency, Tyndall AFB, Fla., the array has to be built and generating electricity by the end of the year.

"The project as it was conceived, contracted and offered to us is only viable and can only be done cost effectively for SunEdison if they can participate in a program to sell the Renewable Energy Certificates (RECs) to Tucson Electric Power. That program ends the 31st of December 2012," said Gray.

Purchasing RECs helps Tucson Electric Power meet state renewable portfolio standards and receive federal tax incentives. A REC is sold or traded as an environmental commodity. The REC owner is credited with purchasing renewable energy.

The Air Force currently operates 131 solar, wind, waste-to-energy and landfill gas projects, which help meet goals established by the Energy Policy Act 2005 and Executive Order 13423. It has plans to build 30 new projects by the end of 2013 – not an easy task.

The Davis-Monthan solar array required the first Department of Defense approval for an Air Force project of this type. Gray said complying with the National Environmental Policy Act, known as

NEPA, process is also challenging in Arizona where many historical Native American areas exist.

"Getting this project through the developmental stage has highlighted areas where we need to improve our process of gaining approval and authority to do our renewable energy projects," said Gray. "We think lessons learned during the development of this project will allow us to shorten execution time by six months." Planning the Davis-Monthan solar array began as early as 2007.

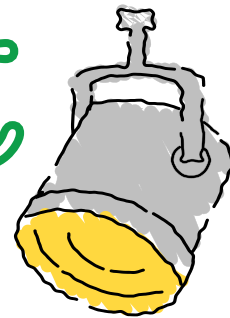
The Air Force is also planning a six-megawatt solar array at Otis Air National Guard Base, Mass., and a 10-megawatt solar array at Joint Base McGuire-Dix-Lakehurst, N.J. "We expect to have these awarded in FY13," said Gray.



The new 14.5-megawatt photovoltaic solar array at Davis-Monthan Air Force Base, Ariz. will join other solar projects at the base already in place for base housing. Completion of the project is expected by December 2012 and will provide 35 percent of the base's power needs. (U.S. Air Force Photo /Staff Sgt Jacqueline Romero)



Spotlight on Success



RE Playbook revision

AFCESA is working with A7CIS to revise and update the current Renewable Energy Playbook. The team is updating the process maps (flow charts) and section narratives for RE project identification and Power Purchase Agreement implementation to incorporate the latest policy and procedural changes. The estimated completion date for on-line implementation is September 30, 2012. (Mr. Cade, AFCESA/CENR, DSN 523-6463)

Process energy project at Tinker

Tinker AFB Civil Engineering, DMAG, AFMC, A7C/A4D and AFCESA personnel held a teleconference to discuss the Utility Energy Service Contract Preliminary Audit (PA) for Bldg 3001. It is a 70-year-old, 2.75 million square foot facility that contains numerous industrial processes and accounts for approximately 18 to 20 percent of base energy use. The PA identified several facility energy opportunities but lacks process energy initiatives, a main objective of this effort. The utility will be advised to concentrate efforts on process energy initiatives/savings during the feasibility study. (Mr. Martin, AFCESA/CENI, DSN 523-6475)

Utility Rate Management Team negotiates Vance Air Force Base power options

URMT and Vance AFB met with Oklahoma Gas and Electric to discuss options for Vance's South West Power Authority federal hydropower allocation under changing utility regulations and the new Southwest Power Pool. Since SWPA is not a SPP member, OG&E is the only option to deliver the hydropower or the Air Force will lose the 5.9MW allocation of electricity. OG&E agreed to deliver the SWPA power. Contract development is ongoing – in place by May 2013. (Ms. Coleal, AFCESA/CENR, DSN 523-6295)

Utilities Privatization project kickoff at Holloman

AFCESA/CENU, ACC/A7COE, GSA and AECOM Technology Corporation conducted a UP kickoff briefing to Holloman AFB leadership on August 28, 2012. AECOM will begin collecting data to support development of the UP Requests for Proposal J Sections for the electric system, the UP Government Should Cost Estimate and the UP Technical Library. (Mr. Giniger, AFCESA/CENU, DSN 523-6398)

Links You Can Use

Algae to Biofuel Video

<http://www.youtube.com/watch?v=fqjD5ztTMYQ&feature=plcp>

Tinker Energy Competition

<http://www.tinker.af.mil/news/story.asp?id=123314784>

Team Seymour Leads ACC In Energy Conservation

<http://www.acc.af.mil/news/story.asp?id=123316468>

Laughlin Reduces Energy

<http://www.aetc.af.mil/news/story.asp?id=123289381>

17th SFS Energy Efficient Roof Increases Savings

<http://www.aetc.af.mil/news/story.asp?id=123307951>



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